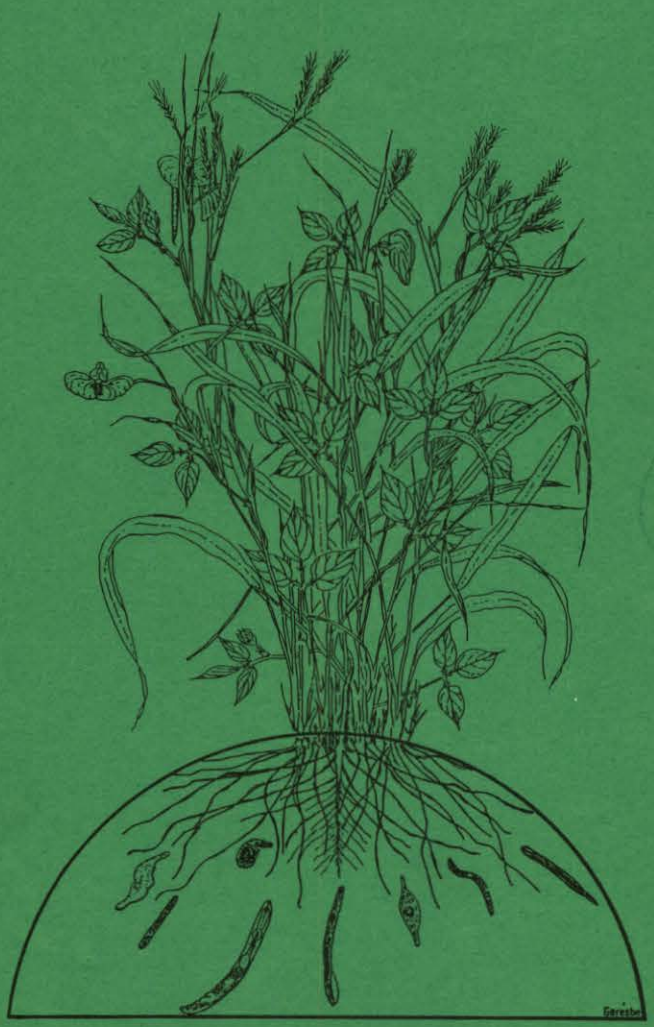
NEMATODES OF FORAGE LEGUMES AND GRASSES

Catalogue and Bibliography 1961–1985

Compiled by Julie M. Stanton and Nora Rizo P.



C·A·B INTERNATIONAL

CIAT

INTERNATIONAL CENTER FOR TROPICAL AGRICULTURE

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CONTENTS

INTRODUCTION

Beef and milk are staple food commodites in the diet of the people of tropical America. Generally, demand for beef and milk increases more rapidly in tropical American countries than does production. This leads to an increase in beef and milk prices which reduces the nutritional and economic status of low income groups. So, there is an ever increasing need to improve production of beef and milk. This can be done by increasing the output of areas already under production as well as by opening up new land for production. In recent years, due to the need to improve animal productivity in the tropics of Latin America, there has been a growing interest in forage species that are adapted to the acid, low fertility soils in areas that have unrealized potential for cattle production. Despite achievements in finding pasture species for this purpose, new problems have arisen. One biotic constraint to pasture production in tropical areas which has been little studied is that of damage to plants by plant parasitic nematodes.

Plant parasitic nematodes have been recognized since World War 2 in the developed world as being a major constraint to crop production. This awareness did not follow simultaneously in developing countries as there were very few trained nematologists to recognize problems which did exist and to take steps to control them.

There have been several attempts aimed at improving knowledge of nematodes in developing countries. Notable among these has been the International Meloidogyne Project based at North Carolina State University. The project was entitled "Research on Integrated Crop Protection Systems with Emphasis on the Root-Knot Nematodes (*Meloidogyne* spp.) Affecting Economic Food Crops in Developing Nations".

The Caribbean Symposium on Nematodes of Tropical Crops held in April 1968 recommended that all Governments and Inter-Government Agencies concerned with the Caribbean and other tropical regions:

1) Encourage the establishment of training courses or workshops in national or regional centres.

2) Develop and intensify the extension or advisory services so as to improve the control of plant nematodes.

3) Place increasing emphasis on the solution of the more practical and urgent problems which are caused by plant nematodes.

4) Establish or improve national and regional quarantine services to prevent the introduction and further spread of nematodes which present special threats to food and other economic crops (Peachey, 1969).

The need has arisen to make comprehensive information available to scientists in pasture research, and particularly to those with limited access to literature and/or information services.

This catalogue and bibliography aims to collect much of the information which has been published on nematode problems of plant species that are used as forage in developing countries.

ORGANIZATION

This publication is divided into two Sections: (Section 1) a Catalogue, and (Section 2) a Bibliography and List of References to First Records.

Section 1: Catalogue

This list of nematodes that reproduce on forage legumes and grasses, or which have been associated with damage to the plant, is organized as follows:

The first column includes, in alphabetical order, the scientific names of tropical forage grasses and legumes. This list is based on Mejia (1984).

The second column lists nematodes which reproduce on, or are associated with, each forage species.

The third column includes the countries where the plant/nematode relationship has been studied.

The last two columns are indices. The fourth refers to an abstract number within the Bibliography. The fifth refers to the List of References to First Records (see Section 2B). When a number in the fifth column is followed by a second number in parentheses, the first indicates the original reference, and the second a reference in which a change in the name of the nematode is reflected. The name in current use is indexed and used throughout this publication. Where the acronym "CIP" appears in the fifth column, this indicates that the reference came from records of the CAB International Institute of Parasitology, St. Albans, UK.

Section 2: Bibliography and List of References to First Records

Section 2A

The Bibliography contains 840 abstracts of publications on nematodes, compiled from **Helminthological Abstracts**[1] (1961-1985). To facilitate the use of this work, an alphabetical index of authors and co-authors is included. The number appearing next to the name of each author in the index corresponds with the abstract in the Bibliography. Abstracts preceded by an asterisk (*) are held in CIAT's library. All documents cited can be found in the CABI collection.

Section 2B

A list of 308 References to First Records follows. This list, derived from Goodey *et al.* (1965), includes only first records of associations where nematodes reproduced on plants.

1. **Renamed Helminthological Abstracts Series B - Plant Nematology** from Volume 39 (1970).

ABBREVIATIONS USED IN THIS PUBLICATION

Ang.	*Anguina*
Aph.	*Aphelenchoides*
Bel.	*Belonolaimus*
Dit.	*Ditylenchus*
Helico.	*Helicotylenchus*
Het.	*Heterodera*
Hop.	*Hoplolaimus*
Mel.	*Meloidogyne*
Prat.	*Pratylenchus*
Rad.	*Radopholus*
Trich.	*Trichodorus*
Xiph.	*Xiphinema*

ACKNOWLEDGEMENTS

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REFERENCES CITED IN INTRODUCTION

Goodey, J.B.; Franklin, M.T.; Hooper, D.J. 1965. "T. Goodey's The nematode parasites of plants, catalogued under their hosts." Farnham Royal, England, Commonwealth Agricultural Bureaux (CAB). iv + 214 pp.

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Mejia, M. 1984. Scientific and common names of tropical forage species. Cali, Colombia, Centro Internacional de Agricultura Tropical, CIAT. 75 pp.

Peachey, J.E., ed. 1969. Nematodes of tropical crops. Tech. Comm. No. 40. Farnham Royal, England, Commonwealth Agricultural Bureaux (CAB). 355 pp.

SECTION 1

Catalogue of Nematode Parasites and Their Hosts

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ACACIA ARMATA	Telotylenchus whitei	Australia	756	-
ACACIA AURICULIFORMIS	Tylenchorhynchus microconus	India	25	-
ACACIA BAILEYANA F. Muell.	Mel. arenaria	-	-	200
	Mel. javanica	-	-	200
	Mel. sp.	-	-	39
ACACIA CORNIGERA Willd.	Rad. similis	-	-	298
ACACIA CULTRIFORMIS Cunn.	Mel. arenaria	-	-	200
	Mel. sp.	-		39
ACACIA CUNNINGHAMII Hook.	Mel. javanica	-	-	64
ACACIA CYANOPHYLLA Lindl.	Mel. hapla	-	-	213
	Mel. javanica	-	-	102
ACACIA DEALBATA Link	Mel. javanica	India	116	-
		-	-	202
	Mel. sp.	-	-	23
ACACIA DECURRENS Will.	Helico. dihystera	-	-	145
	Mel. javanica	-	-	185
ACACIA ELATA A. Cunn.	Mel. javanica	-	-	201
ACACIA FISTULA	Paratrophurus kenanae	Sudan	204	-
ACACIA GLAUCOCARPA Maid. & Blakely	Mel. incognita	-	-	64
ACACIA GLAUCOPHYLLA Stend.	Mel. sp.	-	-	152
ACACIA KOA	Mel. sp.	USA	695	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ACACIA LONGIFOLIA Willd. v. FLORIBUNDA	Mel. sp.	-	-	39
ACACIA MELANOXYLON R. Br.	Mel. javanica	Australia	81	-
	Mel. sp.	-	-	39
ACACIA MERSII DeWild.	Mel. arenaria	-	-	202
	Mel. incognita	-	-	303
	Mel. javanica	Zimbabawe	792	-
ACACIA MYRTIFOLIA (Sm.) Willd.	Mel. javanica	-	-	64
ACACIA PODALYRIAEFOLIA Cunn.	Mel. javanica	-	-	200
	Mel. sp.	-	-	39
ACACIA PRUINOSA A. Cunn.	Helico. dihystera	-	-	145
	Prat. loosi	-	-	143
ACACIA PUGIONIFORMIS Wendl.	Mel. arenaria	-	-	64
ACACIA SALIGNA Wendl.	Mel. sp.	-	-	39
ACACIA SEYAL Del.	Paratrophurus kenanae	Sudan	204	-
ACACIA XANTOPLOEA	Xiph. zulu	South Africa	66	-
ACACIA sp.	Het. glycines	-	-	242
	Mel. sp.	-	-	23
	Prat. vulnus	-	-	154
	Rad. rotundisemensus	Australia	658	-
	Rad. vangundyi	Australia	658	-
	Rad. vertexplanus	Australia	658	-
	Rotylenchulus parvus	Somalia	656	-
	Xiph. dimorphicaudatum	South Africa	704	-
AESCHYNOMENE ABYSSINICA Valka	Mel. sp.	-	-	151

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
AESCHYNOMENE AMERICANA L.	Mel. arenaria	Australia	838	-
		-	4	-
	Mel. hapla	Australia	4	-
	Mel. incognita	Australia	838	-
		-	4	-
	Mel. javanica	Australia	838	-
		-	4	-
AESCHYNOMENE EVENIA Wright	Mel. javanica	Brazil	840	-
AESCHYNOMENE MINUTIFLORA Taub.	Mel. sp.	-	-	66
AESCHYNOMENE RHODESIACA Harms.	Mel. sp.	-	-	151
ALBIZZIA CHINENSIS (Osbeck) Merr.	Mel. javanica	-	-	200
ALBIZZIA DISTACHYA	Mel. javanica	Australia	81	-
ALBIZZIA FALCATA (L.) Backer	Mel. incognita	India	341	-
	Mel. sp.	-	-	39
	Prat. coffeae	-	-	91
ALBIZZIA JULIBRISSIN Durazz.	Mel. arenaria	-	-	251,261
	Mel. incognita	-	542,585	105
	Mel. javanica	-	-	105
	Trich. primitivus	-	-	243
ALBIZZIA LEBBECK (L.) Benth.	Mel. incognita	India	341	-
	Mel. javanica	-	-	200
	Mel. sp.	-	-	104
	Rad. similis	-	-	52
ALBIZZIA MARANGUENSIS	Mel. incognita	India	341	-
ALBIZZIA MOLUCCANA Miq.	Mel. sp.	-	-	306

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ALBIZZIA ODORATISSIMA (L.f.) Benth.	Mel. incognita	India	341	-
ALBIZZIA PROCERA	Mel. incognita	India	341	-
ALBIZZIA RICHARDIANA	Mel. incognita	India	341	-
ALBIZZIA STIPULATA Boiv. von Steenis	Mel. sp.	-	-	104
ALBIZZIA SUMATRANA von Steenis	Mel. javanica	-	-	296
	Prat. loosi	-	-	143
ALTERNANTHERA BRASILANA Kuntze	Prat. coffeae	-	-	91
ALTERNANTHERA DENTICULATA R. Br.	Mel. javanica	-	-	64
ALTERNANTHERA FICOIDEA (L.) R. & S.	Mel. javanica	-	-	64
ALTERNANTHERA NANA R. Br.	Mel. incognita	-	-	64
ALTERNANTHERA PHILOXEROIDES Griseb.	Mel. sp.	-	-	235
ALTERNANTHERA POLYGONOIDES	Mel. javanica	Brazil	28	-
ALTERNANTHERA PUNGENS H. B. & K.	Mel. javanica	-	-	201
ALTERNANTHERA REPENS (L.) O.Kuntze	Mel. incognita	-	-	64
	Mel. javanica	-	-	199
	Mel. sp.	-	-	153
ALTERNANTHERA SESSILIS R. Br.	Mel. sp.	-	-	90
	Prat. coffeae	-	-	91
ALTERNANTHERA sp.	Mel. incognita	-	-	138,187

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
(A. RUGOSUS DC.)	Mel. hapla	Australia	838	-
(A. VIOLACEUS (Forsk.) Schindler)	Mel. incognita	Australia	838	-
	Mel. javanica	Australia	838	-
ALYSICARPUS VAGINALIS (L.) DC.	Mel. arenaria	Australia	838	-
		-	-	199
ANDROPOGON GAYANUS Kunth.	Aph. sp.	Brazil	33	-
	Criconemoides sp.	Nigeria	836	-
	Dit. sp.	Brazil	33	-
	Helico. cavenessi	Nigeria	836	-
	Helico. digonicus	Brazil	33	-
	Helico. pseudorobustus	Nigeria	836	-
	Hemicriconemoides cocophillus	Nigeria	836	-
	Hemicriconemoides oostenbrinki	Nigeria	836	-
	Hemicycliophora oostenbrinki	-	-	187
	Macrophosthonia ornata	Brazil	33	-
	Prat. brachyurus	Brazil	33	-
	Scutellonema clathricaudatum	Nigeria	836	-
	Tylenchorhynchus martini	Nigeria	836	-
	Tylenchus sp.	Brazil	33	-
	Xiph. ebriense	Nigeria	836	-
	Xiph. nigeriense	Nigeria	836	-
ANDROPOGON GERANDI	Bel. sp.	USA	123	-
	Helico. dihystera	USA	-	-
ANDROPOGON NARDUS L.	Mel. incognita	-	-	218
ANDROPOGON NARDUS L.v. FLEXUOSUS	Prat. coffeae	-	-	91
ANDROPOGON NARDUS L.v. GENUINUS	Prat. coffeae	-	-	91
ANDROPOGON PERTUSUS Willd.	Nothanguina cecidoplastes	-	-	122
ANDROPOGON RHIZOMATUS	Tylenchulus semipenetrans	USA	681	-
ANDROPOGON SCHOENANTHUS L.	Mel. sp.	-	-	36

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ANDROPOGON SORGHUM Brot.	Mel. sp.	-	-	151
	Prat. coffeae	-	-	91
ANDROPOGON SORGHUM Brot. v. AMBER Cane	Mel. sp.	-	-	180
ANDROPOGON SORGHUM Brot. v. CAUDATUS Bailey	Rotylenchulus reniformis	-	-	294
ANDROPOGON SORGHUM Brot. v. TECHNICUM Bailey	Mel. sp.	-	-	91
ANDROPOGON TECTORUM Schum. & Thonn.	Rad. nigeriensis	Nigeria	658	-
ANDROPOGON VIRGINICUS Trin.	Prat. spp.	-	-	125
ANDROPOGON ZIZANOIDES Urb.	Prat. coffeae	-	-	91
AQUILEGIA CAERULEA James	Prat. penetrans	-	-	227
AQUILEGIA LONGISSIMA Hort.	Aph. ritzemabosi	-	-	278
AQUILEGIA VULGARIS L.	Aph. ritzemabosi	New Zealand	122	-
	Mel. incognita	-	-	200
AQUILEGIA sp.	Aph. sp.	-	-	176
	Mel. sp.	-	-	40
ARACHIS L. sp.	Aphasmatylenchus straturatus	Upper Volta	38	-
	Dit. destructor	-	-	301
	Mel. hapla	-	503	-
	Scutellonema cavenessi	Senegal	38	-
AXONOPUS AFFINIS Chase	Mel. arenaria	-	-	192
	Mel. incognita	-	-	192

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
AXONOPUS AFFINIS Chase (Cont'd))	Mel. sp.	-	-	189
	Rad. similis	-	-	87
AXONOPUS COMPRESSUS (Swartz) Beauv.	Helico. pseudorobustus	Nigeria	836	-
	Hemicriconemoides cocophillus	Nigeria	836	-
	Het. sacchari	Nigeria	836	-
	Het. schachtii	Nigeria	424	-
	Het. sp.	Nigeria	836	-
	Prat. sp.	Nigeria	836	-
	Scutellonema clathricaudatum	Nigeria	836	-
	Tylenchorhynchus martini	Nigeria	836	-
	Xiph. ifacolum	Nigeria	836	-
AXONOPUS sp.	Criconemoides mutabilis	-	-	217
BAUHINIA THONNINGII Schum.	Mel. sp.	-	-	150
BAUHINIA VARIEGATA L.	Mel. javanica	-	-	201
BRACHIARIA BRIZANTHA (Hochst. ex A. Rich) Stapf (PANICUM BRIZANTHUM Hochst.)	Het. schachtii	-	424	-
	Tylenchorynchus martini	Nigeria	836	-
BRACHIARIA DECUMBENS Stapf	Aph. sp.	Brazil	839	-
	Criconemoides sp.	Brazil	839	-
	Paratrichodorus minor	Brazil	839	-
	Trich. sp.	Brazil	839	-
BRACHIARIA DEFLEXA (Schum.) C.E. Hubbard	Mel. sp.	-	-	79
BRACHIARIA FULVA	Telotylenchus baoulensis	Ivory Coast	596	-
BRACHIARIA MILIIFORMIS (Presl.) Chase	Mel. javanica	-	-	64

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
BRACHIARIA MUTICA (Forsk.) Stapf.	Aph. sp.	Brazil	839	-
	Dolichodorus nigeriensis	Nigeria	836	-
	Helico. dihystera	Brazil	839	-
		Nigeria	836	-
	Helico. pseudorobustus	Nigeria	836	-
	Hemicriconemoides cocophillus	Nigeria	836	-
	Macroposthonia sp.	Brazil	839	-
	Paratrichodorus minor	Brazil	839	-
	Prat. brachyurus	Brazil	839	-
	Prat. zeae	Brazil	583	-
	Prat. sp.	Nigeria	836	-
	Scutellonema clathricaudatum	Nigeria	836	-
	Tylenchorhynchus sp.	Nigeria	836	-
	Xiph. ifacolum	Nigeria	836	-
BRACHIARIA RUZIZIENSIS Germ. & Evrard (B. EMINII Mez.)	Mel. sp.	Madagascar	642	-
CAJANUS CAJAN (L.) Millsp. (C. FLAVUS DC)	Basiria graminophila	India	-	CIP
	Clavilenchus sp.	India	-	CIP
	Filenchus sp.	India	-	CIP
	Helico. dihystera	Trinidad	829	-
		USA	178	-
		-	203	-
	Helico. microcephalus	Malawi	-	CIP
	Helico. talonus	Malawi	-	CIP
	Helico. sp.	India	-	CIP
	Hemicriconemoides cocophillus	India	-	CIP
	Hemicycliophora sp.	India	-	CIP
	Het. cajani	India	95,256,668	
		-	253,540,580	-
	Het. trifolii	India	748	-
	Hop. galeatus	USA	178	-
		-	203	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CAJANUS CAJAN (Cont'd)	Hop. seinhorsti	Nigeria	502	-
	Macrophosthonia ornata	India	-	-
	Malenchus sp.	India	-	-
	Mel. arenaria	Australia	838	CIP
		USA	178	-
	Mel. hapla	Australia	838	-
		-	-	303
	Mel. incognita	Australia	838	-
		Trinidad	829	-
			203,253,753, 761	64,187
	Mel. javanica	Australia	838	-
		Brazil	840	
		Puerto Rico	782	-
		-	-	64
		-	-	183
	Mel. sp.	-	364	23
	Nothotylenchus sp.	India		
	Ottolenchus sp.	India	-	CIP
	Prat. brachyurus	USA	178	-
		-	203	-
	Prat. scribneri	USA	178	-
		-	203	-
	Prat. sudanensis	Sudan	342	-
	Prat. thornei	India	-	CIP
	Prat. zeae	India	-	CIP
	Prat. sp.	Malawi	-	-
	Prat. sp.	Trinidad	829	-
	Rad. similis	-	-	10,43

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CAJANUS CAJAN (Cont'd)	Rotylenchus secondus	India	372	CIP
	Rotylenchulus reniformis	Jamaica	634	-
		Malawi	-	-
		Puerto Rico	757	-
		Trinidad	829	-
		-	697,753,761	180
	Scutellonema magniphasmum	Malawi	-	-
	Trich. christiei	USA	178	-
	Trich. sp.	-	203	-
	Tylenchorhynchus claytoni	USA	178	-
		-	203	-
	Tylenchorhynchus elegans	India	-	CIP
	Tylenchorhynchus sp.	India	-	CIP
		Trinidad	829	-
	Xiph. campinense	-	-	183
	Xiph. lambertii	India	355	-
CALOPOGONIUM CAERULEUM Benth.	Mel. javanica	Brazil	840	-
CALOPOGONIUM MUCONOIDES Desv.	Mel. arenaria	-	-	119
	Mel. incognita	-	-	119
	Mel. javanica	Colombia	51	-
	Mel. sp.	-	-	21
	Prat. coffeae	-	-	18
	Rad. similis	-	-	18
CANAVALIA ENSIFORMIS (Jacq.) DC.	Het. glycines	-	-	242
	Mel. incognita acrita	-	-	187
	Mel. javanica	Brazil	431,840	-
	Mel. sp.	-	-	23
	Prat. brachyurus	-	-	187
CANAVALIA GLADIATA DC.	Mel. incognita	-	-	187
	Mel. javanica	Brazil	840	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CANAVALIA GLADIATA DC.	Mel. sp.	-	-	173
CANAVALIA OBTUSIFOLIA DC	Mel. incognita	Brazil	840	-
CASSIA ABSUS L.	Mel. incognita	-	-	187
	Mel. javanica	-	-	196
	Prat. brachyurus	-	-	187
CASSIA ALATA L.	Mel. javanica	Brazil	840	-
CASSIA ARTEMESIOIDES Gaudich	Mel. sp.	-	-	4
CASSIA CHAMAECRISTA L.	Prat. brachyurus	-	-	203
CASSIA DIDYMOBOTRYA Fresen.	Prat. loosi	-	-	143
CASSIA FLORIBUNDA Hort.	Mel. sp.	-	-	39
CASSIA GORATENSIS Fres.	Mel. sp.	-	-	152
CASSIA HIRSUTA L.	Helico. sp.	-	-	187
	Mel. incognita	-	-	187
	Prat. brachyurus	-	-	187
CASSIA KIRKII Oliv.	Mel. arenaria	-	-	199
	Mel. javanica	-	-	199
CASSIA LAEVIGATA Willd.	Prat. coffeae	-	-	91
CASSIA MIMOSOIDES L.	Mel. incognita	-	-	64,187
	Mel. javanica	-	-	64
	Mel. sp.	-	-	19
	Prat. coffeae	-	-	91
	Prat.? pratensis	-	-	123

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CASSIA OBOVATA Collad.	Mel. sp.	-	-	263
CASSIA OBTUSIFOLIA	Mel. javanica	Brazil	431	-
CASSIA OCCIDENTALIS L.	Mel. arenaria	-	-	193
	Mel. incognita	-	-	187
	Mel. sp.	-	-	108
	Prat. ? pratensis	-	-	123
CASSIA SIAMESA Lamk.	Helico. sp.	-	-	187
	Mel. incognita	-	-	187
CASSIA SOPHERA	Mel. javanica	India	392	-
CASSIA TORA L.	Mel. arenaria	-	-	193
	Mel. incognita	-	422	-
	Mel. javanica	-	-	221
	Mel. sp.	-	-	15
	Prat. coffeae	India	604	-
	Rotylenchulus reniformis	-	-	273
CASSIA sp.	Het. glycines	-	-	242
CENCHRUS BIFLORUS Roxb.	Hemicycliophora paradoxa	-	-	187
CENCHRUS CILIARUS L. (PENNISETUM CILIARE L. Link.)	Helico. dihystera	India	49	-
	Mel. javanica	-	-	198
	Rad. brevicaudatus	Australia	564	-
CENCHRUS ECHINATUS L.	Mel. sp.	-	-	231

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CENTROSEMA PLUMIERI (Turp. ex Pers.) Benth. (CLITORIA PLUMIERI Turp.)	Mel. incognita	-	-	187
	Mel. sp.	-	-	40
CENTROSEMA PUBESCENS Benth.	Helico. sp.	-	-	187
	Macroposthonia fernei	Nigeria	-	-
	Mel. incognita	-	-	187
	Mel. sp.	-	-	21
	Paratylenchus sp.	-	-	187
	Prat. brachyurus	-	-	187
	Prat. coffeae	-	-	18
	Pseudhalenchus sp.	-	-	-
	Rad. similis	-	-	18
CENTROSEMA VIRGINIANUM (L.) Benth.	Mel. sp.	-	-	35
CENTROSEMA DC. Benth (hybrid)	Mel. javanica	Colombia	51	-
CHLORIS GAYANA Kunth.	Bel. longicaudatus	USA	563	-
	Helico. cavenessi	Nigeria	836	-
	Helico. dihystera	Nigeria	836	-
	Helico. pseudorobustus	Nigeria	836	-
	Hop. pararobustus	Nigeria	836	-
	Longidorus cohni	Israel	548,609	-
	Macroposthonia coomansi	Congo	687	-
	Mel. acronea	-	-	120
	Mel. incognita	-	-	177
	Mel. javanica	-	-	177
	Mel. sp.	-	-	40
	Prat. brachyurus	Nigeria	836	-
	Prat. thornei	Australia	47	-
	Rotylenchulus reniformis	Nigeria	836	-
	Scutellonema brachyurum	Zimbabwe	-	CIP
	Scutellonema clathricaudatum	Nigeria	836	-
	Xiph. ifacolum	Nigeria	836	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CHLORIS PYCNOTHRIX Trin.	Mel. sp.	-	-	150
CHLORIS VIRGATA Sw.	Mel. javanica	-	-	199
CICER ARIETINUM L.	Het. goettingiana	-	-	52
	Het. schachtii	-	-	68
	Het. trifolii	-	-	114
	Hop. dimorphicus	India	372,834	-
	Hop. sharafati	India	601	-
	Mel. incognita	India	102	-
		-	169,738,828	-
	Mel. javanica	India	100	-
		-	98,99,708	-
	Mel. sp.	-	738	23
	Rotylenchulus reniformis	-	-	80
	Tylenchorhynchus vulgaris	India	384	-
	Tylenchorhynchus sp.	India	101	-
	Tylenchus sp.	India	101	-
CICER SONGARICUM Steph.	Het. trifolii	-	-	223
CLITORIA TERNATEA L.	Helico. sp.	-	-	187
	Mel. javanica	Brazil	840	-
		-	-	182
	Mel. sp.	-	-	79
	Prat. brachyurus	-	-	187
CLITORIA L. sp.	Mel. sp.	-	-	21
CROTALARIA ANAGYROIDES H.B. & K.	Mel. sp.	-	-	82
	Prat.? pratensis	-	-	97
	Rotylenchulus reniformis	-	-	80
	Scutellonema bradys	-	-	187

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CROTALARIA ANTHYLLOPSIS Welw.	Mel. sp.	-	-	150
CROTALARIA ASTRAGALINA Hochst.	Helico. sp.	-	-	187
CROTALARIA BEQUAERTII Bak. f.	Mel. sp.	-	-	152
CROTALARIA BONGENSIS Bak. f. v. SHIRENSIS	Mel. sp.	-	-	151
CROTALARIA CLARKEI Gamble	Helico. dihystera	-	-	145
CROTALARIA FERRUGINEA R. Grah.	Het. glycines	-	-	242
CROTALARIA HISLOPII Horbisley	Mel. sp.	-	-	151
CROTALARIA HYSSOPIFOLIA Klotzsch	Mel. sp.	-	-	151
CROTALARIA INCANA L.	Het. glycines	-	-	242
CLOTALARIA INTERMEDIA Kotschy	Het. glycines	-	-	242
	Mel. hapla	-	-	178
	Mel. incognita	-	-	178
	Mel. javanica	-	-	75
	Prat. brachyurus	-	-	187
CROTALARIA JUNCEA L.	Helico. cavanessi	Nigeria	836	-
	Helico. dihystera	Nigeria	836	-
	Helico. pseudorobustus	Nigeria	836	-
	Helico. sp.	Papua & New Guinea	-	CIP
	Het. glycines	-	-	242
	Hop. sharafati	India	601	-
	Lobocriconema rara	Thailand	447	-
	Mel. arenaria	-	-	177
	Mel. hapla	-	-	177

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CROTALARIA JUNCEA L.(Cont'd)	Mel. incognita	-	-	177
	Mel. javanica	-	-	75
	Mel. sp.	-	-	23
	Peltamigratus nigeriensis	Nigeria	836	-
	Prat. brachyurus	-	-	187
	Prat. coffeae	-	-	91
	Prat. vulnus	-	-	154
	Prat. sp.	Nigeria	836	-
	Rotylenchulus reniformis	-	-	232
	Scutellonema clathricaudatum	Nigeria	836	-
	Xiph. longicaudatum	Nigeria	836	-
CROTALARIA LANCEOLATA E. Mey.	Het. glycines	-	-	242
	Mel. arenaria	-	-	178
	Mel. hapla	-	-	178
	Mel. incognita	-	-	178
	Mel. javanica	-	-	178
CROTALARIA LONGITHYRSA E. G. Baker	Criconemoides onoensis	-	-	187
	Helico. sp.	-	-	187
	Prat. brachyurus	-	-	187
CROTALARIA MUCRONATA Desv. (C. STRIATA DC.)	Helico. sp.	-	-	187
	Het. glycines	-	-	242
	Mel. hapla	-	-	64
	Mel. incognita	Brazil	28	-
	Mel. sp.	-	-	39
	Prat. sp.	-	-	125
	Rotylenchulus reniformis	-	-	232
CROTALARIA OCHROLEUCA G. Don.	Het. glycines	-	-	242
	Mel. arenaria	-	-	199
CROTALARIA OCHROLEUCA G. Don v. PHLLIPSI	Mel. arenaria	-	-	209
	Mel. hapla	-	-	201

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CROTALARIA OCHROLEUCA (Cont'd)	Mel. incognita acrita	-	-	201
CROTALARIA PAULINA Schrank	Mel. hapla	-	-	178
	Mel. javanica	Brazil	840	-
CROTALARIA RETUSA L.	Helico. sp.	-	-	187
CROTALARIA RHODESIAE E. G. Baker	Het. glycines	-	-	242
CROTALARIA SALTIANA Andrews	Het. glycines	-	-	242
	Mel. sp.	-	-	108
	Prat. ? pratensis	-	-	123
CROTALARIA SPECTABILIS	Mel. javanica	-	-	201
	Prat. brachyurus	-	725	-
	Prat. penetrans	-	-	237
	Prat. vulnus	-	-	154
	Prat. spp.	-	-	125
	Rotylenchulus reniformis	-	-	180
CROTALARIA USARAMOENSIS E. G. Baker	Helico. sp.	-	-	187
	Mel. sp.	-	-	65
	Prat. brachyurus	-	-	187
CROTALARIA VERRUCOSA L.	Het. glycines	-	-	242
CROTALARIA L. sp.	Het. glycines	-	-	242
	Mel. sp.	-	-	231
CYNODON DACTYLON (L.) Pers. (C. POLEVANSII (Stent))	Aph. parascalacaudatus	India	667	-
	Bel. gracilis	-	-	135
	Bel. longicaudatus	USA	259,398,427 759	-
	Criconemoides citri	-	-	256
	Criconemoides ornatum	USA	398	-
	Criconemoides sp.	-	-	55

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CYNODON DACTYLON (Cont'd)	Dolichodorus heterocephalus	-	427	55
	Dolichodorus nigeriensis	Nigeria	836	-
	Helico. dihystera	USA	398	-
		-	-	207
	Helico. indicus	India	661,780	-
	Helico. pseudorobustus	Nigeria	836	-
	Helico. rotundicauda	USA	740	-
	Hemicycliophora sp.	-	-	55
	Het. schachtii	Nigeria	424	-
	Hop. galeatus	USA	398	-
		-	427	55
		-	-	262 (263)
	Mel. graminis	USA	279,385,676	-
	Mel. incognita	India	215	-
	Mel. javanica	-	-	127
	Mel. sp.	USA	398	-
		-	-	214
	Paratylenchus projectus	-	-	192
	Prat. coffeae	-	-	63
	Prat. pratensis	-	-	123
	Prat. zeae	USA	790	-
		-	-	16
	Rad. similis	-	-	87
	Rotylenchulus reniformis	-	697	-
	Rotylenchulus sp.	-	-	161
	Rotylenchus sp.	-	-	55
	Scutellonema clathricaudatum	Nigeria	836	-
	Seriespinula impar	India	402	-
	Trich. christiei	USA	398	-
		-	-	192
	Trich. sp.	-	-	55

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CYNODON DACTYLON (Cont'd)	Tylenchorhynchus claytoni	USA	398	-
		-	-	192
	Tylenchorhynchus sp.	-	-	55
	Tylenchus cynodontus	India	682	-
	Xiph.. sp.	-	-	55
CYNODON DACTYLON (L.) Pers. x C. TRANSVAALENSIS Burtt-Davey	Criconemoides sp.	USA	292	-
	Helico. sp.	USA	292	-
	Hypsoperine graminis	-	-	262 (263)
	Mel. sp.	USA	292	-
	Prat. sp.	USA	292	-
CYNODON MAGENNSII	Mel. graminis	-	435	-
CYNODON PLECTOSTACHYUM (K. Schum.) Pilger	Mel. javanica	-	-	198
CYNODON TRANSVAALENSIS Burtt-Dovey	Ang. tumefaciens	-	-	61
	Mel. arenaria	USA	751	-
CYNODON sp. L.C. Rich.	Criconemoides sp.	-	13	-
	Helico. sp.	-	13	-
	Het. longicolla	South Africa	367	-
	Mel. arenaria	-	405,795	795
	Mel. graminis	-	405,525,602, 686	-
	Mel. hapla	-	795	795
	Mel. incognita	USA	306	-
		-	405,795	795
	Mel. javanica	-	405	795
	Trich. sp.	-	13	-
	Tylenchorhynchus sp.	-	13	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
CYNODON NLEMFUENSIS Vanderyst	Aph. sp.	Brazil	839	-
	Macroposthonia sp.	Brazil	839	-
	Mel. sp.	Brazil	839	-
	Paratrichodorus minor	Brazil	839	-
DESMODIUM ASCENDENS (Sw.) DC.	Mel. incognita	-	-	187
DESMODIUM ASPERUM Desv.	Prat. brachyurus	-	-	187
DESMODIUM BARBATUM (L.) Benth.	Het. glycines	-	-	242
DESMODIUM CANUM (F. J. Gmel.) (Schinz. & Thell.) (D. INCANUM (Sw.) DC.)	Het. trifolii	USA	776	-
DESMODIUM DIMORPHUM Welw.	Mel. sp.	-	-	150
DESMODIUM DISCOLOR Vog.	Mel. javanica	Brazil	840	
DESMODIUM HASSLERI (Schindl.) Burkart	Het. glycines	-	-	242
DESMODIUM GYROIDES DC.	Mel. javanica	Colombia	51	-
(CODARIOCALYS GYROIDES (Roxb. ex	Prat. loosi	-	-	99 (181)
Link) DC.)	Rad. similis	-	-	18
DESMODIUM HETEROCARPON (L.) DC.	Mel. arenaria	-	4	-
	Mel. incognita	-	4	-
	Mel. javanica	-	4	-
DESMODIUM INTORTUM (Mill.) Urb.	Mel. arenaria	Australia	838	-
	Mel. hapla	Australia	838	-
DESMODIUM MOLLE DC.	Mel. javanica	Brazil	840	-
	Mel. sp.	-	-	245
DESMODIUM MUELLERI Benth.	Mel. javanica	-	-	64

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
DESMODIUM NEMOROSUM F. Muell.	Mel. javanica	-	-	64
DESMODIUM OVALIFOLIUM Wall.	Het. glycines	-	-	242
	Mel. ? incognita	-	-	119
	Mel. javanica	Colombia	51	-
	Mel. sp.	-	-	21
	Pterotylenchus cecidogenus	Colombia	5	-
DESMODIUM POLYCARPUM DC.	Mel. incognita	-	-	187
	Prat. brachyurus	-	-	187
DESMODIUM RHYTIDOPHYLLUM F. Muell.	Mel. incognita	-	-	64
DESMODIUM SALICIFOLIUM DC.	Het. glycines	-	-	242
DESMODIUM STRICTA DC.	Mel. sp.	-	-	23
DESMODIUM TILIAEFOLIUM G. Don.	Het. glycines	-	-	242
DESMODIUM TORTUOSUM (Sw.) DC.	Bel. gracilis	-	-	135
	Mel. arenaria	Australia	838	-
		-	-	178
	Mel. hapla	Australia	838	-
		-	-	178
	Mel. incognita	-	-	178
	Mel. sp.	-	-	35
	Rad. similis	-	-	11
	Rotylenchulus reniformis	-	-	52
DESMODIUM TRICHOCAULON DC.	Mel. incognita	-	-	64
DESMODIUM TRIFLORUM (L.) DC.	Mel. javanica	-	-	64
	Mel. sp.	-	-	108

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
DESMODIUM UNCINATUM (Jacq.) DC	Het. trifolii	USA	776	-
	Mel. arenaria	Australia	838	-
	Mel. hapla	Australia	838	-
	Mel. incognita	Australia	838	-
	Mel. javanica	-	-	64
DESMODIUM Desv. sp.	Mel. sp.	-	-	19
DESMODIUM VIRGATUS (L.) Willd. (MIMOSA VIRGATA L.)	Mel. incognita	Brazil	840	-
DICHANTHIUM ANNULATUM (Forsk.) Stapf. (ANDROPOGON ANNULATUS Forsk.)	Ang. sp.	-	-	240
DIGITARIA CHINESIS Hornem.	Mel. sp.	-	-	108
	Prat ? pratensis	-	-	123
DIGITARIA CRUCIATA	Mel. incognita	-	422	-
DIGITARIA DECUMBENS Stent	Aph. sp.	Brazil	839	-
	Bel. longicaudatus	USA	759	-
		-	555	-
	Criconemoides sp.	-	555	-
	Dolichodorus nigeriensis	Nigeria	836	-
	Helico. pseudorobustus	Nigeria	836	-
	Macroposthonia sp.	Brazil	836	-
	Mel. incognita	-	786	-
	Mel. sp.	Brazil	839	-
	Peltamigratus nigeriensis	Nigeria	836	-
	Prat. sp.	Nigeria	836	-
	Scutellonema clathricaudatum	Nigeria	836	-
	Tylenchus sp.	Nigeria	836	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
DIGITARIA ERIANTHA v. STOLONIFERA Stapf.	Mel. sp.	-	-	189
DIGITARIA GAZENSIS	Bel. longicaudatus	USA	563	-
DIGITARIA Haller sp.	Bel. longicaudatus	USA	539,563	-
	Bel. gracilis	-	-	54
	Prat. brachyurus	-	-	203
	Prat. penetrans	-	-	229
DIGITARIA ISCHAEMUM (Schreb.) Muhl.	Mel. sp.	-	-	276
DIGITARIA ORBATA Hughes	Mel. arenaria	-	-	64
DIGITARIA PRURIENS Buese	Mel. sp.	-	-	108
DIGITARIA SANGUINALIS (L.) Scop.	Aph. besseyi	Japan	550	-
		-	-	350
	Bel. gracilis	-	-	135
	Bel. sp.	USA	123	-
	Dit. dipsaci	-	-	58
	Helico. dihystera	-	-	192
	Het. avenae	-	-	149
	Hop. galeatus	-	-	192
	Hypsoperine graminis	-	-	262 (263)
	Longidorus maximus	-	-	279
	Mel. incognita and/or acrita	-	-	100
	Mel. javanica	-	-	64,192
	Mel. naasi	-	551	-
	Mel. sp.	-	-	108
	Paratylenchus projectus	-	-	192
	Prat. brachyurus	-	-	83
	Prat. penetrans	-	-	229
	Prat. ? pratensis	-	-	123
	Prat. zeae	-	-	83

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
DIGITARIA SANGUINALIS (Cont'd)	Rad. similis	-	-	52
	Trich. christiei	-	-	192
	Tylenchorhynchus claytoni	-	-	192
DIGITARIA SMUTSII Stent	Mel. incognita	-	-	177
	Mel. javanica	-	-	177
DIGITARIA TERNATA (Hochst.) Stapf	Mel. arenaria	-	-	199
	Mel. javanica	-	-	199
DIGITARIA VELUTINA (Forsk.) Beauv.	Hemicycliophora oostenbrinki	-	-	187
	Hemicycliophora paradoxa	-	-	187
	Mel. arenaria	-	-	199
	Mel. javanica	-	-	199
DIGITARIA VIOLASCENS Link.	Mel. sp.	-	-	231
	Mel. sp.	-	-	231
DOLICHOS BIFLORUS L.	Mel. sp.	-	-	23
DOLICHOS CARABAMCITO	Mel. incognita	-	-	187
	Prat. brachyurus	-	-	187
DOLICHOS HOSEI Craib	Rad. similis	-	-	52
DOLICHOS LUPINIFLORUS N.E. Br.	Mel. sp.	-	-	150
DOLICHOS TRINERVATUS Bak.	Mel. sp.	-	-	150
DOLICHOS UMBELLATUS Thunb.	Mel. sp.	-	-	23
ECHINOCHLOA COLONA (L.) Link	Dit. angustus	Vietman	48	-
	Ecphyadophoroides graminis	India	499	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ECHINOCHLOA COLONA (Cont'd)	Het. graminophila	USA	589	-
	Mel. graminicola	USA	726	-
	Mel. sp.	-	752	-
ECHINOCHLOA FRUMENTACEA (Roxb.) Link	Aph. besseyi	Japan	555	-
(E. CRUS-GALLI (L.) Beauv.)	Dit. dipsaci	-	-	77
(V. FRUMENTACEA (Roxb.) W. F. Wight.	Hirschmanniella oryzae	-	-	295
	Mel. incognita	-	-	100
	Mel. javanica	-	-	64
	Mel. sp.	-	-	40
	Prat. neglectus	-	-	8
	Prat. penetrans	-	-	130,190 (215)
	Prat. zeae	USA	790	-
		-	-	156
ECHINOCHLOA Beauv.sp.	Het. graminophila	USA	318	-
ERAGROSTIS ARENICOLA (L.) Gaertn.	Mel. incognita	-	-	199
ERAGROSTIS ASPERA (Jacq.) Nees	Mel. incognita	-	-	199
	Mel. javanica	-	-	199
ERAGROSTIS CHLOROMELAS	Mel. sp.	Madagascar	841	-
ERAGROSTIS CILIARIS Link	Mel. sp.	-	-	151
ERAGROSTIS CURVULA (Schrad.) Nees	Mel. acronea	-	-	120
	Mel. incognita	-	-	177
	Mel. javanica	-	-	177
ERAGROSTIS DIFFUSA Buckl.	Mel. sp.	-	-	39
ERAGROSTIS ELONGATA (Willd.) Jacq.	Mel. arenaria	-	-	64

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ERAGROSTIS GUMMIFLUA Nees	Mel. javanica	-	-	199
ERAGROSTIS LEHMANNIANA Nees	Mel. acronea	-	-	120
ERAGROSTIS MAJOR Host	Mel. sp.	-	-	212
ERAGROSTIS PILOSA Beauv.	Mel. incognita	-	-	194
ERAGROSTIS RACEMOSA (Thunb.) Steud.	Mel. arenaria	-	-	202
	Mel. javanica	-	-	199
ERAGROSTIS TEF Trotter	Mel. incognita	-	-	177
	Mel. javanica	-	-	75
ERAGROSTIS TENUIFOLIA	Aph. besseyi	Australia	461	-
	Mel. javanica	-	-	199
	Mel. sp.	-	-	150
ERAGROSTIS VISCOSA Trin.	Mel. incognita	-	-	199
	Mel. javanica	-	-	199
	Mel. sp.	-	-	150
ERECHTITES ATKINSONIAE F. Muell.	Mel. incognita	-	-	64
ERECHTITES PRAEALTA Raf	Aph. besseyi	-	-	254
	Dit. dipsaci	-	-	58
	Mel. sp.	-	-	40
	Prat. ? pratensis	-	-	123
ERECHTITES PRENANTHOIDES	Mel. hapla	Australia	155	-
ERECHTITES QUADRIDENTATA DC.	Mel. incognita	-	-	64
	Mel. sp.	-	-	188
ERECHTITES VALERIANAEFOLIA DC.	Mel. incognita	-	-	120
	Mel. javanica	-	-	64
	Mel. sp.	-	-	231

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ERECHTITES VALERIANAEFOLIA (Cont'd)	Rotylenchulus reniformis	-	-	180
EREMOCHLOA OPHIUROIDES (Muhro) Hack.	Bel. gracilis	-	-	55
	Criconemoides citri	USA	663	-
	Criconemoides ornatus	-	832	-
	Criconemoides sp.	USA	737	-
		-	-	55
	Dolichodorus heterocephalus	-	-	55
	Hemicycliophora parvana	USA	17,663	-
	Hemicycliophora sp.	-	-	55
	Hop. galeatus	-	-	55
	Macroposthonia sphaerocephala	USA	17	-
	Prat. goodeyi	USA	663	-
	Prat. sp.	-	-	125
	Rotylenchus sp.	-	-	55
	Trich. christiei	USA	663	-
	Trich. sp.	-	-	55
	Tylenchorhynchus sp.	-	-	55
	Xiph. sp.	-	-	55
ERIOSEMA PSORALOIDES Don	Mel. sp.	-	-	151
ERYTHRINA AMERICANA Mill.	Mel. sp.	-	-	23
ERYTHRINA CRISTA-GALLI L.	Mel. sp.	-	-	174
ERYTHRINA LITHOSPERMA Blume	Helico. dihystera	-	-	145
	Helico. erythinae	-	-	307
	Mel. javanica	-	-	296
	Mel. sp.	-	-	306
	Scutellonema brachyurum	-	-	98
ERYTHRINA sp.	Mel. sp.	-	-	296
GALACTIA P. Br.sp.	Mel. sp.	-	-	35
GLYCINE ALBIDIFLORA de Wild	Mel. sp.	-	-	152

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
GLYCINE CLANDESTINA Wendl.	Het. glycines	-	-	242
GLYCINE GRACILIS Skvortz	Het. glycines	-	-	259
GLYCINE JAVANICA L.	Mel. arenaria	-	-	178
		Australia	838	-
	Mel. hapla	-	-	178
		Australia	838	-
	Mel. incognita	-	-	177
		Australia	838	-
	Mel. javanica	Brazil	840	-
		-	-	177
GLYCINE USSURENSIS Regel & Maack.	Het. glycines	-	-	149
HARDENBERGIA MONOPHYLLA Benth.	Mel. sp.	-	-	23
HEMARTHRIA ALTISSIMA (Poir.) Stapf & Hubbard	Bel. longicaudatus	-	555	-
	Criconemoides sp.	-	555	-
HEMARTHRIA P. Br.sp.	Bel. longicaudatus	USA	539	-
HYPARRHENIA COLLINA	Ang. hyparrheniae	Malawi	700	-
HYPARRHENIA CYANESCENS Stapf	Hemicycliophora oostenbrinki	-	-	187
HYPARRHENIA RUFA (C. G. Nees) Stapf	Hemicycliophora oostenbrinki	Nigeria	836	-
(ANDROPOGON RUFUS Kunth)	Telotylenchus baoulensis	Ivory Coast	596	-
(TRACHYPOGON RUFUS Nees)	Trichotylenchus rectangularis	Ivory Coast	596	-
	Tylenchorhynchus martini	Nigeria	836	-
IMPERATA CYLINDRICA (L.) Beauv.	Dolichodorus nigeriensis	Nigeria	836	-
	Helico. cavenessi	Nigeria	836	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
IMPERATA CYLINDRICA (Cont'd)	Helico. longicaudatus	Nigeria	-	-
	Hop. pararobustus	Nigeria	-	-
	Prat. sp.	Nigeria	836	-
	Rad. nigeriensis	Nigeria	658	-
	Scutellonema clathricaudatum	Nigeria	836	-
	Tylenchorhynchus martini	Nigeria	836	-
	Tylenchus sp.	Nigeria	836	-
	Xiph. ifacolum	Nigeria	836	-
IMPERATA CYLINDRICA (L.) Beauv. v. MAJOR	Rad. rectus	Australia	564	-
INDIGOFERA ANIL L.	Het. glycines	-	-	242
	Mel. sp.	-	-	231
	Prat. ? pratensis	-	-	123
	Rotylenchulus reniformis	-	-	180
INDIGOFERA ANTUNESIANA Harms.	Mel. sp.	-	-	151
INDIGOFERA ARRECTA Hochst.	Mel. incognita	-	-	303
	Mel. javanica	-	-	303
	Mel. sp.	-	-	150
INDIGOFERA AUSTRALIA Willd.	Mel. arenaria	-	-	64
	Mel. javanica	-	-	64
INDIGOFERA BOGDANII (?)	Mel. javanica	-	-	303
INDIGOFERA DEMISSA Taub.	Mel. sp.	-	-	152
INDIGOFERA DENDROIDES Jacq.	Mel. sp.	-	-	151
INDIGOFERA DOSUA Buch.-Ham.	Het. glycines	-	-	242

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
INDIGOFERA ENDECAPHYLLA Jacq.	Mel. javanica	-	-	64
	Mel. sp.	-	-	18
	Rad. similis	-	-	18
INDIGOFERA ENNEAPHYLLA L.	Mel. sp.	-	-	7
INDIGOFERA HIRSUTA L.	Mel. arenaria	Australia	838	-
	Mel. hapla	Australia	838	-
	Mel. incognita	Australia	838	-
		-	-	193
	Mel. javanica	Australia	838	-
		Brazil	840	-
		-	-	64
	Mel. sp.	-	-	151
	Rad. similis	-	-	27
INDIGOFERA MALACOSTACHYS Benth.	Mel. sp.	-	-	151
INDIGOFERA MUCRONATA Spreng. ex DE.	Het. glycines	-	-	242
INDIGOFERA PARODIANA Burkart	Het. glycines	-	-	242
INDIGOFERA PHYLLANTHOIDES Bak.	Mel. sp.	-	-	150
INDIGOFERA RHYNCOCARPA Welw.	Mel. sp.	-	-	152
INDIGOFERA SUBULATA Poir.	Het. glycines	-	-	242
	Mel. javanica	-	-	201
INDIGOFERA TETELENSIS	Het. glycines	-	-	242

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
INDIGOFERA TINCTORIA L.	Het. glycines	-	-	242
INDIGOFERA KIRILOWI	Criconemella myungsugae	Korea	598	-
INDIGOFERA sp.	Mel. sp.	-	-	150,151
INGA sp.	Mel. sp.	-	-	73
LABLAB PURPUREUS (L.) Sweet	Deladenus indicus	India	245	-
(DOLICHOS LABLAB L.)	Het. cajani	-	540	-
(DOLICHOS PURPUREUS L.)	Het. glycines	-	-	242
(L. NIGER Med.)	Mel. arenaria	Australia	838	-
(L. VULGARIS Savi)		Brazil	431	-
	Mel. incognita	Australia	838	-
		-	-	30
	Mel. javanica	Australia	838	-
		-	-	199
	Mel. sp.	India	245	-
		Madagascar	641	-
		-	-	23
	Prat. brachyurus	-	-	187
	Prat. sudanensis	Sudan	408	-
	Rotylenchus siddiqii	India	372	-
LATHYRUS APHACA L.	Het. glycines	-	-	242
	Het. ? schachtii	-	-	112
LATHYRUS ARTICULATUS L.	Het. trifolii	-	-	242
LATHYRUS CICERA L.	Het. glycines	-	-	242
	Het. ? schachtii	-	-	166
	Mel. sp.	-	-	23
LATHYRUS CLYMENUM L.	Het. trifolii	-	-	223

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
LATHYRUS HETEROPHYLLUS	Het. goettingiana	-	-	304
LATHYRUS HIRSUTUS	Het. goettingiana	-	-	304
	Rotylenchulus reniformis	-	-	28
LATHYRUS INCONSPICUUS L.	Het. glycines	-	-	242
LATHYRUS LATIFOLIUS L.	Het. sp.	-	-	130
	Mel. sp.	-	-	109
LATHYRUS MAGELLANICUS Lam.	Het. goettingiana	-	-	223
LATHYRUS NIGER (L.) Bernh.	Het. goettingiana	-	-	304
LATHYRUS NISSOLIA L.	Het. goettingiana	-	-	304
LATHYRUS OCHRUS DC.	Het. goettingiana	-	-	304
	Mel. sp.	-	-	208
LATHYRUS ODORATUS L.	Dit. dipsaci	-	-	284
	Het. ? schachtii	-	-	94
	Het. schachtii	-	-	238
	Het. trifolii	-	-	210
	Het. sp.	-	-	130
	Mel. arenaria	-	-	209
	Mel. hapla	-	-	213
	Mel. incognita	-	-	209
	Mel. javanica	-	-	197
	Mel. sp.	-	-	23
	Paratylenchus projectus	-	-	280
	Prat. penetrans	-	-	144
	Prat. ? pratensis	-	-	121
	Prat. vulnus	-	-	154

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
LATHYRUS PALUSTRIS L.	Het. goettingiana	-	-	304
LATHYRUS SATIVUS L.	Dit. dipsaci	-	-	22
	Het. glycines	-	-	242
	Het. goettingiana	-	-	304
	Het. ? schachtii	-	-	64
	Het. trifolii	-	-	223
	Mel. sp.	-	-	23
LATHYRUS SYLVESTRIS L.	Het. sp.	-	-	130
LATHYRUS TINGITANUS L.	Het. ? schachtii	-	-	68
	Het. trifolii	USA	776	-
	Mel. sp.	-	-	23
LATHYRUS TUBEROSUS L.	Het. glycines	-	-	242
LATHYRUS sp.	Mel. hapla	-	-	106
	Mel. sp.	-	-	160
LEERSIA HEXANDRA Sw.	Dit. angustus	Burma	285	-
LESPEDEZA BICOLOR Turcz	Het. glycines	-	-	242
	Mel. sp.	-	-	23
LESPEDEZA BUERGERI Miq.	Het. glycines	-	-	242
LESPEDEZA CUNEATA G. Don	Helico. dihystera	-	-	192
	Het. glycines	-	-	259
	Hop. galeatus	-	-	192
	Mel. arenaria	-	729	-
	Mel. hapla	-	729	-
	Mel. incognita	-	729	-
	Mel. javanica	-	729	-
	Mel. sp.	-	-	5

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
LESPEDEZA CUNEATA (Cont'd)	Paratylenchus projectus	-	-	192
	Trich. christiei	-	-	192
	Tylenchorhynchus claytoni	-	-	165
LESPEDEZA CYRTOBOTRYA Miq.	Mel. sp.	-	-	5
LESPEDEZA CYSTOIDES Benth.	Mel. sp.	-	-	5
LESPEDEZA SERICEA Benth.	Mel. arenaria	-	-	171
	Mel. hapla	-	-	171
	Mel. incognita	-	-	171
	Mel. javanica	-	-	171
	Mel. sp.	-	-	275
LESPEDEZA STIPULACEA Makim.	Helico dihystera	-	-	192
	Het. glycines	-	-	260
	Het. lespedezae	-	779	-
	Het. trifolii	-	-	103
	Hop. galeatus	-	-	192
	Mel. arenaria	-	-	300
	Mel. hapla	-	-	300
	Mel. incognita	-	-	300
	Mel. javanica	-	-	300
	Mel. sp.	-	-	273
	Paratylenchus projectus	-	-	154
	Trich. christiei	-	-	154
	Tylenchorhynchus claytoni	-	-	165
LESPEDEZA STRICTA Hook.	Het. glycines	USA	685	-
		-	-	259
	Het. lespedezae	USA	376,774	-
		-	-	779
	Mel. arenaria	-	-	300
	Mel. hapla	-	-	300

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
LESPEDEZA STRICTA (Cont'd)	Mel. incognita	-	-	300
	Mel. javanica	-	-	300
	Mel. sp.	-	-	15
	Paratylenchus projectus	-	-	69
	Trich. christiei	-	-	69
LESPEDEZA sp.	Bel. gracilis	-	-	135
	Prat. brachyurus	-	-	255
	Prat. penetrans	-	-	44
	Prat. spp.	-	-	125
LEUCAENA LATISILIQUA	Helico. dihystera	India	60	-
LEUCAENA LEUCOCEPHALA (Lam.) de Wit (L. GLAUCA (L.) Benth.) (MIMOSA GLAUCA L.) (MIMOSA LEUCOCEPHALA Lam.)	Mel. javanica	-	-	289
	Mel. sp.	-	-	23
LEUCAENA Benth. sp.	Mel. incognita	Papua & New Guinea	-	CIP
LUPINUS ALBO-COCCINEUS	Het. trifolii	-	-	304
LUPINUS ALBUS	Dit. dipsaci	England	200	-
	Het. glycines	USA	86	-
		-	325	84
	Het. goettingiana	-	-	175
	Mel. arenaria	-	-	199
	Mel. hapla	Australia	838	-
	Mel. incognita	Australia	838	-
		-	-	178
	Mel. javanica	Australia	838	-
		-	-	64
	Mel. sp.	-	-	23

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
LUPINUS ANGUSTIFOLIS L.	Aph. bicaudatus	-	-	63
	Bel. gracilis	-	-	118
	Dit. dipsaci	-	-	163
	Mel. arenaria	Australia	838	-
		-	-	178
	Mel. hapla	Australia	838	-
		-	-	178
	Mel. incognita	-	-	64,178
		Australia	838	-
	Mel. javanica	-	-	64
		Australia	838	-
	Mel. sp.	-	-	23
	Prat. coffeae	-	-	63
	Prat. penetrans	-	-	76
	Prat. spp.	-	-	125
	Tylenchus costatus	-	-	63
LUPINUS ARBOREUS Sims	Het. glycines	-	-	242
LUPINUS ELEGANS H.B. & K.	Het. glycines	-	-	242
	Het. trifolii	-	-	223
LUPINUS HARTWEGII Lindl.	Het. glycines	-	-	242
LUPINUS HIRSUTUS L.	Mel. sp.	-	-	230
LUPINUS LUTEUS L.	Bel. gracilis	-	-	118
	Dit. dipsaci	-	-	204
	Het. glycines	-	-	242
	Het. goettingiana	-	-	94
	Longidorus maximus	-	-	279
	Mel. arenaria	-	-	178
		Australia	838	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
LUPINUS LUTEUS (Cont'd)	Mel. hapla	-	-	178
		Australia	838	-
	Mel. incognita	-	-	178
		Australia	838	-
	Mel. javanica	-	-	178
	Mel. sp.	-	-	23
	Prat. penetrans	-	-	225
	Prat. ? pratensis	-	-	110
LUPINUS MUTABILIS Sweet	Het. glycines	-	-	242
	Mel. sp.	-	-	39
LUPINUS MUTABILIS Sweet v. CRUCKSHANKSI	Het. goettingiana	-	-	175
	Het. schachtii	-	-	68
LUPINUS NANUS Dougl.	Het. schachtii	-	-	238
LUPINUS POLYPHYLLUS Lindl.	Het. trifolii	-	-	223
	Mel. sp.	-	-	41
	Prat. penetrans	-	-	225
LUPINUS PUBESCENS Benth.	Het. glycines	-	-	242
LUPINUS REGALIS Bergmans	Mel. javanica	-	-	199
LUPINUS RIVULARIS Dougl. ex Lindl.	Het. glycines	-	-	242
LUPINUS SUBCARNOSUS Hook.	Het. trifolii	-	-	242
LUPINUS TERMIS	Het. goettingiana	-	-	175
	Mel. incognita	Egypt	150	-
	Mel. sp.	-	-	23
LUPINUS VILLOSUS Willd.	Mel. sp.	-	-	35

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
LUPINUS L. sp.	Aph. ritzemabosi	-	-	2
	Het. glycines	-	-	242
	Het. goettingiana	Italy	664	-
LUPINUS sp.	Mel. javanica	-	-	124
	Mel. sp.	-	-	40
	Paratylenchus nanus	USSR		56 -
	Prat. ? pratensis	USSR	56	-
MACROPTILIUM (Benth.) Urb. sp.	Mel. javanica	Colombia	51	-
MEDICAGO ARABICA (L.) All.	Het. glycines	-	-	265
	Mel. sp.	-	-	242
MEDICAGO FALCATA L.	Dit. dipsaci	-	-	20
	Mel. hapla	-	-	268
	Mel. sp.	-	-	294
MEDICAGO GAETULA	Mel. hapla	-	-	268
MEDICAGO GLUTINOSA Bieb.	Dit. dipsaci	-	-	24
	Mel. hapla	-	-	268
MEDICAGO HISPIDA Gaertn.	Dit. dipsaci	-	-	81
	Het. glycines	-	-	242
	Mel. incognita	-	-	64
	Mel. sp.	-	-	195
MEDICAGO LUPULINA L.	Dit. dipsaci	-	-	274
	Het. ? schachtii	-	-	281
	Het. sp.	-	-	130
	Mel. artiellia	-	-	95
	Mel. hapla	-	-	199

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
MEDICAGO LUPULINA (Cont'd)	Mel. incognita	-	-	100
	Prat. penetrans	-	-	227
MEDICAGO MARINA	Mel. hapla	-	-	268
MEDICAGO MINIMA (L.) L.	Dit. dipsaci	-	-	81
MEDICAGO ORBICULARIS All.	Dit. dipsaci	-	-	24
	Het. glycines	-	-	242
MEDICAGO SATIVA L.	Aph. ritzemabosi	-	-	37
	Aph. sp.	Canada	481	-
	Criconemoides curvatus	USA	274	-
		-	361	216
	Criconemoides lobatus	-	-	14
	Criconemoides sp.	-	103	-
	Dit. dipsaci	Argentina	665	-
		Australia	664	-
		Canada	193,481,710, 809,814,823	-
		Czechos-lavakia	297,319,370	-
		Denmark	746	-
		England	30,59,92,	-
		France	145,151, 206,271	-
		Hungary	167	-
		Iran	479	-
		New Zealand	57,138,148, 159,560,599	-
		Peru	797	-
		Sweden	469,561,652, 820	-
		USA	77,103,109, 118,121,135, 138,164,166, 194,274,351, 388,473,574,	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
MEDICAGO SATIVA (Cont'd)	Dit. dipsaci (Cont'd)		582,651,653, 669,679,684, 769,809,825	
		USSR	89,151,272, 348,383	
		Yugoslavia	84,817	
		-	94,179,181, 185,208,221, 225,240,249, 266,267,278, 287,314,320, 324,339,340, 353,374,397, 418,462,468, 475,490,496, 515,522,549, 558,566,569, 594,623,631, 671,690,699, 706,707,713, 716,728,745, 753,764,770, 787,794,801, 802,807	166
	Dit. destructor	-	-	86
	Dit. medicaginis	Poland	720	-
	Helico. digonicus	Canada	426	-
		USA	156,171	-
	Helico. dihystera	USA	164	
	Helico. leucernis	Pakistan	243	-
	Helico. multicinctus	USSR	272	-
	Helico. orthosomaticus	Tanzania	590	-
	Helico. sp.	USA	103	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
MEDICAGO SATIVA (Cont'd)	Hemicycliophora similis	-	-	157
	Het. glycines	-	-	242
	Het. goettingiana	-	-	258
	Het. medicaginis	USSR	6	-
	Het. paratrifolii	USSR	404	-
		-	534	-
	Het. ? schachtii	-	-	137
	Het. trifolii	-	407	297
	Het. sp.	USSR	277,722	-
		-	-	130
	Hop. galeatus	USA	170	-
		-	188	269
	Macroposthonia curvata	-	299	-
	Mel. arenaria	USA	156,171	-
		-	471	249
	Mel. artiellia	-	-	95
	Mel. hapla	Canada	108,162,163, 168	-
		Italy	12,114	-
		USA	12,109,119, 120,121,164, 166,186,190, 210,221,222, 227,248,251	
	Mel. hapla	-	268,287,322, 351,361,373, 374,387,407, 466,523,526, 549,575,581, 584,597,607, 622,635	

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
MEDICAGO SATIVA (Cont.)	Mel. incognita	Brazil	840	-
		-	618,803	249
		Canada	194	-
		USA	119,195	
		-	222,524,537 471,474,456, 345,187	249
	Mel. javanica	-	803	249
	Mel. sp.	New Zealand	36,316,335	-
		USA	77,103,135, 274	-
		-	184,314,338, 558,633	92
	Neotylenchus obesus	-	-	288
	Paratrichodorus minor	USA	156,171	-
	Paratylenchus projectus	Canada	481,521	-
		-	-	69
	Paratylenchus sp.	-	632	-
	Prat. brachyurus	-	471	-
	Prat. coffeae	-	-	16
	Prat. minyus	USA	156	-
	Prat. neglectus	-	-	17
	Prat. penetrans	Canada	15,65,68,70 132,161,421	-
		Taiwan	608	-
		USA	32,85,109, 154,164,171, 209,230,260, 345,349,375, 378,381,456	154
	Prat. penetrans	-	492,537,538, 562,626,698, 701,705,714, 788	
	Prat. ? pratensis	-	-	59

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
MEDICAGO SATIVA (Cont'd)	Prat. pratensis	USSR	272	-
	Prat. scribneri	USA	754	-
	Prat. vulnus	-	-	154
	Prat. sp.	Canada	481	-
		USA	77,103,135	-
	Psilenchus iranicus	Iran	630	-
	Rad. similis	-	718	87
	Rotylenchus goodeyi	-	-	14
	Trich. christiei	USA	164,754	-
		-	-	244
	Trich. sp.	USA	103	-
	Tylenchorhynchus acutus	Canada	481	-
		-	-	12
	Tylenchorhynchus brevidens	-	650	14
	Tylenchorhynchus clarus	USA	274	-
		-	191,300	-
	Tylenchorhynchus claytoni	USA	164	-
		-	647,758	165
	Tylenchorhynchus maximus	-	-	14
	Tylenchus agricola	-	758	-
	Tylenchus bryophilus	-	-	157
	Tylenchus clavidorus	Iran	545	-
	Xiph. americanum	-	724,733,744	12
	Xiph. heynsi	Tanzania	244	-
	Xiph. sp.	Canada	481	-
		USA	103	-
MEDICAGO SCUTELLATA (L.) Mill.	Mel. javanica	-	-	64
MEDICAGO TRIBULOIDES Desr.	Mel. incognita	-	-	64
MELILOTUS ALBA (Desr.) Med. (M. ALBUS Med.)	Bel. gracilis	-	-	118
	Dit. dipsaci	-	-	266
	Het. glycines	-	-	242

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
MELILOTUS ALBA (Cont'd)	Het. trifolii	-	-	103
	Het. sp.	-	-	130
	Mel. hapla	USA	195	-
	Mel. incognita	USA	195	-
	Mel. javanica	-	-	200
	Mel. sp.	-	-	15
	Paratylenchus projectus	-	-	69
	Prat. penetrans	-	-	291
	Prat. ? pratensis	-	-	72
	Prat. vulnus	-	-	154
	Tylenchorhynchus sp.	-	-	203
MELILOTUS ALBA Desr. v. ANNUA Cot.	Helico microlobus	-	-	282
	Mel. sp.	-	-	39
MELILOTUS ALBA Desr. v. Spanish	Prat. penetrans	-	-	154
MELILOTUS ALBA Desr. v. Williamette	Het. trifolii	-	-	103
MELILOTUS GRACILIS DC.	Het. glycines	-	-	242
MELILOTUS HIRSUTA Lipski	Het. glycines	-	-	242
MELILOTUS INDICA (L.) All.	Dit. dipsaci	-	458	-
(M. INDICUS All.)	Het. glycines	-	-	242
	Mel. sp.	-	-	23
MELILOTUS OFFICINALIS (L.) Lam.	Het. glycines	-	-	242
	Het. trifolii	-	-	103
	Mel. hapla	-	-	236
	Mel. sp.	-	-	294
MELILOTUS SUAVEOLENS Ledeb.	Het. glycines	-	-	242
MELILOTUS sp.	Mel. sp.	-	-	39
MELINIS MINUTIFLORA Beauv.	Aphelenchoides sp.	Brazil	839	-
	Criconemoides sp.	Nigeria	836	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
MELINIS MINUTIFLORA (Cont'd)	Hemicriconemoides cocophillus	Nigeria	836	-
	Mel. sp.	Madagascar	641	-
	Peltamigratus nigeriensis	Nigeria	836	-
	Prat. sp.	Nigeria	836	-
	Scutellonema clathricaudatum	Nigeria	836	-
	Tylenchorhynchus sp.	Nigeria	836	-
MIMOSA INVISA Mart.	Mel. incognita	-	-	289
	Mel. javanica	-	-	64
	Mel. sp.	-	-	228
	Prat. brachyurus	-	-	187
	Prat. coffeae	-	-	91
MIMOSA PUDICA L.	Mel. sp.	-	-	40
MIMOSA SCABRELLA Benth.	Mel. incognita	-	-	187
MUCUNA ATERRINA Merrill	Mel. sp.	-	-	79
MUCUNA PRURIENS (L.) DC.	Mel. sp.	-	-	23
MUCUNA PRURIENS DC. v. UTILIS (Wall.) Bak. ex Burck.	Mel. javanica	-	-	201
PACHYRHIZUS EROSUS (L.) Urban	Mel. sp.	-	-	85
PACHYRHIZUS TUBEROSUS Spreng.	Mel. arenaria	-	-	139
	Mel. sp.	-	-	42
PANICUM ANTIDOTALE Retz.	Hemicycliophora oostenbrinki	-	-	187
	Hemicycliophora paradoxa	-	-	187
	Mel. incognita	-	-	187
PANICUM ATROSANGINEUM Hochst. ex. A. Rich	Mel. javanica	-	-	201
PANICUM AURITUM Presl.	Mel. sp.	-	-	124

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PANICUM BISULCATUM	Aph. besseyi	Japan	550	-
PANICUM BREVIFOLIUM L.	Prat. brachyurus	-	-	187
PANICUM CAPILLARE L.	Mel. incognita	-	-	100
PANICUM COLONUM L.	Hirschmanniella oryzae	-	-	295
	Mel. javanica	-	-	199
	Mel. sp.	-	-	39
PANICUM COLORATUM L.	Mel. javanica	-	-	199
PANICUM HEMITOMON Schult.	Rad. similis	-	-	26
PANICUM MAXIMUM Jacq.	Aph. besseyi	Australia	461	-
	Helico. pseudorobustus	Nigeria	836	CIP
	Helico. dihystera	Nigeria	836	-
	Hemicycliophora paradoxa	-	-	187
	Macroposthonia	Brazil	839	
	Mel. incognita	-	-	177
	Mel. sp.	Zimbabwe	-	614
		-	-	79
	Prat. brachyurus	-	-	187
	Prat. zeae	Brazil	583	-
	Rad. similis	-	-	26
	Sarisodera africana	Ivory Coast	413	-
	Scutellonema aberrans	Nigeria	-	CIP
	Scutellonema cavenessi	Nigeria	-	CIP
	Scutellonema clathricaudatum	Nigeria	836	CIP
	Tylenchorhynchus elegans	Nigeria	-	-
	Tylenchorhynchus martini	Nigeria	836	-
	Xiph. longicaudatum	Nigeria	836	-
PANICUM MILIACEUM L.	Bel. gracilis	-	-	51
	Dit. dipsaci	-	-	158
	Mel. sp.	-	-	150

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PANICUM PROSTRATUM Lam.	Mel. sp.	-	-	79
PANICUM REPENS L.	Mel. sp.	-	-	124
PANICUM TURGIDUM Forsk.	Mel. sp.	-	-	212
PANICUM L. sp.	Cacopaurus sp.	-	-	298
	Mel. sp.	-	-	40
	Prat. ? pratensis	-	-	123
PASPALUM COMMERSONII L.	Hirschmanniella oryzae	-	-	295
PASPALUM CONJUGATUM Sw.	Helico. sp.	-	-	187
	Het. schachtii	Nigeria	-	CIP
	Prat. brachyurus	-	-	187
	Prat. coffeae	-	-	91
PASPALUM DILATATUM Poir.	Bel. gracilis	-	-	135
	Helico. cavenessi	Nigeria	836	-
	Helico. dihystera	-	-	207
	Helico. microcephalus	Nigeria	836	-
	Helico. pseudorobustus	Nigeria	836	-
	Hemicriconemoides cocophillus	Nigeria	836	-
	Mel. sp.	-	-	189
	Prat. brachyurus	Nigeria	836	-
	Scutellonema clathricaudatum	Nigeria	836	-
	Trich. christiei	-	-	192
	Tylenchorhynchus claytoni	-	-	192
	Tylenchorhynchus martini	-	-	88
	Tylenchus sp.	Nigeria	836	-
	Xiph. ifacolum	Nigeria	836	-
PASPALUM FASCICULATUM Willd. ex. Flüegge	Het. graminis	Trinidad	273	-
PASPALUM LAEVE Michx.	Mel. sp.	-	-	40
PASPALUM LARRANAGAI Aresch.	Mel. sp.	-	-	108

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PASPALUM MALACOPHYLLUM Trin.	Mel. sp.	-	-	189
PASPALUM NOTATUM Fleügge	Bel. longicaudatus	-	555	-
	Criconemoides sp.	-	555	-
	Helico. cavenessi	Nigeria	836	-
	Helico. dihystera	-	-	192
	Helico. pseudorobustus	Nigeria	836	-
	Hop. pararobustus	Nigeria	836	-
	Hysoperine graminis	-	-	262 (263)
	Mel. arenaria	-	-	192
	Mel. incognita	-	-	192
	Mel. javanica	-	-	192
	Mel. sp.	-	-	189
	Paratylenchus projectus	-	-	192
	Prat. brachyurus	Nigeria	836	-
	Rad. similis	-	-	87
	Scutellonema clathricaudatum	Nigeria	836	-
	Trich. christiei	-	-	192
	Tylenchorhynchus claytoni	-	-	192
	Tylenchorhynchus nudus	Nigeria	836	-
	Xiph. ifacolum	Nigeria	836	-
PASPALUM ORBICULARE Forst.	Prat. ? pratensis	-	-	123
PASPALUM SCROBICULATUM L.	Criconemoides onoensis	-	-	187
	Helico. sp.	-	-	187
	Prat. brachyurus	-	-	187
PASPALUM URVILLEI Steud.	Mel. sp.	-	-	189
PASPALUM VIRGATUM L.	Hemicycliophora paradoxa	-	-	187
	Mel. incognita	-	-	187
PASPALUM L.sp.	Het. sp.	Nigeria	-	CIP
	Mel. sp.	-	-	104
PENNISETUM CLANDESTINUM Hochst. ex. Chiov.	Criconemoides sp.	-	-	211

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PENNISETUM CLANDESTINUM (Cont'd)	Helico. dihystera	Australia	332	-
	Helico. pseudorobustus	Nigeria	836	-
	Hemicycliophora oostenbrinki	Nigeria	836	-
	Hemicycliophora ? typica	-	-	211
	Mel. kikuyensis	-	-	126
	Prat. brachyurus	Nigeria	836	-
	Rotylenchus sp.	-	-	211
	Tylenchorhynchus martini	Nigeria	836	-
	Xiph. nigeriense	Nigeria	836	-
PENNISETUM MAUKENI Leeke	Hemicycliophora oostenbrinki	-	-	187
	Hemicycliophora paradoxa	-	-	187
PENNISETUM PEDICELLATUM	Hemicycliophora paradoxa	-	-	187
PENNISETUM PURPUREUM Schum.	Malenchus tantulus	Malawi	246	-
	Mel. incognita acrita	-	-	187
	Mel. javanica	-	-	198
	Mel. sp.	-	-	108
	Neomalenchus malawiensis	Malawi	246	-
	Zanenchus zanclus	Malawi	246	-
PENNISETUM PURPUREUM x P. TYPHOIDES	Macroposthonia sp.	Brazil	839	-
	Paratrichodorus minor	Brazil	839	-
	Prat. brachyurus	Brazil	839	-
	Tylenchus sp.	Brazil	839	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PENNISETUM TYPHOIDES (Cont'd)	Mel. javanica	India	576	-
		-	296	198
	Mel. sp.	-	-	67
	Prat. brachyurus	USA	464	-
	Hemicycliophora paradoxa	-	-	187
		-	-	186,187
	Prat. mulchandi	India	615	-
		-	437	-
	Prat. zeae	USA	464	-
	Prat. sp.	India	606	-
		USA	464	-
	Telotylenchus indicus	-	620	-
	Trich. christiei	USA	464	-
	Xiph. americanum	USA	464	-
PENNISETUM L. Rich. sp.	Mel. javanica	-	-	75
PHASEOLUS ACONITIFOLIUS Jacq.	Het. cajani	India	668	-
	Het. glycines	-	-	242
	Hop. dimorphicus	India	372,834	-
	Mel. sp.	-	-	23
	Tylenchorhynchus phaseoli	India	689	-
PHASEOLUS ACUTIFOLIUS A. Gray v. LATIFOLIUS Freeman	Het. glycines	-	-	242
	Tylenchorhynchus dubius	-	-	241
PHASEOLUS ANGULARIS W. F. Wight	Het. glycines	-	-	147
	Het.? schachtii	-	-	155
	Mel. sp.	-	-	23
PHASEOLUS ATROPURPUREUS Moc. & Sesse	Het. glycines	-	-	242
	Mel. arenaria	Australia	837,838	-
	Mel. hapla	Australia	837,838	-
	Mel. incognita	Australia	837,838	-
	Mel. javanica	Australia	837,838	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PHASEOLUS AUREUS Roxb.	Het. cajani	India	189,668	-
	Het. glycines	-	800	-
	Hop. indicus	-	436	-
	Mel. incognita	-	293,835	-
	Mel. javanica	-	283	-
PHASEOLUS BRACTEOLATUS Nees & Mart.	Mel. javanica	Brazil	840	-
PHASEOLUS CALCARATUS Roxb.	Het. cajani	India	668	-
	Het. glycines	-	-	242
	Mel. javanica	-	-	289
	Mel. sp.	-	-	23
PHASEOLUS COCCINEUS L.	Het. glycines	-	-	148
	Het. ? schachtii	-	-	96
	Mel. hapla	-	-	101
	Mel. incognita	-	627,642	-
	Mel. javanica	-	-	197
	Mel. sp.	-	-	40
	Prat. penetrans	-	-	227
PHASEOLUS LATHYROIDES L.	Mel. sp.	Fiji	366	-
PHASEOLUS LIMENSIS Macf.	Mel. hapla	-	-	194
	Mel. incognita	-	-	201
	Mel. javanica	-	-	199
	Mel. sp.	-	-	231
	Rotylenchulus reniformis	-	-	180
	Trich. sp.	-	-	56
PHASEOLUS LIMENSIS Macf. vs. Fordhook US 242, N.R.B. U.S. 253, N.R.B. US 151	Mel. hapla	-	-	101
PHASEOLUS LIMENSIS Macf. vs. Westan & Wilbur	Prat. vulnus	-	-	154

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PHASEOLUS LIMENSIS Macf. v. LIMENANUS	Rotylenchulus reniformis	-	-	28
PHASEOLUS LUNATUS L.	Bel. gracilis	-	-	134
	Helico. digonicus	-	-	234
	Helico. dihystera	-	-	272
	Het. glycines	-	-	242
	Mel. incognita	USA	103,391	-
		-	-	1,120
	Mel. javanica	-	-	199
	Mel. sp.	-	261	34
	Prat. brachyurus	-	-	203
	Prat. coffeae	-	-	91
	Prat. penetrans	-	-	144
	Prat. scribneri	-	301	287
	Prat. vulnus	-	-	52
	Rotylenchulus reniformis	-	-	80
	Rotylenchus buxophilus	-	-	117
PHASEOLUS LUNATUS L. v. MACROCARPUS	Het. ? schachtii	-	-	64
	Mel. incognita	-	-	48
	Mel. javanica	-	-	48
	Mel. sp.	-	-	219
PHASEOLUS METCALFEI Woot. & Standl.	Mel. sp.	-	-	23
PHASEOLUS MULTIFLORUS Willd.	Dit. dipsaci	-	-	124
	Mel. arenaria	-	-	199
	Mel. incognita	-	-	199
	Mel. javanica	-	-	199
	Mel. sp.	-	-	78
PHASEOLUS RADIATUS L.	Het. cajani	-	540	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PHASEOLUS SEMIERECTUS L.	Het. glycines	-	-	242
	Mel. incognita	-	-	146
	Mel. javanica	-	448	64
		Brazil	840	-
	Mel. sp.	-	-	40
	Rotylenchulus reniformis	-	-	180
PHASEOLUS L. sp.	Dolichodorus heterocephalus	-	-	50
	Het. glycines	-	-	242
	Het. trifolii	-	-	113
	Mel. acronea	-	-	62
	Mel. incognita	-	289	-
	Mel. javanica	-	-	141
	Mel. sp.	-	-	40
PSOPHOCARPUS TETRAGONOLOBUS (L.) DC.	Mel. incognita	India	369	-
		Papua & New Guinea	217,219,236, 321	-
		Thailand	61	-
	Mel. javanica	-	-	226
	Mel. sp.	Ivory Coast	239	-
		Papua & New Guinea	175,242	-
		-	-	85
PSOROLEA BITUMINOSA L.	Het. glycines	-	-	242
PSORALEA CANDIDANS Eckl. & Zeyh.	Mel. arenaria	-	-	178
	Mel. hapla	-	-	178
	Mel. incognita	-	-	178
	Mel. javanica	-	-	178
PUERARIA PHASEOLOIDES (Roxb.) Benth.	Helico. sp.	-	-	187
	Mel. incognita	-	-	187
	Mel. javanica	-	-	119
	Mel. oteifae	Congo	657	-
	Mel. sp.	-	-	21

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
PUERARIA PHASEOLOIDES (Cont'd.)	Prat. brachyurus	-	-	187
	Rad. similis	-	-	187
PUERARIA THUMBERGIANA Benth.	Mel. arenaria	-	-	178
(DOLICHOS JAPONICUS Spreng.)	Mel. hapla	-	-	178
(P. HIRSUTA (Thunb.) Schneid.)	Mel. incognita	-	-	178
(P. LOBATA Willd.) Ohwi)	Mel. javanica	-	-	178
	Mel. sp.	-	-	270
	Rotylenchulus reniformis	Cuba	486	-
		-	-	80
PUERARIA sp.	Helico. sp.	India	-	CIP
	Hemicriconemoides brachyurus	India	-	CIP
	Mel. incognita	India	-	CIP
	Mel. sp.	Solomon Islands	-	CIP
RHYNCHELYTRUM REPENS (Willd.) C.E. Hubbard	Mel. arenaria	-	-	64
	Mel. javanica	-	-	199
RHYNCHOSIA INTERMEDIA Kotschy & Peyr.	Mel. sp.	-	-	23
RHYNCHOSIA MEMNONIA	Dit. sp.	Sudan	-	CIP
	Prat. sp.	Sudan	-	CIP
	Scutellonema clathricaudatum	Sudan	-	CIP
	Tylenchorhynchus sp.	Sudan	-	CIP
RHYNCHOSIA MINIMA (L.) DC.	Mel. incognita	Brazil	840	-
	Mel. javanica	-	-	200
RHYNCHOSIA PYRAMIDALIS Urb. in Fedde.	Mel. incognita	-	-	140
RHYNCHOSIA RESINOSA Hochst. ex Baker	Mel. sp.	-	-	152
RHYNCHOSIA TORMENTOSA Hook. & Arm.	Mel. sp.	-	-	35
SACCHARUM SPONTANEUM L.	Ang. spermophaga	-	-	271

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
SACCHARUM SPONTANEUM (Cont'd)	Het. sacchari	India	784	-
SACCHARUM L. sp. (hybrid)	Mel. incognita	Brazil	24	-
SACCHARUM L. sp.	Malenchus tantulus	Malawi	246	-
SECHIUM EDULE Sw.	Mel. javanica	-	-	64
	Mel. sp.	-	-	40
	Trich. sp.	-	-	56
SETARIA APICULATA Schum.	Mel. incognita	-	-	178
	Mel. javanica	-	-	178
SETARIA GLAUCA (L.) Beauv.	Mel. acronea	-	-	120
	Mel. incognita	-	-	178
	Mel. javanica	India	349	-
	Mel. sp.	-	-	189
	Paratylenchus projectus	-	-	69
	Prat. penetrans	-	-	6
	Trich. christiei	-	-	69
SETARIA HOMONYMA (Steud.) Chiov.	Mel. javanica	-	-	199
SETARIA ITALICA L. Beauv.	Het. zeae	India	298	-
	Mel. sp.	-	-	23
	Prat. zeae	-	-	83
	Tylenchorhynchus claytoni	-	-	165
SETARIA LINDBERGIANA (Nees) Stapf	Mel. incognita acrita	-	-	199
	Mel. javanica	-	-	199
SETARIA MEGAPHYLLA Dur. & Schinz.	Helico. sp.	-	-	187
	Hemicycliophora oostenbrinki	-	-	187
	Hemicycliophora paradoxa	-	-	187
	Mel. incognita	-	-	187
	Prat. brachyurus	-	-	187
	Xiph. setariae	-	-	187
	Xiph. sp.	-	-	187

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
SETARIA PALLIDIFUSCA Stapf & Hubb.	Mel. arenaria	-	-	199
	Mel. javanica	-	-	196
SETARIA PALMAEFOLIA	Aph. sp.	Papua & New Guinea	-	CIP
	Crossonema civellae	Papua & New Guinea	-	CIP
	Helico. crenacauda	Papua & New Guinea	-	CIP
	Helico. dihystera	Papua &	-	CIP
	Helico. microcephalus	Papua & New Guinea	-	CIP
	Helico. mucronatus	Papua & New Guinea	-	CIP
	Mel. sp.	Papua & New Guinea	-	CIP
	Rad. sp.	Papua & New Guinea	-	CIP
	Xiph. orthotenum	Papua & New Guinea	-	CIP
SETARIA SPHACELATA (Schum.) Stapf & C. E. Hubbard	Mel. incognita	-	-	177
	Mel. javanica	-	-	177
SETARIA SPLENDIDA Stapf	Helico. caveness	Nigeria	836	-
	Helico. dihystera	Nigeria	836	-
	Hemicriconemoides cocophillus	Nigeria	836	-
	Scutellonema clathricaudatum	Nigeria	836	-
	Tylenchorhynchus martini	Nigeria	836	-
SETARIA VERTICILLATA (L.) Beauv.	Mel. incognita	India	215	-
	Mel. javanica	-	-	199
	Mel. sp.	-	-	108
	Prat. ? pratensis	-	-	123
	Trich. mirzai	India	571	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
SETARIA VIRIDIS (L.) Beauv.	Aph. besseyi	-	-	305
	Bel. sp.	USA	123	-
	Het. schachtii = ? avenae	-	-	136
	Mel. sp.	-	-	277
	Prat. ? pratensis	-	-	72
SETARIA sp.	Mel. javanica	-	-	199
SORGHUM ALMUM Parodi	Mel. incognita	-	-	177
	Mel. javanica	-	-	177
SORGHUM ARUNDINACEUM (Desv.) Stapf	Aph. jodphurensis	India	624	-
	Mel. sp.	-	-	79
SORGHUM CAUDATUM Stapf	Mel. javanica	-	-	199
SORGHUM HALEPENSE (L.) Pers. (ANDROPOGON HALEPENSIS Brat.)	Dit. radicicola	USA	482	-
	Helico. dihystera	-	-	207
	Het. graminophila	USA	318	-
	Hop. columbus	USA	382	-
	Prat. brachyurus	USA	382	-
	Prat. zeae	USA	-	156
	Trich. sp.	USA	382	-
	Tylenchorhynchus martini	-	-	29
	Tylenchorhynchus sp.	-	-	25
SORGHUM OETHIOPICUM	Scutellonema clathricaudatum	Sudan	-	CIP
SORGHUM SUDANENSE (Piper) Stapf	Bel. longicaudatus	-	-	144
	Dit. radicicola	-	-	47
	Helico. dihystera	-	-	207
	Mel. incognita	-	-	285
	Mel. javanica	-	-	192
	Mel. sp.	-	-	293
	Paratylenchus projectus	-	-	69
	Prat. brachyurus	-	-	83
	Prat. penetrans	-	-	190
	Prat. scribneri	-	-	287

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
SORGHUM SUDANENSE (Cont'd)	Prat. zeae	-	-	83
	Trich. christiei	-	-	244
	Tylenchorhynchus claytoni			
SORGHUM VULGARE Pers.	Gymnotylenchus zeae	-	-	257
	Helico. dihystera	-	-	207
	Het. avenae	-	-	304
	Het. schachtii = ? avenae	-	-	136
	Mel. acronea	-	-	62
	Mel. hapla	-	-	178
	Mel. incognita	-	-	177,192
	Mel. javanica	-	-	177
	Mel. sp.	-	-	49,230
	Prat. brachyurus	-	-	83
	Prat. delattrei	-	-	184
	Prat. zeae	-	-	83
	Rotylenchulus reniformis	-	-	232
	Tylenchorhynchus claytoni	-	-	165
SORGHUM VULGARE Pers. v. Radar	Mel. acronea	-	-	120
SORGHUM Moench sp.	Paratylenchus obtusicaudatus	Kenya	453	-
	Prat. hexincisus	-	-	222
STIZOLOBIUM ATERRIMUM Piper & Tracy	Mel. javanica	Brazil	431	-
	Mel. sp.	-	-	265
STIZOLOBIUM DEERINGIANUM Bort. (MUCUNA DEERINGIANA (Bort.) Merr.)	Bel. gracilis	-	-	135
	Mel. arenaria	-	-	177
	Mel. hapla	-	-	177
	Mel. incognita	-	-	177
		Brazil	840	-
	Mel. javanica	-	-	245
	Mel. sp.	-	-	75
	Prat. brachyurus	-	-	187
	Rotylenchulus reniformis	-	-	80

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
STIZOLOBIUM PACHYLOBIUM Piper & Tracy	Mel. sp.	-	-	23
STIZOLOBIUM PRURIENS (L.) Medic.	Mel. sp.	-	-	23
STIZOLOBIUM UTILE Piper & Tracy	Mel. sp.	-	-	40
STIZOLOBIUM sp.	Mel. javanica	-	-	64
	Mel. sp.	-	-	264
STYLOSANTHES GRACILIS H.B.I.C.	Helico. pseudorobustus	Nigeria	836	-
	Scutellonema clathricaudatum	Nigeria	836	-
STYLOSANTHES HUMILIS H.B.K.	Mel. arenaria	Australia	838	-
	Mel. hapla	Australia	838	-
	Mel. incognita	Australia	838	-
	Mel. javanica	Australia	838	-
STYLOSANTHES SUNDAICA Taub.	Mel. javanica	-	-	64
STYLOSANTHES Sw. sp.	Mel. arenaria	-	-	30
TEPHROSIA ACACIAEFOLIA Welw.	Mel. sp.	-	-	151
TEPHROSIA CANDIDA (Roxb.) DC.	Mel. incognita	India	341	-
		-	-	187,289
	Mel. javanica	Brazil	840	-
		-	-	64
	Mel. sp.	-	-	264
	Prat. brachyurus	-	-	187
	Rad. similis	-	-	18
TEPHROSIA CINEREA (L.) Pers.	Mel. hapla	Brazil	28	-
TEPHROSIA CUNEATA	Helico. sp.	-	-	187
	Mel. incognita	-	-	187

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TEPHROSIA EYLESII Bak.	Mel. sp.	-	-	150
TEPHROSIA GODMANAE Bak.	Mel. sp.	-	-	152
TEPHROSIA LINEARIS (Willd.) Pers.	Mel. javanica	-	-	199
TEPHROSIA LONGIPES Meissn.	Mel. sp.	-	-	150
TEPHROSIA POLISTACHYA E. Mey	Mel. sp.	-	-	152
TEPHROSIA PURPUREA (L.) Pers.	Helico. sp.	-	-	187
	Mel. sp.	-	-	21
TEPHROSIA VILLOSA Pers.	Helico. sp.	-	-	187
TEPHROSIA VOGELII Hook. f.	Mel. arenaria	-	-	144
	Mel. incognita	India	341	-
	Mel. incognita	-	-	187
	Mel. javanica	-	-	296
	Mel. sp.	-	-	265
	Prat. loosi	-	-	296 (142), 97(181)
	Scutellonema brachyurum	-	-	98
TEPHROSIA Pers. sp.	Mel. sp.	-	-	149,152
TERAMNUS LABIALIS (L.f.) Spreng.	Mel. incognita	India	27	-
TERAMNUS UNCINATUS (L.) Sw.	Mel. incognita	Brazil	840	-
	Mel. javanica	Brazil	840	-
TERAMNUS VOLUBILIS Sw.	Mel. incognita	Brazil	840	-
THEMEDA AUSTRALIS (R. Br.) Stapf	Criconema alticolum	Australia	719	-
	Rad. intermedius	Australia	564	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM AGRARIUM L.	Het. glycines	-	-	242
TRIFOLIUM ALBUM	Mel. sp.	-	-	294
TRIFOLIUM ALEXANDRINUM L.	Het. glycines	United Arab Republic	654	-
		-	-	242
	Mel. hapla	-	-	168
	Mel. incognita	Egypt	150	-
		-	-	191,209
	Mel. javanica	Egypt	8	-
		-	811	-
	Mel. sp.	-	-	23
	Prat. sp.	-	423	-
	Trich. teres	-	-	167
	Tylenchorhynchus mashhoodi	India	113	-
TRIFOLIUM AMABILE H. B. K.	Mel. incognita	-	-	191
TRIFOLIUM ANGUSTIFOLIUM L.	Het. daverti	West Germany	9	-
	Mel. incognita	-	-	191
	Prat. penetrans	-	760	-
TRIFOLIUM ARVENSE L.	Dit. dipsaci	-	-	58
	Het. daverti	West Germany	9	-
	Mel. sp.	-	-	294
TRIFOLIUM BALANSE Boiss.	Het. glycines	-	-	242
TRIFOLIUM BURCHELLIANUM Ser.	Mel. javanica	-	-	199
TRIFOLIUM BURCHELLIANUM Ser. v. JOHNSTONII (Oliv.)	Mel. hapla	-	-	202
TRIFOLIUM CAMPESTRE	Het. daverti	West Germany	9	-
	Mel. hapla	Australia	155	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM CHERANGANIENSE Gillett	Mel. javanica	-	811	199
TRIFOLIUM CHERLERI L.	Mel. incognita	-	-	191
TRIFOLIUM DUBIUM Sibth.	Aglenchus costatus	-	493	-
	Het. trifolii	-	-	304
	Het. sp.	-	-	131
	Mel. hapla	Australia	155	-
	Mel. incognita	-	-	64
	Paratylenchus projectus	New Zealand	494	-
TRIFOLIUM FRAGIFERUM L (T. NEGLECTUM)	Dit. dipsaci	-	-	132
	Het. galeopsidis	-	-	304
	Het. trifolii	-	-	239
	Mel. javanica	-	-	199
	Mel. sp.	-	-	40
	Prat. penetrans	-	-	154
	Prat. thornei	Australia	457	-
TRIFOLIUM GLOMERATUM L.	Het. galeopsidis	-	-	304
	Mel. hapla	Australia	155	-
	Mel. incognita	-	-	191
TRIFOLIUM HIRTUM All.	Mel. javanica	-	811	-
TRIFOLIUM HYBRIDUM L.	Dit. destructor	-	-	133
	Dit. dipsaci	Norway	510	-
		-	403	3
	Helico. microlobus	-	-	282
	Het. trifolii	-	-	103
	Het. sp.	-	-	131
	Mel. hapla	-	-	38
	Mel. incognita acrita	-	777	-
	Mel. javanica	-	811	-
	Mel. sp.	-	-	39

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM HYBRIDUM (Cont'd)	Prat. penetrans	-	-	154
	Prat. ? pratensis	-	-	33
	Prat. sp.	-	777	-
	Trich. christiei	-	-	244
	Tylenchorhynchus maximus	-	-	12
TRIFOLIUM INCARNATUM L.	Bel. gracilis	-	-	135
	Dit. dipsaci	-	-	74
TRIFOLIUM INCARNATUM L.	Het. ? schachtii	-	-	136
	Het. trifolii	-	-	131
	Het. sp.	-	-	113
	Hop. columbus	USA	382	-
	Mel. incognita	-	-	191
	Mel. javanica	-	811	-
	Mel. sp.	-	-	93
	Paratylenchus projectus	-	-	69
	Prat. brachyurus	-	-	83
	Prat. penetrans	-	-	227
	Rotylenchulus reniformis	-	-	28
	Trich. christiei	-	-	244
	Tylenchorhynchus claytoni	-	-	165
TRIFOLIUM INCARNATUM L. v. Auburn	Het. trifolii	-	-	103
TRIFOLIUM INVOLUCRATUM Ort.	Dit. dipsaci	-	-	132
TRIFOLIUM ISTHMOCARPUM Brot.	Mel. incognita	-	-	191
TRIFOLIUM LAPPACEUM L.	Mel. incognita	-	-	191
	Mel. javanica	-	811	-
TRIFOLIUM MASAIENSE Gillett	Mel. javanica	-	811	-
TRIFOLIUM MEDIUM L.	Dit. dipsaci	-	-	246
	Mel. incognita	-	-	191

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM MEDIUM (Cont'd)	Mel. sp.	-	-	39
TRIFOLIUM MICHELIANUM Savi	Mel. incognita	-	-	191
	Mel. sp.	-	-	276
TRIFOLIUM MULTINERVE A. Rich	Mel. sp.	-	-	40
TRIFOLIUM NIGRESCENS Viv.	Mel. incognita	-	-	191
TRIFOLIUM PALLIDUM Waldst. & Kit.	Mel. incognita	-	-	191
TRIFOLIUM PANNONICUM Jacq.	Het. galeopsidis	-	-	304
	Het. trifolii	-	-	304
TRIFOLIUM PHLEOIDES Pourr.	Mel. incognita	-	-	191
TRIFOLIUM PRATENSE L.	Aph. composticola	USSR	393	-
	Aph. helophilus	USSR	393	-
	Aph. ritzemabosi	-	-	267
	Aph. saprophilus	USSR	393	-
	Aph. subtenuis	USSR	393	-
	Criconemoides curvatus	-	-	33
	Criconemoides lobatus	-	-	9
	Dit. destructor	-	-	133
	Dit. dipsaci	Denmark	276,659	-
		England	145,529	-
		Finland	649,796,806	-
		France	271	-
		New Zealand	599,722,723	-
		Northern Ireland	775	-
		Norway	510	-
		Sweden	430,469,670	-
		USA	669	-
		USSR	35,40	-
		-	295,320,334, 358,394,403,	166

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM PRATENSE (Cont'd)	Dit. dipsaci (Cont'd)		462,495,552, 633,755	
	Helico. crassatus	Canada	488	-
	Helico. dihystera	USSR	393	-
		-	-	192
	Helico. multicinctus	USSR	393	-
	Het. galeopsidis	-	508	304
	Het. lespedezae	-	779	-
	Het. ? schachtii	-	-	111
	Het. trifolii	Canada	818	-
		Northern Ireland	775	-
		USSR	393	-
		-	190,346,359, 400,407,508, 674,742,791	223
	Hop. galeatus	-	-	269
	Longidorus maximus	-	-	279
	Mel. arenaria	-	773	171
	Mel. artiellia	-	-	95
	Mel. hapla	Canada	163,572	-
		-	190,210,327, 407,593,812	101
	Mel. incognita	-	345,417,456	171
	Mel. javanica	-	811	171
	Mel. sp.	-	633	93
	Paratylenchus dianthus	-	813	-
	Paratylenchus projectus	USSR	34,96,484	-
		-	808,813	69
	Paratylenchus sp.	-	393	8
	Prat. brachyurus	-	-	63
	Prat. crenatus	Canada	46	-
	Prat. coffeae	-	-	63
	Prat. neglectus	-	-	17
	Prat. penetrans	Canada	15,46,65	-
		-	327,345,346,	130,154

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM PRATENSE (Cont'd)	Prat. penetrans (Cont'd)		456,562,593, 730,799,812	(215)
			730	
	Prat. ? pratensis	-	-	72
	Prat. pratensis	USSR	34,393	72,297
	Prat. scribneri	-	-	144
	Prat. sp.	-	-	144
	Rotylenchulus reniformis	-	-	28
	Rotylenchus robustus	-	812	-
	Scutellonema brachyurum	-	-	46
	Trich. christiei	-	-	244
	Tylenchorhynchus agri	Jamaica	18,20,21	-
		-	327,593,672	-
	Tylenchorhynchus brevidens	-	650	14
	Tylenchorhynchus claytoni	-	-	165
	Tylenchorhynchus dubius	USSR	263	-
		-	812	17
	Tylenchorhynchus martini	-	-	45
	Tylenchorhynchus maximus	-	-	17
	Xiph. americanum	-	680	14
TRIFOLIUM REPENS L.	Aglenchus costatus	-	493	-
	Aph. fragariae	-	-	71
	Dit. dipsaci	England	529	-
		New Zealand	535,723	-
		Norway	510	-
		Poland	73	-
		USA	669	-
		USSR	89	-
		-	536	32
	Helico. dihystera	-	-	207
	Helico. repens	Australia	275	-
	Hemicycliophora similis	-	-	9
	Het. daverti	West Germany	313	-
	Het. galeopsidis	-	508	304
	Het. humuli	-	666	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM REPENS (Cont'd)	Het. lespedezae	-	779	-
	Het ? schachtii	-	-	136
	Het. trifolii	Australia	275	-
		England	727	-
		Netherlands	736	-
		New Zealand	36,284,347, 428,519,520, 768	-
		Northern Ireland	775	-
		USA	776	-
		-	190,313,359, 400,508,600, 742,776,778, 791,810	239
	Longidorus maximus	-	-	279
	Mel. arenaria	-	-	171
	Mel. hapla	Canada	162,163,572	-
		New Zealand	284,347,428, 478,520	-
		-	190,210,683, 778,810	171
	Mel. incognita	Australia	275	-
		Canada	162	-
		USA	759	-
		-	183	171
	Mel. javanica	New Zealand	599	-
		-	811	171
	Mel. sp.	-	-	253
	Paratrichodorus minor	Australia	275	-
	Paratylenchus projectus	New Zealand	494	-
	Prat. brachyurus	Australia	275	63
	Prat. crenatus	-	-	255 (181)
	Prat. neglectus	-	-	14
	Prat. penetrans	USA	821	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM REPENS (Cont'd)	Prat. penetrans (Cont'd)	-	760,772,778, 804	-
	Prat. sp.	New Zealand	36	-
	Prat. zeae	Australia	275	-
	Rad. similis	-	-	87
	Rotylenchulus reniformis	-	-	28
	Trich. christiei	-	-	244
	Trich. teres	-	-	167
	Tylenchorhynchus brevidens	-	650	14
	Tylenchorhynchus claytoni	-	-	165
	Tylenchorhynchus dubius	-	-	159
	Tylenchorhynchus maximus	-	-	14
	Tylenchorhynchus sp.	-	-	299
	Xiph. radicicola	Australia	275	-
TRIFOLIUM REPENS v. LADINO	Bel. gracilis	-	-	135
	Dit. sp.	-	-	172
	Helico. dihystera	-	-	192
	Het. trifolii	-	-	103
	Hop. galeatus	-	-	192
	Mel. arenaria	-	-	171
	Mel. hapla	-	-	171
	Mel. incognita	-	-	171
	Mel. javanica	-	-	171
	Paratylenchus projectus	-	-	69
	Prat. penetrans	-	-	154
	Trich. christiei	-	-	192
	Tylenchorhynchus claytoni	-	-	192
TRIFOLIUM REPENS v. LATUM	Het. trifolii	-	-	242
TRIFOLIUM RESUPINATUM L.	Het. glycines	-	-	242
	Het. ? schachtii	-	-	206
	Het. sp.	-	-	131
	Mel. incognita acrita	-	-	191
	Mel. javanica	-	811	-
	Mel. sp.	-	-	52

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM RESUPINATUM (Cont.)	Prat. sp.	-	423	-
TRIFOLIUM RUBENS L.	Mel. sp.	-	-	294
TRIFOLIUM RUEPPELLIANUM Fresen.	Mel. javanica	-	811	199
TRIFOLIUM SCUTATUM Boiss.	Mel. incognita	-	-	191
TRIFOLIUM SEMIPILOSUM Fresen.	Het. glycines	-	-	242
	Het. trifolii	USA	776	-
	Mel. hapla	-	-	199
	Mel. javanica	-	811	199
TRIFOLIUM SPINOSUM L.	Mel. incognita	-	-	191
TRIFOLIUM SQUARROSUM Bieb.	Mel. incognita	-	-	191
TRIFOLIUM STEUDNERI Schweinf.	Mel. javanica	-	811	199
TRIFOLIUM STRIATUM	Het. daverti	West Germany	9	-
TRIFOLIUM SUBTERRANEUM L.	Het. trifolii	Tunisia	336	-
		-	407	-
	Mel. hapla	-	109,407	64
	Mel. incognita	-	-	191
	Mel. javanica	-	761,811	199
	Mel. sp.	-	-	40
TRIFOLIUM TEMBENSE Fresen.	Mel. incognita	-	-	191
	Mel. javanica	-	811	199
TRIFOLIUM TOMENTOSUM L.	Mel. incognita	-	-	191
TRIFOLIUM USAMBARENSE Taub. ex Engl.	Mel. javanica	-	811	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
TRIFOLIUM sp.	Anguillulina sp. (sic)	-	-	72
	Mel. sp.	-	-	40
	Prat. ? pratensis	-	-	110
	Rotylenchulus reniformis	-	-	28
TRIPSACUM LAXUM Nash	Helico. cavenessi	Nigeria	836	-
(T. FASCICULATUM Trin.)	Hemicycliophora sp.	Nigeria	836	-
(T. LATIFOLIUM Hitch.)	Prat. coffeae	-	-	16
	Prat. sp.	Nigeria	836	-
	Tylenchus sp.	Nigeria	836	-
VICIA AGRITINENSE	Mel. sp.	-	-	195
VICIA ANGUSTIFOLIA	Het. glycines	-	-	242
	Mel. arenaria	-	733,675	-
	Mel. hapla	-	733,675	116
	Mel. incognita	-	733,675	-
	Mel. javanica	-	733,675	-
	Mel. sp.	-	-	115
VICIA ATROPURPUREA Desf.	Het. glycines	-	-	242
	Het. goettingiana	-	-	223
	Het. schachtii	-	-	238
	Het. trifolii	-	-	223
	Mel. sp.	-	-	23
VICIA BENGHALENSIS L.	Prat. vulnus	-	-	154
VICIA BIENNIS L.	Mel. sp.	-	-	195
VICIA CALCARATA Desf.	Het. goettingiana	-	-	304
	Mel. arenaria	-	675	-
	Mel. hapla	-	675	-
	Mel. javanica	Egypt	8	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
VICIA CAROLINIANA	Het. glycines	USA	86	-
VICIA CORNIGERA	Mel. arenaria	-	675	-
	Mel. hapla	-	675	-
VICIA CRACCA L.	Dit. dipsaci	-	-	163
	Het. goettingiana	-	-	304
VICIA DISPERMA DC.	Het. glycines	USA	86	-
	Het. goettingiana	-	-	304
VICIA ERVILLIA Willd.	Het. goettingiana	-	-	224
	Het. trifolii	-	-	223
VICIA FABA L.	Dit. dipsaci	Netherlands	143	-
		-	-	31
	Helico. sp.	Spain	766	-
	Het. goettingiana	Spain	766	-
		-	765	175
	Longidorus maximus	-	-	279
	Mel. arenaria	-	-	201
	Mel. artiellia	-	-	95
	Mel. hapla	-	-	101
	Mel. incognita	Iraq	390	-
		-	533	64,199
	Mel. javanica	Egypt	8,42	-
		-	1,305,455, 514,554	197
	Mel. sp.	Spain	766	-
		-	-	23
	Merlinius viciae	Turkey	512	-
	Prat. neglectus	England	55	-
		Spain	766	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
VICIA FABA (Cont'd)	Prat. penetrans	-	286	225
	Prat. pinguicaudatus	-	200	-
	Prat. ? pratensis	-	-	124
	Prat. thornei	England	55	-
	Prat. vulnus	-	-	154
	Rad. similis	India	264	-
	Rotylenchulus reniformis	-	-	290
	Seinura propora	India	499	-
	Trich. sp.	-	465	-
	Tylenchorhynchus dubius	-	528	-
	Tylenchorhynchus parvus	Spain	766	-
	Tylenchorhynchus sp.	Spain	766	-
		-	465	-
VICIA GRANDIFLORA	Mel. arenaria	-	733	-
	Mel. hapla	-	733	-
	Mel. incognita	-	733	-
	Mel. javanica	-	733	-
VICIA HIRSUTA (L.) S.F. Gray	Het. glycines	USA	86	-
		-	-	242
	Het. ? schachtii	-	-	68
	Mel. hapla	-	-	179
	Mel. sp.	-	-	23
VICIA HYBRIDA L.	Mel. sp.	-	-	195
VICIA LATHYROIDES L.	Het. goettingiana	-	-	304
VICIA LEGANYANA	Mel. arenaria	-	675	-
	Mel. hapla	-	675	-
	Mel. incognita	-	675	-
	Mel. javanica	-	675	-
VICIA LUDOVICIANA Nutt.	Mel. sp.	-	-	195

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
VICIA LUTEA L.	Het. glycines	USA	86	-
		-	-	242
	Het. goettingiana	-	-	304
VICIA MICRANTHA	Het. glycines	USA	86	-
VICIA MONANTHOS Desf.	Het. ? schachtii	-	-	68
	Mel. sp.	-	-	23
VICIA NARBONENSIS L.	Het. glycines	-	-	242
	Het. ? schachtii	-	-	68
	Het. trifolii	-	-	113
	Mel. sp.	-	-	23
VICIA OROBUS DC.	Het. goettingiana	-	-	304
VICIA PANNONICA Crantz	Mel. sp.	-	-	195
VICIA PEREGRINA L.	Mel. sp.	-	-	195
VICIA POLYPHYLLA	Mel. sp.	-	-	195
VICIA PSEUDO-CRACCA Bertol.	Mel. sp.	-	-	23
VICIA SATIVA L.	Dit. destructor	-	-	133
	Dit. dipsaci	-	-	70
	Het. cajani	India	668	-
	Het. glycines	-	-	260
	Het. goettingiana	-	570	175
	Het. sp.	-	-	131
	Longidorus maximus	-	-	279
	Mel. arenaria	-	733	-
	Mel. hapla	-	733	-
	Mel. incognita	-	-	30

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
VICIA SATIVA (Cont'd)	Mel. javanica	-	-	212
	Mel. sp.	-	-	23
	Prat. penetrans	-	-	130 (215), 227
VICIA SATIVA x V. CORDATA	Mel. arenaria	-	675	-
	Mel. hapla	-	675	-
VICIA SEPIUM L.	Het. goettingiana	-	-	304
VICIA SERRATIFOLIA	Mel. arenaria	-	675	-
	Mel. hapla	-	675	-
VICIA STRICTA W. Young	Mel. sp.	-	-	195
VICIA TETRASPERMA (L.) Schreb.	Het. glycines	-	-	242
	Prat. ? pratensis	-	-	123
VICIA VARIA Host	Het. glycines	-	-	242
	Mel. arenaria	-	733	-
	Mel. hapla	-	733	-
	Mel. incognita	-	733	-
	Mel. javanica	-	733	-
	Mel. sp.	-	-	195
VICIA VILLOSA Roth.	Bel. longicaudatus	-	702	118
	Criconemoides curvatus	-	702,712,747	-
	Criconemoides lobatus	-	702	-
	Criconemoides morgensis	-	702	-
	Criconemoides mutabilis	-	702	-
	Criconemoides xenoplax	-	702	-
	Dit. dipsaci	-	-	204
	Het. humuli	-	606	-
	Het. glycines	-	-	259
	Het. ? schachtii	-	-	68
	Het. trifolii	-	-	113
	Hop. galeatus	USA	702	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
VICIA VILLOSA (Cont'd)	Mel. arenaria	-	702,733	-
	Mel. hapla	-	712,733,747	-
	Mel. incognita	-	702,733,747	203
	Mel. javanica	-	733	-
	Mel. sp.	-	-	23
	Paratylenchus curvitatus	USA	702	-
	Paratylenchus projectus	-	-	69
	Prat. crenatus	-	702	-
	Prat. penetrans	-	702	89 (181),154
	Rotylenchulus reniformis	-	-	80
	Rotylenchus uniformis	USA	702	-
	Scutellonema brachyurum	-	702,712	-
	Trich. christiei	-	702,712,747	244
	Tylenchorhynchus claytoni	-	-	165
	Xiph. americanum	USA	702	-
VICIA sp.	Het. glycines	-	-	242
	Het. goettingiana	-	-	174
	Mel. hapla	-	747	38
	Mel. sp.	USSR	91	-
		-	717	39
VIGNA DEKINDTIANA Harms.	Mel. sp.	-	-	150
VIGNA HOSEI (Craib) Backer	Rad. similis	-	-	18
VIGNA MUNGO (L.) Hepper (PHASEOLUS MUNGO L.)	Helico. sp.	Philippines	270	-
	Het. cajani	Brazil	840	-
		India	396,668	-
	Hop. sp.	Philippines	270	-
	Mel. arenaria	Philippines	205	-
		-	-	64
	Mel. hapla	-	-	64
	Mel. incognita	Fiji	-	CIP
		India	41	-
		Philippines	205,228,270	-
		-	212	64,289
	Mel. javanica	Philippines	205,270	-
		-	99	64

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
VIGNA MUNGO (Cont'd)	Mel. sp.	-	-	23
	Prat. brachyurus	-	-	63
	Prat. coffeae	-	-	91
	Prat. sp.	Philippines	270	-
	Rotylenchulus reniformis	Philippines	228,270	-
		-	212	-
	Tylenchorhynchus sp.	Philippines	270	-
VIGNA RADIATA (L.) Wilczek	Mel. javanica	-	250	-
	Rotylenchulus reniformis	-	2	-
VIGNA REPENS Baker	Mel. sp.	-	-	23
VIGNA SESQUIDPEDALIS (L.) Fruw.	Mel. incognita	-	-	286
	Mel. javanica	-	-	209
	Mel. sp.	Brunei	-	-
		-	-	85
	Prat. brachyurus	Brunei	-	CIP
	Pseudhalenchus sp.	Brunei	-	CIP
VIGNA UNGUICULATA (L.) Walp. (V. SINENSIS (L.) Endl.)	Bel. gracilis	-	-	51
	Helico. cavenessi	Nigeria	836	-
	Helico. dihystera	-	354	-
	Helico. pseudorobustus	Nigeria	502	-
	Hemicycliophora arenaria	-	-	128
	Het. cajani	India	396,668	-
		-	231,252,442	-
	Het. glycines	United Arab Republic	692	-
		-	-	242
	Het. graminis	Trinidad	273	-
	Het. ? schachtii	-	-	68
	Het. vigni	India	543	-
		-	416	-
	Hop. seinhorsti	Nigeria	502	-
	Mel. arenaria	Brazil	39	-
		-	-	102,124
	Mel. hapla	Brazil	39	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
VIGNA UNGUICULATA (Cont'd)	Mel. hapla (Cont'd)	USA	103	-
		-	-	124
	Mel. incognita	Brazil	22,39	-
		India	420	-
		Nigeria	45,290,323, 326,502,613	-
		United Arab Republic	692	-
		USA	103,553	-
		-	231,252,445	124
	Mel. javanica	Brazil	39	-
		India	19	-
		Nigeria	45	-
		USA	103	-
		-	254	124
	Mel. sp.	-	-	219
	Peltamigratus nigeriensis	Nigeria	836	-
	Prat. brachyurus	Nigeria	502,836	-
		-	-	203
	Prat. pratensis	-	-	107
	Prat. vulnus	-	-	52
	Rad. similis	-	-	87
	Rotylenchulus reniformis	Nigeria	502,836	-
		-	254,257,442, 531,637	180
	Scutellonema clathricaudatum	Nigeria	836	-
	Xiph. ifacolum	Nigeria	836	-
	Rotylenchus sp.	-	-	161
	Scutellonema bradys	Nigeria	64	-
	Trich. sp.	-	-	56
VIGNA UNGUICULATA (L.) Walp. V. IRON	Het. schachtii	-	-	238
	Mel. javanica	-	-	199
	Prat. vulnus	-	-	154
VIGNA WILMSII Burtt Davy	Het. glycines	-	325	242

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
VIGNA VEXILLATA (L.) A. Rich	Mel. incognita	-	-	13
	Mel. javanica	-	-	201
VIGNA VEXILLATA Benth. v. HIRTA	Mel. sp.	-	-	152
VIGNA Savi sp.	Discocriconemella mauritiensis	Mauritius	-	-
	Het. cajani	-	302,377,540	-
	Het. vigni	-	371	-
	Mel. arenaria	USA	767	-
		-	182	-
	Mel. ethiopica	Tanzania	612	-
	Mel. hapla	-	767	-
	Mel. incognita	Botswana	-	CIP
		India	10,37,44, 352	-
		Pakistan	16	-
		USA	767	-
		-	182,302,315, 357,377	-
	Mel. javanica	Botswana	-	CIP
		Egypt	42	-
		India	352	-
		USA	44,767	-
		-	1,182,619	-
	Mel. sp.	-	-	151
	Prat. sp.	Botswana	-	CIP
	Xiph. vanderlindei	South Africa	805	-
ZEA MAYS L.	Ang. tritici	GDR	90	-
		-	344	-
	Aph. arachidis	Nigeria	176	-
	Aph. echinocaudatus	USSR	688	-
	Aph. spinocaudatus	USSR	783	-
	Aph. subtenuis	USSR	504	-
	Aph. sp.	USSR	504	-
		-	304	-
	Basiroides nortoni	USA	646	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ZEA MAYS (Cont'd)	Bel. gracilis	-	-	273
	Bel. longicaudatus	USA	83,131,158, 227,443	-
		-	648,547,477, 446,258,503, 511	170
	Bel. sp.	USA	123	-
		-	196,526,785	-
	Coslenchus alacinatus	Portugal	50	-
	Criconemoides ornatus	Brazil	731	-
		USA	459,460	-
		-	258,477,547	-
	Criconemoides sp.	Egypt	79,660	-
		Brazil	408	-
		USA	232	-
		-	196,216,363, 503,526,785	-
	Dit. dipsaci	East Germany	395	-
		France	126,172,440, 480,497,530, 565	-
		Poland	124	-
		West Germany	133,643	-
		USSR	90,504,783	-
		Yugoslavia	451,532	-
		-	415,476	-
	Dit. mirus	India	781	-
	Dit. radicicola	USA	482	-
	Dit. mirus	India	781	-
	Dit. radicicola	USA	482	-
	Dit. sp.	-	634	-
	Dolichodorus heterocephalus	-	-	51
	Gymnotylenchus zeae	-	-	257
	Helico. cavenessi	Nigeria	836	-
	Helico. digonicus	USA	741	-
		-	-	234
	Helico. dihystera	USA	459	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ZEA MAYS (Cont'd)	Helico. dihystera (Cont'd)	-	363	261
	Helico. erythrinae	India	578	-
		Mexico	173	-
	Helico. microlobus	Nigeria	836	-
		USA	331,734	-
		-	-	282
	Helico. multicinctus	USSR	504	-
	Helico. pseudorobustus	Nigeria	83,836	-
		USA	67,192	-
		-	282,304	-
	Helico. sp.	Brazil	342	-
		Canada	498	-
		Costa Rica	216	-
		Egypt	660	-
		India	58	-
		USA	498,793	-
		Yugoslavia	452	-
		Zimbabawe	573	-
		-	196,503,634	203
	Hemicycliophora parvana	-	-	247
	Hemicycliophora sp.	Egypt	660	-
	Het. avenae	Canada	735	-
		East Germany	429	-
		France	172,470,480	-
		India	487,784	-
		Netherlands	214	-
		Poland	124	-
		Switzerland	87,343	-
		USA	177	-
		West Germany	90,104, 129,211,310, 380,429,518	-
		-	14,218,432, 557,634,830	-
	Het. glycines	United Arab Republic	654	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ZEA MAYS (Cont.)	Het. punctata	Mexico	439	-
		Yugoslavia	532	-
	Het. ? schachtii	-	-	136
	Het. zeae	Colombia	52	-
		India	75,298,368, 379,636	-
	Het. sp.	India	578	-
	Hexatylus vigissi	USSR	783	-
	Hop. abelmoschi	India	513	-
	Hop. aegypti	Egypt	79,386	-
	Hop. galeatus	Egypt	11	-
		USA	142,192,831	-
		-	304	60
	Hop. indicus	India	141,578	-
		-	409,482	-
	Hop. seinhorsti	-	-	185
	Lobocriconema zeae	South Africa	294	-
	Longidorus breviannulatus	USA	117,142,454	-
	Longidorus elongatus	Canada	463	-
	Longidorus maximus	-	-	279
	Longidorus mirus	India	544	-
	Longidorus reneyii	India	712	-
	Longidorus sp.	Egypt	660	-
		USA	106	-
	Malenchus nanellus	Nigeria	246	-
	Mel. arenaria	Yugoslavia	451	-
		-	467,629	178,248
	Mel. chitwoodi	USA	69	-
	Mel. hapla	Bulgaria	504	-
		USA	125	-
		USSR	505	-
	Mel. incognita	Italy	110	-
		Japan	63	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ZEA MAYS (Cont'd)	Mel. incognita (Cont'd)	Nigeria	83,789	-
		USA	459,460	-
		Yugoslavia	451	-
		-	62,199,226, 258,363,503, 621,629,645	248
	Mel. javanica	Egypt	147	-
		Japan	63	-
		Yugoslavia	451	-
		-	226,360,629	248
	Mel. naasi	Netherlands	152	-
		USSR	90	-
	Mel. sp.	Nigeria	139	-
		USSR	504,798	-
		Yugoslavia	532	-
		-	180,196,216	49,219
	Paratylenchus microdorus	USA	67	-
	Paratylenchus projectus	-	-	69
	Paratylenchus sp.	Egypt	660	-
	Prat. brachyurus	Brazil	703,731	-
		Nigeria	157,207,317, 450,836	-
		South Africa	255	-
		USA	232	-
		Zimbabwe	628	-
		-	269,330,333, 401,777,816	273
			509	
	Prat. crenatus	Canada	365	-
		USA	763	-
		Yugoslavia	451	-
		-	224	205, 225(181)
	Prat. delattrei	-	233,303, 557,634	184

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ZEA MAYS (Cont'd)	Prat. hexincisus	USA	107,831	-
		-	304,308, 235,3	283
	Prat. loosi	-	-	143
	Prat. minyus	Canada	527	-
	Paratylenchus nanus	USSR	56	-
	Prat. neglectus	West Germany	127	-
		Yugoslavia	451	-
		-	-	225
	Prat. penetrans	Canada	128,365,527	-
		Mexico	173	-
		Netherlands	143	-
		South Africa	255	-
		USA	80,223,743, 762,793	-
		USSR	504	-
		West Germany	127,211	-
		-	224,491, 517,809	269 (181)
	Prat. pratensis	USSR	56,504	-
	Prat. scribneri	Nigeria	309	-
		USA	142	-
		-	3,304	46
	Prat. sefaensis	Senegal	410	-
	Prat. thornei	Australia	49	-
		India	111	-
		-	-	242
	Prat. zeae	Brazil	342,703	-
		Bulgaria	125	-
		Egypt	79,660,662	-
		India	541	-
		Nigeria	207	-
		South Africa	255,262	-
		USA	232,579	-
		-	269,330,363, 401,547,586, 634,638,640,	129

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ZEA MAYS (Cont'd)	Prat. zeae (Cont'd)	-	693,777,816	
	Prat. sp.	Canada	498	-
		Egypt	660	-
	Prat. sp.	England	55,200	-
		France	172	-
		India	578	-
	Prat. sp.	Netherlands	112	-
		Nigeria	83,105,836	-
		Pakistan	350	-
		Poland	124	-
		USA	67,97,197, 223,460,498	-
		USSR	90	-
		West Germany	104,153, 211,380,429	-
		Yugoslavia	452,532	-
		Zimbabwe	573	-
		-	258,503,526, 734	-
	Punctodera chalcoensis	Mexico	337	-
	Punctodera punctata	Mexico	173	-
	Rad. similis	Zimbabwe	628	-
		-	-	87
	Rotylenchoides impar	India	53	-
	Rotylenchulus borealis	Bulgaria	125,213	-
		Italy	57	-
		Yugoslavia	452	-
	Rotylenchulus parvus	-	202	-
	Rotylenchulus reniformis	-	634,697	180
	Rotylenchulus sp.	South Africa	255	-
		Zimbabwe	573	-
	Rotylenchus variabilis	Zimbabwe	500	-
	Rotylenchus sp.	Egypt	660	-
		South Africa	255	-
		Yugoslavia	452	-
	Scutellonema brachyurum	South Africa	255	-

HOST	NEMATODE	COUNTRY	ABSTRACT	REFERENCE
ZEA MAYS (Cont'd)	Scutellonema clathricaudatum	Nigeria	836	-
	Trich. christiei	-	503	-
	Trich. primitivus	-	-	57
	Trich. sp.	-	526	56
	Tylenchorhynchus brassicae	India	578	-
	Tylenchorhynchus brevidens	-	-	169
	Tylenchorhynchus claytoni	-	-	220
	Tylenchus sp.	India	578	-
	Xiph. americanum	-	-	302
	Xiph. sp.	-	-	233

SECTION 2A

Bibliography

ABSTRACTS

0001 KHEIR, A. M.; FARAHAT, A. A. Comparative interaction of *Meloidogyne javanica* and five leguminous hosts. *Phytopathologia Mediterranea* (1981) 20 (2-3) 141-143 [En, it; 7 ref.] Dep. of Nematol. & Agric. Zool., Fac. of Agric., Cairo Univ., Giza, Egypt.

In a pot experiment, *M. javanica* developed and multiplied better on common bean, pea and cowpea than on broad bean and soyabean. Syncytia were formed in the cortical and stelar regions of the former legumes but only in the stele of the latter. Common bean, pea and cowpea had the largest syncytial size.

*0002 GUPTA, D. C.; YADAV, B. S. Note on the pathogenicity and on relative susceptibility of greengram varieties to *Rotylenchulus reniformis*. *Indian Journal of Agricultural Science* (1982) 52 (1) 41-42 [En, 9 ref.] Univ. of Udaipur, Udaipur, Rajasthan 313001, India.

In a pot experiment, *Vigna radiata* cv. H70-16 was inoculated with 10, 100, 1000 or 10000 *R. reniformis*/pot. Plant height, fresh shoot weight, fresh root weight and number of nodules/plant were all reduced with increasing inoculum density. Reproduction was maximum with the 100 inoculum density.

*0003 WALUDO, S. W.; NORTON, D. C. Population changes of *Pratylenchus hexincisus* and *P. scribneri* in maize inbred lines. *Plant Disease* (1983) 67 (12) 1369-1370 [En, 9 ref.] Dep. of Pl. Path. Seed & Weed Sci., Iowa State Univ., Ames, IA 50011, USA.

Population changes of *P. hexincisus* and/or *P. scribneri* in 18 maize inbred lines were studied in the glasshouse or field. Hybrids A619Ht × A632Ht and Mo17Ht × B73Ht, or C123Ht, hosts of these nematodes, served as checks to monitor suitability of the environment for nematode reproduction. Inbred C123Ht, Mo17Ht and W64AHt supported significantly more *P. scribneri*/g of dry root than other entries. Inbred C123Ht also supported significantly more *P. hexincisus*/g of dry root than other cultivars. Inbred A632Ht, B37Ht and B68Ht supported significantly fewer *P. scribneri* than other entries.

0004 QUESENBERRY, K. H.; SOFFES, A. R.; BALTENSPERGER, D. D.; DUNN, R. A. Response of *Aeschynomene* and *Desmodium* spp. to *Meloidogyne* spp. [Abstract]. In *Agronomy Abstracts*. Madison, Wisconsin, USA: American Society of Agronomy (1983) 76 [En] Florida Univ., Gainesville, USA.

In greenhouse tests, over 50% of the 110 *Ae. americana* introductions tested rated 3 or more (0 = no root galls, 5 = over 100 root galls/plant) in response to *M. incognita* and 89 and 50% rated 2 or less in response to *M arenaria* and *M. javanica*, respectively. Three of 12 *D. heterocarpon* introductions tested were resistant to *M. incognita* and all rated 3 or more in response to *M. arenaria* and *M. javanica*. Eleven *Ae. americana* and three *D. heterocarpon* lines, varying in glasshouse response to *Meloidogyne* species, were grown in an artificially infested field. Field and glasshouse results were generally in good agreement.

0005 SIDDIQI, M. R.; LENNÉ, J. M. *Pterotylenchus cecidogenus* n.gen., n.sp., a new stem-gall nematode parasitizing *Desmodium ovalifolium* in Colombia. *Journal of Nematology* (1984) 16 (1) 62-65 [En, 2 ref.] Commonwealth Inst. of Parasit., St. Albans, Herts AL4 0XU, UK.

P. cecidogenus n.g., n.sp. from stem-galls of *D. ovalifolium* in Colombia is described and illustrated. The new genus belongs to Anguinidae and is related to *Orrina*, but is unique in having large vulval flaps. *P. cecidogenus* has females with body 0.59-0.8 mm long, stylet 9-11 µm long, no median oesophageal bulb, a crustaformeria of 32-36 cells, a short post-vulval uterine sac, and a conical pointed tail.

0006 ALPAT'EV, N. M. [Effectiveness of evaluating lucerne varieties under conditions of infection.] *Selektsiya i Semenovodstvo, USSR* (1981) No. 3, 16-17 [Ru]

An evaluation of many varieties of different species in the northern Caucasus for resistance to *Heterodera medicaginis* and *Fusarium* wilt (caused primarily by *F. oxysporum*) revealed only a few with resistance, notably a local variety from Armenia (K29241), a *Medicago polychroa* form from the Georgian SSR (K16692), a Mediterranean variety (K19921) and forms from India (K21386) and Asia Minor (K19918).

0007 HELLINGA, J. H.; BOUWMAN, J. J.; SCHOLTE, K.; S'JACOB, J. J. Causes of root rot in maize on sandy soil. *Netherlands Journal of Plant Pathology* (1983) 89 (5) 229-237 [En, nl, 9 ref.] Dep. of Field Crops and Grassland Sci., Agric. Univ., Haarweg 333, 6709 RZ Wageningen, the Netherlands.

In an outdoor pot trial to study the causes of root rot in maize, *Pratylenchus crenatus* and *Tylenchorhynchus dubius* were found to be harmless. The application of oxamyl did not significantly improve the health of the root system.

0008 SALEM, F. M. [Suitability of certain winter crops and winter weeds as hosts of root-nematodes in Egypt.] Über die Eignung einiger Winterkulturen und Winterunkräuter als Wirtspflanzen von Wurzelnematoden in Ägypten. *Anzeiger für Schädlingskunde Pflanzenschutz Umweltschutz*. (1983) 56, 131-132 [De, en, 3 ref.] Fac. of Agric., Shebin El-Kom, Egypt.

Five Egyptian winter crops and associated weeds were pot and field tested in 1981-82. The roots of *Vicia faba* and *Trifolium alexandrinum* and of their associated weed *V. calcarata* were heavily infected with *Meloidogyne javanica*. *Triticum vulgare* was not infected. The herbicidal elimination of *V. calcarata* is an important factor in the control of this nematode.

0009 NORDMEYER, D.; SIKORA, R. A. Four new hosts for *Heterodera daverti*. *Nematologia Mediterranea* (1983) 11 (1) 101-102 [En, 5 ref.] Inst. für Pflanzenkrankheiten, Univ. Bonn, 5300 Bonn 1, GFR.

Trifolium angustifolium, *T. arvense*, *T. campestre* and *T. striatum* are reported as being new hosts for *H. daverti*.

0010 REDDY, P.P.; SINGH, D.B. Chemical control of Meloidogyne incognita on selected crops. Nematologia Mediterranea (1983) 11 (2) 197-198 [En, 1 ref.] Div. of Entomol. & Nematol., Indian Inst. of Hort. Res., Bangalore 560080, India.

Trials in Bangalore, India, showed aldicarb, applied at 1 kg a.i/ha, to have economic value in the control of M. incognita on okra, brinjal, french bean and cowpea.

0011 WILLUT, J. M. Studies on the biology, pathogenicity and control of the lance nematode, *Hoplolaimus galeatus*, on dent corn, *Zea mays*. [Abstract]. *Dissertation Abstracts International, B* (1983) 44 (6) 1667B [En, Order No DA8324672] Illinois Univ., Urbana, USA.

In a greenhouse test, all cultivars studied supported reproduction of the nematode, but the degree varied widely. Seven inbreds supported more nematodes in roots than did seven hybrids. Yields differed widely among hybrids both on untreated soil and in response to nematicide treatment.

0012 INSERRA, R. N.; O'BANNON, J. H.; DI VITO, M.; FERRIS, H. **Response of two alfalfa cultivars to *Meloidogyne hapla*.** *Journal of Nematology* (1983) 15 (4) 644-646 [En, 17 ref.] Ist. Nematol. Agraria, CNR, Bari, Italy.

The relationship between the initial densities of 2 native populations of *M. hapla* and lucerne growth was studied in glasshouse experiments in Bari, Italy, and Prosser, Washington, USA, on *M. hapla* susceptible 'Washoe' and resistant 'Nevada Syn XX' cultivars. There was a greater tolerance limit in both cultivars to the Italian *M. hapla* population than to the American population.

*0013 WHITE, R. H.; DICKENS, R. **Plant-parasitic nematode populations in bermudagrass as influenced by cultural practices.** *Agronomy Journal* (1984) 76 (1) 41-43 [En, 13 ref.] Department of Agronomy and Soils, Auburn University, AL 36849, USA.

A 3-year study was initiated in May 1978 on Dothan sandy loam to determine the effects of N sources, core aerification, vertical mowing, and sand topdressing on nematode populations. Stubby root (*Trichodorus* spp.), ring (*Criconemoides* spp.), stunt (*Tylenchorhynchus* spp.), and spiral (*Helicotylenchus* spp.) nematodes were the principal spp. present. Lower populations occurred where activated sewage sludge was the source of N than where NH_4NO_3 was applied. Topdressing, vertical mowing and core aerification treatments had no consistent effects on populations. The grass selection Dothan supported higher populations of stunt and stubby root nematodes but fewer spiral nematodes than did Tifdwarf or Tifgreen. Tifdwarf supported the greatest overall nematode population.

0014 SAEFKOW, M. **[Pathotype investigations with populations of *Heterodera avenae* in maize.]** Pathotypenuntersuchungen mit Populationen von *Heterodera avenae* an mais. *Zeitschrift für Pflanzenkrankheiten und Pflanzenschutz* (1983) 90 (4) 337-344 [De, en, 30 ref.] Institut für Angewandte Botanik der Univ. Hamburg, Marseiller Strasse 7, D-2000 Hamburg 36, GFR.

H. avenae pathotype A (Hamburg district, GFR), pathotype E (Storman district) and pathotype mixture C + D (Straubing district, southern Germany) were studied in the glasshouse and the first two also in field trials. Pathotype A produced the largest numbers of cysts, followed by E and C + D. All 11 maize varieties studied became infected with all 3 pathotypes, vars. Adour, Forla and Primeur being preferred. Additionally, pathotype A gave higher cyst numbers also on vars. Brillant, Limac and Prior, pathotype E also on Anjou 21 and pathotypes C + D also on Limac and Velox. The population levels achieved were of little importance to all the varieties studied. Pathotype A was the most virulent: yield losses for A were, for all except 2, over 10%, and for many, over 20%; pathotype E gave a yield reduction of 20% in only 2 cases.

*0015 WILLIS, C. B.; KIMPINSKI, J.; THOMPSON, L. S. **Reproduction of *Pratylenchus crenatus* and *P. penetrans* on forage legumes and grasses and effect on forage yield.** *Canadian Journal of Plant Pathology* (1982) 4 (2) 169-174 [En, fr, 14 ref.] Research Sta., Agric. Canada, Charlottetown, Prince Edward Island C1A 7M8, Canada.

The reproduction of *P. crenatus* and *P. penetrans* and their effect on forage yield were determined on lucerne, birdsfoot trefoil, red clover, bromegrass, orchardgrass and timothy in glasshouse and field experiments in Canada. *P. crenatus* did not affect the yield of any of the hosts although reproduction was good on timothy. *P. penetrans* reproduced well on legumes and timothy and reduced yields of birdsfoot trefoil, red clover and lucerne in descending order.

0016 PAKISTAN BOTANICAL SOCIETY **Abstracts of papers presented to the 1st All Pakistan Conference of Plant Scientists, 23-26 February 1982, Department of Botany, University of Karachi.** *Pakistan Journal of Botany* (1982) 14 ((February)) 1-50 [En]

Abstracts of papers of nematological interest presented at the conference include: Studies of some Criconematidae (Nematoda) from Pakistan associated with fruit plants — by M.A. Maqbool; Association of *Merlinius brevidens* with important crops of Pakistan — M.A. Maqbool, N. Fatima and H. Saleha; Studies of plant-parasitic nematodes associated with pear (*Pyrus communis*) in Pakistan — M.A. Maqbool and S. Hashmi; Variation in plant-parasitic nematode population at various depths and moisture content on okra planted soil — A. Khan; Effect of interaction between *Meloidogyne incognita* and *Rhizobium japonicum* on the growth of cowpea — M. Athar, Z. Akbar, A. Mahmood and M.A. Maqbool; An autecological study of anhydrobrosis in some phytonematodes — M. Saeed and J. Roessner; Primary plant health care — nematode-free corms of banana — M. Saeed, S.A. Khan, F. Qamar and H.A. Khan.

0017 TARJAN, A. C.; FREDERICK, J. J. **Reaction of nematode-infected centipedegrass turf to pesticidal and non-pesticidal treatments.** *Proceedings of the Florida State Horticultural Society* (1981) 94, 225-227 [En, 2 ref.] Univ. of Florida, IFAS, Entomology & Nematology Dep., Gainesville, FL 32611, USA.

Centipedegrass turf (*Eremochloa ophiuroides*) at the University of Florida, USA, infected mainly with *Hemicycliophora parvana* and *Macroposthonia sphaerocephala* was treated with Ekol leaf mould, Cytex cytokinins, bendiocarb, Seaborn kelp-extract, phenamiphos-fensulfothion mixture, phenamiphos, ethoprop or ethylene dibromide. The phenamiphos-fensulfothion mixture and ethoprop treatments gave greatest reduction in nematode numbers. Highest grass yields were obtained with leaf mould, followed by ethoprop and phenamiphos-fensulfothion mixture (respectively 61, 45 and 39%) more than untreated control plots.

0018 COATES-BECKFORD, P. L. **Developmental biology and feeding behaviour of *Tylenchorhynchus agri* on two hosts, *Trifolium pratense* and *Poa pratensis*.** *Nematropica* (1982) 12 (1) 1-5 [En, es, 12 ref.] Dep. of Bot., Univ. of the West Indies, Mona, Kingston 7, Jamaica.

Eggs of *Tylenchorhynchus agri* were deposited as a single cell and the embryogeny was similar to that of some other *Tylenchorhynchus* spp. At 27°C eggs hatched 7 days after oviposition and the 2nd-, 3rd- and 4th-stage juveniles and adults were formed at 7, 13, 19 and 25 days respectively after oviposition. Nematodes fed ectoparasitically on *Trifolium pratense* and *P. pratensis* with only the stylet tip inserted in epidermal cells of the root-hair zone. The duration of feeding was usually less than 5 min.

0019 GUPTA, D. C. **Studies on the pathogenicity and relative susceptibility of some varieties of cowpea (*Vigna unguiculata* L. Walp.) against *Meloidogyne javanica*.** *Forage Research* (1979) 5 (2) 141-145 [En, 13 ref.] Dep. of Nematology, Haryana Agric. Univ., Hissar 125004, India.

Cowpea cv. HFC 42-1 inoculated with 1000 or 10 000 larvae of *M. javanica*/500 g of soil showed a significant reduction in height and fresh shoot and root weight. Out of 63 cowpea cvs. tested, vars. HFC-12, HFC-311 and C-28 showed resistance to *M. javanica*.

0020 COATES-BECKFORD, P. L. **Influence of temperature and initial population density on population development and pathogenicity of *Tylenchorhynchus agri* on *Trifolium pratense* and *Poa pratensis*.** *Nematropica* (1982) **12** (1) 15-20 [En, 5 ref.] Dep. of Bot., Univ. of the West Indies, Mona, Kingston 7, Jamaica.

At initial densities of 0 to 10 000 *Tylenchorynchus agri*/pot and temperatures ranging from 22-36°C the rate of population increase was faster at lower densities and at higher temperatures on *P. pratensis* and *Trifolium pratense*. At 30 and 34°C and fluctuating temperatures (23-36°C) plant weights decreased with increasing initial nematode densities. If shoots of *T. pratense* were clipped during growth, plant weight was decreased with the higher density of *Tylenchorhynchus agri* at 22 and 26°C.

0021 COATES-BECKFORD, P. L.; MALEK, R. B. **Influence of time on population development and pathogenicity of *Tylenchorhynchus agri* on *Trifolium pratense*, *Poa pratensis* and *Triticum aestivum*.** *Nematropica* (1982) 12 (1) 7-14 [En, es, 5 ref.] Dep. of Bot., Univ. of the West Indies, Mona, Kingston 7, Jamaica.

In a 12 month glasshouse study begun in December, populations of *Tylenchorhynchus agri* reached maximum levels on winter wheat in May and in July on *P. pratensis* and *Trifolium pratense* when numbers were between 50 and 100 times the initial density of 2000 nematodes/pot for the wheat and forage crops respectively. Dry weights of clippings of the grass and clover were less in inoculated pots between May-July. *Tylenchorhynchus agri* had no apparent harmful effect on a first crop of wheat but in a second sowing in pots containing high populations, stature and total dry matter were decreased.

0027 SHARMA, R. D. [Susceptibility of cowpea cvs. to *Meloidogyne javanica*.] Suscetibilidade de cultivares de caupi (*Vigna unguiculata* (L.) Walp.) ao nematóide *Meloidogyne javanica* (Treub, 1885) Chitwood, 1949. In *Trabalhos apresentados à V Reunião Brasileira de Nematologia. 9-13 fevereiro de 1981, Londrina, PR, Brasil. Publicação No.5, 1981.* Piracicaba, SP, Brazil; Sociedade Brasileira de Nemtologia (1982) 159-169 [Pt, en, 21 ref.] EMBRAPA/CPAC. CP 70.0023, 73.300 Planaltina, DF, Brazil.

Of 12 *V. unguiculata* cvs. grown in pots inoculated with 30 000 eggs and larvae of *M. javanica*, only V-4 Alagoas, IPEAN V-69-S252 and Jaguaribe showed good tolerance after 55 days. The rest were susceptible or highly susceptible.

* **0023** SHARMA, R. D.; MEDEIROS, A. C. DE S. **[Reaction of some sweet sorghum genotypes to *Meloidogyne javanica* and *Pratylenchus brachyurus*.]** Reações de alguns genótipos de sorgo sacarino aos nematóides, *Meloidogyne javanica* e *Pratylenchus brachyurus*. *Pesquisa Agropecuária Brasileira* (1982) 17 (5) 697-701 [Pt, en, 9 ref.] CPAC, EMBRAPA, Caixa Postal 70.0023, CEP 73300, Planaltina, DF, Brazil.

In Brazil 16 *Sorghum bicolor* genotypes were screened for resistance to *M. javanica* and *P. brachyurus* in a greenhouse at 25 to 28 °C. Evaluations for root galls, egg mass development of *M. javanica* and final populations of both nematode species in soil and in root and plant growth were made separately for each container 54 days after inoculations. Genotypes BR 601, CMS × S 733, BR 502, SART, CMS × S 734 and BR 503 were highly resistant; BR 501 and CMS × S 719 were resistant; CMS × S 735, BR 500, CMS × S 623, CMS × S 516, BR 602 and CMS × S 603 were moderately resistant to *M. javanica*. All the genotypes were susceptible to *P. brachyurus* except SART, which was moderately resistant. Out of the 4 genotypes CMS × S 734, BR 503, CMS × S 719 and CMS × S 732 tolerant to *P. brachyurus*, only genotype CMS × S 732 was also tolerant to *M. javanica*.

0024 MOURA, R. M. DE; LEITE, M. C. DA C.; WANG SENG LANG **[Parasitism of *Meloidogyne incognita* on *Saccharum* hybrid seedlings.]** Estudos sobre o parasitismo de *Meloidogyne incognita* (Kofoid & White, 1919) Chitwood, 1949 em plântulas de híbridos de *Saccharum* sp. In *Trabalhos apresentados à V Reunião Brasileira de Nematologia, 9-13 fevereiro de 1981, Londrina, PR, Brasil. Publicação No.5, 1981.* Piracicaba, SP, Brazil; Sociedade Brasileira de Nematologia (1982) 41-50 [Pt, en, 10 ref.] Univ. Fed. Rural de Pernambuco, Recife, Brazil.

Pot trials on 19 hybrids of *Saccharum* inoculated with about 20 000 ova or larvae of *M. incognita* showed that although galling was high in some hybrids, all were tolerant to infection. Hybrids CB 45-3, Co 997 and CP 51-27 were inoculated with 4000 ova, and the development of the infection monitored at 5-day intervals and compared with a susceptible tomato variety. The 3 hybrids were poor hosts.

0025 SIDDIQI, M. R.; MUKHERJEE, B.; DASGUPTA, M. K. ***Tylenchorhynchus microconus* n.sp., *T. crassicaudatus leviterminalis* n.subsp. and *T. coffeae* Siddiqi & Basir, 1959 (Nematoda: Tylenchida).** *Systematic Parasitology* (1982) 4 (3) 257-262 [En, 6 ref.] Commonwealth Inst. of Parasit., 395A Hatfield Rd., St. Albans, Herts, AL4 0XU, UK.

T. microconus n.sp. from around the roots of *Acacia auriculiformis* from Birbhum, West Bengal, India, is described and figured. It is characterized by having females 0.46 to 0.65 mm long with coarse body annules, spear 15 to 18 µm long, short conoid tail with 10 to 15 annules and smooth terminus. *T. crassicaudatus leviterminalis* n.subsp. from soil around banana, mango and *Artocarpus integrifolia* from West Bengal is distinguished from *T. c. crassicaudatus* by lacking transverse striae in the lip region. The description of *T. coffeae* is amplified.

0026 RAM NATH; DWIVEDI, R. P. **Effect of root-knot nematode on development of gram caused by *Fusarium oxysporum f. ciceri* and root rot by *Rhizoctonia* sp.** *Indian Journal of Mycology and Plant Pathology* (1981) **11** (1) 46-49 [En, hindi, 9 ref.] Dep. of Pl. Path., Chandra Shekhar Azad Univ. of Agric. & Technology, Kanpur, India.

Inoculation of gram with *Meloidogyne* and *Fusarium* or *Meloidogyne* and *Rhizoctonia* caused wilt and root-rot symptoms to be exhibited earlier and to a greater extent than when inoculated with either fungus alone. The role of *Meloidogyne* in the pathogenicity of *Fusarium* and *Rhizoctonia* is discussed.

* **0027** SHUKLA, V. N.; GAIKWAD, S. J.; BULDEO, A. N. **Two new records of root-knot nematodes.** *Indian Phytopathology* (1981) 34 (3) 404-405 [En, 1 ref.] Dep. of Plant Path., Coll. of Agric., Nagpur, 440 010, India.

Meloidogyne incognita is reported for the first time from *Teramnus labialis* and *Ruellia prostrata* from Nagpur, India

0028 PONTE, J. J.DA; FRANCO, A.; LEAL, O. B. **[New wild hosts of root-knot nematodes.]** Novos hospedeiros silvestres de nematóides das galhas. In *Trabalhos apresentados à V Reunião Brasileira de Nematologia, 9-13 fevereiro de 1981, Londrina, PR, Brasil. Publicação No.5, 1981.* Piracicaba, SP, Brazil; Sociedade Brasileira de Nematologia (1982) 21-23 [Pt, en, 3 ref.] Cent. Cienc. Agric., Univ. Fed. Ceará, Fortaleza, Brazil.

Meloidogyne hapla on *Tephrosia cinerea*, *M. javanica* on *Alternanthera polygonoides* and *M. incognita* on *Crotalaria striata* are recorded from Ceará, Brazil.

0029 ÈRENFELDE, E. YA. **[Pathogenicity of *Meloidogyne hapla* on clover.]** In *Gallovye nematody sel'skokhozyaïstvennykh kul'tur i mery bor'by s nimi. (Materialy simpoziuma, Dushanbe, 25-27 sentyabrya 1979 g.).* Dushanbe, USSR; "Donish" (1979) 64-65 [Ru]

In a field test, *M. hapla* reduced the green yield of clover by some 30% in the first year and the number of galls increased from 24 to 476/10 g root.

0030 BRITAIN, PLANT BREEDING INSTITUTE **Annual report 1977.** Cambridge, UK. (1978) 168 pp. [En, Plant nematology pp. 28-29, 74, 77, 82, 85-86]

Brief reports are given of field tests of potato clones for resistance to *Globodera rostochiensis*, and of commercial diploid varieties of red clover for resistance to *Ditylenchus dipsaci*. Two techniques are described for assessing resistance of lucerne seedlings to *D. dipsaci*. Symptoms appeared after 24 hours. Of 9 varieties tested none was as resistant as cv. Lahontan but there were real and repeatable differences between varieties and it is concluded that resistant varieties could be bred. Breeding of potatoes has been continued with the object of combining resistance to pathotype Ro1 of *G. rostochiensis* with resistance to pathotypes Pa1 and Pa3 of *G. pallida*.

0031 VOVLAS, N.; INSERRA, R. N. **Biological relationship of *Rotylenchulus borealis* on several plant cultivars.** *Journal of Nematology* (1982) 14 (3) 373-377 [En, 12 ref.] Inst. di Nematologia agraria del Consiglio Nazionale delle Ricerche, 70126 Bari, Italy.

The embryogenic development of *R. borealis*, at 24 to 26°C, was completed on maize in 12 to 15 days, and the life-cycle of the nematode from egg to egg required 35 to 40 days at 20 to 25°C. Juveniles remained in the soil as preinfective stages for 17 to 19 days before becoming adults. Only immature vermiform and swollen egg-laying females were found attached to maize roots. Eggs were laid in a gelatinous matrix on the root surface; the number of eggs/egg mass was 45 ± 28 on maize roots. Bean, green pea, potato, sorghum, and sweet potato were also found to be hosts of *R. borealis*. The nematode established a permanent feeding site on maize root in an endodermal cell that became hypertrophied. Pericyclic cells close to the feeding site showed granular cytoplasm and nuclei with hypertrophied nucleoli. A cell wall ingrowth was also noted around the area of stylet penetration into the endodermal cell.

***0032** SHEAFFER, C. C.; RABAS, D. L.; FROSHEISER, F. I.; NELSON, D. L. **Nematicides and fungicides improve legume establishment.** *Agronomy Journal* (1982) 74 (3) 536-538 [En, 13 ref.] Dep. of Agronomy & Pl. Genetics, Univ. of Minnesota, St. Paul, MN 55108, USA.

In a field experiment in Minnesota, USA, application of phenamiphos (5.6 kg a.i./ha), aldoxycarb (8.9 kg a.i./ha) or carbofuran (2.2 kg a.i./ha), prior to planting with lucerne or birdsfoot trefoil, increased legume yields compared to controls in the planting and following year. Carbofuran or phenamiphos were more effective than aldoxycarb. Soil nematode populations were unaffected. In a 2nd field experiment, carbofuran (2.2 kg a.i./ha) alone or in combinations with metalaxyl (2.2 kg a.i./ha) or benomyl (16 kg a.i./ha) gave significantly greater lucerne yields than controls or fungicides alone. Soil nematode populations were unaffected although carbofuran or carbofuran-fungicide mixtures significantly reduced *Pratylenchus penetrans* numbers in lucerne roots. It is suggested that a nematode-fungus disease complex may be responsible for poor seedling establishment and yields of lucerne.

0033 SHARMA R. D.; SWARUP, G. **Hitherto unrecorded plant parasitic nematodes of *Andropogon gayanus* Kunth. var. *bisquamulatus* Stapf. from Cerrado region of Brazil.** In *Trabalhos apresentados à VI reunião Brasileira de nematologia. 8-12 fevereiro de 1982, Fortaleza. Publicação No.6. (Edited by: Lordello, L.G.E.)* Piracicaba, SP, Brazil: Sociedade Brasileira de Nematologia (1982) 99-102 [En, 5 ref.] EMBRAPA, CPAC, Planaltina-DF, Brazil.

A survey of 10 soil and root samples of *A. gayanus* var. *bisquamulatus* cv. 'Planaltina' from Planaltina, Brazil revealed the following plant parasitic nematodes: *Pratylenchus brachyurus*, *Helicotylenchus digonicus* and *Macroposthonia ornata*. The dominant species, *H. digonicus*, is reported for the first time from Brazil. Other genera and species present were: *Tylenchus*, *Aphelenchoides*, *Ditylenchus* and *Aphelenchus avenae*. This is the first report of these nematodes associated with andropogon grass from the Cerrado regions of Brazil.

0034 SHESTEPEROV, A. A. **[Dynamics of parasitic nematodes on *Trifolium pratense*.]** *Byulleten' Vsesoyuznogo Instituta Gel'mintologii im. K.I. Skryabina* (1981) No.31, 98-104 [Ru, en, 8 ref.]

The seasonal variation in the numbers of the specific plant pathogenic nematodes of *T. pratense* — *Pratylenchus pratensis*, *Tylenchorhynchus dubius* and *Paratylenchus projectus* — in the roots, rhizosphere and soil were studied [in the European SSR]. Vegetative stages (flowering and preparation for winter), humidity < 16%, large numbers of predatory nematodes, antagonism, numbers of bacteria and fungi, ploughing and crop rotation had a limiting effect on *P. projectus* populations. Often, 4th stage larvae were the dominant stage in the soil. Migration from roots to rhizosphere to soil, and vice-versa and into deep soil layers was often observed. All these factors and, especially antagonism with *P. projectus* and with species of *Tylenchus*, *Aglenchus* and *Filenchus* also influenced the population dynamics of *T. dubius*. Peak numbers of *T. dubius* coincided with low numbers of *P. projectus*. *Pratylenchus pratensis* had little influence on population dynamics and was found mainly in small roots at 25 to 60 cm.

0035 PUTSA, N. M. **[Changes in numbers of *Ditylenchus dipsaci* and its distribution on *Trifolium pratense* and in soil.]** *Byulleten' Vsesoyuznogo Instituta Gel'mintologii im. K.I. Skryabin* (1981) No.31, 40-44 [Ru, en, 9 ref.]

The distribution of *D. dipsaci* on *Trifolium pratense* seedlings was studied in experimentally infected plants. At the 2-leaf stage, most of the nematodes were in the epicotyl and the upper part of the hypocotyl; only 2.3% were in the cotyledon and only in 8.6% of the plants. Other plant organs were gradually penetrated but no nematodes were found in the roots of either susceptible or resistant var. at 5 weeks. At all stages most of the nematodes and eggs were in the bud and in the epi- and hypocotyl. The nematodes multiplied and accumulated in the leaf stalks and veins; few were found in the mesophyll. At 5 weeks, there were 118.0 nematodes and 81.2 eggs/plant of the susceptible var. and 69.8 and 59.4 respectively on the resistant var. The distribution of *D. dipsaci* on adult plants was studied over 3 years in the field (in USSR). Most nematodes were found in the stems at all stages of growth, followed by leaves, root neck and roots (very few nematodes were in the roots). At the end of vegetative growth most nematodes found in the soil were in the 0-10 cm layer; there were none below 30 cm.

0036 SKIPP, R. A.; CHRISTENSEN, M. J. **Invasion of white clover roots by fungi and other soil micro-organisms. IV. Survey of root-invading fungi and nematodes in some New Zealand pastures.** *New Zealand Journal of Agricultural Research* (1983) 26 (1) 151-155 [En, 18 ref.] Pl. Dis. Div., DSIR, Private Bag, Palmerston North, New Zealand.

A survey of nematode invaders of white clover roots from pastures throughout New Zealand showed *Heterodera trifolii*, *Meloidogyne* spp. and *Pratylenchus* spp. to be present in samples from 75%, 58% and 48% of sites respectively.

0037 SINGH, D. B.; REDDY, P. P. **Chemical control of *Meloidogyne incognita* infecting cowpea.** *Indian Journal of Nematology* (1982) 12 (1) 196-197 [En, 2 ref.] Indian Inst. of Horticultural Res., Bangalore 560080, India.

In a field experiment in Bangalore, India, aldicarb, carbofuran, ethoprop or phenamiphos at 0.5, 1.0 or 1.5 kg a.i./ha was applied one day before sowing cowpea seeds. All nematicides significantly reduced the root-knot index and increased yields compared to controls; phenamiphos and aldicarb being the most effective.

0038 GERMANI, G.; CUANY, A.; MERNY, G. **[Factorial analysis of the effect of 2 nematodes on the growth of *Arachis* and on the symbiotic fixation of nitrogen.]** L'analyse

factorielle des correspondances appliquée à l'influence de deux nématodes sur la croissance de l'arachide et sa fixation symbiotique de l'azote. *Revue de Nématologie* (1982) 5 (1) 161-168 [Fr, en, 11 ref.] Lab. de Nématol. ORSTOM, BP 1386, Dakar, Senegal.

The numbers of nematodes in soil and roots, the numbers and weights of bacterial nodules, the weights of roots and aerial parts and nitrogen fixation, as determined by the acetylene reduction assay, were recorded every fortnight during the growth of *Arachis* infected with *Scutellonema cavenessi* in Senegal and with *Aphasmatylenchus straturatus* in Upper Volta in plots treated with DBPC or left untreated. Factorial analysis demonstrated the relationships between variables and gave a clearer picture of the events occurring during a control programme. A marked negative correlation was established for both nematodes between nematode numbers and nitrogen fixation by symbiotic bacteria. The nematode affects the plants both directly and indirectly reducing symbiotic nitrogen fixation.

0039 PONTE, J. J. DA; SANTOS, C. D. G. [Behaviour of new *Vigna unguiculata* hybrids to parasitism by *Meloidogyne* spp.] Comportamento de novos híbridos de feijão macássar, *Vigna unguiculata* Walp., em relação ao parasitismo de nematóides das galhas, *Meloidogyne* spp. In *Trabalhos apresentados à VI reunião Brasileira de nematologia, 8-12 fevereiro de 1982, Fortaleza. Publicação No.6. (Edited by: Lordello, L.G.E.)* Piracicaba, SP, Brazil; Sociedade Brasileira de Nematologia (1982) 27-32 [Pt, en, 5 ref.] Univ. Fed. Ceará, Fortaleza, Brazil.

Of the 5 new hybrids of *V. unguiculata* tested for resistance to *M. incognita*, *M. javanica*, *M. arenaria* and *M. hapla*, Amélia and Otília showed resistance while Carmen, Ângela and Lianna were moderately susceptible, susceptible and highly susceptible respectively.

0040 PUTSA, N. M. [Assessment of the resistance and tolerance of red clover to the stem nematode.] In *Zaschita kormovykh kul'tur ot vrediteleĭ, bolezneĭ i sornyakov. (Nauchnye Trudy VASKhNIL). [Chief Editor: Fadeev, Y.N.]* Moscow, USSR; "Kolos" (1980) 31-34 [Ru]

Methods used to assess the resistance of red clover vars to *Ditylenchus dipsaci* in the laboratory and in experimental field conditions in the European USSR are described. In laboratory tests the resistance index (RI) of the 8 vars tested ranged from 17.09 to 35.83% with the highest in Tetraploid VIK. In field tests when resistance and tolerance were assessed in 2 consecutive years, Tetraploid VIK showed an RI of 48.47% at the final assessment and good tolerance. The field RI's of the other vars were lower than those recorded in the laboratory.

0041 DAS, P.; PHUKAN, P.. N. Reaction of certain mung cultivars to root-knot nematode (*Meloidogyne incognita*). *Indian Journal of Nematology* (1982) 12 (1) 204-205 [En, 2 ref.] Dep. Zool. & Entomol., Assam Agric. Univ., Jorhat-785013, India.

In a pot experiment, all 17 cultivars of mung tested were susceptible to *M. incognita*. Cultivar B-1 was the least susceptible.

0042 RUSHDI, M. H.; SELLAM, M. A.; ASD-ELRAZIK, A.; ALLAM, A. D.; SALEM, A. Histological changes induced by *Meloidogyne javanica* and *Fusarium* species on roots of selected leguminous plants. *Egyptian Journal of Phytopathology* (1980, publ. 1982) 12 (1/2) 43-47 [En, ar, 19 ref., 6 pl. (unpaged)] Dep. of Plant Path., Fac. of Agric., Univ. of Assiut, Egypt.

Invasion of *M. javanica* alone into roots of broad bean and cowpea caused much damage to plant tissues and caused the formation of thick-walled, multinucleate giant cells with granular cytoplasm. Hyperplastic tissues were formed around hypertrophied cells. Roots of broad bean infected by *F. oxysporum* or roots of cowpea infected by *F. solani* alone showed that the fungal invasion was confined to the epidermis with poor fungal growth in the cortex. Vascular bundles were free from mycelium. Roots infected with both organisms indicated that fungal penetration could be through the epidermis far from the nematode as well as at the nematode point of entry. The fungus grew well in sloughing epidermal cells and xylem vessels. Giant cells were also infected by several fungal hyphae and became devoid of cytoplasm.

0043 NORDMEYER, D. [Studies on a root rot complex in *Trifolium subterraneum* in north-west Tunisia, with special reference to interactions among the causal agents.] Untersuchungen über einen Wurzelfäulekomplex an *Trifolium subterraneum* L. in Nordwest-Tunesien unter besonderer Berücksichtigung von Wechselbeziehungen zwischen den Erregern. *Thesis, Rheinische Friedrich-Wilhelms-Universität, Bonn, GFR* (1979) 124pp. [De, 13pp. of ref.] From *Plant Breeding Abstracts 53* (6), 4894.

0044 DUNCAN, L. W.; FERRIS, H. Validation of a model for prediction of host damage by two nematode species. *Journal of Nematology* (1983) 15 (2) 227-234 [En, 18 ref.] Dep. Nematol., Univ. California, Riverside, CA 92521, USA.

Plant roots were mechanically injured or subjected to nematode parasitism to test the model of host damage by 2 nematode species: $y = m' + (1-m')c'z_1P_{i1}z_2P_{i2}$ for $y < 1.0$ and $y = 1.0$ for $y > 1.0$, where $m' = m_1 + (m_1-m_1)(1-y_1)/[(1-y_1) + (1-y_2)]$ and $c' = (z_1^{-T_1} + z_2^{-T_2})/2$. Damage functions for greenhouse-grown radish plants (cv. Cherry Belle) mechanically injured with small or large steel needles were used to predict growth of plants injured by both needles. Growth predictions accounted for 94%, 87% and 82% of mean treatment variation in plant height, stem weight, and root weight, respectively. Cowpea (cv. California Blackeye No.5) damage functions, based on preplant population levels of *Meloidogyne incognita* and *M. javanica*, were used to predict seed yield of plants concomitantly infected with various levels of each species. Single species damage functions and population growth curves indicated significant host resistance to *M. incognita* and significantly lower virulence of that species compared to *M. javanica*. Model predictions accounted for 88% of mean seed yield vaiation in 2 species treatments. In a separate experiment, mean top weights of 30-day-old cowpea plants, uniformly inoculated with 20 000 *M. javanica* eggs, increased with increasing levels of concomitantly inoculated *M. incognita* eggs. It may be that the competitive interactions between *M. incognita* and *M. javanica* mitigated host damage by the more virulent species.

0045 ODIHIRIN, R. A. Screening of some West African cowpeas *Vigna unguiculata* for resistance to root-knot nematodes *Meloidogyne incognita* and *M. javanica*. In *Proceedings of the 3rd Research Planning Conference on root-knot nematodes, Meloidogyne* spp., Regions IV and V, 16-20 November 1981, Ibadan, Nigeria. (International *Meloidogyne* Project). Ibadan, Nigeria; International Institute of Tropical Agriculture (1982) 231-238 [En, 10 ref.] Sch. of Biol. Sci., Univ. of Port harcourt, Rivers State, Nigeria.

Of the *V. unguiculata* lines from Senegal and Nigeria screened for resistance to 3 races of *M. incognita* and one race of *M. javanica*, only line TVU 857 from Nigeria showed high resistance.

0046 KIMPINSKI, J.; EL ERAKI, S. Influence of aldicarb, carbofuran, propoxur and fenamiphos on activity of *Pratylenchus penetrans* (Cobb) and *P. crenatus* Loof. *Revue de Nématologie* (1983) 6 (1) 103-110 [En, fr, 36 ref.] Agric. Canada, Res. Sta., P.O. Box 1210, Charlottetown, Prince Edward Island, Canada C1A 7MS.

Aldicarb was more effective than carbofuran, propoxur or fenamiphos in controlling *P. penetrans* and *P. crenatus* on timothy and red clover in a pot experiment and in reducing the number of nematodes passing through sand columns. There was a significant interaction between temperature,

aldicarb concentration and nematode species. Yield increases were associated with aldicarb treatments on red clover and timothy infected with *P. penetrans* and *P. crenatus* respectively. Aldicarb and fenamiphos caused changes in body shape and activity of female nematodes; *P. penetrans* recovered more quickly from the effects of fenamiphos than from aldicarb whereas *P. crenatus* recovered more quickly after similar exposure to aldicarb.

*0047 O'BRIEN, P. C. A study on the host range of *Pratylenchus thornei*. *Australasian Plant Pathology* (1982) 11 (1) 3-5 [En, 6 ref.] Pl. Pathol. Branch, Dep. of Primary Industries, Indooroopilly, Q. 4068, Australia.

Inoculation of maize, soybean, navy bean, sorghum, peanut and rhodes grass with *P. thornei* in a pot experiment indicated that navy bean, sorghum, maize and soybean were good hosts of the nematode. A list ranking the susceptibility of cvs. to *P. thornei* is given.

*0048 NGUYEN-THI THU CUC New weed host of rice stem nematode identified in Vietnam. *International Rice Research Newsletter* (1982) 7 (3) 15 [En] Pl. Protection Dep., Cantho Univ., Hau Giang, Vietnam.

The weed species *Sacciolepis interrupta* and *Echinochloa colona* are reported as being hosts for *Ditylenchus angustus* in Mekong Delta rice fields.

0045 JAIN, R. K. Pathogenicity of *Helicotylenchus dihystera* to *Cenchrus ciliaris*. *Indian Journal of Nematology* (1980, publ. 1981) 10 (2) 236-239 [En, 7 ref.] Indian Grassland & Fodder Res. Inst., Jhansi, India.

Helicotylenchus dihystera (at 0, 10, 100, 1000 or 10 000/pot) was inoculated to 25-day-old seedlings of *Cenchrus ciliaris*, cultivar IGFRI 3108, and in a separate experiment to 6 cultivars at 10 000/pot. After 6 months, fresh and dry weights of roots and shoots in both experiments were significantly reduced. In the field, 72 cultivars of *C. ciliaris* had high soil populations of *H. dihystera*. RKJ

0050 SIDDIQI, M. R. Six new species of *Coslenchus* Siddiqi, 1978 (Nematoda: Tylenchidae). *Nematologica* (1980) 26 (4) 432-447 [En, de, 7 ref.] Commonwealth Inst. Helminthology, St. Albans, Herts, Herts, UK.

Coslenchus turkeyensis n.sp. from gladiolus soil in Turkey has 12 longitudinal cuticular ridges besides the lateral fields, a well developed postvulval uterine sac and rudimentary lateral vulval membranes. *C. pycnocephalus* n.sp. and *C. multigyrus* n.sp. from cauliflower soils in Syria are recognized, respectively, by a strongly sclerotized cephalic framework and by 22 longitudinal ridges excluding lateral fields. *C. alacinatus* n.sp. from maize and tomato soils in Portugal lacks lateral vulval membranes and has the excretory pore at or near the oesophageal base. *C. franklinae* n.sp. from Nigeria and Ghana differs from *C. costatus*, to which it is related, in having a body less than 0.5 mm long, a continuous cephalic region which is broadly rounded to truncate and narrower lateral fields being 1/4 as wide as body. *C. bisexualis* n.sp. from banana soil in Nicaragua, is bisexual and the smallest (0.36 to 0.38 mm long) species in the genus. The new species are described and a key to differentiate between the various nominal species is given. *Tylenchus cancellatus* Cobb, 1925 is reinstated as *Coslenchus cancellatus* (Cobb, 1925) n.comb. A neotype has been designated for *Coslenchus costatus* (de Man) and *Coslenchus lycopersicus* (Husain & Khan, 1976) s regarded as a *species inquirenda*.

*0051 LENNE, J.M. Reaction of Desmodium species and other tropical pasture legumes to the root-knot nematode Meloidogyne javanica. Tropical Grasslands (1981) 15 (1) 17-20 [En, 12 ref.] Centro Internac. de Agric. Trop. (CIAT), Apartado Aéreo 6713, Cali, Colombia.

During 1978 and 1979, patches of stunted, chlorotic and wilted plants developed in experimental stands of D. gyroides and D. ovalifolium in Colombia (Santander de Quilichao and Carimagua). Many plants were defoliated and died. Large galls were found on the roots and nematodes found in the galls and the soil were identified as M. javanica; this is the first report of M. javanica pathogenic to Desmodium spp. in South America. Surveys failed to detect M. javanica or any other Meloidogyne spp. on Desmodium spp. and other plants at 17 pasture evaluation sites elsewhere in South America (Bolivia, Brazil, Colombia, Ecuador, Peru and Venezuela). At one of the sites in Colombia, M. javanica was widespread on several Desmodium spp. and many weeds of the family Compositae; it was not detected on native legumes (including Desmodium spp.). Of 38 tropical pasture legumes tested in glasshouse pot trials, only 13 were susceptible to M. javanica. These included 10 of 13 Desmodium spp. accessions: Calopogonium mucunoides, Centrosema hybrid and Macroptilium. The last 2 were only slightly susceptible. Reactions of 7 D. heterocarpon accessions varied from moderately susceptible to resistant. D. gyroides, D. ovalifolium and Desmodium sp. CIAT 336 were more susceptible. D. distortum, Leucaena leucocephala, D. heterophyllum, Pueraria phaseoloides, Stylosanthes spp. and Zornia latifolia were resistant.

*0052 SARDANELLI, S.; KRUSBERG, L. R.; GOLDEN, A. M. Corn cyst nematode, *Heterodera zeae*, in the United States. *Plant Disease* (1981) 65 (7) 622 [En, 3 ref.] Dep. of Botany, Univ. of Maryland, College Park, MD 20742, USA.

Heterodera zeae was found in January 1981 in samples of soil from cornfields in Kent County, Maryland, USA. This species was known previously only from India, Egypt and Pakistan.

0053 KHAN, E.; SAHA, M.; CHAWLA, M. L. Two new species of Hoplolaimoidea (Tylenchida: Nematoda) from India. *Indian Journal of Nematology* (1980, publ. 1981) 10 (2) 118-123 [En, 5 ref.] Div. of Nematol., Indian Agric. Res. Inst., New Delhi-110012 India.

Rotylenchoides impar n.sp. from soil around maize and *Scutellonema brabanum* n.sp. from soil around palm at Bangalore, India, are described and figured. *R. impar* resembles *R. intermedius* and *R. affinis* but differs by having the smallest stylet in the genus (17 to 21 µm), an anteriorly located vulva (V = 67 to 74%) and a post-rectal intestinal sac. *S. brabanum* resembles *S. brachyurum* and *S. bangalorensis* but can be distinguished by having a conoid truncate lip region, scutellae located 2 to 4 annules anterior to anus, absence of areolation in lateral field, stylet 25 to 28 µm and O = 16 to 19.

0054 DUNBIER, M. W.; PALMER, T. P.; ELLIS, T. J.; BENNETT, P. P. Field evaluation of lucerne cultivars for *Ditylenchus dipsaci* (Nematoda: Tylenchidae) and *Acyrthosiphon kondoi* (Hemiptera: Aphididae). In *Proceedings of the 2nd Australasian Conference on grassland invertebrate ecology, Palmerston North, New Zealand, 22-26 May 1978. [Edited by: Crosby, T.K.; Pottinger, R.P.]* Wellington, New Zealand: P.D. Hasselberg, Government Printer. (1980) 99-102 ISBN 0-477-06054-2 [En, 9 ref.] Crop Res. Div., Private Bag, Christchurch, New Zealand.

In New Zealand, 8 lucerne cultivars were tested for resistance to *D. dipsaci* and *A. kondoi* in soil already infected with bacterial wilt. Cultivars Washoe, Lahontan and Resistador II showed good resistance to both wilt and

nematode but Gladiator showed susceptibility to the local population of *D. dipsaci*. Even heavy infestations of nematode took some time to cause considerable damage but by the 3rd season only cultivars Washoe, Lahontan and Resistador II were still producing adequately.

0055 BRITAIN, ROTHAMSTED EXPERIMENTAL STATION **Report for 1980, Part 1.** Harpenden, Herts; Lawes Agricultural Trust. (1981) 314 pp. [En, [Plant nematology pp. 21, 29, 31-32, 149-164]]

Investigations included the effect of aldicarb on nematodes on winter wheat, on *Pratylenchus neglectus* and *P. thornei* on *Vicia faba*, and *Pratylenchus* and *Tylenchorhynchus* on leafless pea. A short review of work on the nematicidal control of cyst nematodes over the last 15 years is given. Work on the economic effects of nematodes on crops included *Helicotylenchus* and *Paratylenchus* on grasses, *Paratrichodorus* and other nematodes on spring wheat, *Pratylenchus*, *Tylenchorhynchus* and others on forage maize, *Meloidogyne graminocola* on rice, *M. acronea* on cotton and *Hirschmanniella* on *Colocasia esculenta*. Tolerance of potato varieties to cyst nematode, the interactions between nematodes, *Rhizobium* and fungi on peas and between nematodes and *Fusarium* on cotton, the biology of *Globodera pallida*, *Heterodera goettingiana* and *Ditylenchus dipsaci* were also investigated. Other studies included the pathogenicity of *Nematophthora gynophila* to *H. schachtii* and of *Verticillium chalmydosporium* to *H. avenae*, feeding behaviour of *Longidorus caespiticola* and *Caenorhabditis elegans*, the morphology of *Hexatylus viviparus*, morphometrics of *Meloidogyne*, techniques for cyst extraction from soil and the ultrastructure of *Parachordodes wolterstorffii*.

0056 STEPANCHUK, L. G. [The prevalence of plant nematodes on wheat, lupin and maize grown in crop rotation.] In *Teoreticheskie osnovy i prakticheskie priemy vyrashchivaniya sakharnoĭ svekly i drugikh kul'tur*. Kiev, USSR;. (1977) 101-103 [Ru] From *Referativnyi Zhurnal, Biologiya* (1978), 7 E945.

Pratylenchus pratensis and *Paratylenchus nanus* were recorded on wheat, lupin and maize grown in a 9-field system of crop rotation in Zhitomir, Ukrainian SSR. *P. nanus* was predominant on lupin and *Pratylenchus pratensis* on wheat. Maize was the least affected.

0057 NEW ZEALAND, MINISTRY OF AGRICULTURE AND FISHERIES. Annual report of the Agricultural Research Division, 1978/1979. Wellington, New Zealand. (1979) xxi + 320pp. [En, Plant nematology p.269]

The annual use of chemical nematicides against Ditylenchus dipsaci on lucerne in dryland and irrigated trials in the Upper Waitaki Valley, North Otago, New Zealand, resulted in production increases of lucerne of over 180% in spring and autumn (as measured by dry matter production). Within 3 years the plant density of susceptible lucerne cultivars had diminished by about 20%.

0058 SULTAN, M.S. Spiral nematodes of the subfamily Rotylenchinae Golden, 1971 (Tylenchida: hoplolaimidae) from India. Nematologica Mediterranea (1981) 9 (1) 35-47 [En, it, 2 ref.] Dep. of Zool., Aligarh Muslim Univ., Aligarh-202001, India.

Females of Helicotylenchus shakili n.sp. from Chamba, India; H. parapteracercus n.sp. from Imphal, India; H. tangericus n.sp. from Srinagar, India; H. wajihi n.sp. from Bareilly, India and H. valecus n.sp. from Khajjiar Valley, Chamba, India are described and figured. Species were found around roots of Zea mays, Nobab fruit, Rosa sp., Morus indica and grasses respectively. H. shakili differs from H. dihystera in the different shaped spear knobs, the longer basal oesophageal gland lobe and the longer pointed tail. H. parapteracercus differs from H. pteracercus in the longer spear (27-28 microns), the ventral overlap of the basal oesophageal gland lobe being longer than the dorsal, phasmids anterior to the anal level and different manner of termination of lateral lines on the tail. H. wajihi differs from H. digonicus in the prominent hemispherical lip region, shorter spear (23-24 microns), different position of phasmids and shape of tail. H. tangericus and H. valecus closely resemble H. serenus but the former differs in the truncate lip region, shape of basal knobs, position of the orifice of the dorsal oesophageal gland, no spermatheca and broadly hemispherical tail. H. valecus differs in the longer spear (31-33 microns), lower 'O' value (29) and irregularly shaped tail terminus.

0059 ATKINSON, H. J.; SYKES, G. B. An analysis from aerial photography of the spread of seed-borne *Ditylenchus dipsaci* in lucerne. *Nematologica* (1981) 27 (2) 235-241 [En, de, 17 ref.] Dep. of Pure & Applied Zool., The Univ. of Leeds LS2 9JT, UK.

Aerial photography of 3 fields of lucerne in the UK in the spring of 1978 and 1979 were used to monitor the spread of a seed-borne infestation of *D. dipsaci*. Analysis suggests that there was an aggregated distribution of the foci 2 months after sowing, with a better fit to a negative binomial than to a Poisson distribution over the subsequent 3 years. Results from using an image analyser suggest that the infestation develops by the generation of additional colonies from the original foci and by the progressive expansion of the area damaged by an established colony. There was a 4- to 5-fold annual increase in the number of foci, their mean size and the area of the field that was damaged during the initial years of the infestation. In these fields movement due to mowing seemed to be the main factor in dispersal but higher rates of colonization may occur when surface drainage or the wind contribute to this process.

0060 AZMI, M. I. Rate of multiplication and pathogenic effects of *Helicotylenchus dihystera* on koobabool (*Leucaena latisiliqua*). *Indian Journal of Nematology* (1981) 11 (1) 69-71 [En, 1 ref.] Indian Grassland and Fodder Res. Inst., Jhansi, 284001 India.

An experiment to study the rate of multiplication of *H. dihystera* in the presence and absence of *L. latisiliqua* showed rates to be greater in the presence of the host. Shoot and root length and shoot and root weight of *L. latisiliqua* were reduced by 36, 29, 37 and 68% respectively at the 1000 inoculum level.

0061 CHOMCHALOW, N. The cultivation of winged bean. *Kasikorn, Thailand* (1976) 49 (3) 224-241 [En] From Winged Beans, IDRC Abs. World Lit. 1900-1977, (1978), 138.

In a general article *Meloidogyne incognita* is reported as a pest of *Psophocarpus tetragonolobus*.

***0062 JOHNSON, A.W.; YOUNG, J.R.; MULLINIX, B.G. Applying nematicides through an overhead sprinkler irrigation system for control of nematodes. Journal of Nematology (1981) 13 (2) 154-159 [En, 4 ref.]**

Phenamiphos, ethoprop and carbofuran each at 6.7 kg a.i/ha were applied to squash, southern pea and corn via injection into a sprinkler irrigation system. This method was then compared with a conventional application of phenamiphos and ethoprop

granules spread on the soil surface and incorporated into the top 15 cm for control of Macroposthonia ornata and Meloidogyne incognita. Nematode populations in the soil and root-gall indices were lower, and yields greater, in treated than in untreated plots, but there were no significant differences between the methods of application in most comparisons.

0063 NISHIZAWA, T. Preliminary experiment on varietal reaction of corn to three Meloidogyne species. In Proceedings of the 3rd Research Planning Conference on root-knot nematodes, Meloidogyne spp., Region VI, 20-24 July 1981, Jakarta, Indonesia, Raleigh, NC, USA; North Carolina State University (1981) 55-63 [En, 16 ref.] Phytonemic Res. Lab., Nat Inst. of Agric. Sci., Yatabe, Tsukuba, Ibaraki 305, Japan.

All 72 maize cultivars tested in a pot experiment showed immunity to M. hapla; none was immune to M. incognita or M. javanica.

0064 NIGERIA, INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE. Annual report 1980. Ibadan, Nigeria. (1981 ?) vi + 185 pp. [En, Plant nematology pp. 61-62, 70,72, 76-78]

All of 10 cassava cultivars were susceptible to Meloidogyne incognita and M. javanica with the former being more aggressive. For Dioscorea rotundata cv Nwapoko hot-water treatment in the range 45°C for 40 min and 55°C for 40 min is recommended for nematode control. Scutellonema bradys was cultured in the greenhouse on sweet potato or cowpea, but culture on sprouting yam pieces was unsuccessful. Newly harvested D. rotundata were treated with combinations of hot water and chemical (Tecto, aldicarb, Miral) treatment: none of the treatments was 100% effective against S. bradys. Treatment of D. rotundata at various stages of growth with ethephon at concentrations of 5 to 320 ppm had no effect on soil nematode populations.

0065 TOWNSHEND, J. L., STOBBS, L. Histopathology and histochemistry of lesions caused by *Pratylenchus penetrans* in roots of forage legumes. *Canadian Journal of Plant Pathology* (1981) 3 (3) 123-128 [En, fr, 26 ref.] Research Station, Agric. Canada, Vineland Sta., Ontario LOR 2E0, Canada.

P. penetrans entered along the entire length of feeder roots of lucerne, red clover, and birdsfoot trefoil except root tips. Lesions first appeared as watersoaked areas which later became discoloured. Lesions coalesced and intensity of discolouration increased with time, the colour of lesions varying with the host. Nematodes fed in the cortex and never entered the stele although the stele became discoloured. Polyderm developed beneath the endodermis in lucerne roots and cell multiplication occurred in spindle-shaped cells at the endodermis in birdsfoot trefoil roots in response to damaged cortical tissue. In lucerne the presence of polyphenols was observed in nematode damaged cells. Much of the discolouration resulted from oxidation of phenols involving the formation of ligninlike substances as when phenols were held in a reduced state, characteristic lesions did not form.

0066-HEYNS, J., 1965. "Four new species of the genus *Xiphinema* (Nematoda: Dorylaimoidea) from South Africa." *Nematologica*, 11 (1), 87–99. [French summary p. 99.]

4 new species of *Xiphinema* are described and figured including details of their juvenile stages. *X. clavatum* n.sp., from marshy areas in the Bizana district in the Transkei, is close to *X. rotundatum* from which it differs in the absence of an organ Z, the shape of the female tail which is hemispherical to slightly clavate and the presence of males with a hemispherical tail. It differs from *X. yapoense* in a relatively longer and differently shaped tail and the flatter lip region which is not offset by a constriction. The odontostyle is 119 (107–127)μ long plus an extension 78–90μ long. In *X. pini* n.sp., from about the roots of unthrifty *Pinus patula* at Sabie, Transvaal, the tails of both sexes are subhemispherical with a slight protuberance at the terminus. It is distinguished from *X. yapoense*, *X. mammillatum* and *X. turicum* by the presence of an organ Z which has 3 or 4 sclerotized ridges projecting into its lumen in each gonad of the females; from *X. rotundatum* by a relatively shorter tail and a shorter odontostyle which is 101–113μ long plus an extension 73–86μ long; from *X. ingens* by its smaller size L=3·09–3·58mm., and shorter spear. *X. imitator* n.sp. from a grassy hill near Sordwana Bay, Zululand, is closely related to *X. pini* but is smaller, 1·95–2·63mm. long, and the organ Z contains a fairly large number of irregularly shaped dark granules. The odontostyle is 84 (74–101)μ long plus an extension 60–67μ long. The spicules are 45μ long compared with 53–56μ in *X. pini*. Both sexes in *X. zulu* n.sp., from about the roots of *Acacia xantophloea* in Northern Zululand, have a dorsally convex ventrally concave tail 3 to 4½ anal-body-widths long. The posterior half of the tail consists of a narrow cylindroid non-protoplasmic tip with a rounded terminus. It is distinguished from *X. nigeriense*, the only other species with a similar shaped tail, by its larger size, L=2·96–3·47mm., and its relatively shorter tail.

*0067 NORTON, D. C.; OARD, M. Plant-parasitic nematodes in loess toposequences planted with corn. *Journal of Nematology* (1981) 13 (3) 314-321 [En, 8 ref.] Dep. of Plant Path., Seed and Weed Sci., Iowa State Univ., Ames, IA 50011, USA.

In an Iowa maize field samples were collected monthly during the growing season along north- and west-facing toposequences. The greatest biomass for *Xiphinema americanum* occurred at the footslope on the north face. *Paratylenchus microdorus* had its greatest biomass at the summit position, generally more in the west- than in the north-facing slope. *Pratylenchus* spp. in the roots peaked at the toeslope in the north-facing slope, but at the foot-slope in the west-facing slope. *Helicotylenchus pseudorobustus* peaked at the backslope and the toeslope along the north- and west-facing slopes, respectively. Diversity, as computed for each plot by the Shannon-Weiner diversity index, was highest at the backslope in both toposequences. Distribution is related to drainage and pH.

*0068 KIMPINSKI, J.; WILLIS, C. B. Influence of soil temperature and pH on *Pratylenchus penetrans* and *P. crenatus* in alfalfa and timothy. *Journal of Nematology* (1981) 13 (3) 333-338 [En, 22 ref.] Res. Sta., Agric. Canada, PO Box 1210, Charlottetown, Prince Edward Island, Canada C1A 7M8.

In Canada, numbers of *P. penetrans* in lucerne and *Phleum pratense* (timothy), and to a lesser extent *P. crenatus* in timothy, increased substantially as temperature increased from about 10°C to 30°C. However, *P. crenatus* in lucerne decreased in number as temperature increased. Mobility of *P. crenatus* in vertical soil columns decreased as temperature increased from 9.5°C to 28.5°C. Raising the soil pH in which lucerne was grown from 5.0 to 6.9 increased the numbers of *P. penetrans* and greatly reduced the numbers of *P. crenatus*. The numbers of both nematode species in timothy were reduced significantly as soil pH increased. The optimum soil

pH for movement of *P. penetrans* was 6.0. *P. crenatus* moved equally well over a range of pH 5.0 to 7.0.

***0069** SANTO, G.S., O'BANNON, J.H. Pathogenicity of the Columbia root-knot nematode (Meloidogyne chitwoodi) on wheat, corn, oat and barley. Journal of Nematology (1981) 13 (4) 548-550 [En, 2 ref.] Washington State Univ., Washington, USA.

In pot trials using inocula of 500 or 5000 M. chitwoodi ova, the total dry weight of infected Wanser wheat, Boyer barley and PX 46 maize was lower than that of uninfected controls after 60 days. Park oat was affected only at the higher inoculum level. Prodax and Nugaines wheat and Jubilee maize did not show significant growth reduction although M. chitwoodi showed the highest reproduction index on Pradax wheat. Maize is probably a better rotation crop than wheat, barley or oats for the susceptible potato crop on the Pacific Northwest of the USA.

***0070** OLTHOF, T. H. A. Effect of age of alfalfa root on penetration by *Pratylenchus penetrans*. *Journal of Nematology* (1982) 14 (1) 100-105 [En, 25 ref.] Res. Branch, Agric. Canada, Res. Sta., Vineland Sta., Ontario, LOR 2EO, Canada.

Penetration of *P. penetrans* into young lucerne root tissue (2 day) was about twice that in medium (10 day) or old (20 day) root segments. Age related differences were only significant in 3-week-old plants, not in 2- and one-week-old seedlings and were unaffected by cultivar used, substratum, inoculum density, length of incubation period or temperature. Penetration into the different aged root segments averaged 61% for females, 50% for 3rd-stage juveniles and 27% for males.

0071 BROWN, D. J. F.; LUC, M.; PURBADI A description of some juveniles stages of *Xiphinema vulgare* (Nematoda: Dorylaimoidea). *Nematologia Mediterranea* (1981) 9 (2) 205-210 [En, 9 ref.] Scottish Crop Res. Inst., Invergowrie, Dundee, Scotland, UK.

X. vulgare L2, L3 and L4 and females are described and figured from *Zea mays*, from W. Java, Indonesia. Body and spear length show a constant relationship and can be used for reliable identification. The homogeneity of *X. vulgare* populations is confirmed and synonymy with *X. setariae* is rejected.

0072 RUDZYAVICHENE, Z. [RUDZEVIČIENĖ, Z.]; LUGAUSKAS, A. [Nematodes and micromycetes in crop rotations of perennial grasses.] *Acta Parasitologica Lituanica* (1981) 19, 74-79 [Ru, en, li, 7 ref.] Inst. of Zool. & Parasit., Acad. of Sci. of the Lithuanian SSR, Vilnius, USSR.

Parasitic nematodes formed the most varied group of nematodes under perennial grasses grown on sod-gleyed sandy loam in the Lithuanian SSR. *Ditylenchus dipsaci* was dominant. *Helicotylenchus multicinctus*, *Tylenchorhynchus dubius*, *Aphelenchus avenae* and *Aphelenchoides composticola* were numerous. Interactions were observed between fungi and nematodes. The presence of some nematodes in the rhizosphere of clover and lucerne encouraged the growth of fungi. Both nematode population and fungi were affected by the preceeding crop, by other components of the soil and by the vegetative phase of the host.

0073 ZAKRZEWSKI, J. [Observations on the occurrence, biology and pathogenicity of *Ditylenchus dipsaci* on red clover in Poland. Part III. Occurrence of *D. dipsaci* on red clover in Poland.] Badania nad występowaniem, biologią i szkodliwością węgorka niszczyka (*Ditylenchus dipsaci* Kühn) na koniczynie czerwonej w Polsce. Cz.III. Występowanie węgorka niszczyka (*Ditylenchus dipsaci*) na koniczynie czerwonej w Polsce. *Hodowla Roślin, Aklimatizacja i Nasiennictwo* (1977) 21 (6) 595-606 [Pl. en, ru, 9 ref.] From *Referativnyĭ Zhurnal (1979), Fitopatologiya*, 7.79.172.

Examination of 500 red clover plantations in Poland showed that *D. dipsaci* is widely spread throughout the country but is particularly frequent in the north.

0074 RUDZYAVICHENE, Z. [RUDZEVIČIENĖ, Z.] [The effect of crop rotation on the population density of *Ditylenchus dipsaci* (Kühn, 1857) Filipjev, 1936 on clover.] *Acta Parasitologica Lituanica* (1981) 19, 80-85 [Ru, en, li, 3 ref.] Inst. of Zool. & Parasit., Acad. of Sci. of the Lithuanian SSR, Vilnius, USSR.

Seasonal variations in the population density of *D. dipsaci* on clover were studied in the Lithuanian SSR. The numbers of *D. dipsaci* were determined by the length of time during which clover had been grown in monoculture. Short duration intervention crops did not prevent the accumulation of the nematode. The variation in total nematode numbers was determined by the dominant species. *D. dipsaci*, the 2nd dominant species, *Panagrolaimus rigidus* had no effect on total population numbers. Severe disease was observed on some of the experimental plots.

0075 DAREKAR, K. S.; KADAM, M. V.; AJRI, D. S.; DORGE, S. K. Occurrence of maize cyst nematode, *Heterodera zeae* in Maharashtra State, India. *Journal of Maharashtra Agricultural Universities* (1981) 6 (2) 156 [En, 2 ref.] Mahatma Phule Agric. Univ., Rahuri — 413722, India.

Large numbers of *H. zeae* were found associated with *Zea mays* for the first time in Maharashtra State, India.

0076 MARUMINE, S.; SAKAMOTO, S. [Selection for resistance to the root-knot nematode (Meloidogyne incognita) in sweet potato.] Kyushu Agricultural Research, Japan (1979) no 41, 47.

0077 GRIFFIN, G.D. The biology and control of parasitic nematodes on alfalfa. Utah Science (1981) 42 (4) 130-135 [En, 18 ref.]

The pathogenicity, distribution and control of Ditylenchus dipsaci, Meloidogyne spp. and Pratylenchus spp. on lucerne in Utah, USA are discussed. Other nematodes associated with lucerne are listed.

0078 KURT, L.A., SHESTEPEROV, A.A. [The nematodes of lucerne and clover.] Selskoe Khozaistvo za Rubezhom (1981) 5, 24-29 [Ru]

The occurrence of nematodes on lucerne and clover is reviewed and the following species recorded: Ditylenchus dipsaci, Heterodera trifolii, H. galeopsis, Meloidogyne hapla, Pratylenchus sp., Tylenchorhynchus sp., Helicotylenchus and Merlinius sp.

0079 MOUSSA, F.F.; EISSA, M.F.M. Effect of post-emergence application of certain systemic nematicides on plant-parasitic nematodes and maize yield in Nile-Delta, Egypt. Research Bulletin, Faculty of Agriculture, Zagazig University, Egypt (1981) No. 409, 9 pp. [En, ar, 15 ref.] Pests & Plant Protection Lab., Nat. Res. Centre, Dokki, Cairo, Egypt.

Aldicarb, carbofuran or phenamiphos (1.5 kg a.i./feddan) and oxamyl (1.44 kg a.i./feddan) were applied to a field in the Nile-Delta, Egypt, moderately infested with Criconemoides spp., Hoplolaimus aegypti, Pratylenchus zeae and Tylenchorhynchus

clarus. Carbofuran or aldicarb gave best nematode control; carbofuran in addition gave greatest increase in maize yield (19% increase over controls). [1 feddan = 0.42 ha].

*0080 DISANZO, C.P. Effect of foliar application of carbofuran and a related compound on plant-parasitic nematodes under microplot and field conditions. Journal of Nematology (1982) 14 (2) 208-212 [En, 15 ref.] FMC Corp., 100 Niagara St., Middleport, NY 14105, USA.

Foliar applications of carbofuran or its analogue FMC 3500 (2,400 micrograms/ml) to maize or potato significantly reduced populations of Pratylenchus penetrans in roots and Tylenchorhynchus claytoni, Xiphinema americanum and Hoplolaimus sp. in soil. Generally there was no difference between 2 or 3 applications.

0081 BIRD, A.F., MILLN, J.P. The growth of Meloidogyne javanica in some Australian native plants. Search (1979) 10 (1/2) 48-50 [En, 7 ref.] CSIRO, Div., of Hort. Res., Box 350 GPO, Adelaide, SA 5001, Australia.

Sixteen Australian plants were tested for susceptibility to M. javanica. The following were good hosts: Albizzia distachya, Acacia melanoxylon, Alyogyne hakeifolia, Hibiscus trionum, Sida rhombifolia, Lycium australe and Solanum laciniatum. The growth rates of M. javanica on tomato, S. laciniatum and H. trionum were compared and shown to be similar. The heat factor required for development from 1st-stage juveniles to egg-laying females on S. laciniatum was 13 018 centigrade-hours for M javanica and 13 560 for M. incognita.

*0082 DISANZO, C. P. Effect of foliar application of carbofuran and a related compound on plant-parasitic nematodes under greenhouse and growth chamber conditions. *Journal of Nematology* (1981) 13 (1) 20-24 [En, 8 ref.] FMC Corpn Agric. Chemical Group, 100 Niagara St., Middleport, NY 14105, USA.

Foliar application of carbofuran at 2400 or 4800 ppm and FMC 35001 at 2400 ppm reduced root galling on tomatoes by *Meloidogyne incognita*. Reduction was greatest at the higher rate and when inoculation of *M. incognita* was delayed up to 11 days after foliar application. On tobacco, repeated foliar applications of carbofuran at 2400 ppm increased percentage control. Carbofuran at 1200 ppm controlled *Pratylenchus penetrans* on pea though repeated applications increased the effectiveness of control. *Tylenchorhynchus claytoni* on maize and tobacco was controlled by foliar applications of FMC 35001 at 2400 ppm and carbofuran and oxamyl at 1200 and 2400 ppm. Percentage control of *P. penetrans* on pea by carbofuran at 1200 ppm was greater than *T. claytoni* on either maize or tobacco.

0083 NESMITH, W. C. (EDITOR) Results of 1980. Raleigh, NC, USA; American Phytopathological Society. *Fungicide and Nematicide Tests* (1981) 36, 229 pp. [En] Plant Path. Dep., S-305 Ag.Sci. Bldg. -North' Univ. of Kentucky, Lexington, KY 40546, USA.

[1699] DUNN, R. (SECTION EDITOR) Nematicides. 179-191 [En] Nematol. Lab., Univ. Florida, Gainesville, FL 32611, USA.

Evaluations were: Temik against *Pratylenchus penetrans* on *Phaseolus vulgaris*; RH 9358, Counter and Temik against *Heterodera schachtii* on sugar beet; Terr-O-Gas and Mocap against nematodes on cucumber and pepper; Temik, Mocap, Vydate, BAS 263041, Thimet, against *P. penetrans* on potato; Telone, D-D, Soilbrom, Vapam, Nemacur, Vydate, Mocap, Temik, Furadan and Agramine against *Meloidogyne hapla* and *M. chitwoodi* on potato; Dasanit, Furadan, Counter, Temik, BAS 263021, Mocap, Terr-O-Cide and Nemacur against *Rotylenchulus reniformis* on *Ipomoea batatas*; Dasanit, Vorlex and Dowfume mc-2 against *M. incognita* on tomato; Counter, Dyfonate, Vydate, Temik, Furadan and Mocap against *Pratylenchus* on maize; Furadan and Counter against *Belonolaimus longicaudatus* on maize; Nemacur, Soilbrom, RH 9358, Furadan, Vydate, D-D, Telone, Temik and Mocap against *Hoplolaimus columbus* on cotton; Nemacur, Furadan, Vydate, Mocap, Soilbrom, Terr-O-Cide, BAS 263, Temik and Counter against *M. hapla* and *Macroposthonia* on *Arachis hypogaea*, D-D, Soilbrom, Telone, RH 9358, Vydate, Nemacur, Mocap, Furadan, Temik, FMC 35001, Dyfonate, BAS 263021 and Counter against *H. columbus* on soybean; Temik, Vydate, Counter, Furadan, Nemacur and Dyfonate against *Heterodera glycines* on soybean; L-676863, L-676897, L-642126, Nemacur, Mocap, RH 9358, BASF 263, Vydate and Nemacur + Dasanit against *M. incognita* on tobacco; Nemacur, Nemacur + Dasanit, Vydate, Mocap and Furadan against *M. arenaria* on tobacco; Nemadi, EDB and Fumazone against *H. avenae* on wheat; Standak, AC 64475, Temik, Nemacur, Mocap, Vydate, FMC 35001, DBCP, EDB and D-D against *Helicotylenchus multicinctus* on banana.

0084 KLINDIĆ, O.; PETROVIĆ, D.; BUMBIĆ, K.; BELJO, J. [Investigation of the resistance of some imported varieties of alfalfa to the domestic populations of stem nematode and of tobacco to root-knot nematode.] Ispitivanje otpornosti nekih introdukovanih sorata lucerke prema domaćim populacijama stabljikine nematode i duhana prema nematodama korijenovih guka. *Zaštita Bilja* (1978) 29 (4) 381-385 [Cr, en, 4 ref.] Zavod za ratarstvo, Sarajevo, Yugoslavia.

Ditylenchus dipsaci presents a serious problem to alfalfa growing and *Meloidogyne* spp. to tobacco plantations in Bosnia and Hercegovina in Yugoslavia. 5 imported varieties of alfalfa were tested in inoculation and field experiments and unlike the locally grown varieties, the Swedish variety U-0640 and the American variety Apalachee showed high degrees of resistance to local populations of *D. dispaci*. The American tobacco variety NC-95 proved highly resistant to local populations of *M. incognita* (but not to *M. arenaria* and *M. javanica* which also occur in mixed *Meloidogyne* populations in Hercegovina). The resistance was successfully transferred to the F_1 generation, obtained by crossing NC-95 with the susceptible domestic varieties Šeginovac and Visoki Hercegovac (VH-32).

*0085 JAFFEE, B. A. Influence of root biomass on number of *Pratylenchus penetrans* within host roots. *Phytopathology* (1980) 70 (12) 1214-1216 [En, 10 ref.] Dep. of Plant Path., Cornell Univ., Ithaca, NY 14853, USA.

One, 2, 6 or 12 lucerne seeds were planted in 120 cm³ loamy sand. 2 days later, 750 *Pratylenchus penetrans* were added to the centre, one cm from each seedling. After 4 days, seedlings were removed and nematodes were extracted from the roots. Other seeds were planted in pots already infested with *P. penetrans* and root extracts were made after 6 days. Nematodes recovered per beaker were linearly related to root weight per beaker and conversely nematodes recovered per gram of roots were inversely correlated with root weight ($r = -0.92$, slope $= -0.71$ significant at 0.1% for the inoculation experiment). Relevance of these results in field situations is discussed.

0086 RIGGS, R. D. Cover crops and soybean cyst nematode. *Arkansas Farm Research* (1980) 29 (6) 16 [En] Agric. Exp. Sta., Univ. of Arkansas, Fayetteville, AR 72701, USA.

The suitability of cover crops for cultivation in Arkansas, USA between soybeans as possible hosts for *Heterodera glycines* (race 3 or 4) is reviewed. Various collections of *Vicia villosa*, *V. sativa*, *V. dasycarpa*, various cereals and

leguminous hosts were rated as either immune or resistant. *V. hirsuta, V. lutae, V. caroliniana, V. disperma, V. micrantha* and white lupins were rated as good hosts.

0087 [Report for 1978/1979. Changins Federal Agronomic Research Station.] Rapport d'activité 1978-1979. Station fédérale de recherches agronomiques de Changins. *Landwirtschaftliches Jahrbuch der Schweiz (Annuaire Agricole de la Suisse 81e année)* (1980) 94 (3/4) 333-432 [Fr, De, It, Plant nematology pp. 353-354, 360, 362, 373-374, 376, 381-382, 389, 411-412]

Work reported on includes: resistance to *Heterodera avenae* in maize and control with crop rotation, problems associated with *Pratylenchus* spp. on cereals, identification of pathotypes of *Globodera rostochiensis* and *G. pallida* and their control, control of *Ditylenchus dipsaci* on beet using various methods of nematicide application, nematode as vectors of plant viruses in vine, nematode control in fruit tree nurseries and pathology of *Aphelenchoides fragariae* and *A. ritzemabosi* on strawberry, *D. dipsaci* on bulbs, *Meloidogyne arenaria* on tomato and *H. carotae* on carrot.

***0088** CAPITAIN, P. **A simple method of extracting stem nematodes, *Ditylenchus dipsaci* (Kühn) Filipjev, from lucerne.** *Grass and Forage Science* (1980) **35**, 165-166 [En, 1 ref.] Plant Breeding Inst., Cambridge, UK.

A simple technique for extracting *Ditylenchus dipsaci* from air-dried samples of lucerne is described. The technique was found to be suitable for use in a breeding programme to improve resistance to stem nematodes in lucerne.

0089 PUTSA, N. M. **[Susceptibility of lucerne and white and pink clover to infestation with *Ditylenchus dipsaci* Kuhn, 1857.]** Materialy Konferentsii (2) molodykh uchenykh-gel'mintologov, Moscow, 25.11.77. [Abstract]. *Byulleten' Vsesoyuznogo Instituta Gel'mintologii im. K.I. Skryabina* (1979) No. 24, 88-89

0090 PODOLSKU, A. D. **[The practical recommendations for control of nematodes and pests of maize in GDR.]** Prakticeskije rekomendaciji po bor'be s nematodami i vreditel'jami zernovych kultur v GDR. *Sel'skoe Khozyaistvo za Rubezhom* (1979) No.2, 30-32 [Uk]

The distribution of *Heterodera avenae, Pratylenchus* sp., *Ditylenchus dipsaci, Meloidogyne naasi, Anguina tritici* is indicated, together with the damage caused by them

0091-KAKTINYA, D., 1961. **[Stem and other eelworms of papilionaceous plants in the Latvian S.S.R.]** In: Skryabin, K. I. & Turligina, E. S. [Editors], "Voprosi fitogelmintologii." *Moscow: Akademiya Nauk SSSR*, pp. 69–73. [In Russian.]

The occurrence and control of *Ditylenchus dipsaci* on clover in the Latvian S.S.R. is discussed. To the list published by the author in 1959 [The eelworm fauna of clover in the Latvian S.S.R. Research Notes on Plant Protection in the North-Western Zone. Riga], the following are now added, making in all a total of 19 species: *Rhabditis monhystera, Cephalobus nanus, Eucephalobus* spp., *Tylenchus filiformis* and *Pratylenchus pratensis*. Of the species occurring on *Vicia* spp. and *Medicago* spp., only *Meloidogyne* sp. is of pathogenic importance. Examination of seed samples showed that 40% of *Melilotus albus* had *Panagrolaimus rigidus*. This and another 5 species of eelworms were found on peas. 32 eelworms are known for Papilionaceae in the Latvian S.S.R.

0092 CAUBEL G. [Observations on resistance of vegetables to stem nematode Ditylenchus dipsaci] Observations sur la résistance des végétaux vis-a-vis du nématode des tiges: Ditylenchus dipsaci (Kuhn) Fil. [Colloque Internat, 6-8 nov. 1978. Strasbourg, Soc. Botanique de France]. Bulletin de la Société Botanique de France Actualités Botaniques (1980) 127 (1) 179-182.

0093 KORNOBIS, S. ***Tylenchorhynchus wilskii* sp.n. Nematoda, Tylenchorhynchidae) from Poland.** *Bulletin de l'Académie Polonaise des Sciences, Sciences Biologiques* **(1980) 28 (3) 173-175 [En, ru, 4 ref.] Lab. of Nematol., Inst. of Pl. Protection, Miczurina 20, 60-318 Poznań, Poland.**

***Tylenchorhynchus wilskii* n.sp. was associated with maize in Wielkopolska, Poland. *T. wilskii* resembled *T. bryobius, T. maximus, T. parvus* and *T. husingi*, but differed by having regular and aerolated lateral fields with crenate incisures, an off-set head and numerous males. Other diagnostic measurements cited were for ♀♀, L = 0.92 µm, stylet length 26 µm, b = 7.0 and c = 9.3 and for ♂♂, L = 0.90 µm, stylet length 25 µm and spicule length 30 µm.**

0094 GUBIS, V. [Combined inoculation of Paiva alfalfa with some pathogens.] Kombinovaná inokulácia lucerny Palava s niektorými patogénmi. *Poľnohospodárstvo* (1979) 25 (9) 718-726 [Sk, en, ru]

In 1972 a small plot field trial was started, in which Palava lucerne was infected with *Verticillium albo-atrum, Corynebacterium insidiosum* and *Ditylenchus dipsaci* alone or in combination. By the end of the first production year the highest percentages of plants showing necrosis were with *Ditylenchus* + *Corynebacterium* + *Verticillium* (79.5%) and *Ditylenchus* + *Corynebacterium* (72.3%).

0095 EDWARD, J. C.; SINGH, K. P. **Interaction between *Heterodera cajani* and *Fusarium udum* on pigeon pea.** *Allahabad Farmer* (1979) **50** (1) 23-24 [En, 3 ref.; 3pp. of pl. (unpaged)] Biol. Dep., Allahabad Agric. Inst., Allahabad, India.

Pigeon pea, variety type 21, was inoculated with *Heterodera cajani* (50 cysts/pot), or *H. cajani* (50 cysts/pot) and *Fusarium udum*. *Heterodera* alone caused less damage than when associated with *F. udum*. Transverse sections of roots inoculated with the nematode and fungus showed that only old syncytial or non syncytial regions were invaded by the fungus

0096 SHESTEPEROV, A. A. **[*Paratylenchus* infection of red clover.]** *Zashchita Rastenii. Moscow. USSR* (1976) No.9, 45–46 [Ru] Skryabin All-Union Inst. Helm., Moscow, USSR.

Paratylenchus projectus is widely distributed on red clover in the Moscow region, USSR, giving stunted growth, a 43% reduction of green and dry weight, a 38% loss of plants during the winter and lowered resistance to other infections. The nematode populations were higher on loamy than on sandy soils and increased under cereal grasses. Nematode numbers in loamy soils could be reduced to half or a third by manuring, ploughing and leaving fallow. Carbathion treatment reduced nematode numbers for 2 years following treatment.

0097 NESMITH, W. C. (EDITOR) **Results of 1980** Raleigh, NC, USA, American Phytopathological Society. *Fungicide and Nematicide Tests* **(1981) 36**, 229 pp. [En] Plant Path. Dep., S-305 Ag.Sci. Bldg. North Univ. of Kentucky, Lexington, KY 40546, USA.

DUNN, R. (SECTION EDITOR) Nematicides, 179-191 [En] Nematol. Lab., Univ. Florida, Gainesville, FL 32611, USA.

Evaluations were: Temik against *Pratylenchus penetrans* on *Phaseolus vulgaris*; RH 9358, Counter and Temik against *Heterodera schachtii* on sugar beet; Terr-O-Gas and Mocap against nematodes on cucumber and pepper; Temik, Mocap, Vydate, BAS 263041, Thimet, against *P. penetrans* on potato; Telone, D-D, Soilbrom, Vapam, Nemacur, Vydate, Mocap, Temik, Furadan and Agramine against *Meloidogyne hapla* and *M. chitwoodi* on potato; Dasanit, Furadan, Counter, Temik, BAS 263021, Mocap, Terr-O-Cide and Nemacur

against *Rotylenchulus reniformis* on *Ipomoea batatas*: Dasanit, Vorlex and Dowfume mc-2 against *M. incognita* on tomato: Counter, Dyfonate, Vydate, Temik, Furadan and Mocap against *Pratylenchus* on maize; Furadan and Counter against *Belonolaimus longicaudatus* on maize; Nemacur, Soilbrom, RH 9358, Furadan, Vydate, D-D, Telone, Temik and Mocap against *Hoplolaimus columbus* on cotton: Nemacur, Furadan, Vydate, Mocap, Soilbrom, Terr-O-Cide, BAS 263, Temik and Counter against *M. hapla* and *Macroposthonia* on *Arachis hypogaea*, D-D, Soilbrom, Telone, RH 9358, Vydate, Nemacur, Mocap, Furadan, Temik, FMC 35001, Dyfonate, BAS 263021 and Counter against *H. columbus* on soybean; Temik, Vydate, Counter, Furadan, Nemacur and Dyfonate against *Heterodera glycines* on soybean; L-676863, L-676897, L-642126, Nemacur, Mocap, RH 9358, BASF 263, Vydate and Nemacur + Dasanit against *M. incognita* on tobacco; Nemacur, Nemacur + Dasanit, Vydate, Mocap and Furadan against *M. arenaria* on tobacco; Nemadi, EDB and Fumazone against *H. avenae* on wheat; Standak, AC 64475, Temik, Nemacur, Mocap, Vydate, FMC 35001, DBCP, EDB and D-D against *Helicotylenchus multicinctus* on banana.

0098 RAM, K.; GUPTA, D. C. **Studies on the control of *Meloidogyne javanica* infected chickpea (*Cicer arietinum*).** *Haryana Agricultural University Journal of Research* (1981) **11** (1) 77-81 [En, 8 ref.] Dep. of Nematol., Haryana Agric. Univ., Hissar, India.

In pot trials with seedlings of *Cicer arietinum* infected with *Meloidogyne javanica* at 1000 larvae/kg soil, the soil was mixed with neem or datura leaves (200 or 400 quintals/ha), aldicarb or carbofuran 1.5 or 3.0 kg a.i./ha or phorate (3.0 or 6.0 kg a.i./ha). Aldicarb and neem (400 q/ha) were the most effective in increasing growth and reducing galling.

0099 KAUSHIK, H. D.; BAJAJ, H. K. **Control of root-knot nematode *Meloidogyne javanica* infesting mung bean and gram by seed treatment.** *Haryana Agricultural University Journal of Research* (1981) **11** (1) 106-108 [En, 4 ref.] Dep. of Nematol., Haryana Agric. Univ., Hissar, India.

Aldicarb sulphone 75 WP, carbofuran 50 SP, bendiocarb 80 WP and phemamiphos 40 EC were disolved in acetone to produce concentrations of 0.5, 1.0, 2.0 and 4.0%, and seeds of mung bean and gram were immersed in the solutions for 60 sec and then air dried. Carbofuran and bendiocarb at 2 and 4% and phenamiphos at 4% reduced the number of galls of *Meloidogyne javanica* on mung 35 days after sowing. Carbofuran and phenamiphos at 1, 2 and 4% reduced the number of galls on gram 42 days after sowing. None of the treatments inhibited germination. Gram seeds treated with acetone alone also showed some reduction in galling.

0100 KALIRAM; GUPTA, D. C. **A note on the efficacy of fresh neem leaf extract in the control of *Meloidogyne javanica* infecting chickpea (*Cicer arietinum*).** *Indian Journal of Nematology* (1980) **10** (1) 96-98 [En, 3 ref.] Dep. of Nematology, Haryana Agric. Univ., Hissar, India.

Aqueosis extracts from 10, 20, 30 or 40 g neem leaves/kg of treated soil, were applied to young chickpea plants grown in *Meloidogyne javanica* infested soil (950 larvae/kg of soil). Plant growth (shoot and root lengths, fresh shoot and root weights) were greatest and root galling least with the highest application rate, with effects decreasing with a reduction of application rate.

0101 SOBUN, N.; NEMA, K. G.; DAVE, G. S. **The possible interrelationship between plant-parasitic nematode (*Tylenchorhynchus*) and a root-rot fungus from gram (*Cicer arietinum* L.).** In *Physiology of parasitism. [Edited by: Agarwal, G. P.; Bilgrami, K. S.] (Current trends in life sciences, vol.7.).* New Delhi, India; Today & Tomorrow's Printers & Publishers. (1979) 451-456 [En, 11 ref.] Dep. of Pl.Path., J.N. Krishi Vishwa Vidyalaya, Jabalpur, India.

Nematodes were extracted from soil samples from wilted gram plants, *Cicer arietinum*, from Madhya Pradesh, India. *Tylenchorhynchus* sp. and *Tylenchus* spp. were abundant and *Helicotylenchus* and *Hirschmanniella* were present in low numbers. In a pot experiment, *Tylenchorhynchus*, inoculated at 50, 100 and 200/pot, adversely affected the root: shoot ratio (on dry weight basis). This effect was more pronounced in the presence of a fungus associated with the field wilt symptom. This fungus delayed emergence of gram seedlings.

* **0102** GAUR, H. S.; MISHRA, S. D.; SUD, U. C. **Effect of date of sowing on the relation between the population density of the root-knot nematode, *Meloidogyne incognita* and the growth of three varieties of chickpea, *Cicer arietinum*.** *Indian Journal of Nematology* (1979, publ. 1980) **9** (2) 152-159 [En, 9 ref.] Div. of Nematology, Indian Agric. Res. Inst., New Delhi-110012, India.

Seedlings of 3 chickpea (*Cicer arietinum*) varieties, B.G.203, H-208 and L-550, were inoculated with 100, 1000 or 10 000 *Meloidogyne incognita* juveniles/1000 ml of soil one week after sowing in September, October, November or December. The maximum reduction in shoot growth was observed following inoculation at the optimum sowing time i.e. October, followed by that observed in September. Sowing in November or December resulted in little nematode damage. Below an initial inoculum density of 1000 nematodes plant growth was best in October but at higher inoculum densities it was best in the November sowing. The variety L-550 grew better than the other 2 varieties.

* **0103** MEINERS, J. P. **Genetics of disease resistance in edible legumes.** *Annual Review of Phytopathology* (1981) 19, 189-209 [En, 124 ref.] Beltsville Agric. Res. Center, Agric. Res., Sci. & Education Admin., USDA, Beltsville, MD 20705, USA.

The genetics of disease resistance in 11 species of edible legumes, including resistance to *Meloidogyne incognita* in *Phaseolus lunatus* and to *M. incognita*, *M. hapla* and *M. javanica* in *Vigna unguiculata* are reviewed.

0104 KUTHE, K. **[Efficacy of in-furrow applications of insecticides/nematicides to sugar-beet and maize.] Auswirkungen von Saatreihenbehandlungen mit Insektiziden/Nematiziden bei Rüben und Mais.** *Gesunde Pflanzen* (1978) **30** (2) 35-41 [De, en, 13 ref.] Inst. für Phytopathol., Giessen, GFR.

In-furrow applications of aldicarb (Temik 10G) or carbofuran (granular and liquid formulations of Curaterr) were effective in controlling *Pratylenchus* spp. and *Heterodera avenae* on maize and the 2 granular formulations were effective against *Ditylenchus dipsaci* on sugar-beet. The advantages of in-furrow application of pesticides over broadcast application are discussed.

0105 EGUNJOBI, O. A.; BOLAJI, E. I. **Dry season survival of *Pratylenchus* spp. in maize fields in Western Nigeria.** *Nematologia Mediterranea* (1979) 7 (2) 129-135 [En, it] Nematol. Lab., Phytopathology Unit, Dep. of Agric. Biol., Univ. of Ibadan, Ibadan, Nigeria.

Maize roots remaining in the soil after harvest provided a dry season habitat for *Pratylenchus* spp. (51 adults and 14 juveniles from 100 g root samples, 4 months after maize harvest). Large numbers of *Pratylenchus* were found in weed species, particularly *Axonopus compressus*, *Amaranthus viridis* and *Commelina nudiflora* in December, February and March. All motile stages of the nematode were recovered.

* **0106** MILLER, P. M.; RICH, S. **Injury to sweet corn by a *Longidorus* sp. in Connecticut.** *HortScience* (1980) **15** (1) 29-30 [En, 3 ref.] Dep. of Plant Pathology and Botany, The Connecticut Agricultural Experiment Station, New Haven, CT 06504, USA.

A species of *Longidorus*, longer than *L. breviannulatus*, is reported from a field of *Zea mays* cv. Early Fortune near Glastonbury, Connecticut, USA. In glasshouse and field trials, cultivars of *Zea mays* were tested against this species and *Pratylenchus penetrans*. Stunting by *Longidorus* sp. was positively correlated with heights of uninfected cultivars, that

caused by *P. penetrans* was not related to height. When plants were grown in soil infested with both nematodes, stunting was not additive. Diazinon and carbofuran in the glasshouse and diazinon in the field protected *Zea mays* from *Longidorus* sp.

*0107 ZIRAKPARVAR, M. E. **Host range of *Pratylenchus hexincisus* and its pathogenicity on corn, soybean, and tomato.** *Phytopathology* (1980) 70 (8) 749-753 [En, 15 ref.] Dep. of Plant Path., Seed and Weed Sci., Iowa State Univ., Ames 50011, USA.

P. hexincisus was recovered from the roots of all 44 plant species or cultivars tested except smooth brome and orchardgrass. Final populations of *P. hexincisus*/pot in tomato and garden pea (*Pisum sativum*) were larger than in maize. In glasshouse experiments, an initial inoculum of 5000 *P. hexincisus*/plant significantly decreased root and top weights of maize, soybean and tomato after 3 months. An initial inoculum of 20 000 nematodes/plant significantly decreased height and top and root weights of maize in all 3 monthly samplings.

0108 SULLIVAN, J. A.; CHRISTIE, B. R. **The inheritance of resistance to the northern root-knot nematode (*Meloidogyne hapla* Chitwood) in alfalfa (*Medicago sativa* L.).** *Forage Notes* (1979) 24 (1) 20-23 [En] Dep. Crop Sci., Guelph Univ., Ontario, Canada. From *Plant Breeding Abstracts 50*, 8014.

Five resistant and 4 susceptible clones selected from Vernal were selfed and crossed with at least one other clone. In all, 3800 S_1 and F_1 seedlings were screened. On the basis of the segregation ratios obtained, it is postulated that resistance is controlled by 2 independent loci segregating tetrasomically, resistance being dominant over susceptibility. To be resistant, there must be at least 2 dominant alleles at both loci.

*0109 SANTO, G. S.; EVANS, D. W.; BOWER, D. B. **Reactions of three Alfalfa cultivars to several species of plant-parasitic nematodes.** *Plant Diseases* (1980) 64 (4) 404-405 [En, 15 ref.] Irrigated Agric. Res. & Extension Center, Prosser, WA 99350, USA.

Ditylenchus dipsaci reduced growth of all lucerne cultivars tested, except Washoe. *Pratylenchus penetrans* reduced growth of Washoe and Vernal but not of Thor. *Meloidogyne hapla* reduced the top growth of Thor but not growth of roots and crown. The opposite was true with Washoe. *M. hapla* did not affect Vernal. *P. neglectus*, *Paratylenchus hamatus*, and *Macroposthonia xenoplax* did not affect final plant growth of the cultivars tested.

*0110 DI VITO, M.; VOVLAS, N.; INSERRA, R. N. **Influence of *Meloidogyne incognita* on growth of corn in pots.** *Plant Disease* (1980) 64 (11) 1025-1026 [En, 6 ref.] Istituto Nematologia Agraria, CNR, 70126 Bari, Italy.

The influence of *Meloidogyne incognita* race 1 on growth of maize hybrid Dekalb-XL-41 was studied in pots containing a geometric series of eggs (0 and 0.5, 1, 2, 4, ... 1024 eggs/g soil) kept at 24 to 26°C for 75 days. The decline in fresh weight of tops of maize indicated a tolerance limit to *M. incognita* of 10 eggs/g soil.

0111 SINGH, P.; LAL, S. S. **Population fluctuation of *Pratylenchus thornei* in maize in relation to temperature and moisture.** [3rd Nat. Congr. Parasit., Haryana Agric. Univ., Hissar, 24-26 Apr. 1980. Abstract B.80.]. *Indian Journal of Parasitology* (1980) 3 (Supplement) 37 [En] Dep. of Zool., N.R.E.C. Coll., Khurja, India.

0112 DOLMANS, N. G. M.; BUNT, J. A. **Control of plant-parasitic nematodes in maize by different seed treatments with oxamyl.** [32nd Int. Symp. Fytofarm. en Fytiat. Gent, 1980. Deel II.]. *Mededelingen van de Faculteit Landbouwwetenschappen Rijksuniversiteit Gent* (1980) 45 (3) 733-737 [En, 9 ref.] Lab. of Nematology, Agric. Univ., Wageningen, Netherlands.

Maize seed was dipped in oxamyl (0, 20, 60 and 180 g/l or g/kg) dissolved in water for 15 min, in acetone for 15 seconds or dipped in a talcum powder-oxamyl mixture. The seeds, with approximately 0, 0.30, 0.90 and 2.70 mg oxamyl/seed, were planted in pots with soil containing *Pratylenchus* spp. (2300/l), *Tylenchorhynchus* spp. (1900/l) and saprozoic nematodes (9900/l). No differences occurred in aerial growth after 1, 3, 5 or 7 weeks. Oxamyl treatment reduced root populations of *Pratylenchus* spp. and soil populations of *Tylenchorhynchus* spp. and saprozoic nematodes although the reduction of the latter was slight. The water and acetone treatments at the highest rates were the most effective treatment.

*0113 JAIN, R. K. **Control of *Tylenchorhynchus mashoodi* on Berseem.** *Indian Journal of Nematology* (1980) 10 (1) 98-100 [En, 4 ref.] Indian Grassland and Fodder Res. Inst., Jhansi-284003, India.

Nemacur, carbofuran and phorate applied at 1.0, 1.5 and 2.0 kg a.i./ha and DBCP at 10, 15 and 20L/ha were applied to berseen *Trifolium alexandrinum* to test the effects of control of *Tylenchorhynchus mashoodi* on green fodder and seed yield of berseem. DBCP at 20L/ha followed by DBCP at 15L/ha, nemacur at 2.0 kg a.i./ha and carbofuran at 2.0 kg a.i./ha were the most successful treatments in increasing yields and reducing numbers of nematodes. Phorate was ineffective.

0114 INSERRA, R. N.; O'BANNON, J. H.; SANTO, G. S. **The effect of *Meloidogyne hapla* on growth of alfalfa seedlings.** *Nematologica* (1980) 26 (3) 379-381 [En, 5 ref.] Lab. Nematologia agraria, Bari, Italy.

The effect of initial population densities of *M. hapla* (0, 0.25, 0.50, 1, 2, 4, 8, 16, 32, 64, 128, 256, and 512 eggs + 2nd-stage juveniles/ml of soil) on lucerne growth was studied in a pot experiment. Results suggested an extremely small tolerance limit of lucerne for *M. hapla*, possibly due to attack by a second generation of the nematode.

0115 HAALAND, R. L.; HOVELAND, C. S.; GREY, F.; CLARK, E.; RODRIGUEZ-KABANA, R. **Rhizosphere problems limiting alfalfa production in the "Deep South.".** In *Report of the 26th Alfalfa Improvement Conference, 6-8 June, 1978, South Dakota State University, Brookings, South Dakota, USA*. St. Paul, Minnesota, USA; US Department of Agriculture. (1979) 30 [En, [ARM-NC-7]] Auburn Univ., Auburn, Alabama, USA.

The following nematodes were associated with lucerne in Alabama, USA: *Meloidogyne* sp., *Pratylenchus* sp., *Criconemoides* sp., *Xiphinema* sp., *Tylenchorhynchus* sp., *Trichodorus* sp., *Helicotylenchus* sp. and *Hoplolaimus* sp. *Tylenchorhynchus* sp. and *Trichodorus* sp. were severe pathogens

0116 NIRMAL SINGH; GILL, J. S.; KRISHNANADA, N. **Prevalence of root-knot nematode in Nilgiri hills.** *Indian Phytopathology* (1979) 32 (3) 499-501 [En, 3 ref.] Div. of Entomol., Central Potato Res. Inst., Simla (H.P.), India.

In a survey of root galls from the potato-growing localities in the Nilgiri hills, India, *Meloidogyne hapla* was the dominant species, followed by *M. incognita* and *M. javanica*. Gall size depended on the response of the host plant. New hosts were: *Erigeron mucronatus*, *Laggera altaa*, *Verbena venosa*, *Anotis leschenaultiana* and *Pelargonium graveolens* for *M. hapla*; *Chrysanthemum leucanthemum*, *Plectranthus coleoids* and *Polygonum punctatum* for *M. incognita* and *Silene gallica* and *M. javanica*. New host records for India were: *Bidens pilosa* and *Plantago major* for *M. hapla*; *Sonchus arvensis* and *Phytolacca americana* for *M. incognita* and *Acacia dealbata* for *M. javanica*.

*0117 MALEK, R. B.; NORTON, D. C.; JACOBSEN, B. J.; ACOSTA, N. A new corn disease caused by *Longidorus breviannulatus* in the Midwest. *Plant Disease* (1980) 64 (12) 1110-1113 [En, 5 ref.] Dep. of Plant Path., Univ. of Illinois, Urbana 61801, USA.

The distribution of *Longidorus breviannulatus* on maize in Illinois and Iowa, USA is described. Populations were highest and disease symptoms most severe in very sandy soil (>90% sand). *L. breviannulatus* caused severe stunting, chlorosis and occasional seedling mortality in field populations of 100/100 cm^3 soil. As *L. breviannulatus* populations declined after June, plants recovered but stalks remained slender and yields in severely affected areas were reduced by up to 62%. Root symptoms included yellow discolouration, slight swelling of root tips, severe stubby-root and pruning of lateral roots and a reduction in number of feeder roots. High soil moisture levels enhanced root symptom expression. The prop root system was unaffected.

*0118 THYR, B. D.; KEHR, W. R.; MANGLITZ, G. R.; HARTMAN, B. J.; HUNT, O. J. Development of multiple pest resistance in three alfalfa populations. In *Report of the 26th Alfalfa Improvement Conference, 6-8 June, 1978, South Dakota State University, Brookings, South Dakota, USA*. St. Paul, Minnesota, USA; US Department of Agriculture. (1979) 17 [En, [ARM-NC-7]] Univ. of Nevada, Reno, Nevada, USA.

Three synthetic lucerne populations (N.S. 77, 78 and 79) were screened for resistance to *Ditylenchus dipsaci* and 5 other pests and diseases. 2 cycles of phenotypic selection produced populations of N.S. 77 and 78 with levels of resistance to *D. dipsaci* higher than that of the cultivar 'Washoe'. Resistance to the other pests and favourable agronomic factors were either maintained or enhanced by selection.

*0119 ISOM, W. H.; GREEN, W. L.; STANFORD, E. H.; LEHMAN, W. F.; MARBLE, V. L.; TEUBER, L. R. Registration of UC-PX 1971, alfalfa germplasm (Reg. No. GP104). *Crop Science* (1980) 20 (2) 288-289 [En] Dep. of Agron. & Range Sci., Calif. Univ., Davis, USA. From *Plant Breeding Abstracts, 51*, 1260.

In tests at Davis, California, USA, the lucerne germplasm UC-PX1971 has shown moderate to high resistance to *Meloidogyne hapla, M. incognita* and *M. javanica* and has yielded well in trials in California on sandy soils with large populations of nematodes.

0120 HARTMAN, B. J.; THYR, B. D.; HUNT, O. J. Nematode resistant alfalfa in crop rotations for root-knot nematode control. In *Report of the 26th Alfalfa Improvement Conference, 6-8 June, 1978, South Dakota State University, Brookings, South Dakota, USA*. St. Paul, Minnesota, USA; US Department of Agriculture. (1979) 29 [En, 2 ref. ARM-NC-7] Univ. of Nevada, Reno, Nevada, USA.

A hardy lucerne cultivar, 'Nevada Synthetic XX', resistant to *Meloidogyne hapla* was planted in heavily infested soil (ca. 600 *M. hapla*/100 c.c. of soil) in Nevada, USA. Populations of *M. hapla* were reduced such that a bioassay 12 months after planting of Nevada Synthetic resulted in 0.8 galls/tomato plant compared to 200 galls/tomato plant on plots planted with susceptible lucerne. Resistance levels above 70% gave successful control of *M. hapla*.

*0121 GRIFFIN, G. D. Interrelationship of *Meloidogyne hapla* and *Ditylenchus dipsaci* on resistant and suceptible alfalfa. *Journal of Nematology* (1980) 12 (4) 287-293 [En, 16 ref.] USDA, SEA, AR, Crops Res. Lab., Utah State Univ., Logan, UT 84322, USA.

Root penetration of 4 lucerne cultivars, Nev Syn XX, Vernal 298, Lahontan and Ranger by *Ditylenchus dipsaci* and *Meloidogyne hapla* at 16, 20, 24 and 28°C was similar in single and combined inoculation tests. Invasion by *M. hapla* increased with temperature whereas invasion by *D. dipsaci* on Vernal 298, Lahontan and Ranger was greatest at 20 and 24°C and on Nev Syn XX at 20, 24 and 28°C. Invasion by *M. hapla* was least on Nev Syn XX and Vernal 298 and by *D. dipsaci* was least on Nev Syn XX. *D. dipsaci* suppressed root weights of Ranger at all temperatures and Vernal 298 at 20, 24 and 28°C. *M. hapla* did not depress root weight but *D. dipsaci* and *M. hapla* combined suppressed root weights of Ranger more than *D. dipsaci* alone. Galling caused by *M. hapla* on Ranger and Lahontan was not influenced by pre-inoculation of *D. dipsaci*, though on these susceptible varieties, galling increased with increasing temperature. Galling on Vernal 298 was reduced by plant age at inoculation, such that most galling occurred on plants inoculated as seeds at 28°C with *M. hapla* and *D. dipsaci* combined. Germinating Ranger seeds were more attractive to both species than Nev Syn XX seeds.

0122 BOESEWINKEL, H. J. *Phytophthora hibernalis* and *Aphelenchoides ritzemabosi* on foliage of *Aquilegia vulgaris* in New Zealand. *Australasian Plant Pathology* (1980) 9 (2) 10-11 [En, 5 ref.] Mt Albert Res. Centre, Private Bag, Auckland, New Zealand.

Aphelenchoides ritzemabosi is recorded for the first time from *Aquilegia vulgaris* in Auckland, New Zealand. It is possibly the first world recording on this host.

*0123 KERR, E. D.; WYSONG, D. S. Sting nematode, *Belonolaimus* sp., in Nebraska. *Plant Disease Reporter* (1979) 63 (6) 506-507 [En] Univ. of Nebraska, Scottsbluff, Nebraska 69361, USA.

Belonolaimus sp. is reported associated with coarse, stubby roots of maize near the Nebraska–South Dakota border, USA. The nematode which is very similar to *B. nortoni* was also associated with *Digitaria sanguinalis, Setaria viridis* and undisturbed pastures of *Andropogon gerardi* and *Bouteloua gracilis*. This is thought to be the most northerly site of *Belonolaimus* sp. in the USA.

0124 KORNOBIS, S. [Nematodes – pests of maize.] Nicienie – szkodniki kukurydzy. *Ochrona Roślin* (1978) 22 (6) 14-16 [Pl] Instytut Ochrony Roślin, Poznań, Poland.

The disease symptoms aiding recognition of nematode infections (*Ditylenchus dipsaci, Heterodera avenae* and *Pratylenchus* spp.) on maize, a crop increasingly cultivated in Poland, are outlined for the field worker.

0125 STOYANOV, D. [Parasitic species of nematodes on maize.] *Rastitelna Zashchita* (1977) 25 (10) 23-24 [Bg]

In Bulgaria, *Meloidogyne hapla, Pratylenchus zeae* and *Rotylenchulus borealis* were found in the damaged roots of maize. *R. borealis*, recorded for the first time in Bulgaria, and on maize, is described and its measurements compared with those of the original description.

0126 CAUBEL, G. [Problems posed by the stem nematode (*Ditylenchus dipsaci* (Kühn)) in maize culture.] Problèmes posés par le nématode des tiges (*Ditylenchus dipsaci* (Kühn)) en culture de mais. *Comptes Rendus des Séances de l'Académie d'Agriculture de France* (1973) 59 (8) 627-640 [Fr] Inst. National de la Recherche Agronomique, Lab. de Recherches de la Chaire de Zoologie, E.N.S.A., 65 rue de St. Brieuc, 35042, Rennes Cedex, France.

Aspects of the life-cycle and pathology of *Ditylenchus dipsaci* on maize in France and the possibility of control by crop rotation are described and discussed. Observations on 788 ha of maize, in France, from 1968 to 1972 showed that 114 ha were destroyed by the nematode. *D. dipsaci* populations from 10 different hosts reproduced on maize. Populations from beetroot, oats, carnation and maize reproduced well but a population from shallots reproduced poorly. Reproduction in maize plants inoculated between 20th April and 23rd May was fairly constant but in plants inoculated on the 31st May it was poor. In pot experiments penetration of maize seedlings occurred 2 days after inoculation in 1- to 4-week-old seedlings and after 6 days in

newly germinated seeds. Over a temperature range of 11 to 21°C reproduction was best at 17 to 19°C.

0127 DERN, R. [Freeliving root-nematodes as pests of agricultural plants in Hessen-Nassau.] Freilebende Wurzelnematoden als Schädlinge an landwirtschaftlichen Kulturpflanzen in Hessen-Nassau. *Gesunde Pflanzen* (1977) 29, 287-289 [De] Pflanzenschutzamt Frankfurt am Main, GFR.

In Hessen-Nassau, German Federal Republic, damage to cereals and maize, as well as to other agricultural crops, is caused in many fields by *Pratylenchus neglectus* and *P. penetrans*. Losses of between 20 and 34% were demonstrated in cereals, maize and fodder beet in fields infested with more than 250 *P. penetrans* or more than 500 *P. neglectus* in 250 ml soil. Treatments with nematicides such as Curaterr and Temik 10 G are profitable.

0128 OGIGA, I. R.; ESTEY, R. H. **Penetration and colonization of *Brassica rapa* and *Zea mays* root tissues by *Pratylenchus penetrans*.** *Phytoprotection* (1975) 56 (1) 23-30 [En, fr] Dep. of Pl. Path., Macdonald Coll. of McGill Univ., Que., Canada.

Parasitism of *Brassica rapa* and *Zea mays* by *Pratylenchus penetrans* was studied on seedlings grown in soil or agar. Brownish necrotic lesions were formed on roots and many more lateral roots were produced on parasitized plants than on control plants, particularly in soil-grown seedlings. Adults and juveniles migrated within a few min of inoculation towards the zone of differentiation or to epidermal ruptures caused by emerging lateral roots. The nematodes fed externally on all zones except the root cap. Nematode migration within the root tissue was intracellular and although the process of penetration appeared to be mechanical it was often preceded by cell discolouration. Penetration of *B. rapa* occurred within 6 hours of inoculation and of *Z. mays* within 8 to 12 hours, unless penetration was through ruptures caused by emerging lateral roots when it was equally rapid in both species. The endodermis of *B. rapa* was disrupted within 2 weeks of infection but that of *Z. mays* was not affected. Mass invasion of *B. rapa* sometimes occurred causing lesions open to the stele. Histochemical tests showed the presence of phenols in the host roots.

0129 BEHRINGER, P. [Maize cultivation and cereal nematodes. Experience in Bavaria.] Maisanbau und Getreidenematoden. Erfahrungsbericht aus Bayern. *Mais* (1978) No. 1, 18, 27-28 [De] Bayerische Landesanstalt für Bodenkultur und Pflanzenbau, Neuburg a.d. Donau, GFR.

Heterodera avenae is widespread in Bavaria, German Federal Republic, and is present in 78% of fields. A general account of the nematode on cereals is given and the use of resistant varieties is recommended as being the only way of overcoming the disease. The nematode pathotypes A, B, C and D are present, sometimes in mixed populations, and possibly also pathotypes E and F in the hill country of upper/lower Bavaria. Maize is in a different category from that of other cereals because nematode larvae enter the roots but may not mature. Crop yields may be reduced but the nematode population is also reduced. The nematode-reducing influence of maize was demonstrated in an experiment started in 1967 where, after 10 years of maize monoculture, the heavy infestation of cyst nematodes was also completely destroyed, while in an area growing summer wheat the infestation remained very high. In Bavaria, where frequent maize crops are combined with widespread growth of winter wheat, infestations of cereal cyst nematodes remain slight.

0130 ORR, C.C., 1967. "Observations on cotton root-knot nematode in grain sorghum in West Texas." Pl. Dis. Reptr, 51 (1), 29. Meloidogyne incognita acrita was found associated with reduced growth and yield of grain sorghum in Texas, U.S.A.

0131 RHOADES, H. L. Evaluation of nematicides and methods of their application for control of nematodes on field corn. *Nematropica* (1979) 9 (1) 43-47 [En, es] Agric. Res. & Education Center, P.O. Box 909, Sanford, FL 32771, USA.

In a 2 year field experiment maize (*Zea mays*) yields were increased by application of various fumigant and non-volatile nematicides by an average of 28% in 1977 and 58% in 1978. Yield increase was correlated to a decrease in numbers of *Belonolaimus longicaudatus*. DBCP and EDB also gave good control of *B. longicaudatus* and DBCP controlled *Hoplolaimus galeatus*. Stubby nematodes (*Paratrichodorus christiei*) were controlled by terbufos, phenamiphos and CGA-12223. Application of phenamiphos, carbofuran, aldicarb and oxamyl in a 38 cm band incorporated by rotary wheels just prior to planting was more effective than application in a 25 cm band in front of the press wheel or in the seed furrow with the planter.

***0132** WILLIS, C. B.; THOMPSON, L. S. **Effects of phenamiphos, methyl bromide, and fallowing on *Pratylenchus penetrans*, yield of *Medicago sativa*, and *Fusarium* infections.** *Journal of Nematology* (1979) 11 (3) 265-269 [En] Agric. Canada, Res. Station, P.O. Box 1210, Charlottetown, Prince Edward Island, Canada C1A 7MS.

In a field study the effects of phenamiphos (22.4 kg a.i./ha), methyl bromide (488 kg/ha) and fallowing on the numbers of *Pratylenchus penetrans*, lucerne yields and the incidence of *Fusarium* spp. were measured. In the 1st year plots were left fallow or sown to red clover and in the 2nd year lucerne was planted and chemical treatment applied. Lucerne was cropped for a further 3 years. Fallowing initially controlled the nematodes but at the end of the 2nd growing season populations were as dense as in plots which had grown a susceptible crop. Yields were increased only in the 1st year after fallowing and *Fusarium* was not reduced. Phenamiphos treatment reduced nematode numbers, increased forage yields in 2 of the 4 years and reduced *Fusarium* infection of taproots. The best control of *P. penetrans* and *Fusarium* infection was obtained following methyl bromide treatment and lucerne yields were increased in all 4 years.

0133 CASPARY, W. [Investigations on the epidemiology of and injury caused by *Ditylenchus dipsaci* (Kühn 1857) Filipjev, 1936 on maize.] Untersuchungen zur Epidemiologie und Schadwirkung von *Ditylenchus dipsaci* (Kühn 1857) Filipjev 1936 an Mais. *Thesis, Universitat Bonn, German Federal Republic.* (1976) 116 pp. [De] Rheinische Friedrich-Wilhelms Univ., Bonn, GFR.

Glasshouse and field experiments were done to investigate the epidemiology and disease caused by *Ditylenchus dipsaci* infecting maize. Plant invasion was influenced mainly by the stage of development of the host, soil moisture and environmental factors. Attack diminished with increasing age of the seedling. Maximum attack and most damage occurred at over 50% water saturation and 15°C soil temperature. At 20 to 25°C invasion was less, shoot growth was increased and root development reduced, as compared with uninoculated control plants. Different maize varieties were attacked to different degrees but no resistance was observed. Fresh weight reduction in comparable plants varied between 0 and 100% with a mean of about 15%. A similarly wide variation occurred in plant infection but there was a lack of correlation between infection and damage. The non-uniform behaviour of the same population of *D. dipsaci* on maize and other plants was based on the genetic heterogeneity of the parasite and host. The identity of the race of the 2 beet populations of the nematode could not be clearly determined by host-range tests. The use of morphological criteria for race separation is impossible because the host plant and temperature can cause modifications. Maize was also attacked by an isolate from tobacco. All motile stages of the nematode could attack maize but predominantly 4th stage larvae. Only rarely did more than 20% of the inoculum invade, usually less than 1%. Shoots as well as roots were penetrated and reproduction took place in them. The unusual behaviour of the nematode

in entering maize leaves and coleoptiles has not previously been described. There are more than 200 references.

0134 DEMEURE, Y. **[Reasons for survival of certain phytoparasitic nematodes (*Scutellonema cavenessi* and *Meloidogyne* spp.) during the dry season in the Senegalese Sahel.]** Les causes de la survie de certains nématodes phytoparasites (*Scutellonema cavenessi* et *Meloidogyne* spp.) pendant la saison sèche dans le Sahel Sénégalais. *Thesis. Université Claude Bernard (Lyon I)* Paris, France; ORSTOM. (1979) 105 pp. [Fr]

[308] DERN, R. [Migratory plant-parasitic nematodes in agriculture.] Freilebende Wurzelnematoden im Ackerbau. [Abstract]. 131 [De] Pflanzenschutzamt Frankfurt Main, GFR.

In Hesse, German Federal Republic, nearly all agricultural land is infested with *Pratylenchus*, about one third having more than 250 *Pratylenchus* sp./250 ml soil. Numbers of the nematodes extracted from 10 g samples of roots were 6440 in rye, 7310 in barley, 7490 in wheat, 26 650 in oats, 2780 in maize, 3620 in clover, 2500 in beet and 2320 in potato. A comparison of crops on nematicide-treated and untreated plots showed an average yield 25% higher on treated maize plots even in dry years. With heavier nematode infestations the differences between treated and untreated plots were larger.

0135 GRAHAM, J. H. (COORDINATOR); STUTEVILLE, D. L.; FROSHEISER, F. I.; ERWIN, D. C. **A compendium of alfalfa diseases.** Minnesota, USA; American Phytopathological Society. (1979) vi + 65 pp [En, 8 pl. (unpaged)]

This compendium is intended to help extension and advisory plant pathologists in the diagnosis of diseases of lucerne. After an introductory section outlining disease development and giving a short general account of disease agents and the principles of control there are sections detailing the diseases caused by abiotic agents and by biotic agents including bacteria, fungi, viruses, insects and nematodes. These sections give descriptions of the symptoms of disease, the causal organism, the disease cycle and control methods. The 3 nematodes dealt with in detail are *Ditylenchus dipsaci* (the most important), *Meloidogyne* spp. and *Pratylenchus* spp., the first 2 being illustrated by line drawings and photographs. A guide to the identification of lucerne diseases classified by the plant part affected, a glossary of terms and a comprehensive index complete the compendium. The book is well illustrated throughout with many line drawings and with black and white and coloured photographs. It amply fulfills its purpose.

0136 NORTHERN IRELAND, DEPARTMENT OF AGRICULTURE **Northern Ireland Agriculture, 38th Annual General Report of the Department of Agriculture year ended 31 March 1979.** Belfast; HM Stationery Office. (1979) 158 pp. [En, Plant nematology pp. 39-40]

Work reported on includes; screening of potato seedlings and varieties for resistance to *Globodera rostochiensis* and *G. pallida*, development of more efficient techniques for resistance screening and investigations of damage caused by clover cyst nematode [*Heterodera trifolii*] to clover in glasshouse experiments.

0137 KATALAN-GATEVA, S. D.; GUDUROVA, L. B. **[The endoparasitic species *Zygotylenchus guevarai* (Tobar Jimenez, 1963) Braun & Loof, 1966, (Nematoda, Tylenchida) found in Bulgaria.]** *Acta Zoologica Bulgarica* (1979) No.12, 44-49 [Bg, en, ru]

Zygotylenchus guevarai was recorded for the first time in Bulgaria on lucerne (*Medicago sativa*), beans (*Phaseolus vulgaris*) and maize (*Zea mays*) which were new hosts for the nematode. The biometric data of nematode populations from Bulgaria, Germany, Czechoslovakia, France, Italy, Tunisia and Spain are tabulated.

***0138** ELGIN, J. H., JR. **Inheritance of stem-nematode resistance in alfalfa.** *Crop Science* (1979) 19 (3) 352-354 [En] Field Crops Lab., Plant Genetics & Germplasm Inst., AR, SEA, USDA; BARC West Beltsville, MD 20705, USA.

Inheritance of resistance to *Ditylenchus dipsaci* in lucerne was investigated by selfing and testcrossing 25 resistant and 3 susceptible clones. Segregation ratios could be explained by the hypothesis that resistance was conditioned by 2 complementary, dominant, tetrasomically inherited genes, *Sn* and Sn_1. Evaluation of results from earlier reports confirmed the conclusions.

0139 OLOWE, T. **Research work on root knot nematodes at the National Cereals Research Institute, Ibadan.** In *Proceedings of the research planning conference on root-knot nematodes, Meloidogyne* spp., 7-11 June, 1976, Ibadan, Nigeria. Ibadan, Nigeria; International Institute of Tropical Agriculture. (1976) 15-19 [En, IMP Contract No. AID/ta-c-1234] Nematol. Div., National Cereals Res. Inst., P.M.B. 5042, Moor Plantation, Ibadan, Nigeria.

A survey of maize in 7 States of Nigeria showed infestation with *Meloidogyne* spp. in 51% of the sites examined. The worst affected varieties were Farz 26 & 27. The survey is to be extended in cowpea-growing areas. In pot tests of 46 lines/varieties of cowpeas with *M. incognita* one was immune, 24 were resistant or highly resistant and 17 susceptible or highly susceptible. The resistant varieties are to be re-examined under severe conditions. Surveys of cowpea and soybean are continuing.

0140 GILL, J. S.; SWARUP, G. **Pathogenic effect of *Tylenchorhynchus vulgaris* on gram.** *Indian Journal of Nematology* (1977, publ. 1979) 7 (2) 155-156 [En] Div. of Nematol., Indian Agric. Res. Inst., New Delhi 110012, India.

Tylenchorhynchus vulgaris was inoculated on seedlings of *Cicer arietinum* grown in pots of sterilized soil with farmyard manure. Plant growth was decreased with increasing inoculum levels up to 20 000 nematodes/pot. Decreases in shoot weight and root length were significant. Final nematode populations increased with inoculum level.

0141 HAIDER, M. G.; NATH, R. P.; PRASAD, S. S. **Studies on the lance nematode *Hoplolaimus indicus*. I. Pathogenicity and histopathogenesis on maize.** *Indian Journal of Nematology* (1978, publ. 1979) 8 (1) 9-12 [En] Dep. of Nematol., Sugarcane Res. Inst., Rajendra Agric. Univ., Bihar, Pusa 848125, India.

In a pot experiment 10 day-old maize seedlings inoculated with 100 or more *Hoplolaimus indicus* larvae showed significant growth reduction. Leaves of infested plants were yellowed and the tips started to dry 15 to 20 days after inoculation and most of the leaves were dried out after 2 months. Roots of plants inoculated with 100 000 nematodes were totally destroyed. The decrease in plant growth was proportional to the initial inoculum level. Reproduction of the nematode population was most rapid at an inoculum density of 10 nematodes/plant and slowest at 10 000 nematodes/plant. The nematode population from the inoculum of 100 000 decreased from the initial level. *H. indicus* was observed feeding ecto- and endoparasitically. No hypertrophy or hyperplasia of cells was observed but browning of epidermal cells was seen around the point of infection or feeding site. The parenchymatous cells of the cortex around the feeding site were granular, thick-walled and stained darkly with saffranine. In later stages of infection the cytoplasm disappeared and tunnels were formed in the cortical tissues due to cell wall disintegration. In heavily infested roots the epidermis was completely sloughed off.

***0142** WILLUT, J. M.; MALEK, R. B. **Spatial distribution of plant-parasitic nematodes associated with corn.** [Ann. Meet. Amer. Phytopath. Soc., N. Cent. Div., 25-27 June, 1979.]. *Phytopathology* (1979) 69 (5) 544 [En] Dep. of Plant Path. Univ. of Illionis, Urbana, IL 61801, USA.

Soil populations of *Longidorus breviannulatus* on 4th-year maize peaked in July. Numbers of *Xiphinema americanum* and *Pratylenchus scribneri* reached a maximum in August or September and populations of *Hoplolaimus galeatus* also peaked in September. Root populations of *P. scribneri* and *H. galeatus* were most dense in August. At the end of the season *L. breviannulatus* was concentrated at a soil depth of 16 to 30 cm, *H. galeatus* and *P. scribneri* at 0 to 15 cm and *X. americanum* was evenly distributed throughout the 2 horizons.

0143 BUNT, J. A. Effect and mode of action of the nematicide ethoprophos. [31st Int. Symp. Fytofarm. en Fytiat., Gent, 1979. Deel 1.]. *Mededelingen van de Faculteit Landbouwwetenschappen Rijksuniversiteit Gent* (1979) 44 (1, Pt. 1) 357-366 [En, nl] Lab. of Nematol., Agric. Univ., Wageningen, The Netherlands.

The results are presented of laboratory and glasshouse tests to compare the effects and mode of action of ethoprophos and oxamyl on *Ditylenchus dipsaci* and *Pratylenchus penetrans*. The ability of *D. dipsaci* to penetrate stem sections of *Vicia faba* was inhibited to approximately the same extent by the 2 chemicals and the reactions of the nematodes *in vitro* were similar. *D. dipsaci* larvae immersed for several weeks in oxamyl recovered when transferred to water but did not recover from immersion in ethoprophos. After 4 days of exposure in oxamyl solutions at high concentrations the nematodes recovered in water, but recovered only from low concentrations of ethoprophos. Experiments using drench treatments of the 2 chemicals on maize plants infested with *Pratylenchus penetrans* and on tomato infested with *D. dipsaci* suggest that ethoprophos acts as a local systemic as well as a contact nematicide.

0144 SINGH, I.; BINDRA, O. S. Effect of carbofuran as seed treatment and granular soil treatment alone and in combination on nematodes associated with maize. *Indian Journal of Nematology* (1978. publ. 1979) 8 (1) 89-91 [En] Dep. of Plant Path., Punjab Agric. Univ., Ludhiana, Punjab, India.

In a maize field experiment carbofuran as a seed treatment or as a granular soil treatment alone or in combination reduced *Tylenchorhynchus* populations. Lowest numbers were observed with treatments of 10% a.i. on the seed 20 and 35 days after germination and, after 65 days, with 10% a.i. on the seed plus 3.0 kg a.i./ha soil treatments. Numbers of saprozoic nematodes were also reduced. The lowest numbers were recorded with the 10% a.i. on seed treatment after 20 days and with the 10% a.i. on seed plus 3.0 kg a.i./ha soil treatment after 95 days.

0145 BRITAIN, PLANT BREEDING INSTITUTE Annual report 1977 [II]. Cambridge, UK;. (1978) 168 pp. [En] From *Plant Breeding Abstracts 49*, 9844, 9845, 9846.

Work reported on includes resistance to *Ditylenchus dipsaci* in lucerne and in red clover [*Trifolium pratense*].

0146 REZK, M. A.; IBRAHIM, I. K. A. Survey study on plant parasitic nematodes associating with corn and rice in Egypt. *Alexandria Journal of Agricultural Research* (1978) 26 (1) 215-222 [En, ar] Dep. of Plant Path., Fac. of Agric., Alexandria Univ., Egypt.

From a total of 733 samples collected from the rhizosphere of maize and rice plants in Egypt 18 and 15 genera of nematodes, respectively, were isolated. The most prevalent genera, occurring in 53 to 86% of samples, were *Aphelenchoides, Meloidogyne, Pratylenchus* and *Tylenchorhynchus*. *Aphelenchoides, Aphelenchus, Criconemoides, Ditylenchus, Longidorus, Trichodorus, Tylenchus* and *Xiphinema* on rice were new records for Egypt.

0147 IBRAHIM, I. K. A.; REZK, M. A. Pathogenicity of *Meloidogyne javanica* and certain fungi on corn. *Alexandria Journal of Agricultural Research* (1978) 26 (2) 441-446 [En, ar] Dep. of Plant Path., Fac. of Agric., Alexandria Univ., Egypt.

In pot experiments 19 maize cultivars, hybrids and strains were tested for resistance to *Meloidogyne javanica*. The strain Jelli cross was highly resistant whereas the double hybrid 17A and cultivars Giza 249 and Giza 251 were susceptible. Inoculation with *M. javanica* plus *Fusarium moniliform, F. solani, Rhizoctonia solani* or *Sclerotium bataticola* decreased the growth of the hybrid 17A more than infection with nematode or fungus alone.

0148 DUNBIER, M. W.; PALMER, T. P.; ELLIS, T. J.; BURNETT, P. A. The effect of stem nematode infestation on productivity and persistence of lucerne cultivars. In *Proceedings of the 32nd New Zealand Weed and Pest Control Conference. Dunedin, 7-9 August 1979.* Palmerston North, New Zealand. (1979) 195-198 [En] Crop Res. Div., DSIR, Christchurch, New Zealand.

A field trial was conducted to assess plant mortality and production losses of resistant and susceptible cultivars of lucerne (*Medicago sativa*) due to stem nematode (*Ditylenchus dipsaci*) in the presence of bacterial wilt (*Cornyebacterium insidiosum*). Only cultivars resistant to stem nematode and bacterial wilt gave high yields and maintained adequate plant numbers in infected plots. Cultivars susceptible to either or both diseases had reduced yields and suffered high plant mortality. Cv. 'Gladiator' which had been described as resistant or tolerant to stem nematode was susceptible in this trial.

0149 NEMATOLOGICAL SOCIETY OF INDIA Abstracts of papers presented at the Nematology Symposium held at Bhubaneswar, Orissa, India, March, 1979. *Indian Journal of Nematology* (1979) 9 (1) 53-89 [En]

MAHAPATRA, S. N.; DAS, S. N. Host-range and pathogenicity of *Tylenchorhynchus mashhoodi* Siddiqi and Basir, 1959 on maize (*Zea mays*). 64 [En] Orissa Univ. of Agric. & Technology, Bhubaneswar 751003, India.

***0150** YOUSIF, G. M. Histological responses of four leguminous crops infected with *Meloidogyne incognita*. *Journal of Nematology* (1979) 11 (4) 395-401 [En] Nematol. Res. Centre, Fac. of Agric., Cairo Univ., Giza, Egypt.

The histological responses to *Meloidogyne incognita* infection were investigated in *Rhizobium* nodules of *Trifolium alexandrinum, Vicia faba, Lupinus termis* and *Pisum sativum*. The nematodes were found in the vicinity of the vascular bundles. Giant cells consisting of thickened unbroken walls, dense cytoplasm and clusters of nuclei were present within the vascular strands. These cells did not prevent development of nodular tissues. Gall size and giant cell wall thickness was greatest in *V. faba* and least in *T. alexandrinum*. Nematodes interfered with the symbiotic relationship between leguminous plants and *Rhizobium* by disrupting the nodules vascular connection with the root stele.

0151 KOSTYUK, N. A. [The influence of the physiological condition of the plant host on the stem nematode cultured on lucerne calluses.] *Trudy Gel'mintologicheskoĭ Laboratoriĭ (Gel'minty zhivotnykh i rastenii)* (1979) 29, 70-75 [Ru]

The motility, exogenic nutrition, development and multiplication of *Ditylenchus dipsaci* (onion race) maintained on young lucerne callus or on passaged callus (obtained by propagating small sections of young callus) over a period of several months and also in variants using additional mineral supplements were compared. The results showed a close relationship between the physiological condition of the host tissue and that of the nematode. The highest activity of *D. dipsaci* was observed on young, strongly growing callus, suggesting a close link between the oxidative processes of the host and the activity of the parasite.

0152 MAAS, P. W. T.; MAENHOUT, C. A. A. A. [The grass root-knot nematode (*Meloidogyne naasi*) on sugar beet.] Het graswortelknobbelaaltje (*Meloidogyne naasi*) bij suikerbieten. *Gewasbescherming* (1978) 9 (6) 159-166 [Nl] Plantenziektenkundige Dienst, Wageningen, The Netherlands.

Observations were made on the biology of *Meloidogyne naasi* on sugar beet and fodder maize growing on marine sandy soil in Holland. Populations were high after winter wheat and larvae entered the roots of a good host (wheat) and developed to maturity, producing egg masses in summer which remained in the soil and from which larvae hatched the following spring. Larvae entering the roots of fodder maize (a poor host) did not develop to maturity and egg production. In sugar beet, also a poor host, distinct root galls were seen in June but the nematodes did not reach maturity. Little damage was observed on sugar beet, the infestation in the soil investigated being usually below 2 000 larvae and eggs/100 ml. Larval hatch in the laboratory was best at 19°C; a few more larvae hatched in grass root leachate than in tap water.

0153 MAASSEN, H. [Investigation of migration of *Pratylenchus* into and out of maize roots in relation to the taking of soil or root samples.] Untersuchung über die Ein- und Auswanderung von Nematoden der Gattung *Pratylenchus* in Maiswurzeln im Hinblick auf die Entnahme von Boden- oder Wurzelproben. *Gesunde Pflanzen* (1977) 29 (9) 203-205 [De]

Counts of *Pratylenchus* in soil and root samples in a maize crop showed that numbers in soil fell from May to July and then increased to a maximum in November. Numbers in the roots increased as those in the soil decreased. In July 2% of the population of *Pratylenchus* were in the soil and 98% in the maize roots. The nematodes multiplied in the roots in August so that in September 36% of the population was in the soil and 64% in the roots. With decay of the roots in November all the nematodes left the roots and were found in the soil. The implications of the movement of *Pratylenchus* into and out of maize roots in estimating the degree of field infestation are discussed.

0154 RUDZYAVICHENE, Z. [RUDZEVICIENĖ, Z.] [Comparative evaluation of the nematode fauna of some fodder grasses grown after different preceding crops.] *Acta Parasitologica Lituanica (Biokhimicheskie immunogeneticheskie aspekty invazionnogo protsessa)* (1979) 17, 101-105 [Ru, en, li] Inst. Zoologii i Parazitologii AN Litovskoĭ SSR, Vilnius, Lithuania, USSR.

The effect of a precursor crop followed by a catch crop (barley) on the nematode fauna of newly-sown fodder grasses was studied in experimental plots in the Lithuanian SSR. Barley, grown for one year, did not permanently affect the nematode species composition. The nematode fauna of clover and lucerne sown after barley soon became re-established with *Ditylenchus dipsaci* as the dominant species. This was most marked when clover had been previously grown in prolonged monoculture.

0155—McLEOD, R. W. & McGECHAN, J. K., 1966. "New hosts of *Meloidogyne* species (root knot nematodes) in New South Wales." *Agric. Gaz. N.S.W.*, 77 (2), 115–116.

The following *Meloidogyne* species are recorded on new hosts: *M. arenaria* from *Bellis perennis; M. hapla* from *Cotula australis, Cryptostemma calendula, Cyclamen persicum, Echium plantagineum, Erechtites prenanthoides, Helichrysum diosmifolium, Oenothera tetragona, Pimelea linifolia, Silene gallica* [=*S. anglica*], *Trifolium campestre* [=*T. procumbens*], *T. dubium, T. glomeratum* and *Vitis rupestris; M. incognita* from *Althaea rosea, Bouvardia* sp.cult., *Primula malacoides* and *Vitis riparia; M. javanica* from *Ardisia crenata, Cyclamen persicum, Gardenia augusta* and *Solanum mauritianum.*

0156 GOODELL, P. B.; FERRIS, H. Distribution of five plant-parasitic nematodes in alfalfa. 299 [En] Dep. of Nematol., Univ. of California, Riverside, CA 92521, USA.

Five nematode populations were recorded from a lucerne field: *Meloidogyne arenaria, Pratylenchus minyus, Merlinius brevidens, Helicotylenchus digonicus* and *Paratrichodorus minor* and the goodness of fit of each observed frequency distribution to a negative binomial tested.

0157 EGUNJOBI, O. A. On the possible utilisation of discarded cocoa (*Theobroma cacao* L.) pod husks as fertilizer and nematicide. In *Proceedings of the 5th International Cocoa Research Conference, Ibadan, Nigeria, 1-9 September, 1975.* Ibadan, Nigeria; Cocoa Research Institute of Nigeria. (1977) 541-547 [En] Dep. of Agric. Biol., Univ. of Ibadan, Ibadan, Nigeria.

Application of dried cocoa pod husk powder to *Pratylenchus brachyurus* infested maize plots at 90, 65 and 40 kg/ha resulted in a decrease in nematode numbers (85, 79 and 78%) and an increase in maize yields (127, 78 and 70%). Maize growth was also improved. Residual effects were observed in a second crop. The results indicated that cocoa pod husks were effective both as a fertilizer and nematicide.

0158 RHOADES, H. L. Effect of nonfumigant nematicides on the sting nematode, *Belonolaimus longicaudatus*, and yield of sweet corn. Symp: New develop. soil and crop sci. *Proceedings, Soil and Crop Science Society of Florida* (1978) 37, 218-220 [En] Agric. Res. & Education Center, Sanford, FL 32771, USA.

A 3-year study on Delray fine sand showed that populations of *Belonolaimus longicaudatus* were reduced and the yield of *Zea mays* var. *saccharata* was increased when nonfumigant nematicides were applied just before planting. The best control was obtained following treatment with phenamiphos, aldicarb, sulphocarb or AC-64475. Post-plant applications of phenamiphos or oxamyl to severely injured plants were not effective in improving plant growth or increasing yields.

0159 BURNETT, P. A.; DUNBIER, M. W.; HIATT, J. A. A glasshouse screening technique for resistance to stem nematode in lucerne. In *Proceedings of the 32nd New Zealand Weed and Pest Control Conference, Dunedin, 7-9 August 1979.* Palmerston North, New Zealand. (1979) 199-201 [En] Crop Res. Div., DSIR, Christchurch, New Zealand.

A glasshouse technique for screening lucerne (*Medicago sativa*) for resistance to stem nematode (*Ditylenchus dipsaci*) is described. Resistance shown by plant survival for 12 weeks or by absence of swelling and distortion 20 days after inoculation agreed with field results. Cv 'Gladiator' which was susceptible in field trials in Canterbury, New Zealand, was shown in tests to be as susceptible as 'Saranac', while 'Washoe' was confirmed as resistant.

0160 FERRIS, J. M. [Consideration of nematodes in an integrated approach to management of pests in corn and sorghum.] Abs. No. 418 Dep. of Entomol., Purdue Univ., West Lafayette, IN 47907, USA.

Assessment of maize and sorghum yield losses caused by *Pratylenchus, Hoplolaimus, Longidorus* and *Xiphinema* in the USA and possible control methods are considered.

0161 CANADA, DEPARTMENT OF AGRICULTURE Research Branch Report 1976-1978. Ottawa. (1979) xi + 473 [En, Plant nematology pp. 2-3, 12, 13, 79, 86, 131-132, 177, 179-180, 395, 415]

Work reported on includes: potato breeding for resistance to *Globodera* spp., the pathological effects of *Pratylenchus penetrans* on legumes and forage grasses, interaction between *P. penetrans* and *Fusarium* spp. on lucerne and control of the nematode with phenamiphos or methyl bromide or by fallowing, control of *P. penetrans* on tobacco using Telone C-17, the contribution of nematodes to

tobacco stunting, control of dagger nematode [*Xiphinema* spp.] on grapevines by fumigation with Vorlex, the use of nematicides to control *P. penetrans* on fruit trees, production of an illustrated key to the plant-parasitic nematodes of Canada, taxonomic work on insect parasitic mermithids and plant-parasitic species, rapeseed as an alternative host of the sugar beet cyst nematode [*Heterodera schachtii*] and the use of nematicides on maize.

***0162** JOHNSON, P. W.; POTTER, J. W. Winter survival of root-knot nematodes (*Meloidogyne incognita* and *M. hapla*) under selected host crops in Southern Ontario. *Canadian Journal of Plant Science* (1980) 60 (1) 203-207 [En, fr] Res. Stn., Agric. Canada, Vineland Stn., Ontario L0R 2E0, Canada.

In field experiments at Harrow, Ontario, Canada, *Meloidogyne incognita* was capable of overwintering on peach only under moderate conditions. At Vineland Station, Ontario, *M. incognita* did not overwinter below the frost line (30 cm) under lucerne in moderate conditions but did so under red clover [*Trifolium repens*] and tomato even during a severe winter. *M. hapla* survived well under all 3 hosts in both winters at depths from 0 to 90 cm.

***0163** TOWNSHEND, J. L.; POTTER, J. W. Population behaviour of *Meloidogyne hapla* under four forage legumes in microplots. *Canadian Journal of Plant Science* (1980) 60 (1) 293-295 [En] Res. Stn., Agric. Canada, Vineland Stn., Ontario L0R 2E0, Canada.

Populations of *Meloidogyne hapla* fluctuated under forage legumes (lucerne, red clover, white clover, birdsfoot trefoil) in microplots sampled in the spring and autumn for 2.5 years, in Ontario, Canada. With a low initial inoculum density the nematode population had increased by the first autumn, whereas with a high inoculum density, the nematode population decreased by autumn. Over the next 1.5 years the nematode population decreased or remained static. At the end of the 2.5 year period the number of larvae extracted from the rest of the 4 legumes ranged from 125 larvae/g of root (lucerne) to 1600 larvae/g of root (red clover).

0164 BOOKBINDER, M. G.; BLOOM, J. R.; LUKEZIC, F. L. Interactions of nematodes and bacteria on alfalfa. [Ann. Meet. Amer. Phytopath. Soc., Northeastern Div., 31 Oct. – 2 Nov., 1979. Abstract.]. *Phytopathology* (1980) 70 (5) 459 [En] Dep. of Pl. Pathol., The Pennsylvania State Univ., Univ. Park, PA 16802, USA.

Meloidogyne hapla, *Pratylenchus penetrans*, *Helicotylenchus dihystera*, *Tylenchorhynchus claytoni*, *Trichodorus christiei* and *Ditylenchus dipsaci* reduced the growth of 'Saranac AR' lucerne. The first 4 nematodes interacted synergistically with isolates of *Pseudomonas syringae*, *P. corrugata* and *P. marginalis* in reducing seedling growth. *Tylenchus* sp. acted as vectors on the bacteria.

***0165** DONNELLY, E. D. **Registration of Cahaba White, Vantage, Nova II, and Vanguard vetch.** *Crop Science* (1979) 19 (3) 414 [En] Dep. of Agron. & Soils, Auburn Univ., Ala., USA. From *Plant Breeding Abstracts 50*, 3050.

Cahaba White, Vantage and Nova II from the cross *Vicia sativa* 'Ala. 1894' × *V. cordata* 'PI 121275', and Vanguard, a composite from the cross *V. sativa* 'Ala. 1894' × *V. narbonensis* 'PI 170017', are resistant to *Meloidogyne incognita* and *M. incognita acrita*.

0166 ELGIN, J. H., JR.; HARTMAN, B. J.; EVANS, D. W.; THYR, B. D.; FAULKNER, L. R.; HUNT, O. J. **Stem nematode and northern root-knot nematode resistance ratings for alfalfa cultivars and experimental lines.** *Leaflet, USDA, Science and Education Administration, Agricultural Research Results, Northeastern Series* (1980) No.7, 14 pp. [En] Field Crops Lab., Beltsville Agric. Res. Center-West, Beltsville MD 20705, USA.

This publication characterizes 179 domestic and foreign cultivars of *Medicago sativa* and 9 experimental lines for resistance to *Ditylenchus dipsaci* and *Meloidogyne hapla*. Results indicated that most cultivars are susceptible to the 2 nematodes. However, 21 cultivars and 6 experimental check lines exhibited resistance to *D. dipsaci* at 50% or higher, these included the Washington-resistant experimentals WDS3, W1S1 and W2S1. Only 4 cultivars had 50% or higher resistance to *M. hapla*. Tables of results are given.

0167 MANNINGER, S. [Results achieved in breeding lucerne for resistance.] A lucernarezisztencia-nemesítésben elért eredmények. *Agrártudományi Közlemények* (1978) 37 (2/3) 201-202 [Hu] Gödöllői Agrártudományi Egyetem Kutatóintézete, Kompolt, Hungary. From *Plant Breeding Abstract 50*, 3041.

An outline is given of Hungarian attempts to breed for resistance to viruses and to pathogens involved in the lucerne wilt complex, which includes *Ditylenchus dipsaci*.

***0168** SULLIVAN, J. A.; CHRISTIE, B. R.; POTTER, J. W. **Inheritance of northern root-knot nematode resistance in alfalfa.** *Canadian Journal of Plant Science* (1980) 60 (2) 533-537 [En, fr. 10 ref.] Crop Sci. Dep., Univ. of Guelph, Ontario, Canada N1G 2W1.

Nine clones were selected from the cultivar Vernal to determine the inheritance of resistance to *Meloidogyne hapla* in lucerne. The S_1 and F_1 progenies of these 9 clones were screened for their reaction to *M. hapla*. Ratios showed that resistance to *M. hapla* was controlled by 2 loci which segregated tetrasomically. This study showed that at least 2 dominant alleles must be present at both loci for a genotype to show resistance. Resistance was dominant. Genotypes was proposed for 8 of 9 clones to explain the reaction of their progenies to *M. hapla*. Significant reciprocal differences were observed in 2 of 7 crosses. The screening technique allowed each plant to be grown in an individual container filled with soil uniformly infested with nematodes. After retesting a sample of plants showing zero galls, it was concluded that 13% were escapes.

***0169** NATH, R. P.; BANERJEE, A. K.; HAIDAR, M. G.; SINHA, B. K. **Studies on the nematodes of pulse crops in India. I. Pathogenicity of *Meloidogyne incognita* on gram.** *Indian Phytopathology* (1979) 32 (1) 28-31 [En] Dep. of Nematol., Sugarcane Res. Inst., Rajendra Agric. Univ., Pusa, Bihar-848125, India.

In a pot experiment gram (*Cicer arietinum*) seedlings were inoculated with 10, 100, 1000, 10 000 or 100 000 *Meloidogyne incognita* juveniles/500 g soil. Root and shoot growth and pod number decreased with increasing inoculum density. Flowering was delayed by 10 to 15 days following inoculation with 100 or more juveniles and at a density of 100 000 nematodes the seedlings failed to flower. Mortality was 60% at the highest inoculum density after 30 days. The pathogenic threshold was 100 juveniles/500 g soil. Histopathological examination showed nematodes feeding on vascular tissue. In the early stages of infection the protoplasm of the cells around the head of the larvae became granular with enlarged nuclei, later giant cells developed. The cortical and vascular tissue surrounding the feeding site was blackened in some plants. Nematodes were observed in the root nodules and bacterial numbers and nodule size decreased with increasing nematode density.

0170 NG, O. C.; CHEN, T. A. **Histopathological study of alfalfa root infected by *Hoplolaimus galeatus*.** [Ann. Meet. Amer. Phytoph. Soc., Northeastern Div., 31 Oct. – 2 Nov., 1979. Abstract.]. *Phytopathology* (1980) 70 (5) 466-467 [En] Dep. of Pl. Pathol., Rutgers Univ., New Brunswick, NJ 08903, USA.

Damage to lucerne root tissues caused by feeding by *H. galeatus* is described.

*0171 GOODELL, P.; FERRIS, H. Plant-parasitic nematode distribution in an alfalfa field. *Journal of Nematology* (1980) 12 (2) 136-141 [En, 23 ref.] Univ. of California, Riverside, CA 92521, USA.

Systematic samples taken from a field of *Medicago sativa* in California, USA, showed *Meloidogyne arenaria, Pratylenchus minyus, Merlinius brevidens, Helicotylenchus digonicus* and *Paratrichodorus minor* to be consistently present. All species had a highly skewed frequency distribution that departed significantly fron randomness. *M. arenaria, M. brevidens* and *H. digonicus* were described by a negative binomial in samples from the entire field. When categorized by soil texture, all populations in the fine-textured areas and 3 populations (*M. arenaria, P. minyus* and *M. brevidens*) in the coarse areas fitted a negative binomial distribution.

0172 CAUBEL, G.; RIVOAL, R. **[Evaluation of action of pesticides against various nematodes in maize fields.]** Évaluation de l'action de pesticides sur divers nématodes en culture du mais. In *Sciences Agronomiques Rennes.* Rennes, France; École Nationale Supérieure Agronomique. (1977) 33-49 [Fr, en] I.N.R.A., Lab. de recherche de la chaire de Zoologie, E.N.S.A., Rennes, France.

In field experiments in France various nematicides were tested for control of *Ditylenchus dipsaci, Heterodera avenae* and *Pratylenchus* spp. on maize. Treatment with aldicarb or carbofuran inhibited nematode infestation over a 50 day period and stimulated maize growth. Maize was hypersensitive to populations of *D. dipsaci* and *H. avenae* above 30 and 50 nematodes/plant respectively, but was a very bad host and could be used in cereal rotations to reduce nematode populations.

0173 VAZQUEZ, J. T. **[Infestations of parasitic nematodes as a factor limiting the production of maize in the Mexican altiplano.]** Infestaciones de nemátodes fitopárasitos como factor limitante en la producción de maíz en el altiplano Mexicano. Xalapa, Veracruz, Mexico; DGEM. (1976) 79 pp. [Es]

Maize monoculture, a system which favours the multiplication of pathogens, is typical of the regions of the high plain of Mexico. Studies on the distribution and prevalence of nematodes in these areas and on the pathogenicity and control of nematodes, especially *Punctodera punctata* [*Heterodera punctata* in text], are reported. In 1962 and 1963, a total of 94 soil samples were collected from maize plantations, all of which were infested with *P. punctata; Helicotylenchus erythrinae, Tylenchorhynchus* [*Quinisulcius*] *acti* and *Pratylenchus penetrans* were also very common. Experimental studies on the pathogenicity of *P. punctata* on 3 varieties of maize grown in field plots showed a relationship between the degree of infestation and plant height as well as shoot and root weight. Applications of manure and/or ammonium sulphate improved the yield of maize in experimental plots but, with the exception of *Tylenchorhynchus*, did not significantly affect nematode populations. It is concluded that more work is needed to extend these preliminary studies and it is recommended that certain traditional agricultural practices (including monoculture) which favour the nematodes should be discontinued. 4 pages of references are given and 12 pages of colour photographs, mainly illustrating the pathogenicity experiments, are included.

0174 BULGARIA, B"LGARSKA AKADEMIYA NA NAUKITE **[Third National Conference of Parasitology, Albena, Bulgaria, 12-14 Oct. 1977. Summaries.]** Treta Natsionalna Konferentsiya po Parazitologiya, Albena, Bulgaria, 12-14 X 1977. Rezyumeta. Bulgaria. (1977) 253 pp.

The following 20 papers on plant nematology were presented at this conference.

STOYANOV, D. **[*Rotylenchulus borealis* – a new parasite of maize in Bulgaria.]** [Abstract]. 111-112 [Ru]

0175 KEANE, P. J. Diseases of legumes relevant to Papua New Guinea. *Science in New Guinea* (1974) 2 (1) 112-125 [En] From *Winged Beans, IDRC Abs. World Lit. 1900-1977,* (1978), 169.

Meloidogyne has been found on *Psophocarpus tetragonolobus* at the University of Papua New Guinea.

0176 BOS, W. S. **A preliminary report on the distribution and host-range of the nematode *Aphelenchoides arachidis* Bos. in the north of Nigeria.** *Samaru Agricultural Newsletter* (1977) 19 (1) 21-23 [En]

Examination of samples of seed of *Arachis hypogaea* from different parts of Northern Nigeria revealed *Aphelenchoides arachidis* in significant numbers only in samples from a limited area around Samaru. In a general survey *A. arachidis* was found in large numbers in the roots of sugarcane, maize, sorghum, millet, rice and some wild grasses. All but 2 samples of groundnut had no infestation; the 2 infested samples were from areas which were regularly supplied with seed from Samaru. Groundnuts intercropped in fields with heavily infested maize or sorghum were not infested. It is suggested that 2 biotypes of *A. arachidis* are present, one occurring on cereals and the other on both cereals and groundnuts.

0177 LÜCKE, E.; SAEFKOW, M. **Maize varieties as hosts of the cereal cyst-nematode (*Heterodera avenae* Woll.).** [Abstract]. In *International Congress of Plant Pathology (3rd), München, GFR, 16-23 August, 1978. Abstracts of papers.* Berlin and Hamburg; Paul Parey. (1978) 150 [En] Inst. für Angewandte Botanik, Abt. Pflanzenschutz, Univ. Hamburg, GFR.

In tests of 11 maize cvs. used for ensilage with different pathotypes of *Heterodera avenae*, pronounced differences were observed between the pathotypes in numbers of cysts produced and in crop yields.

0178 RODRIGUEZ-KABANA, R.; INGRAM, E. G. **[Susceptibility of pigeon peas to plant parasitic nematodes in Alabama.]** Susceptibilidad del gandul a especies de fitonematodos en Alabama. *Nematropica* (1978) 8 (1) 32-34 [Es, en] Dep. of Botany, Auburn Univ., Auburn, Alabama, E.E.U.U. 36830, USA.

Infected field soils were used in pot tests with *Cajanus cajan* seedlings to assess nematode soil populations after 8 weeks. *C. cajanus* roots in a sandy loam from a soybean field contained *Pratylenchus brachyurus, Tylenchorhynchus claytoni,* and *Hoplolaimus galeatus*; soil contained *T. claytoni, H. galeatus* and *Trichodorus christiei.* Roots of plants grown in a sandy loam from a cotton field contained *P. scribneri* and *H. dihystera*; the soil contained *H. dihystera* and *T. christiei* but no *P. scribneri.* Pigeon peas were severely attacked by *Meloidogyne arenaria* when planted in a sandy loam from a peanut field. Results indicate that pigeon peas or at least the cultivar tested, are not suitable for inclusion in rotation schemes in S.E. United States.

0179 WOOD, F. H. **Biology, incidence and general control of the lucerne stem nematode.** In *Proceedings of the 25th New Zealand Weed and Pest Control Conference Christchurch, New Zealand, 15-17 August, 1972.* New Zealand; New Zealand Weed and Pest Control Society Inc (1972) 116-121 [En] Plant Diseases Div., DSIR., Auckland, New Zealand.

The symptoms, life-history and disease cycle of *Ditylenchus dipsaci* on lucerne in New Zealand are described. The nematode is present in both North and South Islands. The minimum generation time is 25 days at 15 to 20°C on seedlings. In South Island, infestation may exceed 30% as indicated by examination of seed samples. Control methods are discussed with emphasis on prevention of spread by careful cleaning of lucerne seed.

0180 GOSWAMI, B. K.; RAYCHAUDHURI, S. P. **Interaction of root-knot nematodes and viruses in maize and**

tobacco in India. [Abstract]. In *International Congress of Plant Pathology (3rd), München, GFR, 16-23 August, 1978. Abstracts of papers.* Berlin and Hamburg; Paul Parey. (1978) 154 [En] Inst. für Nematologie, Toppheideweg 88, 4400 Münster, GFR.

Meloidogyne spp. interacted with maize mosaic virus on maize and with tobacco mosaic virus on tobacco and tomato. The nematodes multiplied more on virus-infected plants and more giant cells with numerous nuclei were observed than when nematodes only were present. There was greater accumulation of N, P and K in roots of plants infected with both virus and nematodes than in plants with nematodes alone. The nematodes did not act as vectors of the viruses.

0181 BARNES, D. K.; SORENSEN, E. L.; PEADEN, R. N.; KEHR, W. R.; ELGIN, J. H., JR.; HUNT, O. J.; DEVINE, T. E.; KAWAGUCHI, I. I.; FROSHEISER, F. I.; HANSON, C. H. **Registration of seventeen populations from the BIC alfalfa germplasm pool (GP No. 55 to GP No. 71).** *Crop Science* (1977) **17** (4) 675-676 [En] ARS, USDA, Dep. of Agronomy and Plant Genetics, Univ. of Minnesota, St. Paul, MN 55108, USA.

Ditylenchus dipsaci is one of 9 pests and diseases against which resistance is being developed in lucerne. The agronomic and pest resistance characteristics will be described later.

0182 CASTILLO, M. B. **Relative susceptibility, resistance and tolerance of selected crops to inoculation with *Meloidogyne* spp. in pots.** *Philippine Phytopathology* (1976, publ., 1978) **12** (1/2) 17-23 [En] Dep. of Pl. Path., U.P. at Los Baños, Coll. of Agric., College, Laguna, Philippines.

Pot experiments were carried out to test the susceptibility of a number of crop plants to *Meloidogyne acrita, M. arenaria, M. incognita* and *M. javanica*. Cotton (cv. Deltapine 16), peanut (cv. CES 101) and pigeon pea (cv. Native) were resistant to all root-knot species tested and black pepper (*Piper trioicum*) was resistant to *M. acrita*. Hawaiian ginger, cowpea (All Season), soybean (Clark 63) and strawberry (Missionery) were tolerant to *M. incognita, M. incognita, M. arenaria* and *M. javanica* respectively. Other crops tested were susceptible to one or more root-knot species as shown by gall ratings, nematode reproduction and reduction in plant growth or yield.

0183 HALPIN, J. E., 1963. "The effect of soil fungi and root-knot nematodes on the growth of white clover in field bins." [Abstract.] Phytopathology, **53** (8), 877.

Observations on growth, vigour and persistence of white clover were made for 5 months following experimental inoculations with: (i) one of 6 soil fungi, (ii) *Meloidogyne incognita* and *M. incognita* var. *acrita* or (iii) a mixture of the nematodes and one of the fungi. The most pathogenic organism was *Sclerotium rolfsii*; *Fusarium roseum, Rhizoctonia solani* and the nematodes were about equal and *F. oxysporum, Leptodiscus terrestris* and *Nigrospora* sp. were less pathogenic than the nematodes. Combined with *L. terrestris* or *S. rolfsii* the nematodes did not give significantly more damage than was produced by the fungi alone, but with each of the other 4 fungi combined with nematodes the damage was greater than for either pathogen alone. The greatest damage was in August and September and the fungus was still the dominant pathogen on the diseased clover stolens a year later.

0184 DUNBIER, M. W. **Development of disease-resistant lucerne cultivars for New Zealand.** In *3rd International Congress of the Society for the Advancement of Breeding Researches in Asia and Oceania (SABRAO). Plant Breeding Papers: 2. 14. Breeding pasture plants. (a) Lucerne.* Canberra, Australia. (1977) 4-7 [En] Crop Res. Div., DSIR, Christchurch, New Zealand. From *Plant Breeding Abstracts 48*, 7687.

A brief general account is given of breeding lucerne varieties resistant to fungi, *Corynebacterium* and to *Meloidogyne*.

***0185** PEDERSEN, M. W.; GRIFFIN, G. D. **Registration of Deseret alfalfa (Reg. No. 78).** *Crop Science* (1977) **17** (4) 671 [En] Crops Res. Lab., Utah State Univ., Logan, USA. From *Plant Breeding Abstracts 48* (6), 5581.

The *Medicago sativa* var. Deseret, formerly called Kayseri, is more resistant to *Ditylenchus dipsaci* than is the var. Ranger.

***0186** SULLIVAN, J. A.; CHRISTIE, B. R.; POTTER, J. **The inheritance of resistance to the northern root knot nematode in Vernal alfalfa.** [Ann. Meet. Can. Soc. Agron., Guelph, Ontario. 14-18 August 1977. Abstract.]. *Canadian Journal of Plant Science* (1978) **58** (2) 585 [En] Crop Sci. Dep., Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada.

Inheritance of resistance to *Meloidogyne hapla* in lucerne cv. Vernal is thought to be quantitative.

***0187** VIGLIERCHIO, D. R. **Resistant host responses to ten California populations of *Meloidogyne incognita*.** *Journal of Nematology* (1978) **10** (3) 224-227 [En] Div. of Nematol., Univ. of California, Davis 95616, California, USA.

Resistant and susceptible cultivars of tomato, lima beans, cotton and lucerne were tested with 10 populations of *Meloidogyne incognita* from different Californian locations. Nine of the populations differed in aggressiveness on the 9 cultivars tested. Two populations were especially aggressive toward resistant tomato cultivars.

0188 AHMAD, M.; CHEN, T. A. **Histochemical root pathology of alfalfa infected by *Hoplolaimus galeatus* (Cobb, 1913) Thorne 1935.** [Abstract]. In *International Congress of Plant Pathology (3rd), München, GFR, 16-23 August, 1978. Abstracts of papers.* Berlin and Hamburg; Paul Parey. (1978) 153 [En] Dep. of Plant Path., Rutgers, The State Univ., New Jersey, USA.

0189 GAUR, H. S.; INDERJIT SINGH **Pigeon-pea cyst nematode, *Heterodera cajani*, associated with the moong crop in the Punjab State.** *Journal of Research, Punjab Agricultural University* (1977) **14** (4) 509 [En] Dep. of Plant Path., Punjab Agric. Univ., Ludhiana, India.

Examination of the roots of *Phaseolus aureus* and soil from a field of a poorly growing moong crop in Ludhiana, India, revealed the presence of large numbers of *Heterodera cajani*. The plants were stunted and had small yellowish leaves. A preliminary pathogenicity test was conducted by growing the moong variety G65 in naturally infested soil containing about 150 larvae/100 g of soil. After 30 days, plant growth, as indicated by plant height and fresh weight of shoots, was significantly poorer than that of plants grown in nematode-free soil. The life-cycle of the nematode was experimentally completed in 17 to 19 days in July. This is the first report of this species from Punjab State.

***0190** HEALY, W. B.; WIDDOWSON, J. P.; YEATES, G. W. **The effect of nematodes on the growth and utilization of phosphorus by white clover on a yellow-brown loam.** *New Zealand Soil News* (1972) **20** (5) 125-133 [En]

Three glasshouse experiments were conducted using yellow-brown loam infested with *Meloidogyne hapla* and *Heterodera trifolii*. In the first, seedling growth of 'Huia' white clover was 5 times greater in sterilized soil than in infested soil in the first 36 days after sowing. Limiting to a depth of 10 cm gave a small response in clover growth but only in infested soil. In the 2nd experiment, white clover plants grown in sterilized soil for 40 days suffered marked growth depression when repotted in infested soil. Clover in infested soil required 5 times more phosphorus fertilizer than did clover grown in sterilized soil to produce the same amount of dry matter. In the 3rd experiment, 7 lines of white clover grown in infested soil all exhibited marked growth

depression: the mean yield was 7.1% of that in sterilized soil. The yield of *Lotus pedunculatus* was also severely depressed, whereas red clover, subterranean clover and lucerne were less affected. Nematode counts showed that all clover species were hosts for *M. hapla* but only white and red clover for *H. trifolii*.

***0191** NOEL, G. R.; LOWNSBERY, B. F. **Effects of temperature on the pathogenicity of *Tylenchorhynchus clarus* to alfalfa and observations on feeding.** *Journal of Nematology*. (1978) **10** (2) 195-198 [En] Div. of Nematol., Univ. of Calif., Davis, CA 95616, USA.

The addition of a suspension of surface-axenized *Tylenchorhynchus clarus* reduced top and root growth of pot-grown lucerne. Reproduction of *T. clarus* was greater at 24 and 27 than at 21°C. The interaction of nematodes with temperature did not produce significant effects on lucerne growth in the 4.5 month experimental period. *T. clarus* fed endo- and ectoparasitically.

***0192** NORTON, D. C.; TOLLEFSON, J.; HINZ, P.; THOMAS, S. H. **Corn yield increases relative to nonfumigant chemical control of nematodes.** *Journal of Nematology*. (1978) **10** (2) 160-166 [En] Iowa Agric. and Home Economics Exp. Sta., Ames, Iowa, 50011, USA.

The average maximum yield increase of *Zea mays* in Iowa in 1973 was 21% greater in nematicide-treated plots than in untreated plots. Yields were negatively correlated with nematode numbers or biomass in almost every test. Correlation coefficients for nematode numbers in the soil and yield were –0.56 for *Helicotylenchus pseudorobustus*, –0.45 for *Hoplolaimus galeatus*, –0.51 for *Pratylenchus* spp., –0.64 for *Xiphinema americanum* and for numbers in the roots and yield were –0.63 for *Pratylenchus* spp. and –0.56 for *Hoplolaimus galeatus*. Coefficients for yield and total nematode numbers averaged –0.65 in roots and –0.55 in soil. Negative correlations were greater for comparison of yield with total parasitic nematode biomass than with numbers of individual nematodes of a species or total numbers of parasitic nematodes.

0193 ZINOV'EV, V. G. **[A study of the mechanisms of growth formation in plants infected with *Meloidogyne*.]** In *Problemy parazitologii. Materialy VIII nauchnoĭ konferentsii parazitologov UkSSR. Chast' 1*. Kiev, USSR; Izdatel'stvo "Naukova Dumka". (1975) 188-190 [Ru]

Galls were formed in freshly isolated roots of tomato or lucerne (but not of wheat or rye) infected with one *Meloidogyne incognita* larva; 10 days later gall growth stopped, to be resumed only if the root was sub-cultured and supplied with plant host extracts. In roots grown in culture for 14 years galls formed only if given plant extracts or growth-inducing substances. Larger amounts of nucleic acids were found in infected than in uninfected, isolated roots. Growth stopped if the larva was killed by immersion of the gall in water at 51°C for 10 minutes but resumed if the root was placed in nutrient containing exudates of mature female *M. incognita*, even if the exudate was previously autoclaved or filtered. Used on their own, nematode exudates did not stimulate gall growth; plant extracts stimulated growth in the presence of live larvae, the effect being enhanced by the addition of adult nematode exudate. Growth of isolated gall tissue (1 to 2 mm^3) was stimulated by aqueous extracts of young galls only during the first passage (7 to 10 days).

***0194** ELGIN, J. H., JR.; EVANS, D. W.; FAULKNER, L. R. **Response of resistant and susceptible alfalfa cultivars to regional isolates of stem nematodes.** *Crop Science* (1977) **17** (6) 957-959 [En] Field Crops Lab., Plant Genetics & Germplasm Inst., ARS, USDA, Agric. Res. Centre (West). Beltsville, MD 20705, USA.

Nine isolates of *Ditylenchus dipsaci* were collected from different regions of USA and Canada and tested for variations in pathogenicity at 15, 20 and 25°C on lucerne cvs Ranger and Moapa (susceptible) and Lahontan and Caliverde 65 (resistant) to determine if variations in plant responses should be considered when breeding for resistance to stem nematode. All isolates were generally capable of parasitizing lucerne but differences in virulence were detected. No interaction with temperature or with lucerne cultivar was observed. The authors conclude that a resistant lucerne developed in a breeding programme using one pathogenic isolate of *D. dipsaci* would probably be resistant to isolates from other regions.

***0195** VRAIN, T. C.; BARKER, K. R.; HOLTZMAN, G. I. **Influence of low temperature on rate of development of *Meloiodgyne incognita* and *M. hapla* larvae.** *Journal of Nematology*. (1978) **10** (2) 166-171 [En] North Carolina Agric. Exp. Sta., Raleigh, N.C. 27606, USA.

Development of *Meloidogyne incognita* and *M. hapla* larvae in clover roots (*Melilotus alba*) was studied at 20, 16, 12 and 8 C in growth chambers and in the field from October to April in North Carolina, USA. Larvae of both species invaded roots and developed at 20, 16 and 12°C, but not at 8 C. The time necessary to complete the larval stages at each temperature was determined. The minimal temperature for development of *M. incognita* larvae was 10.08°C and 8.8°C for *M. hapla* larvae. In the field, soil temperature at 10 cm deep was favorable for development of larvae until the end of November, and again from February on. All stages of the nematodes survived freezing temperatures in the roots. Reproduction of both species was evident in March or April after inoculation and accumulation of 8,500 to 11,250 degree-hours.

0196 ALL, J. N.; JELLUM, M. D. **Efficacy of insecticide-nematocides on *Sphenophorus callosus* and phytophagous nematodes in field corn.** *Journal of the Georgia Entomological Society* (1977) **12** (4) 291-297 [En] Dep. of Entomology, Univ. of Georgia, Athens, USA.

Applications of 8 nematicides at rates of 0.1 (CGA 12223) or 0.2 (fensulphothion, ethoprop, oxamyl, aldicarb, carbofuran, oftanol, parathion) kg a.i./1,000 m row at sowing of *Zea mays* resulted in reduced numbers of *Meloidogyne, Helicotylenchus, Criconemoides* and *Belonolaimus* in the soil 40 days later. At harvest, 75 days after sowing, no control was evident, except for carbofuran and oftanol on *Criconemoides*, and no yield differences were found.

***0197** BERGESON, G. B. **Control of the lesion nematode (*Pratylenchus* spp.) in corn with carbofuran.** *Plant Disease Reporter* (1978) **62** (4) 295-297 [En] Dep. of Botany & Plant Path., Purdue Univ., West Lafayette, Indiana 47907, USA.

Carbofuran at 2.25 and 4.5 kg a.i./ha had no effect on the incidence of stalk rot of corn [*Zea mays*] in small replicated field plots in Indiana, USA, but significantly reduced numbers of *Pratylenchus* and increased yields in 3 out of 4 years. Yield increases from 10 plots (0.5 ha or larger) in 1974 and 6 plots in 1975 treated with 2.25 kg a.i./ha averaged 12.6 and 14.4%, respectively. Reduction of *Pratylenchus* in roots for 1974 and 1975 averaged 84.5 and 98.3%, respectively.

0198 RHOADES, H. L. ***Indigofera hirsuta* as a summer cover crop for controlling *Belonolaimus longicaudatus* and *Meloidogyne incognita* in Florida, U.S.A.** [Abstract]. In *International Congress of Plant Pathology (3rd), München, GFR, 16-23 August, 1978. Abstracts of papers*. Berlin and Hamburg: Paul Parey. (1978) 375 [En] Agric. Res. and Education Center, Sanford, Florida, USA.

The effects of summer crops on populations of *Belonolaimus longicaudatus* and *Meloidogyne incognita* and yields of subsequent vegetable crops were studied during 1973 to 1977. High populations of *Belonolaimus longicaudatus* developed on *Sorghum vulgare, Sesbania macrocarpa* and a natural population of weeds but declined to low levels on *Indigofera hirsuta*. Root-knot nematode populations in general were high on sesbania, moderate to low on sorghum and low on hairy indigo and weeds. Yields of cabbage, cucumber and snap beans were significantly higher following hairy indigo than following sesbania, sorghum or weeds. Soil

fumigation with recommended rates of DD or DBCP greatly increased crop yields following sesbania, sorghum, and weeds but produced only small increased following hairy indigo.

0199 SUNDARESH, H. N.; SETTY, K. G. H.; GOVINDU, H. C. **Integrated control of root knot nematode (*Meloidogyne incognita* Chitwood).** *Mysore Journal of Agricultural Sciences* (1977) **11** (4) 540-543 [En] Dep. of Pl. Path., UAS, Bangalore-560 024, India.

In Bangalore, India, *Zea mays* var. Seneca was resistant to *Meloidogyne incognita* and when used in rotation with tomato and chilli caused a significant reduction in nematode reproduction and development. *Abelmoschus esculentus* var. Pusa Sawani was susceptible to root-knot and increased egg production on a test crop in rotation experiments. Under both rotations, carbofuran and oil cake together caused the greatest reduction in nematode reproduction and development on a tomato test crop. Chilli roots were almost completely free from infestation under both rotations.

0200 BRITAIN, ROTHAMSTED EXPERIMENTAL STATION **Report for 1977. Part 1.** Harpenden, Herts, UK; Lawes Agricultural Trust. (1978) 348 pp. [En, [Plant nematology pp. 53-54, 66, 68, 100, 126, 128, 155-156, 171-191, 298]]

Research reported from the Nematology Department includes the following: the first recorded occurrence in England of *Heterodera hordecalis, Pratylenchoides ritteri* and *Paratylenchus bukowinensis*: estimation of the quantity of sap extracted from plant cells by *Ditylenchus dipsaci* when feeding and the ultrastructure of its anterior alimentary tract: feeding behaviour of *Longidorus caespiticola*: identification of pathotypes of *Globodera pallida* in Britain (3 known ones, Pa1, Pa2 and Pa3 confirmed and a new one recognized): identification of potato cyst nematodes (PCN) from the Nilgiri Hills, India, as mainly *G. pallida* with some *G. rostochiensis*: reaction of 19 European PCN populations to a potato clone with gene H_3: the morphology of 131 PCN populations from South America (good separation of the 2 *Globodera* species was obtained using certain measurements of 2nd-stage juveniles and certain environmental factors were shown to influence their body and stylet lengths): mating tests between individuals of the 2 PCN species from English and Peruvian populations: comparison of water uptake by PCN-tolerant and -intolerant potato varieties infected with *G. rostochiensis*: relation between transfer cells and sex of *G. rostochiensis* in tomato, indicating doubt on the environmental determination of sex: effect of temperature on the development of the 2 PCN species indicating that *G. pallida* is better adapted to relatively low soil temperatures: hatching of *G. rostochiensis* as affected by osmotic stress and ion transport: presence of fungi in *Heterodera avenae* and of rickettsia-like organisms in *H. goettingiana, H. glycines* and *G. rostochiensis* where they have been observed in eggs, 2nd-stage juveniles males and females: chemical control of *Ditylenchus dipsaci* in *Vicia faba* (leafless pea and *Lupinus albus*, though attacked, appear to be poor hosts of *D. dipsaci*). Nematicide tests reported include the use of formalin and aldicarb in soil where *H. avenae* cysts are infected by fungi: post-harvest numbers of eggs were 50% fewer where no formalin was applied. Numerous potential nematicides were tested against *G. rostochiensis* on potato in pot and field experiments. A successful technique for incorporating nematicide granules in field soil using a vertical band distributor was developed. Oxamyl was tested for control of *H. goettingiana* on peas, oxamyl and aldicarb for *H. schachtii* on sugar beet and aldicarb for *Ditylenchus dipsaci* on onion. Observations were made on the parasitism of *Pratylenchus* spp. on oilseed rape, on the life history and morphology of *Angiostoma limacis* in slugs and on the occurrence of mermithids in leather jackets in Wales. Attempts to use *Neoaplectana carpocapsae* in the field for control of insect pests of seedling sugar beet showed some promise. In other departments at the Station, observations were made on Docking disorder of sugar beet, on *Pratylenchus* spp. on *Vicia faba* (4 species present with *P. pinguicaudatus* in larger numbers than usual) on *Pratylenchus* spp. on maize (7,000/l soil), on leaching and degradation of oximecarbamate nematicides in a sandy soil (pH 7.0, organic matter 1.4%) and the same soil modified by peat over several years (pH 6.0, organic matter 6.0%).

0201 NORTHERN IRELAND, DEPARTMENT OF AGRICULTURE **Annual Report on research and technical work, 1977.** Belfast, Northern Ireland. (1978?) xxii + 263 pp. [En, Plant nematology pp. 47-50, 102]

Research reported includes experiments for control of *Globodera rostochiensis* on potato using oxamyl and aldicarb: nematode multiplication rates in plots were 2.5 × with oxamyl at 4.0 kg a.i./ha, 2.2 × with aldicarb at 2.5 and 4.0 kg a.i./ha and 22 × in untreated plots. In the laboratory, silage effluent delayed hatching from *Globodera* cysts. Sodium hypochlorite solution (1% available chlorine) failed to kill all cyst contents when infected tubers were dipped in it. Tests with a number of potato varieties and seedlings for resistance to cyst nematodes showed that seedlings 8806 A25 was almost completely resistant to pathotypes Ro I and Pa I but susceptible to Pa 3: 5 other seedlings showed various degrees of resistance to pathotypes Pa I and Pa 3. Techniques for the tests are discussed. Work on clover cyst nematode [*Heterodera trifolii*] includes a technique for determining soil infestation by estimating hatachable larvae in material floated from soil, confirmation of hatch stimulation by pea root leachate and comparison of its action with that of flavianic acid and zinc chloride. Aldicarb and oxamyl applied to clover infected with cyst nematode increased dry matter yield, when dosage was not too high, and reduced numbers of nematodes, but the results suggested that nematodes were not the main factor limiting clover yield in infested soil. In pot tests *Anguina tritici* caused typical symptoms in 4 selections of Triticale. This is thought to be the first record of *A. tritici* on Triticale.

0202 FURSTENBERG, J. P.; HEYNS, J. **The effect of cultivation on nematodes. Part I. *Rotylenchulus parvus*.** ***Phytophylactica*** **(1978) 10 (3) 77-80 [En, af, fr] Plant Protection Research Institute, Private Bag X134, Pretoria 0001, South Africa.**

The effect of cultivation on the indigenous nematode populations was studied on a virgin loamy soil, using three treatments, maize, cowpeas and natural vegetation (control), for 3 successive years. The effect of a monoculture of these treatments was determined at 2 soil depths, 0 to 25 and 25 to 40 cm. The dominant plant parasitic nematode was *Rotylenchulus parvus* and intra- as well as inter-seasonal fluctuations were observed. Population peaks occurred in October and March of each season. Nematode populations built-up greatly in maize plants, while cowpeas inhibited development.

0203 INGRAM, E. G.; RODRÍGUEZ-KÁBANA, R. **Susceptibility of pigeon pea to plant parasitic nematodes.** Division Meetings, 1977. Abstract No. C-13. *Proceedings of the American Phytopathological Society* (1977, publ. 1978) **4**, 177 [En] Botany & Microbiol, Dep. Auburn Univ., Auburn, AL 36830, USA.

Seeds of pigeon pea (*Cajanus cajan*) were planted in 10 cm diam. pots containing 500 g of field soil known to contain plant parasitic nematodes. Plants were maintained in the glasshouse (27-32°C). Eight weeks after planting, soil samples were collected for nematode analysis. The roots were examined for galls caused by root knot nematodes and were then incubated for 72 hours in water, sufficient for coverage, to determine the number of endoparasitic nematodes. Pea roots in a sandy loam from a soybean field did not show any galling by *Meloidogyne incognita*: however, nematode densities (number/g fresh root) in the roots were: 2.5 larvae of *M. incognita*, 9.5 *Pratylenchus brachyurus*, 8.8 *Tylenchorhynchus claytoni*, and 32.7 *Hoplolaimus galeatus*. Soil populations (50 cm^3 soil) were: 2.7 larvae of *M. incognita*, 155.5 *T. claytoni*, 6.1 *H. galeatus*, and 2.2 *Trichodorus christiei*. Roots of plants grown in loamy sand from a cotton field did not have galls from *M. incognita* but evidenced the following nematode densities in roots: 1.5 larvae of *M. incognita*, 161.0 *P. scribneri*, and 27.1 *Helicotylenchus dihystera*. Soil populations were: 44.7 *H.*

dihystera and 1.2 *Trichodorus christiei* with no *P. scribneri* or larvae of *M. incognita*. These data show that pigeon peas are a good host for a number of ecto- and endoparasitic nematode species. Even though no galling reaction from *M. incognita* was observed, the nematode may be able to reproduce in this host.

0204 DECKER, H.; EL-AMIN, E. T. M. **[*Paratrophurus kenanae* n.sp. (Nematoda: Trophurinae) from the Democratic Republic of Sudan.]** *Paratrophurus kenanae* n.sp. (Nematoda: Trophurinae) aus der D.R. Sudan. In *Vortragstagung (4) zu aktuellen Problemen der Phytonematologie am 8.6.1978 in Rostock. Manuskriptdruck der Vorträge. Biologische Gesellschaft der DDR, Sektion Phytopathologie und Wilhelm-Pieck-Universität, Rostock* . . . Rostock, DDR;. (1978) 89-95 [De, en] Sektion Meliorationswesen & Pflanzenproduktion der Wilhelm-Pieck-Universität. Rostock, 25 Rostock, Satower Str. 48, DDR.

A description is given of the male and female of *Paratrophurus kenanae* sp.n. found in 1977 in acacia forest (*Acacia seyal* and *A. fistula*) near Kenana research station in Blue Nile province, Sudan. The nematode has a relatively short and often claviform tail the final third of which is included in the thick hyaline cuticle. It is similar to *P. crassicaudatus* and *P. clavicaudatus*, but is distinguished from both by the non-annulated head and greater body-length, and from *P. crassicaudatus* also by the lower c value and the more posteriorly placed phasmids and from *P. clavicaudatus* by the smooth tail terminus and smaller number of caudal annules. *P. kenanae* was the dominant species among soil-inhabiting nematodes. As regards the other two species of the genus known from the Sudan, namely *P. lobatus* and *P. sudanensis*, the investigation of 1977 confirmed that *P. lobatus* is the more widespread, it again having been found in several provinces, although not in very high numbers. Characters are given distinguishing *P. kenanae* from these species.

0205 CASTILLO, M. B.; LITSINGER, J. A. **Plant parasitic nematodes of mungbean in Philippines.** In *The 1st international mungbean symposium [2].* Taiwan; Asian Vegetable Research and Development Center. (1978) 195-200 [En] Dep. Pl. Path., Coll. Agric., UPLB, Laguna, Philippines. From *Plant Breeding Abstracts 48*, 11093, 11100.

Of many hundred mungbean [*Phaseolus mungo*] lines, including local varieties and foreign introductions, tested for resistance to nematodes in the Philippines, only one, a multifoliate mutant, was resistant. This mutant showed some resistance to *Meloidogyne acrita*, *M. incognita* and *M. javanica* but was susceptible to *M. arenaria*.

0206 GUY, P. **[Improving the resistance of lucerne to its plant and animal enemies.]** L'amélioration de la luzerne pour la résistance à ses ennemis végétaux et animaux. *Fourrages* (1975) No. 64, 19-34 [Fr] Station d'Amélioration des Plantes Fourragères, INRA, 86600 Lusignan, France.

In the northern half of France *Ditylenchus dipsaci* causes damage to lucerne in spring; in some southern seed producing zones the seed is heavily contaminated. The genetic aspects of resistance are briefly discussed; the only available resistant variety is Vertus.

0207 OLOWE, T. **Histological changes in maize root induced by *Pratylenchus brachyurus* and *P. zeae* in the absence of other micro-organisms.** *Nigerian Journal of Plant Protection* (1977) 3, 41-51 [En] National Cereals Res. Inst., Moor Plantation, Ibadan, Nigeria.

Monoxenic maize root cultures were inoculated with *Pratylenchus brachyurus* and *P. zeae*. Necrosis was seen in the roots infested with *P. brachyurus* after 1 week but only after 1 month in the *P. zeae*-infested roots. The nematodes caused mechanical breakage of cells and necrosis in both cortical and stelar tissues and cavities were formed in the tissues. *P. brachyurus* caused less mechanical damage but more necrosis than *P. zeae*. Metaxylem vessels were penetrated. *P. zeae* also fed on lateral root initials. Penetration by both species was preferably in the root hair region: *P. brachyurus* also penetrated at the root tip.

0208 REED, B. M.; RICHARDSON, P. E.; RUSSELL, C. C. **Histological and cytological effects of an alfalfa-nematode interaction.** 69th Ann. Meet., E. Lansing, Michigan, 14-18 Aug. 1977. Abstract No. 191. *Proceedings of the American Phytopathological Society* (1977, publ. 1978) 4, 123-124 [En] School of Biol. Sci., Oklahoma State Univ., Stillwater, OK 74074, USA.

Buffalo and Washoe cultivars of alfalfa were found to have lignified cell walls surrounding the large cavities formed by *Ditylenchus dipsaci*. Large areas of tissue destruction were found in these galled areas and cells with dense cytoplasm were abundant near the edges of the cavities. Washoe, resistant cultivar, infested with the nematode formed smaller cavities within the gall than did the susceptible cultivar Buffalo. Fewer cells with dense cytoplasm and cells with very heavily lignified walls surrounded the cavities in the resistant Washoe variety. Inflicting mechanical injury upon the two cultivars caused greater lignification around wounds in Washoe than Buffalo. No cells with granular cytoplasm were found in either case with mechanical injury. Visible light microspectrophotometry indicated increased DNA content in the dense cells of both cultivars with the response varying with date of infection and cultivar.

*0209 SUZUKI, M.; WILLIS, C. B. **Fluorescence in alfalfa roots as influenced by infestation with root lesion nematodes.** In *Proceedings of the 12th International Grasslands Congress Volume 1 (Part 2).* (1974) 538-545 [En] Res. Sta., Agric. Canada Charlottetown, Prince Edward Island, Canada.

The response of *Medicago sativa* to infestation with *Pratylenchus penetrans* has been investigated. Dry matter decreased in heavily infested plants. Total nitrogen did not change and total available carbohydrate was only significantly lower in tap roots of heavily infested plants. In all infested plants, even when root necrosis could not be detected, the characteristic blue fluorescence of tap roots was replaced by a yellow-green fluorescence restricted to the central cylinder of the root. It is suggested that this could be used as a diagnostic factor, for root lesion nematode infestation.

*0210 TOWNSHEND, J. L.; POTTER, J. W. **Yield losses among forage legumes infected with *Meloidogyne hapla*.** *Canadian Journal of Plant Science* (1978) 58 (4) 939-943 [En, fr] Agric. Canada Res. Station, Vineland Station, Ontario L0R 2E0, Canada.

A microplot experiment was designed to measure yield losses of *Medicago sativa*, *Lotus corniculatus*, *Trifolium pratense* and *T. repens* inoculated with *Meloidogyne hapla* at 0, 4,000 and 24,000 nematodes/kg soil. At the higher inoculum level seeding establishment was 80 and 50% of the control for *M. sativa* and the other species, respectively. Dry weight was reduced in proportion to increasing inoculum density, up to 76% in *Trifolium* spp. and 24% in *M. sativa*. The dry weight values were also reduced in the 2nd year but then there were no differences between inoculum levels. Stem length was decreased in infested plants of *T. pratense* and *M. sativa*.

0211 KÜTHE, K.; RÖSSNER, J. **[Use of pesticides against plant-parasitic nematodes to ensure yields of maize.]** Einsatz von Pflanzenschutzpräparaten gegen Phytonematoden zur Ertragssicherung bei Mais. *Anzeiger für Schädlingskunde Pflanzenschutz Umweltschutz* (1978) 51 (7) 102-107 [De, en] Inst. für Phytopath. der Univ., Ludwigstrasse 23, 6300 Giessen, G.F.R.

In field experiments in Hesse, G.F.R., *Pratylenchus* spp. (mainly *P. neglectus*) and *Heterodera avenae* were controlled in maize by the use of nematicides. Carbofuran as Curaterr G at 1.0 or 1.25 g/m in the row or as Curaterr SK at 0.15 ml/ha gave at least 90% control of *Pratylenchus*: thiofanox as Dacamox 10G at 0.75 g/m was 78 to 98% efficient and terbufos (Counter 2G) at 1.25 g/m gave 95% control as compared with untreated plots. Control of *H. avenae* was

assessed by the number of males extracted from maize roots after about 9 weeks growth. At one locality, where 0.8 males/g roots were extracted from untreated plants, aldicarb and carbofuran reduced infestation to less than 10% of that in the controls. In another locality with 0.4 males/g roots in untreated plots, treatment with thiofanox resulted in 0.2, Curaterr SK in 0.1, Curaterr G in 0.04 and aldicarb 0.03 males/g roots. Increases in root and shoot growth and in yields were also recorded in pesticide-treated plots.

*0212 CASTILLO, M. B.; ALEJAR, M. S.; LITSINGER, J. A. **Note: Increased efficiency of determining populations of *Rotylenchulus reniformis* and *Meloidogyne acrita* through bioassay.** *Philippine Agriculturist* (1977, publ. 1978) **61** (1/2) 64-69 [En] Dep. of Plant Path., Coll. of Agric., U.P. at Los Baños, College, Laguna.

The efficiency of a bioassay for quantifying populations of *Rotylenchulus reniformis* and *Meloidogyne acrita* has been compared with a routine extraction method combining sieving and the Baermann funnel technique. The bioassay consisted of growing 3 nematode-susceptible mung beans [*Phaseolus mungo*] in the test soil in 5 cm clay pots for 19 days prior to routine extraction. At the end of the bioassay none of the nematodes was in the egglaying stage indicating that all the estimated nematodes were first generation. Recovery of *R. reniformis* and *M. acrita* growing together was 2.4 and 90 times higher, respectively, when using the bioassay. In soils where *M. acrita* was alone recovery was 1.8 times higher by the bioassay technique. The experiment was made on pot, microplot and field samples. The bioassay is not considered to be reliable when nematode populations are very high.

0213 BULGARIA, B"LGARSKA AKADEMIYA NA NAUKITE **Third National Conference of Parasitology, Albena, Bulgaria, 12-14 Oct. 1977. Summaries.]** Treta Natsionalna Konferentsiya po Parazitologiya, Albena, Bulgaria, 12-14 X 1977. Rezyumeta. Bulgaria. (1977) 253 pp.

The following 20 papers on plant nematology were presented at this conference.

STOYANOV, D. [*Rotylenchulus borealis* – a new parasite of maize in Bulgaria.] [Abstract]. 111-112 [Ru]

0214 MAAS, P. W. T.; BRINKMAN, H. **[Damage to maize by *Heterodera avenae*.]** Schade door het havercysteaaltje (*Heterodera avenae*) bij maïs. *Gewasbescherming* (1977) 8 (4) 139-144 [Nl] Plantenziektenkundige Dienst (PD), Wageningen, The Netherlands.

In 1971/1972 in Holland a correlation was found between soil populations of *Heterodera avenae* and poor growth areas of maize: cyst numbers varied from 22 to 137/200 ml soil. Nearby, in healthy maize, the maximum population was 16 cysts/200 ml. soil. The root systems of the maize exhibited many side roots at the infected point. In one study, 770/eggs and larvae/200 ml soil resulted in a yield reduction of 48% compared with non-infested maize. Inoculation with 1300 larvae + eggs/200 ml soil resulted in 276 cysts/30 g maize roots and a yield reduction of 35%. Maize sown in PVC rings containing steamed soil inoculated 2 to 3 months previously with *H. avenae* showed few cysts on the roots and no reduction in growth when compared with the control plants in July, whereas in similar conditions barley sown in April was heavily infested and growth was reduced. Damage to maize depends on the period of activity of the nematode larvae. When maize is sown in May many *H. avenae* larvae have been free in the soil for some weeks and are no longer able to invade the roots.

*0215 ALAM, M. M.; KHAN, A. M. **New host records of the root-knot nematode in North India.** *Indian Phytopathology* (1975, publ. 1976) **28**, 540-541 [En] Dep. of Bot., Aligarh Muslim Univ., Aligarh 202001, India.

Meloidogyne incognita, from Uttar Pradesh, India, is reported on the following plants for the first time: *Abutilon indicum, Commelina nudiflora, Corchorus acutangulus, Cynodon dactylon, Euphorbia geniculata, Lippia nodiflora, Phyllanthus fraternus, Physalis peruviana, Setaria verticillata.*

*0216 GONZÁLEZ F., L. **[Plant-parasitic nematodes associated with rice and corn in several agricultural areas of Costa Rica.]** Nematodos fitoparasitos asociados con la rizosfera de arroz y maiz en varias zonas agricolas de Costa Rica. *Agronomia Costarricense* (1978) 2 (2) 171-173 [Es, en] Lab. de Nematol., Fac. de Agronomía, Univ. de Costa Rica, San José, Costa Rica.

In samples of rice soils from 5 localities in Costa Rica the nematodes most frequently found belonged to the genera *Tylenchorhynchus, Criconemoides, Helicotylenchus* and *Pratylenchus*. In maize soils from 4 localities the commonest were *Helicotylenchus, Meloidogyne* and *Criconemoides*.

0217 KHAN, T. N. **Problems and progress in improvement of winged beans in Papua New Guinea.** Meeting on Winged beans, Nat. Acad. Sci., Washington DC, 24-26 Oct. 1974. Mimeo. (1974) 21 pp. [En] From *Winged Beans, IDRC Abs. World Lit. 1900-1977*, (1978), 109.

Among diseases of winged beans observed in Papua New Guinea is root knot caused by *Meloidogyne incognita*.

0218 LÜCKE, E.; SAEFKOW, M. **[Investigations on the infection and cyst-development of *Heterodera avenae* Woll. in maize.]** Untersuchungen über Befall und Zystenbildung durch das Getreidezystenälchen am Mais. *Zeitschrift für Pflanzenkrankheiten und Pflanzenschutz* (1978) 85 (7) 385-392 [De, en] Inst. für Angewandte Botanik der Univ. Hamburg, Marseiller Strasse 7, D-2000 Hamburg 36, GFR.

The development of *Heterodera avenae* race E was observed in the glasshouse in the roots of maize cv. Primeur. Larvae invaded only those roots up to 0.6 mm in diameter; they became orientated with heads towards the root tip and for 2 weeks followed root growth keeping in the region of cell elongation, usually causing necrosis but in a few cases the root reacted with hyperplasy. In severely necrotic roots 2nd-stage larvae left the decayed tissue and attacked healthy roots thus increasing damage. Males left the roots 39 days after larval invasion and 8 days later the first eggs appeared in the females. 2nd-stage larvae were found 12 weeks after invasion. New cysts contained an average of 98 eggs and larvae. In a field experiment 10 varieties of silage maize were grown in lightly (40 viable eggs and larvae/100 cm^3 soil) and heavily (590 viable eggs and larvae/100 cm^3 soil) infested plots. Very few cysts were formed on plants in the lightly infested field: on the heavily infested field cv. Forla (maximum 18 cysts/plant) and Primeur (maximum 26 cysts/plant) were the most heavily infested. All varieties may be judged resistant as regards cyst formation. However, yield losses varied from 5.5% in cv. Anjou to 39.2% in Limac and 38.9% in Primeur; quality, as measured by starch equivalent, varied from an increase of 4.9% in Inrafrüh to a loss of 23.1% in Limac.

0219 POWELL, J. M. **Traditional legumes of the New Guinea highlands. (Proceedings of seminar workshop: The development of legumes in Papua New Guinea).** *Science in New Guinea* (1974) 2 (1) 48-63 [En] From *Winged Beans, IDRC Abs. World Lit. 1900-1977*, (1978), 38.

The winged bean *Psophocarpus tetragonolobus*, an important seasonal food in some areas of Papua New Guinea, has been recorded as infested with *Meloidogyne incognita*.

0220 VALOCKA, B.; SABOVÁ, M. **[Parasitic nematodes of lucerne in eastern Slovakia.]** Výskyt parazitických nematódov na lucerne na východnom Slovensku. In *Sympóz. o rezist. viacročn. krmovín proti chorobám, škodcom a iným nepriazn. podmienk. prostredia, Piešťany, 1974. Zb. referátov.* Piešťany, Czechoslovakia; Vyd. VURV. (1974) 136-140 [Sk, en] From *Referativnyĭ Zhurnal, Biologiya* (1976), 7 E770.

0221 GRIFFIN, G. D. **Effect of temperature on the root-knot nematode/alfalfa stem nematode interaction on alfalfa.**

Division Meetings, 1976. Abstract N. PA-14. *Proceedings of the American Phytopathological Society* (1976, publ. 1977) 3, 317 [En] USDA, ARS, Crops Res. Lab., Utah State Univ., Logan, UT 84322, USA.

biological control agent for silver-leaf nightshade. *Journal of Nematology* (1978) **10** (4) 362-366 [En] Sci. & Education Admin., USDA, Texas Agricultural Experiment St., Lubbock, Texas 79401, USA.

A 64,000 sq. km area in Texas, USA was surveyed for the common weed, *Solanum elaeagnifolium* and the parasite, *Nothanguina phyllobia*. Nematode galls were found at 42% of the locations in 1975 and 64% in 1976. Of 21 soil samples taken, 15 contained infective-stage larvae. Larvae were concentrated at the soil surface and at a depth of 15 cm. *N. phyllobia* was never found in root tissue. Infective-stage larvae remained viable in desiccated galls. Larvae were transmitted in water films to non-infected plants and the soil where they infested pre-emergent shoots. Parasitism by *N. phyllobia*, which is specific to *S. elaeagnifolium* resulted in reduced plant size and numbers of berries and seeds and could, therefore, be used as a biological control agent.

*0222 GRIFFIN, G. D.; THYR, B. D. **Interaction of *Meloidogyne hapla* and *Fusarium oxysporum* on alfalfa.** 17th Ann. Meet., Soc. of Nematol., Hot Springs, Arkansas, 7-10 Aug. 1978. Abstract. *Journal of Nematology* (1978) **10** (4) 289 [En] USDA, Sci. & Education Administration, Crops Res. Lab., Utah State Univ., Logan, Utah 84322, USA.

When 14-day-old seedlings of a *Meloidogyne hapla* susceptible lucerne variety were inoculated with *M. hapla* larvae and 30 days later with *Fusarium oxysporum* the combination significantly reduced growth. The same treatment did not reduce growth of a *M. hapla* resistant variety neither did *F. oxysporum* affect resistance to *M. hapla*.

0223 ROTH, F. **The role of *Pratylenchus* species in the root rot of dent corn in late season.** *Dissertation Abstracts International* (1978) **39B** (4) 1565-1566 [En, Order No. 7817805]

Apparently the development of fungal root rot of dent corn in late season in New York State, USA, is not influenced by the presence of *Pratylenchus* sp. or *P. penetrans*.

0224 ROTH, F.; BOOTHROYD, C. W. **Corn root rot is not caused by the interaction of species of *Fusarium* and *Pratylenchus*.** 68th Ann. Meet., Kansas City, Missouri, 11-15 July, 1976. Abstract No. 183. *Proceedings of the American Phytopathological Society* (1976, publ. 1977) **3**, 244 [En] Dep. of Plant Path., Cornell Univ., Ithaca, NY 14853, USA.

In experiments *Pratylenchus penetrans* or *P. crenatus* infestation caused extensive root damage to maize at high population levels but *Fusarium* spp. did not cause root rot in the presence or absence of *Pratylenchus* spp.

0225 GRAY, F. A.; SCHONHORST, M. E.; THOMPSON, R. K. **Occurrence of stem nematode resistance in non-winter-hardy alfalfas.** 68th Ann. Meet., Kansas City, Missouri 11-15 July, 1976. Abstract No. 184. *Proceedings of the American Phytopathological Society* (1976, publ. 1977) **3**, 244 [En] Univ. of Arizona, Tucson, AZ 85721, USA.

Lucerne varieties which are non-winter-hardy have been used to develop strains with resistance to *Ditylenchus dipsaci*.

*0226 IBRAHIM, I. K. A.; REZK, M. A. **Reaction of corn to *Meloidogyne javanica* and *M. incognita*.** 17th Ann. Meet., Soc. of Nematol., Hot Springs, Arkansas, 7-10 Aug. 1978 Abstract. *Journal of Nematology* (1978) **10** (4) 289-290 [En] Dep. of Plant Path., Coll. of Agric., Alexandria Univ., Alexandria, Egypt.

0227 KEHR, W. R. **Multiple pest resistance in alfalfa.** *Agricultural Research* (1978) **26** (10) 3-4 [En] 333 Keim Hall, Univ. of Nebraska, Lincoln NE 68583, USA.

The estimated annual loss in crop value resulting from diseases and nematodes on lucerne is 25%. There are varieties resistant to 9 pests including stem nematode [*Ditylenchus dipsaci*]. Resistance screening procedures for 18 pests, including northern root-knot nematode, [*Meloidogyne hapla*] exist.

*0228 CASTILLO, M. B.; ALEJAR, M. S.; LITSINGER, J. A. **Pathological reactions and yield loss of mung bean to known populations of *Rotylenchulus reniformis* and *Meloidogyne acrita*.** *Philippine Agriculturist* (1977, publ. 1978) **61** (1/2) 12-24 [En] Dep. of Plant Path., Coll. of Agric., U.P., Los Banos Coll., Laguna, Philippines.

The pathological reactions of mung bean [*Phaseolus mungo*] to a combination of *Rotylenchulus reniformis* and *Meloidogyne acrita* and to *M. acrita* alone in pot, microplot and field conditions in Laguna, Philippines were studied. Seedlings were grown for 22 days in 5 cm diameter pots containing 250 cc of baked soil with or without an inoculum of *R. reniformis* and *M. acrita* together or *M. acrita* alone. Plants and soil were then transferred to 30 cm diameter pots or $1m^2$ microplots containing baked soil or to field plots which were almost nematode-free following trap-cropping and application of carbofuran. At transplanting there were no apparent differences in top growth between non-infected plants and plants infested with *R. reniformis* and *M. acrita*. Roots of infested plants were lightly necrotic and darkly coloured. Leaf chlorosis was observed 4 days after transplanting. Stunting began between the 5th and 6th days. Death occurred after 11 days in the field. The root systems were reduced, very severely necrotic, lightly galled and partly rotted. Infested plants flowered 2, 5 and 2 days earlier than non-infested plants in pots, microplots and field plots, respectively. The nematode population increased during the experimental period: *R. reniformis* 9.7 times, *M. acrita* 16.4 times in pots. 4.4 and 7.2 times respectively in microplots and in the field there were 109 *R. reniformis*/250 cc soil and 1 g root sample and < 1 *M. acrita*. Yield loss from infested plants in the field was at least 61.5%. Plants infested with *M. acrita* only showed leaf chlorosis 5 days after transplanting and the extent of chlorosis was related to moisture content in the field. Stunting first showed 8 and 12 days after transplanting in pots and field, respectively. Some plants died after 15 days. The root system was reduced, moderately necrotic, very severely galled and partly rotted. The nematode population increased 24.4 times during experiments in pots. A 28% yield loss was estimated to have resulted from infestation in the field.

*0229 UPADHYAY, K. D.; SWARUP, G. **Reaction of some maize varieties against *Tylenchorhynchus vulgaris*.** *Indian Journal of Nematology* (1976 publ. 1978) **6** (1) 105-106 [En] Div. of Nematology, Indian Agric. Res. Inst., New Delhi 110012, India.

Tylenchorhynchus vulgaris was inoculated on 10-day-old seedlings of 17 varieties of maize grown singly in pots and the nematode population was estimated after 90 days growth. From an inoculum of 1,000 nematodes the population built up to over 40,000 on 3 varieties and to 11,000 to 12,000 on 3 others, showing that the nematodes had different preferences for the different maize varieties. Growth of all varieties but one (Ganga-2 with 21,700 nematodes, and the most stunted) was equally affected.

*0230 TOWNSHEND, J. L. **Infectivity of *Pratylenchus penetrans* on alfalfa.** *Journal of Nematology* (1978) **10** (4) 318-323 [En] Res. Sta., Res. Branch, Agric. Canada, Vineland Sta., Ontario, Canada LOR 2EO.

Penetration by *Pratylenchus penetrans*, females, males and 3rd-stage larvae, occurred along lucerne roots from behind the root-cap to the junction of the root and hypocotyl. Females penetrated from 5 to 35°C with a maximum between 10 to 30°C. Males and larvae could only penetrate between 10 to 30°C with a maximum at 20°C. In a 96 h period, at 20°C, 80% of females penetrated, 43% of males and 30% of larvae. Rate of penetration showed a logarithmic increase with a plateau at 48 h (females), 60 h (males) and 84 h (larvae). The

area of the longitudinal section of the subventral oesophageal penetration gland was 338 μ^2 (female), 157 μ^2 (male) and 146 μ^2 (larvae). Inoculum densities of 1 or 20 females/seedling gave similar percentage penetration. When nematodes were stored at 5°C, in 0.1% streptomycin solution, for up to 141 days the percentage penetration by females remained constant but penetration by the males and larvae declined after 35 days. Females dissected from lesions failed to penetrate new roots and 80% died within 72 h.

0231 SHARMA, N. K.; SETHI, C. L. **Interaction between *Meloidogyne incognita* and *Heterodera cajani* on cowpea.** *Indian Journal of Nematology* (1976 publ. 1978) 6 (1) 1-12 [En] Division of Nematology, Indian Agric. Res. Inst., New Delhi 110012, India.

Maximum population increases of *Meloidogyne incognita* and *Heterodera cajani* were obtained by inoculating *Vigna sinensis* (cowpea) plants with 200 larvae of each species separately/g soil. Higher inoculum levels reduced the final populations. The number of galls formed by *M. incognita* and number of cysts of *H. cajani* when the 2 species were inoculated together were less than when they were inoculated singly at the same level. *M. incognita* showed depressed galling and reproduction rates in the presence of *H. cajani*. *H. cajani* showed a reduction in the number of cysts but no reduction in reproduction rate. The penetration rate of *M. incognita* was 63.6% for an inoculum of 50 larvae and 49.8% for 100 larvae and for *H. cajani* 78.0 and 65.6% respectively. There was evidence that *H. cajani* penetrated faster (48.75% at 4 days) than *M. incognita* (28% at 8 days). 9.62% of *H. cajani* larvae and 1.2% of *M. incognita* larvae developed into males. *H. cajani* had a 19-day life-cycle and *M. incognita* a 26-day life-cycle.

0232 DICKSON, D. W.; WAITES, R. E. **Chemical control of *Trichodorus christiei*, *Pratylenchus zeae*, *P. brachyurus* and *Criconemoides* sp. on field corn in Florida.** 17th Ann. Meet., Soc. Nematol., Hot Springs, Arkansas, 7-10 Aug. 1978. Abstract. *Journal of Nematology* (1978) 10 (4) 285 [En] Dep. of Entomol. & Nematol., Univ. of Florida, Gainesville, FL 32611, USA.

Maize yields were significantly increased by treatment with all the nematicides tested except DBCP (4.7 l/ha) and parathion (1.7 kg/ha). Twelve of the 19 treatments resulted in average yield increases of at least 1000 kg/ha over control plots. The largest yield increase (2,623 kg/ha) was on plots treated with 1,3-D at 46.8 l/ha.

0233 NAGANATHAN, T. G.; SIVAKUMAR, C. V. **Control of the lesion nematode *Pratylenchus delattrei* Luc, 1958 on maize.** *Indian Journal of Nematology* (1976 publ. 1978) 6 (1) 32-38 [En] Dep. of Entomology, Tamil Nadu Agric. Univ., Coimbatore 641003, India.

A significant reduction in *Pratylenchus delattrei* populations in maize roots was found in plots treated with carbofuran or aldicarb (both at 25 kg/ha) or aldicarb (1.0 kg/ha) at the time of sowing. Fensulphothion treatment had no significant effect. All the treatments, except aldicarb 1.0 kg/ha, gave significantly higher yields of grain and cob than untreated plots.

0234 SINGH, N. D. **Effects of intercropping maize with soybean on crop yields and populations of several plant-parasitic nematodes.** 17th Ann. Meet., Soc. Nematol., Hot Springs, Arkansas, 7-10 Aug. 1978. Abstract. *Journal of Nematology* (1978) 10 (4) 299 [En] Caribbean Agric. Res. & Development Inst., Univ. of the West Indies, St. Augustine, Trinidad, West Indies.

*0235 ZIRAKPARVAR, M. E. **Population changes of *Pratylenchus hexincisus* as influenced by chemicals in fibrous and coarse roots of corn.** *Plant Disease Reporter* (1979) 63 (1) 55-58 [En] Dep. of Bot. and Plant Path., Iowa State Univ., Ames 50011, USA.

In field and glasshouse experiments the numbers of *Pratylenchus hexincisus*/g dry root of maize were larger in fibrous roots than in coarse roots. Treatment with aldicarb, carbofuran, CGA-12223 and ethoprop at 2.24 kg a.i./ha reduced the nematode numbers in the fibrous roots. In the field tests only aldicarb or ethoprop treatment significantly reduced the numbers in the coarse roots, but all treatments reduced the numbers in the coarse roots in the glasshouse experiment. Aldicarb and ethoprop were more effective than CGA-1223 or carbofuran in both field and glasshouse experiments.

0236 LINGE, D. S. **Studies on the root-knot of winged-bean (*Psophocarpus tetragonolobus* (L.) DC.) in Papua New Guinea.** *Thesis, Department of Agriculture, University of Papua New Guinea.* (1976) 46 pp. [En]

Meloidogyne incognita was confirmed as the species attacking *Psophocarpus tetragonolobus* in Papua New Guinea. In the field, larvae entered seedling roots within a week of planting and adult females and galls were observed after 4 weeks. Larvae hatched from eggsacs most readily at 25°C: slightly fewer hatched at 30° and 37° (47.1 and 51.1% respectively after 3 days) and at 5° and 15° the cumulative hatch after 7 days was 3.3 and 31.9% respectively. In a pot experiment galls were found after 4 weeks with an inoculum of 4 larvae/g soil. *M. incognita* from winged bean reproduced on tomato cv. T45 New Zealand.

*0237 NIGERIA, INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE **Annual report 1977.** Ibadan, Nigeria. (1978?) v + 98pp [En, Plant nematology pp. 68-69]

Mulches were tested over a 3 year period as modifiers of the plant parasitic nematode population on maize, cassava, cowpea and soybean crops. In the 3rd year soil populations were similar under soybean tops, rice, straw, maize cobs, cassava stems, pigeon pea stems and on control plots. Plots mulched with mixed twigs, *Pennisetum* straw, pigeon pea tops, rice husks, oil palm leaves, black plastic and fine gravel continued to show a decline in nematode population. Other mulches gave a mixed response. The mean numbers of nematodes were higher than in previous years and higher than the preplant mean. Nematode populations were largest under maize. *Pratylenchus sefaensis* and *P. brachyurus* were the most abundant species. Other commonly occurring genera included *Helicotylenchus* and *Meloidogyne*.

0238 BRZESKI, M. W. **[*Ditylenchus dipsaci* (Kühn) in field bean seeds.]** *Ditylenchus dipsaci* (Kühn) w nasionach bobu. *Roczniki Nauk Rolniczych, E* (1978) 8 (1) 71-74 [Pl, en, ru] Inst. Warzywnictwa, Skierniewice, Poland.

Ditylenchus dipsaci was found in one sample of field bean, *Vicia faba*, seeds in Poland. This population reproduces also on pea, onion, parsley and celeriac.

*0239 FORTUNER, R.; FAUQUET, C.; LOURD, M. **Diseases of the winged bean in Ivory Coast.** *Plant Disease Reporter* (1979) 63 (3) 194-199 [En] Nematology Dep., Office de la Recherche Scientifique et Technique, Outre-Mer (ORSTOM), BP V-51, Abidjan, Ivory Coast.

The incidence of nematodes and other pathogens on winged bean (*Psophocarpus tetragonolobus*) in the Ivory Coast was investigated. In July 1977 a field plot had a small *Pratylenchus brachyurus* infestation but no *Meloidogyne* infestation. By the following November the roots were galled and by January 1978 they were heavily infested by *Meloidogyne* spp. resulting in an estimated 50% loss of tubers. Preliminary experiments suggested that carbofuran (5g/plant) might control the nematode.

*0240 GREEN, C. D. **Aggregated distribution of *Ditylenchus dipsaci* on broad bean seeds.** *Annals of Applied Biology* (1979) 92 (2) 271-274 [En] National Vegetable Res. Sta., Wellesbourne, Warwick, UK.

The distribution of *Ditylenchus dipsaci* between seeds in infested samples of broad bean [*Vicia faba*] seed was skewed so that the nematodes were concentrated on a few seeds. Such aggregation increases the likelihood of reproduction by the nematodes in infested plants and the consequent

establishment of foci of infestation in the soil. These foci will be small and scattered giving the nematode the best chance of finding a favourable environment in the field. The numbers of foci of infestation introduced by seed tend to be nearly constant, independent of the numbers of nematodes on the seed and therefore provide a stable unit of population.

*0241 GREEN, C. D.; SIME, S. **The dispersal of *Ditylenchus dipsaci* with vegetable seeds.** *Annals of Applied Biology* (1979) 92 (2) 263-270 [En] National Vegetable Res. Sta., Wellesbourne, Warwick, UK.

Commercial seed samples of 7 vegetable crops in Britain, were examined for the presence of *Ditylenchus dipsaci*. 36 to 45% of seed stocks of broad bean (*Vicia faba*), red beet [*Beta vulgaris*] and carrots [*Daucus carota*], 14 to 17% of shallots [*Allium ascalonicum*] and runner beans [?*Phaseolus coccineus*] and >3% of peas [*Pisum sativum*], onions [*A. cepa*] and leeks [*A. porrum*] were infested. No nematodes were found in seeds of chive [*A. schoenoprasum*] or dwarf bean [*Phaseolus vulgaris*].

0242 SHAW, D. E. **Diseases of some of the major food crops in Papua New Guinea and some aspects of quarantine.** In *Proceedings of Papua New Guinea Food Crops Conference, Port Moresby, Department of Primary Industry.* Papua New Guinea. (1975) 251-256 [En] *Winged Beans, IDRC Abs. World Lit. 1900-1977,* (1978), 181.

Root knot nematode has been recorded [on winged bean] in Papua New Guinea but severe infestations have not been reported.

0243 KHAN, H. A.; AHMAD, M. **New species of *Helicotylenchus* (Steiner 1945) with the description of *Helicotylenchus buxophilus* from West Pakistan.** *Agriculture Pakistan* (1970) 21 (2) 215-221 [En]

Helicotylenchus leucernis n.sp. is described and illustrated from soil around the roots of lucerne in Pakistan. It is most closely related to *H. digonicus* and *H. dihystera* but can be distinguished by the comparatively anterior location of the spear, by the location of the oesophagus and the narrow lateral field. *H. buxophilus* is also described and revised from cultivated land in Pakistan. A key to the species of *Helicotylenchus* is given.

0244 SIDDIQI, M. K. **Four new species of *Xiphinema* Cobb, 1913 (Nematoda: Dorylaimida) from East Africa.** *Revue de Nématologie* (1979) 2 (1) 51-64 [En, fr] Commonwealth Inst. of Helminthology, 103 St. Peter's St., St. Albans, Herts, UK.

Xiphinema neobasiri n.sp. from soil around potato and tomato roots at Limbe, Malawi is close to *X. basiri* but is larger (L = 3.29 to 3.92 mm), has a more expanded lip region and the female tail is >1.5 body widths long and tail peg one-fifth of the tail length (one-third in *X. basiri*). *X. michelluci* n.sp. from soil around the roots of unthrifty, stunted plants of *Ricinus communis* at Zomba, Malawi, resembles *X. seredouense* but differs in its low, angular, offset lip region, shorter odontostyle (122 to 129 against 146 to 162 μm), longer odontophore (77 to 85 against 62 to 76 μm), more anterior guiding ring, more anterior vulva and in having the uterus filled with spiny, spore-like bodies. No males were found with these 2 species. *X. heynsi* n.sp. occurred round the roots of *Medicago sativa* at South Kilimanjaro, Tanzania, males, females and juveniles being found. It is most like *X. clavatum* but has a conoid, rounded, continuous lip region, a tapering, not clavate female tail and a shorter odontostyle (107 to 114 against 107 to 127 μm) and odontophore (71 to 77 against 78 to 90 μm). From the same location males, females and larvae of *X. mammatum* n.sp. are described. *X. mammatum* is recognized by its hemispherical terminus bearing a large, offset peg and by the presence of stellate spines in the uterus. It differs from *X. mammillatum* in its more slender body (a = 67 in the female, 70 to 81 in the male, against 43 to 51 in *X. mammillatum*), and longer tail (46 μm including peg against 28 to 38 μm in *X. mammillatum*).

0245 SINGH, S. P. **A new species of the genus *Deladenus* Thorne, 1941 and *Tylenchorhynchus* Cobb, 1913 from Lucknow, India.** *Indian Journal of Zootomy* (1974, publ. 1976) 15 (3) 187-192 [En] Dep. of Zool., Univ. of Lucknow, Lucknow, India.

Females of *Deladenus indicus* n.sp. were found in the roots of *Dolichos lablab* heavily galled by *Meloidogyne* sp. at Lucknow, India. The mean measurements are L = 0.68 mm, a = 21.5, b = 8.8, c = 23, V = 91%, stylet = 6.2 μm and tail 2.6 times the anal body width. The lateral field occupies about one-third of the body width and has 11 longitudinal incisures, the number remaining the same in the vulval region, with 11 additional longitudinal wavy lines between them. The prodelphic ovary is outstretched, reaching to the dorsal oesophageal gland or beyond. The excretory pore is just in front of the nerve ring, which is at the base of the fusiform median oesophageal bulb; the hemizonid is well behind the excretory pore and covers 3 body annules. The new species is characterized by the form of the lateral field, the positions of the excretory pore, nerve ring and hemizonid, the width of the annules (6 to 9 cover 10 μm) and the shape and size of the weakly developed stylet. This is the first member of the genus *Deladenus* recorded from India. *Tylenchorhynchus spinaceai* n.sp. from the soil around roots of *Spinacea oleracea* at Lucknow, India is 0.6 to 0.84 mm long with a = 22.5 in females, 28.5 in males, and clearly offset head with 4 annules. The body annulations are prominent in females, less so in males and there are 4 longitudinal incisures. The stylet averages 16.3 μm in females, 19.8 μm in males, and is robust with well-developed, anteriorly pointed basal knobs. The nerve ring is 13 μm behind the median oesophageal bulb; the excretory pore is behind the nerve ring, 90 μm from the anterior end of the body. There is a spermatheca in the female and the phasmids are in the anterior third of the tail. Details of the morphology of *T. spinaceai* are compared with several other species of the genus.

0246 SIDDIQI, M. R. **Seven new species in a new nematode subfamily Duosulciinae (Tylenchidae), with proposals for *Duosulcius* gen.n., *Zanenchus* gen.n. and *Neomalenchus* gen.n.** *Nematologica* (1979) 25 (2) 215-236 [En, de] Commonwealth Inst. of Helminthology, St. Albans, Herts., UK.

A new subfamily of Tylenchidae, Duosulciinae n.subfam., is proposed to accommodate species with only 2 incisures (or a single ridge) in the lateral field. A key to the 6 genera of the Duosulciinae; *Malenchus, Neomalenchus* n.g., *Zanenchus* n.g., *Duosulcius* n.g., *Miculenchus* and *Ottolenchus*, is presented. *Duosulcius* n.g. differs from *Zanenchus* n.g. in having a non-muscular, non-valvate median bulb and from *Neomalenchus* n.g. in that the body does not taper markedly behind the vulva, the cephalic region is not dorso-ventrally compressed and the curved vagina is strongly cuticularized. *D. acutus* n.sp. (females only) is the type species and the female is described and illustrated from bush soil in Nigeria. *Zanenchus* n.g. differs from *Miculenchus* in having a curved cuticularized vagina, the absence of a post-vulval uterine sac and the presence of a bursa. *Z. zanclus* n.sp., the type species, is described and illustrated from soil around the roots of *Pennisetum purpureum* in Malawi: the tail tapers to a slender terminus which is hooked. *Z. salmae* n.sp. is described and illustrated from 3 females collected in peaty soil around the roots of horse chestnut (*Aesculus hippocastanum*) in Bedfordshire, England. It differs from *Z. zanclus* in having a less slender body (a = 25 to 27 against 36 to 40 in *Z. zanclus*), annules bearing fine longitudinal indentations, a more posterior vulva (V = 65 to 67 against 61 to 63 in *Z. zanclus*), a smaller number of annules between the vulva and anus and a tail terminus which is not hooked. *Neomalenchus* n.g. differs from *Malenchus* in having a spindle-shaped median oesophageal bulb that lacks muscle fibres and valvular apparatus. The type species, *N. ovalis* n.sp., is described and illustrated from soil around the roots of *Capsicum annuum* in Brunei. *N. malawiensis* n.sp. is described from soil around the roots of *Eucalyptus saligna* (type host) and *Pennisetum purpureum* in Malawi. It differs from *N. ovalis* in having coarser body annules between the vulva and anus and bigger sperm. *Malenchus sulcus* n.comb. is proposed for *Ottolenchus sulcus* and *M. fusiformis* n.comb.

for *O. fusiformis*. *M. nanellus* n.sp. is described from soil around the roots of *Zea mays* in Nigeria. It differs from *M. acarayensis* in being more slender (a = 24 to 30 against 20 to 24 in *M. acarayensis*) with finer annules, in having a more anterior vulva (V = 57.8 to 61.6 against 64 to 66) and a tail 1.5 to 2.1 times the vulva-anus distance long (1.3 to 1.4 in *M. acarayensis*). *M. tantalus* n.sp. is described from soil around the roots of tomato (type host), *P. purpureum* and *Saccharum* sp. in Malawi. It differs from *M. acarayensis* in having lateral fields originating some distance behind the spear base, a smaller T/V-A ratio (0.96 to 1.13) and in having a straight elongate-conoid tail with straight, pointed terminus. *M. tantalus* differs from *M. andrassyi* in having a shorter female tail with a sharply pointed but not hooked tip (hooked in *M. andrassyi*), a smaller spear (8 μm against 10 to 11 μm in *M. andrassyi*) and coarser body annules (1.4 μm wide in mid-body against 1.0 to 1.3 μm in *M. andrassyi*).

0247 TAYLOR, D. P.; LUC, M. **Observations on *Sarisodera africana* (Nematoda: Heteroderidae): redescription of anterior end of females and occurrence of juveniles with aberrant tails.** *Revue de Nématologie* (1979) 2 (1) 111-114 [En] Lab. de Nématol., ORSTOM, B.P. 1386, Dakar, Senegal.

Entire females of *Sarisodera africana* were obtained from roots of *Panicum maximum* in hydroponic culture and the anterior region is described for the first time. The "neck" is small, usually bent at a right angle to the long axis of the body and the cuticle is 1.5 to 2 μm thick. The oval oral aperture is in the centre of a roughly rectangular first annule or labial disc: no papillae or amphids were seen. The stylet is thin, curved, 25 to 27 μm long with rounded, backward sloping knobs and the dorsal oesophageal gland opening is 3 μm behind them. There is a well-developed muscular median bulb 25 to 30 by 22 to 25 μm in size; only one nucleus was seen in the ovoid basal bulb; the excretory pore is level with the base of the oesophagus. Of juveniles hatched from cysts in water 5% had aberrant tails.

*0248 HUNT, O. J.; HARTMAN, B. J.; THYR, B. D.; PEADEN, R. N. **Registration of alfalfa germplasm, NMP-9 (Reg. No. G.P. 93).** *Crop Science* (1978) 18 (4) 697 [En] Nev. Agric. Exp. Sta., Reno, USA. From *Plant Breeding Abstracts 49* (4), 2794.

The lucerne germplasm, NMP-9, is resistant to 3 Nevada, USA region populations of *Meloidogyne hapla*.

0249 SVERIGES UTSÄDESFÖRENING **[Annual report 1977/78.]** Årsredovisning 1977/78. Svalöv, Sweden. (1978) 101 pp. [Sv] From *Plant Breeding Abstracts 49* (4), 2339, 2344.

Selection for resistance to *Ditylenchus dipsaci* in lucerne variety, Lesina, has given variety Sv0672 which is being included in trials.

0250 BOPAIAH, B. M.; PATIL, R. B.; REDDY, D. D. R. **Effect of *Meloidogyne javanica* on nodulation and symbiotic nitrogen fixation in mung, *Vigna radiata*.** *Indian Journal of Nematology* (1976, publ. 1979) 6 (2) 124-130 [En] Dep. of Microbiology, Univ. of Agric. Sciences, Hebbal, Bangalore, India.

In a pot experiment *Vigna radiata* seedlings were inoculated with 3000 *Meloidogyne javanica* larvae/pot and with *Rhizobium* either before nematode inoculation, at the same time or several days later. Nematode infection retarded plant growth but if the plants were inoculated with rhizobia simultaneously, or 2 to 7 days later, growth was normal. Nodulation was significantly reduced when nematode inoculation preceded rhizobia inoculation. The nitrogen content was significantly higher when *Rhizobium* inoculation preceded nematode infection.

*0251 GRIFFIN, G. D.; ANDERSON, J. L. **Effects of DCPA, EPTC, and chlorpropham on pathogenicity of *Meloidogyne hapla* to alfalfa.** *Journal of Nematology* (1979) 11 (1) 32-36 [En] Utah State Univ., Logan, Utah 84322, USA.

Treatments with the herbicides chlorpropham (isopropyl *m*-chlorocarbinilate), DCPA (dimethyl tetrachloroterephthalate), and UPTC (S-ethyl dipropylthiocarbamate), alone or in combination with *Meloidogyne hapla*, significantly reduced the growth of both nematode-resistant 'Nev Syn XX' and susceptible 'Ranger' alfalfa (*Medicago sativa* L.) seedlings. *M. hapla* infection of both alfalfas was reduced by all herbicides because of fewer available infective courts in the treated plants. EPTC, however, reduced resistance to *M. hapla*, as indicated by increased galling of 'Nev Syn XX' plants.

0252 SHARMA, N. K.; SETHI, C. L. **Interrelationship between *Meloidogyne incognita*, *Heterodera cajani* and *Rhizobium* sp. on cowpea (*Vigna sinensis* (L.) Sevi)** *Indian Journal of Nematology* (1976, publ. 1979) 6 (2) 117-123 [En] Division of Nematology, Indian Agric. Res. Inst., New Delhi-110012, India.

In a pot experiment *Vigna sinensis* seedlings were inoculated with *Meloidogyne incognita*, *Heterodera cajani* and *Rhizobium* singly or in combination. Both nematode species significantly reduced plant growth, nodulation and shoot nitrogen content. Symptoms following inoculation with both species together were more severe than with either species alone. Both species penetrated and developed in root nodules. *M. incognita* reduced the nitrogen content more than *H. cajani*. Inoculation with rhizobia reduced cyst formation but not gall formation.

0253 SHARMA, N. K.; SETHI, C. L. **Influence of *Meloidogyne incognita* and *Heterodera cajani* on carbohydrate content of cowpea.** *Indian Journal of Nematology* (1976, publ. 1979) 6 (2) 171-173 [En] Division of Nematology, Indian Agric. Res. Inst., New Delhi, India.

Seedlings of *Vigna sinensis* (varieties Pusa Barsati and Barsati mutant) were inoculated with 1000 *Meloidogyne incognita* or *Heterodera cajani* larvae. 45 days after inoculation infection with *M. incognita* had resulted in an increase in non-reducing sugars in the shoots of both varieties and an increase in reducing sugars in Pusa Barsati. The sugar content of the roots decreased. Infestation with *H. cajani* decreased reducing sugar concentration in the shoots of both varieties and increased the non-reducing sugar content in the shoots and decreased it in the roots. Accumulation of non-reducing sugars in shoots of *H. cajani*-infested plants was more marked than in shoots of *M. incognita*-infested plants. Nematode infection increased the total carbohydrate content and affected the ratio of reducing/total soluble carbohydrate.

*0254 TAHA, A. H. Y.; KASSAB, A. S. **The histopathological reactions of *Vigna sinensis* to separate and concomitant parasitism by *Meloidogyne javanica* and *Rotylenchulus reniformis*.** *Journal of Nematology* (1979) 11 (2) 117-123 [En] Plant Protection Dept., Faculty of Agriculture, Ain Shams Univ., Cairo, Egypt.

In a pot experiment seedlings of *Vigna sinensis* were inoculated with 2 egg masses of *Meloidogyne javanica* or 50 egg masses of *Rotylenchulus reniformis* or both together. Histopathological examination of the infected tissue showed that *M. javanica* initiated giant cells in the vascular parenchyma and syncytia in the cortex of bacterial nodules. *R. reniformis* caused mild hypertrophy of pericycle and endodermal cells in roots and nodules. Syncytia were also formed in roots and nodules. A ring of hypertrophied pericycle cells was formed as a result of multiple infections with *R. reniformis*. In the plants infected with both species, each species produced its own characteristic response independently.

0255 WALTERS, M. C. **The possible status of parasitic nematodes as limiting factors in maize production in South Africa.** In *Proceedings of the 2nd South African maize breeding Symposium, 17-19 March, 1976, Pietermaritzburg, Natal. Organized by the Department of Agricultural Technical Services. Publication No. 2. (Edited by H.O. Gevers).* South Africa. (1979) 112-118 [En, Discussion pp. 118-122. Technical Communication No. 142]

A survey of plant-parasitic nematodes was made in the major maize-producing areas of South Africa. The dominant

and most widely distributed nematodes were *Pratylenchus brachyurus, P. zeae, P. penetrans, Scutellonema brachyurum,: Rotylenchus* spp., *Rotylenchulus* spp. and *Trichodorus* spp. Most of the genera were more common in the sandier soils. Pot trials and field observations indicated that growth of maize was adversely affected by *Pratylenchus* spp. and *Trichodorus* spp. Preliminary field trials with methyl bromide and granular nematicides have resulted in increased growth in treated plots. Further investigations into the occurrence of nematodes in maize culture in South Africa is needed.

0256 SINGH, J.; RAO, A. S. H. **Quantitative estimation of viable *Heterodera* cyst in Arhar (*Cajanus cajan*) field at Varanasi.** *Indian Journal of Zootomy* (1974) 14 (1) 19-21 [En] Dep. of Entomology, Fac. of Agric., Banaras Hundu Univ., Varanasi 221005, India.

A survey of *Heterodera cajani* in a *Cajanus cajan* field in Varanasi, Uttar Pradesh, India from October 1970 to April 1971 showed that the cyst population was lowest in January when soil temperatures were low and high in April when soil temperatures had increased.

0257 BADRA, T.; ELGINDI, D. M. **Single and double combinations of nematicides against *Rotylenchulus reniformis* and *Tylenchulus semipenetrans* infecting cowpea and citrus.** *Revue de Nématologie* (1979) 2 (1) 23-27 [En, fr] Nematol. Res. Centre, Fac. of Agric., Cairo Univ., Giza, Egypt.

In a glasshouse experiment, the effects of 7 nematicides singly and in combination on *Rotylenchulus reniformis* on *Vigna sinensis* and *Tylenchulus semipenetrans* on *Citrus aurantifolia* were tested. All treatments decreased nematode numbers and most increased plant growth. Plants treated with ethoprop (24 and 36 kg/ha) or phenamiphos (24 and 36 kg/ha) did not grow well. The best results were obtained with fensulphothion (18 kg/ha) plus DBCP (18 kg/ha) or oxamyl (18 kg/ha) plus DBCP (18 kg/ha).

0258 JOHNSON, A. W.; DOWLER, C. C.; MORGAN, L. W. **Influence of organic pesticides on nematodes, weeds, and insects and on yield of field corn.** *Research Bulletin, Georgia University, Agricultural Experiment Stations* (1978) No. 223, 16 pp. [En]

In a 2-year field experiment the effect of ethoprop, fensulphothion or carbofuran at 6 lb/acre on control of nematodes on maize (*Zea mays*) was tested. All nematicide treatments reduced *Criconemoides ornatus* and *Meloidogyne incognita* populations, in 1973, and *Pratylenchus* spp. were reduced by ethroprop or carbofuran treatment. In 1974, only fensulphothion treatment reduced *M. incognita* populations, which were low, and the low populations of *Pratylenchus* spp. were only reduced on plots which had been treated by the herbicide butylate in addition to a nematicide. *Belonolaimus longicaudatus* populations were reduced on butylate and nematicide treated plots. Average yields were increased 12% by nematicide treatment and the increase was related to the control of *C. ornatus, M. incognita* and *Pratylenchus* spp.

*0259 LUCAS, L. T. **Control of *Belonolaimus longicaudatus* on bermudagrass golf greens.** Ann. Meet. Amer. Phytopath. Soc., S. Div., 4-7 Feb., 1979. Abstract S-35. *Phytopathology* (1979) 69 (1) 1A6 [En] Dep. of Plant Path., NC State Univ., Raleigh, NC 27607, USA.

Poor growth of 'Tifton 328' bermudagrass (*Cynodon dactylon*) on golf greens with sandy soil along the coast of North Carolina was associated with *Belonolaimus longicaudatus*. An average of 400 *B. longicaudatus* and 966 *Macroposthonia ornata* /500 cm^3 of soil were found in soil samples before treatment with nematicides. Phenamiphos, fensulfothion and 1,2-dibromo-3-chloropropane (DBCP) were applied as granules at 0.2, 0.2 and 0.64 kg (a.i.)/93 m^2, respectively, on August 8, 1977. Turf quality ratings (9 being the best quality) were 6.2, 6.2, 4.7 and 2.7 4 weeks after treatment and 8.7, 4.0, 4.0 and 4.0 40 weeks after treatment in phenamiphos, fensulfothion, DBCP and nontreated plots, respectively. Densities of *B. longicaudatus* were 160, 100, 315 and 1390 4 weeks after treatment, and 106, 823, 406 and 752 40 weeks after treatment in phenamiphos, fensulfothion, DBCP and nontreated plots, respectively. Densities of *M. ornata* were reduced in DBCP treated plots only.

*0260 TOWNSHEND, J. L.; POTTER, J. W. **Inhibiting infection of alfalfa seedlings by *Pratylenchus penetrans* by treating seed with oxamyl.** *Canadian Journal of Plant Science* (1979) 59 (2) 519-520 [En] Agric. Canada, Res. Sta., Vineland Sta., Ontario, Canada L0R 2E0.

Soaking lucerne seeds in aqueous oxamyl solutions for 17 hours at concentrations exceeding 2000 ppm reduced infection of seedlings by *Pratylenchus penetrans*. At a concentration of 32000 ppm there was no infection.

0261 TURNER, G. O. **Effects of soil fumigation with 1,3-dichloropropene and 1,2-dibromo-3-chloropropane on yields of cotton, lima beans and tomatoes.** *Down to Earth* (1979) 35 (3) 4-8 [En] Dow Chemical USA, Davis, California, USA.

Soil fumigation of cotton crops with 1,3-D or DBCP gave yields of 1.86 and 1.74 bales/acre respectively with 1.43 for the untreated control. Control of *Meloidogyne* spp. averaged 81% for 1,3-D treatment and 85% for DBCP. Lima bean [*Phaseolus lunatus*] yield was increased 36% by 1,3-D and 9% by DBCP. Nematode control was 96% with both chemicals. Higher tomato yields were obtained with 1,3-D (45%) than with DBCP (20%) and nematode control was approximately 70%.

0262 WALTERS, M. C. **Present status of knowledge of nematode damage and control in South Africa.** Proc. 3rd S.A. Maize Breeding Symp., Dep. Agric. Tech. Serv., Potchefstroom, 21-23 Mar. 1978. Ed. by: J. G. Du Plessis. Publ. No.3. *Technical Communication, Department of Agricultural Technical Services, Republic of South Africa* (1979) No. 152, 62-66 [En]

In a number of field trials at sites where *Pratylenchus zeae* was always and *Trichodorus* spp. usually present, nematicides were evaluated by measuring maize yield increases after treatment. Methyl bromide fumigation applied under plastic at 0.5 kg/10 m^2 gave a 128% yield increase and carbofuran at 2 g/m row gave a 33% increase. Carbofuran was the most promising of the non-fumigant nematicides tested. In an indicator trial with D-D the average yield increase for the 7 tested sites was 37.6% and the range from 14 *to* > 60%. *In fertilizer trials nematicide treatment* increased nutrient uptake by 2.6% for N, 12.7% for P and 17.9% for K. The percent yield increase following fumigation was higher on plots of low nutrient status than on those of high nutrient status. Nematode damage to maize was more severe when there was an interaction with root-rot organisms or under dry conditions.

026? SHESTEPEROV, A. A. [Dynamics of parasitic nematodes on *Trifolium pratense*.] *Byulleten' Vsesoyuznogo Instituta Gel'mintologii im. K.I. Skryabina* (1981) No.31, 98-104 [Ru, en, 8 ref.]

The seasonal variation in the numbers of the specific plant pathogenic nematodes of *T. pratense* — *Pratylenchus pratensis, Tylenchorhynchus dubius* and *Paratylenchus projectus* — in the roots, rhizosphere and soil were studied [in the European SSR]. Vegetative stages (flowering and preparation for winter), humidity < 16%, large numbers of predatory nematodes, antagonism, numbers of bacteria and fungi, ploughing and crop rotation had a limiting effect on *P. projectus* populations. Often, 4th stage larvae were the dominant stage in the soil. Migration from roots to rhizosphere to soil, and vice-versa and into deep soil layers was often observed. All these factors and, especially antagonism with *P. projectus* and with species of *Tylenchus, Aglenchus* and *Filenchus* also influenced the population dynamics of *T. dubius*. Peak numbers of *T. dubius* coincided with low numbers of *P. projectus*. *Pratylenchus pratensis* had little influence on population dynamics and was found mainly in small roots at 25 to 60 cm.

*0264 SOSAMMA, V. K.; KOSHY, P. K. **Additional hosts of the burrowing nematode, *Radopholus similis*, infesting coconut palm in South India.** *Plant Disease Reporter* (1977) 61 (9) 760-761 [En] Nematology Lab., Central Plantation Crops Res. Inst., Regional Sta., Krishnapuram, Kerala, S. India 690533.

In tests in South India on plants of 24 species in 16 families, only *Adenanthera pavonia, Tamarindus indica, Vicia faba, Careya arborea, Lagenaria vulgaris, Cucurbita pepo, Trichosanthes anguina, Ficus religiosa* and *Phoenix dactylifera* were recorded as host for *Radopholus similis*. All, except *C. pepo*, are new host records.

0265 MERNY, G.; NETSCHER, C. **[*Heterodera gambiensis* n.sp. (Nematoda: Tylenchida), a parasite of millet and sorghum in Gambia.]** *Heterodera gambiensis* n.sp. (Nematoda: Tylenchida) parasite du mil et du sorgho en Gambie. *Cahiers O.R.S.T.O.M., Série Biologie, Nematologie* (1976) 11 (3) 209-218 [Fr, en] Lab. de Nématol., ORSTOM, B.P. V 51, Abidjan, Ivory Coast.

Heterodera gambiensis n.sp., found in Gambia associated with sorghum, millet and fallow ground, is described and figured. This species is characterized by 3 lines in the lateral fields of the male and 2nd-stage juveniles and has no finger-like projections in the underbridge. It is amphimictic, has 18 chromosomes (2n) and belongs to Mulvey's group 4. A lattice for species determination for this group is given.

*0266 **Alfalfa.** *Crops and Soils* (1976) 29 (3) 23 [En] From *Plant Breeding Abstracts 47*, 7504.

Lew is a non-winterdormant lucerne variety released by the University of Arizona which is resistant to *Ditylenchus dipsaci*. Under conditions with no *D. dipsaci* the hay yield of Lew is better or similar to that of Hayden or Mesa Sirsa, but in heavily infected areas the yield is much higher.

*0267 **Many new alfalfa varieties available this year.** *Crops and Soils* (1976) 28 (9) 22 [En] From *Plant Breeding Abstracts 47*, 5483.

Thirteen new American varieties of lucerne are described. AS13R is as resistant to *Ditylenchus dipsaci* as Lahontan.

0268 AL TAIT, B. **Light and electron microscopy of resistant and susceptible alfalfa roots infected by *Meloidogyne hapla*.** *Dissertation Abstracts International.* (1974) 35B (2) 672 [En] Brigham Young University, Provo, Utah, USA.

In susceptible lucerne infected with *Meloidogyne hapla*, giant cells were formed by enlargement of nematode-stimulated cells without cell wall lysis. The giant cells became multinucleate by karyokinesis without cytokinesis. The resistant cultivar responded with extensive wall build-up in cells surrounding the infection sites. Nematodes often remained in the necrotic tissue.

0269 DICKSON, D. W.; WAITES, R. E. **Nematode and lesser cornstalk borer (*Elasmopalpus lignosellus*) control on field corn.** [IX Ann. Meet. OTAN, Lima, Peru, 20-24 March, 1977. Abstract.]. *Nematropica* (1977) 7 (1) 1 [En] Dep. of Entomol. & Nematol., Univ. of Florida, Gainesville, Florida 32611, USA.

The nematodes mentioned are *Trichodorus christiei, Pratylenchus zeae* and *P. brachyurus*.

*0270 CASTILLO, M. B. **Plant parasitic nematodes associated with Mung bean, soybean and peanut in the Philippines.** *Philippine Agriculturist* (1975) 59 (3/4) 91-99 [En]

The following nematode-plant associations were observed in the Philippines in 1973 to 1974: *Rotylenchulus reniformis, Helicotylenchus, Tylenchorhynchus, Pratylenchus, Hoplolaimus, Aphelenchus, Meloidogyne incognita, M. incognita acrita, M. arenaria* and *M. javanica* on mung bean; *Rotylenchulus reniformis, Helicotylenchus, Tylenchorhynchus, Pratylenchus, Hoplolaimus, Aphelenchus, Meloidogyne incognita acrita* and *M. arenaria* on soybean; *Rotylenchulus reniformis, Helicotylenchus, Tylenchorhynchus, Pratylenchus, Hoplolaimus* and *Aphelenchus* on peanut. *Meloidogyne* root galling was the only apparent nematode damage.

0271 CAUBEL, G.; PEDRON, J. P. **[Geographical distribution of the stem nematode *Ditylenchus dipsaci* in cultures of forage legumes.]** Distribution géographique du nématode des tiges *Ditylenchus dipsaci* (Kühn) Fil. en cultures de légumineuses fourragères. Rennes, France; ENSA. *Sciences Agronomiques Rennes* (1976) 183-188 [Fr, en] I.N.R.A., Lab. de Recherches de la Chaire de Zool., E.N.S.A., Rennes, France.

During 1972 to 1975 over 1,000 un-cleaned seed samples of lucerne and red clover from different areas of France were examined for *Ditylenchus dipsaci*. At least 13% of lucerne and 10% of red clover seed were infested. The degree of contamination varied according to region and cultivar. The importance of adopting measures to ensure the production of clean seed is emphasized.

0272 ERZHANOVA, P. K.; UTAMBETOV, A. **[The nematode fauna of lucerne in Karakalpakiya.]** *Uzbekskii Biologicheskii Zhurnal* (1977) No. 4, 66-68 [Ru, uzbek]

The nematode fauna of lucerne was studied at a farm in the Karakalpak ASSR, Uzbek SSR. 79 nematode species were recorded; 93% of the nematodes were found in the rhizosphere. The dominant pathogenic species were *Helicotylenchus multicinctus, Ditylenchus dipsaci, D. destructor* and *Pratylenchus pratensis*.

0273 FARRELL, K. M. ***Heterodera graminis*, first record for Trinidad, West Indies.** *Nematropica* (1977) 7 (1) 23-24 [En, es] Nematol. Dep., Rothamsted Exp. Sta., Harpenden, Herts, UK.

Nematode cysts containing viable eggs were recovered from bamboo grass (*Paspalum fasciculatum*) at the University of West Indies Field Station in Trinidad. The cysts and 2nd-stage juveniles resmbled those of *Heterodera graminis* except the juveniles were larger (449 compared to 391 μm). White mature females were found adhering to the roots. The nematode failed to multiply on *Cynodon dactylon* in pot tests but did so on bamboo grass. Cysts and 2nd-stage juveniles resembling *H. graminis* were also found in soil around *Glycine max, Vigna unguiculata* and *Ipomoea batatas*. This is the first specific record of a *Heterodera* in the West Indies. 2nd-stage juveniles of *H. sacchari* have been reported from Trinidad but these may have been *H. graminis* which are very similar.

0274 HART, W. H. **Nematodes in alfalfa production.** In *Sixth California Alfalfa Symposium, 8-9 December, 1976, Fresno, California*. California, USA: Division of Agricultural Sciences, University of California. (1976) 7-9 [En, Special publication No. 3209] Cooperative Extension Service, Univ. of California, Davis, USA.

The plant-parasitic nematodes known to be associated with lucerne in California, USA, are listed. Damage to the crop is caused by *Meloidogyne* spp., *Criconemoides curvatus, Tylenchorhynchus clarus* and, in certain areas, *Ditylenchus dipsaci*. Control by means of chemicals is not practical on this crop because of the low price of lucerne and high price of chemicals. A better means of control would be by resistant varieties but so far these are few and the development of new ones is slow.

*0275 IRWIN, J. A. G.; JONES, R. M. **The role of fungi and nematodes as factors associated with death of white clover (*Trifolium repens*) stolons over summer in south-eastern Queensland.** *Australian Journal of Experimental Agriculture and Animal Husbandry.* (1977) 17 (88) 789-794 [En] Dep. of Primary Industries, Indooroopilly, Queensland, Australia.

Meloidogyne incognita, Heterodera trifolii,

Helicotylenchus dihystera, *Pratylenchus brachyurus*, *P. zeae*, *Paratrichodorus minor* and *Xiphinema radicicola* were observed in white clover pastures in south-eastern Queensland, Australia in 1974-75. Some nematode populations and clover decline were significantly reduced after phenamiphos application.

0276 DANSKE LANDBOFORENINGERS FRØFORSYNING; FÆLLESFORENINGEN FOR DANMARKS BRUGSFORENINGER **[34th report of work done at Boelshøj and St. Lundgård.]** (1971) 55pp. [Da]

In addition to the details given below, tabulated data and reports are presented for trials and other investigations of varieties and breeding material of field peas and beans, beetroot, fodder beet and herbage legumes and grasses. [*See also PBA* 42, 1780-84].

0277 **Alfalfa.** *Crops and Soils* (1977) 29 (6) 20 [En] Field Crops Lab., West Beltsville, Md. USA. From *Plant Breeding Abstracts* 47, 9517.

Two lucerne varieties for breeding purposes are described. WDS3P1, derived from Vernal, and W1S1P1 are resistant to *Ditylenchus dipsaci* and other pathogens.

0278 TERENT'EVA, T. G. **[Harmfulness of *Heterodera* on Lucerne in the Krasnodar Territory.]** *Byulleten' Vsesoyuznogo Nauchno-Issledovatel'skogo Instituta Zashchity Rastenii* (1976) No. 39, 58-60 [Ru, en]

The relation between yield losses in lucerne and different population densities of *Heterodera* sp. were studied. In the Krasnodar Territory of the USSR, the critical population density above which losses became unacceptable was 800 larvae/100 cm^3 soil.

0279 BURTON, G. W.; HANNA, W. W. **Performance of mutants induced in sterile triploid turf bermudagrass.** *Mutation Breeding Newsletter* (1977) No. 9, 4 [En] ARS, USDA, Univ. Ga., Coastal Plain Exp. Sta., Tifton, USA. From *Plant Breeding Abstracts* 47, 9495.

Some irradiation-induced mutants of *Cynodon dactylon* remained free of root knots caused by *Meloidogyne graminis* while others, although infected, showed no reduction in root or top weight.

0280–IRVINE, W. A., 1965. "Interaction of *Meloidogyne hapla* and *Rhizoctonia solani* in alfalfa." *Diss. Abstr.*, 25 (11), 6146.

0281 MESSIAEN, C. M.; GINOUX, J. P.; JACQUA, G. **[The selection of a French runner bean with resistance to root knot nematodes in Guadeloupe.]** Sélection en Guadeloupe d'un haricot rame résistant aux nematodes à galles. *Nouvelles Maraîchères et Vivrières de l'INRA aux Antilles* (1974) No. 9, 36-38 [Fr, en] Sta. de Path. Vegetale, Inst. National de la Recherche Agronomique, Petit Bourg, Guadeloupe, West Indies. From *Plant Breeding Abstracts* 47, 9991.

0282 NORTON, D. C. ***Helicotylenchus pseudorobustus* as a pathogen on corn, and its densities on corn and soybean.** *Iowa State Journal of Research* (1977) 51 (3) 279-285 [En] Dep. Bot. and Plant Path., Iowa State Univ., Ames, USA. From *Plant Breeding Abstracts* 47, 10123.

Ten maize and 18 soybean lines were examined 84 to 90 days after inoculation with *Helicotylenchus pseudorobustus*. B73 maize and Harosoy soybean were most resistant as regards numbers of nematodes recovered per pot of soil and nematode reproduction.

0283 CATIBOG, C. S.; CASTILLO, M. B. **Pathogenicity of *Meloidogyne javanica* on Mung bean (*Phaseolus aureus* Roxb.)** *Philippine Agriculturist* (1975) 59 (5/6) 189-195 [En]

Seedlings of *Phaseolus aureus*, aseptically inoculated with 5, 15, 25 and 50 egg masses of *Meloidogyne javanica*, died one month after infection, the extent of root galling increasing with nematode levels. An increase in root and reduction in top and yield weights were correlated to increasing inoculum levels, with high nematode counts in soil and root samples indicating the high susceptibility of the crop to *M. javanica*. Inoculations of less than 50 eggs had no pathogenic results.

***0284** YEATES, G. W.; ROSS, D. J.; BRIDGER, B. A.; VISSER, T. A. **Influence of the nematodes *Heterodera trifolii* and *Meloidogyne hapla* on nitrogen fixation by white clover under glasshouse conditions.** *New Zealand Journal of Agricultural Research* (1977) 20 (3) 401-413 [En] Soil Bureau, DSIR, P.B., Lower Hutt, New Zealand.

When *Trifolium repens* grown in Egmont brown loam or Kokotau silt loam under varying phosphorus and nitrogen regimes in a glasshouse were inoculated with cysts of *Heterodera trifolii* and *Meloidogyne hapla*, the N-fixing capacity of the plants was adversely affected, herbage dry matter yields, plant nitrogen content and plant nitrogen yield all being reduced. In Egmont brown loam *H. trifolii* had a greater effect than *M. hapla* and simultaneous nematode inoculation gave results equalling those of *H. trifolii* on its own. In Egmont loam root weights and rhizobia numbers were reduced under all nematode treatments and pot experiments showed a significant correlation between nematode numbers and rhizobia numbers.

***0285** TIN SEIN; KAUNG ZAN **Ufra disease spread by water flow.** *International Rice Research Newsletter* (1977) 2 (2) 5 [En] Agric. Res. Inst., Rangoon, Burma.

Wild rice (*Oryza perennis*), *O. meyeriana*, *Leersia hexandra* and volunteer rice plants were found to be sources of *Ditylenchus angustus* in Irrawaddy Delta, Burma. Nematode dispersal along water currents was demonstrated by placing healthy plants up and down stream of a group of diseased plants grown in a canal bed. Downstream plants only were infected within 3 to 4 weeks. Control of weeds and volunteer rice, prevention of river overflow by dikes and clean cultivation and early roguing of diseased plants are suggested as control measures.

0286 BUNT, J. A.; NOORDINK, J. P. W. **Autoradiographic studies with [^{14}C] oxamyl in *Vicia faba* infested with *Pratylenchus penetrans*.** [29th Int. Symp. Fytofarm. en Fytiat., Gent, 1977, Deel. II.]. *Mededelingen van de Faculteit Landbouwwetenschappen Rijksuniversiteit Gent* (1977) 42 (2, Pt. 2) 1549-1558 [En, nl] Lab. of Nematology, Agric. Univ. Res. Inst. for Plant Protection, Wageningen, The Netherlands.

When ^{14}C-labelled oxamyl was applied to *Vicia faba* leaves it was translocated both acropetally and basipetally. *Pratylenchus penetrans* isolated from roots of plants whose leaves had been treated showed only weak radioactivity. Radioactivity was found in the rhizosphere of treated plants.

0287 GRANDISON, G. S. **Root-knot and stem nematodes of lucerne.** In *Proceedings of the 29th New Zealand Weed and Pest Control Conference, 3-5 August, 1976, Christchurch.* Hamilton, New Zealand. (1976) 31-34 [En] Entomol. Division, DSIR, Auckland, New Zealand.

Oxamyl, phenamiphos and carbofuran broadcast at 9 kg/ha to a stand of lucerne infected with *Meloidogyne hapla* significantly increased yield over ethoprophos, chlorobromopropane treatments and controls. The lucerne variety Nevada Synthetic XX showed resistance to *M. hapla*. Oxamyl and phenamiphos broadcast at 8 kg/ha to a stand of lucerne infected with *Ditylenchus dipsaci* each reduced the nematode population within the plant. No foliar necrosis was caused by phenamiphos and plants grew out of the slight chlorosis caused by oxamyl. There was no effect upon yield except that TCA at 35 kg/ha reduced yield by causing severe chlorosis.

0288 BRITAIN, MINISTRY OF AGRICULTURE, FISHERIES AND FOOD. **Stem eelworm on clover.** *Advisory Leaflet*,

Agricultural Development and Advisory Service, Ministry of Agriculture, Fisheries and Food. (1977) No. 409 (Revised), 5 pp. [En]

This revised leaflet includes information on the EEC Directive on the Marketing of Seed of Forage Crops whereby uncertified clover seed may not be marketed and certain categories of certified seed must be fumigated if *Ditylenchus dipsaci* is found during field inspection.

0289 REDDY, D. B. (EDITOR) **Reviews on pest disease and weed problems in rainfed crops in Asia and the Far East. Presented at the *ad hoc* panel of experts on pest disease and weed problems in some rainfed crops, 15-19 September 1975, Bangkok, Thailand.** Bangkok, Thailand; Food and Agriculture Organization of the United Nations. (1975) iii + 258 pp. [En, FAO Regular Programme No. RAFE 23]

References to plant-parasitic nematodes on crops in Asia and the Far East include: in Nepal, local occurrence of *Aphelenchoides besseyi* on Taiwanese varieties of rice in the valleys and mid-hills and of *Meloidogyne* spp. on *Brassica campestris*; in the Philippines, *A. besseyi* is common on rice and *Hirschmanniella* has been found in many rice-growing soils but nothing is known of its effects; *M. incognita* is common on mungo [*Phaseolus* sp.] and has been found on castor; in Thailand, *Meloidogyne* causes stunting of soybean seedlings.

0290 NIGERIA, INTERNATIONAL INSTITUTE OF TROPICAL AGRICULTURE **Annual report 1974.** Ibadan, Nigeria. (1975) ix + 199 pp. [En] From *Plant Breeding Abstracts 47*, 10088, 10095.

Of 241 lines of *Vigna unguiculata* tested in Nigeria in 1974, 4 were highly resistant to *Meloidogyne incognita*.

0291 SIGAREVA, D. D. [SIGAR'OVA, D. D.] **[The nematode fauna of some grass crops in the Ukrainian Poless'ie.]** In *Paraziti, parazitozi ta shlyakhi ikh likvidatsii (Parazity, parazitosy i puti ikh likvidatsii), Vipusk 1.* Kiev, USSR; "Naukova Dumka". (1972) 190-198 [Uk, ru]

The 59 species of nematodes recorded on clover, lupin and *Phleum* in the Poless'ie, Ukrainian SSR, are listed and the incidence of each ecological group on each crop tabulated.

*0292 TASHIRO, H.; MURDOCH, C. L.; APT, W. J. **Plant-parasitic nematodes associated with golf putting green turf in Hawaii.** *Plant Disease Reporter* (1977) **61** (11) 919-921 [En] Dep. of Entomology, Geneva Agric. Exp. Sta., Geneva, New York, USA.

Criconemoides sp., *Helicotylenchus* sp., *Meloidogyne* sp. and *Pratylenchus* sp. were found in soil samples from bermudagrass (*Cynodon dactylon* x *C. transvaalensis*) putting greens. *Trichodorus* sp. and *Helicotylenchus* sp. were most frequently associated with samples from *Agrostis palustris* greens. There were no symptoms of nematode damage on any of the greens sampled. Nematode counts from chlorotic spots and from normal turf on the same greens revealed no correlation between population density of plant-parasitic nematodes in or outside the affected areas.

*0293 HUSSAINI, S. S.; SESHADRI, A. R. **Interrelationships between *Meloidogyne incognita* and *Rhizobium* sp. on mung bean (*Phaseolus aureus*).** *Indian Journal of Nematology* (1975, publ. 1977) **5** (2) 189-199 [En] Div. of Nematol., Indian Agric. Res. Inst., New Delhi 110012, India.

Meloidogyne incognita and *Rhizobium* sp. were inoculated at various levels separately, simultaneously or in sequence to *Phaseolus aureus* seedlings growing in pots of sterilized soil. Nematodes at any of the inoculum levels used, whether added before, after or simultaneously with *Rhizobium* caused significant decreases in plant height, fresh and dry weights of shoots and roots, number of nodules on primary and secondary roots and nitrogen content of the shoots and roots as compared with the nematode-free control plants. Bacterial nodules invaded by nematodes showed giant cells, hypertrophy and hyperplasia typical of nematode galls which probably prevented normal nitrogen fixation by the bacterium. There was no evidence that the *Rhizobium* interfered with the development of the nematodes.

0294 VAN DEN BERG, E.; HEYNS, J. **Descriptions of new and little known Criconematidae from South Africa (Nematoda).** *Phytophylactica.* (1977) 9 (4) 95-101 [En, af, fr] Pl. Prot. Res. Inst., Private Bag X134, Pretoria, 0001, S. Africa.

Nothocriconema sanctus-francisci n.sp. was collected from coarse sand just above spring tide highwater mark at Cape St. Francis, Cape Province, South Africa and from soil around *Aloe* roots near the beach at Jeffreys Bay. It closely resembles *N. duplicivestitum* but differs in the longer body (328 to 568 μm compared with 340 to 400 μm in *N. duplicivestitum*), longer spear (72 to 99μm compared with 66 to 72 μm) which extends over 13 to 18 annules compared with 11 to 12, body annules 70 to 84 compared with 55 to 60, oesophagus extending over 19 to 24 annules compared with 15 to 17 and vulva 8 to 11 annules from posterior end compared with 7 to 8 in *N. duplicivestitum*. It differs from *N. crotaloides* in having a smaller spear (89 to 114 μm in *N. crotaloides*), fewer body annules (62 to 76 in *N. crotaloides*), more posterior vulva (11 to 15 annules from tail end in *N. crotaloides*), more posterior anus (7 to 9 annules from tail end in *N. crotaloides* compared with 3 to 5) and vulva and anus further apart (4 to 6 annules compared with 3 to 4 in *N. crotaloides*). *Lobocriconema zeae* n.sp., like *N. sanctus-francisci* is known from females only. It was collected round roots of *Zea mays* in Transvaal, South Africa. It is similar to *L. aberrans* but can be distinguished by the slightly scalloped posterior margins of the annules, by having 8 founded scales on each of the 6 to 9 caudal annules, by the more anterior position of the vulva (88 to 91% compared with 91 to 95% in *L. aberrans*), shorter spear (54 to 59 μm compared with 68 to 78 μm), body annules 53 to 59 compared with 39 to 41, distance of vulva from terminus divided by body width at vulva 1.3 to 1.6 compared with 0.9 to 1.1, stylet length to body length 12 to 14% compared with 14 to 17% in *L. aberrans*. The number of body annules and their ornamentation, the spear length and form of lip region distinguish *L. zeae* from the other South African species of the genus. Detailed, illustrated descriptions are given of *Hemicycliophora halophila* and *H. brachyurus* found in South Africa.

*0295 ARMSTRONG, J. M.; PINKERTON, J. N.; JENSEN, J. J. **Responses of red clover germplasm to stem nematodes in greenhouse trials.** *Plant Disease Reporter.* (1977) **61** (12) 1060-1063 [En] Dep. of Bot. and Pl. Path., Oregon State Univ., Corvallis 97331, USA.

During 1975 and 1976, 682 selections of *Trifolium pratense* were exposed, as seedlings, to inoculum of *Ditylenchus dipsaci* in a search for sources of resistance. Tested entries included selections from several States in the USA and from 40 other countries. Observations during the early seedling stage indicated that all of the seedlings in 30 selections tested in 1975, and 447 of 652 selections tested in 1976, were extremely susceptible. Additional testing of 205 remaining selections (those with 40% or less seedlings infected) indicated that 102 were more than 25% susceptible. Only 27 selections of the remainder developed less than 13% infection. Of these, only four of the original 652 (1976 tests) entries were highly resistant, but none was immune.

*0296 JOHNSON, A. W.; BURTON, G. W.; WRIGHT, W. C. **Reactions of sorghum-sudangrass hybrids and pearl millet to three species of *Meloidogyne*.** *Journal of Nematology* (1977) 9 (4) 352-353 [En] ARS, USDA, Coastal Plain Exp. Sta., Tifton, GA 31794, USA.

When hybrids of sorghum-sudangrass and cultivars of *Pennisetum americanum* were inoculated with *Meloidogyne incognita*, *M. arenaria* and *M. javanica*, both sorghum hybrids (Funk's Hybrid 78 and Haskel Harris' 1746 E) were resistant to all 3 nematode species. Cultivars of pearl millet varied in resistance.

0297 RADOŠINSKÝ, J. **[Research tasks completed at the Research Institute for Plant Production in Piešťany.]** Vyriešené vedeckovýskumné úlohy vo Výskumnom ústave rastlinnej výroby v Piešťanoch. *Věstník Československé Akademie Zemědělské* (1976) **23** (7) 324-331 [Sk] VÚRV, Piešťany, Czechoslovakia. From *Plant Breeding Abstracts*, *48*, 79.

The lucerne varieties Marais de Chalans, Elga, Poitou, Du Poits, Orchčienne and Palava were resistant to *Ditylenchus dipsaci* in Czechoslovakia.

***0298** SRIVASTAVA, A. N.; SWARUP, G. **Preliminary studies on some graminaceous plants for their susceptibility to the maize cyst nematode, *Heterodera zeae* Koshy et al., 1970.** *Indian Journal of Nematology* (1975, publ. 1977) **5** (2) 257-259 [En] Div. of Nematol., Indian Agric. Res. Inst., New Delhi, India.

Zea mays and *Setaria italica* were good hosts of *Heterodera zeae* in India, the maize variety Rattan showing least susceptibility and Shakti exhibiting maximum infestation.

***0299** NOEL, G. R.; MEYER, R. D.; LOWNSBERY, B. F. **Effect of *Macroposthonia curvata* on the nutrition of alfalfa.** [16th Ann. Meet., Soc. Nematol., East Lansing, Michigan, 16-19 Aug. 1977. Abstract.]. *Journal of Nematology* (1977) **9** (4) 278-279 [En] Dep. of Nematol., Univ. of California, Davis, CA 95616, USA.

In *Macroposthonia curvata*-infected alfalfa Moapa 69 plants, PO_4-P and Zn levels were significantly reduced but P, N, crude protein and K levels were not affected.

0300 NOEL, G. R.; LOWNSBERY, B. F. **The pathogenicity of *Tylenchorhynchus clarus* to alfalfa.** [16th Ann. Meet., Soc. Nematol., East Lansing, Michigan, 16-19 Aug. 1977. Abstract.]. *Journal of Nematology* (1977) **9** (4) 278 [En] Dep. of Nematol., Univ. of California, Davis, CA 95616, USA.

One-month-old seedlings of lucerne cv. Moapa 69 grown in pots were inoculated with 1800 axenized *Tylenchorhynchus clarus* and grown at 21, 24 or 27°C. The nematode reduced plant growth at all temperatures. Root penetration was mainly in the zone of differentiation. Greatest reproduction occurred at 24 and 27°C.

***0301** RICH, J. R.; KEEN, K. T.; THOMASON, I. J. **Association of coumestans with the hypersensitivity of Lima bean roots to *Pratylenchus scribneri*.** *Physiological Plant Pathology* (1977) **10** (2) 105-116 [En] Dep. of Nematol. and Pl. Path., Univ. of California, Riverside, CA 92502, USA.

Roots of *Phaseolus lunatus* exhibited a hypersensitive response to *Pratylenchus scribneri* concomitant with the accumulation of at least 4 coumestans. *Phaseolus vulgaris* allowed rapid multiplication of the nematode, showed no visible response and did not accumulate significant amounts of coumestans. One of the coumestans, identified as coumestrol, inhibited the motility of *Pratylenchus scribneri* above 5 µg/ml *in vitro*. One other compound was tentatively identified as psoralidin. Coumestans may be related to the expression of resistance of *Phaseolus lunatus* roots to *Pratylenchus scribneri*.

0302 SHARMA, N. K.; SETHI, C. L. **Effects of initial inoculum levels of *Meloidogyne incognita* and *Heterodera cajani* on cowpea and on their population development.** *Indian Journal of Nematology* (1975, publ. 1977) **5** (2) 148-154 [En] Div. of Nematol., Indian Agric. Res. Inst., New Delhi 110012, India.

Cowpea seedlings var. Pusa Barsati grown in sterilized soil in pots were inoculated with 10, 100, 1,000 or 10,000 larvae of *Meloidogyne incognita* or *Heterodera cajani*, or with a combined inoculum of 5,000 larvae of each species. The threshold level for producing measurable effects on the growth of the plants was 100 larvae/500 g soil of either nematode. The final population was greatest at this inoculum level but the rate of multiplication was greatest with an inoculum of 10 larvae. The effects of the combined inoculum were similar to those caused by an inoculum of 10,000 larvae of either nematode alone.

0303 NAGANATHAN, T. G.; SIVAKUMAR, C. V. **Host-parasite relationships and influence of soil types on the lesion nematode, *Pratylenchus delattrei* Luc, 1958, on maize.** *Indian Journal of Nematology* (1975, publ. 1977) **5** (2) 162-169 [En] Dep. of Entomol., Tamil Nadu Agric. Univ., Coimbatore 641003, India.

Pratylenchus delattrei multiplied better on *Zea mays* growing in pots of black, sandy clay loam and brown, sandy loam than on the host plant in red, sandy loam, which had coarser fractions and less favourable cation exchange and water holding capacities. In both red and brown sandy loam, the nematode was pathogenic causing brown to black lesions on the maize roots, extensive damage to the cortex and reduced shoot and root weights. In red, sandy loam, a positive correlation was shown between initial and final populations with inocula of 1, 2 or 4 nematodes/5 g soil. In black, sandy clay loam and brown, sandy loam there was a curvilinear relationship with a decline in population after inoculations with 4 nematodes/5 g soil.

***0304** THOMAS, S. H. **Population densities of nematodes under seven tillage regimes.** *Journal of Nematology* (1978) **10** (1) 24-27 [En] Dep. of Bot. & Pl. Path., Iowa State Univ., Ames, Ia 50011, USA.

Under the 7 tillage regimes tested, densities of *Xiphinema americanum*, dorylaims, *Helicotylenchus pseudorobustus*, *Pratylenchus hexincisus* and *P. scribneri* on *Zea mays* were highest in no-till ridge plots and lowest in autumn- or spring-ploughed plots. Tylenchs were most numerous in offset-disk, autumn-plough, spring-plough and chisel-plough plots but *Aphelenchus* spp., *Aphelenchoides* spp., *Hoplolaimus galeatus*, *Tylenchorhynchus nudus*, Psilenchinae, Mononchidae and nonstylet-bearing nematodes were not affected by tillage treatments.

***0305** IBRAHIM, I. K. A. **Effects of plant-growth substances on pathogenicity of *Meloidogyne javanica* on horse bean and soybean.** [16th Ann. Meet., Soc. Nematol., East Lansing, Michigan, 16-19 Aug. 1977. Abstract.]. *Journal of Nematology* (1977) **9** (4) 271 [En] Fac. of Agric., Alexandria Univ., Alexandria, Egypt.

Spraying of *Vicia faba* and *Glycine max* with either 50 or 100 µg/ml indole-3-acetic acid (IAA) at the time of inoculation with *Meloidogyne javanica*, 50 µg/ml 24 hours before inoculation or 50 µg/ml indole butyric acid or gibberellic acid before and at the time of inoculation, suppressed gall development and severity. Treatment with 10 µg/ml IAA at the time of inoculation and application of IAA 24 hours after infection stimulated root galling and suppressed plant growth.

***0306** MURDOCH, C. L.; APT, W. J.; TASHIRO, H. **Effects of nematicides on root-knot nematodes in bermudagrass putting greens in Hawaii.** *Plant Disease Reporter* (1977) **61** (11) 978-981 [En] Dep. of Hort., Univ. of Hawaii, USA.

Nematicides were tested for efficacy against *Meloidogyne incognita* in 'Tifdwarf' bermudagrass (*Cynodon* spp) putting greens. Phenamiphos and DBCP gave excellent control with repeated applications. Diazinon-xylene, CGA-12223 and oxamyl were ineffective. No improvement in turf quality was noted as a result of nematode control.

***0307** RHOADES, H. L. **Influence of nonfumigant nematicides and DBCP on *Belonolaimus longicaudatus* and yield of field corn in central Florida.** *Plant Disease Reporter* (1978) **62** (1) 91-94 [En] Inst. of Food and Agric. Sci., Univ. of Florida, Agric. Res. and Education Center, Sanford, FL 32771, USA.

In a 3-year study conducted in central Florida, USA, fensulphothion, phenamiphos, ethoprop, carbofuran, aldicarb, oxamyl, sulphocarb, CGA 12223, and AC 64,475, applied at

2.2 kg a.i./ha in-the-row just ahead of planting, reduced populations of *Belonolaimus longicaudatus* and significantly increased yields of *Zea mays*. Phenamiphos and oxamyl, applied post-plant after injury symptoms were present, greatly reduced nematode populations, but yield increases were much less than for applications just before planting. DBCP applied at 6.7 kg a.i./ha in-the-row and at 16.8 kg a.i./ha broadcast performed as well as the nonfumigants applied just before planting.

*0308 McSORLEY, R.; FERRIS, J. M.; FERRIS, V. R. **A predictive simulation model of corn-nematode interactions.** [16th Ann. Meet., Soc. Nematol., East Lansing, Michigan, 16-19 Aug. 1977. Abstract.]. *Journal of Nematology* (1977) 9 (4) 277 [En] Dep. of Entomol., Purdue Univ., West Lafayette, IN 47907, USA.

The model, constructed from field and glasshouse data, is used to simulate population levels of *Pratylenchus hexincisus* in maize roots during growth.

0309 NIGERIA, FEDERAL DEPARTMENT OF AGRICULTURAL RESEARCH **Annual report 1973-74.** Moor Plantation, Ibadan, Nigeria. (1975) 178 pp. [En, Plant Nematology 42-45, 96-99, 157-160, 167-173]

Of 16 genera of plant-parasitic nematodes associated with maize in Nigeria, *Aphelenchus*, *Helicotylenchus* and *Pratylenchus* were the most common and *P. scribneri* was the most widespread species. Cultivar resistance of maize to *P. scribneri*, of okra to *Meloidogyne* and of lowland rice to *Aphelenchoides* is detailed and host ranges of *Pratylenchus*, *Meloidogyne* and *Aphelencoides* are given. *Tylenchus*, *Tylenchorhynchus*, *Pratylenchus*, *Heterodera*, *Meloidogyne* and *Aphelencoides* were most common around lowland rice. *Scutellonema clathricaudatum*, *Pratylenchus zeae* and *Helicotylenchus erythrinae* were predominant and widespread around sugar-cane. Nematodes found around tomato, okra and pepper are listed and control of maize nematodes by fallowing and cropping techniques and of root-knot nematodes on tomato by Nemagon is described.

0310 MAASSEN, H. **[Oat cyst nematode.]** Hafernematoden. *Pflanzenschutzdienst Baden-Württemberg Jahresbericht* (1975) 213-214 [De]

In the Donaueschingen district of West Germany 63% of 24 soil samples were infested with *Heterodera avenae*. In the Waldshut district oat cyst nematodes have damaged oats and maize.

0311 OGBUJI, R. O. **Responses of cowpea (*Vigna unguiculata*) to inoculation with root-knot nematode and cowpea rhizobium.** [Ann. Conf. (6th) NSPP, Nsukka, Nigeria, 16-18 Feb., 1976. Abstract]. *Occasional Publication, Nigerian Society for Plant Protection* (1977) No. 2, 58 [En] Crop. Sci. Dep., Univ. of Nigeria, Nsukka, Nigeria.

Three-day-old seedlings of 2 cowpea cvs (TYU 317 and Ife Brown) inoculated with cowpea rhizobia and root-knot nematodes 24 hrs later, grew well and had high counts of galls and nodules on their roots. Separate inoculation with either root-knot nematodes or cowpea rhizobia resulted in plants with fewer galls or nodules than when both inocula were applied at an interval. Seedlings inoculated simultaneously with root-knot nematodes and cowpea rhizobia became stunted and had few or no galls or nodules on their roots.

0312 STONE, A. R.; SOSA MOSS, C.; MULVEY, R. H. **[Taxonomic position of the cyst nematode of maize.]** Posición taxonómica actual del nemátodo enquistado en el maiz. [Abstract]. In *Avances en la enseñanza y la investigación, 1975-1976.* Chapingo, Mexico. (1976) 92 [Es] Rothamsted Exp. Sta., Harpenden, UK.

A Mexican race of *Heterodera punctata* which attacks only *Zea mays* and *Z. mexicana* is in fact a new species and will be described elsewhere.

0313 WOUTS, W. M.; STURHAN, D. **The identity of *Heterodera trifolii* Goffart, 1932 and the description of *H. daverti* n.sp. (Nematoda: Tylenchida).** *Nematologica* (1978) 24 (1) 121-128 [En, de, 1 pl. (unpaged)] Entomol. Div., Dep. of Sci. and Industrial Res., Auckland, New Zealand.

Heterodera trifolii is re-described from the type locality and a neotype cyst with eggs is deposited in the German nematode collection in Münster. The neotype cyst is 620 μm long, 430 μm wide, with distances of outer edges of semifenestrae from vulval slit 25 μm and 30 μm, fenestral width 35 μm, vulval slit 40 μm, width of vulval bridge 7 μm and length of underbridge 105 μm. The cyst is light brown with a pronounced vulval cone, a coarse zig-zag cuticular pattern and pale brown bullae. Juveniles from the cyst had an average length of 517 μm, width 19.4 μm, stylet length 28 μm, the stylet knobs robust with anterior faces deeply concave. The lateral field has 4 lines and is not areolated. Males are unknown. *H. trifolii* is separated from *H. glycines*, *H. rosii* and *H. galeopsidis* by juvenile characters. Larvae of *H. glycines* are shorter (440 μm) with shorter tail (50 μm compared with 65 μm in *H. trifolii*) and hyaline part of tail (27 μm compared with 37.5 μm) and shorter stylet (23 μm). *H. rosii* has a longer stylet (31 μm) and *H. galeopsidis* has a stylet of 22 μm. The type locality is pasture with *Trifolium repens*, which is shown in tests to be a good host. *H. daverti* n.sp. was collected from pasture on dark sandy soil in a forest area south of Münster, West Germany, and reared on *Trifolium repens* in a glasshouse. It has lemon-shaped ambifenestrate cysts (650 μm by 380 μm) with a long vulval slit (47 μm) and well-developed bullae and underbridge (82 μm long). The males average 1043 μm long, 25 μm wide and have a stylet of 27.6 μm long and knobs with flat or slightly concave anterior faces, spicules 30 to 33 μm and gubernaculum 11 to 12 μm. The juveniles are 457 μm long, 19 μm wide, the stylet is 25 μm, tail 55 μm with hyaline part 60% of its length and stylet knobs strong with anterior faces slightly concave. *H. daverti* is similar to *H. glycines* but the larvae have longer stylets (23 μm in *H. glycines*), are slightly longer (440 μm in *H. glycines*) and the hyaline part of the tail is only 50% of the total in *H. glycines*. *H. daverti* differs from *H. trifolii*, *H. galeopsidis* and *H. rumicis* in having males, and from *H. trifolii* also in the shorter total length, stylet and tail lengths and smaller, less concave stylet knobs of the juveniles.

0314 STANFORD, E. H. **Genetic resources in alfalfa and their preservation.** *California Agriculture* (1977) **31** (9) 22-23 [En] Dep. Agron. & Range Sci., Univ. Calif., Davis, USA. From *Plant Breeding Abstracts* 48, 4414.

After a summary of its history as a cultivated crop, the breeding of *Medicago sativa* vars. resistant to *Ditylenchus dipsaci*, *Phytophthora megasperma*, *Meloidogyne* spp. and *Therioaphis maculata* in California is briefly described. The sources used for the work at Davis have mostly been USDA collections.

0315 OGBUJI, R. O. **Influence of soil pH on reproduction of *Meloidogyne incognita*.** [Ann. Conf. (7th) NSPP, Ibadan, Nigeria, 7-9 March, 1977. Abstract]. *Occasional Publication, Nigerian Society for Plant Protection.* (1977) No. 2, 47 [En] Dep. of Crop Sci., Univ. of Nigeria, Nsukka, Nigeria.

When tomato cv Roma VF and cowpea cv Ife Brown were inoculated with *Meloidogyne incognita* and grown in soil at pH 4.6, 5.6 or 7.6, root-knot galls developed at all pH levels but egg masses were produced only at pH 5.6 and 7.6.

*0316 **Lucerne, pasture nematodes.** *New Zealand Journal of Agriculture* (1978) **136** (4) 57 [En]

Oxamyl and phenamiphos were most effective in reducing root-knot nematode damage in young lucerne plants in New Zealand. Nematicides reduced the number of nematodes on white clover but had no effect on pasture appearance or yield.

0317 EGUNJOBI, O. A. **Nematodes and maize growth in Nigeria. III. Effects of cocoa pod husk soil amendments**

on populations of *Pratylenchus brachyurus* and on the growth and yield of maize (*Zea mays* L.). *Nematologia Mediterranea* (1977) 5 (2) 151-157 [En, it] Nematol. Lab., Phytopath. Unit, Dep. of Agric. Biol., Univ. of Ibadan, Nigeria.

Incorporation of cocoa pod husk (CPH) at 90, 45 or 40 tonne/ha increased the yield, stem diameter and shoot fresh weight of *Zea mays* in soil with and without *Pratylenchus brachyurus*. Soil populations of the nematode were greatly reduced by CPH addition to 2 consecutive crops of *Z. mays*. Differences between treatments observed in the first crop became more pronounced in the second.

*0318 BIRCHFIELD, W. Pathogenesis and host-parasite relations of the cyst nematode, *Heterodera graminophila*, on grasses. *Phytopathology* (1973) 63 (1) 38-40 [En] Dept. of Plant Pathology, Louisiana State Univ., Baton Rouge, Louisiana 70803, USA.

The cyst nematode *Heterodera graminophila* was found on barnyard grass *Echinochloa colonum* in Louisiana, USA. In glasshouse conditions the larvae penetrated the roots of seedlings and became oriented along the vascular cylinder in 12 days. Females developed in 18 days and lemon shaped cysts emerged through the epidermis after 24 days. There was no galling of root tissue, giant cell formation or secretion of a gelatinous matrix around the eggs. There was slight necrosis of the pericycle and cortex but no foliage symptoms. Male *H. graminophila* larvae did not penetrate to the vascular tissue but developed in the cortex near the epidermis. Other hosts were *Oryza sativa* and *Sorghum halapense*.

0319 ADAMOVÁ, B. **[Investigations on the damage and bionomics of stem eelworm (*Ditylenchus dipsaci*) on lucerne and possibilities of control. [Report].]** Výzkum škodlivosti a bionomie hádátka zhoubného na vojtěšce a možnosti ochrany proti němu. In *Závěrečná zpráva výzkumného ústavu pícninářského, Troubsko*. Czechoslovakia. (1975) 1-36 [Cs]

There was a severe infestation of *Ditylenchus dipsaci* on 6% of plants in 23% of the lucerne-growing area in Czechoslovakia. Nematodes were observed during the entire vegetation period with largest numbers in August. Immature seeds were infested but no nematodes were found in healthy seeds.

0320 EUROPEAN AND MEDITERRANEAN PLANT PROTECTION ORGANIZATION **Fourth report of the Standing Committee on fumigation standards, Paris. 17-18 June, 1974.** *EPPO Publications, Paris, C* (1974) No. 34, 47 pp. [En] 1, rue Le Nôtre, Paris, France. From *Bromides in Agriculture* No. 42 (1978), 3-7.

Recommended standards are given for the fumigation of seed of onion, lucerne and red clover with methyl bromide for the control of *Ditylenchus dipsaci*.

0321 PRICE, T. V. Diseases of the winged bean in Papua New Guinea. [Proc. 2nd Nat. Pl. Path. Conf., Brisbane, Australia, 12-14 May, 1976. Abstract.]. *Australian Plant Pathology Society Newsletter* (1976) 5 (1, Suppl.) Abs. 209 [En] Univ. of Papua New Guinea, Pt. Moresby, Papua New Guinea.

The most widespread disease of *Psophocarpus tetragonolobus* in Papua New Guinea is root-knot due to *Meloidogyne incognita*. Seedlings become infected within 2 weeks of germination and adult females appear 4 weeks later. Pure lines are being screened for resistance.

0322 **Varieties.** *Crops and Soils* (1975) 28 (1) 19-20 [En] From *Plant Breeding Abstracts 46*, 6829, 6832.

Lucerne breeding material designated as Nevada Synthetic XX displayed resistance to 3 collections of *Meloidogyne hapla* in glasshouse tests in the USA. In fields where *Meloidogyne* spp. and other nematodes were prevalent, Nevada Synthetic XX had higher stand density ratings than 34 other varieties tested.

0323 AMOSU, J. O. **The reaction of cowpea (*Vigna unguiculata* (L.) Walp) to the root-knot nematode (*Meloidogyne incognita*) in Western Nigeria.** *Nigerian Agricultural Journal* (1974) 11 (2) 165-169 [En] Inst. of Agric. Res. and Training, Univ. of Ife, Nigeria.

Seventy-seven cultivars and lines of cowpea (*Vigna unguiculata*) were rated in replicated tests in the screenhouse, microplots and the field for their reaction to *Meloidogyne incognita*. 36 cultivars and lines were found resistant. Other cultivars and lines were moderately to highly susceptible as indicated by the root-knot nematode's ability to reproduce on the host. In the wet season tests, roots both of Mak I/I and Victor K798 cowpea were free of galls but in the dry season tests some roots of cultivars exhibited slight galling. Ife Brown (H62-1) was susceptible to *M. incognita*.

0324 CAUBEL, G. **[Reactions of three varieties of lucerne to the inoculation of seedlings with the stem nematode *Ditylenchus dipsaci*.]** Réactions de trois variétés de luzerne à l'inoculation des plantules par le nématode des tiges *Ditylenchus dipsaci* (Kühn) Fil. *Sciences Agronomiques Rennes* (1974) 37-42 [Fr, en] I.N.R.A., Lab. de Zool., E.N.S.A. Rennes, France.

The reaction to *Ditylenchus dipsaci* of the lucerne varieties Europe (susceptible), Vertus and Alfa II (both resistant), inoculated at the cotyledon stage with 30 nematodes each, was observed 12, 21 and 39 days after inoculation. Reactions were classified as swelling, arrest of growth or necrosis. The symptoms

observed 3 weeks after inoculation gave the best estimate of varietal reaction. Counts of nematodes in the seedlings 7 weeks after inoculation were related to symptom expression. The greatest numbers of nematodes were found in plants showing swelling, followed by plants with necrotic symptoms, and smallest numbers in apparently healthy plants. It is concluded that symptoms shown by seedling lucerne are a good guide to susceptibility and to the multiplication of *D. dipsaci*.

* **0325** HAMBLEN M. L.; SLACK, D. A.; RIGGS, R. D. Temperature effects on penetration and reproduction of soybean-cyst nematode. [Abstract.]. *Phytopathology* (1972) **62** (7) 762 [En] Univ. of Arkansas, Fayetteville, USA.

The optimum temperature for invasion and reproduction of *Heterodera glycines* on Lee soybean was 28°C: on *Lupinus albus* and *Vigna wilmsii* it was 22 C.

* **0326** SINGH, S. R.; WILLIAMS, R. J.; RACHIE, K. O.; RAWAL, K.; NANGJU, D.; WIEN, H. C.; LUSE, R. A. **VITA-3 cowpea (GP-3).** *Tropical Grain Legume Bulletin* (1975) **1** (1) 18-19 [En] International Inst. Trop. Agric., Ibadan, Nigeria. From *Plant Breeding Abstracts 46*, 8536.

In trials in Nigeria VITA-3, a tropical strain of *Vigna unguiculata* selected from the introduction VU5 from Kenya, has shown resistance to *Meloidogyne incognita*.

0327 AMOSU, J. O. **Interaction of *Meloidogyne hapla, Pratylenchus penetrans,* and *Tylenchorhynchus agri* on kenland red clover.** *Dissertation Abstracts International* (1971) **31B** (12) 7031 [En] Univ. of Illinois, Urbana-Champaign, USA.

* **0328** WALLER, J. M.; BRIDGE, J. **Plant diseases and nematodes in the Sultanate of Oman.** *PANS* (1978) **24** (3) 313-326 [En] Commonwealth Mycological Inst., Ferry Lane, Kew, Surrey, UK.

Rotylenchulus reniformis, Pratylenchus brachyurus, Xiphinema americanum and *Tylenchorhynchus* spp. were found in the soil around the roots of lucerne. Omani lucerne varieties are resistant to *Meloidogyne javanica* and *M. incognita*. Large numbers of *Tylenchulus semipenetrans* were found on citrus crops and also *X. americanum, Helicotylenchus microcephalus* and *Hoplolaimus* spp. An association between *T. semipenetrans* and *Fusarium solani* was reported on lime. *H. multicinctus* and *Radopholus similis* were common on banana. *Meloidogyne* spp. occurred on pawpaw (*Carica papaya*), tomato, *Phaseolus vulgaris*, carrot, *Beta vulgaris*, tobacco, sweet pepper (*Capsicum* spp.), cucurbits and were very damaging on *Solanum melongena* in association with *F. solani*.

0329 RAZAK, A. R.; EVANS, A. A. F. **An intracellular tube associated with feeding by *Rotylenchulus reniformis* on cowpea root.** *Nematologica* (1976) **22** (2) 182-189 [En, de, 3 pl. (unpaged)] Imperial Coll., Field Sta., Ashurst Lodge, Sunninghill, Ascot, Berkshire, UK.

Rotylenchulus reniformis fed on modified pericycle tissue in cowpea roots. The feeding area extended 6 to 15 cells on either side of the nematode head but a group of 4 to 6 cells closest to the nematode lips were obviously inter-connected by gaps in the radial walls, thus forming a functional unit (the feeding zone). The cell wall adjacent to the nematode lips (the feeding cell or initial syncytial cell) contained a feeding peg enclosing the nematode stylet. Opposite the stylet tip a hyaline tube (feeding tube) could be traced coiling helically in the feeding cell. Since the nematode head becomes immobile following establishment at a feeding site, the tube is thought to act as a filter through which the nematode may obtain cell solutes without cell particles that might block the stylet lumen.

0330 OLOWE, T.; CORBETT, D. C. M. **Aspects of the biology of *Pratylenchus brachyurus* and *P. zeae*.** *Nematologica* (1976) **22** (2) 202-211 [En, de, 1 pl. (unpaged)] Rothamsted Exp. Sta., Harpenden, Herts, UK.

Vertical migration of *Pratylenchus* and *P. zeae* was best between 15° and 35°C: *P. brachyurus* moved fastest in coarse particled sand and *P. zeae* faster in a finer particled sand than *P. brachyurus*, *P. zeae* developed faster than *P. brachyurus* at all temperatures tested: both species developed faster at 30° and 35°C, one generation taking 3 weeks in *P. zeae* and 4 weeks in *P. brachyurus*. Reproduction of both *P. brachyurus* and *P. zeae* was greatest at 30°C. More *P. zeae* invaded roots at all inoculum levels than *P. brachyurus*. Both *P. brachyurus* and *P. zeae* occupied all parts of excised maize roots including the stele. Cavities were formed in the cortex with little accompanying necrosis and in the stele with much, including the deposition of a dense staining substance that occluded xylem vessels and phloem tissues. *P. zeae* caused more mechanical damage but less necrosis than *P. brachyurus*, which also greatly decreased the growth of excised maize roots.

0331 CASTANER, D. **The relationship of numbers of *Helicotylenchus microlobus* to nitrogen soil amendments.** *Iowa State Journal of Science* (1966) **41** (2) 125-135 [En] Biol. Dep., Central Missouri State Coll., Warrensberg, Missouri 64093, USA.

The numbers of *Helicotylenchus microlobus* in the soil of continuous corn plots at 3 sites in Iowa, USA, that had received 0, 40, 80 or 160 lb N/acre yearly for 11 years (Ames), 40, 80 or 160 lb N/acre yearly for 12 years (Independence) or 0, 30, 60, 120 or 240 lb N/acre yearly for 12 years (Bloomfield) were found to be negatively correlated with the amount of nitrogen applied. In 3 glasshouse tests, 0, 0.03, 0.3, 1.5 and 3.0 g ammonium nitrate were applied to Iowa 4570 corn planted in 6 inch pots and infested with 2,500 to 33,000 *H. microlobus*/pot. After 103 to 127 days, *H. microlobus* was significantly less numerous in the 3.0 g-treated pots than in the others, except when the 3 g were applied over a 4-week period instead of once at the beginning of the experiment. It is suggested that ammonium nitrate at high dosages is nematostatic to *H. microlobus*. An increase in the density of *Pratylenchus* spp. with the amount of nitrogen, as observed at the field sites, is believed to be related to an increase in the root system.

0332 SMITH, A. D. M.; WALLACE, H. R. **Fluctuations in the distribution and numbers of *Helicotylenchus dihystera* in Kikuyu turf (*Pennisetum clandestinum*).** *Nematologica* (1976) **22** (2) 145-152 [En, de] Dep., of Plant Path., Waite Agric. Research Inst., Univ. of Adelaide, Glen Osmond, South Australia, 5064, South Australia.

Studies of fluctuations in numbers of *Helicotylenchus dihystera* in an area of kikuyu turf (32 × 16 m) from March 1974 to May 1975 indicated that populations within the area fluctuated asynchronously in time, such fluctuations were superimposed on a general seasonal trend and there were some centres of permanently high and low populations. Attempts to correlate nematode numbers with environmental components were unsuccessful. Further measurements suggested that as the size of an area increased so the reliability of the estimate of mean density decreased. To obtain a reliable assessment of the mean density of a nematode species in a large area is very time consuming and may have little meaning if there is considerable environmental variability within the area. It is suggested that large areas should first be mapped to indicate this environmental variability thus enabling stratified sampling to be used.

0333 EGUNJOBI, O. A.; AFOLAMI, S. O. **Effects of neem (*Azadirachta indica*) leaf extracts on populations of *Pratylenchus brachyurus* and on the growth and yield of maize.** *Nematologica* (1976) **22** (2) 125-132 [En, de] Dep., of Agric. Biol., Univ. of Ibadan, Nigeria.

Four water extracts of the leaves of *Azadirachta indica* in concentrations of 1.5, 1.0 and 0.5 kg fresh leaves/3 litres water were found in *in vitro* tests to be directly toxic to *Pratylenchus brachyurus*. Boiled extracts became toxic within the first 4 hours of exposure, there being a linear relationship between concentration and the number of inactive nematodes (assumed dead) which approached an asymptote value of 0.5 kg/3 litres concentration at 24 hours exposure. The juice of *Citrus aurantifolia* fruits seemed to reduce the toxicity of the neem extracts. Under semi-field conditions boiled extracts without lime juice significantly reduced maize root populations of *P. brachyurus* and increased grain yield, plant heights and root weights. A strong positive correlation existed between increases in plant growth and yield, reduction in soil populations, and extract concentrations.

0334 LADYGINA, N. M. **[The genetic and physiological compatibility of different forms of the stem nematode. 5. Crossing of the red clover race with other stem nematodes.]** *Parazitologiya* (1976) **10** (1) 40-47 [Ru, en] Biol. Res. Inst., Kharkov Univ., Kharkov, USSR.

Reciprocal crossing took place between the stem nematode of red clover and those of onion, strawberry, narcissus, parsnip and parsley, giving rise to fecund progeny which were kept under observation for 10 generations. Deviations from control generations were observed, manifested mainly as decreases in numbers and fecundity and structural and morphological anomalies. Whenever deviations occurred, they were always more clearly manifested when the red clover nematode represented the female in the parenteral pair. The red clover stem nematode is considered to be a narrowly specific biological race of *Ditylenchus dipsaci* at a certain stage of intraspecific differentiation.

0335 NEW ZEALAND, MINISTRY OF AGRICULTURE AND FISHERIES **Annual Report of Agricultural Research Division, 1974-1975.** New Zealand; Government Printer. (1976?) 244 pp. [En, Plant nematology p. 21]

In this report on agricultural research in New Zealand in 1974-1975 there is one section on nematodes which describes research on the control of *Meloidogyne* spp. on lucerne and nematodes on white clover.

0336 SIKORA, R. A. ***Heterodera trifolii* associated with *Fusarium* root rot of *Trifolium subterraneum* in northern Tunisia.** *Nematologia Mediterranea* (1977) 5 (2) 319-321 [En] Inst. für Pflanzenkrankheiten der Univ. Bonn, 5300 Bonn, GFR.

Heterodera trifolii is for the first time reported to have caused economic damage to *Trifolium subterraneum* and is recorded for the first time in Africa (northern Tunisia). Cysts were found on 11 Tunisian ecotypes and 6 Australian cvs. of subterranean clover. *Fusarium oxysporum* and *F. avenaceum* were consistently associated with *H. trifolii*-diseased clover.

0337 STONE, A. R.; SOSA MOSS, C.; MULVEY, R. H. ***Punctodera chalcoensis* n.sp. (Nematoda: Heteroderidae) a cyst nematode from Mexico parasitising *Zea mays*.** *Nematologica* (1976) **22** (4) 381-389 [En, fr, 3 pl. (unpaged)] Rothamsted Exp. Station, Harpenden, Herts., UK.

Punctodera chalcoensis n.sp. differs from *P. punctata* in that mature females are spherical to sub-spherical (pear-shaped in *P. punctata*), 2nd-stage juveniles are > 500 µm long (350 to 470 µm in *P. punctata*) and in reproducing only on *Zea* spp. It differs from *P. matadorensis* in having flat to slightly concave stylet knobs in the juvenile compared with knobs strongly concave anteriorly in *P. matadorensis*; the juvenile oesophageal gland lobe reaches to about 30% of the body length compared with 50% in *P. matadorensis;* the bullae in the cyst of *P. chalcoensis* are small and scattered or absent but massive and always present in *P. matadorensis*. The new species occurs on *Z. mays* (type host) near Chalco (type locality) in the Valley of Mexico and in other regions about 2000 m altitude in Tlaxcala and Pueblo States, Mexico. The only other known host is *Z. mexicana*. No resistance was found in a range of maize varieties and *Z. mexicana* isolates: no hosts were found amongst other Gramineae tested. Maize crops are damaged in heavily infested fields.

0338 CAFATI K., C. **[Combined and separate forage yield and *Meloidogyne* resistance of six lucerne clones.]** Capacidad combinatoria general y especifica de seis clones de alfalfa (*Medicago sativa* L.) para resistencia de *Meloidogyne* spp. y rendimiento en forraje. [Thesis, 1967 (title only).]. *Bibliotecología y Documentacíon, IICA/CIDIA (Indice Latinoamericano de Tesis Agrícolas)* (1972) No. 20, Abs. No. 701 [Es, Available on microfiche from: CIDIA, Turrialba, Costa Rica.]

***0339** KEHR, W. R.; BARNES, D. K.; SORENSEN, E. L.; SKRDLA, W. H.; HANSON, C. H.; MILLER, D. A.; THOMPSON, T. E.; CARLSON, I. T.; ELLING, L. J.; TAYLOR, R. L.; RUMBAUGH, M. D.; BINGHAM, E. T.; BROWN, D. E.; MILLER, M. K. **Registration of alfalfa germplasm pools NC-83-1 and NC-83-2 (Reg. Nos. GP 45 and GP 46).** *Crop Science* (1975) **15** (4) 604-605 [En]

Medicago sativa germplasm pools NC-83-1 and NC-83-2 have been developed to provide broad-based populations that could be used as sources of disease, insect and *Ditylenchus dipsaci* resistance and desirable agronomic traits for lucerne improvement programmes in the North Central region of the USA, to provide plant breeders with large quantities of seed and to preserve germplasm. The sources of the germplasm and results of plantings are briefly outlined. Harmful insects were controlled and no disease problems were evident.

***0340** PEADEN, R. N.; HUNT, O. J.; FAULKNER, L. R.; GRIFFIN, G. D.; JENSEN, H. J.; STANFORD, E. H. **Registration of a multiple-pest resistant alfalfa germplasm.** *Crop Science* (1976) **16** (1) 125-126 [En] Dep. Plant Path., Kans. State Univ., Manhattan, USA. From *Plant Breeding Abstracts, 46*, 11203.

Nevada Synthetic XX lucerne was developed by back crossing clones M7 and 1-167, which are resistant to *Meloidogyne hapla*, to clones C952, C949, C951, C953, C89, Nevada 759 and a clone resistant to *Acyrthosiphon pisum*. Nevada Synthetic XX was highly resistant to three regional collections of *M. hapla* and also had some resistance to *Therioaphis maculata, Ditylenchus dipsaci, Corynebacterium insidiosum* and *Phytophthora megasperma*.

0341 BASU, S. D.; BANERJEE, B. **Effect of infestation of *Meloidogyne incognita* (Kofoid & White) Chitwood on some ancillary plants grown with tea in north east India.** *Two and a Bud* (1978) **25** (1) 28-29 [En, 16 ref.] Entomology Dep., Tocklai, India.

All of 15 different shade trees and green crops except *Crotalaria anagyroides* were infested with *Meloidogyne incognita* following inoculation of seedlings in a pot experiment. *Albizzia lebbek, A. maranguensis, A. moluccana, A. odoratissima, A. procera, A. richardiana, Tephrosia candida* and *T. vogelii* were all good hosts.

0342 LORDELLO, L. G. E. **[On the incidence of nematodes on maize.]** Observações sobre incidência de nematóides em uma cultura de milho. In *Lordello, L.G.E. (Editor), Trabalhos apresentados à reunião de nematologia, Piracicaba, Brasil, 6-7 February, 1974. Sociedade Brasileira de Nematologia, publicaçao No. 1.* Piracicaba, São Paulo, Brazil; Sociedade Brasileira de Nematologia. (1974) 33-36 [Pt, en] Dep. de Zool., ESALQ, Piracicaba, Brazil.

In Sao Paulo State, Brazil, the symptoms of *Pratylenchus zeae, Helicotylenchus* sp. and *Criconemoides* sp. attack on maize are briefly summarized. Yield was reduced by 50% or more.

0343 VALLOTTON, R.; PERRIER, J. J. **[*Heterodera avenae*, the cereal cyst nematode, a little-known parasite of maize in French-speaking Switzerland.]** *Heterodera avenae*, le nématode à kyste des céréales, un parasite du maïs peu connu en Suisse romande. *Revue Suisse d'Agriculture* (1976) 8 (6) 160-174 [Fr, it, de, 1 pl. (unpaged)] Sta. fédérale de recherches agronomiques de Changins, CH-1260 Nyon, Switzerland.

An account is given of the life-cycle of *Heterodera avenae* and the symptoms and damage caused by it to cereals. It has been found on maize in French-speaking Switzerland for the first time and is associated with reduced growth. Populations in maize roots seldom exceeded 30 larvae/g compared with more than 300/g in other cereals. Of 6 varieties of maize tested with 2 Swiss populations of *H. avenae*, none was tolerant to either population, attacked plants being at least 3 times lighter than healthy plants. Nematode reproduction on maize was poor, fewer than one new cyst/g root being formed compared with up to 200 on barley. Maize in crop rotation can reduce larval populations of *H. avenae* by up to 50% but it can be severely damaged by small numbers of larvae. Treatment of infected land with Curaterr 5G at 13 kg/ha gave only slight yield increases and was uneconomic. The only advice that can be given is to grow several successive maize crops.

0344 LIMBER, D. P. **Artificial infection of sweet corn seedlings with *Anguina tritici* Steinbuch (1799) Chitwood, 1935.** *Proceedings of the Helminthological Society of Washington* (1976) 43 (2) 201-203 [En] Plant Importation Branch, Plant Quarantine Divn, ARS, USDA, 209 River St., Hoboken, N.J. 07030, USA.

Seedlings of *Zea mays* and *Sorghum vulgare* growing in pots were inoculated with larvae of *Anguina tritici* from wheat galls. The larvae did not penetrate the stem below the first node except for isolated individuals. When more soil was added to the pots of sweet corn so that the first node was covered heavy invasion took place into the leaf tissue above the node. No evidence of growth of the invading larvae was found.

0345 TURNER, D. R. **Infection of seedlings of alfalfa and red clover by concomitant populations of *Meloidogyne incognita* (Kofoid and White) and *Pratylenchus penetrans* (Cobb).** *Dissertation Abstracts International* (1971) **32B** (4) 1951 [En]

Meloidogyne incognita did not affect the invasion of *Medicago sativa* or *Trifolium pratense* by *Pratylenchus penetrans*. Invasion was measured in terms of site and rate of penetration of the host. The effect of invasion on root elongation was also studied. Some reduction in egg-laying by *P. penetrans* may have occurred in the presence of a previous inoculation of *Meloidogyne incognita*.

0346 FRECKMAN, D. H. W. **Penetration of and early development in red clover seedlings by *Heterodera trifolii* and *Pratylenchus penetrans* .** *Dissertation Abstracts International* (1971) **32B** (2) 654 [En] Univ. of Kentucky, USA.

***0347** YEATES, G. W.; HEALY, W. B.; WIDDOWSON, J. P.; THOMSON, N. A.; MACDIARMID, B. N. **Effect of a soil fumigant on the establishment and growth of a grazed pasture on a yellow-brown loam.** *New Zealand Journal of Agricultural Research* (1976) **19** (3) 397-403 [En] Soil Bureau, DSIR, P.B., Lower Hutt, New Zealand.

'Telone' soil fumigant was applied to the seedbed of a mixed pasture being sown after 2 years of cropping; the effect on dry matter production was measured over 11 months. During the trial the proportion of white clover in the sward increased, and during establishment, clover growth in 'Telone' plots appeared better than in control plots. Populations of *Meloidogyne hapla* and *Heterodera trifolii* were lower in 'Telone' plots. Total dry matter yield was significantly higher in 'Telone' plots at 7 of the 12 harvests, but there were no significant increases in clover yield. Over the trial, dry matter production from 'Telone' plots was 13% more than from control plots. Pot trials showed that clover yields in soil cropped for 2 years were more than double those in soil under old pasture. Total *M. hapla* and *H. trifolii* larvae in clover seedlings grown for 33 days in seedbed soil from control and old pasture sites were 4 and 6 times, respectively, those for 'Telone'-treated soil. Thus a reduction in clover root nematode populations was an important benefit of crop rotation in the pasture renewal programme.

0348 ADAMOVÁ, B. **[On the occurrence and pathogenicity of *Ditylenchus dipsaci* on lucerne (*Medicago sativa*) in south Moravia.]** Příspěvek k výskytu a škodlivosti Hádátka zhoubného *Ditylenchus dipsaci* (Kühn) Filipjev na vojtěšce (*Medicago sativa* L.) na jižní Moravě. *Sborník Vědeckých Prací* (1975) No. 4, 193-197 [Cs, en, ru]

Samples from 30 localities in Czechoslovakia showed *Ditylenchus dipsaci*, *Aphelenchus avenae*, *Panagrolaimus rigidus*, *Cephalobus* spp. and *Eucephalobus* spp. in the stems of lucerne. Only *D. dipsaci* appears to be a severe pest. It was found in 7 localities, 2 showing heavy infestation. *D. dipsaci* caused seed yields of infested lucerne to decrease by 50%

*0349 SOCIETY OF NEMATOLOGISTS Abstracts of papers presented at the 18th Annual Meeting, Salt Lake City, Utah, July 23-26, 1979. *Journal of Nematology* (1979) 11 (4) 293-317 [En]

JAFFEE, B. A. Reduced penetration of alfalfa roots by *Pratylenchus penetrans* with increased alfalfa root/soil ratio. 302-303 [En] Dep. of Pl. Path., Cornell Univ., Ithaca, NY 14853. USA.

In an experiment to assess the influence of root density on penetration by *Pratylenchus penetrans* the mean numbers of nematodes recovered from lucerne seedlings in beakers containing 1, 2, 6 or 12 seedlings were 52, 71, 82 and 108, respectively. A significant correlation was found between root weight/beaker and the number of penetrations/g root. Penetrations/g root were 1060 and 2120 at root weights of 0.08 and 0.03 g, respectively.

0350 ANWAR, S. A.; CHAUDHRY, G. Q.; CHAUDHRY, N. A. **Nematodes associated with corn and sorghum.** *Journal of Agricultural Research, Punjab* (1973) 11 (4) 101-102 [En] Plant Protection Inst., Lyallpur, Pakistan.

The results of a survey indicate that *Pratylenchus* spp. are the predominant plant-parasitic nematodes on maize and sorghum in Pakistan.

0351 BOHART, G. E.; DAVIS, D. W.; GRIFFIN, G. D.; HAWS, B. A.; KNOWLTON, G. F.; NEY, W. P. **Insects and nematodes associated with alfalfa in Utah.** *Bulletin, Utah Agricultural Experiment Station, Logan, Utah.* (1976) No. 494, 59 pp [En]

Ditylenchus dipsaci and *Meloidogyne hapla* are the nematodes important on lucerne in Utah, USA, which are discussed in this bulletin. *D. dipsaci* is particularly important in areas where irrigation waste water is used. Damage is usually confined to the first cutting during cool humid weather. *M. hapla* is not as severe a problem as *D. dipsaci*, since it is not as widely distributed. Plant resistance is the only practical method of control of these nematodes, although the feasibility of using systemic nematicides is being studied. The greater part of this bulletin is concerned with insects.

0352 PATEL, G. J.; SHAH, H. M.; PATEL, D. J. **Screening of cowpea cultivars against root-knot nematodes.** *Indian Journal of Nematology* (1977, publ. 1979) 7 (2) 169-170 [En] Gujarat Agric. Univ., Anand Campus, Anand, India.

Of 104 *Vigna sinensis* cultivars tested for resistance to *Meloidogyne incognita* and *M. javanica* infection in field and microplot experiments, 10 lines were resistant, one of which, C-152, was completely disease-free.

*0353 GRIFFIN, G. D. Infection of alfalfa by *Ditylenchus dipsaci* as affected by thermal acclimatization of the nematode. [Abstract.]. *Phytopathology* (1972) 62 (7) 761 [En] ARS, USDA, Utah State Univ., Logan, USA.

Infestation of lucerne seedlings at different temperatures was greater with populations of *Ditylenchus dipsaci* bred at the same than at other temperatures.

0354 BROWN, O. D. R. **The influence of the plant parasitic nematode *Helicotylenchus dihystera* (Cobb) on the growth and nitrogen fixation in the Southern Pea *Vigna sinensis* (L.) Endl.** *Dissertation Abstracts International* (1972) 32B (10) 5563 [En]

Vigna sinensis seeds germinating in glasshouse sand without nitrogen were exposed to 3 levels of the cowpea strain of *Rhizobium* and 3 levels of *Helicotylenchus dihystera* for periods of 13 to 50 days. *Rhizobium* resulted in an increase in fresh-weight, dry-weight, nodule weight and total nitrogen content in almost all experiments. The nematodes consistently increased nodule weight after 13 days, significantly reduced fresh-weight in 2 of the 33-day experiments and usually had no significant effect on total nitrogen content. In the 33-day experiments, there was evidence for an interaction between the nematodes and *Rhizobium*, in regard to both fresh and nodule weights.

0355 BAJAJ, H. K.; JAIRAJPURI, M. S. **Two new species of *Xiphinema* from India.** *Nematologia Mediterranea* (1976) 4 (2) 195-200 [En, fr, it] Sec. of Nematol., Dep. of Zool., Aligarh Muslim Univ., Aligarh, India.

The female of *Xiphinema lambertii* n.sp. is described from soil around the roots of *Cajanus cajan* and from the roots of *Mangifera indica* in Uttar Pradesh, India. It is differentiated from *X. americanum* by having a smaller body (1.3 to 1.46 mm) and stylet (odontostyle 55 to 64 μm) and a longer and differently-shaped tail (c = 37 to 50). The female of *X. neoelongatum* n.sp. is described from soil around the roots of *Psidium guajava* in the Punjab, India, and differs from *X. elongatum* in its body posture (C-shaped) after fixation and in having a post-equatorial vulva (V = 54 to 55) and smaller uterus. No male of either species was found.

0356 VOVLAS, N.; INSERRA, R. N. [Morphological characters of *Macroposthonia sphaerocephala* (Nematoda: Criconematidae).] Peculiarità morfologiche di *Macroposthonia sphaerocephala* (Nematoda: Criconematidae). *Nematologia Mediterranea* (1976) 4 (2) 155-160 [It, en, fr] Lab. di Nematol. Agraria del C.N.R., 70126 Bari, Italy.

Scanning electron photomicrographs are presented of the lateral fields of *Macroposthonia sphaerocephala* from the rhizosphere of maize in Greece. The zig-zag junction of the annules is continuous along the length of the body. At irregular intervals (5 to 8 annules) the dorsal and ventral annules were aligned with each other and formed a complete ring. In the cephalic region were seen short, smooth, hemispherical submedian lobes with amphid apertures between them in the lateral position. Labial plates were not distinct and appeared to form a disc. The last 2 annules of the tail were incomplete.

0357 CAVENESS, F. E. Screening cowpea for resistance/susceptibility to root-knot nematode. Ibadan, Nigeria; International Institute of Tropical Agriculture. (1975) 16 pp. [En] From *Plant Breeding Abstracts 46*, 11640.

Several lines of cowpea were screened for resistance to *Meloidogyne incognita*. The nunbers of eggs and juveniles/plant are recorded.

0358 PUTSA, N. M. [Preliminary data on the susceptibility to infection by *Ditylenchus dipsaci* of some varieties of red clover.] [Abstract]. In *VIII Vsesoyuznoe soveshchanie no nematodnym boleznyam sel'skokhozyaistvennykh kul'tur. Tezisy dokladov i soobshchenii.* Kishinev, USSR; Izdatel'stvo "Shtiintsa". (1976) 85-86 [Ru] All-Union Inst. of Forages (i. V.R. Vil'yamsa), Dolgoprudnyi-2, Moscow District. USSR.

0359 SHESTEPEROV, A. A. [The susceptibility of certain varieties of white and red clover to *Heterodera trifolii*.] [Abstract]. In *VIII Vsesoyuznoe soveshchanie no nematodnym boleznyam sel'skokhozyaistvennykh kul'tur. Tezisy dokladov i soobshchenii.* Kishinev, USSR; Izdatel'stvo "Shtiintsa". (1976) 66-67 [Ru] VIGIS, Moscow, USSR.

0360 IBRAHIM, I. K. A.; REZK, M. A. Pathogenesis and development of *Meloidogyne javanica* on corn. [15th Ann. Meet., Soc. Nematol., Daytona Beach, Florida, 15-19 Aug. 1976. Abstract.]. *Journal of Nematology* (1976) 8 (4) 288 [En] Dep. of Plant Path., Fac. of Agric., Alexandria Univ., Alexandria, Egypt.

Meloidogyne javanica induced root galling and depressed growth in the maize hybrid A-17. Most regions of the root were invaded, though mainly the tips, giant cells were formed and endodermis and pericycle were interrupted. The life-cycle was completed in about 34 days.

0361 NOEL, G. R.; LOWNSBERY, B. F. Pathogenicity of *Criconemoides curvatus* and *Meloidogyne hapla* to nondormant alfalfa. [15th Ann. Meet., Soc. Nematol., Daytona Beach, Florida, 15-19 Aug. 1976. Abstract.]. *Journal of Nematology* (1976) 8 (4) 298 [En] Dep. of Nematology, Univ. of California, Davis, California 95616, USA.

0362 RIISPERE, A. YU.; RIISPERE, U. R. [Comparative study of the reaction of the potato and clover nematodes to the inhibition of the metabolism of their hosts.] [Abstract]. In *VIII Vsesoyuznoe soveshchanie no nematodnym boleznyam sel'skokhozyaistvennykh kul'tur. Tezisy dokladov i soobshchenii.* Kishinev, USSR; Izdatel'stvo "Shtiintsa". (1976) 63-64 [Ru] Inst. of Zool. and Botany, Acad. of Sci. of the Estonian SSR, Tartu, USSR.

The effects on *Heterodera rostochiensis* and *H. trifolii* of inhibition of host metabolism (potato and clover, respectively) are reported.

* 0363 SINGH, N. D. Effects of nematicides on nematode populations and yield of corn. [15th Ann. Meet., Soc. Nematol., Daytona Beach, Florida, 15-19 Aug. 1976. Abstract.]. *Journal of Nematology* (1976) 8 (4) 302-303 [En] Caribbean Agric. Res. and Development Inst., Univ. of the West Indies, St. Augustine, Trinidad, West Indies.

Of 6 nematicides DD-MENCS and D-D were the most effective in controlling *Pratylenchus zeae, Helicotylenchus dihystera, Criconemoides* sp. and *Meloidogyne incognita* in plots growing maize.

0364 KAISER, W. J. Important diseases and pests of bean (*Phaseolus vulgaris*), lima bean (*Phaseolus lunatus*) and pigeon pea (*Cajanus cajan*) in Africa. [Interafr. Symp. "The role of plant protection in crop improvement in Africa"; Ibadan, Nigeria, 7-12 Oct. 1974.]. *African Journal of Plant Protection* (1976) 1 (1)

97-107 [En, Fr, Discussion pp. 111, 115] East African Agric. & Forestry Res. Organization, P.O. Box 30.148, Nairobi, Kenya.

The decrease in yield of *Phaseolus vulgaris* in Africa attributable to nematodes is not known although it is considered to be "undoubtedly significant". Potentially important diseases of *Cajanus cajan* include *Meloidogyne* spp.

*0365 KIMPINSKI, J.; THOMPSON, L. S.; WHITE, R. P.; WILLIS, C. B. **Nematodes in field corn in Prince Edward Island.** *Canadian Journal of Plant Science* (1977) 57 (2) 323-330 [En, fr] Res. Station, Agric. Canada, Charlottetown, Prince Edward Island CIA 7MS, Canada.

Soil and root samples were collected from corn (*Zea mays*) fields in Prince Edward Island, Canada, in 1973 and 1975. Representatives of 24 genera of plant and soil nematodes were extracted. The dominant plant-parasitic species, *Pratylenchus crenatus* and *P. penetrans*, were recovered in greater numbers than had been reported previously for *Pratylenchus* spp. in corn in North America. Nematicide treatments in the field and glasshouse reduced the numbers of nematodes but there were no consistent significant increases in silage or grain yields. Methyl bromide treatment was associated with increased plant yields in the glasshouse. It was concluded that *P. crenatus* and *P. penetrans* are not a major problem to corn in Prince Edward Island. However, they reproduce well on corn and can survive the winter in large numbers, and may pose a threat to subsequent crops.

0366 REDDY, D. B. (COMPILER) **New records of pests and diseases in South East Asia and Pacific Region November 1973 - December 1975.** *Technical Document, FAO Plant Protection Committee for the South East Asia and Pacific Region, Bangkok, Thailand* (1975) No. 101, 5 pp. [En] FAO Regional Office for Asia and the Far East, Maliwan Mansion, Phra Atit Road, Bangkok, Thailand.

New records for nematodes comprise *Meloidogyne* spp. on *Amaranthus sessilis*, *Dioscorea nummularia*, *Heliconia* sp., *Phaseolus lathyroides*, *Solanum torvum* and *S. tuberosum*; *Pratylenchus* sp. on *Dioscorea alata*; *Radopholus similis* on *Zingiber officinale* and *D. alata*; and *Xiphinema* sp. on *Saccharum officinarum* and *Sorghum vulgare*, all from Fiji.

0367 NEMATOLOGICAL SOCIETY OF SOUTHERN AFRICA **Newsletter.** (1977) No. 9, 12 pp. [En, Plant nematology pp. 4-6]

It is reported from Pretoria that, in the area north of the city where the cyst-nematode [*Globodera rostochiensis*] has been found on potatoes, the egg population in the soil has been reduced to 3% of the original number after 3 years of non-host crops and has not increased during 2 subsequent potato crops. In the colder soils on the Witwatersrand the nematode is thriving. On *Cynodon*, growing on putting greens in Pretoria, *Heterodera longicolla* (provisional identification) has been found.

0368 INDIA, SOCIETY OF MYCOLOGY AND PLANT PATHOLOGY Symposium on plant disease problems, **Jaipur, 1-3 October 1978.** *Indian Journal of Mycology and Plant Pathology* (1978, publ. 1979) 8 (1) 1-95 [En] From *Horticultural Abstracts 50* (4), 2230, 2247, 2248, 2250, 2251.

Abstracts of papers concerned with plant nematology appear below.

SINGH, K. P.; EDWARD, J. C. **Effect of organic amendments on growth of maize, morphometrics of *Heterodera zeae* and rhizosphere microflora.** 166 [En] Biol. Dep., Allahabad Agric. Inst., Allahabad, India.

0369 SINGH, D. B.; REDDY, P. P.; RAJENDRAN, R. **Reaction of certain winged bean varieties to the root-knot nematode, *Meloidogyne incognita*.** *Indian Journal of Nematology* (1979) 9 (1) 43-45 [En] Indian Inst. of Horticultural Res., Bangalore, India.

Of 37 *Psophocarpus tetragonolobus* varieties tested for resistance to *Meloidogyne incognita* only LBN C_3 was moderately resistant. EC 38957 was moderately susceptible and the remaining varieties were all susceptible.

0370 VALOCKÁ, B.; SABOVÁ, M. **[Spreading of the stem nematode *Ditylenchus dipsaci* (Kühn) Filipjev, 1936 on lucerne in the Slovak Socialist Republic.]** Rozšírenie hádatka zhubného *Ditylenchus dipsaci* (Kühn) Filipjev, 1936 na lucerne na území SSR. *Polnohospodárstvo* (1977) 23 (3) 281-285 [Sk, en, ru]

Ditylenchus dipsaci was found on lucerne in the USSR in 28 of the 52 localities surveyed. In 17 localities its occurrence was sporadic, in 9 it was abundant and in 2 it was heavy (up to 135 specimens/100g) with typical symptoms of infection on the plants. Preventive measures are proposed.

0371 GUPTA, P.; SINGH, K. P.; EDWARD, J. C. **Studies on the effect of some soil borne fungi on the development of *Heterodera vigni* on cowpea.** *Indian Journal of Nematology* (1975 publ. 1976) 5 (1) 132-135 [En] Dep. of Biology, Allahabad Agric. Inst., Allahabad, India.

The effects of nematode (*Heterodera vigni*) and fungus (7 species) inoculations on cowpea, alone or in combinations, were studied in relation to root growth and nematode population. The fungi significantly reduced the nematode infestation, greatest reduction being with *Penicillium citrinum* and least with *Aspergillus terreus*. The average root weight per plant was significantly reduced when fungus was present in direct proportion to the number of nematodes in the roots. Differences in sex ratios in the presence of different fungi were noted.

0372 MULK, M. M., JAIRAJPURI, M. S. **Nematodes of leguminous crops in India. IV. Two new species of *Rotylenchus* Filipjev, 1936 (Hoplolaimidae).** *Indian Journal of Nematology* (1975 publ. 1976) 5 (1) 9-14 [En] Section of Nematology, Dep. of Zool., Aligarh Muslim Univ., Aligarh, India.

Rotylenchus siddiqii n.sp. from soil around roots of *Pisum sativum* and *Dolichos lablab* from Dudhi, Mirzapur, U.P., India, differs from the closely related species *R. calvus* by bearing indistinct annules on the head and by the posterior position of the orifice of the dorsal oesophageal gland. *R. secondus* n.sp. from soil around roots of *Cajanus cajan* from Morhiyawn, Mirzapur, U.P. differs from the closely related *R. pumilus* by head shape, by the absence of distinct head annulations, by having indented spear knobs and by the absence of a functional spermatheca. No males were found in either species.

* **0373** GRIFFIN, G. D.; ELGIN, J. H., JR. **Penetration and development of *Meloidogyne hapla* in resistant and susceptible alfalfa under differing temperatures.** *Journal of Nematology* (1977) 9 (1) 51-56 [En] Agric. Res. Serv., US Dep. of Agric., Crops Res. Lab., Utah State Univ., Logan, Utah 84322, USA.

Studies were conducted to examine under differing temperatures (12, 16, 20, 24, 28 and 32°C) the penetration and development of *Meloidogyne hapla* in resistant lines '298' and 'Nev.Syn XX', and susceptible 'Lahontan' and 'Ranger' hardy-type lucerne. The results indicated that resistance to *M. hapla* was similar to that previously described for *M. incognita* in non-hardy lucerne. Although initial penetration in resistant seedlings was similar to that of susceptible seedlings, nematode larvae failed to establish and develop in root tissues and nematode numbers subsequently declined. In susceptible seedlings, nematode development proceeded rapidly, and egg production began after 5 weeks. Temperature had little influence on nematode development except to slow the response at the lower temperatures. Other studies were conducted to verify a previously reported immune (no penetration) reaction to *M. hapla* by the 'Vernal' selection 'M-4'. When compared to the resistant (penetration without nematode development) Vernal selection 'M-9' under differing temperatures (20, 24, 28 and 32°C), each selection was equally penetrated by *M. hapla* but at a lower level than in susceptible Ranger cuttings. Generally, no root galling was observed in either M-4 or M-9; however, very slight galling was found 35 days after inoculation on about 50% of these cuttings when grown at 32°C.

* **0374** PEDERSEN, M. W.; BARNES, D. K.; SORENSEN, E. L.; GRIFFIN, G. D.; NIELSEN, M. W.; HILL, R. R., JR.; FROSHEISER, F. I.; SONODA, R. M.; HANSON, C. H.; HUNT, O. J.; PEADEN, R. N.; ELGIN, J. H., JR.; DEVINE, T. E.; ANDERSON, M. J.; GOPLEN, B. P.; ELLING, L. J.; HOWARTH, R. E. **Effects of low and high saponin selection in alfalfa on agronomic and pest resistance traits and the interrelationship of these traits.** *Crop Science* (1976) 16 (2) 193-199 [En] Crops Res. Lab., Utah State Univ., Logan, USA. From *Plant Breeding Abstracts 47*, 441.

High saponin content of the *Medicago sativa* varieties du Puits, Ladak, Lahontan, Ranger, Uinta and Vernal had no appreciable effect on resistance to *Meloidogyne hapla* or *Ditylenchus dipsaci*.

* **0375** HIGGINS, D. L.; BECKMANN, J. VON; JEWELL, E.; JOSEPHSON, G. G. S.; WILLIS, C. B.; SUZUKI, M.; THOMPSON, R. G.; FENSOM, D. S. **Electrical impedance measurements on alfalfa to detect infection by root lesion nematodes.** *Canadian Journal of Plant Science* (1977) 57 (3) 853-858 [En, fr, Dep. of Biol., Mount Allsion Univ., Sackville, New Brunswick E04 3C0, Canada.]

Electrical impedance measurements were made on *Medicago sativa* infected with *Pratylenchus penetrans*, and on control plants under conditions of drought and cold stress. Differences were found in the daily cycles of impedance between the 2 groups, with the infected group showing a greater increase in % impedance relative to the initial value in early day, and slower and less pronounced drop of % impedance upon watering after drought stressing as compared to the controls. The difference in electrical impedance between 2 groups of lucerne was greater at 20°C than at 2°C. It is concluded that root lesion nematodes interfere with normal water uptake and hence water potential in lucerne roots.

* 0376 FAGBENLE, H. H. **The lespedeza cyst nematode, *Heterodera lespedezae* Golden and Cobb: temperature effects on histopathology on two hosts and infraspecific physiological variation.** *Dissertation Abstracts International* (1974) **34B** (11) 5277 [En]

Development of syncytia by the Illinois, USA, isolate of *Heterodera lespedezae* on striate lespedeza was slower at 18° than at 25°C. The response of alsike clover, a poor host, was isolation of the nematode form surrounding cells by a host necrotic response. The host range, emergence, penetration, population development and pathogenicity were studied at various temperatures for isolates of *H. lespedezae* from Illinois and North Carolina on striate lespedeza and red clover. Distinct physiological races are represented by the 2 isolates.

0377 SHARMA, N. K.; SETHI, C. L. **Leghaemoglobin content of cowpea nodules as influenced by *Meloidogyne incognita* and *Heterodera cajani*.** *Indian Journal of Nematology* (1975 publ. 1976) **5** (1) 113-114 [En] Div. of Nematology, Indian Agric. Res. Inst., New Delhi, India.

The leghaemoglobin content of cowpea nodules decreased as a result of infestation with *Meloidogyne incognita* and *Heterodera cajani*. *M. incognita* caused a reduction of 51.56%, *H. cajani* of 36.65%. The nematodes in combination caused a reduction of 44.1%.

0378 DUNN, R. A. **Effect of temperature on survival and reproduction of *Pratylenchus penetrans* (Cobb, 1917) Filipjev and Schurmans Stekhoven, 1941.** *Dissertation Abstracts International* (1973) **34B** (1) 14 [En]

The period necessary to kill 50% of *Pratylenchus penetrans* in artificially-infested soil was 742 days at +4°C and one to 7 days at −4°C. Survival rates in host roots were no higher. In lucerne grown in sandy loam soil, numbers of *P. penetrans* were highest at 25°C after 7 weeks and at 30°C after 13 weeks. The duration of the life-cycle in lucerne was 30 days at 30°C, 37 days at 25°C and 92 days 15°C.

0379 VERMA, A. C.; YADAV, B. S. **Life-history of *Heterodera zeae* on maize under Udaipur conditions.** [1st Symp. pl. dis. probl., 18-20 Sept. 1975, Udaipur. Abstract]. *Indian Journal of Mycology and Plant Pathology* (1975, publ. 1976) **5** (1) 19 [En] Dep. of Plant Pathology, Univ. of Udaipur, Udaipur, India.

0380 KÜTHE, K. **Evaluation of Curaterr for the control of maize pests and its effect on yield.** *Pflanzenschutz-Nachrichten Bayer* (1975) **28** (1) 67-79 [En, fr, es] Inst. für Phytopathologie, Giessen, Germany (FDR).

In trials in Germany of the use of carbofuran for the control of fruit fly and wireworm on maize, the results suggested that *Pratylenchus* and *Heterodera avenae* were present and were also controlled.

0381 RAMA RAO, G. V. S. V. **Effects of nematode-trapping fungi on the biology of the lesion nematode, *Pratylenchus penetrans* (Cobb) Filipjev & Shuurmans-Stekhoven.** *Dissertation Abstracts International* (1973) **34B** (2) 486-487 [En]

Arthrobotrys arthrobotryoides, *A. dactyloides*, *Dactylaria thaumasia* and *Dactylella doedycoides* greatly reduced penetration of lucerne roots by *Pratylenchus penetrans* under initially sterile conditions. Under gnotobiotic conditions, *A. dactyloides* was the most effective against nematode populations at various levels of inocula for up to 6 months and was also effective against nematodes on corn.

0382 HOGGER, C. H. **Plant-parasitic nematodes associated with weeds and agronomic crops in Georgia.** *Dissertation, University of Georgia, Athens, Georgia, USA.* (1975) viii + 66 pp. [En]

An investigation was carried out on the role of weeds as alternative hosts of plant-parasitic nematodes of cotton and soybean in Georgia, USA, with special reference to *Hoplolaimus columbus*. Nematodes frequently associated with the weeds *Cyperus* spp. and *Sorghum halepense* included *H. columbus*, *Meloidogyne incognita*, *Pratylenchus brachyurus* and *Trichodorus* spp. *P. brachyurus* had the widest distribution and host range. Host range tests on 40 weed species from cotton fields were carried out with *Criconemoides* spp., *Helicotylenchus dihystera*, *M. incognita*, *P. brachyurus*, *Rotylenchulus reniformis*, *Trichodorus* spp. and *Hoplolaimus columbus*, a number of new host records being reported for the last-named. Natural over-winter decline in populations of *H. columbus*, *Trichodorus* spp. and *M. incognita* was decreased by various annual weeds, *H. columbus* over-wintering in roots and rhizosphere of *Trifolium incarnatum*. The soil fumigants D-D and 80% D-D plus 20% methyl isothiocyanate controlled *M. incognita* in cotton and *Cyperus*. The population density of *Cyperus* in May had a negative influence on growth and development of cotton (probably due to competition for light and space) and determined the rhizosphere population of root-knot nematodes in cotton

in mid-season and the end of the season root population in *Cyperus*. There was no evidence of migration of *M. incognita* between cotton and *Cyperus* during the growing season.

0383 KRALL, E.; KRALL, H. **[A new pest of lucerne in Estonia.]** Uus lutsernikahjur Eestis. *Sotsialistlik Põllumajandus* (1970) **25** (20) 922-924 [Ee] Academy of Sciences of the Estonian SSR, Inst. of Zoology & Botany, USSR.

Typical patches of damage by *Ditylenchus dipsaci* were found on lucerne in a field on the island of Hiiumaa (formerly Dagö) in the Baltic Sea, Estonia, USSR. In a laboratory experiment, heavy reproduction of the parasite occurred on *Medicago sativa* variety Jõgeva 118, and on *M. falcata* variety Saaremaa kollane. Only moderate reproduction occurred on *Trifolium hybridum* variety Jõgeva 2, and no reproduction could be established on *T. pratense* or *T. repens*. This population was highly pathogenic to both *Medicago* species and also pathogenic, but to a lesser extent, to all other species tested. It is the first record of the lucerne race of *D. dipsaci* in the whole European part of the USSR. The biology of the parasite is reviewed and control measures are discussed.

0384 GILL, J. S.; SWARUP, G. Pathogenic effect of *Tylenchorhynchus vulgaris* on gram. *Indian Journal of Nematology* (1977, publ. 1979) 7 (2) 155-156 [En] Div. of Nematol., Indian Agric. Res. Inst., New Delhi 110012, India.

Tylenchorhynchus vulgaris was inoculated on seedlings of *Cicer arietinum* grown in pots of sterilized soil with farmyard manure. Plant growth was decreased with increasing inoculum levels up to 20 000 nematodes/pot. Decreases in shoot weight and root length were significant. Final nematode populations increased with inoculum level.

0385 MINTON, N.A. & IVEY, H., 1967. "The pseudo-root-knot nematode on Bermudagrass in Alabama." Pl. Dis. Reptr, 51 (2), 148.

Hypsoperine graminis is recorded for the first time from Alabama (U.S.A.) on roots of Cynodon dactylon (Tifgreen Bermudagrass).

0386 SHAFIEE, M. F.; KOURA, F. ***Hoplolaimus aegypti* n.sp. (Hoplolaimidae: Tylenchida, Nematoda) from U.A.R.** *Bulletin, Zoological Society of Egypt* (1968/1969, publ. 1970) No. 22, 117-120 [En] Fac. of Agriculture, Cairo Univ., Egypt.

Hoplolaimus aegypti n.sp. from soil around *Zea mays* at Bahteem, Egypt, is described and illustrated. It is closely related to *H. indicus* but differs in the longer female tail; larger size; longer spear, spicules and gubernaculum; number of longitudinal lines on the basal annule of the lip region; and the relatively anterior position of the anterior phasmid in males.

***0387** OGBUJI, R. O.; JENSEN, H. J. **Effects of soil pH on resistance and susceptibility of alfalfa and tomato to *Meloidogyne hapla*.** *Plant Disease Reporter* (1974) **58** (7) 594-596 [En] Fac. of Agricultural Sciences, Univ. of Nigeria, Nusukka, Nigeria.

A susceptible variety of tomato, and a susceptible and a resistant variety of lucerne were inoculated with *Meloidogyne hapla* and propagated at *p*H's of 4.7, 5.9 and 7.8. Gall and egg mass development were severely restricted in resistant lucerne, and although not significant, there was a trend towards less galling and less egg mass formation as the *p*H increased. Both the susceptible lucerne and tomato indicated trends toward increased gall and egg mass formation as the *p*H increased. There appeared to be a tendency towards increased susceptibility in these 2 varieties as the *p*H approached neutrality, but this effect may have been as a result of an increase in available roots, as both susceptible and resistant plants grew poorly at the lower *p*H, but increased in vigour as the *p*H approached neutrality.

***0388** GRIFFIN, G. D. **Effect of acclimation temperature on infection of alfalfa by *Ditylenchus dipsaci*.** *Journal of Nematology* (1974) **6** (2) 57-59 [En] Agricultural Research Service, USDA, Crops Research Lab., Utah State Univ., Logan 84322, USA.

In the Intermountain Region of the USA, *Ditylenchus dipsaci* occurs on lucerne (*Medicago sativa*) at temperatures from just above freezing to near 30°C. Inoculation experiments showed a direct correlation between the temperature to which the nematode was acclimatized previously and the temperature at which the greatest nematode infection occurred, and also the percentage of lucerne seedlings infected. The optimum infective temperature was correlated with field temperature when collections were made during different seasons and from different areas. This agrees with Croll's (1967) findings [see *Helminth. Abstr. 37*, 1357]. The nematode developmental stage had no effect on the ability of the nematode to infect lucerne.

***0389** WOOD, F. H.; CLOSE, R. C. **Dissemination of lucerne stem nematode in New Zealand.** *New Zealand Journal of Experimental Agriculture* (1974) **2** (1) 79-82 [En] Plant Diseases Div., DSIR, P.B., Auckland, New Zealand.

Ditylenchus dipsaci was detected in 11% of 92 lines of field-dressed lucerne seed when one sample was analysed /line. Replicated analyses of 37 of these lines revealed an incidence of approximately 30%, infestations ranging from one to 32 *D. dipsaci*/sample. *D. dipsaci* was found in only one replicate of 5 lines, 2 replicates of 2 lines, 3 of 3 lines and all 4 replicates of one line. 6 of the lines included were known from the results of the first analysis, to be infested ; *D. dipsaci* was recovered from 5 of these, as well as from an additional 6 lines. Bacteria-feeding nematodes (predominantly *Panagrolaimus* sp.) were present in nearly all seed lines, often in very high numbers. Commercial cleaning of the seed was effective in removing the nematodes along with associated plant debris. The role of lucerne management in dissemination of *D. dipsaci* is discussed with reference to a questionnaire concerning crop husbandry which was circulated to 200 lucerne growers in Canterbury, New Zealand. Distribution of infested hay on lucerne stands appears to significantly increase the risk of spreading *D. dipsaci*.

0390 ABU ELAMAYEM, M. M.; BOCHOW, H. **[Results of the application of systemic active substances for the control of root-knot nematodes.]** Erfahrungen über den Einsatz systemischer Wirkstoffe zur Bekämpfung von Wurzelgallenälchen. In *Vorträge der 13. Tagung über probleme der Phytonematologie, Gross Lüsewitz, 7. Juni 1974.* Gross Lüsewitz; Akademie der Landwirtschaftswissenschaften der Deutschen Demokratischen Republik. (1974) 89-108 [De, en, ru]

The systemic active substances aldicarb, fensulfothion and carbofuran were tested against *Meloidogyne incognita* in pot cultures of *Vicia faba* and *Lycopersicon esculentum*, using various kinds of soils, and the results compared with dazomet treatment. Dazomet was superior to the systemic nematicides in both intensity and duration of its effect. With regard to the initial effect of the systemic active substances, the order of intensity was aldicarb, fensulfothion, carbofuran. Differences in soil type and application rate were more significant with the systemic substances than with dazomet. Mixing of the systemic nematicides into the soil gave more effective control than soil surface application. The combined application of aldicarb and benomyl to tomatoes for the simultaneous control of *M. incognita* and *Rhizoctonia solani* was not effective.

*0391 JOHNSON, A. W.; HARMON, S. A. **Lima bean yield increased by chemical control of *Meloidogyne incognita*.** *Plant Disease Reporter* (1974) 58 (8) 749-753 [En] Georgia Coastal Plain Experiment Stn., Tifton, Georgia 31794, USA.

Control of *Meloidogyne incognita* on *Phaseolus lunatus* by preplant treatment of sandy loam soil with phenamiphos, ethoprop, fensulfothion and carbofuran each at 8.96 kg a.i./hectare resulted in an average 41% increase in crop yield in field trials during 1969-71 in Tifton, Georgia, USA. D-D at 93.5 litres/hectare was much less effective and increased the yield by a mean of only 9%. Greatest reduction in the number of root-galls was produced by phenamiphos and ethoprop. All the nematicides used had the effect of delaying plant maturity.

0392 BHATTI, D. S.; GUPTA, D. C.; DAHIYA, R. S.; MALHAN, I. **Additional hosts of the root-knot nematode, *Meloidogyne javanica*.** [Correspondence]. *Current Science* (1974) 43 (19) 622-623 [En] Dept of Entomology & Plant Pathology, Haryana Agricultural Univ., Hissar, India.

A survey of cultivated fields in Haryana, India for *Meloidogyne javanica* infestation adds *Achyranthes aspera* var. *prophyristachya*, *Cassia sophera*, *Euphorbia thymifolia*, *Potamogeton* sp. and *Withania somnifera* to the list of plant hosts of this species.

0393 ALALYKINA, N. M.; IGNAT'EVA, T. N. **[Nematodes of *Trifolium pratense* in the Kirov region, USSR.]** *Materialy Nauchnykh Konferentsii Vsesoyuznogo Obshchestva Gel'mintologov, 1971-1972* (1973) No. 25, 3-5 [Ru] Kirov Teaching Inst., USSR.

Nematodes were found in all of 43 root and soil samples and in 5 of 23 samples of leaf and stem of *Trifolium pratense* in flood meadows and dry valleys of the Kirov region, USSR. 42 nematode species were found in the roots, 20 in the soil and 3 in the stems and leaves. Samples from flood meadows were generally more heavily infected. *Aphelenchoides composticola*, *A. subtenuis*, *A. helophilus*, *A. saprophilus*, *Aphelenchus avenae*, *Tylenchorhynchus dubius*, *Helicotylenchus dihystera*, *H. multicinctus*, *Pratylenchus pratensis*, *Paratylenchus* sp. and *Heterodera trifolii* were pathogenically important.

0394 DIJKSTRA, J.; KOSTER, H. **[Testing red clover for resistance to stem nematode, particularly with relation to varietal registration.]** Toetsing van rode klaver op resistentie tegen stengelaaltjes speciaal met betrekking tot de rassenregistratie. *Zaalbelangen* (1973) 27 (8) 168-173 [Nl] Stichting voor Plantenveredeling, Wageningen, Netherlands. From *Plant Breeding Abstracts* 44, 2529.

Of 15 varieties of red clover tested in laboratory experiments, SVP 2*x*, Mom Tp 2 and SVP 4*x* were relatively little affected by *Ditylenchus dipsaci*. Plants with less than 40% attack also showed adequate resistance in the field.

0395 HUBERT, K. E. **[On the occurrence of *Ditylenchus dipsaci* on cereals.]** Zum Schadauftreten von *Ditylenchus dipsaci* an Getreide. *Nachrichtenblatt für den Pflanzenschutz in der DDR* (1974) 28 (1) 6-8 [De, en]

In East Germany, *Ditylenchus dipsaci* does most harm to rye, followed by oats and maize. Symptoms on rye and maize are described. Onion is also affected in some districts. Some control may be achieved by good husbandry.

0396 JANARTHANAN, R. **Occurrence of the pigeon pea cyst nematode in Tamil Nadu.** *Indian Journal of Nematology* (1972, publ. 1974.) 2 (2) 215 [En] Dept. of Entomology Tamil Nadu Agricultural Univ., Coimbatore, India.

Heterodera cajani is recorded for the first time from Tamil Nadu, India, infesting cowpea (*Vigna sinensis*) pigeon pea and black gram (*Phaseolus mungo*).

0397 SHERWOOD, R. T., DUDLEY, J. W., BUSBICE, T. H. & HANSON, C. H., 1967. "Breeding alfalfa for resistance to the stem nematode, *Ditylenchus dipsaci*." *Crop. Sci.*, 7 (4), 382–384.

An experimental synthetic, combining agronomic characteristics of Flemish lucerne with stem nematode resistance equivalent to Lahontan variety, was developed largely by back-crossing. Selections were made in a naturally infested field. Certain selected plants were further evaluated by inoculating their S_1 progeny under controlled conditions in a laboratory. A 2nd resistant synthetic was developed by recurrent selection in the susceptible variety Cherokee. Laboratory tests of seedling reaction were the basis for all selections. In each of 2 successive cycles mass selection was followed by S_1 progeny testing of selected plants. The procedure followed in developing resistance in the 2nd synthetic appeared to be more efficient than the one used in the first. Results from laboratory tests agreed well with those from field tests, but laboratory evaluation was found to be more reliable and economical for determining resistance.

*0398 LUCAS, L. T.; BLAKE, C. T.; BARKER, K. R. **Nematodes associated with bentgrass and bermudagrass golf greens in North Carolina.** *Plant Disease Reporter* (1974) 58 (9) 822-824 [En] Crop Science Dept., North Carolina State Univ., Raleigh 27607, USA.

Criconemoides ornatus, Helicotylenchus dihystera, Trichodorus christiei, Meloidogyne sp., *Tylenchorhynchus claytoni, Hoplolaimus galeatus* and *Belonolaimus longicaudatus*, in that order, were the commonest plant-parasitic nematodes found in soil samples from bermudagrass golf greens in N. Carolina, USA. *Trichodorus christiei, H. galeatus, Tylenchorhynchus claytoni* and *Helicotylenchus dihystera* were also common on bentgrass greens where *C. ornatus* was much less common, *Meloidogyne* sp. rare and *B. longicaudatus* absent. Nematode recovery was twice as good using the centrifugation-flotation method as with sugar-flotation-sieving.

0399 PONTE, J. J. DA **[Contributions to the knowledge of the host plants and control of root-knot nematodes, *Meloidogyne* spp., in the State of Ceará.]** Subsídios ao conhecimento de plantas hospedeiras e ao contrôle dos nematóides das galhas, *Meloidogyne* spp., no estado Ceará. *Boletim da Sociedade Cearense de Agronomia* (1968) 9, 1-26 [Pt, en] Escola Superior de Agricultura "Luis de Queiroz", Univ. de São Paulo, Brazil.

Five species of *Meloidogyne* were found in a survey for root-knot nematodes in the State of Ceará, Brazil. *M. incognita* was present on 76% of the 120 plant species examined, *M. javanica* on 30%, *M. hapla* on 10 plants, *M. arenaria* on 4 and *M. thamesi* was found once. A map and table summarize the results. Using galled roots of various hosts as inoculum, 4 varieties of *Gossypium hirsutum mariegalante* were found to be immune: of 4 varieties of *Vigna sinensis* the variety Seridó showed most resistance: 2 varieties of *Carica papaya* were highly susceptible. Piperazine hexahydrate was tested as a systemic nematicide by soaking seed of *C. papaya* for 12 hours in a 1 or 2% solution before sowing in soil infested with *M. incognita* and *M. javanica*. The results, assessed by the degree of galling 30 days later, showed some promise.

0400 RIISPERE, U.; RIISPERE, A.; JAAGUS, M. **[On resistance of clover to the cyst eelworm.]** Ristikute kiduussi-resistentsusest. *Sotsialistlik Põllumajandus* (1971) 26 (12) 545-547 [Ee]

Of 8 varieties of white clover and one variety each of alsike clover and red clover, only alsike clover proved to be resistant to *Heterodera trifolii*. Of the white clover varieties, N.Z. and Huia were relatively more resistant than the others.

0401–ENDO, B. Y., 1967. "Comparative population increase of *Pratylenchus brachyurus* and *P. zeae* in corn and in soybean varieties Lee and Peking." *Phytopathology*, 57 (2), 118–120.

The soy-bean varieties, Peking (resistant to *Heterodera glycines*) and Lee (susceptible to *H. glycines*) were tested for resistance to *Pratylenchus brachyurus* and *P. zeae* to provide information for further breeding programmes. When Lee soy-beans were inoculated with 400 or 800 nematodes, the numbers of *P. zeae* present after 3 months varied with the inoculum but the numbers present after 7 months did not; the numbers of *P. brachyurus* present after 3 and 7 months was not affected by the numbers in the inoculum. Lee and Peking soy-beans seemed equally susceptible to both nematodes when the assay was based on the number of nematodes per g. of root but Lee seemed more susceptible than Peking to *P. zeae* when the assay was based on the number of nematodes in the entire root system and in the soil. *P. brachyurus* reproduced more rapidly on the soy-bean varieties and *P. zeae* reproduced more rapidly on Golden Bantam maize. The numbers of *P. brachyurus* increased more on Peking than on Lee soy-bean. The factors enabling Peking to resist *H. glycines* are not effective against root-lesion nematodes, and other sources must be sought for breeding resistance to these nematodes.

0402 KHAN, E.; CHAWLA, M. L.; SAHA, M. **Criconematoidea (Nematoda: Tylenchida) from India, with descriptions of nine new species, two new genera and a family.** *Indian Journal of Nematology* (1975 publ. 1976) 5 (1) 70-100 [En] Div. of Nematology, Indian Agric. Res. Inst., New Delhi. 110012, India.

The family Criconematidae is emended to contain genera in which the body annules of adult females are fringed or have scales or other ornamentations. The genera included are *Criconema*, *Bakernema*, *Blandicephalanema*, *Croserinema* n.g., *Crossonema* n.rank, *Lobocriconema*, *Neolobocriconema*, *Pateracephalanema*, *Seriespinula* n.rank and *Variasquamata* n.rank. A key to the genera is given and emended diagnoses for *Criconema* and the new ranking genera. In *Croserinema* there are palmate, scale-like protuberances on the posterior edge of the body annules of females and larvae. The type and only species is *C. palmatum* n.comb. for *Crossonema* (*Crossonema*) *palmatum*. *Crossonema* comprises 10 species raised from subgeneric to generic rank (type species *C. civellae*) together with *C. fimcivatum* n.sp. and *C. taylatum* n.sp. *C. fimcivatum* from soil round roots of lime (*Citrus* sp.) from Ranikhet, Almora district, U.P., India, is close to *C. fimbriatum* and *C. civellae*: it is 0.54 to 0.60 mm long, has 41 to 48 body annules, vulva 3 to 5 annules from the terminus, spear 84 to 105 µm, serrated annules (resembling *Neolobocriconema serratum* but without lobes) and terminus not knob-like. *C. taylatum* from soil round roots of *Elettaria cardamomum* from Mysore, India, is 0.51 to 0.61 mm long with a = 5 to 8, spear = 78 to 92 µm, R = 42 to 52 and R_v = 3 to 5. It is close to *C. taylori* and *C. latens* but differs in various features of the lips and first 2 annules, the structure of the vulva and number of annules. *Seriespinula* (type species S. *cobbi*) comprises 9 species, 7 from *Crossonema* (*Seriespinula*), one from *Criconema* (*C. punici*) and *S. impar* n.sp. This species, from soil around roots of *Cynodon dactylon* from Dalhousie, India, is 0.41 to 0.50 mm long with a = 6 to 8, spear 112 to 120 µm, R = 52 to 59 with 12 rows of scales each divided into 2 to 4 spines of varying size, in which characters it differs from *S. tenuicaudatum*, the nearest species. In *Variasquamata* (type species *V. decalineatum*) are included 9 species raised from the subgenus *Criconema* (*Variasquamata*) and a new species *V. rhosimum*. The new species, found around moss at Dalhousie, India, is close to *V. rhombosquamatum* and *V. simlaensis*; it is 0.39 to 0.40 mm long with spear 67 to 72 µm, 4 submedian head lobes, R = 59 to 65, annules thick and only slightly retrorse with 10 longitudinal rows of rhomboid scales in mid-body, R_v = 7 to 9 and R_{ve} = 3 to 4. No males were found in any of the new species described. The paper should be seen for full diagnoses and descriptions of the genera and species, and lists of new combinations. Keys are given for the genera in Madinematidae and Criconematidae.

0403 SPANAKAKIS, A. **[Investigations on yield damage of red clover by the stem eelworm, *Ditylenchus dipsaci* (Kühn 1857) Fil.]** Untersuchungen zur Ertragsbeeinträchtigung des Rotklees durch das Stengelälchen, *Ditylenchus dipsaci* (Kühn 1857) Fil. *Bayerisches Landwirtschaftliches Jahrbuch* (1973) 50 (1) 167-183 [De]

Under glasshouse conditions, *Ditylenchus dipsaci* caused yield losses of more than 40% in susceptible red clover varieties; the proportion of healthy plants was only about 20%. Under natural conditions, infection with *D. dipsaci* causes losses averaging about 50% of the crop. The different infestation rates of different varieties of clover was reflected in their yield. It was shown that under glasshouse conditions there was a high positive correlation between the percentage of healthy plants and the forage yield and under natural conditions a high negative correlation between nematode infestation and forage yield. Under natural conditions, it was shown that *Trifolium hybridum* was susceptible to *D. dipsaci*, while lucerne, *T. alexandrinum* and *T. resupinatum* were resistant.

0404 TERENT'EVA, T. G.; ALPAT'EV, N. M. **[*Heterodera* disease of lucerne in the northern Caucasus.]** [Abstract]. In *Nematodnye bolezni sel'skokhozyaĭstvennykh*

kul'tur i mery bor'by s nimi. Tezisy soveshchaniya. Moskva, dekabr' 1972. Moscow, USSR; VASHNIL. (1972) 55-56 [Ru]

A nematode, provisionally identified as *Heterodera paratrifolii*, was widespread and heavily damaged lucerne.

0405 WEBBER, A. J., JR.; FOX, J. A. **Parasitism of "Tifgreen" Bermudagrass and reed canary grass by root-knot nematodes.** Ann. Meeting (49th) Va. Acad. Sci., May 12-14 1971, Blacksburg, Va. Sect. Agric. Sci. Abstracts of papers. *Virginia Journal of Science* (1971) 22 (3) 87 [En] Dept. of Plant Pathology & Physiology, UPI & SU, Blacksburg, Virginia 24061, USA.

Meloidogyne incognita, M. javanica, M. arenaria and *M. graminis* were tested on *Cynodon* sp., *Phalaris arundinacea* and tomato at 26 and 32°C soil temperature. *M. incognita* infected and developed on the 3 plant species to a comparable degree but development of males was 10 to 20 and 4 to 5 times greater on *Cynodon* and *P. arundinacea*, respectively, as on tomato. *M. javanica* infected tomato twice as heavily as it did the 2 grasses: adult development on *Cynodon* was comparable to that on tomato but on *P. arundinacea* occurred only at 32°C and only to one third of the number on tomato: 20 to 40 times as many males developed on the 2 grasses at 26°C as on tomato. *M. arenaria* infected tomato twice as heavily as *Cynodon* and 6 times more heavily than *P. arundinacea* and development of males on *Cynodon* and tomato at 32° was 9 to 14 times greater than on tomato at 26°. *M. graminis* did not infect tomato but infection and development was 5 times greater on *Cynodon* than *P. arundinacea*, on which there were 3 to 4 times as many males as on *Cynodon* at 32°C.

0406 DONCASTER, C. C. Feeding of the stem nematode, *Ditylenchus dipsaci* on leaf tissue of field bean, *Vicia faba*. *Journal of Zoology* (1976) 180, 139-153 [En] Rothamsted Exp. Station., Harpenden, Herts., UK.

Film records and direct observations showed *Ditylenchus dipsaci* penetrating a plant cell with its stylet to a depth of about 1 μm. Saliva, chiefly or only from the dorsal pharyngeal gland, was injected between the cell wall and cytoplasm and inhibited cytoplasmic streaming away from the area. Saliva remaining close to the stylet then suddenly flowed back into the nematode together with, or followed by, liquid cell constituents. For the first half of the ingestion period the flow was not directly induced by the nematode, suggesting that pressure in the food cell was higher than in the nematode during this phase. Refractive cytoplasmic constituents of the cell condensed around the stylet tip. When a nematode withdrew before completing its feed cytoplasm leaked from the penetration hole. During this passive ingestion phase, liquid was seen flowing along nonmuscular parts of the pharynx and sometimes, in the food cell, towards the stylet. Eventually the nematode fed actively by pulsating its pharyngeal pump, thus prolonging ingestion. Pressure in the food cell then became reduced so that, when the nematode withdrew, the cell took in some of the surrounding liquid. Feeding periods lasted for 2 min to 2 hours 14 min. Within an hour of penetration nuclei enlarged and became abnormally spheroidal in shape.

0407 WIDDOWSON, J. P.; HEALY, W. B.; YEATES, G. W. **The effect of nematodes on the growth and utilization of phosphorus by white clover on a yellow-brown loam.** [Abstract]. In *Proceedings of the Agronomy Society of New Zealand.* Christchurch, New Zealand. (1972) 125-126 [En] Soil Bureau, DSIR, Private Bag, Lower Hutt, New Zealand. From *Plant Breeding Abstracts 44*, 6528, 6534.

Four varieties of white clover and 2 of *Lotus pedunculatus* were highly susceptible to *Meloidogyne hapla* and *Heterodera trifolii*. Red clover and Wairau lucerne were less susceptible and College glutinosa lucerne and subterranean clover were tolerant.

0408 YASSIN, A. M. **A root lesion nematode parasitic to cotton in the Gezira.** *Cotton Growing Review* (1973) 50 (2) 161-168 [En] Gezira Agricultural Research Stn., Wad Medani, Sudan.

Laboratory observations on *Pratylenchus sudanensis* feeding on *Gossypium barbadense* demonstrated the adverse effects of this nematode on the plant's growth and development. Field experiments at the Gezira Research Station, near Wad Medani, Sudan, showed that several other of the commonly grown crops of the area are suitable hosts. At another site *P. sudanensis* was found to be associated with *Fusarium oxysporum* f. *vasinfectum*, causing vascular wilt of cotton. Multiplication of *P. sudanensis* was highest on *Cajanus cajan, Lablab vulgaris, G. barbadense* and *Sorghum vulgare*, in that order. Very few nematodes of this species were found in association with *Arachis hypogaea, Cucumis sativus, Hibiscus esculentus, Lycopersicon esculentum, Solanum melongena* and *Triticum vulgare*. The size and age structure of *P. sudanensis* populations on suitable hosts were found to be directly related to crop growth. In field trials over 4 seasons from 1967/68 to 1971/72 preplant treatment of the soil with DBCP at rates up to 7.5 litres a.i./hectare produced significant increases in cotton yield. This was so even when the populations were as low as 18 to 58 per 200g soil in the control plots.

0409 NATH, R. P.; HAIDER, M. G.; PRASAD, S. S. **Combined effect of *Hoplolaimus indicus* and *Fusarium moniliforme* on maize plant.** *Indian Journal of Nematology* (1974) 4 (1) 90-93 [En] Sugarcane Research Inst., Pusa (Samastipur), Bihar, India.

Hoplolaimus indicus and *Fusarium moniliforme* individually have a debilitating effect on maize plants, but when in association the symptoms of disease are aggravated. The plants show stunted growth with thinner leaves and are prone to wilting during the day even with adequate moisture.

0410 FORTUNER, R. **[Description of *Pratylenchus sefaensis* n.sp. and *Hoplolaimus clarissimus* n.sp. (Nematoda: Tylenchida).]** Description de *Pratylenchus sefaensis* n.sp. et de *Hoplolaimus clarissimus* n.sp. (Nematoda: Tylenchida). *Cahiers de l'Office de la Recherche Scientifique et Technique Outre-Mer, Biologie* (1973) No. 21, 25-34 [Fr, en] Lab. de Nématologie, ORSTOM, Dakar, B.P. 1386, Sénégal.

Pratylenchus sefaensis n.sp. from the roots of *Zea mays* in Séfa, Senegal, is characterized by the presence of 3 head annules, a stylet length of 14 to 15.5 µm (rarely 13 to 16 µm), V value of 76 to 81%, an unstriated tail terminus and an empty spermatheca; males are very rare. The differences between the new species and other *Pratylenchus* spp. with these characters are tabulated. Measurements of other populations and additional hosts and localities are given. *Hoplolaimus clarissimus* n.sp. from the roots of *Oryza sativa* in Casamance, Senegal, differs from other species in the possession of 4 incisures in the lateral field and 6 nuclei in the oesophageal glands. A table is presented for the differentiation of *Hoplolaimus* species. The author agrees with Jairajpuri & Baqri (1973) *Nematologica 19*, 19-30 in considering *H. steineri* Kannan, 1961 *species inquirenda*.

0411 FORTUNER, R.; AMOUGOU, J. **[*Tylenchorhynchus gladiolatus* n.sp. (Nematoda: Tylenchida), a nematode associated with crops in Senegal and Gambia.]** *Tylenchorhynchus gladiolatus* n.sp. (Nematoda: Tylenchida), nématode associé aux cultures du Sénégal et de Gambie. *Cahiers de l'Office de la Recherche Scientifique et Technique Outre-Mer, Biologie* (1973) No. 21, 21-24 [Fr, en] Lab. de Nématologie, ORSTOM, B.P. 1386, Dakar, Sénégal.

Tylenchorhynchus gladiolatus n.sp. from the rhizosphere of upland rice (*Oryza sativa*) in Senegal, is described and figured. The species is characterized by the presence of 16 longitudinal cuticular grooves and a stylet length of less than 14.5 µm. Other *Tylenchorhynchus* spp. with similar grooves have stylets longer than 19 µm except *T. pachys* and *T. brevilineatus*. The differential characters of these species are tabulated. *T. gladiolatus* possesses a serpentine canal system from the level of the oesophageal gland to near the tail. The new species was also found around the roots of peanut, maize, millet, and sorghum in Senegal and cotton, millet and sorghum in Gambia.

0412 FOTEDAR, D. N.; MAHAJAN, R. **Two new nematode species (Nothotylenchidae) from Kashmir.** *Indian Journal of Nematology* (1972, publ. 1974) 2 (2) 169-172 [En] Helminthology Laboratory, Post-Graduate Dept. of Zoology, Univ of Kashmir, Srinagar, India.

Boleodorus cynodoni n.sp., from soil around roots of *Cynodon dactylon* from Satwari, Jammu, India, differs from the closely related species *B. thylactus* mainly in head shape, rounded spermatheca, and in the slightly hooked male tail. *Nothotylenchus srinagarensis* n.sp., from soil around roots of *Brassica oleracea* from Rajbagh, Srinagar, Kashmir, differs from the closely related species *N. acris* in its smaller body and shorter post-uterine sac, from *N. cylindricus* in the pyriform shape of the basal oesophageal bulb, which has no projection into its base, and from *N. alii* in the truncate lip region and clearly offset basal oesophageal bulb.

0413 LUC, M.; GERMANI, G.; NETSCHER, C. **[Description of *Sarisodera africana* n.sp. and observations on the relationships between the genera *Sarisodera* Wouts & Sher, 1971 and *Heterodera* A. Schmidt, 1871 (Nematoda: Tylenchida).]** Description de *Sarisodera africana* n.sp. et considérations sur les relations entre les genres *Sarisodera* Wouts & Sher, 1971 et *Heterodera* A. Schmidt, 1871 (Nematoda: Tylenchida). *Cahiers de l'Office de la Recherche Scientifique et Technique Outre-Mer, Biologie* (1973) No. 21, 35-43 [Fr, en] Lab. de Nématologie, ORSTOM, Dakar, B.P. 1386, Sénégal.

Sarisodera africana n.sp. parasitizing Guinea grass (*Panicum maximum*) in the Ivory Coast is described and figured. The species is characterized by the position of the anus in the female, a short stylet in males and juveniles and the chromosome number 2n = 18. The relationship between the genera *Sarisodera* and *Heterodera* is discussed and the diagnosis of *Sarisodera* emended.

0414 UPADHYAY, K. D.; SWARUP, G.; SETHI, C. L. ***Tylenchorhynchus vulgaris* sp.n. associated with maize roots in India, with notes on its embryology and life history.** *Indian Journal of Nematology* (1972, publ. 1974.) 2 (2) 129-138

[En] Div. of Nematology, Indian Agricultural Research Inst., New Delhi-12, India.

Tylenchorhynchus vulgaris n.sp., from soil around roots of *Zea mays*, grown at the Indian Agricultural Research Institute farm, New Delhi, differs from the closely related species, *T. brassicae* in having 6 or 7 striae on the lip region, fine body striations, a post-anal blind sac, and in the shape of the gubernaculum. The embryonic and post-embryonic development of the new species was studied and it was found to require 25 to 27 days at 25 to 30°C to complete its life cycle. Males are essential for reproduction. All stages of the nematode are attracted towards the host by diffusible substances released by maize roots; they feed on root hairs.

0415 CAUBEL, G. **[Effect of sowing date on the early toppling of maize due to the stem nematode (*Ditylenchus dipsaci*).]** Influence de la date de semis du maïs sur la verse précoce causée par le nématode des tiges (*Ditylenchus dipsaci*). In *Sciences Agronomiques Rennes*. Rennes, France; ENSA, INRA. (1973) 101-107 [Fr, en] INRA, Zoologie, ENSA, Rennes, France.

Early sowing of maize substantially increases the damage due to *Ditylenchus dipsaci* which remains active in the soil for long periods and can then attack the very young shoots. 50% of maize plants sown on 9 April showed toppling but only 3% of those planted on 4, 10 or 21 May.

0416 GUPTA, P.; EDWARD, J. C. **Studies on the biology of *Heterodera vigni* (Heteroderidae: Nematoda). I. Life cycle.** *Indian Journal of Nematology* (1973, publ. 1974) 3 (2) 99-108 [En] Dept. of Biology, Allahabad Agricultural Inst., Allahabad, U.P. India.

The life-cycle of *Heterodera vigni* on *Vigna sinensis* is described and observations on the morphology and dimensions of the 2nd- and 3rd-stage larvae reported. The development of the later stages is illustrated for males and females separately. A table shows the differences in the dimensions of the developmental stages of *H. vigni* and *H. cajani*.

0417 ENDO, B. Y.; WERGIN, W. P. **Ultrastructural investigation of clover roots during early stages of infection by the root-knot nematode, *Meloidogyne incognita*.** *Protoplasma* (1973) 78 (4) 365-379 [En] Nematology Lab., Agricultural Research Service, USDA, Beltsville, Maryland, USA.

Migration of larvae of *Meloidogyne incognita* into the primary root tissues of *Trifolium pratense* was accompanied by separation and subsequent compression of cells in front of and along the path of the penetrating nematode. The protoplasts of the parenchymatous cortical cells did not respond to the presence of the penetrating larva. However, as the nematode approached the differentiating vascular tissue, the cytoplasmic density of the pericyclic and meristematic cells increased. This increased density was accompanied by an alteration in the morphological features of the nucleus. In addition to these changes, two different types of extracellular material were observed during penetration. A homogeneous substance appeared in and around the external opening of the amphid; and an electron dense material was found along the middle lamellae of the separating plant cells and between the cuticle of the nematode and the cell walls of the host.

0418 KRALL', E. L.; KRALL', KH. A. **[Parasitism and pathogenicity of stem nematodes in non-host plants.]** In *Gagarin, V.G. (Editor), Problemy obshchei i prikladnoĭ gel'mintologii*. Moscow, USSR; Izdatel'stvo "Nauka". (1973) 369-373 [Ru] Inst. of Zoology and Botany of the Estonian Acad. of Science, Tartu, Estonian SSR.

Experimental inoculation of 2 lucerne and 3 clover species with *Ditylenchus dipsaci* (lucerne race) produced heavy infection on the 2 lucerne species, medium infection on hybrid and red clover and slight infection on white clover. Most of the young lucerne plants perished 50 to 60 days post-infection, the number of diseased plants increasing at each 10 day count; a proportion of the infected clover plants recovered towards the end of the experiment, thus showing the decreased pathogenicity of the nematode to a non-host plant. *D. dipsaci*, at different stages of development (including ova) was found after 80 days on both species of lucerne and on hybrid clover (although in smaller numbers on clover). As a rule, no *D. dipsaci* were found on red and white clover, although 2 mature males and one dead larva were found on one red clover plant.

0419 PONTE, J. J. DA; LEMOS, J. W. V.; MONTE, E. V. [Selection of varieties of *Vigna sinensis* resistant to *Meloidogyne* spp.] Seleção de variedades de *Vigna sinensis* resistentes a meloidoginose. 96-97 [Pt] Centro Ciên. Agr., Univ. Fed. Ceará, Fortaleza, CE, Brazil.

0420–SWARUP, G., 1962. "Root-knot of vegetables. I. Prevalence of *Meloidogyne* species in soil and vegetable crops." **Indian Phytopathology, 15** (2), 228–230.

The author examined soil and root samples from 42 vegetable plots in Delhi. *Meloidogyne* larvae or males were present in soil from 38 of the plots. Examination of more than 50 females from each root sample revealed *M. incognita*, *M. incognita acrita* and *M. javanica*, sometimes more than one species in a single sample. Tomato had all 3 species, brinjal (*Solanum melongena*) had only *M. incognita*, while bhindi (*Abelmoschus esculentus*), cowpea (*Vigna sinensis*), smooth gourd (*Luffa cylindrica*) and ridge gourd (*L. acutangula*) had *M. incognita* and *M. incognita acrita*.

*0421 SUZUKI, M.; WILLIS, C. B. **Root lesion nematodes affect cold tolerance of alfalfa.** *Canadian Journal of Plant Science* (1974) 54 (3) 585-586 [En]

In Canada, pot tests showed that lucerne plants infested with *Pratylenchus penetrans* were less resistant to cold temperatures than nematode-free plants. Desiccation at freezing temperatures was significantly greater in infested plants.

0422 ALAM, M. M. **New host records of the root-knot nematode, *Meloidogyne incognita*.** *Current Science* (1975) 44 (12) 445 [En] Dep. of Botany, Aligarh Muslim Univ., Aligarh 202 001, India.

Cassia tora, *Cucumis melo* var. *agrestis*, *Cyperus rotundus*, *Digitaria cruciata*, *Gomphrena globosa* and *Mukia maderaspatana* are reported as new hosts of *Meloidogyne incognita*. The nematode was recovered from most gall tissues of these plants in India.

*0423 KATZNELSON, J. **Studies in clover soil sickness. I. The phenomenon of soil sickness in berseem and Persian clover.** *Plant and Soil* (1972) 36 (2) 379-393 [En] The Volcani Inst. of Agric. Res., Newe Ya'ar Experiment Sta., Post Haifa, Israel.

The clover soil sickness phenomenon (CSS) was studied over a 5-year period in plots with different *Trifolium alexandrinum* histories. Alternating *T. alexandrinum* with Persian clover [*T. resupinatum*] was found impracticable, since growing Persian clover resulted in CSS symptoms in both *T. alexandrinum* and Persian clover. Nematodes, particularly *Pratylenchus*, were considered a major cause of yield decline in Persian clover, but had no effect on *T. alexandrinum*. The smallest number of nematodes was found on *T. alexandrinum* where CSS symptoms were most severe.

0424 ODIHIRIN, R. A. **Occurrence of *Heterodera* cyst nematode (Nematoda: Heteroderidae) on wild grasses in southern Nigeria.** [5th Ann. Conf. Nigerian Soc. Plant Prot., Samaru, March 3-5 1975. Abstract]. *Occasional Publication, Nigerian Society for Plant Protection* (1975) No. 1, 24-25 [En] Dep. of Agric. Biol., Univ. of Ibadan, Ibadan, Nigeria.

In the Western State of Nigeria a nematode, probably *Heterodera sacchari*, was found on the wild grasses *Paspalum conjugatum*, *Axonopus compressus*, *Mariscus umbellatus* and *Cynodon dactylon* and in Kwara State on *Eleusine indica* and *Brachiaria brizantha*. It is suggested that this nematode is indigenous to Nigeria.

*0425 WANG, K. C.; BERGESON, G. B.; GREEN, R. J., JR. **Effect of *Meloidogyne incognita* on selected forest tree species.** *Journal of Nematology* (1975) 7 (2) 140-149 [En] Dept. of Botany and Plant Pathology, Purdue Univ., West Lafayette, Indiana 47907, USA.

The effects of *Meloidogyne incognita* on seedlings of 14 species of forest trees were investigated in pot experiments by inoculating with 100, 1,000 or 10,000 larvae at 5 seedling growth stages up to one year. Growth and histopathology of the seedlings and reproduction of the nematodes were assessed. *Taiwania cryptomerioides* proved immune: *Picea abies* and *Pinus virginiana* were highly resistant and there was no nematode reproduction: seedling emergence was severely reduced in *Cryptomeria japonica* and seedlings of *Chamaecyparis obtusa* were severely damaged in the young stages and the nematodes failed to reproduce. Inoculations of 1-year-old seedlings of *Thuja occidentalis*, *Pinus resinosa* and *P. strobus* caused little damage and few or no nematodes reproduced. In *P. sylvestris* and *P. banksiana* survival of seedlings was reduced but reproduction of most nematodes was restricted by layers of densely stained cells. Seedlings of *Cunninghamia lanceolata* were severely damaged by *M. incognita* associated with *Fusarium oxysporum*; the nematodes reproduced in variable numbers. Similar effects were seen in *Paulownia fortunei* but seedling damage was less. In *Albizzia falcata* the nematode had little effect on seedling emergence and survival and it reproduced well as it did also on *Robinia pseudoacacia*, but seedlings of this species were stunted in early growth and survival was reduced at the highest pre-emergence inoculum level.

0426 TOWNSHEND, J. L.; POTTER, J. W. **Some observations on the survival and development of *Helicotylenchus digonicus* under alfalfa.** *Canadian Plant Disease Survey* (1973) 53 (4) 196-198 [En, fr] Research Station, Agriculture Canada, Vineland Station, Ontario LOR 2EO, Canada.

In Ontario, Canada, during 1971 and 1972 similar numbers of *Helicotylenchus digonicus* overwintered on lucerne plots irrespective of whether the plants survived or were killed due to the absence of snow cover. On the plots where the lucerne had been killed the *H. digonicus* persisted with little reduction in numbers for a further 3 to 4 months. Plots on which the lucerne survived showed increases in population size, slower in 1972 than in 1971 because of less favourable temperatures. The ability of *H. digonicus* to survive near- and sub-freezing temperatures was demonstrated in laboratory experiments.

0427 PERRY, V. G.; DICKSON, D. W. **Nematode control on turfgrasses.** [Abstract]. *Nematropica* (1974) 4 (1) 4 [En] Dept. of Entomology and Nematology, Univ. of Florida, Gainesville, Fla. 32611, USA.

Carbofuran (22 kg a.i./ha), aldicarb (11 kg a.i./ha), fensulfothion (22 kg a.i./ha), phenamiphos (17 kg a.i./ha) and DBCP (39 kg a.i./ha) were tested on nematode-infested *Cynodon dactylon* on a golf course fairway, and carbofuran, aldicarb and phenamiphos at these rates and aldicarb at 7 kg a.i./ha were tested on *C. dactylon* on a golf green. Surface application of the granular material or injection of the DBCP was followed by 2.5 cm of irrigation. *Belonolaimus longicaudatus* and *Hoplolaimus galeatus* were the major pests on the fairway; the green had high populations of *Dolichodorus heterocephalus* and *H. galeatus*. The grass responded quicker to the granular treatments, especially with aldicarb and phenamiphos. After 8 weeks the DBCP-treated plots on the fairway were best, with the lowest nematode counts. Fensulfothion and ethoprop resulted in only moderate turf responses.

0428 NEW ZEALAND. DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH. **Report for the year ended 31 March 1974.** Wellington, New Zealand. (1974) 68 pp. [En, Plant nematology p. 21]

Heterodera trifolii in yellow-grey soil in Wairarapa, New Zealand responded to both nematicide and methyl bromide sterilization with an increased yield of white clover of from 4 to 6% over 12 months. At one harevest more than a year later, responses greater than 20% were recorded. In yellow-brown loam in Taranaki infected with both *H. trifolii* and *Meloidogyne hapla* similar treatments improved yield by up to 13% over 12 months; during the first 2 months after treatment improvement was as high as 108%.

0429 HIRLING, W. **[Pathogenic nematodes on maize in Baden-Würtemburg. II. Lesion nematodes (*Pratylenchus* spp.) and the cereal cyst nematode (*Heterodera avenae*). The control of injurious nematodes on maize.]** Schädliche Nematoden an Mais in Baden-Würtemberg. II. Wiesenälchen (*Pratylenchus* spp.) und Getreidezystenälchen (*Heterodera avenae*). Bekämpfung schädlicher Nematoden bei Mais. *Anzeiger für Schädlingskunde Pflanzen- und Umweltschutz* (1974) 47 (5) 65-69 [De, en] Landesanstalt für Pflanzenschutz, Stuttgart, Germany.

Pratylenchus is recorded as a pathogen of maize for the first time in Baden-Würtemberg and *Heterodera avenae* for the first time in East or West Germany. Symptoms of infection were areas of bad germination or inhibition of growth which persisted until harvest. Maize is a good host for *Pratylenchus* but a poor host of *H. avenae*. At heavy soil infestation, however, *Heterodera* larvae penetrate the roots and cause loss of yield. Only males become adult. Chemical control of pathogenic nematodes (*Ditylenchus dipsaci*, *Pratylenchus* spp., *Heterodera avenae*) is possible but not economical. Foliar feeding helps the recovery of young damaged plants. Control of weeds is important.

0430 LUNDIN, P.; JÖNSSON, H. A. **[Weibull's Britta – a new medium-late diploid red clover variety with high resistance against clover rot.]** Weibulls Britta – en ny medelsen, diploid rödklöver med hög resistens mot klöverröta. *Agri Hortique Genetica* (1974) 32 (1/4) 44-54 [Sv, en] Plant Breeding Inst. Weibullsholm, Fack, S-26120 Landskrona, Sweden.

The new medium-late red clover variety Britta, marketed in 1974 for southern Sweden, has satisfactory resistance to *Ditylenchus dipsaci* with more than 50% resistant plants. It is also more resistance to *Sclerotinia trifoliorum* than any other diploid red clover cultivar in commerce in Sweden.

☆0431 MORAES, M. V., DE; LORDELLO, L. G. E.; PICCININ, O. A.; LORDELLO, R. R. A. **[Host plants for the coffee root-knot nematode *Meloidogyne exigua*.]** Pesquisas sobre plantas hospedeiras do nematóide do cafeeiro, *Meloidogyne exigua* Goeldi, 1887. *Ciência e Cultura* (1972) 24 (7) 658-660 [Pt, en] Inst. Agronomico do Estado de São Paulo, Campinas, Brazil.

Trials at Ribeirão Preto, Brazil showed that of 36 local crops and weeds only *Citrullus vulgaris* and *Allium cepa* were susceptible to *Meloidogyne exigua*. *Stizolobium aterrimum*, *Canavalia ensiformis*, *Leonorus sibiricus* and *Cassia obtusifolia* are new hosts for *M. javanica* and *M. arenaria* was recorded from *Dolichos lablab*.

0432 RIVOAL, R. **[Damage to the early growth of maize in western France due to cultural methods and parasitism. Eelworm disease of maize caused by the cyst nematode of cereals, *Heterodera avenae*.]** Accidents végétatifs et parasitaires au début de la croissance du maïs dans l'ouest de la France. La maladie vermiculaire du maïs cuasée par le nématode à kyste des céréales, *Heterodera avenae*. (C.R. Journée Inf., 26 Avr. 1973, Rennes. Groupe de travail maïs.). In *Sciences Agronomiques Rennes*. Rennes, France; ENSA, INRA. (1973) 223-224 [Fr] INRA. Lab. de Zoologie, ENSA, Rennes, France.

Cyst nematode disease on maize has been reported since 1971 and becomes apparent a month after sowing i.e. June/July, by a reduction in height of the maize and atrophy of the root system. *Heterodera avenae* populations increase little on

0433 HUSAIN, Z. ***Aglenchus parvulus* n.sp. (Nematoda: Tylenchidae) found associated with the roots of *Sorghum vulgare*.** [Abstract]. *Proceedings of the National Academy of Sciences, India* (1967) 37, 184-185 [En] Section of Plant Pathology, Dept. of Botany, Aligarh Muslim Univ., India.

Aglenchus parvulus n.sp. was found associated with roots of *Sorghum vulgare* (locality not mentioned). Only body measurements and relationships of the species are given. 6 females: L = 0.34 to 0.40mm; a = 22 to 26; b = 4.7 to 5.0; c = 5.0 to 5.4; V = 61 to 64; spear = 8 to 10 µm. 5 males: L = 0.34 to 0.38mm; a = 28 to 36; b = 4.8 to 5.2; c = 3.7 to 4.0; T = 26.3; spear = 8 to 9 µm. It is related to *A. parvus* (Siddiqi, 1963) n.comb. but differs in having a shorter body, short post-uterine sac, anteriorly located orifice of the dorsal oesophageal gland and vulva-anus distance greater than tail length.

*0434 ABOUL-EID, H. Z.; GHORAB, A. I. **Pathological effects of *Heterodera cajani* on cowpea.** *Plant Disease Reporter* (1974) 58 (12) 1130-1133 [En] Plant Protection Dept., National Research Centre, Dokki, Giza, Egypt.

In glasshouse studies, an Egyptian population of *Heterodera cajani* inoculated on to cowpea (*Vigna unguiculata unguiculata* cv. Balady) [formerly *Vigna sinensis*] caused a retardation in the emergence of leaves, flowering buds, coloured flowers and growing pods and a reduction in their number and in plant height and yield. Histological studies showed that the 2nd-stage larvae penetrated the elongation region of the root and at the feeding sites caused the formation of thick-walled syncytia, mainly in the vascular bundle tissues.

*0435 GRISHAM, M. P.; DALE, J. L.; RIGGS, R. D. ***Meloidogyne graminis* and *Meloidogyne* spp. on zoysia; infection, reproduction, disease development, and control.** *Phytopathology* (1974) 64 (12) 1485-1489 [En] Dept. of Plant Pathology, Univ. of Arkansas, Fayetteville 72701, USA.

In greenhouse experiments, root growth of 3 cultivars of zoysia (*Zoysia japonica*, 'Meyer' and 'Emerald' zoysia) and 'Sunturf' bermuda-grass (*Cynodon magennisii*) was depressed following inoculation with *Meloidogyne graminis*, but 4 and 7 months later the fresh root and top weight of inoculated plants did not differ significantly from uninoculated plants. The rate of infection and development increased with temperature; the optimum for development on Meyer zoysia was 28°C. *M. incognita* and *M. hapla* also infested all 3 zoysia cultivars, but *M. hapla* developed more slowly than the other 2 species. The presence of *M. incognita* and *M. hapla* was associated with hypertrophy and hyperplasia of the surrounding tissues but giant cell formation, and not hyperplasia, was the predominant histopathological reaction at the feeding sites of *M. graminis*. Destruction of *M. graminis* on zoysia was achieved by immersion of infested roots for 10 min in water at 50°C.

0436 HAIDER, M. G.; NATH, R. P.; PRASAD, S. S. **Effect of *Hoplolaimus indicus* on germination of green gram.** [Correspondence]. *Current Science* (1975) 44 (1) 28-29 [En] Agricultural Research Inst., Dholi, Muzaffarpur, India.

In laboratory experiments, germination of *Phaseolus aureus* in dishes of sterilized sandy soil was reduced by about 20% in the presence of 100 *Hoplolaimus indicus* and by progressively larger amounts at higher inoculum levels.

*0437 NANDKUMAR, C.; KHERA, S. ***In vitro* studies on the feeding habits of *Pratylenchus mulchandi* and *Hoplolaimus indicus* on pearl millet roots.** *Indian Journal of Nematology* (1973, publ. 1974) 3 (2) 138-142 [En] Central Rice Research Inst., Cuttack, India.

Observations are recorded on the feeding behaviour of *Pratylenchus mulchandi* and *Hoplolaimus indicus* on the roots of pearl millet, *Pennisetum typhoides*. The former species is more mobile and prefers to feed near the root tip between the meristematic region and region of differentiation. *Hoplolaimus indicus* prefers to feed on the cortical tissues.

*0438 URR, C. C.; MOREY, E. D. **Anatomical response of grain sorghum roots to root-knot nematodes.** [Abstract.]. *Journal of Nematology* (1974) 6 (4) 148 [En] Agricultural Research Service, U.S. Dept. of Agriculture, Lubbock, Texas 79401, USA.

0439 SOSA MOSS, C.; GONZÁLEZ, P., C. **[Response of fertilized and non-fertilized corn to 4 different population levels of the Mexican race of *Heterodera punctata* (Nematoda: Heteroderidae).]** Respuesta de maíz chalqueño fertilizado y no

fertilizado a 4 diferentes niveles de *Heterodera punctata* raza mexicana (Nematoda: Heteroderidae). [Abstract]. *Nematropica* (1973) 3 (1) 13-14 [Es] Rama de Fitopatología, C.P.E.N.A Chapingo México.

0440 CAUBEL, G. **[Damage to the early growth of maize in Western France due to cultural methods and parasitism. Note on the stem eelworm of maize.]** Accidents végétatifs et parasitaires au début de la croissance du maïs dans l'ouest de la France. Aperçu sur le nématode des tiges du maïs. (C.R. Journée Inf., 26 Avr. 1973, Rennes. Groupe de travail maïs.). In *Science Agronomiques Rennes.* Rennes, France; ENSA, INRA. (1973) 225-227 [Fr] INRA, Lab. de Zoologie, ENSA, Rennes, France.

The ecology of *Ditylenchus dipsaci* on maize in western France is briefly outlined. Control is best effected by careful rotation, avoiding good hosts, and by thorough weeding.

*0441 CAVENESS, F. E. **Plant-parasitic nematode population differences under no-tillage and tillage soil regimes in western Nigeria.** [Abstract]. *Journal of Nematology* (1974) 6 (4) 138 [En] International Inst. of Tropical Agriculture, P.M.B. 5320, Ibadan, Nigeria.

In Ibadan, Nigeria, numbers of *Pratylenchus* spp. were greater under a tillage regime, while *Meloidogyne incognita* juveniles and *Helicotylenchus pseudorobustus* were more numerous under a non-tillage regime. D-D controlled *Pratylenchus* equally well in tilled and non-tilled soils.

*0442 HEALD, C. M.; MENGES, R. M.; WAYLAND, J. R. **Efficacy of ultra-high frequency (UHF) electromagnetic energy and soil fumigation on the control of the reniform nematode and common purslane among southern peas.** *Plant Disease Reporter* (1974) 58 (11) 985-987 [En] Agricultural Research Service, US Dept. of Agriculture, Weslaco, Texas 78596, USA.

Hidalgo fine sandy loam infested with *Rotylenchulus reniformis* and *Portulaca oleracea* was treated with ultra-high frequency (UHF) electromagnetic energy and/or 1,3-D before planting with southern peas (*Vigna unguiculata unguiculata* cv. Blackeye). Soil nematode counts at 50 and 82 days after treatment indicated that soil fumigation with 1,3-D at 74.8 litres/ha controlled nematode populations more effectively than UHF energy at 400 or 800 J/cm^2, in particular at the earlier date. Counts at 19 days after treatment showed that the higher level of UHF energy alone effectively controlled nematode populations to a soil depth of 10 cm, whereas 1,3-D controlled them to depths of 15 cm. The effects of 1,3-D plus UHF energy (1,200 J/cm^2) was difficult to evaluate as soil fumigation alone virtually eliminated the nematode and gave pea yields equal to that of this combined treatment. Yields were significantly increased by UHF energy at 800 J/cm^2 or soil fumigation, but yields from the latter were much higher. Mean plant heights were also significantly increased by soil fumigation and the combined treatment.

*0443 JOHNSON, J. T.; DICKSON, D. W. **Evaluation of methods and rates of application of three nematicide-insecticides for control of the sting nematode on corn.** *Proceedings of the Soil and Crop Science Society of Florida* (1973) 32, 171-173 [En] Dept. of Agronomy, IFAS, Gainesville, Florida, 32601, USA.

Dasanit 15G, Furadan 10G and Mocap 10G were applied to maize fields (Orlando fine sand) in Florida, USA, heavily infested with *Belonolaimus longicaudatus* before (one or 2 lb a.i./acre), at (one lb a.i./acre) or 21 days after planting (one lb a.i./acre); Dasanit 6SC was applied at one lb a.i./acre at planting or 21 days after. Grain yields were increased by 21 to 121% (mean 75%), ear weight increases averaged 33%, and an average of 1.33 ears/plant was obtained compared to 1.08 ears for the untreated control plot. Banding the materials in the drill furrow at planting was more effective than the same rate applied before or after planting, and the higher preplant rate was more effective than the lower one. Grain yield and ear weight were significantly correlated with the number of *B. longicaudatus* 7 weeks after planting.

*0444 POWELL, D. F. **Fumigation of field beans against *Ditylenchus dipsaci*.** *Plant Pathology* (1974) 23 (3) 110-113 [En] Plant Pathology Laboratory, Hatching Green, Harpenden, Herts., UK.

Field bean seeds (*Vicia faba*) heavily-, lightly- and apparently non-infested with *Ditylenchus dipsaci* were collected in Hertfordshire, UK, and fumigated with methyl bromide at 18°C. Fumigation of 600 to 2,000 mg hr/litre failed to kill all the worms in the heavily infested seed, but, except with the lowest dosage, killed all worms in the lightly infested seed; only slight but significant reductions (1.7% at 800 mg hr/litre to 4.2% at 2,000 mg hr/litre) in the percentage germination occurred. Fumigation at 3,000 mg hr/litre killed all the eelworms in heavily infested seed whereas 2,500 mg hr/litre did not, but these treatments resulted in substantial decreases in germination. It is concluded that standard commercial treatments of

1,000 mg hr/litre should give good control under normal conditions, and that treatment should preferably be applied to seed of approximately 12% moisture content. with an exposure of at least 24 hr.

0445 GOSWAMI, B. K.; SINGH, S.: VERMA, V. S. **Interaction of a mosaic virus with root-knot nematode *Meloidogyne incognita* in *Vigna sinensis*.** *Nematologica* (1974, publ. 1975) 20 (3) 366-376 [En] Div. of Mycology and Plant Pathology, Indian Agricultural Research Inst., New Delhi-110012, India.

In glasshouse experiments, *Vigna sinensis* seedlings were inoculated with *Meloidogyne incognita* or cowpea mosaic virus alone, with both simultaneously, with nematodes 10 days after the virus or with virus 10 days after the nematodes. Root and shoot growth of plants inoculated with nematodes only or with virus 10 days after nematodes was stunted: galls/g root were fewer in plants inoculated with both pathogens together or with virus followed by nematodes 10 days later (when much of the root system was less suitable for nematode penetration). Virus concentration in the cowpeas appeared to be unaffected by the presence of nematodes in the roots.

0446 RHOADES, H. L. **A comparison of pre-plant and post-plant nematicides for controlling sting nematodes.** *Proceedings of the Soil and Crop Science Society of Florida.* (1971, publ. 1972) **31**, 260-262 [En] Agricultural Research and Education Center, Sanford, Florida 32771, USA.

In experiments conducted on field corn, sweet corn and cabbage growing in sand infested with *Belonolaimus longicaudatus*, pre-plant applications of D-D and granular formulations of fensulfothion (Dasanit), a mixture of equal parts of thionazin and phorate, carbofuran (Furadan), prophos (Mocap), fenamiphos (Nemacur) and Tirpate (2,4-dimethyl-1,3-dithiolane-2-carboxaldehyde *O*-(methylcarbamoyl) oxime) gave good nematode control. Post-plant treatments were less consistent in their efficacy.

0447 BOONDUANG, A.; RATANAPRAPA, D. **Identification of plant parasitic nematodes of Thailand. Systemic study of Criconematidae in Thailand with descriptions of three new species.** *Plant Protection Service Technical Bulletin, Department of Agriculture, Bangkok, Thailand* (1974) No. 22, 16 pp. [En]

In this supplement to an earlier paper on the Criconematidae of Thailand [see *Hm/B 44*, 1624] the following species are described and illustrated: *Criconemoides curvatus*, *C. humilis*, *C. dorsoflexus* n.sp., *Hemicriconemoides birchfieldi*, *Hemicycliophora tesselata* n.sp. and *Lobocriconema rara* n.sp. *C. dorsoflexus*, based on 2 females from *Euphoria longan*, is most closely related to *C. curvatus* but is curved dorsally instead of ventrally in death. *H. tesselata*, from *Citrus grandis* is described from 5 females and differs from all other known species of the genus in the form of the tail which is filiform with an acute terminus. Two females of *L. rara* were found on *Crotalaria juncea* and are similar to *L. crassianulata* but with longer body (350 and 400 µm) and more rounded, conical terminus.

0448 PONTE, J. J. DA; FREIRE, F. C.; CHAGAS, J. M. F.; VASCONCELOS, I. **[An *in vitro* test for pathogenicity of plant parasitic nematodes.]** Provas de patogenicidade *in vitro* envolvendo nematóides fitoparasitas. [VI Congr. An. Soc. Bras. Fitopat., Pelotas, RS, Brazil, Fev. 1973. Abstract.]. *Fitopatologia* (1973) **8** (1) 17 [Pt, en] Univ. Fed. Ceará, Fortaleza, Brazil.

Phaseolus semierectus was grown *in vitro* in tubes and illuminated for 12 hours each day. The sides of the tubes were partially covered with black paper. *Meloidogyne javanica* eggs and larvae were used as test nematodes, and pathogenicity judged by root galling of non-illuminated roots. Symptoms appeared within 18 to 25 days.

0449 ABIVARDI, C.; MOKHTARZADEH, A.; SHARAFEH, M. **Evaluation of some varieties of alfalfa, *Medicago sativa* (L.), for their resistance to the alfalfa stem nematode, *Ditylenchus dipsaci* (Kühn 1857) Filipjev 1936, under laboratory conditions.** *Nematologia Mediterranea* (1975) 3 (1) 55-63 [En, fr, it] Dep. of Plant Protection, Pahlavi Univ., Shiraz, India.

Forty-two lucerne varieties from Iran and other countries were screened for resistance to *Ditylenchus dipsaci*. The variety Piaskowa from Poland produced no swollen seedlings, the variety Arnim's Altdeutsche 194 from Germany produced 11.4% swollen seedlings, and all the other varieties produced 34 to 82% swollen seedlings. However, an examination of the galls of varieties Mohajeran-e-Hamadan (Iran), Culver, Lahontan and Grimm (USA), and Melissopetia Lamia and Lamia (Greece), showed that no females had been produced one month after sowing. In Sechin-e-Hamadan (Iran) only a few males and non-gravid females were observed in some galls. Moapa (USA) and Altfranken and Kurmarsk-Ostsaat (Germany) tolerated nematode attack and gave high yields in spite of having many swollen seedlings and active nematode reproduction.

0450 EGUNJOBI, O. A. **Nematodes and maize growth in Nigeria. I. Population dynamics of *Pratylenchus brachyurus* in and about the roots of maize and its effects on maize production at Ibadan.** *Nematologica* (1974) 20 (2) 181-186 [En, fr] Dept. of Agricultural Biology, Univ. of Ibadan, Nigeria.

Populations of *Pratylenchus brachyurus* under maize during 1969-1971 at Ibadan, Nigeria, were very low during the dry season (November-April) but increased rapidly from March during the growth of the maize crop, peaked during June-July 4-5 months after the crop was sown and then quickly declined to low levels. Much smaller rises occurred later in the year with peaks in November, 2-3 months after the sowing of a second crop. Very low numbers of *P. brachyurus* were found each year under weeds which may possibly help to sustain the populations of this nematode during the dry season. Maize yields during 1970 were 28.5% lower than in 1969. This reduction was associated with and may have been the result of a 55% increase in the *P. brachyurus* populations in the maize roots.

0451 GRUJIČIĆ, G. **[Studies on plant parasitic nematodes of maize plants.]** Prilog proučavanju parazitnih nematoda na kukuruzu. *Biljna Zaštita* (1974) 5, 193 [Sh]

Ditylenchus dipsaci, Pratylenchus crenatus, P. thornei, P. neglectus, Meloidogyne incognita, M. arenaria and *M. javanica* are recorded from maize in Yugoslavia.

0452 KLINDIĆ, O.; PETROVIĆ, D. **[Contribution to the study of plant nematodes on roots of maize.]** Prilog poznavanju fitopatogenih nematoda vezanih za korijen kukuruza u SR BiH. *Biljna Zaštita* (1974) 5, 193-194 [Sh]

The incidence and distribution of *Pratylenchus, Helicotylenchus* and *Rotylenchus* [?] on maize roots from 13 localities in Yugoslavia is recorded. *Rotylenchus* [= *Rotylenchulus*] *borealis* is new for Yugoslavia.

0453 RASKI, D. J. **Revision of the genus *Paratylenchus* Micoletzky, 1922 and descriptions of new species. Part 1 of 3 parts.** *Journal of Nematology* (1975) 7 (1) 15-34 [En] Dept. of Nematology, Univ. of California, Davis 95616.

A revision of part of the genus *Paratylenchus* is reported covering those species with stylet averaging <22μm. 13 new species are described, viz: *Paratylenchus humilis* on *Theobroma cacao* in Brazil, *P. leiodermis* on sugarcane in Indonesia, *P. serricaudatus* on *Camellia japonica* in California, USA, *P. goldeni* on *Buxus* sp. in North Carolina, USA, *P. breviculus* in soil around *Nephelium lappaceum* in Thailand, *P. alleni* on *Atriplex confertifolia* in Utah, USA, *P.colbrani* in soil in Queensland, Australia, *P. variabilis* on *Rhus trilobata* in California, USA, *P. italiensis* in soil in Sicily, Italy, *P. leptos* in soil around *Piper* sp. in Brazil, *P. longicaudatus* on *Equisetum* sp. in California, USA, *P. obtusicaudatus* in soil around *Sorghum* sp. in Kenya and *P. perlatus* on *Theobroma cacao* in Brazil. Observations on the morphology and relationships of 9 other species are given. *Hemicriconemoides gabrici* (Yeates, 1972)n.comb. is proposed for *Paratylenchus gabrici* Yeates, 1972.

☆**0454** NORTON, D. C.; HOFFMANN, J. K. ***Longidorus breviannulatus* n.sp. (Nematoda: Longidoridae) associated with stunted corn in Iowa.** *Journal of Nematology* (1975) 7 (2) 168-171 [En] Dept. of Botany and Plant Pathology, Iowa State Univ., Ames, USA.

Longidorus breviannulatus n.sp. is described from females and larvae collected around maize roots in Iowa, USA. Females are 4,019 to 5,151 (4,755) μm long and have flattened knob-like lip region, wide bilobed amphidial pouches extending to spear guiding ring which is 21 to 26 μm from anterior end of the body, an odontostyle 81 to 88 (83.2) μm long, an odontophore 28 to 45 (35) μm long and a conoid tail which sometimes has a short broad peg in adults (c=111 to 143). Females maintained on sorghum and originally collected from a tobacco field in Ontario, Canada, were *L. breviannulatus*. In a preliminary greenhouse test, *L. breviannulatus* increased on maize from 100 to 4,120 individuals after 322 days. In fields, largest populations occurred in soils containing over 90% sand.

☆**0455** BIRD, A. F.; LOVEYS, B. R. **The incorporation of photosynthates by *Meloidogyne javanica*.** *Journal of Nematology* (1975) 7 (2) 111-113 [En] CSIRO, Div. of Horticultural Research, Post Office Box 350, Adelaide, South Australia 5001.

Significant uptake of C^{14} by *Meloidogyne javanica* occurred 24 hours after exposure of the host plants (*Vicia faba* and tomato) to an atmosphere of $C^{14}O_2$ for 30 min. The rate of incorporation was related to the nematode's physiological age and reached its peak at the time egg-laying commenced. Galls and egg masses harvested 5 days after exposure to $C^{14}O_2$ contained about 6 times as much C^{14} as did adjacent root and about half of this activity was located in the egg mass. The results support the hypothesis that the nematode functions as a metabolic sink and the nutrients required originate at least in part from the products of current photosynthesis.

0456 CHAPMAN, R. A.; TURNER, D. R. **Effect of *Meloidogyne incognita* on reproduction of *Pratylenchus penetrans* in red clover and alfalfa.** *Journal of Nematology* (1975) 7 (1) 6-10 [En] Dept. of Plant Pathology, Univ. of Kentucky, Lexington 40506, USA.

Seedlings of red clover and lucerne growing in nutrient agar were inoculated with various combinations of *Meloidogyne incognita* and *Pratylenchus penetrans*. Egg-laying by *P. penetrans* decreased with increase in the number of nematodes, in the ratio of *M. incognita* to *P. penetrans* entering the roots, and in priority of invasion by *M. incognita*. In red clover the reduction was greatest when 65 nematodes invaded, the ratio of *M. incognita* to *P. penetrans* was 4:1 and *M. incognita* was inoculated 4 days before *P. penetrans*. In lucerne, a less favourable host for both nematodes, the corresponding figures were: 45 invading nematodes, a ratio of 2:1 and inoculation of *M. incognita* 4 days before *P. penetrans*. No effects were observed on the embryogeny and hatching of *P. penetrans* eggs, the development of *M. incognita* larvae or root penetration by either nematode in the presence of the other.

0457 GRANDISON, G. S.; WALLACE, H. R. **The distribution and abundance of *Pratylenchus thornei* in fields of strawberry clover (*Trifolium fragiferum*).** *Nematologica* (1974, publ. 1975) 20 (3) 283-290 [En, de] Dept. of Plant Pathology, Waite Agricultural Research Inst., Univ. of Adelaide, Glen Osmond, South Australia 5064, Australia.

Variations in the numbers of *Pratylenchus thornei* in *Trifolium fragiferum* roots and soil sampled during November 1970 to July 1971 at 8 sites within a 30 km radius of Adelaide, Australia, were found to be closely correlated with soil texture (% clay). Other soil factors appeared to have less influence. Populations of *P. thornei* reached maximum levels in summer in clay soils and in winter in sandy soils. The maximum numbers were greater in the clay than in the sandy soils.

*0458 GRIFFIN, G. D. **Parasitism of nonhost cultivars by *Ditylenchus dipsaci*.** *Journal of Nematology* (1975) 7 (3) 236-238 [En] Crops Res. Lab., Utah State Univ., Logan 84322, USA.

In growth-chambers at 20°C, seedlings of sweet clover (*Melilotus indica*), onion, tomato, sugarbeet and wheat inoculated with the lucerne race of *Ditylenchus dipsaci* (20 per plant) were parasitized by the nematode and, 14 and 28 days after inoculation, showed characteristic symptoms of attack. Nematode reproduction did not occur on any of these plants but, at 15°C, plant mortalities ranged from 20% in sugarbeet and tomato to 100% in onion. Mortalities of plants inoculated 32 days previously with 50 *D. dipsaci* per plant were greater at 15 than at 20°C in some plants but at 25°C there were no deaths, except of onion.

*0459 JOHNSON, A. W. **Resistance of sweet corn cultivars to plant-parasitic nematodes.** *Plant Disease Reporter* (1975) 59 (4) 373-376 [En] Agricultural Research Service, US Dept. of Agric., Coastal Plain Experiment Stn., Tifton, Georgia 31794, USA.

In plot experiments in Georgia, USA, during 1970-72, 15 cultivars of *Zea mays* were evaluated for resistance to *Criconemoides ornatus*, *Meloidogyne incognita*, *Helicotylenchus dihystera* and *Trichodorus christei*. Judging by plant height and yield, Seneca 110 and Seneca Explorer were most resistant while Spancross was the most susceptible. *C. ornatus*, *H. dihystera* and *T. christei* were the species mainly responsible for yield reductions. Soil treatment with D-D at 93.5 litres/ha increased the average yield of all cultivars by 10%. Combined use of nematicides and resistant cultivars is suggested as a means of delaying the build up of pathogenic nematodes to damaging levels.

*0460 JOHNSON, A. W.; DOWLER, C. C.; HAUSER, E. W. **Crop rotation and herbicide effects on population densities of plant-parasitic nematodes.** *Journal of Nematology* (1975) 7 (2) 158-168 [En] Agric. Research Service, US Dept. of Agric., Georgia Coastal Plain Experiment Stn., Tifton 31794, USA.

The influence of various herbicides and mono- and multicropping sequences on population densities of nematode species common in corn, cotton, peanut and soybean fields in the southeastern United States was studied for 4 years. The application of herbicides did not significantly affect nematode population densities. *Meloidogyne incognita* and *Trichodorus christiei* increased rapidly on corn and cotton, but were suppressed by peanut and soybean. More *Pratylenchus* spp. occurred on corn and soybean than on cotton and peanut. *Criconemoides ornatus* increased rapidly on corn and peanut, but was suppressed by cotton and soybean. *Helicotylenchus dihystera* was more numerous on cotton and soybean than on corn and peanut. Numbers of *Xiphinema americanum* remained low on all crops. The peanut sequence was the most effective monocrop system for suppressing most nematode species. Multi-crop systems, corn-peanut-cotton-soybean and cotton-soybean-corn-peanut, were equally effective in suppressing nematode densities.

0461 AUSTRALIA, QUEENSLAND DEPARTMENT OF PRIMARY INDUSTRIES **Annual report 1973-74.** Brisbane, Australia. (1974) 64 pp. [En, Plant nematology pp. 48, 49.]

In Queensland, Australia, Nemacur and Mocap treatments increased yields of pineapple infested with *Radopholus similis* and controlled the nematode. *Aphelenchoides besseyi* has become a serious problem in strawberry. The significance of its presence in seed heads of *Panicum maximum* var. *trichoglume*, *Eragrostis tenuifolia* and a large number of other grasses is being investigated.

0462 CAUBEL, G.; PEDRON, J. P. **[Nematodes on leguminous plant seeds.]** Les nématodes et les semences de légumineuses. *Bulletin, Fédération Nationale des Agriculteurs Multiplicateurs de Semences, Paris* (1972) October, 1-8 [Fr]

Symptoms of infestation of lucerne and red clover with *Ditylenchus dipsaci* are described. The results of examinations of seed and seed debris are given and demonstrate the importance of contaminated seed in the spread of the nematodes. Control of the nematodes by treatment of the seed with methyl bromide is recommended and is described. Addresses are given where seed treatment can be carried out in France.

***0463** MARKS, C. F.; ELLIOT, J. M. **Damage to flue-cured tobacco by the needle nematode *Longidorus elongatus*.** *Canadian Journal of Plant Science.* (1973) 53 (3) 689-692 [En, fr] Research Stn., Agriculture Canada, Vineland Stn., Ontario, Canada.

Tobacco seedlings in Ontario, Canada, were severely damaged by *Longidorus elongatus*, the first record in Ontario of damage by this nematode to an economic crop. In greenhouse tests, *Zea mays* var. *saccharata* and *Sorghum vulgare* were good hosts and tobacco, rye and wheat were poor hosts. The damaged tobacco seedlings had followed a crop of sorghum which is here recorded for the first time as a host of this nematode. Foliar applications of Vydate [oxamyl] to stunted tobacco seedlings reduced the number of *L. elongatus* in the surrounding soil, but did not improve plant growth possibly because the nematicide was applied too late (about 5 weeks after transplanting). It is considered unlikely that control of *L. elongatus* in tobacco fields in Canada will be necessary because most growers use nematicides to control *Pratylenchus penetrans* and the crops normally grown in rotation with tobacco are not hosts of needle nematodes.

0464 JOHNSON, A. W.; BURTON, G. W. **Comparison of millet and sorghum-sudangrass hybrids grown in untreated soil and soil treated with two nematicides.** *Journal of Nematology* (1973) 5 (1) 54-59 [En] Plant Science Research Div. Agricultural Research Service, Coastal Plain Experiment Stn., Tifton, Georgia 31794, USA.

Aldicarb and Bay 68138 [phenamiphos] both at 11.2 kg active ingredient/hectare were effective in increasing the plant height and yield of pearl millet (*Pennisetum glaucum*) and sorghum-sudangrass hybrids naturally infected with 6 species of nematodes, in USA. *Pratylenchus* spp. and *Belonolaimus longicaudatus* were shown to be primarily responsible for reduction in yield. Millet and sorghum-sudangrass hybrids supported large numbers of *Criconemoides ornatus*, *Pratylenchus* spp., *B. longicaudatus*, and *Xiphinema americanum*. Funk's sorghum × sudangrass Hybrid 78 was more sensitive to injury by the nematode complex than were Tift 23A × 186 or Gahi-1 pearl millet. 'Tiflate' pearl millet was more resistant than other millets or sorghums to injury caused by *C. ornatus*, *Pratylenchus* spp., *Trichodorus christiei*, and *B. longicaudatus*. Millet and sorghum-sudangrass hybrids are poor summer cover crops because they favour intensive development of *P. brachyurus*, *P. zeae*, *T. christiei*, and *B. longicaudatus*.

0465 MCEWEN, J.; SALT, G. A.; HORNBY, D. **The effects of dazomet and fertilizer nitrogen on field beans (*Vicia faba* L.).** *Journal of Agricultural Science* (1973) 80 (1) 105-110 [En] Rothamsted Experimental Stn., Harpenden, Herts., UK.

The mean yield of field beans (*Vicia faba*) grown for 3 consecutive years on a site infested with migratory nematodes (mainly *Trichodorus*, *Tylenchorhynchus* and *Pratylenchus*) was 1540 kg/ha in untreated soil and 1870 kg/ha in soil treated with dazomet at 450 kg/ha, applied in autumn, followed by rotavation to a depth of 15 cm and subsequent rolling. Fertilizer nitrogen in amounts up to 250 kg N/ha decreased yield to 990 kg in untreated soil but increased it to 2220 kg in soil treated with dazomet. Fertilizer nitrogen did not affect nematode numbers or root blackening but decreased nodulation and increased mycorrhizal infection by *Endogone* sp. in untreated soil. Dazomet greatly decreased numbers of migratory nematodes of the genera *Tylenchorhynchus* and *Trichodorus* and eliminated *Pratylenchus*. It had little effect on root blackening in the top 10 cm of soil but decreased it in the next 10 cm. Infection with *Endogone* was almost eliminated.

*0466 ELGIN, J. H., JR.; GRAY, F. A.; PEADEN, R. N.; FAULKNER, L. R.; EVANS, D. W. **Optimum inoculum levels for screening alfalfa seedlings for resistance to northern root-knot nematode in a controlled environment.** *Plant Disease Reporter* (1973) 57 (8) 657-660 [En] USDA, Irrigated Agriculture Research and Extension Center, Prosser, Washington 99350, USA.

Lucerne seedlings were screened for resistance to *Meloidogyne hapla* using aqueous suspensions of 2nd-stage larvae. The optimum level of inoculum was found to be 600 to 800 larvae per plant and infection was more satisfactory for plants grown in flats than for plants grown in small vials. The student 't' test indicated that the level of root galling was directly related to the number of females within the roots.

0467 MILLER, L. I. **Development of a Virginia isolate of *Meloidogyne arenaria* on eighteen inbred lines of *Zea mays*.** [Abstract]. *Virginia Journal of Science* (1973) 24 (3) 110 [En] Dep. Plant Path. & Physiol., V.P.I. & S.U., Blacksburg, Va. 24061, USA.

Of 18 inbred lines of *Zea mays* grown for 2 months in soil infested with an isolate of *Meloidogyne arenaria* from a farm in Virginia, USA, only 2 became heavily infested. No galls or eggmasses were found on 6 lines and the other 10 were lightly infested.

0468 WASHINGTON AGRICULTURAL EXPERIMENT STATION **1971 research progress.** *Bulletin, Washington Agricultural Experiment Station* (1971) No. 734, 58 pp. [En] From *Plant Breeding Abstracts 42*, 6989, 6993.

Of 18 varieties of lucerne tested under conditions of infestation with *Ditylenchus dipsaci*, Nevada Synthetic WW gave the greatest yield of dry matter per acre.

0469 BINGEFORS, S. **Breeding for nematode resistance.** *Sveriges Utsädesförenings Tidskrift* (1973) 83 (Supplement) 24-31 [En, ru] Swedish Seed Association, S-751 05 Uppsala, Sweden.

The present situation in Sweden is reviewed with regard to breeding resistance in cereals against *Heterodera avenae*, in potatoes and tomatoes against *H. rostochiensis*, in red clover and lucerne against *Ditylenchus dipsaci*; a few other crops and nematodes are also mentioned.

0470 RIVOAL, R. **[Observations on cyst nematodes of cereals in maize cultures.]** Observations sur des attaques du nématode à kystes des céréales en cultures de maïs. *Phytoma* (1973) 25 (250) 17-18 [Fr] Laboratoire de Recherche (INRA), Rennes, France.

Heterodera avenae was first found attacking maize in France in 1971. In 1972 attacks were seen throughout the zones of intense cereal culture north of the Loire, 22 being confirmed. The most characteristic symptom is observed at the level of the seedling root system which becomes stunted. Unfavourable climatic conditions in 1971 and 1972, with cold, wet weather after the seed was sown aggravated the damage. Maize appears to be sensitive to even very small populations of *H. avenae* as, although most cases of damage occurred when it was grown after several years of other cereals, a number were found after 3 years of growing non-hosts such as beet and lucerne.

*0471 GAY, C. M.; BIRD, G. W. **Influence of concomitant *Pratylenchus brachyurus* and *Meloidogyne* spp. on root penetration and population dynamics.** *Journal of Nematology* (1973) 5 (3) 212-217 [En] Dept. of Plant Pathology and Plant Genetics, Univ. of Georgia, Athens 30602, USA.

Populations of *Pratylenchus brachyurus* on cotton increased significantly in the presence of either *Meloidogyne incognita* or *M. arenaria*. This occurred with either simultaneous inoculation or earlier invasion by *M. incognita*. *P. brachyurus* penetrated cotton roots previously invaded by, or simultaneously inoculated with, *M. incognita* as well as, or better than, in its absence but earlier invasion by *M. incognita* suppressed *P. brachyurus* reproduction on tomato and had no effect on lucerne and tobacco. Populations of *M. incognita* on cotton were generally inhibited by the presence of *P. brachyurus*. Simultaneous inoculation with, or previous invasion by, *P. brachyurus* also inhibited root penetration by *M. incognita*. These findings emphasize the importancce of host susceptibility in the study of concomitant nematode populations.

0472 VERMA, R. S. **Two new species in the subfamily Longidorinae (Nematoda) from Uttar Pradesh, India, with a key to species of *Paralongidorus* Siddiqi et al., 1963.** *Zoologischer Anzeiger* (1973) 190 (3/4) 170-174 [En] Div. of Entomology, U.P. Inst. of Agricultural Sciences, Kanpur-2, India.

Paralongidorus major n.sp. and *P. oryzae* n.sp. are described from females

collected around roots of *Zea mays* and *Oryza sativa*, respectively, in Uttar Pradesh, India. *P. major* has these characteristics: L = 5.50 to 6.40mm; V = 41 to 44%; spear = 116 to 122μ; spear extension = 50 to 85μ; spear guiding ring = 32 to 35μ from anterior end; tail = 33 to 35μ or less than one anal body width long; lip region set off by a constriction; amphidial pouches short, cup-like. *P. oryzae* is based on a single female with these characteristics: L = 2.56mm; V = 52%; spear = 52μ; spear extension = 40μ; spear guiding ring = 25μ from anterior end; tail = 30μ or just over one anal body width long; lip region set off by a slight constriction; amphidial pouches short, stirrup-shaped. A key to the species of *Paralongidorus* is given.

*0473 CAMPBELL, W. F.; GRIFFIN, G. D. **Fine structure of stem nematode-induced white flagging in *Medicago sativa*.** *Journal of Nematology* (1973) 5 (2) 123-126 [En] Plant Science Dept., Utah State Univ., Logan 84322, USA.

White flagging of lucerne, *Medicago sativa* 'Ranger', was found associated with *Ditylenchus dipsaci* in the Columbia River Basin in northern Utah, USA, during 1971. This is a report on chloroplast changes, induced by *D. dipsaci* in lucerne leaves, as observed with an electron microscope. Leaves from lucerne plants infected with *D. dipsaci* were either devoid of normal pigmentation or displayed various shades of yellow-green. Cells of leaf tissue from uninfected plants exhibited normal chloroplast structure. By contrast, the chloroplast structure in cells of leaf tissue from infected plants showed progressive degradation as normal pigmentation decreased.

*0474 HAMLEN, R. A.; BLOOM, J. R.; LUKEZIC, F. L. **Hatching of *Meloidogyne incognita* eggs in the neutral carbohydrate fraction of root exudates of gnotobiotically grown alfalfa.** *Journal of Nematology* (1973) 5 (2) 142-146 [En] Dept. of Plant Pathology, Pennsylvania State Univ., University Park 16802, USA.

Meloidogyne incognita egg masses were incubated in soil sterilized by gamma irradiation and wetted with root exudates from lucerne plants at different stages of development and subjected to various degrees of clipping. Carbohydrate components of the exudates were identified by gas chromatography/mass spectrometry. A significant stimulation of hatching was detected in exudates of seedlings and of flowering plants but the importance of this is doubtful because hatching in distilled water was always greater than 50%. Hatching did not differ among exudate samples from variously clipped plants. Incubation of eggs in soil moistened with 10^{-7} to 10^{-3} *M* solutions of glucose did not result in increased hatching over that in distilled water.

*0475 ELGIN, J. H., JR.; EVANS, D. W.; FAULKNER, L. R. **Swelling reponse of alfalfa seedlings to initial stem-nematode infection.** *Crop Science* (1975) 15 (3) 435-437 [En] ARS, USDA, Field Crops Lab., Beltsville, MD 20705, USA.

Germinating seedlings of 7 cultivars of *Medicago sativa* were inoculated with 1000 *Ditylenchus dipsaci* per row of 20 germinating seedlings. 3 and 24 days later the seedlings were rated for cotyledonary node swelling and nematode populations. The degree of node swelling at 3 days was directly related to the numbers of nematodes in the cotyledonary node; at 24 days it was directly related to the nematode populations in both the cotyledonary node and in the hypocotyl. Little change was seen in the degree of node swelling between days 3 and 24 indicating that this symptom is a response to the initial rate of nematode infection. In the selection by breeders of resistant plant varieties, selection at a later stage is urged, such as after 12 to 16 weeks, when nematode reproduction has significantly differentiated between resistant and susceptible seedlings.

0476 CAUBEL, G. **[Study of the penetration of *Ditylenchus dipsaci* into maize seedlings.]** Étude de la pénétration de *Ditylenchus dipsaci* dans les plantules de maïs. [Abstract]. In *Simposio Internacional (XII) de Nematologia, Sociedad Europea de Nematologos, 1-7 Septiembre. 1974, Granada, Spain.* Granada, Spain. (1974) 19-20 [Fr] I.N.R.A. Zoologie, Rennes, France.

In France, damage to maize due to *Ditylenchus dipsaci* was more severe in plants sown in April than in May. Nematodes invaded the stems a few days after germination when the soil temperature at a depth of 5 cm was 10°C. Adults appeared in 2 to 4 weeks. Toppling of the plants due to stem damage was severe by late June.

0477 JOHNSON, A. W.; CHALFANT, R. B. **Influence of organic pesticides on nematode and corn earworm damage and on yield of sweet corn.** *Journal of Nematology* (1973) 5 (3) 177-180 [En] Agricultural Research Service, USDA, Georgia Coastal Plain Exp. Stn., Tifton 31794, USA.

Soil fumigants and non-volatile pesticides increased growth and yield of sweet corn 'Seneca Chief' over that of control plants in a 3-year study. Nematicide treatments increased average yields by 31% over controls, but did not significantly affect the mean weight per ear. Increase in yield was related to control of

Belonolaimus longicaudatus, Trichodorus christiei and *Pratylenchus zeae*. Non-volatile chemicals more effectively reduced populations of *B. longicaudatus* and *T. christiei* than did soil fumigants. Aldicarb did not control *Criconemoides ornatus*. All pesticides controlled *P. zeae*. Pesticides did not control *Heliothis zea* effectively.

0478 NEW ZEALAND. DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH. **Report for the year ended 31 March 1973.** Wellington, New Zealand: Government Printer. (1973) 79 pp. [En, Plant nematology p. 17]

All lines of white clover [*Trifolium repens*] examined in a study of the effect of root-knot nematodes on pasture legumes in New Zealand have proved highly susceptible to *Meloidogyne hapla*. Field experiments are in progress to examine the effect of *M. hapla* and phosphate level in soil on establishment and subsequent growth of white clover and to compare the effectiveness of nematicides and methyl bromide sterilization as control methods.

0479 ABIVARDI, C.; SHARAFEH, M. **The alfalfa stem nematode, *Ditylenchus dipsaci* (Kühn 1857) Filipjev 1936 as an important threat for cultivation of alfalfa in Iran.** *Nematologia Mediterranea* (1973) 1 (1) 22-27 [En, fr, it] Dept. of Plant Protection, College of Agriculture, Pahlavi Univ., Shiraz, Iran.

Ditylenchus dipsaci is reported for the first time in Iran where it caused serious damage to lucerne.

0480 CAUBEL, G.; RIVOAL, R. **[Observations on attacks of two nematodes harmful to maize in 1971.]** Observations sur les attaques de deux nématodes nuisibles au maïs en 1971. *Phytoma* (1972) 24 (239) 15-18 [Fr] Laboratoire de Zoologie de l'ENSA, Rennes, France.

Field investigations in 1971 and laboratory studies of the effects of *Ditylenchus dipsaci* on maize in France are reported. In the field the attack becomes apparent at the beginning of July; plants in circular or elongated patches start to fall early and during this month almost all the affected plants are flattened; the flattening does not continue much after August and plants at the periphery develop normally. More rarely, the attack is diffuse, affecting plants scattered throughout the plot. Longitudinal sections of affected plants at the point where the break occurs show blackish necrosis which spreads through the whole base of the plant. Secondary roots are absent and the internodes are very short. Climatic conditions in May and June appear to be extremely important, damp, cool weather retarding growths of the maize and permitting optimum development of the nematodes so that they become well established within the stem. The beet (also parasitizing oats), onion, clover and strawberry races of *D. dipsaci* are capable of attacking maize. *Heterodera avenae* is also reported causing disease in maize, observed for the first time in Normandy and Beauce in 1971. In these regions the signs of attack appeared in June, the plants showing poor vegetative growth and becoming stunted, with an atrophied root system. Although maize is only a mediocre host for *H. avenae*, the damage caused was not negligible but, probably resulted from the unfavourable climatic conditions which prevailed in May 1971. The significance of these attacks is discussed and it is pointed out that the possibilities of control are limited and can only be by cultural methods.

0481 HAWN, E. J. **Plant-parastic nematodes in irrigated soils of Alberta.** *Canadian Plant Disease Survey* (1973) 53 (1) 29-30 [En] Research Stn., Canada Dept. of Agriculture, Lethbridge, Alberta, Canada.

In a survey in 1971 of 72 irrigated fields of *Medicago sativa* in Alberta, Canada, *Tylenchus, Aphelenchus, Ditylenchus dipsaci* and *Tylenchorhynchus acutus* were each found in 75% or more of the fields, *Pratylenchus projectus* in 56%, *Aphelenchoides* in 40%, *Xiphinema* in 21% and *Pratylenchus* in 8%. In the following year 7 irrigated crops were sampled and the percentage occurrence of the same nematode genera and species (except *Xiphinema*) is tabulated. *Ditylenchus dipsaci* occurred most often and *Pratylenchus* least. The crops sampled were lucerne, *Pisum sativum, Phaseolus vulgaris*, sugar-beet, potato, *Zea mays* and carrot.

* **0482** JATALA, P.; JENSEN, H. J.; SHIMABUKURO, R. A. **Host range of the 'grass root-gall nematode', *Ditylenchus radicicola*, and its distribution in Willamette Valley, Oregon.** *Plant Disease Reporter* (1973) 57 (12) 1021-1023 [En] Dept. of Botany and Plant Pathology, Oregon State Univ., Corvallis, Oregon 97331, USA.

Experimental studies of the host range of the Oregon population of *Ditylenchus radicicola* indicate that it is a physiological race or biotype. 17 of 27 plant species and all 10 varieties of *Poa pratensis* tested were susceptible. Newly recorded hosts are: *Agropyron desertorum, Elymus junceus, Festuca rubra, Sorghum halepense, S. sudanense* and *Zea mays*. Highest numbers of galls were recorded on the *Poa pratensis* varieties Sydsport, Arista and Prato and the *Hordeum vulgare* variety Luther.

0483 MILLER, L. I.; FOX, J. A. **Specificity of resistance of inbred lines of *Zea mays* to races of *Meloidogyne incognita*.** [Abstract]. In *International Congress of Plant Pathology (2nd), Minneapolis, Minnesota, September 5-12, 1973. Abstracts of papers.* St. Paul, Minnesota, USA: American Phytopathological Society Inc. (1973) No. 0861 [En] Virginia Polytechnical Inst. and State Univ., Blacksburg, Virginia 24061, USA.

0484 SHESTEPEROV, A. A. **[The effect of phytohelminths on growth and development of red clover.]** *Byulleten' Vsesoyuznogo Instituta Gel'mintologii im. K.I. Skryabina* (1971) No.6, pp. 121-126 [Ru, en]

Red clover was grown in the laboratory in soil naturally infested with nematodes obtained from a locality in the Moscow region, USSR, where there appears to be considerable nematode damage. Plants were also grown in soil sterilized with boiling water (with or without subsequent addition of a suspension of microflora). Species or groups of nematodes found are listed, a large proportion being *Paratylenchus projectus*. Population changes among the nematodes on plants and in the soil, and details of plant growth and development are recorded. It is concluded from the results that the phytohelminth complex delays growth and development of red clover, reduces numbers of plants and their foliage, dry-weight and winter hardiness, and increases susceptibility to pathogenic organisms and low soil moisture.

0485 FURSTENBERG, P. J. **The effect of cultivation on soil nematodes, especially *Rotylenchulus parvus*.** [Abstract]. In *Simposio Internacional (XII) de Nematología, Sociedad Europea de Nematologos, 1-7 Septiembre, 1974, Granada, Spain.* Granada, Spain. (1974) 31 [En] Univ. of Port Elizabeth, South Africa.

Cultivation of maize on previously undisturbed veld in South Africa was followed by a massive increase in the population size of *Rotylenchulus parvus*.

0486 STOYANOV, D. **[Some nematological problems in citrus crops in Cuba.]** Algunos problemas nematológicos de los cítricos en Cuba. *Revista de Agricultura, Cuba* (1971) 4 (2) 65-71 [Es, en]

Of 35 citrus varieties examined at Santiago de las Vegas, Cuba, all except *Aeglopsis chevalieri* and *Afraegle paniculata* were infected with *Tylenchulus semipenetrans*. *Aegle marmelo*, *Fortunella margarita*, *Citropsis gilletiana* and *Swinglea glutinosa* (the last 2 by experimental infection) are new host records. Other nematodes found are listed. *Rotylenchulus reniformis* infects *Pueraria hirsuta* (tropical kudsu) a cover crop for citrus plantations, as well as citrus, but kudsu is on balance useful in plantation agronomy. *Meloidogyne incognita* was not considered to be a problem and *Radopholus similis* was not found.

0487 YADAV, B. S.; VERMA, A. C. **Disease of maize (*Zea mays* L.) associated with cereal root nematode (*Heterodera avenae*, Wollenweber, 1924).** [Abstract]. *Proceedings of the Indian Science Congress Association* (1970) 57 (III) 551-552 [En]

Of soil samples examined from maize fields in Rajasthan, India, 46% were positive for *Heterodera avenae*. Damage caused is briefly described. Incidence of other nematodes is given.

0488 ANDERSON, R. V. **Morphology and description of *Helicotylenchus crassatus* n.sp. (Nematoda: Hoplolaimidae) from eastern Canada.** *Canadian Journal of Zoology* (1973) 51 (11) 1195-1200 [En, fr] Entomology Research Inst., Canada Dept. of Agriculture, Ottawa, Canada.

Helicotylenchus crassatus n.sp. is described from over 100 adult females found on red clover (type host) in eastern Canada. It is most similar to *H. digonicus* but can be distinguished by the sclerotization of the head skeleton, size and position of the anterior cephalid, and thickness of the vagina. The morphology and diagnostic value of the cephalic region and reproductive tract are discussed. Males are, as yet, unknown.

0489 TIKYANI, M. G.; KHERA, S.; BHATNAGAR, G. C. **A new species of *Aphelenchoides* from Jodhpur.** [Abstract]. *Proceedings of the Indian Science Congress Association* (1970) 57 (III) 463 [En]

Two females of the genus *Aphelenchoides* from the rhizosphere of *Sorghum vulgare* are reported as a new species. It is not named or described.

*0490 CHANG, D. C. N.; CAMPBELL, W. F.; GRIFFIN, G. D. **Ultrastructure changes induced by stem nematodes in hypocotyl tissue of alfalfa.** *Journal of Nematology* (1973) 5 (3) 165-173 [En] Dept. of Horticultural Sciences, National Taiwan Univ., Taipei, Taiwan, China.

Scarified seeds of *Medicago sativa* vars. Ranger and Lahontan were allowed to imbibe water for 36 hr and then were inoculated with *Ditylenchus dipsaci*

Seedlings were grown in sterilized Provo sand at 20°C and hypocotyl sections harvested at 1, 3 and 7 days. No morphological symptoms of nematode infection were observed in infected plants of either Ranger or Lahontan lucerne one day after inoculation. Electron micrographs of tissue from the infected plants, however, indicated more osmiophilic bodies (lipid bodies) per cell than did the uninfected control, with more lipid bodies present in Ranger than in Lahontan. Three and 7 days after planting, swollen hypocotyls could be seen; the degree of swelling was greater in Ranger than in Lahontan. Electron micrographs of infected tissues indicated that both cultivars were undergoing the same kind of damage. Injured organelles were endoplasmic reticulum, chloroplasts and the nucleus. Histochemical staining indicated no changes in the middle lamellae.

0491 OGIGA, I. R.; ESTEY, R. H. **Histopathogenesis of *Brassica rapa* and *Zea mays* infected by *Pratylenchus penetrans*.** [Abstract]. In *International Congress of Plant Pathology (2nd). Minneapolis, Minnesota, September 5-12, 1973. Abstracts of papers*. St. Paul, Minnesota, USA: American Phytopathological Society Inc. (1973) No. 1097 [En] Macdonald College of McGill Univ., Ste. Anne de Bellevue, Quebec, Canada.

0492 WILLIS, C. B. **Effect of potassium fertilization and *Pratylenchus penetrans* on forage yield and potassium content of alfalfa.** [Abstract]. In *International Congress of Plant Pathology (2nd). Minneapolis, Minnesota, September 5-12, 1973. Abstracts of papers*. St. Paul, Minnesota, USA: American Phytopathological Society Inc. (1973) No. 1099 [En] Agriculture Canada, Research Stn., P.O. Box 1210, Charlottetown, Prince Edward Island, Canada.

*0493 WOOD, F. H. **Life cycle and host-parasite relationships of *Aglenchus costatus* (de Man, 1921) Meyl, 1961 (Nematoda: Tylenchidae).** *New Zealand Journal of Agricultural Research* (1973) **16** (3) 373-380 [En] Dept. of Zoology, Univ. of Canterbury, Christchurch, New Zealand.

The life-cycle of *Aglenchus costatus* cultured on the roots of *Lolium perenne* in water agar at 18° to 20°C took 27 to 35 days. Development time for each stage is given together with measurements of eggs, juvenile stages and adult females and feeding on root hairs and epidermal cells is described. Development of the eggs took 5 to 7 days at 25°C, 6 to 7 days at 20°C, 13 to 17 days at 15 C, while only 2 of 12 eggs hatched at 10°C after 25 and 26 days respectively and none at 5 C in 30 days. Feeding on 10 grass species and 2 clovers (*Trifolium repens* and *T. dubium*) was observed in agar culture and confirmed in pots of soil. In water agar individual specimens of *A. costatus* were attracted to ryegrass roots from distances of up to 20mm. No preferences were observed when the nematodes had a choice of 2 host species.

*0494 WOOD, F. H. **Biology and host range of *Paratylenchus projectus* Jenkins, 1956 (Nematoda: Criconematidae) from a sub-alpine tussock grassland.** *New Zealand Journal of Agricultural Research* (1973) **16** (3) 381-384 [En] Dept. of Zoology, Univ. of Canterbury, Christchurch, New Zealand.

Feeding of *Paratylenchus projectus* (collected from *Festuca novae-zelandiae* in New Zealand) on epidermal root cells of *Lolium perenne* growing in agar culture is described and measurements are given of 4th-stage juveniles and females from the cultures. The complete life-cycle from egg to egg took 36 to 38 days at 18 to 20°C. Populations of the nematode became established on 10 species of grass and on *Trifolium repens* and *T. dubium* grown in sterilized soil in the glasshouse. About 50 % of individuals in all populations were non-feeding 4th-stage juveniles and this stage is considered to promote the success of the species by being able to survive adverse conditions.

0495 CAUBEL, G.; MUGNIERY, D.; RIVOAL, R. **[Distribution of the bulb and stem nematode *Ditylenchus dipsaci* (Kühn) Filipjev, in the soil of a field of red clover under attack.]** Distribution de l'anguillule des bulbes et des tiges, *Ditylenchus dipsaci* (Kühn) Filipjev, dans le sol, a l'intérieur d'un foyer d'attaque sur trèfle. *Annales de Zoologie – Écologie Animale* (1972) **4** (3) 385-393 [Fr, en] Centre de Recherches, I.N.R.A., École nationale superieure agronomique, 35 – Rennes, France.

Damage caused by *Ditylenchus dipsaci* in a plot of red clover, where contamination has been through the seed, showed itself in circular patches throughout the plot. Within each patch, the distribution of the nematodes was heterogeneous, being dense at the centre and more scattered at the periphery. The ratio of numbers of other species to *D. dipsaci* was about 10:1 so that the calculations for *D. dipsaci* cannot be directly transposed for other species. Distribution of *D. dipsaci* is aggregative and follows Taylor's rule (1961). Using a logarithmic transformation, it is possible to study the distribution of *D. dipsaci* statistically and to devise a sampling technique. An estimation of the density of a population may be made by taking 50 samples, each of 20gm of soil, at a depth of 15 to 20cm where the nematode is concentrated.

0496 ABIVARDI, C.; SHARAFEH, M. **Laboratory and field evaluation of seven insecticides for control of the alfalfa stem nematode, *Ditylenchus dipsaci* (Kühn 1857) Filipjev 1936.** *Nematologia Mediterranea* (1975) **3** (1) 75-81 [En, fr, it] Dep. of Plant Protection, Coll. of Agric., Pahlavi Univ., Shiraz, Iran.

In pot experiments, spraying *Ditylenchus dipsaci*-infested lucerne plants with monocrotophos (Azodrin) 24% EC as a 1/4,000 aqueous dilution of active material, with parathion 25% EC at 1/8,000 or with dimecron (phosphamidon) 20% EC, dimethoate 40% EC, metasystox 20% EC, or gusathion (guthion) 20% EC at concentrations of 1/2,500 in each case, significantly reduced the number of nematodes extracted from the buds 3 days later; all the treatments were similarly effective. In the same experiment DDVP (dichlorvos) 50% EC at 1/1000 was ineffective. Motionless nematodes recovered by dissection of buds from treated plants regained motility after aeration. In field trials, dimethoate at 400 g a.i./ha was the most effective, giving the greatest growth increase. Parathion was phytotoxic at 125g a.i./ha.

0497 CAUBEL, G. **[Nematological problems on maize in France: present knowledge and possibilities of control.]** Problèmes nématologiques du maïs en France: connaissances actuelles, possibilités d'intervention. *Phytiatrie-Phytopharmacie* (1973) **22** (1) 39-47 [Fr] INRA, ENSA, 65 rue de St. Brieuc, 35-Rennes, France.

The author reviews briefly the nematodes which attack maize in France, particularly those recorded in recent years, and summarizes the methods of control. *Ditylenchus dipsaci* is considered to be the most important species.

0498 DISANZO, C. P. **Significance of nematodes associated with field corn.** [Abstract]. In *International Congress of Plant Pathology (2nd), Minneapolis, Minnesota, September 5-12, 1973. Abstracts of papers.* St.Paul, Minnesota, USA: American Phytopathological Society Inc. (1973) No. 0214 [En] Agricultural Chemical Div., FMC Corporation, Middleport, New York 14105, USA.

In studies in USA and Canada, a direct correlation was found between the control by carbofuran of plant-parasitic nematodes, especially *Pratylenchus, Tylenchorhynchus* and *Helicotylenchus*, and yields of maize. Control of *Tylenchorhynchus* at the beginning of the growing season resulted in yield increases of up to 200 per cent.

0499 KHAN, A. M. **Studies on plant parasitic nematodes associated with vegetable crops in Uttar Pradesh. Final technical report.** Aligarh, India: Aligarh Muslim University, Botany Department. (1972) iv + 238 pp. [En]

This report of work carried out in the period 1964/9, is divided into 3 parts. In part I the results of extensive surveys of plant-parasitic nematodes from sites all over Uttar Pradesh, India, are presented in tabular form with information on host crops and frequency of occurrence. 102 species of 33 genera of Tylenchida and 56 species of the Dorylaimida and Enoplida were identified and are listed. New taxa are described and figured as follows: *Meloidoderella* n.g. (type *M. indica* n.sp.) from tomato; *Hirschmanniella exigua* n.sp. from paddy soil; *H. dubia* n.sp., from paddy soil; *Paurodontella* n.g. (type *P. minuta* n. comb.) is erected to accomodate species of *Paurodontus* having a robust body, a short convex conoid, ditylenchoid tail and basal oesophageal bulb with a distinct stem-like extension (i.e *Paurodontella minuta* n. comb. for *Paurodontus minuta, Paurodontella apitica* n.comb. for *Paurodontus apiticus, Paurodontella nigra* n.comb. for *Paurodontus niger, Paurodontella densa* n.comb. for *Paurodontus densus*); *Boleodorus typicus* n.sp. from *Narcissus; Basiliophora propora* n.sp. from *Raphanus sativus* and *Saccharum officinarum; Nothotylenchus cylindricus* n.sp. and *N. hexaglyphus* n.sp. from cabbage and potato; *N. allii* n.sp. from *Allium sativum; Ecphyadophoroides graminis* n.sp. from *Echinochloa colonum, Allium cepa* and *Artocarpus integrifolia; Ecphyadophora acuta* n.sp., from *Prunus persica; E. vallipuriensis* n.sp. from *Psidium guajava; Aphelenchoides aligarhiensis* n.sp. from citrus, pumpkin and cabbage soil; *Seinura propora* n.sp. from *Oryza sativa* and *Vicia faba; Thornedia* is emended to include *T. opisthodelphis* n.sp. a species with a single posterior ovary from *Pisum sativum; Longidorella minutissima* n.sp. from potato; *L. karamkalla* n.sp. from cabbage. Part II contains reports of extensive work on the ecology and pathogenicity of *Tylenchorhynchus brassicae* and *Meloidogyne incognita* on local crops, the effect of N, P and K content on root-knot development and effects of soil moisture, fungi and other microorganisms on nematode populations and their pathogenicity. Part III is concerned with control, especially the use of organic amendments. D-D and Vapam were generally more effective than Nemaphos, Thimet 10G, Solvirex or Rogor G. Extensive trials with oilcakes of neem, ground-nut, mustard, castor and sesame showed the oil cakes and their water soluble fractions were effective nematicides and fungicides. Other control methods investigated were the use of crop rotations, *Tagetes* intercropping and trials of resistance of *Lycopersicon pimpinellifolium* and *Cucumis* to root-knot. This report contains a vast amount of well presented information which will form a basis for much further nematological work in India. It is also an example of a project that might well be considered by other developing countries. It is only regrettable that the final report has taken so long to appear in print.

0500 RHODESIA. TOBACCO RESEARCH BOARD. **Abridged Annual Report for the year ended 30th June, 1973.** Salisbury, Rhodesia: Kutsaga Research Station. (1973) 26 pp. [En, Plant nematology pp. 15-16, 17]

Control of *Meloidogyne javanica* in sandy tobacco-growing soil in Rhodesia with DD/MITC was excellent. Bayer 68138 at 8 kg/active ingredient/ha applied as 10% granular and 40% emulsifiable concentrate formulations gave better *M. javanica* control than EDB treatment of 4 ml per plant station. A comparison of 2 formulations of 1,3-D and D-D, both at 2 dosage rates, with EDB at 2 rates showed best control to be with EDB at 4 ml and D-D at 8 ml per plant. Observations on nematode plots at Banket Research Station include the following: more than one species of *Meloidogyne* may be present on tobacco; on rice a high population of *Pratylenchus* and slightly lower one of *Helicotylenchus* was maintained during the year; *Rotylenchulus variabilis* numbers increased rapidly under maize. Breeding of tobacco resistant to *M. javanica* is continuing.

0501 BIRD, M. **Nematode damage to clover.** *New Zealand Journal of Agriculture* (1974) **128** (5) 12-13 [En]

A general account of damage caused to clover by *Meloidogyne hapla* and *Heterodera trifolii* in New Zealand, and possible methods of control, is given.

***0502** BRIDGE, J. ***Hoplolaimus seinhorsti*, an endoparasitic nematode of cowpea in Nigeria.** *Plant Disease Reporter* (1973) **57** (9) 798-799 [En] Imperial College, Ashurst Lodge, Ascot, Berks, UK.

At Ibadan, Nigeria, *Vigna sinensis* is parasitised by 5 nematode species namely *Meloidogyne incognita, Hoplolaimus seinhorsti, Rotylenchulus reniformis, Pratylenchus brachyurus* and *Helicotylenchus pseudorobustus*. *Hoplolaimus seinhorsti* is recorded for the first time on the African continent and on this host. It causes serious damage to cowpea, and soil populations were observed to increase from 100 to 3,800 /litre of soil in 9 weeks. *H. seinhorsti* was also found within the roots of rice, tomato, melon (*Cucumis melo*), okra and pigeon pea (*Cajanus cajan*).

0503 DICKSON, D. W.; JOHNSON, J. T. **Effect of rates and methods of applying several nematicides on nematode populations and corn yields.** *Proceedings of the Soil and Crop Science Society of Florida* (1974) **33**, 74-77 [En] Dep. of Entomology and Nematology, IFAS, Gainesville, Florida, 32611, USA.

The effects of fensulphothion, carbofuran, ethoprop, Dyfonate 10G, phenamiphos, phorate and the 6SC and 4F formulations of fensulphothion and carbofuran, respectively, at 1.12 or 2.24 kg/hectare and of EDB at 14 litres/hectare on grain yield and nematode control were studied on maize in Florida, USA. The nematodes involved were *Criconemoides* sp., *Pratylenchus* spp., *Belonolaimus longicaudatus, Meloidogyne incognita, Trichodorus christiei* and *Helicotylenchus* sp. Treatments increased grain yields and improved plant stand 30 and 14% respectively. The largest yield increase of 46% occurred where the soil was heavily infested with sting nematodes. Application at planting was as effective as preplant treatments.

0504 NESTEROV, P. I.; LIZOGUBOVA, L. P. **[Nematode fauna of the biocoenosis of maize in the Moldavian SSR.]** Kishinev, USSR: Izdatel'stvo "Shtiintsa". *Parazity Zhivotnykh i Rastenii* (1972) No. 8, 122-132 [Ru]

Examination of the roots and rhizosphere of maize in Moldavia (USSR), revealed 99 species of nematodes (listed), of which 33 were plant-parasitic and included the following pathogenic forms: *Ditylenchus dipsaci, Meloidogyne* sp., *M. hapla, Tylenchorhynchus cylindricus, Pratylenchus penetrans, P. pratensis, Helicotylenchus multicinctus, Aphelenchoides* sp. and *A. subtenuis*. The vertical and horizontal distribution of the nematodes in the maize rhizosphere was also studied.

***0505** OGBUJI, R. O.; JENSEN, H. J. **Two Pacific northwest biotypes of *Meloidogyne hapla* reproduce on corn and oat.** *Plant Disease Reporter* (1974) **58** (2) 128-129 [En] Dept. of Botany and Plant Pathology, Oregon Agricultural Experiment Stn., Oregon State Univ., Corvallis 97331, USA.

Populations of *Meloidogyne hapla* obtained from 11 random collections in Idaho, Oregon and Washington States, USA, and including 5 biotypes were tested as pathogens on maize var. Gold Cross Bantam and oat var. Lee. Neither of these crops has previously been considered a host for *M. hapla*. Two biotypes reproduced on maize and oat and 2 others invaded oat roots but did not mature.

0506 PÉREZ MANGAS, M.; MONTESSORO, R. R. **[Nematode survey on alfalfa (*Medicago sativa* L.) in the State of Mexico.]** Exploración nematologica en el cultivo de alfalfa (*Medicago sativa* L.) en el Estado de México. *Nematropica* (1973) 3 (2) 51 [Es] Colegio de Postgraduados, Escuela Nacional de Agricultura, Chapingo, México.

Twelve genera and 9 species of *Pratylenchus* are named.

0507 PONTE, J. J. DA **[The diseases of the cowpea, *Vigna sinensis* Endl., in northeast Brazil.]** Doenças do feijoeiro macássar, *Vigna sinensis* Endl., no nordest Brasileiro. *Boletim da Sociedade Cearense de Agronomia* (1972) **13**, 1-12 [Pt, en] Escola de Agronomia, Univ. Federal do Ceará, Fontaleza, Ceará, Brazil.

Meloidogyne infection is one of the major diseases of *Vigna sinensis*, the staple subsistence crop of Northeastern Brazil. Graminaceous or *Crotalaria* rotations are recommended.

0508 STELTER, H.; MEINL, G. **[The effects of the infestation of red and white clover by *Heterodera trifolii* and *Heterodera galeopsidis*.]** Die Auswirkung des Befalles von Rot- und Weisklee durch *Heterodera trifolii* und *Heterodera galeopsidis*. *Archiv für Pflanzenschutz* (1972) 8 (6) 463-470 [De, en, ru]

In glasshouse experiments the damage to red and white clover caused by *H. trifolii* was investigated at 2 levels of infestation. 500 larvae/100 cm^3 of soil reduced the dry-matter yield of red clover by 15% and 5,000 larvae/100 cm^3 of soil by 50%. Similar results were found for white clover. At the 2 levels of infestation, *H. galeopsidis* caused yield depressions of 13% and 32%, respectively, in red clover, and of 14% and 22% respectively, in white clover. Both nematodes reduced re-growth and flowering.

0509 EGUNJOBI, O. A.; LARINDE, M. A. **Nematodes and maize growth in Nigeria. II. Effects of some amendments on populations of *Pratylenchus brachyurus* and on the growth and production of maize (*Zea mays*) in Nigeria.** *Nematologia Mediterranea* (1975) 3 (1) 65-73 [En, fr, it] Dep. of Agric. Biology, Univ. of Ibadan, Ibadan, Nigeria.

Farmyard manure (rotted cow dung plus 5% straw of *Pennisetum purpureum*), aqueous extract of neem (*Azadirachta indica* leaves boiled for 1.5 h), partially decayed dry cocoa pods (fruit husks of *Theobroma cacao* var. Amelonado) and partially decayed cassava peelings (roots of *Manihot utilissima*), used as soil amendments, reduced soil populations of *Pratylenchus brachyurus* around roots of *Zea mays* cv. Lagos White, at harvest 14 weeks after planting, by 35, 72, 58 and 75%, respectively. Root populations of the nematode were higher than in the untreated control, except in the neem treatment. In spite of this, yields were increased by 83, 124 and 20% in plots treated with farmyard manure, cocoa pods and cassava residues, respectively. Corresponding increases were observed in vegetative growth and biomass of the maize plants.

0510 VESTAD, R. **[Variety trials with alsike clover.]** Forsøk med alsike-kløversorter. *Forskning og Forsøk i Landbruket* (1973) **24** (6) 601-614 [No, en] Inst. for Planteforedling og Genetikk, N-1432 Aas-NLH, Norway.

In Norway extensive field trials supplemented with infection experiments showed alsike clover varieties to be much more resistant than red clover to red clover stem nematodes [*Ditylenchus dipsaci*]. Nematode-attacked alsike clover plants developed very week symptoms only. It is recommended to replace some of the red clover in the seed mixtures by alsike clover where the soil is heavily infested with these nematodes.

0511 RHOADES, H. L. **Comparison of 2 methods of applying granular nematicides for control of sting nematodes on snap beans, sweet corn and field corn.** *Proceedings of the Soil and Crop Science Society of Florida* (1974) **33**, 77-79 [En] Agric. Res. and Education Cent., Sanford, Florida 32771, USA.

Good control of *Belonolaimus longicaudatus* and excellent increases in yield of *Phaseolus vulgaris*, *Zea mays* var. *saccharata* and *Z. mays* were obtained by applying fensulphothion, phenamiphos and carbofuran at 2.24 kg/hectare. Slightly increased stands of sweet and field corn resulted from wide band treatments (granules applied in a 38 cm band, 5 to 8 cm deep before planting) compared with narrow band treatments (applied in a 20 cm band during planting). Ethoprop (at 2.24 kg/hectare) was effective by both methods on snap beans and by the 38 cm band treatment on sweet and field corn, but was phytotoxic to corn when concentrated in the 20 cm band. Oxamyl at 2.24 kg/hectare gave good control on snap beans but was very poor on sweet and field corn by both methods.

0512 SALTUKOGLU, M. E. ***Merlinius viciae* n.sp. (Tylenchida: Nematoda) from Turkey and redescription of *Merlinius camelliae* Kheiri, 1972.** *Biologisch Jaarboek Dodonaea* (1973) **41**, 188-193 [En, fr] Lab. voor Morfologie en Systematiek der Dieren, Rijksuniversiteit, B-9000 Gent, Belgium.

Merlinius viciae n.sp. is described from soil around the roots of broad bean (*Vicia faba*) and parsely (*Petroselinum*) at Istanbul, Turkey. The female is characterized by having 1.11 mm long body, 32μ long spear with backwardly sloping 7μ wide knobs; body striae averaging 1.3μ apart; lip region truncated, not offset, 5μ high by 12μ wide at base, with 6-7 annules; spermatheca with sperms; tail 48μ long, cylindrical with hemispherical, annulated terminus; lateral fields on tail widening posteriorly and phasmids slightly anterior to middle of the tail. The males

are 0.99 to 1.13 mm long and have spear, spicules and gubernaculum measuring 31 to 34μ, 34 to 35μ and 11 to 12μ long, respectively. *M. camelliae* is redescribed on the basis of a population from around the roots of garlic (*Allium sativum*) from Istanbul, Turkey.

0513 TANDON, R. S.; SINGH, S. P. **Two plant parasites of two different families of nematodes parasitising lady finger (*Abelmoschus esculentus*) at Lucknow.** *Zoologischer Anzeiger* (1973) **191** (1/2) 139-150 [En] Dept. of Zoology, Univ. of Lucknow, India.

Hoplolaimus abelmoschi n.sp. and *Aphelenchoides lucknowensis* n.sp. are described from the roots of *Abelmoschus esculentus* from Lucknow, India. Both species are bisexual and copulation is described for *H. abelmoschi*, which species also occurs on roots of maize and scales and roots of onion at Lucknow. *H. abelmoschi* has lateral fields appearing as a very narrow interruption of the annules, 3 oesophageal gland nuclei [depicted in figure 1 but not described] and is close to *H. pararobustus* from which it is said to differ in body measurements, and in the female having 5 labial annules, spear 42 to 47μ long, vulva at 47 to 62% of the body length from anterior end, hemizonid 8 to 9 annules posterior to the excretory pore and opposite the oesophageal glands. The male differs in the size of the spicules and gubernaculum which are 44 to 47μ and 13 to 18μ long respectively. Females of *A. lucknowensis* are 0.56 to 0.76 mm long with spear 11 to 14μ long without distinct basal thickening [figures 12, 13 and 14 show otherwise], the lateral fields are marked with 4 incisures, and the excretory pore lies between the nerve ring and the median oesophageal bulb or opposite the latter. The head is offset, the vulva at 65.75 to 72.0% of the body length from the anterior end, the ovary extends forward to the oesophageal glands with oocytes arranged in a single file, the post-vulval uterine sac is 2.5 body widths long and filled with sperms and the tail has a single ventrally placed mucro and measures 2.5 to 3 anal [body] diameters long. The dorsal limb of the spicule measures 24μ long and the male tail carries a terminal, conical, sharply pointed mucro.

***0514** BIRD, A. F. **Observations on chromosomes and nucleoli in syncytia induced by *Meloidogyne javanica*.** *Physiological Plant Pathology* (1973) **3**, 387-391 [En, 3 pl. (unpaged)] C.S.I.R.O., Div. of Horticultural Research, G.P.O. Box 350, Adelaide, South Australia 5001.

Observations on chromosomes and nucleoli in syncytia induced in roots of *Vicia faba* by *Meloidogyne javanica* have shown that in small syncytia mitosis is synchronous while in larger ones a phase lag occurs. In the early stages of formation of syncytia, cell wall break-down and cell fusion were observed. The growth of syncytia is thought to be by a combination of cell fusion and mitosis. Mitosis appears to be stimulated by the nematode only in the pre-moult phase of development, though the chemical nature of the stimulating substance is unknown. The combined size of the nucleoli in the syncytial nuclei increases irregularly, often to a considerable extent, during growth of the syncytium.

***0515** CAMPBELL, W. F.; GRIFFIN, G. D. **Stem nematode-induced injury to alfalfa plants.** *Utah Science* (1973) **34** (3) 74-77 [En]

Damage to alfalfa caused by *Ditylenchus dipsaci* is described and illustrated by light and electron microscopy of the hypocotyl region of infected and control plants. The symptoms of "white flagging" caused by *D. dipsaci*, which occurred in alfalfa in Utah, USA, in 1970-71 are described.

0516 CAUBEL, G. **[Study of *Ditylenchus dipsaci* (Kühn) Filipjev populations. Distribution and fluctuations in the soils of Western France in vegetable and fodder cultures.]** Étude des populations de *Ditylenchus dipsaci* (Kühn) Filipjev distribution et fluctuations dans les sols de l'ouest de la France en cultures légumières et fourragères. *Annales de Zoologie, Écologie Animale.* (1973) **5** (3) 309-324 [Fr, en] Laboratoire de Recherches de la Chaire de Zoologie, École nationale supérieure agronomique, I.N.R.A., 65, rue de Saint-Brieuc, 35042 Rennes Cedex, France.

The distribution and numerical fluctuations of *Ditylenchus dipsaci* in soil under clover and onion were studied in western France. Distribution was uneven and difficult to estimate quantitatively. Population density varied with the season, increasing slowly in spring when the soil temperature exceeded 15°C, with a rapid increase in May and a decline towards the end of September. Few individuals were normally found below 20 cm, but when placed deep in the soil they rapidly migrated upward in the presence of a host plant. The vertical distribution is influenced by the part of the plant infested, the stem in this instance. Adults were rare in soil and 4th-stage larvae made up most of the population. A seed-borne infestation does not increase much during the first year of a host crop but a spot-infection at the beginning of the season spreads to give a low but regular distribution. Survival of the nematodes is linked to the soil characteristics.

0517 ESTEY, R. H.; OGIGA, I. R. **Cellular responses of turnip and corn root tissues to invasion and parasitism by *Pratylenchus penetrans*.** [Abstract].

Phytoprotection (1973) **54**, 90 [En] Macdonald College, Quebec, Canada.

A study of root tissues of turnip (*Brassica rapa*) and corn (*Zea mays*) that had been parasitized by an axenic culture of *Pratylenchus penetrans* showed that similar tissues in the two hosts reacted similarly, whereas different tissues within each host reacted differently. Endodermal cells of both hosts were similarly discoloured, usually in advance of, or several cells away from, nematodes in the adjacent cortical tissue. Invaded cortical cells commonly collapsed, as nematodes moved through them, leaving cavities containing substances that appeared granular in prepared slide mounts of the tissue.

0518 HIRLING, W. **[Damage to maize by the cereal cyst nematode (*Heterodera avenae*) and the technique of examination.]** Schäden an Mais durch das Getreidezystenälchen (*Heterodera avenae*) und die Untersuchungstechnik für den Nachweis des Befalls. *Gesunde Pflanzen* (1974) **26** (3) 58-62 [De, en] Landesanstalt für Pflanzenschutz, Stuttgart, Germany.

Heterodera avenae infestation of maize in Baden-Württemberg, Germany, is described. Larvae invade the roots causing poor plant growth. Only males develop to maturity. When they leave the roots some recovery of growth may occur but there is an estimated yield loss of 40 per cent. No cysts have been found on maize. A technique for examining roots for *Heterodera* males is described.

***0519** YEATES, G. W. **Annual cycle of root nematodes on white clover in pasture. I. *Heterodera trifolii* in a yellow-grey earth.** *New Zealand Journal of Agricultural Research* (1973) **16** (4) 569-574 [En] Soil Bureau, DSIR, Private Bag, Lower Hutt, New Zealand.

From November 1971, to December 1972, fortnightly samples for *Heterodera trifolii* were taken in an area in New Zealand which had been pasture for at least 50 years and where the soil is Kokatau silt loam (a strongly gleyed yellow-grey earth), annual rainfall is 624 to 944 mm and there is typically a summer drought. Cyst numbers per 350 ml core were stable at 600 to 800 except for periods in autumn and spring when they fell to 200 to 300. The decreases were correlated with the appearance in the roots of the white clover of larvae which developed into females and returned to the soil as cysts. In spring invading larvae died in the roots but subsequent re-invasion led to counts twice as high as those in the autumn, probably due to more favourable soil moisture levels. Occurrence of larvae in the soil generally preceded root invasion and times of invasion corresponded with the autumn and spring periods of pasture growth. The combination of *H. trifolii* invasion and low soil moisture appears to be responsible for the poor autumn growth and lack of vigour of white clover in these soils. Although *H. trifolii* is regarded as the primary pathogen, secondary infection probably occurs also.

***0520** YEATES, G. W. **Annual cycle of root nematodes on white clover in pasture. II. *Meloidogyne hapla* and *Heterodera trifolii* in a yellow-brown loam.** *New Zealand Journal of Agricultural Research* (1973) **16** (4) 575-578 [En] Soil Bureau, DSIR, Private Bag, Lower Hutt, New Zealand.

From October 1971 to January 1973, monthly samples for *Meloidogyne hapla* and *Heterodera trifolii* on white clover were taken from an Egmont brown loam soil in New Zealand. This soil is friable, free-draining, yellow-brown loam which supports excellent pastures in a wet climate. Large numbers of larvae were present in the clover roots in the spring. As larval numbers declined the number of *H. trifolii* females reached a peak and cyst counts were lowest when larvae were invading the roots. *M. hapla* knots were abundant in summer and low in winter, indicating that this species overwinters as eggs in egg masses. Pasture growth in spring corresponds well with invasion of clover roots by nematode larvae.

0521 WEBSTER, G. R.; ORCHARD, W. R.; HAWN, E. J. ***Paratylenchus projectus* in alfalfa fields of central and northern Alberta.** *Canadian Plant Disease Survey* (1972) **52** (2) 75-76 [En] Alberta Inst. of Pedology, Univ. of Alberta, Edmonton, Canada.

Soil adhering to lucerne roots from 43 locations in Alberta, Canada, was examined for the presence of the nematode *Paratylenchus projectus*. Counts ranged from 0 to 7,000 per kg of dry soil, with over 4,000 in 23% of samples. Most of the high counts were from areas where lucerne showed symptoms of poor growth, chlorosis and reduced nodulation. The authors consider that the association of *P. projectus* with "alfalfa sickness" should be investigated.

0522 ELGIN, J. H., JR.; PEADEN, R. N.; FAULKNER, L. R.; EVANS, D. W.; GRAY, F. A. **Reactions of 101 alfalfas to stem nematode at three temperatures.** In *Crop Science Abstracts, 1971 Annual meeting, Western Society of Crop Science*. University of Wyoming. (1971) 11 [En] Washington State Univ., Prosser, USA. From *Plant Breeding Abstracts 42*, 2808.

0523 GRIFFIN, G. D.; HUNT, O. J. **Plant age, a factor determining resistance of alfalfa to *Meloidogyne hapla*.** In *Crop Science Abstracts, 1971 Annual meeting, Western Society of Crop Science*. University of Wyoming. (1971) 10 [En] Plant Science Research Div., ARS, Logan, Utah, USA. From *Plant Breeding Abstracts 42*, 2809.

[Age of seedlings and temperature were both correlated with galling of lucerne by *Meloidogyne hapla*.]

0524 NIGH, E. L., JR. **Resistance of selected alfalfa clones to the root knot nematode, *Meloidogyne incognita*.** [Abstract.]. *Phytopathology* (1972) **62** (7) 780 [En] Univ. of Arizona, Tucson, USA.

***0525** WEBBER, A. J., JR.; FOX, J. A. **Interaction of genetic and environmental factors influencing sex determination of *Meloidogyne graminis*.** [Abstract.]. *Phytopatholgy* (1972) **62** (6) 673 [En] Va. Polytech. Inst. & State Univ., Blacksburg, USA.

Environmental conditioning of the host plant, *Cynodon* sp., had a greater effect on the proportion of males in 2 populations of *Meloidogyne graminis* than did preconditioning of the nematodes. However the population normally having a greater proportion of males retained this characteristic, indicating a predominant genetic effect.

***0526** ROBERTSON, W. K.; HAMMOND, L. C.; LUNDY, H. W.; DICKSON, D. W. **Effect of soil management practices on populations of nematode genera in corn (*Zea mays* L.).** *Proceedings of the Soil and Crop Science Society of Florida* (1974) 33, 80-82 [En] Univ of Florida, Gainesville, Florida, USA.

In a soil management experiment numbers of *Criconemoides* spp., *Belonolaimus* sp., *Meloidogyne* spp., *Trichodorus* spp. and *Pratylenchus* spp. were not related to plant numbers of *Zea mays* or to soil fertility. Apparently, numbers of nematodes were greater, and damage occurred, before the maize crop reached the dough stage of maturity. Treatment with EDB at 57 litres/hectare reduced *Belonolaimus* spp., *Meloidogyne* spp. and *Pratylenchus* spp. to trace levels in the following year, and in general *Trichodorus* spp. populations were also lower. Numbers of *Criconemoides* spp. were high and related to crop growth and rates of applied N. Populations of *Criconemoides* spp. and *Trichodorus* spp., soil K and Mg and maize grain yields were higher when an asphalt layer was present 60 cm below the soil surface.

0527 TOWNSHEND, J. L. **Influence of edaphic factors on penetration of corn roots by *Pratylenchus penetrans* and *P. minyus* in three Ontario soils.** *Nematologica* (1972) **18** (2) 201-212 [En, fr] Research Stn., Canada Dept. of Agriculture, Vineland Stn., Ontario, Canada.

The optimum temperature for the penetration of maize roots by *Pratylenchus penetrans* was 20°C and for *P. minyus* was 30°C. Moisture tension at 10 to 100 cm of water was best for penetration, which was greater in a coarse sandy loam than in silt loams.

***0528** WHITEHEAD, A. G. ; FRASER, J. E. **Injury to field beans (*Vicia faba* L.) by *Tylenchorhynchus dubius*.** *Plant Pathology* (1972) **21** (3) 112-113 [En] Rothamsted Experimental Station, Harpenden, Herts, UK.

Barley was grown twice in pots of sterile soil inoculated with one or two hundred *Tylenchorhynchus dubius* in distilled water. Although the barley was apparently unharmed the nematode multiplied several hundredfold. *Vicia faba* cv. Tarvin, grown in the pots, were severely damaged by the nematode; plants were stunted and root systems sparse. The method used could be adapted to suit other nematodes and crops.

0529 BRITAIN. MINISTRY OF AGRICULTURE, FISHERIES AND FOOD. **Stem eelworm on clover.** *Advisory Leaflet, Ministry of Agriculture, Fisheries and Food* (1972) No.409, 5 pp. [En, Revised]

The symptoms of disease due to *Ditylenchus dipsaci* attack on red and white clovers are described in this revised edition. Control is by crop rotation, the use of resistant varieties of red clover and fumigation of red clover seed with methyl bromide.

0530 CAUBEL, G. **Observations on some conditions influencing stem eelworm attack on maize.** [Abstract.]. In *International Symposium of Nematology (11th). European Society of Nematologists, Reading, UK, 3-8 September, 1972. Abstracts.* (1972) 7-8 [En, Fr] INRA, Laboratoire de Recherche de la Chaire de Zoologie, Rennes, France.

Ditylenchus dipsaci is increasing in importance on maize in France. Cool wet

weather in May and June favours the nematodes and infestation results in lodging of the plants. Most attacks are on maize cultivated for the first time and a bad attack often occurs in a crop following oats.

0531 DASGUPTA, D. R.; SESHADRI, A. R. **Effect of age of seedlings and nematode density on host-parasite relationships of *Rotylenchulus reniformis* and cow pea (*Vigna sinensis*).** [Abstract.]. In *International Symposium of Nematology (11th). European Society of Nematologists, Reading, UK, 3-8 September, 1972. Abstracts.* (1972) 16 [En] Div. of Nematology, Indian Agricultural Research Inst., New Delhi, India.

In pot experiments, an inoculum of 20 *Rotylenchulus reniformis*/g of soil was more damaging on 7-day-old *Vigna sinensis* seedlings than on older seedlings. Nematode reproduction rate was greatest with inocula of 1,000 nematodes/g of soil.

0532 GRUJIČIĆ, G. **[Occurrence and pathogenicity of parasitic nematodes on maize in Serbia.]** Pojava i štetnost parazitnih nematode na kukuruzu u Srbiji. *Savremena Poljoprivreda* (1969) **17** (5/6) 667-672 [Sh, en]

Ditylenchus dipsaci has been found on maize in several localities in Serbia, Yugoslavia. Symptoms of attack include twisting and deformation of the stems and leaves and stunted and poorly-filled ears. Inoculation experiments were undertaken to determine the race of stem nematode present. Other nematodes of corn investigated were *Pratylenchus* spp. and *Meloidogyne* spp. Cysts, and sometimes young females of *Heterodera punctata* were also found.

* **0533** KATCHO, Z. A. **First occurrence of certain root-knot nematode species in Iraq.** *Plant Disease Reporter* (1972) **56** (9) 824 [En] Plant Pathology Div., Abu-Ghraib, Iraq.

Meloidogyne javanica has been reported in Iraq on a wide variety of crops. Recently *M. arenaria* was found on watermelon and fig and *M. incognita* on watermelon [*Citrullus vulgaris*], peach and bean [*Vicia faba*]. This is the first known record of the last 2 species in Iraq. All 3 root-knot nematodes were observed on the same watermelon roots. It is hoped to control these nematodes by the use of chemicals, fallowing and by growing resistant varieties.

0534 TERENT'EVA, T. G.; ALPAT'EV, N. M. **[Nematode disease of lucerne.]** *Zashchita Rastenii* (1972) No. 6, 45 [Ru]

The nematodes of lucerne in the northern Caucasus were studied. *Heterodera paratrifolii* is considered of greatest importance, since 833 hectares were found infested out of 1,267 hectares surveyed. 424 full cysts containing 45,163 eggs and larvae were found per 100 cm^3 of soil. The nematode was not found on red clover roots. The symptoms of disease caused by *H. paratrifolii* on lucerne are described.

***0535** WILLIAMS, W. M. **Laboratory screening of white clover for resistance to stem nematode.** *New Zealand Journal of Agricultural Research* (1972) **15** (2) 363-370 [En] Grasslands Div., DSIR, Private Bag, Palmerston North, New Zealand.

A large number of white clover lines were screened for resistance to *Ditylenchus dipsaci* under New Zealand conditions. A rapid screening technique using seedlings in filter paper rolls inoculated with nematodes in 3% cellulose gum is described. Correlation with field trials was not good and the influence of nematode 'race' and of age of seedling at inoculation were investigated. Unsatisfactory results were obtained if plants were inoculated too soon (2 days) after germination. Varieties differed in their relative susceptibilities to the nematode, but susceptibility to a mixture of red and white clover race nematodes was no greater than to the white clover race alone.

***0536** WILLIAMS, W. M.; BARCLAY, P. C. **The effect of clover stem eelworm on the establishment of pure swards of white clover.** *New Zealand Journal of Agricultural Research* (1972) **15** (2) 356-362 [En] Grasslands Div., DSIR, Private Bag, Palmerston North, New Zealand.

A comparison was made of establishment of 5 white clover lines sown as pure swards on soil infested with *Ditylenchus dipsaci* and on uninfested Nemafos-treated soil. On infested soil two lines found to be resistant (Morocco × "Grasslands 4700" and Ladino × "Grasslands 4700") showed most rapid establishment and least production loss due to poor establishment. A very susceptible line from Israel suffered severe loss due to eelworm attack, and the varieties 'Grasslands Huia' and 'Grasslands 4700', known to be of intermediate susceptibility, showed an intermediate loss of production due to the effects of eelworm on establishment. All except the Israeli line recovered from the initial effect of eelworm attack on newly germinated seedlings and within 9 months from sowing were producing as much forage dry matter in the presence as in the absence of eelworm. Recovery was possible by virtue of the sprawling nature of the white clover plant, the recovery

*0537 TURNER, D. R.; CHAPMAN, R. A. **Infection of seedlings of alfalfa and red clover by concomitant populations of *Meloidogyne incognita* and *Pratylenchus penetrans*.** *Journal of Nematology* (1972) 4 (4) 280-286 [En] Dept. of Plant Pathology, Univ. of Kentucky, Lexington 40506, USA.

A study was made of the invasion of 2-day-old seedlings of lucerne var. Buffalo and red clover (*Trifolium pratense*) var. Kenland by larvae of *Meloidogyne incognita* and adults of *Pratylenchus penetrans* during one to 3-day incubation periods on 1% agar at 24 C. When the nematode species were inoculated separately the numbers invading increased arithmetically with increasing numbers in the inoculum but *P. penetrans* entered both hosts in greater numbers than *M. incognita*. The preferred host of *M. incognita* was clover and that of *P. penetrans* lucerne, but root growth of lucerne was inhibited more than that of clover by both nematodes. When inocula consisting of both nematodes in equal numbers, or 10 of one and 50 of the other species, were used, the numbers invading were not affected, but penetration of *M. incognita* into lucerne (but not into red clover) was significantly reduced when 50 *M. incognita* and 200 *P. penetrans* were inoculated together. When large numbers of *P. penetrans* entered either plant, invasion by *M. incognita* was significantly reduced. In the reciprocal situation penetration by *P. penetrans* was not affected. There are 36 references.

*0538 WILLIS, C. B. **Effects of soil *p*H on reproduction of *Pratylenchus penetrans* and forage yield of alfalfa.** *Journal of Nematology* (1972) 4 (4) 291-295 [En] Canada Dept. of Agriculture, Box 1210, Charlottetown, Prince Edward Island, Canada.

The effects of soil *p*H on the reproduction of *Pratylenchus penetrans* on lucerne and the effects of soil *p*H and nematode infestation on forage yield of lucerne under glasshouse conditions were studied. Large numbers of nematodes were recovered from roots of plants grown at *p*H 4.4 after 9 weeks but after 18 and 30 weeks greater numbers were recovered at *p*H 5.2 and *p*H 6.4. The highest level of reproduction of *P. penetrans* which occurred at *p*H 5.2 resulted in the greatest decrease in forage yield. Soil *p*H had a significant effect on forage yields throughout the growing period. The interaction of nematode infestation and soil *p*H on forage yield was highly significant at 26 and 30 weeks.

*0539 BOYD, F. T.; PERRY, V. G. **Effects of seasonal temperatures and certain cultural treatments on sting nematodes in forage grass.** *Proceedings. Soil and Crop Science Society of Florida* (1971) 30, 360-365 [En] Florida Agricultural Experiment Stn., Gainesville, Florida 32601, USA.

The numbers and distribution of *Belonolaimus longicaudatus* in a sandy soil in Florida, USA, were greatly influenced by soil temperature and by the species of grass grown. Data collected over 12 months showed the nematodes in the upper 6 in of soil to be most numerous in April and May and fewest in June and July. The best host for the nematodes was *Hemarthria* and the poorest *Digitaria*. The nematicide Dasanit applied in April gave increased yield of pangolagrass harvested in July, but had no effect on the September harvest because of slight nematode activity during summer.

0540 KOSHY, P. K.; SWARUP, G. **Susceptibility of plants to pigeonpea cyst nematode, *Heterodera cajani*.** *Indian Journal of Nematology* (1972, publ. 1973) 2, 1-6 [En] Div. of Nematology, Indian Agricultural Research Inst., New Delhi, India.

To determine the host range of *Heterodera cajani*, 105 species of plants belonging to 58 genera in 21 families were tested. Of these, only 19 (18 in Leguminosae and *Sesamum indicum* in Pedaliaceae) proved to be hosts. Pigeon pea [*Cajanus cajan*], hyacinth bean [*Dolichos lablab*], green gram [*Phaseolus radiatus*], cowpea [*Vigna catjang*] and *Sesamum indicum* were the most favoured hosts and showed extensive damage due to the nematode.

*0541 PALL, B. S.; CHAND, J. N. **A nematode parasite of maize in Madhya Pradesh.** *Indian Phytopathology* (1971, publ. 1972) 24 (3) 607-608 [En] Dept. of Plant Pathology, J.N. Krishi Viswa Vidyalaya, Jabalpur (M.P.), India.

Pratylenchus zeae was found associated with maize in Madhya Pradesh, India. The crop was very poor showing stunted growth and yellowing. In pot experiments significant differences in height were observed in maize plants inoculated with the nematode and in plants serving as controls, the former showing very poor growth.

*0542 PHIPPS, P. M.; STIPES, R. J.; MILLER, L. I. **A race of *Meloidogyne incognita* from *Albizzia julibrissin* parasitizes *Nicotiana tabacum* 'NC 95'.** [Abstract]. *Journal of Nematology* (1972) 4 (4) 232 [En] Dept. of Plant Pathology and Physiology, Virginia Polytechnic Inst. and State. Univ., Blacksburg 24061, USA.

[*Meloidogyne incognita* from *Albizzia julibrissin* reproduced well on the resistant tobacco NC 95, amongst other crop plants.].

0543 EDWARD, J. C.; MISRA, S. L. ***Heterodera vigni* n.sp. and second stage larvae of *Heterodera* spp. in Uttar Pradesh, India.** *Allahabad Farmer* (1968) **42** (3) 155-159 [En] Biology Dept., Allahabad Agricultural Inst., Allahabad, U.P., India.

Heterodera vigni n.sp. is described on *Vigna sinensis* in India. The cysts resemble those of the *H. schachtii* group in being lemon-shaped, ambifenestrate, bullate and with an underbridge. The new species is closest to *H. sacchari* but cysts and larvae are smaller (2nd stage larvae 440 μ compared with 480 μ in *H. sacchari*); in the larvae the oesophageal gland duct opens closer to the stylet base (3 to 5 μ compared with 5 to 8 μ in *H. sacchari*), the excretory pore is more anterior, the lateral field is narrower, the stylet shorter (18 to 22 μ against 23 to 25 μ in *H. sacchari*) and the males longer. Unidentified 2nd stage *Heterodera* larvae are also described from the rhizosphere of *Diospyros tomentosa* and *Tectona grandis* and a larger unidentified species from *Bombax malabaricum*. The former are close to *H. glycines* but differ in the ratio of spear length to clear tail tip length and in having 3 incisures on the lateral field. The second species resembles *H. trifolii* but also differs in having 3 incisures on the lateral field. No cysts of either population have been found.

0544 KHAN, E.; CHAWLA, M. L.; SESHADRI, A. R. ***Longidorus mirus* sp. nov. (Nematoda: Longidoridae) from soil around the roots of maize from Delhi, India.** *Bulletin of Entomology* (1971, publ. 1972) **12** (2) 113-117 [En] Div. of Nematology, Indian Agricultural Research Inst., New Delhi-12, India.

Longidorus mirus n.sp., from soil around roots of maize (*Zea mays*) from field No. 6 of Agronomy Division, I.A.R.I., New Delhi, India, is 3.0 to 3.6 mm long, odontostyle 75 to 85 μ, odontophore 40 to 50 μ, lip region continuous, lateral hypodermal glands 56 anterior to vulva and 60 posterior, tail dorsally convex-conoid and terminus bluntly rounded. A key to species of *Longidorus* is given.

0545 KHEIRI, A. ***Tylenchus* (*Irantylenchus*) *clavidorus* n.sp. and *Merlinius camelliae* n.sp. (Tylenchida: Nematoda) from Iran.** *Nematologica* (1972) **18** (3) 339-346 [En, fr] Inst. voor Dierkunde, Ledeganckstraat 35, Gent, Belgium.

Tylenchus (*Irantylenchus*) *clavidorus* n.subg., n.sp., from around roots of lucerne in an orchard at Isfahan, Iran, is characterised by its moderately developed spear with round to clavate basal swelling, the ventral junction of the oesophageal lumen with the spear lumen (at the base of the spear) and the position of the dorsal oesophageal gland outlet at half to one spear length behind the spear base. The new species is close to *T. vicinus* which is considered to be in the same subgenus. *Merlinius camelliae* n.sp. is described from 3 males and 2 females collected from around the roots of tea (*Camellia sinensis*) and *Citrus* sp. at 2 places in Iran. It is distinguished by having 6 incisures on the lateral field, the ventral curvature of the body on death, an offset spermatheca, the female tail with thickened cuticle and annulated terminus, spicules with curved, notched distal ends and gubernaculum also strongly curved. There is a well d e v eloped bursa. The female tail of *Tylenchorhynchus parobscurus* is similar to that of the new species and *T. parobscurus* is therefore transferred to *Merlinius* and becomes *M. parobscurus* n.comb.

0546 VERMA, R. S. ***Scutellonema ramai* sp. nov. (Nematoda: Hoplolaiminae) associated with *Sorghum vulgare* Pers. from Uttar Pradesh.** *Bulletin of Entomology* (1970, publ. 1972) **11** (2) 118-120 [En] Zoology Dept., Aligarh Muslim Univ., Aligarh (U.P.), India.

Scutellonema ramai n.sp., from soil around roots of jowar (*Sorghum vulgare*) from Gonda, U.P., India, is 0.65 to 0.72 mm long, lip region with 3 to 4 annules, spear 27 to 28 μ with rounded basal knobs, tail marked with 14 to 16 annules, and scutella 3μ in diameter situated opposite anus.

* **0547** JOHNSON, A. W.; CHALFANT, R. B. **Control of nematodes and corn earworm on sweet corn.** [Abstract.]. *Journal of Nematology* (1972) **4** (4) 227-228 [En] Plant Science Research Div., ARS, USDA, Coastal Plain Experiment Stn., Tifton, Ga. 31794, USA.

Belonolaimus longicaudatus, *Trichodorus christiei*, *Criconemoides ornatus* and *Pratylenchus zeae* were present in plots treated with the soil fumigants D-D, DBCP or EDB, or the non-volatile granular insecticide/nematicides aldicarb, carbofuran, fensulfothion, phenamiphos and prophos. *Zea mays* var. *saccharata* was sown 1 to 3 days after soil treatment. The non-volatile materials were best for controlling *B. longicaudatus* and *T. christiei*; aldicarb was ineffective against *C. ornatus*; all pesticides controlled *P. zeae*. Average yields were increased by the treatments. Corn earworm was not controlled.

* **0548** COHN, E.; AUSHER, R. ***Longidorus cohni* and *Heterodera latipons*, economic nematode pests of oats in Israel.** *Plant Disease Reporter* (1973) **57** (1) 53-54 [En] Volcani Center, Bet Dagan, Israel.

Longidorus cohni was first observed in the Sharon region, Israel, in 1969 on

Rhodes grass and lucerne: it was later found on ryegrass and occasionally on oats. By the winter of 1971/72 it was found in most winter oat fields, causing severe damage with patches of stunted, chlorotic plants. This is apparently the first record of economic damage to a cereal by ectoparasitic nematodes. Heavy infestations of *Heterodera latipons* were also found in one field and the rapid increase in numbers of both species is assumed to be the result of the recent adoption of oat monoculture.

0549 GRIFFIN, G. D. **Interaction of *Meloidogyne hapla* and *Ditylenchus dipsaci* on root knot-resistant alfalfa.** [Abstract]. *Phytopathology* (1972) **62** (10) 1103 [En] USDA, ARS, Utah State Univ., Logan, USA.

[*Ditylenchus dipsaci* predisposed root-knot resistant lucerne seedlings to infestation by *Meloidogyne hapla*.].

0550 INO, M. **[On the water dissemination of *Aphelenchoides besseyi*. III. Nematode infestation of weeds and disease occurrence in a heavily infested area.]** *Proceedings of the Kanto-Tosan Plant Protection Society* (1971) No. 18, 123 [Ja] Ibaragi Agricultural Experiment Stn., Mito, Ibaragi 311-42, Japan.

[A large nematode population on *Panicum crus-galli* var. *frumentaceum* and slight infestation on *Panicum bisulcatum* and *Digitaria adscendens*.]

***0551** MICHELL, R. E.; MALEK, R. B.; TAYLOR, D. P.; EDWARDS, D. I. **Races of the barley root-knot nematode, *Meloidogyne naasi*. I. Characterization by host preference.** *Journal of Nematology* (1973) **5** (1) 41-44 [En] Univ. of Illinois, Urbana 61801, USA.

Populations of *Meloidogyne naasi* from 5 geographical locations were tested for their ability to reproduce on 22 plant species. Differences indicated the presence of 5 physiological races. *Digitaria sanguinalis* is a new host record, all races reproducing on it. The races can be differentiated by their reaction on *Agrostis palustris* var. Toronto C-15, *Rumex crispus* and *Sorghum bicolor* var. RS-610.

0552 NÜESCH, B. **[Stem-eelworm damage and breeding for resistance in red clover.]** Schäden durch Stengelälchen und Resistenzzüchtung bei Rotklee. *Grüne* (1971) No. 37, 1313-1324 [De] FAP, Zürich-Reckenhalz, Switzerland. From *Plant Breeding Abstracts 42*, 5360.

[Heritability of resistance to [*Ditylenchus dipsaci*] in [*Trifolium pratense*].].

***0553** SOUTHARDS, C. J.; PRIEST, M. F. **Variation in pathogenicity of seventeen isolates of *Meloidogyne incognita*.** *Journal of Nematology* (1973) **5** (1) 63-67 [En] Univ. of Tennessee Inst. of Agriculture, Knoxville 37916, USA.

Meloidogyne incognita was collected from 17 localities in Tennessee, USA, and tested on 6 host plants. All 17 isolates infested Rutgers tomato and none infested tobacco var. N.C. 95. From the root-knot indices on cotton (*Gossypium hirsutum* var. McNair 1032), cowpea (*Vigna sinensis*, line M57-13N), watermelon (*Citrullus vulgaris* var. Dixie Queen) and pepper (*Capsicum frutescens* var. California Wonder) it is deduced that 6 physiological races of the nematode were present. The implications for breeding crops resistant to *M. incognita* are discussed.

0554 BIRD, A. F. **Cell wall breakdown during the formation of syncytia induced in plants by root knot nematodes.** *International Journal for Parasitology* (1972) **2** (4) 431-432 [En] CSIRO Div. of Horticultural Research, Adelaide, South Australia.

In a study of syncytia formation, serial sections 2 μ thick were cut from roots of *Vicia faba*, tomato and cabbage infected with *Meloidogyne javanica*. Syncytia were closely associated with adjacent cells which sometimes protruded into the syncytial cytoplasm, while at other times there was breakdown of syncytial and adjacent cell walls allowing contact of the cytoplasm. The results support the hypothesis that syncytia are formed partly by incorporation of cells whose walls have dissolved rather than by expansion of a single cell. They also explain the variability in nucleic acid content of the syncytial nuclei.

***0555** BOYD, F. T.; SCHRODER, V. N.; PERRY, V. G. **Interaction of nematodes and soil temperature on growth of three tropical grasses.** *Agronomy Journal* (1972) **64** (4) 497-500 [En] Florida Agricultural Experimental Stn., IFAS, Gainesville, 32601, USA.

Relationships between soil temperatures and the effects of 2 nematode species on forage yields of 3 important Florida pasture grasses were studied in temperature-controlled glasshouse experiments. *Belonolaimus longicaudatus* was most active at 20 to 34°C. Yields of *Paspalum notatum* and *Hemarthria altissima* were greatest between 34° and 38°C, and of *Digitaria decumbens* at 38° to 41°C. At these high

temperatures, numbers of *B. longicaudatus* were greatly reduced but *Criconemoides* spp. were little affected. A short literature review is given of host-parasite relationships on forage grass crops and temperature effects on nematodes.

0556 GOTOH, A. **[Comparison of nematode fauna between natural and artificial grasslands in the Aso District.]** [Abstract.]. In *Annual Meeting of the Japanese Society of Applied Entomology and Zoology, Fuchû, Tokyo, April 7-9, 1971.* (1971) 31 [Ja] Kyushu Agricultural Experiment Stn., M.A.F., Nishigôshi, Kumamoto 861-11, Japan.

On grasslands located 700 m above sea level, *Meloidogyne* was most prevalent on clover in both natural and sown grasslands, but spiral nematodes, cyst nematodes, *Pratylenchus* and *Paratylenchus* were rarely found on the sown grassland.

0557 YADAV, B. S.; VERMA, A. C. **Effect of season and crop on the population of certain species of parasitic nematodes.** [Abstract.]. In *International Symposium of Nematology (11th), European Society of Nematologists, Reading, UK, 3-8 September, 1972. Abstracts.* (1972) 83-84 [En] Agricultural Experimental Stn., Univ. of Udaipur, India.

[A 3-year study of soil populations of *Pratylenchus delattrei, Heterodera avenae* and *Tylenchorhynchus mashhoodi* in a wheat/maize rotation.].

* **0558** HUNT, O. J.; PEADEN, R. N. **Resistant plants combat the alfalfa nematode.** *Crops and Soils* (1972) **24** (6) 6-7 [En]

Damage to lucerne by stem nematode [*Ditylenchus dipsaci*] and root-knot nematodes [*Meloidogyne* spp.] is briefly described. Cultivation of resistant varieties is the best method of control. Suitable varieties are being developed.

0559 AUSTRALIA. CSIRO DIVISION OF HORTICULTURAL RESEARCH. **Report 1969-71.** Adelaide, Australia. (1971) 99pp. [En, Plant Nematology pp. 32-39.]

Unpublished research briefly reported includes the developmental morphology of *Radopholus neosimilis* and *R. inaequalis* collected from roots of *Eucalyptus* and other native Australian plants; the presence of *Pratylenchus coffeae* and/or *P. vulnus* in grapevine roots and of *P. penetrans* in *Nerium oleander*; the failure of abscisic acid to influence the development of *Meloidogyne javanica* in tobacco leaves ; the influence of the environment on the numbers of *Pratylenchus* in roots of wheat and oats and of *M. javanica* and other nematodes in clover roots and the melting point of the lipid layer of the egg shells of *Heterodera avenae, Aphelenchus avenae. M. javanica* and *Ascaris suum.* There are 3 unpaginated pages of plates, and reference is made to an 18 min 16 mm colour film on the life-cycle of *M. javanica.*

0560 NEW ZEALAND. DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH. **Report for the year ended 31 March 1972.** Wellington, New Zealand. (1972) 72 pp. [En, Plant nematology pp. 16-17, 21-22.]

Taxonomic studies of both root-knot [*Meloidogyne*] and cyst-forming [*Heterodera*] nematodes are being undertaken to enable accurate identification of New Zealand species to be made. Glasshouse pot trials on the effect of soil sterilization on clover growth in nematode-infested soil were carried out. Lucerne is being selected and bred for resistance to stem nematode [*Ditylenchus dipsaci*].

0561—ANON., 1970. [Annual Report of the work of the Swedish Seed Association in 1969.] "Årsberättelse över Sveriges Utsädesförenings verksamhet år 1969." *Sver. Utsädesför. Tidskr.*, **80** (2/3), 71–139.

Nearly all the current breeding material of barley has resistance to mildew or nematodes [*Heterodera avenae*] or both. The lucerne variety Sv0643 is resistant to nematodes [*Ditylenchus dipsaci*]. Potato varieties resistant to nematodes [*H. rostochiensis*], Sv66123 and Sv68130, are suitable for crisps and baking, respectively.

***0562** THOMPSON, L.S.; WILLIS, C.B. Influence of fensulfothion and fenamiphos on root lesion nematode numbers and yield of forage legumes. Canadian Journal of Plant Science (1975) 55 (3) 727-735 [En, fr] Res. Stn., Agric. Canada, P.O. Box 1210, Charlottetown, Prince Edward Island, Canada C1A 7M8.

In field trials, fensulfothion at 11.2, 22.4 and 44.8 kg/ha and fenamiphos at 5.6, 11.2 and 22.4 kg/ha applied to soil before planting of red clover (Trifolium pratense), alfalfa (Medicago sativa) and birdsfoot trefoil (Lotus corniculatus) reduced populations of Pratylenchus penetrans in the soil, as well as in rootlets of the legumes and increased seeding year yields. In the second growing season yields were increased only at the time of the second and third cuts. At the same rates of application, fenamiphos provided better nematode control than fensulfothion, particularly with increasing time following treatment.

0563–BOYD, F. T.; PERRY, V. G., 1970. "The effect of sting nematodes on establishment, yield, and growth of forage grasses on Florida sandy soils." *Proc. Soil Crop Sci. Soc. Fla*, Year 1969, 29, 288–300.

Of 18 forage grasses tested in Florida, USA, for resistance to *Belonolaimus longicaudatus*, some varieties of *Digitaria gazensis* and *D. procumbens* were non-hosts; *Digitaria* X 125–1, Coastcross 1, Paraguay bahia 22 (*Paspalum notatum* var.) and Slenderstem digitgrass (*Digitaria* sp.) were poor hosts and the others good hosts or grew poorly. 15 selections of 82 introductions of *Chloris gayana* were also highly resistant. Sting nematodes became inactive or descended to deeper layers when the temperature one inch below bare soil exceeded 103°F. Yields of susceptible Pangola grass (*Digitaria procumbens*) increased when soil temperature rose above 103°. Yields of a number of *Digitaria* species and varieties and of *Chloris gayana* introductions were correlated with their resistance to sting nematodes. Yields of both susceptible and resistant grasses were higher with increased fertilization in summer but the increased growth led to shading of the soil reducing soil temperature which favoured multiplication of the nematodes. Susceptible varieties therefore benefited less from fertilization than did resistant.

*0564–COLBRAN, R. C., 1971. "Studies of plant and soil nematodes. 15. Eleven new species of *Radopholus* Thorne and a new species of *Radopholoides* de Guiran (Nematoda: Tylenchoidea) from Australia." *Qd J. agric. anim. Sci.*, 27 (4), 437–460.

The following new species have been described from Queensland and New South Wales, Australia: *Radopholus rectus* from *Imperata cylindrica* var. *major*; *R. crenatus* from eucalypt forest soil;

0565–CASSINI, R.; CAUBEL, G., 1969. [*Ditylenchus dipsaci* on maize in Beauce in 1968.] "*Ditylenchus dipsaci* sur maïs en Beauce en 1968." *C. r. hebd. Séanc. Acad. Agric. Fr.*, 55 (9), 646–651.

An account is given of attack by *Ditylenchus dipsaci* on maize in the Beauce region of France. The first obvious symptom was the toppling over of plants having no secondary roots; stunting and "tulip-root" symptoms were observed in plants that remained standing. Necrosis occurred in stems at the level of development of the tillers. Nematodes were found in the tissues of affected plants. Previous cropping had no apparent effect on the occurrence of the disease but 12 of 18 fields affected were sown immediately before a cool rainy period. In preliminary tests using soil from fields with infested maize, no infestation was found

0566–GRIFFIN, G. D.; WAITE, W. W., 1971. "Attraction of *Ditylenchus dipsaci* and *Meloidogyne hapla* by resistant and susceptible alfalfa seedlings." *J. Nematol.*, 3 (3), 215–219.

Ditylenchus dipsaci were equally attracted to resistant Lahontan and susceptible Ranger lucerne seedlings exposed to them at various distances and under different temperature regimes. However, at 12·5 mm. and 20°C. the susceptibles were more attractive. The same was true for *Meloidogyne hapla* offered M-9 (resistant) and Lahontan (susceptible to this sp.) seedlings singly. When hatched midway between the two, more larvae were attracted to the susceptibles.

0567–GUPTA, J. C.; ATWAL, A. S., 1971. "Biology and ecology of *Hoplolaimus indicus* (Hoplolaiminae: Nematoda). II. The influence of various environmental factors and host plants on the reproductive potential." *Nematologica*, 17 (2), 277–284. [German summary p. 284.]

Hoplolaimus indicus thrives best at 30°C. and soil *p*H 7, in sandy loam with 16% moisture content. The host plants on which rapid multiplication takes place are tomato, sugar-cane and maize. No reproduction occurs on gram (*Cicer arietinum*), guava (*Cyamposis tetragonoloba*), tobacco, watermelon, sugar-beet and rape-seed. With an increase in the initial level of population a corresponding decrease in the rate of reproduction takes place.

*0568 YEATES, G.W.; CROUCHLEY, G.C.; WITCHALLS, J.T. Effect of soil fumigation on white clover growth in a yellow-grey earth infested with clover cyst nematode. New Zealand Journal of Agricultural Research (1975) 18 (2) 149-153 [En] Soil Bureau, DSIR, Lower Hutt, New Zealand.

A field trial in New Zealand to study the effects of soil fumigants on pure swards of 'Grasslands Huia' white clover growing in a yellow-grey earth infested Heterodera trifolii was run for 18 months. The treatments, replicated four times (24 plots, 2 x 1 m), were: control, methyl bromide, D-D at 300 l/ha, Nemagon at 11.23 l/ha or 22.46 l/ha, and Mocap at 67 kg/ha. 12 harvests were taken during the trial and mean yield response to fumigation was 7.6.% [- 0.2% (Nemagon 22.46 l/ha) to 12.3% (D-D)]. However, during periods of activity of the nematode yields were up to 46% higher in fumigated than in control plots. The effect was enhanced by moisture stress. Fumigation also extended the growing season into the summer drought.

0569–ELGIN, Jr., J. H.; GRAY, F. A., 1971. "Dichlorvos pest strips reduce stem nematode damage in seedling alfalfa." *Pl. Dis. Reptr*, 55 (7), 621–622.

Lucerne seedlings inoculated with *Ditylenchus dipsaci* were grown in the presence and absence of a 2,2-dichlorovinyl dimethyl phosphate (dichlorvos) impregnated pest strip. Symptoms and nematode numbers were reduced when seedlings were grown for 24 days in the presence of the dichlorvos strip. Nematodes were found mostly below the soil surface in the hypocotyl of plants grown exposed to dichlorvos, and mostly in the cotyledonary node when no dichlorvos was present.

0570–GUEVARA-BENITEZ, D.; TOBAR-JIMENEZ, A.; GUEVARA-POZO, D., 1970. "Quantitative study of the life cycle of *H. goettingiana* Liebscher and the possibility of its control by trap crops." [Abstract.] *International Nematology Symposium.* (10th), *European Society of Nematologists, Pescara*, 8-13 Sept., 1970. Summaries, pp. 102–103. [Also in French, German & Italian.]

[*Vicia sativa* a successful trap crop under experimental conditions.]

0571 ALAM, M.M.; NAQVI, S.Q.A.; MAHMOOD, K. Three additional hosts of the stubby-root nematode, Trichodorus mirzai Siddiqi, 1960. Current Science (1975) 44 (19) 722 [En] Dep. of Bot., Aligarh Muslim Univ., Aligarh

202001, India.

Moderate to heavy galling of the roots of Commelina nudiflora, Eclipta alba and Setaria verticillata growing in Aligarh, India, was found to be due to infection with Trichodorus mirzai. All 3 plants are recorded for the first time as hosts for this nematode.

0572—CANADA, 1970. "Research report of the Research Branch for 1969." *Ottawa: Canada Department of Agriculture*, ix + 370 pp. [Plant nematodes pp. 4, 9–10, 41, 78, 105–106, 136–137, 139, 353–354.]

In reports from Canadian research stations it is recorded that resistance to *Heterodera rostochiensis* in potato is present in 2 selections tested in Newfoundland: in Prince Edward Island, yields of Empire birdsfoot trefoil (*Lotus corniculatus*) were more reduced when *Pratylenchus penetrans* and *Fusarium oxysporum* together infected the plants than when either pathogen was present alone. In tests of the nematicides lannate and aldicarb for nematode control in tobacco in Quebec, the former was the better. In a survey of tomato and cucumber houses in the Harrow region of Ontario over 50% were found to contain *Meloidogyne* sp. and 13% had *Pratylenchus* sp. The effects of nematicides on respiration rates of *Caenorhabditis* sp. and *Aphelenchus avenae* were investigated in the laboratory. In glasshouse studies *Meloidogyne hapla* caused more severe damage to ladino and double-cut red clovers [*Trifolium repens* var. *ladino* and *T. pratense*] than to lucerne and birdsfoot trefoil. The cabbage var. Early Marvel, when grown at controlled soil temperatures of 22 and 26°C., was killed in 4 weeks by *Fusarium oxysporum* f. *conglutinans* whether or not *Meloidogyne hapla* or *M. incognita* was also present. The variety Market Prize was highly resistant while Marion Market was

0573—RHODESIA, 1971. "Tobacco Research Board of Rhodesia. Abridged Annual Report for the year ended 30th June, 1971." *Salisbury: Tobacco Research Board of Rhodesia*, 20 pp. [Plant nematology p. 9.]

Nematicide trials with D-D/MITC, methyl bromide, Bayer 68138, EDB, Mocap, furadan and Hoechst 2960 against *Meloidogyne javanica* on tobacco have been carried out in Rhodesia. Numbers of *Helicotylenchus* sp., *Pratylenchus* sp. and *Rotylenchulus* sp. have increased under maize and rice grown on clay-loam soil for one season at Banket. *Rhizoctonia solani* and *Fusarium* sp. have been collected from nematode-infested tobacco and possible interactions are being investigated. Monoxenic cultures of *P. brachyurus* and *P. zeae* have been established on sterile lucerne callus; attempts to establish cultures of *M. javanica* on lucerne, tomato and tobacco callus and on excised roots of lucerne, tomato and tobacco have not been successful.

0574—U.S.A., 1970. "Research Progress 1970." *Bull. Wash. agric. Exp. Stn*, No. 723, 51 pp. [Plant nematodes p. 47.]

Tests showed that rapid assay of lucerne seedlings for resistance to *Ditylenchus dipsaci* can be carried out on plants growing in flats. In experiments in which *Verticillium dahliae* f. *menthae* and *Pratylenchus minyus* were inoculated separately or together on peppermint [*Mentha piperita*], the concentration of free reducing sugars in the roots was influenced more by the fungus than by the nematode. The results indicate a probable lack of correlation between the influence of *P. minyus* on wilt disease and the concentration of free reducing sugars in peppermint roots. In fumigated soil planted with crops, populations of plant-parasitic nematodes increased under irrigation with canal water but not when well water was used. Standard soil fumigants [not named] controlled root-knot nematodes [*Meloidogyne*] in potato.

0575—GRIFFIN, G. D., 1971. "Susceptibility of common sainfoin to *Meloidogyne hapla*." *Pl. Dis. Reptr*, 55 (12), 1069–1072. [En] Agricultural Research Service, USDA, Logan, Utah 84321, USA.

Sainfoin, *Onobrychis viciaefolia*, was compared with lucerne, *Medicago sativa* var. Lahontan, for its reaction to *Meloidogyne hapla*. All 15 varieties tested were highly susceptible at 22 ± 4°C., with galls larger and located further from the root tips than in lucerne. At 15 and 20°C. 3 varieties of sainfoin were more severely galled than lucerne but at 25 and 30°C. there was little difference. Larger galls were produced on sainfoin than on lucerne at all temperatures. More nematodes invaded sainfoin than lucerne at 15 and 20°C. but not at 25 or 30°C.: the percentage of larvae reaching maturity was the same in both hosts. At 25°C. the greatest number of larvae entered and matured in both hosts. Sainfoin was less tolerant than lucerne to *M. hapla*, as measured by seedling mortality, but tolerance increased with the age of seedlings from 0 to 4 weeks.

0576—HANDA, D. K.; MATHUR, B. N.; BHARGAVA, L. P., 1971. "Occurrence of root-knot on pearl millet." *Indian J. Nematol.*, 1 (2), 244. [En] Plant Pathology Laboratory, Durgapura, Jaipur-4, Rajasthan, India.

Galls on the roots of *Pennisetum typhoides* formed by *Meloidogyne javanica* and *M. incognita* were recorded from many fields at Jaipur, India. This is claimed as the first record of *Meloidogyne* infestation on this crop.

0577 RAI, B.B. Parasitic nematodes associated with maize. Allahabad Farmer (1969) 43 (5) 315-319 [En, 2 pl (unpaged)] Dep. of Biol., Allahabad Agric. Inst., Allahabad, U.P., India.

In a study of the nematode population in the rhizosphere of maize growing at Allahabad, India, greater numbers were found associated with unhealthy than with healthy plants. The chief species found were Hoplolaimus indicus, Tylenchorhynchus brassicae and Helicotylenchus erythrinae; found less frequently were Heterodera, Tylenchus and Pratylenchus. Populations were smallest in May and June when soil temperatures were high with low moisture content. Numbers were increased from July to October, being greatest in July, especially from around the roots of unhealthy plants.

0578—CHÉVRES-ROMÁN, R.; GROSS, H. D.; SASSER, J. N., 1971. "The influence of selected nematode species and number of consecutive plantings of corn and sorghum on forage production, chemical composition of plant and soil, and water use efficiency." [Abstract.] *Nematropica*, 1 (2), 40–41, 46. [En, Es] Faculty of Agriculture, College of Agricultural Sciences, Univ. of Puerto Rico, Mayagüez, Puerto Rico.

In surveys of forage maize and sorghum in North Carolina, USA, nematodes of 9 plant-parasitic

genera were recorded. In glasshouse tests, *Trichodorus porosus*, *Tylenchorhynchus claytoni* and *Pratylenchus zeae* damaged maize and sorghum. Heavy parasitism affected the uptake of nutrients and water from the soil.

0579—KOSHY, P. K.; SWARUP, G., 1971. "Susceptibility of aerial parts of pigeon-pea seedlings to *Heterodera cajani* larvae." *Indian J. Nematol.*, 1 (2), 245–246. [En] Division of Nematology, Indian Agricultural Research Inst., New Delhi, India.

When transferred to the cotyledons and young shoots of the seedlings of *Cajanus cajan*, 2nd-stage juveniles of *Heterodera cajani* may develop into adult males but failed to develop into adult females, perhaps because of adverse conditions—mainly lack of nutrition.

0580—HUNT, O. J.; JENSEN, H. J.; PEADEN, R. N.; FAULKNER, L. R.; GRIFFIN, G. D., 1970. "Breeding alfalfa resistant to northern root-knot nematode (*Meloidogyne hapla* Chitwood)." *International Grassland Congress* (11*th*), *Surfers Paradise, Queensland, Australia*, 13–23 April, 1970. Proceedings, pp. 270–273. [En] United States Dept. of Agriculture, Reno, Nevada, USA.

In a breeding programme, lucerne clones with dominant monogenic resistance to *Meloidogyne hapla* were used to combine resistance to root-knot nematode with resistance to fungi, bacteria and stem nematode, *Ditylenchus dipsaci*. The results indicated that this could be done and that resistance to *M. hapla* is conditioned by one dominant gene with tetrasomic inheritance. [From *Pl. Breed. Abstr.*, 41, No. 7901.]

0581 PEREIRA, M.C.L.; SANTOS, M.S.N. DE A. [Occurrence of stem nematode (Ditylenchus dipsaci) in seeds of bean (Vicia faba) in Portugal.] Ciencia Biológica Portugal (1975) 2 (3) 85-88 [Pt, en]

In one of 2 samples of seed of Vicia faba, all stages of Ditylenchus dipsaci were found. The other sample (50 seeds) was negative. In 20 seeds of the infected sample there were 20,035 larvae (over 8,000 on one seed), 265 females and 245 males. Dead nematodes were observed in the seed coat.

*0582-EVANS, D. W.; ELGIN, Jr., J. H.; FAULKNER, L. R., 1971. "White flagging of stem nematode-infected alfalfa." *Crop Science*, 11 (4), 591–592. [En]

White shoots (flags) occur sporadically on plants in lucerne stands infected with *Ditylenchus dipsaci* in central Washington State, USA. All plants showing white flagging were found to be infected. Attempts to induce this symptom consistently under controlled conditions were unsuccessful.

0583-LORDELLO, L. G. E.; MELLO FILHO, A. DE T., 1970. [Three more grasses as hosts of migratory nematodes.] "Mais três capins hospedeiros de nematóides migradores." *Revista de Agricultura, Piracicaba*, 45 (2/3), 78. [Pt, en] Escola Superior de Agricultura "Luiz de Queiroz", Univ. de São Paulo, Brazil.

In Brazil, *Pratylenchus zeae* was found on *Panicum maximum* and *P. purpurascens*, and *Pratylenchus brachyurus* on *Panicum purpurascens* and *Brachiaria mutica*. *Pratylenchus brachyurus* caused severe *B. mutica* crop loss.

0584—GRIFFIN, G. D.; HUNT, O. J., 1972. "Effects of temperature and inoculation timing on the *Meloidogyne hapla*/*Corynebacterium insidiosum* complex in alfalfa." *Journal of Nematology*, 4 (1), 70–71. [En] US Dept. of Agriculture, Utah Agricultural Experiment Stn, Logan, Utah 84321, USA.

In pot experiments with 3 varieties of lucerne inoculated with *Meloidogyne hapla* and *Corynebacterium insidiosum*, either together or separately, there were no significant differences in symptoms of bacterial wilt whether the 2 pathogens were inoculated together or either one before the other, but wilting was more severe in the 2 susceptible varieties with nematodes than without. Increased soil temperatures of 16, 20, 24 and 28°C. had no effect on bacterial wilt symptoms and wilt disease was as severe when bacteria were inoculated after mechanical root damage as in the presence of *M. hapla*.

0585—JOHNSON, A. W.; GILL, D. L., 1972. "Control of the root-knot nematode, *Meloidogyne incognita*, on mimosa (*Albizzia julibrissin*) by chemical dips." *Journal of Nematology*, 4 (1), 68–69. [En] Plant Science Research Div., Agricultural Research Service, Coastal Plain Experiment Stn, Tipton, Georgia 31794, USA.

Chemical root-dip treatments were used in experiments to free mimosa (*Albizzia julibrissin*) root-cuttings from infestation with *Meloidogyne incognita*. 4 nematicides were used—Prophos (0-ethyl, S,S-dipropyl phosphorodithioate), SD 1897 (a mixture of the 2,4-dichlorophenyl ester of methanesulfonic acid and 1,2-dibromo-3-chloropropane), Bay 25141 (*O*, *O*-diethyl *O*-[(*p*-methylsulfinyl)phenyl] phosphorothioate) and Bay 68138 (ethyl 4-(methylthio)-m-tolylisopropyl-phosphoramidate). Treatment of the roots was for 15, 30 or 60 min. and observations were made on plant growth and galling after 11 weeks. SD 1897 and Prophos controlled nematodes in all treatments except in the cuttings from the thickest roots (average diameter 1·6 cm.). Bay 68138 and Bay 25141 controlled nematodes in all treatments. Some phytotoxicity resulted from all treatments as measured by plant height, but plants from root-cuttings treated with Prophos grew vigorously and weighed more than those from other treatments. The authors conclude that nematicidal dips may be used to free root-cuttings of mimosa from root-knot nematodes.

0586 REYES, R.D. [Determination of the efficiency of maize and rice varieties as hosts of Pratylenchus zeae.] Determinación de la eficiencia de diferentes variedades de arroz y de maíz, como hospederas de Pratylenchus zeae. In Progreso de Labores de Investigaciones Agropecuarias, 1970. Panama; Facultad de Agronomía, Panamá Universidad. (1971) 159-166.

0587-CHIARAPPA, L. [Editor], 1971. "Crop loss assessment methods. FAO manual on the evaluation and prevention of losses by pests, disease and weeds." *Farnham Royal, UK: Commonwealth Agricultural Bureaux* [by arrangement with the Food and Agriculture Organization of the United Nations], xx+[198 pp.] [En]

This manual has been compiled by the Plant

Production and Protection Division of FAO with the collaboration of 5 working groups, one of which consists of nematologists. The nematology group had the assistance of nematologist correspondents from 18 different countries. An introduction by L. Chiarappa, F. J. Moore and A. H. Strickland sets out the aims of the manual, defines the basic concepts and explains the lay-out. The primary aim is to guide plant protection workers in planning and carrying out field experiments to measure crop losses. The 2nd section gives general guidance on the principles involved in the collection of data on crop losses with a chapter on field experiments by E. L. Le Clerg and one on the place of sample survey in crop loss estimation by B. M. Church. The major part of the manual is in section 3 with 3 sub-sections on techniques and apparatus, general methods and special methods. For the chapter on estimating nematode densities in soil and roots by A. L. Taylor see No. 926 above. The 3rd section gives special methods for assessment of losses in 84 crop/disease situations of which 4 are due to nematodes, namely *Heterodera rostochiensis* on potato (by E. B. Brown, UK), *H. avenae* on cereals (by G. M. Dixon, UK), *Meloidogyne hapla* on lucerne (by D. C. Norton, USA) and *Belonolaimus longicaudatus* on groundnut (by J. N. Sasser, USA). Each host-parasite combination is on a separate loose-leaf sheet with information under the headings: "method developed in" (country), "field symptoms",

0588—USA, 1970. "83rd Annual Report, Fiscal Year ending June 30, 1970, Mississippi Agricultural and Forestry Experiment Station." *Mississippi Agricultural and Forestry Experiment Station*: 126 pp. [Plant nematology pp. 39, 50–51, 74, 98.] [En]

Mention is made of the development of root-knot resistant varieties of tomato, pepper, red clover, cotton and soybean. Resistance is combined with tolerance to fungal diseases in cotton and soybean and to tobacco mosaic virus in pepper. Resistance to cyst nematode also is incorporated in soybean. Experiments with a range of nematicides for use against root-knot nematodes on okra, bean, cucurbits and sweet potato are briefly reported.

* 0589—GOLDEN, A. M.; BIRCHFIELD, W., 1972. "*Heterodera graminophila* n.sp. (Nematoda: Heteroderidae) from grass with a key to closely related species." *Journal of Nematology*, 4 (2), 147–154. [En] Agricultural Research Service USDA, Beltsville, Md. 20705, USA.

Heterodera graminophila n.sp., found on *Echinochloa colonum* in USA, belongs to the *H. goettingiana* group. It is closest to *H. cyperi* and *H. graminis* but differs in having 3 incisures on the lateral field of male and larva and in the mean length of the larval stylet and hyaline tail tip being 22·7 and 32 μ respectively. Males and larvae have 5 head annules. The cysts are abullate, ambifenestrate, with a strongly developed underbridge—the bifurcated ends of which look at first sight like bullae. The anus is 20% of the cyst length from the terminal cone, compared with 10% in *H. cyperi* and *H. graminis*, and there is no circum-anal cyst wall pattern as in those species. The vulval slit is 45μ compared with 30 and 38 μ long respectively in the other species. A key to the 10 species in the *goettingiana* group is given, based on cyst and larval characters. Biology of the new species was given in papers abstracted in *Helminthological Abstracts, Series B*, 40, No. 150 and *Series B*, 41, No. 164.

0590—SIDDIQI, M. R., 1972. "On the genus *Helicotylenchus* Steiner, 1945 (Nematoda: Tylenchida), with descriptions of nine new species." *Nematologica*, 18 (1), 74–91. [En, de] Commonwealth Inst. of Helminthology, St. Albans, UK.

The genus *Helicotylenchus* is discussed and a key to its species given. 9 new species are described: *H. dihysteroides* n.sp. from tomato soil in Portugal, *H. abunaamai* n.sp. from soil around roots of *Citrus paradisi*, *Psidium guajava*, *Vitis vinifera* and *Gossypium hirsutum* in Sudan; *H. conicephalus* n.sp. from soil around roots of *Aeolanthus myrianthus* in Malawi and *Citrus paradisi* and *Vitis vinifera* in Sudan; *H. densibullatus* n.sp. and *H. talonus* from soil around roots of *A. myrianthus* in Malawi; *H. paraplatyurus* n.sp. from cultivated soil in Portugal; *H. australis* n.sp. from soil around roots of *Nicotiana tabacum* in Western Australia; *H. orthosomaticus* n.sp. from lucerne soil in Tanzania and *H. willmottae* n.sp. from potato soil in India. *H. microlobus* is considered a valid species. *Helicotylenchus annobonensis* (Gadea, 1960) n.comb. is proposed for *Tylenchorhynchus africanus* v. *annobonensis* of Gadea, 1960.

0591—CAVENESS, F. E., 1972. "Changes in plant parasitic nematode populations on newly cleared land." [Abstract] *Nematropica*, 2 (1), 1–2, 15–16. [En, Es] International Inst. of Tropical Agriculture, Ibadan, Nigeria.

On land previously farmed traditionally, abandoned, or covered with thicket or secondary forest in Nigeria, 19 plots were cleared and cropped successively with maize, cowpea (*Vigna unguiculata*) and maize. Nematodes were counted in soil samples taken monthly during the 19 months of the investigation. Within 2 months of clearing, nematode numbers decreased by 85%, then increased under the crops and decreased between crops. The principal species to increase under crops were *Pratylenchus coffeae*, *Meloidogyne incognita* and *Helicotylenchus pseudorobustus*, the first being rare before cropping but accounting for 96% of the total at the end. *H. pseudorobustus* was dominant before clearing and second dominant under cultivation. *M. incognita* was uncommon before clearing and increased under cultivation. Species that disappeared under cultivation were *Scutellonema bradys*, *Xiphinema americanum*, *X. ebriense*, *Xiphinema* sp. and *Criconemoides* sp. It is concluded that plant-parasitic nematodes can survive in small numbers under shifting cultivation and modern farming practices favour the increase of some species at the expense of others.

0592—OVERMAN, A. J.; BRYAN, H. A.; HARKNESS, R. W., 1972. "Effect of weed control on nematodes and potato (*Solanum tuberosum* L.) yields in marl type soils." [Abstract] *Nematropica*, 2 (1), 8–9, 22. [En, Es] Agricultural Research and Education Center, 5007-60th Street E., Bradenton, Florida 33505, USA.

Populations of *Criconemoides onoensis* and *Tylenchorhynchus martini* in marl type soils in Florida, USA, were affected by weed control in summer preceding the potato crop. Plots sown with *Sorghum vulgare* during the summer gave the highest counts of the nematodes in the following potato crop. The nematode populations were decreased more by 4 ploughings at intervals of 3 to 5 weeks than by 2 applications of the herbicide Dalapon and one ploughing. Potato yields were greater from the weed-free plots with smaller nematode populations than from the plots where sorghum had grown and nematode populations increased.

*0593 AMOSU, J.O.; TAYLOR, D.P. Interaction of Meloidogyne hapla, Pratylenchus penetrans and Tylenchorynchus agri on Kenland red clover, Trifolium pratense. Indian Journal of Nematology (1974 publ. 1975) 4 (2) 124-131 [En] Dep. of Plant Path., Univ. of Illinois, Urbana, Champaign, Illinois 61801, USA.

Meloidogyne hapla singly and in all combinations with Tylenchorhynchus agri and Pratylenchus penetrans is highly pathogenic to red clover as determined by top and root weights. T. agri alone has a slight stimulating effect on the plants while P. penetrans alone has a slight detrimental effect. P. penetrans and T. agri singly or together have no effect on the formation of nodules on the roots but M. hapla greatly reduces nodule numbers.

0594–HAWN, E. J., 1969. "Alfalfa root galls caused by the stem and bulb nematode." *J. Nematol.*, 1 (2), 190–191.

Ditylenchus dipsaci is reported in an unusual infection of lucerne in a glasshouse. Apart from the usual symptoms of *D. dipsaci* infection, black galls girdled the crown and subcrown portions of tap roots of many inoculated plants.

0595–TIKYANI, M. G., KHERA, S. & BHATNAGAR, G. C., 1969. "A note on nematode population from great millet (*Sorghum vulgare* Pers.)." [Correspondence.] *Labdev. J. Sci. Technol.*, 7B (2), 176–177.

The following nematode species were found around roots of *Sorghum vulgare* in Rajasthan, India: *Aphelenchus avenae, Telotylenchus loofi, T. indicus, Tylenchorhynchus* sp., *Ditylenchus myceliophagus, Ditylenchus* sp., *Pseudhalenchus anchilisposonus, Scutellonema* sp., *Hoplolaimus indicus, Aphelenchoides radicicolus, A. asterocaudatus, A. subtenuis, Pratylenchus zeae, Neopaurodontus asymmetricus* and *Nothotylenchus bhatnagari*. More *Telotylenchus loofi* were found at lower temperatures and in older plants.

0596–NETSCHER, C. & GERMANI, G., 1969. "*Telotylenchus baoulensis* n.sp. et *Trichotylenchus rectangularis* n.sp. (Nematoda, Tylenchoidea)." *Nematologica*, 15 (3), 347–352. [English summary p.352.]

Telotylenchus baoulensis n.sp. from near roots of *Brachiaria fulva* and *Hyparrhenia rufa*, and *Trichotylenchus rectangularis* n.sp. from near roots of *Loudetia simplex* and *H. diplandra* are described from Toumodi, Ivory Coast.

*0597 GRIFFIN, G.D., 1969. "Effects of temperature on Meloidogyne hapla in alfalfa." Phytopathology, 59 (5), 599-602.

Galling by Meloidogyne hapla on resistant lucerne increased above 30°C. The nematode matured more quickly as the temperature increased up to 30°C. More males were found in resistant lucerne varieties than in susceptible varieties. Maximum nematode reproduction occurred at 25°C. in resistant and susceptible lucerne.

0598 CHOI, Y.E., GERAERT, E. Criconematids from Korea with the description of eight new species (Nematoda: Tylenchida). Nematologica (1975) 21 (1) 35-52 [En, Fr] Dept. of Horticulture, Agricultural Coll., Kyung-Pook National Univ., Taegu, Korea.

Criconema (Variasquamata) querci n.sp. from oak differs from the other Criconema spp. by having several rows of scales, a longer body and rounded tail; Criconemella myungsugae n.sp. from Indigofera kirilowi differs from other Criconemella spp. by a longer body and a disc-like first head annule; C. paragoodeyi n.sp. from Salix koreensis differs from C. goodeyi by having several anastomosed annules and in body and stylet length; Crossonema (Seriespinula) sokliense n.sp. from Zelkova serrata differs from C. (S.) hungaricum and C. (S.) venustum by having smooth head annules and different shaped head and spines; Discocriconemella hengsungica n.sp. from maize closely resembles D. baforti but has annules that are posteriorly directed on the ventral side and bearing no anastomoses; Macroposthonia wolgogica n.sp. from Pinus densiflora has a similar head shape to M. oostenbrinki but has a closed vulva; Neolobocriconema insulicum n.sp. from maize is distinguished from N. serratum by more body annules and the presence of long effilated spines at the posterior end; Nothocriconema jaejuense n.sp. from Lagerstroemia indica has the tail similar to that of N. demani and the head as in N. duplicivestitum; Crossonema (Crossonema) menzeli, Hemicriconemoides mangiferae, Macroposthonia antipolitana, Nothocriconema demani and Xenocriconemella macrodora are new records for Korea.

0599–BREWERTON, H. V., McGRATH, H. J. W. & GRANDISON, G. S., 1969. "Thionazin residues on lucerne and red clover. (Experiments for control of *Ditylenchus dipsaci*)." *N. Z. Jl agric. Res.*, 12 (1), 171–176.

Foliar sprays of 46% thionazin at 2 to 3 U.S. pints per acre failed to control *Ditylenchus dipsaci* on lucerne and red clover. Phytotoxicity was observed on lucerne. Rapid breakdown of the thionazin residues was observed in the plants.

0600–TAHA, A. H. Y. & RASKI, D. J., 1969. "Interrelationships between root-nodule bacteria, plant-parasitic nematodes and their leguminous host." *J. Nematol.*, 1 (3), 201–211.

The effects of infection with *Meloidogyne javanica* and *Heterodera trifolii* on the nodules formed by *Rhizobium trifolii* on the roots of white clover were studied. The size, number and efficiency of the nodules were not reduced in infected plants although the galls contained normal nematodes. Both nematode species showed a preference for the galls.

0601 MULK, M.M.; JAIRAJPURI, M.S. Nematodes of leguminous crops in India. II. Five new species of Helicotylenchus Steiner, 1945 (Hoplolaimidae). Indian Journal of Nematology (1974 publ. 1975) 4 (2) 212-221 [En] Section of Nematol., Dep. of Zool., Aligarh Muslim Univ., Aligarh, U.P., India.

Five known species of Helicotylenchus (indicus, egyptiensis, pteracercus, paraplatyurus, and abunaamai) and 5 new species (bihari, arachisi, sharafati), macronatus, and indenticaudatus) were recorded from different parts of India from around the roots of leguminous crops. The new species are described in detail and

compared with closely related species. H. bihari n.sp. was collected from soil around roots of Pisum sativum from Gaya, Bihar, H. arachisi n.sp. from roots of Arachis hypogaea from Khaspura, Ajmer, Rajasthan; H. sharafati n.sp. from roots of Cicer arietinum from Raisen, Madhya Pradesh; H. macronatus n.sp. from roots of Lens culinaris from Gaya, Bihar; and H indenticaudatus n.sp. from roots of Crotalaria juncea from Udaipur, Rajasthan.

0602–LAUGHLIN, C. W., WILLIAMS, A. S. & FOX, J. A., 1969. "The influence of temperature on development and sex differentiation of *Meloidogyne graminis*." *J. Nematol.*, **1** (3), 212–215.

The effects of temperature on *Meloidogyne graminis* on *Cynodon* sp. were studied. At temperatures above 27°C. there was a tendency towards a preponderence of males. Temperature changes caused developing males to undergo sex reversals or form intersexes.

0603–CHOUDHARY, B., RAJENDRAN, R., SINGH, B. & VERMA, T. S., 1969. "Breeding tomato, brinjal and cowpea resistant to root-knot nematodes (*Meloidogyne* spp.)." [Abstract.] *All India Nematology Symposium, New Delhi*, August 21–22, 1969, pp. 46–47.

0604–D'SOUZA, G. I. & KASIVISWANATHAN, P. K., 1969. "*Cassia tora* L., a new host of *Pratylenchus coffeae* in South India." [Abstract.] *All India Nematology Symposium, New Delhi*, August 21–22, 1969, p. 18.

0605–NANDAKMAR, C., KHERA, S. & BHATNAGAR, G. C., 1969. "Studies on the susceptibility of pearl millet to *Heterodera avenae*." [Abstract.] *All India Nematology Symposium, New Delhi*, August 21–22, 1969, p. 65.

0606–NANDKUMAR, C. & KHERA, S., 1969. "Host-range studies on a new species of *Pratylenchus* infesting pearl millet." [Abstract.] *All India Nematology Symposium, New Delhi*, August 21–22, 1969, pp. 23–24.

*0607–NORTON, D. C., 1969. "*Meloidogyne hapla* as a factor in alfalfa decline in Iowa." *Phytopathology*, **59** (12), 1824–1828.

The stand and yield of lucerne were significantly reduced in loam and silty clay loam field plots artificially infested with *Meloidogyne hapla*, as compared with plots not infested with *M. hapla*, in a 4-year test in USA. Crown and root rot were significantly more severe in the *M. hapla* plots than in the plots free of the nematode. There was virtually no migration or transfer of the nematode across 3-foot aisles from the infested to the non-infested plots during 4 years. In glasshouse tests, *M. hapla* increased the incidence of bacterial wilt caused by *Corynebacterium insidiosum* in both a resistant and a susceptible variety. In the field, the stand of a resistant variety was reduced significantly when both organisms were tested in combination, as compared with either one tested alone.

0608–LIN, Y., 1968. [Studies on plant-parasitic nematodes. Interrelationship between *Pratylenchus penetrans* and *Fusarium oxysporum* f. sp. *niveum*.] *Pl. Prot. Bull., Taiwan*, **10** (2), 29–40. [In Chinese: English summary.]

When inoculated separately both *Pratylenchus penetrans* and *Fusarium oxysporum* f. *niveum* were pathogenic on lucerne seedlings but the fungus caused more serious symptoms, had a shorter incubation period and was highly pathogenic. When both were inoculated in combination the disease percentage was higher and the incubation period shorter than with either pathogen alone and both were present in the same infected root tissues. The nematode appeared to be attracted by the presence of the fungus. [From *Rev. Pl. Path.*, **49**, No. 1070.]

0609–HEYNS, J., 1969. "*Longidorus cohni* n.sp., a nematode parasite of alfalfa and Rhodes grass in Israel." *Israel J. agric. Res.*, **19** (4), 179–183.

Longidorus cohni n.sp. from roots of lucerne and *Chloris gayana* in Israel, is described and figured. It is more slender than any known species in the genus.

0610–TIKYANI, M. G. & KHERA, S., 1969. "*Nothotylenchus bhatnagari* n.sp. from the rhizosphere of great millet (*Sorghum vulgare* Pers.)." *Zool. Anz.*, **182** (1/2), 87–91.

Nothotylenchus bhatnagari n.sp. from the rhizosphere of *Sorghum vulgare* is described from Jodhpur, India. Females have a 0·55 to 0·75 mm. long body, a 9 to 10 μ long spear, 4 incisures in the lateral fields, a vulva at 80 to 82% of body and a short posterior uterine sac. Males have a 0·42 to 0·6 mm. [in text 0·42 to 6·0 mm.] long body, 17 to 19 μ long spicules, a 5 to 6 μ long gubernaculum and a bursa extending over half of tail length.

0611–TIKYANI, M. G., KHERA, S. & BHATNAGAR, G. C., 1969. "*Helicotylenchus goodi* n.sp. from rhizosphere of great millet." *Zool. Anz.*, **182** (5/6), 420–423.

Helicotylenchus goodi n.sp. from the rhizosphere of *Sorghum vulgare* from Rajasthan, India has the body 0·64 to 0·84 mm. long, an unstriated lip region, a prominent labial disc, the spear 23 to 25 μ long and a hemispherical tail 0·5 anal body-width long. The male is not known.

0612–WHITEHEAD, A. G., 1968. "Taxonomy of *Meloidogyne* (Nematodea: Heteroderidae) with descriptions of four new species." *Trans. zool. Soc. Lond.*, **31** (3), 263–401.

This is a monographic account of the genus *Meloidogyne*. 4 new species are described, namely, *M. decalineata* n.sp. from *Coffea arabica* in Tanzania, *M. ethiopica* n.sp. from cowpea and tomato in Tanzania, *M. indica* n.sp. from *Citrus aurantium* and *C. sinensis* in India, and *M. megadora* n.sp. from *Coffea arabica* and *C. canephora* in Uganda. *M. graminis* and *M. spartinae* are proposed as new combinations for species of *Hypsoperine* which is considered synonymous with *Meloidogyne*. *M. poghossianae* is considered a *species inquirenda*. The nominal species are thoroughly detailed and there are 86 figures, 10 tables and 2 keys to differentiate the various species.

0613 CAVENESS, F.E. Screening cowpea germplasm for resistance to root-knot nematodes at I.I.T.A. [Abstract]. Nematropica (1975) 5 (2) 21 [En] International Inst. of

Tropical Agric., PMB 5320, Ibadan, Nigeria. Of 241 Vigna unguiculata lines evaluated for resistance to Meloidogyne incognita only 4 proved resistant. 48 of the susceptible lines gave a mixed response, suggesting heterogeneity within the cowpea line.

0614 CLATWORTHY, J.N.; HOLLAND, D.G.E. A new strain of Panicum maximum for pastures in Rhodesia. Rhodesia Agricultural Journal (1975) 72 (2) 47-48 [En] Grasslands Res. Sta., Marandellas, Rhodesia.

The strain G438 is not a host of Meloidogyne and should therefore be suitable in tobacco rotations.

0615 -NANDAKUMAR, C. & KHERA, S., 1970. "A new nematode species, *Pratylenchus mulchandi* from millets of Rajasthan." *Indian Phytopath.*, Year 1969, 22 (3), 359–363.

Pratylenchus mulchandi n.sp., is described from 55 females collected from soil around roots of *Pennisetum typhoides* and *Sorghum vulgare* from Lamba, Merta city, north-west of Jodhpur, Rajasthan, India. The body length of the new species is 0·44 to 0·58 mm.; there are 4 lateral lines, the lip region is set off bearing 3 annules, the spear is 16 to 20 μ long, the posterior uterine sac is more than 1·5 body-widths long and sometimes has rudiments of an ovary, and the tail is 2·5 anal body-widths long with 16 to 22 annules. Variations in the length and shape of the oesophageal gland lobes, female tail and female gonad are detailed.

0616–TIKYANI, M. G. & KHERA, S., 1970. "A new species of *Telotylenchus* (Nematoda: Tylenchida)." *Labdev. J. Sci. Technol.*, 8B (1), 27–29.

Telotylenchus paaloofi n.sp., (= *T. loofi* nomen nudum) based on 40 females and 20 males collected from soil around roots of *Sorghum vulgare* from the Central Arid Zone Research Institute, Jodhpur, Rajasthan, India, has a 0·77 to 1·44 mm. long body, a 19 to 21 μ long spear, non-areolated lateral fields, a lip region set off, and a tail bluntly conical and 3 to 4 anal body-widths long.

0617–DASGUPTA, D. R., NAND, S. & SESHADRI, A. R., 1970. "Culturing, embryology and life history studies on the lance nematode, *Hoplolaimus indicus*." *Nematologica*, 16 (2), 235–248. [French summary pp. 247–248.]

Two populations of *Hoplolaimus indicus* were cultured monoxenically on excised roots of *Sorghum vulgare* var. CSH 1 (jowar) in nutrient agar. Prior feeding was necessary for oviposition and development of successive postembryonic stages. The first moult occurred within the egg and the development outside the egg consisted of 3 larval stages and an adult stage with the 3 usual moults. The life-cycle at a temperature of 28° to 32°C. from egg to egg stage was completed in 27 to 36 days and from egg stage to male in 25 to 27 days. Sex differentiation was indicated in the 2nd moult by the presence of 4 specialized ventral chord nuclei present only in female larvae.

*0618–REYNOLDS, H. W., CARTER, W. W. & O'BANNON, J. H., 1970. "Symptomless resistance of alfalfa to *Meloidogyne incognita acrita*." *J. Nematol.*, 2 (2), 131–134.

Penetration, development and migration of *Meloidogyne incognita acrita*, in resistant and susceptible lucerne varieties were compared. Larvae entered both resistant and susceptible plants in approximately the same numbers. After 3 to 4 days, the number of larvae in resistant roots decreased sharply until at 7 days fewer than 5 larvae per seedling and no nematode development could be found. In susceptible roots, larvae became sedentary and developed normally; egg production began as early as 18 days after penetration of the host.

0619-ELMILIGY, I. A., 1968. "Root-knot nematode infectivity and host response in relation to soil types." *Meded. Rijksfac. LandbWet. Gent*, 33 (4), 1633–1641. [Flemish summary p. 1640.]

Desert sand, Nile mud and valley soil were used to make up soils having different textures. Great variability in physical and chemical properties of the composed soils thereby resulted. The infection index of *Meloidogyne javanica* on cowpea progressively increases with the increase of fine soil particles to a certain level after which infectivity declines. Soils containing 61 to 75% sand and with ratios of silt: clay in the orders of 1:1, 2:1 and 3:1 are found the best for nematode infectivity. Infestation in loamy soils shows a high rate of crop damage despite the relatively low infection index.

0620–KHERA, S., BHATNAGAR, G. C., TIKYANI, M. G. & NANDKUMAR, C., 1969. "Culturing of *Telotylenchus indicus* Siddiqi, 1960 on alfalfa callus tissue." [Correspondence.] *Labdev J. Sci. Technol.*, 7B (4), 330–331.

Telotylenchus indicus obtained from the rhizosphere of millets (*Pennisetum typhoides* and *Sorghum vulgare*) were successfully cultured on lucerne, callus tissue for the first time. The nematodes were seen to increase in population after the 45th day of inoculation. Nematodes placed on nutrient agar without callus tissue failed to propagate and started dying after 2 weeks of starvation.

*0621 BALDWIN, J. G. & BARKER, K. R., 1970. "Histopathology of corn hybrids infected with root knot nematode, *Meloidogyne incognita*." *Phytopathology*, 60 (8), 1195–1198.

The histopathology of *Zea mays* hybrids, Coker 911 and Pioneer 309B, infected with *Meloidogyne incognita* was compared. Differences in the penetration of *M. incognita* larvae were apparent 4 and 8 days after inoculation. Stained root sections from plants harvested after 5, 10, 20 and 25 days, showed that differences between the cells of the 2 hosts become apparent after 10 days. In Coker 911, a good host, granular, multinucleate, giant cells developed. Adjacent cells appeared turgid, and hyperplasia was minimal. In Pioneer 309B, a poor host, giant cells were vaculated and empty with ill-defined walls and fewer nuclei, and the surrounding cells lacked turgidity in comparison with adjacent healthy tissue. Differences were more pronounced 25 days after inoculation. In Coker 911, there were large numbers of mature egg-laying females, little root necrosis, and well-developed giant cells. In Pioneer 309B, few females and no egg masses were found, necrotic cells often surrounded the nematodes, and giant cells were collapsed and apparently dead. A few eggs were found in Pioneer 309B, 58 days after inoculation, indicating very slow development of the few females which did survive.

*0622–HUNT, O. J. ET AL., 1969. "Development of resistance to root-knot nematode (*Meloidogyne hapla* Chitwood) in alfalfa (*Medicago sativa* L.)." *Crop. Sci.*, 9, 624–627.

Clones with dominant monogenic resistance were used in a back-crossing programme to develop resistance in adapted lucerne material. 2 of the recurrent parents were Washoe and Lahontan, which are resistant to aphids, *Ditylenchus dipsaci* and *Corynebacterium insidiosum*. Results indicate that it was relatively easy to transfer *Meloidogyne hapla* resistance to adapted germ plasm while maintaining resistance to several other pests. [From *Pl. Breed. Abstr.*, **40**, No. 5302.]

0623-LUNDIN, P., 1969. "Breeding of lucerne for resistance to stem nematode and *Verticillium* wilt." *Sver. Utsädesför. Tidskr.*, **79**, Suppl. pp. 133–139. [Russian summary pp. 138–139.]

A breeding line of lucerne combining very high resistance to *Ditylenchus dipsaci* and *Verticillium* wilt was developed by recurrent mass selection. Nematode resistance seemed to be due to a small number of major genes, while *Verticillium* resistance appeared to be more complex.

0624-TIKYANI, M. G., KHERA, S. & BHATNAGAR, G. C., 1970. "*Aphelenchoides jodhpurensis* n.sp. from soil of great millet from Rajasthan, India." *Zool. Anz.*, **184** (3/4), 239–241.

Aphelenchoides jodhpurensis n.sp. from soil around roots of *Sorghum vulgare* in India is based on 2 female specimens with body 0·53 to 0·54 mm. long, lateral fields with 4 incisures, spear 13 to 14 μ long lacking basal thickenings, excretory pore located behind the nerve ring, vulva at 70 to 71%, ovary with a single row of oocytes, post-vulval uterine sac about one body-width long and a tapering tail measuring 4·2 anal body-widths long and carrying a simple terminal mucro. M.R.S.

0625-HUANG, C. S., 1969. "Mechanism of giant cell initiation and the subsequent intracellular changes caused by root-knot nematode." *Diss. Abstr.*, **29** (12, Pt. 1), 4470–4471.

Giant cell formation and associated pathology in *Meloidogyne javanica*-infected *Vicia faba* and *Cucumis sativus* is described.

*0626-SONTIRAT, S. & CHAPMAN, R. A., 1970. "Penetration of alfalfa roots by different stages of *Pratylenchus penetrans* (Cobb)." *J. Nematol.*, **2** (3), 270–271.

The difference in the ability of various stages of *Pratylenchus penetrans* to penetrate alfalfa seedlings was studied. Each seedling was inoculated with 25 specimens of a single stage in 1.5 ml. water and incubated in the dark for 48 hours at 20 to 25°C. Results indicated that greater numbers of 4th-stage larvae and females had penetrated the roots than 2nd stage larvae and males. It is concluded that the composition of inocula used in the study of this nematode is as important as its quantity.

0627—HARTMANN, R. W., 1968. "A comparison of genetic resistance and fumigation for root-knot nematode control in pole beans." *Proc. Am. Soc. hort. Sci.*, **93**, 397–401.

Two similar pole bean cultivars, Hawaiian Wonder (susceptible to *Meloidogyne incognita*), and Manoa Wonder (resistant), were grown in a field heavily infested with nematodes. Half of the field was fumigated with D-D. Both genetic resistance and fumigation were highly effective in increasing yields over the susceptible Hawaiian Wonder in the non-fumigated plots. [From *Hort. Abstr.*, **40**, No. 1107.]

0628-RHODESIA, 1970. "Report of the Secretary for Agriculture, 1968–69." *Salisbury: Government Printer*, 82 pp. [Plant nematodes p. 30.]

A survey of the distribution of *Radopholus similis* on banana in Rhodesia revealed a number of infested sites, mainly in the Lowveld. Sugar-cane, maize, rice, wheat, tobacco, soybean, potato and groundnut also act as hosts, the last-named often being seriously affected. Fumigation trials on 40 farms indicated that nematodes are not generally of economic significance in cotton production, but *Trichodorus* sp. and *Pratylenchus brachyurus* can cause serious damage to cotton and maize.

*0629-BALDWIN, J. G. & BARKER, K. R., 1970. "Host suitability of selected hybrids, varieties and inbreds of corn to populations of *Meloidogyne* spp." *J. Nematol.*, **2** (4), 345–350.

The rates of reproduction of 10 populations of *Meloidogyne* spp. on 14 cultivars of *Zea mays* were determined and the resulting host response to infection was measured under glasshouse conditions. The rates of nematode reproduction varied with species, populations of species and with maize cultivars. *Meloidogyne arenaria, M. incognita* and *M. javanica* reproduced on all cultivars tested but none of the 3 populations of *M. hapla* reproduced. Coker and Pioneer hybrids proved more favourable for *Meloidogyne* reproduction than McNair hybrids or open pollinated varieties and inbreds. The root weight of Coker 911 which supported large numbers of *M. incognita* was not affected by the nematode but that of Pioneer 309B which had fewer *M. incognita* eggs per g. was reduced. There was generally some reduction in root growth of infected plants although top weights were not affected. There was little significant difference in root growth within a given nematode/cultivar treatment.

0630-KHEIRI, A., 1970. "Two new species in the family Tylenchidae (Nematoda) from Iran, with a key to *Psilenchus* de Man, 1921." *Nematologica*, **16** (3), 359–368. [German summary p. 367.]

Psilenchus iranicus n.sp. from rye and lucerne soil and *Tylenchus cerealis* n.sp. from rye and sunflower (*Helianthus*) soil are described in Iran. The former species has a clavate tail, a post-anal intestinal lobe and spicules 33 μ long. The latter species has 0·365 to 0·415 mm. long body in the female, vulva at 76 to 78·5%, a short tail with rounded terminus (c = 10 to 11 in females) and 12 to 13 μ long spicules.

*0631-SHERWOOD, R. T. & HUISINGH, D., 1970. "Calcium nutrition and resistance of alfalfa to *Ditylenchus dipsaci*." *J. Nematol.*, **2** (4), 316–323.

The influence of Ca^{++} nutrition on the resistance of lucerne, *Medicago sativa*, to *Ditylenchus dipsaci* was determined. Susceptible 'Atlantic' and resistant 'Lahontan' lucerne seedlings were grown on sand with a modified Hoagland's solution containing $CaCl_2$ at 0·75, 1·5, 3, 6, or 12 mM per litre and buds were inoculated with 40 active nematodes in a 1% carboxymethylcellulose suspension. Plants were re-inoculated after one day by covering the seedlings with moist vermiculite and pipetting nematodes onto the surface; this covering was removed after 2 days. Penetration of buds and cotyledons after 2 days was equal in 'Atlantic' and 'Lahontan' plants at each Ca^{++} concentration although most nematodes were found in the cotyledons of Lahontan' and the buds of 'Atlantic'. Concentrations of 12 mM Ca^{++} per litre reduced penetration in both plants. 21 days after inoculation the number of nematodes in 'Atlantic' buds had increased 3-fold at all Ca^{++}

concentrations, in the cotyledons at the 4 lower concentrations and in 'Lahontan' buds and cotyledons at the 2 lowest concentrations.

*0632-FAULKNER, L. R. & BOLANDER, W. J., 1970. "Agriculturally-polluted irrigation water as a source of plant-parasitic nematode infestation." *J. Nematol.*, 2 (4), 368–374.

Experiments were made to determine the infectiveness of plant nematodes introduced to a crop in irrigation water. Crops of lucerne, bean, egg plant (*Solanum melongena*), peppermint, sugar-beet and wheat were grown during the 3-year experiment in screenhouses on soil initially fumigated with methyl bromide and watered with canal water (contaminated) or deep-well water (nematode free). Crops were grown under normal commercial conditions of planting and nutrition but at temperatures 6 to 9°C. above field conditions. Samples were taken from the fumigated soil before planting, at 2 weekly intervals during the growing season and monthly for the remaining periods. Large numbers of several genera of nematodes were found in soil samples from most crops irrigated with canal water and very few in those irrigated with well water. *Paratylenchus* was dominant on all crops except egg-plant, where *Meloidogyne* was dominant. Extremely high levels of *Paratylenchus* on both well—and canal—watered peppermint were attributed to aerial contamination. Absence of *Ditylenchus dipsaci*, known to be present in canal water, was probably due to the higher screenhouse temperatures.

*0633-ABDÓN GUÍNEZ, S., 1969. "Transmisión de nematodos fitopatógenos por semillas de forrajeras." *Agricultura téc.*, 29 (3), 139–141.

Ditylenchus dipsaci was found in 3 of 24 samples of lucerne seed and in one of 11 samples of clover (*Trifolium pratense*) seed. *Meloidogyne* larvae were also found in seed samples of lucerne and clover.

0634-YADAV, B. S. & VERMA, A. C., 1971. "Cereal cyst eelworm and other nematodes associated with maize in Rajasthan." *Indian J. Nematol.*, 1 (1), 97–98.

The following species of plant-parasitic nematodes were found associated with maize in Rajasthan, India (the percentage of their occurrence in soil samples is given in parentheses): *Heterodera avenae* (46); *Pratylenchus zeae* and *P. delattrei* (72), *Tylenchorhynchus mashhoodi* (48), *Helicotylenchus* spp. (14), *Hoplolaimus indicus* (26), and *Rotylenchulus reniformis* (4). In addition, *Aphelenchus avenae*, *Ditylenchus* sp. and *Tylenchus* sp. were present in 82, 62 and 2% respectively of the samples examined. Preliminary pathogenicity tests indicate that *Heterodera avenae* causes as much damage to maize as it does to wheat and barley.

*0635-HUNT, O. J., GRIFFIN, G. D., MURRAY, J. J., PEDERSEN, M. W. & PEADEN, R. N., 1971. "The effects of root knot nematodes on bacterial wilt in alfalfa." *Phytopathology*, 61 (3), 256–259.

The incidence of bacterial wilt infection increased significantly (7 to 76%) in lucerne plants inoculated with a combination of *Meloidogyne hapla* and *Corynebacterium insidiosum* compared with those inoculated with *C. insidiosum* alone.

*0636-KOSHY, P. K., SWARUP, G. & SETHI, C. L., 1971. "*Heterodera zeae* n.sp. (Nematoda: Heteroderidae), a cyst-forming nematode on *Zea mays*." *Nematologica*, Year 1970, 16 (4), 511–516. [German summary p. 515.]

Heterodera zeae n.sp. from the roots of maize in Rajasthan State, India, is described and figured. It belongs to the *H. schachtii* group with ambifenestrate type of vulval region. The 2nd-stage larvae are closest to those of *H. lespedezae* but are shorter (360 to 440 μ compared with 400 to 510 μ) and have shorter tails (c = 8 to 13 compared with 7 to 9). It is distinguished from *H. glycines* by host range, cyst measurements and the relatively shorter larval tail. Barley is also a host. It was also collected from maize fields in Pusa, Bihar and Ludhiana, Punjab.

0637-DASGUPTA, D. R. & SESHADRI, A. R., 1971. "Races of the reniform nematode, *Rotylenchulus reniformis* Linford and Oliveira, 1940." *Indian J. Nematol.*, 1 (1), 21–24.

Two races of *Rotylenchulus reniformis* became evident when 10 populations of this nematode species were tested using cowpea (*Vigna catjang*), castor, and cotton as hosts. 9 populations (Race A) reproduced on all the 3 hosts, but one population (Race B) multiplied on cowpea only and failed to reproduce on castor and cotton.

0638-TARTÉ, R., 1971. "Evaluation of the damage caused by *Pratylenchus zeae* in corn under greenhouse conditions." [Abstract.] *Nematropica*, 1 (1), 16 [Also in Spanish p. 36.]

[Negative correlation between nematode density and dry weight of aerial parts of host.]

0639-CORNELISSE, A., MARKS, F., TOWNSHEND, J. L., OLTHOF, TH. H. A. & POTTER, J. W., 1970. "Plant-parasitic nematode genera associated with crops in Ontario in 1969." *Can. Pl. Dis. Surv.*, 50 (3/4), 104–105.

The commonest plant-parasitic nematode genera found in Ontario, Canada, in 1969 in soil samples from 28 crops were *Pratylenchus* and *Paratylenchus* in 177 and 86 samples respectively from 17 crops, and *Meloidogyne* in 16 samples from 9 crops. *Heterodera avenae* is a potential danger to corn and crop rotation is necessary to control it.

0640-SOUTHARDS, C. J., 1971. "Effect of fall tillage and selected hosts on the population density of *Meloidogyne incognita* and *Pratylenchus zeae*." *Pl. Dis. Reptr*, 55 (1), 41–44.

The effects of autumn ploughing, fallowing and selected hosts on the populations of *Meloidogyne incognita* and *Pratylenchus zeae* were investigated. Plots were ploughed to depths of 15 or 30 cm. and planted with tobacco or maize in the following spring after normal fertilization and cultivation procedures. Few weeds grew until August when the fallow plots became covered in crab grass (*Digitaria* sp.). Although the population of *M. incognita* larvae was reduced by 73% compared with untilled plots in the following April, this reduction did not persist into the 2nd year. Tobacco crops greatly increased the population of *M. incognita* whilst little increase occurred in maize crops. *P. zeae* increased on maize crops but did not feed on tobacco. There was little increase in nematode numbers on fallow plots.

*0641 ELGIN, J.H., JR.; EVANS, D.W.; FAULKNER, L.R. Evaluation of alfalfa for

stem nematode resistance. Crop Science (1975) 15 (2) 275-276 [En] Field Crops Labs., ARS, USDA, Beltsville, MD 20705, USA.

Germinating seedlings of 3 resistant (Apalachee, Lahontan and Washoe) and 3 susceptible (Saranac, Vernal and Ranger) varieties of Medicago sativa were inoculated in the glasshouse with Ditylenchus dipsaci once at 50/seedling and on 3 further occasions, 2, 4 and 6 weeks later, at 200/seedling. The seedlings were then rated for resistance on easily recognizable symptoms 16 weeks after the first inoculation. 90.1, 67.8 and 63.7% of Apalachee, Lahontan and Washoe and 34.9, 15.1 and 12.2% of Saranac, Vernal and Ranger seedlings, respectively, proved resistant. This method differentiated clearly between resistant and susceptible varieties of lucerne and is easy to use.

0642-HARTMANN, R. W., 1968. "Manoa Wonder, new root-knot nematode resistant pole bean." *Circ. Hawaii agric. Exp. Stn*, No. 67, 10 pp.

[Manoa Wonder pole bean [*Phaseolus multiflorus*] resistant to *Meloidogyne incognita*.]

0643-KÜTHE, K. & DERN, R., 1970. "Erfahrungen bei der Untersuchung von *Ditylenchus*-Befall an Mais (*Zea mays*) in Hessen." *Gesunde Pfl.*, 22 (6), 101–104. [English summary p. 104.]

Damage by *Ditylenchus dipsaci* to maize has been increasing since 1960 in Hesse, West Germany. It frequently occurs in fields where maize is grown in place of fodder beet that has suffered damage by the same nematode. Observations on 7 varieties of maize sown in 2 infested fields showed that the varieties Inrakorn and Inrafrüh yielded best although, in the more heavily infested field, 13% and 52% of the plants, respectively, were attacked. The varieties Inti, Cusco, Hybridor, Prior and Velox were more susceptible to damage: their infection rates varied from 52 to 72% and yields were 18 to 31% below that of Inrakorn.

0644-STUBBS, L. L., 1971. "Plant pathology in Australia." *Rev. Pl. Path.*, 50 (9), 461–478. [Nematode disorders, pp. 473–474.]

Xiphinema index, the vector of fanleaf virus of grapevine occurs in only one district of north-eastern Victoria, Australia. *Meloidogyne* spp. are widespread and damaging in Australia: *M. javanica* and *M. incognita* cause serious losses to tobacco, ginger, grapevine, banana, pineapple, tomato, carrot and *Duboisia* in Queensland and the former is present on numerous crops in irrigated areas of the Murray valley. Root-knot also occurs in Western Australia on many crops and on potato, strawberries, groundnuts and root crops in Victoria, New South Wales and Queensland. *Heterodera avenae* is the most important root-pathogen of cereals in north-western Victoria and occurs in South Australia, and Western Australia. *H. schachtii* and *H. trifolii* are also important pests in Victoria and Queensland. *Tylenchulus semipenetrans* is prevalent on citrus and grapevine in the Murray valley: nematode-resistant, virus-free grapevine rootstocks are being developed. In New South Wales, *Radopholus similis* is a major pest of bananas, *Pratylenchus* spp. are widespread on many crops and are associated with disease symptoms and *Ditylenchus dipsaci* causes decline of lucerne and rotting of narcissus bulbs. *Aphelenchoides fragariae* and *A. ritzemabosi* cause leaf diseases of ornamentals and yields of cultivated mushrooms are reduced by *A. composticola*. Root-tip galls of rose are caused by *X. diversicaudatum*. There has been increasing use of nematicides particularly for high-value crops.

0645-KHURANA, S. M. P., GOSWAMI, B. K. & RAYCHAUDHURI, S. P., 1970. "Interaction of maize mosaic with root-knot nematode *Meloidogyne incognita* (Kofoid & White) Chitwood in maize (*Zea mays* L.)." *Phytopath. Z.*, 69 (3), 267–272. [German summary p. 271.]

The interaction of *Meloidogyne incognita* and maize mosaic virus in maize var. Ganga-3 was investigated in experiments in India. When nematodes and virus were inoculated simultaneously the plants suffered more damage, the incubation period for mosaic symptoms was shortest and the reproduction of the nematode was greatest than when either was inoculated alone or one 10 days before the other. The nematode did not transmit the virus. Symptoms of virus disease were not observed in the roots nor could virus be recovered from them.

***0646**-ELMILIGY, I. A., 1971. "Two new species of Tylenchidae, *Basiroides nortoni* n.sp. and *Tylenchus hageneri* n.sp. (Nematoda: Tylenchida)." *J. Nematol.*, 3 (2), 108–112.

Basiroides nortoni n.sp. and *Tylenchus hageneri* n.sp. from soil around the roots of maize from Ollie, Iowa, USA, are described. *B. nortoni* is 0·67 to 0·86 mm. long, with spear 7·0 to 8·5 μ long, vulva at 79·5 to 85·5%, posterior uterine branch slightly longer than the body diameter, spicules 21 to 25 μ long and an arcuate tail with pointed terminus. *T. hageneri* has 12 to 14 μ long spear, 1·7 to 2·0 μ wide annules near mid-body, vulva at 55 to 64%, posterior uterine branch about 2/3 as long as body diameter, 18 to 23·5 μ long spicules and 154 to 194 μ long, filiform tail in both sexes. Sex ratio for both species was about 1:1.

***0647**-WANG, L. H., 1971. "Embryology and life cycle of *Tylenchorhynchus claytoni* Steiner, 1937 (Nematoda: Tylenchoidea)." *J. Nematol.*, 3 (2), 101–107.

The embryology and development of *Tylenchorhynchus claytoni* on lucerne are described. The first moult is in the egg and the 2nd-stage larva hatches in 5 to 6 days at 22 to 25°C. Measurements are given of all stages from 2nd to adult and gonad development is described and illustrated. At the fourth moult, which takes 5 to 6 days the cuticle splits transversely into 2 unequal parts. The life-history from egg to egg takes 31 to 38 days at 28°C. on lucerne. Adult females have 26 and males 24 or 26 longitudinal striations.

0648-RHOADES, H. L., 1969. "Effect of nematicides on yield of field corn in central Florida." *Proc. Soil Crop Sci. Soc. Fla*, Year 1968, 28, 262–265.

Eight granular nematicides applied in small doses in the rows at planting time were compared with broadcast D–D in fine sandy soil for control of *Belonolaimus longicaudatus* in maize in Florida, USA. The nematicides used were Dasanit [fensulfothion], Furadan [carbofuran], cynem [thionazin], phorate, a mixture of equal parts of cynem and phorate, Mocap, Temik [aldicarb] and methomyl at rates of 3 lb. and 1·5 lb. per acre applied as a 14 in. band 2 in. deep in the rows just before planting. All nematicides gave improved growth and highly significant yield increases. Sting nematode populations were greatly decreased.

0649 ROIVAINEN, O., TINNILA, A. & KANERVO, V., 1962. "Observations on the stem nematode Ditylenchus dipsaci (Kuhn) Filipjev as a pest of red clover in Finland." Annls agric. Fenn., 1 (2), 127-132.

0650–TOBAR JIMÉNEZ, A., GUEVARA BENÍTEZ, D. & MARTINEZ SIERRA, C., 1968. "Influencia del *Zygotylenchus guevarai* (Tobar Jimenez, 1963) Braun y Loof, 1966 sobre algunos de sus hospedadores." *Revta ibér. Parasit.*, 28 (2), 177–187. [English summary pp. 185–186.]

A pot experiment was carried out with 5 species of plants, on a sandy-loam soil, to assess new hosts of *Zygotylenchus guevarai*. The statistical data, obtained 10 months after planting, showed that *Viola tricolor* and *V. odorata* were good hosts; white clover and lucerne were resistant hosts but red clover was not attacked by *Z. guevarai*. *Tylenchorhynchus brevidens*, accidentally present in the soil, reproduced on white clover, lucerne, and especially on red clover without interfering with *Z. guevarai*. Other nemarodes present in the soil did not play any significant role in the experiment.

0651 GRIFFIN, G.D., 1968. "The pathogenicity of Ditylenchus dipsaci to alfalfa and the relationship of temperature to plant infection and susceptibility". Phytopathology, 58 (7), 929-932.

Ditylenchus dipsaci penetrated resistant and susceptible varieties of lucerne with equal ease and there was no relationship between the numbers of invading nematodes and the response of the host. 28 days after inoculation, 43 and 33% of the invading nematodes were found in the cotyledons of susceptible and resistant plants respectively. The effect of temperature on infection was investigated.

0652 LUNDIN, P., 1967. "Ny nematodresistent elit av Weibulls Alfa Blalucern." Weibulls Arbs. Vaxtiforadl. Vaxtodling, Year 1967, pp.10-12.

Ditylenchus dipsaci is one of the most important parasites of lucerne in Sweden. Work is in progress on breeding lines for resistance.

0653 TSENG, S.T., ALLRED, K.R. & GRIFFIN, G.D., 1968. " A soil population study of Ditylenchus dipsaci (Kuhn) Filipjev in an alfalfa field." Proc. helmintch. Soc. Wash., 35 (1), 57-62.

Numbers of Ditylenchus dipsaci in a lucerne field on silt loam near Smithfield, Utah, U.S.A., fluctuated seasonally. 2 peak densities were observed during the sampling period from August 1965 to June 1966. One peak was between late August and early September 1965, and the other occurred during the middle of May 1966. At 0 to 10 cm. depth where most of the nematodes were found, numbers ranged from 50 nematodes per 400 c.c. of soil in autumn to one nematode per 400 c.c. of soil in the winter. Peak numbers occurred when the soil temperature was approximately 15°C., and the greater the deviation from this temperature, the smaller the number of nematodes.

0654–ELMILIGY, I. A., 1968. "The occurrence of *Heterodera glycines* on *Trifolium alexandrinum* in United Arabic Republic." *Nematologica*, 14 (4), 592–593.

Heterodera glycines males, females and larvae were found in soil around roots of *Trifolium alexandrinum* in the United Arab Republic. Larvae were found in soil around the roots of *Zea mays*, *Cucurbita moschata*, *Lycopersicon esculentum* and *Solanum tuberosum*. *T. alexandrinum* is considered a host plant of *H. glycines* in the United Arab Republic.

0655–SKARBILOVICH, T. S., 1963. [Study of the susceptibility of various varieties of legumes and of maize to *Tylenchorhynchus dubius* (Bütschli, 1873).] In: [Helminths of man, animals and plants and their control: Papers on helminthology presented to Academician K. I. Skryabin on his 85th birthday.] *Moscow: Izdatelstvo Akad. Nauk SSSR*, pp. 511–514.

0656 DASGUPTA, D.R., RASKI, D.J. & SHER, S.A., 1968. "A revision of the genus Rotylenchulus Linford and Oliveira, 1940 (Nematoda: Tylenchidae)." Proc. helminth. Soc. Wash., 35 (2), 169-192.

The genus Rotylenchulus is reviewed and the genetic diagnosis emended. The morphology of Rotylenchulus and key to the species is given. R. nicotiana and R. stakmani are synonymized with R. reniformis. Description of the neotype and redescriptions of various stages are given for the genotype, R. reniformis. Males and mature females of R. parvus and larvae of R. borealis are described for the first time. Thus Rotylenchulus has 6 new species. R. macrosomus n.sp. from Olea europaea, Arachis hypogaea, Phaseolus vulgaris and banana in Israel, is similar to R. borealis but differs in its longer stylet, longer hyaline portion to the immature female tail and the larger size of males and immature females. R. clavicaudatus n.sp. associated with Strelitzia sp. from the Transkei, South Africa, can be distinguished from R. macrosomus and R. borealis by the lack of annulation on the lip region and the lower 'o' value, and from R. macrosomus by the more anterior position of the vulva. R. leptus n.sp. from soil around the roots of grasses and Bamboos vulgaris from Gwelo, Rhodesia, resembles R. parvus but has no annulations in the lip region, and has a larger hyaline portion to the immature female tail and a high conoid lip region. R. variabilis n.sp. associated with Rumex sp. in Rhodesia and with bean, corn, banana, cowpea, oil-palm and other plants in Kenya and Nigeria, differs from Rotylenchulus parvus in the annulation of the lip region and the longer hyaline tail portion. R. anamictus n.sp. associated with Acacia sp. at Merca, Somalia, differs from R. parvus in the more posterior vulva and in the shape and larger size of the tail in the immature female. The body is shorter and the stylet smaller than in R. reniformis. R. macrodoratus n.sp. from Vitis sp., Laurus nobilis, and Prunus amygdalus soils in Italy, is unique in that its stylet is more than 22 microns long and the stylet knobs have anchor shaped processes directed forwards.

0657 ELMILIGY, I.A., 1968. "Three new species of the genus Meloidogyne Goeldi, 1887 (Nematoda: Heteroderidae)." Nematologica, 14 (4), 577-590. [French summary p.589.]

Meloidogyne deconincki n.sp. was found on Fraxinus excelsior in Belgium. M. litoralis n.sp. was found on Ligustrum sp. in France. M. oteifae n.sp. was found on Pueraria javanica and Coffeae robusta in the Congo. They can be distinguished from other known described species by the perineal pattern of the female, the lateral field of the male in M. deconincki and M. litoralis, the long stylet and more posterior position of the dorsal gland orifice in female and male of M. deconincki and by the elongated stylet knobs of the male in M. oteifae.

0658 SHER, S.A., 1968. "Revision of the genus Radopholus Throne, 1949 (Nematoda: Tylenchoidea)." Proc. helminth. Soc. Wash., 35 (2), 219-237.

The genus Radopholus is emended and R. similis, R. inaequalis, R. neosimilis and R. williamsi redescribed and figured. 7 new species are described and figured, and a key to the genus provided. The distribution and morphological characters of Radopholus are discussed. R. vangundyi n.sp., associated with Eucalyptus sp., Acacia sp. and grasses from Victoria, Australia, is similar to R. neosimilis differing in the hemispherical shape of the female lip, the more tapering tail and the higher unannulated male lip region. R. magniglans n.sp. from grasses and Eucalyptus sp. soil in South Australia, differs from R. vangundyi in the long conspicuous oesophageal glands and in the absence of males. R. trilineatus n.sp. from grass and Eucalyptus sp. soil from New South Wales, Australia, differs from R. magniglans by the 3 incisures of the lateral field in the female, and the more anterior vulva. R. rotundisemensus n.sp. from grass, Eucalyptus sp. and Acacia sp. from Victoria, Australia, differs from R. inaequalis in having round sperms in the spermatheca, fewer incisures in the lateral field and usually a shorter stylet. R. vertexplanus n.sp. from grass, Eucalyptus sp., and Acacia sp. from Victoria, Australia, differs from R. williamsi by the longer tail with terminal annulations and in the absence of males. R. nativus n.sp. associated with Carmichaelia monroi, Celmisia sp., Danthonia sp., Dracophyllum sp. and Senecio bellidioides from Springfield, New Zealand, differs from R. neosimilis and R. vangundyi by its longer stylet, the absence of sperms in the spermatheca and the absence of males. R. nigeriensis n.sp. associated with Andropogon tectorum and Imperata cylindrica from Ibadan Province, Nigeria, is distinct in having phasmids in the posterior part of the body, a shorter stylet and prominent vulval lips. All these new species are from native habitats in the areas described.

0659 FRANDSEN, K.J., 1965. "Observations on the attack by populations of Ditylenchus dipsaci on strains of red clover." Suom. maatal. Seur. Fulk., 107, 18-29.

Populations of Ditylenchus dipsaci collected from red clover in different localities in Denmark showed varying infectivity on several red clover varieties. However, the variation in resistance within the clover strains exceeded the variation of the nematode populations. In a few cases, significant clover strain nematode population interactions were found, but were not consistent; and did not indicate a possible occurrence of specific races of red clover nematodes. The variation in infectivity between nematode populations is an indication to the plant breeder to use nematode inoculum consisting of an adequate number of different nematode populations when testing and selecting for resistance.

0660 OTEIFA, B.A. & TAHA, A., 1964. "Significance of plant parasitic nematodes in maize deterioration problem. 1. Nematode species involved in the syndrome of diseased plants." Tech. Bull. Bahtim exp. Stn, Egypt agric. Org., No. 73, 16pp. [Arabic summary pp.15-56]

In a survey of the nematodes associated with wilt of maize in Egypt the pathogenic nematodes found were in the genera Criconemoides, Longidorus, Helicotylenchus, Hemicycliophora, Paratylenchus, Xiphinemus, Rotylenchus, Trichodorus, Tylenchorhynchus, Hoplolaimus and Pratylenchus. P. zeae was the most common species and is probably the main cause of the deterioration of maize crops in Egypt.

0661 GUPTA, N.K. & GUPTA, J.C., 1967. "On Helicotylenchus indicus Siddiqi, 1963 (Nematoda: Hoplolaimidae), a phytoparasitic nematode in the Punjab." Res. Bull. Panjab Univ. Sci., Year 1966, 17 (3/4), 221-222.

Helicotylenchus indicus Siddiqi, 1963 is detailed; Citrus sinensis and Cynodon dactylon are recorded as its host in Ludhiana, India.

0662 OTEIFA, B.A. & TAHA, A., 1964. "Significance of plant parasitic nematodes in maize deterioration problem. II. Incidence of root rot caused by the root-lesion nematode, Pratylenchus zeae Graham." Tech. Bull. Bahtim exp. Stn, Egypt. agric. Org., No. 74, 26pp. [Arabic summary pp.24-26]

The symptoms and histopathology of Pratylenchus zeae on Zea mays in the United Arab Republic are described. Maize varieties Nab Elgamal, Early American and Giza baladi were not resistant to infection but showed less damage than varieties Single Cross 14 and Double Cross 67 which, although they had fewer nematodes in them, showed high levels of root and stem rot. Vapam [metham sodium] at 40, 70 and 100 gal. per feddan gave good control of the nematode and increased crop yields.

0663 TARJAN, A.C., 1865. "Rejuvenation of nematized centipedegrass turf with chemical drenches." Proc. Fla St. hort. Soc., Year 1964, 77, 456-461.

Criconemoides citri and Pratylenchus scribneri on Eremochloa ophiuroides in pots were controlled by drenches of Nemagon, Diazinon, Bayer 25141 [Dasanit], Zinophos [thionazin] and Niagara 9227 in Florida, U.S.A. In plot tests with E. ophiuroides infected with P. goodeyi, Trichodorus christei and Hemicycliophora parvana, only

Bayer 25141 remained an effective control agent 12 weeks after treatment.

0664 GAROFALO, F., 1964. "Fenomeni di correlazione tra Heterodera gottingiana Liebscher e Fusarium oxysporum (Sch.) Syn. et Hana nell'avvizzimento delle piante di pisello et di lupino". Boll. Lab. sper. Oss. Fitopatol., 27 (2/) 33-48. [English & French summaries pp.45-46]

0665 GODECK, W. & FAVRET, E.A., 1965. "Observaciones sobre la selección de alfalfa resistente al nematode del tallo." Revta Investnes Agropec., B. Aires, Serie 2, 2(3), 41-54, [English summary p.41]
The effect of Anguillullina [Ditylenchus] dipsaci as a selective agent on lucerne in 3 regions of the Argentine was investigated. In fields the effect was not reliable and so pot tests were carried out. This gave a selection index of up to 35% for the 4 years following germination.

0666 SEN, A.K. & JENSEN, H.J., 1969. "Host-parasite relationships of various plants and hop cyst nematode, Heterodera humuli". Pl. Dis. Reptr, 53(1), 37-40.
The host range of Heterodera humuli was found to be mainly in the Urticaceae but it will also infect some plants in the Cruciferae, Cucurbitaceae, Leguminosae and Moraceae. New host records are given for Phaseolus vulgaris humulis, Vicia villosa, Trifolium repens, Cucumis sativus, Pisum sativum and Brassica nigra.

0667 CHAWLA, M.L., BHAMBURKAR, B.L., KHAN, E. & PRASAD, S.K., 1968. "One new genus and seven new species of nematodes from India." Labdev F. Sci. Technol. Ser. B, 6 (2), 86-100.
The following new nematodes are described and figured from Delhi, India. Leptonchulus indicus n.g., n. sp. from tap water is similar to Chitwoodius spp., differing in the shape of the spear extension and in having unpaired gonads and an unfringed anterior vaginal area. Tylenchorhynchus cacti n.sp. from soil around the roots of an unnamed cactus differs from T. acutus in the anterior location of the excretory pore and posterior location of the phasmid. T. delhiensis n.sp. from soil around the roots of Anona squamosa differs from T. nudus by its shorter stylet and oesophagus, posteriorly located excretory pore and absence of males. Trophurus indicus n.sp. from soil around the roots of A. squamosa is distinctive in its small body and spear size, distinct hemizonid and posterior location of the vulva. A key to Trophurus is given. Males are not recorded from any of the species so far described. Aphelenchoides delhiensis n.sp. from soil around the roots of Anona squamosa differs from Aphelenchoides trivialis, A. dactylocercus, A. sacchari and A. composticola in having the mucro centrally located on the tail. It also differs from the first 2 species in its longer stylet, well developed post-vulvar-uterine sac and higher 'o' valve, and from the last 2 species in the positions of the nerve-ring and excretory pore. A. indicus n.sp. from soil around the roots of Gossypium indicum differs from A. composticola, A. sacchari, A. dactylocercus and A. trivialis in the shape of the tail and form of the mucro. A. teres n.sp. (females only) from soil around the roots of G. indicum, differs from A. chamaelocephalus by having a post-vulvar-uterine sac and from A. longiurus by the smaller post-vulvar-uterine sac, the position of the nerve-ring and the smaller number of incisures in the lateral field. A. parascalacaudatus n.sp. (female only) from soil around the roots of Cynodon dactylon differs from A. scalacaudatus and A. singhi in the absence of knobs or thickenings on the stylet.

0668 KOSHY, P.K., 1967. "A new species of Heterodera from India." Indian Phytopath. 20 (3), 272-274.
Heterodera cajani n.sp. is briefly described from Cajanus cajan, Vigna sinensis, Glycine max, Pisum sativum, Vicia sativa, Phaseolus mungo, P. aureus, P. calcaratus and P. aconitifolius in India. The new species is close to H. trifolii, differing only in some body measurements of the 2nd-stage juveniles. A detailed description is to be published.

0669 VIGLIERCHIO, D.R. & CROLL, N.A., 1968. "Host resistance reflected in differential nematode population structures." Science, N.Y., 161 (3838), 271-272.
Axenic cultures of callus tissue from onion, white clover, red clover and lucerne were used as host material for the garlic race of Ditylenchus dipsaci. It was found that good host material bore a nematode population with fewer males than poor host material.

0670 BINGEFORS, S. & ERIKSSON, K.B., 1968. "Some problems connected with resistance breeding against stem nematodes in Sweden." Z. Pflzucht., 59 (4), 359-375. [German summary p.373.]
Techniques for rearing Ditylenchus dipsaci inoculum in callus tissue cultures and for inoculation and resistance testing in the laboratory are described with red clover and lucerne. Red clover seedlings inoculated with tap water suspensions of the nematode became infected. Repeated inoculations did not increase the degree of infection. Nematodes from callus cultures seemed to be as effective an inoculum as nematodes collected from infested fields. D. dipsaci populations from red clover in different parts of Sweden showed only slight differences in pathogenicity.

0671 LUNDIN, P.; JONSSON, H.A. Weibull's Vertus, a lucerne variety with high resistance to stem nematodes and Verticillium wilt. Agri Hortique Genetica (1975) 33 (1/4) 17-32 [En, de]
An account is given of the development in Sweden of the lucerne variety Vertus which is highly resistant to Verticillium albo-atrum and Ditylenchus dipsaci. The new variety is based on the Flemish type of lucerne and can be grown in areas suitable for this type where Verticillium wilt and stem nematode are common.

0672 AMOSU, J.O.; TAYLOR, D.P. Stimulation of growth of red clover by Tylenchorhynchus

agri. Indian Journal of Nematology (1974 publ. 1975) 4 (2) 132-137 [En] Dep. of Plant Path. Univ. of Illinois, Urbana-Champaign, Illinois 61801, USA.

Tylenchorhynchus agri on Kenland red clover, Trifolium pratense, was not pathogenic for 90 days after inoculation. The top growth and weight of red clover increased progressively as the level of inoculum was increased from 1,000 to 10,000 nematodes/pot. The nematodes were seen to feed only on the epidermal cells in the region of elongation of their host roots.

0673 HUTTON, D.G.; HAMMERTON, J.L. Investigating the role of Rotylenchulus reniformis in a decline of pigeon pea. [Abstract]. Nematropica (1975) 5 (2) 24 [En] Plant Protection Div., Min. of Agric., Hope, Jamaica, West Indies.

No relationship was evident between the numbers of Rotylenchulus reniformis in the rhizospheres of 3 pigeon pea [Cajanus indicus] varieties in Jamaica and the number of plants showing symptoms of decline. However, when the nematode populations were suppressed the plants grew faster and flowered earlier and one variety produced a significantly greater yield of green pods.

0674 ENDO, B.Y. & SCHAEFFER, G.W., 1967. "Response of Heterodera trifolii in red clover roots to azauracil and other inhibitors." Phytopathology, 57 (6), 576-579.

Azauracil, an inhibitor of RNA synthesis, consistently prevented Heterodera trifolii from developing beyond the 3rd stage in roots of Trifolium pratense. Uracil and uridine, normal constituents of nucleic acids, partially reversed this effect.

0675 MINTON, N.A. & DONNELLY, E.D., 1967. "Additional Vicia species resistant to root-knot nematodes." Pl. Dis. Reptr, 51 (7), 614-616.

Glasshouse experiments indicated that Vicia calcarata, V. serratifolia, V. cornigera and seventeen F_7 and F_8 hybrids from the V. sativa x V. cordata cross are resistant to Meloidogyne incognita, M. incognita acrita and M. javanica but susceptible to M. arenaria and M. hapla. V. leganyana and V. angustifolia are susceptible to all 5 nematode species.

0676 SOUTHARDS, C.L., 1967. "The pseudo-root-knot nematode of Bermuda grass in Tennessee." Pl. Dis. Reptr, 51 (6), 455.

Abundant egg masses and females of Hypsoperine graminis were recovered from root fragments of Cynodon dactylon.

0677 SHAVROV, G.N., 1967. [Three new species of Aphelenchoides Fischer, 1894 (Nematoda: Aphelenchoididae).] Zool. Zh., 46 (5), 762-764. [In Russian: English summary p.764.]

3 new species of Aphelenchoides are described from the roots and soil around the roots of Glycine hispida in the Primorsk region in the Russian Far East. A. parabicaudatus n.sp. is characterized by a compound mucro and is similar to A. bicaudatus but differs in the structure of the buccal capsule, stylet length (8 microns) and the position of the excretory pore and nerve ring. A. editocaputis n.sp. has a single mucro and a short post-vulval uterine sac and differs from A. spinosus by the shape of the tail, buccal capsule and ovary and the position of the excretory pore and nerve ring. A. parasubtenuis n.sp. has a simple mucro and differs from A. subtenuis by the body size and proportions, shape of buccal capsule and the shape and size of the genital system.

0678 BIRD, A.F., 1967. " Changes associated with parasitism in nematodes. I. Morphology and physiology of preparasitic and parasitic larvae of Meloidogyne javanica" F. Parasit., 53 (4), 768-776.

Both morphological and physiological changes associated with the onset of the parasitic mode of life were observed in living 2nd-stage larvae of Meloidogyne javanica. These changes which took place as the larvae became parasitic in clover radicles were observed under phase-contrast at high magnification. Changes in the mobility and infectivity of these larvae during the same periods were also measured. There is an accumulation of granules in the ducts of the subventral oesophageal glands shortly before hatching. These granules appear to be associated with penetration both of the egg-shell and the plant cell wall and disappear completely within one to 3 days of entry into the host. Within this period of time there is an approximate threefold enlargement of the dorsal and subventral oesophageal glands. At the same time there is a progressive loss in the ability of the larva to reinfect its host and to move through the soil.

0679 GRIFFIN, G.D., 1967. "Evaluation of several techniques for screening alfalfa for resistance to Ditylenchus dipsaci." Pl. Dis. Reptr, 51 (8), 651-654.

Inoculation of lucerne seed with Ditylenchus dipsaci was best done in the glasshouse at 30 to 60% R.H. or in a controlled humidity chamber of 80 to 100% R.H. Inoculation of mature lucerne plants was, however, more effective. Inoculation of cotyledons was only effective when done in a controlled humidity chamber at 80 to 100% R.H.

0680 NORTON, D.C., 1967. "Xiphinema americanum as a factor in unthriftiness of red clover." Phytopathology, 57 (12), 1390-1391.

In field and glasshouse tests, yields of Trifolium pratense were greater when Xiphinema americanum was absent. X. americanum was the most common pathogenic nematode in the field. Other pathogenic and non-pathogenic nematodes found are listed. DBCP was toxic to red clover and probably did not directly influence the yield increase. X. americanum probably caused poor growth of red clover.

0681 STOKES, D.E. & LANGDON, K.R., 1966. "A grass host plant of the citrus nematode, Tylenchulus semipenetrans, and other associated plants." Pl. Dis. Reptr, 50 (11), 822-825.

An indigenous Florida grass, Andropogon

rhizomatus, is a newly reported host for Tylenchulus semipenetrans. Adult females and other stages were dissected from A. rhizomatus roots. The nematode was found associated with 18 other plant species.

0682 HUSSAIN, S.I. & KHAN, A.M. 1967. "A new subfamily, a new subgenus and eight new species of nematodes from India belonging to superfamily Tylenchoidea." Proc. helmith. Soc. Wash., 34 (2), 175-186.

A new subfamily Rotylenchulinae is proposed under the family Hoplolaimidae to include the genus Rotylenchus. Interrelationships of the genera of the family Tylenchidae are discussed. Ottolenchus n.subg. is proposed under the genus Tylenchus. Tylenchus (Ottolenchus) equisetus n.subg., n.sp. is described from soil around the roots of Casvarina equisetifolia at Aligarh, Uttah Pradesh, India. It is distinguished by a moderately developed bursa in males, a lip region not clearly annulated, and an oval median bulb. T. (Lelenchus) mirus n.sp. is described from soil around the roots of Hibiscus rosasinensis at Aligarh. It is distinguished by the position of the vulva, size of the spear and in the tail length. T. (L.) cynodoneus n.sp. is described from soil around the roots of Cynodon dactylon at Aligarh. It differs from T. (L.) discrepans in the absence of males, size of the spear and length of the tail. Ditylenchus minutus n.sp. is described from soil around the roots of Punica granatum at Ghazipur, Uttah Pradesh. It differs from D. misellus by the almost straight body when relaxed and more posteriorly located vulva. D. cyperi n.sp. is described from soil around the roots of Cyperus rotundus at Aligarh and it differs from related species mainly in the position of the vulva, the size of the spear and in the shape and length of the tail. D. ausafi n.sp. is described from soil around the roots of Rosa sp. at Aligarh and is characterized by a long tail, short bursa and relatively anterior vulva. In the family Hoplolaimidae, Rotylenchus helicus n.sp. is described from soil around the roots of Psidium guajava at Rampur, Uttah Pradesh. It differs from all closely related species except R. orientalis in having the orifice of the dorsal oesophageal gland at more than half the spear length behind the spear base. It is distinguished from R. orientalis in the size of the spear, position of the phasmid and presence of distinct epiptygma in females. Hemicycliophora dhirendri n.sp. (Hoplolaimidae) is described from soil around the roots of Cyperus rotundus at Aligarh. It is characterized by the absence of longitudinal lines, hemizonid and the tubular sheath covering the spicules, also by the size of the spear and the spicules, the shape of the tail and in having the vulva under a folded skirt.

0683 HIJINK, M.J., 1968. "Influence of Meloidogyne hapla on the white clover content of a grass-clover mixture at different levels of nitrogen fertilisation." [Abstract.] International Symposium of Nematology (8th), Antibes, Sept. 8-14, 1965. Reports, p.75.

0684 GRIFFIN, G.D. 1967. "Chemical control of the stem nematode Ditylenchus dipsaci." Pl. Dis. Reptr, 51 (11), 973-974.

The effectiveness of various chemicals in controlling Ditylenchus dipsaci in lucerne was compared. Liquid formulations of cynem [thionazim] and dimethoate at 0.5, 1.0 and 2.0 lb. per acre, and Bayer 37289 at the 2.0 lb. rate, gave good to excellent control of D. dipsaci. Methyl demeton-R and Bayer 25141 gave fair control but were equally effective in suppressing galling as were cynem, dimethoate and Bayer 37289. Both formulations of phorate at all rates and the granular formulation of cynem gave relatively poor nematode control but fair supression of galling. No data on nematode numbers were obtained for the liquid formulation of phorate owing to the poor control of galling.

0685 EPPS, J.M. & GOLDEN, A.M., 1967. "Suitability of Kobe Lespedeza for reproduction of isolates of the soybean cyst nematode from nine locations." Pl. Dis. Reptr, 51 (9), 775-776.

Isolates of Heterodera glycines reproduced on Lespedeza striata in glasshouse experiments. Some variations occurred in the rates of reproduction but all isolates were highly pathogenic and could not be differentiated on this host. Results show that L. striata can serve as an important host for all the 9 isolates of the soy-bean cyst nematode from 6 states of the U.S.A.

0686 LAUGHLIN, C.W. & WILLIAMS. A.S., 1968. "Effects of inoculum levels of Hyposoperine graminis on root growth of 'Tifgreen' bermudagrass (Cynodon sp.)." Nematologica, 14 (1), 9-10.

0687 GRISSE, A. DE, 1967. "Description of fourteen new species of Criconematidae with remarks on different species of this family." Biol. Faarb., 35, 66-125. [French summary pp.87-88]

14 new species of Criconematidae are described and figured: one Criconemoides sp., 4 Macroposthonia spp., 4 Nothocriconema spp., 4 Discocriconemella spp. and one Lobocriconema sp. C. amorphus n.sp. was collected from a dune at Middelkerke, Belgium; M. coomansi n.sp. from around the roots of Chloris gayana from Salines, Congo Republic [= Congo Kinshasa]; M. denondeni n.sp. from sandy soil around the roots of citrus and from clay soil around the roots of coffee from Paramaribo, Surinam; M. dherdei n.sp. from around the roots of old peachtrees and grass from Rijkstuinbouwschool, Melle, Belgium; M. peruensiformis n.sp. from around the roots of potato from Santo Domingo, Venezuela; N. corbetti n.sp. from around the roots of Fimbristylis sp. from Zomba, Malawi; N. dubium n.sp. from around the roots of tea plants in Musasa and banana in Mwindozi, Burundi; N. loofi n.sp. from sandy dune soil around the roots of grass plants from Middelkerke, Belgium; N. solitarium n.sp. from a bamboo forest near Pweto, Congo Republic; D. baforti n.sp. and D. macramphidia n.sp. from a forest along the Kinga river, Kamena, Congo Republic; D. glabrannulata n.sp. from savanna at Kamena, Congo Republic; D. sphaerocephaloides n.sp. from around the

roots of sugar-cane from central Nyanza, Kenya; L. pauperum n.sp. from grass roots from Kansimba, Congo Republic. 34 formerly described Criconemoides species are synonyms and 20 are species inquirendae. A key is given for the 10 genera of Criconematidae and the species are described and illustrated.

0688 KHAK [HAQ], M.M., 1968. [Aphelenchoides echinocaudatus n.sp. (Nematoda, Aphelenchoididae)] Zool. Zh., 47 (2), 287-289. [In Russian: English summary p.289.]

Aphelenchoides echinocaudatus n.sp. from the roots of maize grown for several years on the experimental fields of the Timiryuzev Agricultural Academy in Moscow, is described and is differentiated in a key from the 3 nearest species A. helophilus, A. brevionchus and A. parasaprophilus. The new species is characterized as follows: both females and males just over 0.42 mm. in length, "a" = 23.3 to 28.2, cuticular striation very fine, lateral fields with 4 lines, stylet 10.44 microns in length and with weakly developed basal knobs, about 2.32 microns; in females, the uterus is short (about 2.1 x the vulval body diameter) and in males, the spicules measure 16.24 microns and a pair of post-anal papillae is present.

0689 SETHI, C.L. & SWARUP, G., 1968. "Plant parasitic nematodes of north-western India. I. The genus Tylenchorhynchus." Nematologica, 14 (1), 77-88. [German summary p.87.]

A survey of 4 states of north-western India revealed a preponderance of species of Tylenchorhynchus in soil samples. 11 known species, 3 of which are recorded for the first time from India, and 4 new species are described. T. chonai n.sp. from soils around the roots of Syzyglum cuminis in New Delhi differs from T. triglyphus in having a longer stylet and a different head shape. T. phaseoli n.sp. from soil around the roots of Phaseolus aconitifolius in Bhantinda, Punjab, has a distally recurved bursa. T. zeae n.sp. from soil around the roots of Zea mays in Sangrur, Punjab, has a continuous lip region and no post-anal extension of the intestine. T. berberidis n.sp. from soil around the roots of Berberis aristata in Narkanda, Himachel Pradesh, has a long stylet.

0690 HUISINGH, D. & SHERWOOD, R.T., 1968. "The role of calcium in resistance of alfalfa to Ditylenchus dipsaci." [Abstract.] Nematologica, 14 (1), 8-9.

0691 OVECHNIKOV, G.T., 1962. [The dynamics of Ditylenchus, Aphelenchoides and Hexatylus infections of clover on collective farms in the Moscow and Smolensk regions.] Trudy vses. Soveshch. Fitogelmint. (5th), Samarkand, pp.180-199. [In Russian: English summary p.199.]

0692 DIAB, K.A., 1968. "Occurrence of Heterodera glycines from the Golden Island, Giza, U.A.R." Nematologica, 14 (1), 148.

Roots of Vigna sinensis grown on Golden Island, Giza, U.A.R., were heavily infected with various stages of Meloidogyne incognita and also had lemon-shaped females of Heterodera glycines, the latter being a new record for the U.A.R.

0693 MARTINEZ, R. [Determination of losses in yield caused by the nematode Pratylenchus zeae in maize.] Determinación de pérdidas ocasionadas por el nemátodo Pratylenchus zeae en los rendimientos de maíz. In Tarté, R. El nemátodo Pratylenchus zeae, parásito del maíz, del arroz y del sorgo; una amenaza para la agricultura Panameña. Panama; Facultad de Agronomía, Panamá Universidad. (1971) [Es]

0694 COLMAN, R.L., "Root knot nematodes as a cause of poor growth of clover on the far north coast of N.S.W." Agric. Gaz. N.S.W., 75 (10), 1367-1368.

0695 RAABE, R.D., 1966. "Check list of plant diseases previously unreported in Hawaii," Pl. Dis. Reptr, 50 (6), 411-414.

Meloidogyne sp. is reported from Acacia koa, Mondo japonicum and Ornithogallum thyrsoides for the first time in Hawaii.

0696 SHEPHERD, R.L., 1965. "Reaction of Trifolium repens L. to root-knot nematodes, Meloidogyne incognita acrita." Diss. Abstr., 26 (3), 1271.

0697 SINGH, N.D. Studies on selected hosts of Rotylenchulus reniformis and its pathogenicity to soybean (Glycine max.) Nematropica (1975) 5 (2) 46-51 [En, es] CARDI, Univ. of the West Indies, Trinidad, West Indies.

Population changes of Rotylenchulus reniformis were estimated on 6 plant species, namely, tomato, onion, pigeon pea (Cajanus cajan), maize, Commelina elegans and Cynodon dactylon after 6 and 10 weeks' growth. Tomato, pigeon pea and Commelina elegans (a weed grass) were good hosts; maize, onion and Cynodon dactylon were poor hosts. The roots of pigeon pea and onion were severely damaged. Experiments on the pathogenicity of R. reniformis to soybean cv Jupiter showed significant reductions in the mean weight of roots and tops and in plant height 8 weeks after 3-day-old seedlings were planted in soil with 384 larvae/200 g. When 10-day-old seedlings were inoculated with 500 or 1,000 R. reniformis larvae/pot containing 2 seedlings in sterilized soil, reductions in root and top weights and in plant height were recorded after 10 weeks, and infected plants had paler leaves than those not infected.

0698 EDMUNDS, J.E., 1966. "Nematode-fungus interactions with alfalfa roots with special reference to Pratylenchus penetrans, Fusarium oxysporum and Trichoderma viride." Diss. Abstr., 26 (10), 5637-5638.

0699 GOSTICK, K. G. & CRANSTON, D. M., 1964. "The sorption of methyl bromide by lucerne seed." *Pl. Path.*, 13 (1), 1–6.

It is possible to use parameters based on the adsorp-

tion of methyl bromide gas on to lucerne seed infested with *Ditylenchus dipsaci* to predict the length of time a fumigation should take at the obtaining temperature and moisture content.

0700 CORBETT, D.C.M., 1966. "Central African nematodes. III. Anguina hyparrheniae n.sp. associated with 'witches' broom of Hyparrhenia spp." Nematologica, 12 (2), 280-286. [French summary p.286.]

Anguina hyparrheniae n.sp., from inflorescences of Hyparrheniae collina from Malawi, is described. It most closely resembles A. spermophaga but differs in the size and shape of the terminal process of the tail of both sexes and in having a smaller female gonad with no flexures and a larger post-uterine sac. The male also has a shorter tail than that of A. spermophaga. The inflorescences of several species of Hyparrhenia in Malawi are commonly clumped, forming "witches' brooms". All such inflorescences examined were infested by A. hyparrheniae.

0701 EDMUNDS, J.E. & MAI, W.F., 1966. "Population increase of Pratylenchus penetrans in alfalfa and celery roots infected with Trichoderma viride." Phytopathology, 56 (11), 1320-1321.

Significantly more nematodes were recovered from lucerne roots infected with Pratylenchus penetrans and Trichoderma viride than from roots infected with P. penetrans only. Each organism retarded the growth of shoots and roots of lucerne, and their combined effect was greater but not additive. The number of P. penetrans recovered from celery was similar whether the roots were inoculated with T. viride or not, but their combined effect significantly retarded the growth of shoots and roots.

0702 MALEK, R. B. & JENKINS, W. R., 1964. "Aspects of the host-parasite relationships of nematodes and hairy vetch." *Bull. New Jers. agric. Exp. Stn*, No. 813, 31 pp.

In pot-tests, *Meloidogyne arenaria* galled *Vicia villosa* but not as intensively as did *M. incognita acrita* and *M. hapla*. *V. villosa* is a new host for *M. arenaria*. *Trichodorus christiei*, *Criconemoides curvatum*, *C. mutabile*, *Paratylenchus curvitatus*, *Scutellonema brachyurum*, and *Rotylenchus uniformis* increased at least 10-fold on *V. villosa* in 3 months. *V. villosa* is a new host recorded for all but *T. christiei*. *C. xenoplax*, also a previously unreported species from hairy vetch, increased less than 10-fold. *Pratylenchus penetrans*, *P. crenatus*, *Belonolaimus longicaudatus*, *Hoplolaimus galeatus*, *C. lobatum*, *C. morgense* and *Xiphinema americanum* sustained their original inoculation levels. All but *P. penetrans* are newly recorded from hairy vetch. *C. reedi*, *C. macrodorum* and *Longidorus elongatus* did not reproduce on hairy vetch. Hairy vetch is not recommended as a cover crop in the presence of these nematodes: In pathogenicity tests, *T. christiei* increased 97-fold in 90 days and the fresh weights of tops and roots averaged 63 and 79% respectively, less than those of non-inoculated plants. Infected plants had abnormally bluish-green foliage and smaller leaflets compared with healthy controls. Infected roots had an over-all dark brown discoloration and devitalized root tips. *C. curvatum* increased 56-fold in 90 days but there were no differences in the top and root weights compared with control plants. Infected roots were only slightly discoloured. *M. hapla* and *M. incognita acrita* severely galled the roots of hairy vetch but the root weights were not very different from those of controls. *M. incognita acrita* had no effect on top weights but *M. hapla* decreased top weight by 23%. Of these 4 nematodes only *T. christiei* decreased the total yield of hairy vetch in 4 croppings at monthly intervals; there was 41% less total yield by weight compared with controls. *M. hapla*, *M. javanica*, *T. christiei* and *C. curvatum* interfered with root nodulation by *Rhizobium leguminosarum*. The combined effects of *M. hapla*, *T. christiei* and *C. curvatum* in various combinations were severest in the treatments incorporating *T. christiei*. *C. curvatum* and *T. christiei* reproduced best at 25°C. but *T. christiei* seemed more tolerant of a wider range of temperature. The total length of *T. christiei* but not of *C. curvatum* varied inversely with the temperature; mean values of length and width of adults from those reared in lower temperatures were consistently greater than those reared in higher temperatures.

0703 -MONTEIRO, A. R., 1963. "Pratilencose do milho." *Revta Agric., S Paulo*, 38 (4), 177–187. [English summary pp. 184–185.]

In 11 localities of São Paulo State, Brazil, *Pratylenchus brachyurus* and *P. zeae* alone and together were found causing disease of *Zea mays*. This is the first record of *P. zeae* from Brazil. Measurements of members of each population are given with reference to distinguishing between the 2 species. Other hosts and the geographical distribution of the nematodes are mentioned, the symptoms of infected *Z. mays* are described and control methods are suggested. A female *P. brachyurus* killed by the fixative had, in the uterus, an egg containing a live, well developed larva; the significance of this is discussed.

0704 -HEYNS, J., 1966. "Studies on South African *Xiphinema* species, with descriptions of two new species displaying sexual dimorphism of the tail (Nematoda: Dorylaimoidea)." *Nematologica*, 12 (3), 369–384. [German summary p. 383.]

Xiphinema dimorphicaudatum n.sp. from soil about the roots of pineapple, citrus, cotton and *Acacia* spp. near East London, Cape Province, South Africa, is described. The female resembles *X. vanderlindei* and has an elongate-conoid tail, while the male has a short tail with a peg. In *X. variabile* n.sp., of which the female resembles *X. opisthohysterum*, the female tail is likewise conoid and the male tail pegged, but the tail is shorter than in *X. dimorphicaudatum*, quite variable, usually shorter in the male than in the female, and the peg not always distinct. *X. variabile* was collected from grassland next to a citrus orchard in Transvaal. *X. flagellicaudatum*, of which the male was hitherto unknown, is redescribed and figured.

0705 -EDMUNDS, J. E. & MAI, W. F., 1966. "Effect of *Trichoderma viride*, *Fusarium oxysporum* and fungal enzymes upon the penetration of alfalfa roots by *Pratylenchus penetrans*." *Phytopathology*, 56 (10), 1132–1135.

More *Pratylenchus penetrans* entered lucerne roots treated with *Trichoderma viride* and *Fusarium oxysporum* at spore concentrations ranging from $9{\cdot}6 \times 10^7$ to $5{\cdot}1 \times 10^5$ and $6{\cdot}2 \times 10^6$ to $2{\cdot}0 \times 10^5$ respectively, than entered non-inoculated roots.

In general, the number of *P. penetrans* recovered from lucerne roots was not significantly influenced by treatment of roots either with crude fungal enzyme preparations or with purified polygalacturonase or cellulase.

0706 -HOWELL, R. K. & KRUSBERG, L. R., 1966. "Changes in concentrations of nitrogen and free and bound amino acids in alfalfa and pea infected by *Ditylenchus dipsaci*." *Phytopathology*, 56 (10), 1170–1177.

Total nitrogen and free and bound amino-acids in lucerne and pea seedling shoot tissues infected with *Ditylenchus dipsaci* were compared with those in non-infected tissues at 7, 14, 21 and 28 days after inoculation of germinating seeds. At 28 days almost 2·5 times as many nematodes were obtained from pea seedling shoots as from lucerne shoots. Infected tissues contained slightly more dry matter than non-infected tissues. Dry weight of all tissues increased with each successive harvest and varied from 8·0 to 9·7%. Total nitrogen and total free and bound amino-acid contents of lucerne and pea tissues also increased with each successive harvest; the increases were much greater in infected than in non-infected tissues. Most free amino-acids in lucerne and pea shoots increased more rapidly in infected than in healthy tissues with successive harvests. In infected lucerne tissues, the amino-acids that increased most significantly, based on the ratio of galled to healthy tissue, were arginine, asparagine, threonine and tryptophan; in pea, arginine, asparagine, serine and tryptophan increased most significantly. The galled to healthy tissue ratio of glutamic acid content of both plant species was greatest at 7 days. Thereafter, this amino-acid increased more rapidly in non-infected than in infected tissues, although at 28 days the ratios were still greater than one. The patterns of bound amino-acids in infected

0707 GRIFFIN, G.D., 1966. "Effect of environment on association of Ditylenchus dipsaci to alfalfa." [Abstract.] Phytopathology, 56 (8), 879.

*0708 SRIVASTAVA, A.S.; UPADHYAY, K.D.; SINGH, G. Effect of root-knot nematode, Meloidogyne javanica on gram crop. Indian Journal of Nematology (1974 publ. 1975) 4 (2) 248-251 [En] Div. of Entomol., U.P. Inst. of Agric. Sciences, Kanpur, India.

A continuous reduction in length and weight of roots and shoots of gram (Cicer arietinum) was obtained with an increase in the level of inoculum of larvae of Meloidogyne javanica from 10 to 10,000/500 g soil. However, significant reduction compared with the uninoculated control was found only with 100 or more larvae/500 g soil. The maximum reduction was observed with the 10,000 larval inoculum.

0709—JOHNSON, P. W. & FUSHTEY, S. G., 1967. "The biology of the oat cyst nematode *Heterodera avenae* in Canada. II. Nematode development and related anatomical changes in roots of oats and corn." *Nematologica*, Year 1966, 12 (4), 630–636. [German summary p. 635.]

Studies on the development of *Heterodera avenae* and on related anatomical changes within roots of *Avena sativa* and *Zea mays* (variety Pride 5) showed that the latter is an unsuitable host for the development of *H. avenae*. Nematodes readily entered roots of both plants but their development in *Z. mays* was inhibited by a necrotic tissue reaction and female nematodes failed to produce viable cysts. Nematode development and related histological changes within invaded root tissues are described for each host and differences in host-parasite relationships are discussed.

0710 -HAWN, E. J. & HANNA, M. R., 1967. "Influence of stem nematode infestation on bacterial wilt reaction and forage yield of alfalfa varieties." *Can. J. Pl. Sci.*, 47 (2), 203–208.

After glasshouse experiments in which *Ditylenchus dipsaci* carried *Corynebacterium insidiosum* into the crown buds of lucerne [see *Helminth. Abstr.*, 33, No. 1020] field experiments were done with lucerne grown under irrigation in southern Alberta, Canada, to examine (i) the effects of stem nematode on the susceptibility of lucerne to bacterial wilt and (ii) the effect of stem nematode on hay production. In experiment (i), lucerne varieties Grimm (susceptible to *D. dipsaci* and *C. insidiosum*), Vernal (partially resistant to *D. dipsaci*, very resistant to *C. insidiosum*), Beaver (susceptible to *D. dipsaci*, very resistant to *C. insidiosum*) and Lahontan (resistant to *D. dipsaci* and *C. insidiosum*) were inoculated with both pathogens in a factorial design and rated for nematode infestation and bacterial wilt. In experiment (ii), lucerne varieties Grimm, Vernal, Beaver, Lahontan, Ladek (susceptible to *D. dipsaci*, partially resistant to *C. insidiosum*) and Talent (resistant to *D. dipsaci*, susceptible to *C. insidiosum*) were inoculated with *D. dipsaci* and rated for winter injury and yield. Grimm became infected with bacterial wilt in all treatments but when bacteria and nematodes were both inoculated the incidence of bacterial wilt increased. The incidence of bacterial wilt in Vernal remained small in spite of moderate infestation with nematodes. The incidence of bacterial wilt in Beaver was increased by the nematodes and was equal to that of Grimm when both pathogens were inoculated. Lahontan retained its resistance to both pathogens. In experiment (ii), there were no significant losses in the first season but all except Talent and Lahontan suffered winter injury and yielded less in the following season. Vernal recovered better than the other varieties but similar trends were established in the 3rd season. These experiments show the need for a cold-hardy variety of lucerne resistant to both *D. dipsaci* and *C. insidiosum* for the irrigated areas of southern Alberta.

0711 -RAINA, R., 1966. "*Longidorus reneyii* sp.nov. (Nematoda: Longidoridae) from Srinagar, Kashmir." *Indian J. Ent.*, 28 (4), 438–441

Longidorus reneyii n.sp. is described from 5 female specimens taken from soil around roots of *Zea mays*. It is 2·1 to 2·6 mm. long, has a spear 50 to 58 μ long and a spear extension 30 to 36 μ long. The guiding ring is 2½ head widths from the anterior

0712 -JENKINS, W. R. & MALEK, R. B., 1966. "Influence of nematodes on absorption and accumulation of nutrients in vetch." *Soil Sci.*, 101 (1), 46–49.

Vicia villosa was grown in pots and inoculated with *Meloidogyne hapla*, *Trichodorus christiei*, *Criconemoides curvatum* or *Scutellonema brachyurum*. The tops of the plants were cropped and analysed for nitrogen, phosphorus, potassium, calcium and sodium 30, 60 and 90 days after inoculation; the roots were analysed 90 days after inoculation. Changes in plant nutrients varied with the nematode

and with time. *M. hapla* induced the greatest changes in the roots and *T. christiei* induced the greatest changes in the shoots. Nitrogen was the most seriously affected nutrient in the roots and potassium was the most seriously affected nutrient in the shoots.

0713 HAWN, E.J., 1965. "Influence of stem nematode infestation on the development of bacterial wilt in irrigated alfalfa." [Abstract.] Nematologica, 11 (1), 39.

0714-CASTILLO, J. M. & ROHDE, R. A., 1965. "Biochemical changes in alfalfa injured by lesion nematodes." [Abstract.] *Phytopathology*, 55 (2), 127-128.

Roots of lucerne seedlings inoculated aseptically with *Pratylenchus penetrans* showed symptoms of browning and necrosis which could also be produced by pricking the root with a sterile needle; the addition of pectinol, emulsin and peroxidases to pricked areas intensified the browning. Diazotized sulphanilic acid caused lesions to become intensely yellow-brown. Crude extracts from homogenates of lesions, unaffected adjacent tissues and uninoculated root tissues were analysed by paper chromatography. A bright blue fluorescent reaction (unidentified phenolic compound) appeared from the extracts of lesions and from oxidized uninoculated tissues.

0715 DROPKIN, V.H., 1965. "Polyploidy in syncytia of hairy vetch induced by a Meloidogyne species." [Abstract.] Nematologica, 11 (1), 36.

0716 HOWELL, R.K. & KRUSBERG, L.R., 1965. "Effect of Ditylenchus dipsaci on certain nitrogen compounds in alfalfa and pea. [Abstract.] Phytopathology, 55 (5), 504-505.

0717 MINTON, N.A., DONNELLY, E.D. & SHEPHERD, R.L., 1965. "Reaction of species and breeding lines of vetch to five root-knot nematode species." [Abstract.] Phytopathology, 55 (5), 500.

0718 MYERS, R.F., FEDER, W.A. & HUTCHINS, P.C., 1965. "The rearing of Radopholus similis (Cobb) Thorne on grapefruit, okra, and alfalfa root callus tissues." Proc. helminth. Soc. Wash. 32 (1), 94-95.

Cultures of roots callus tissue developed from lucerne seed were better for supporting populations of Radopholus similis than were cultures of okra or grapefruit root callus.

0719 COLBRAN, R.C., 1965. "Studies of plant and soil nematodes. 8. Two new species of Criconema (Nematoda: Criconematidae) from Queensland." Qd F. Agric. anim. Sci., 22 (1), 83-87.

Criconema alticolum n.sp. and C. imbricatum n.sp. are described and figured. Specimens were obtained by sorting screenings left on 300 mesh sieve as practically none passed through modified Baermann funnels. C. alticolum, female, in 2 localities from soil about the roots of Themeda australis in Queensland, has 98 annules, 16 rows of laterally contiguous semicircular scales and a stylet 51-61 microns long. The anterior annule of the lip region is wider than the posterior annule. C. imbricatum, female, from sandy soil denominated by Eucalyptus pilularis, has 70-72 annules, 8 rows of laterally contiguous semicircular scales and a stylet 67-80 microns long. The lip region has a large saucer-shaped basal annule. Both species have a broadly conoid tail, a spherical spermatheca and the vulva 8 annules from the tail terminus. Males were not found. C. alticolum is distinguished by its short spear. C. imbricatum is distinguished from C. paxi and C. southerni in having more body annules, from C. octangulare in its rounder tail terminus, and from C. spinalineatum, C. zernovi and C. australe in the length of the stylet and the shape of the scales in C. australe.

0720 WASILEWSKA, L., 1965. "Ditylenchus medicaginis sp.n., a new parasitic nematode from Poland (Nematoda, Tylenchidae)." Bull. Acad. pol. Sci. Cl. II Ser. Sci. biol., 13 (3), 167-170.

Ditylenchus medicaginis n.sp., is described and figured. The head is not annulated, the lateral field has six incisures and the spear is well developed, 8.2-8.8 microns long. The basal oesophageal bulb is distinctly offset and joins the intestine without any overlap. The female has a post-vulval sac which reaches to about half the vulva to anus distance but never exceeds it; the tapering tail is 4-5 anal-body-widths long and its terminus varies from almost pointed to rounded. The bursa of the male begins opposite the proximal end of the spicules and extends to about 40% of the tail length. D. medicaginis is distinguished from D. dipsaci by the number of lateral incisures and from D. destructor and D. myceliophagus in the greater value of the spear-length to head-width proportion, different structure of the basal oesophageal bulb, longer thinner tail, shorter spicules and relatively shorter bursa. From D. triformis it differs in the lack of intersexes and longer post-vulval sac. D. medicaginis was commonly found in the leaves, stems and roots of Medicago sativa in Poland but neither D. dipsaci nor D. destructor was found.

0721 CORBETT, D.C.M., 1965. "Nematodes as plant parasites in Malawi." Nyasald Fmr Forester, 6(4), 21-27.

In this general article on nematodes and their control, Corbett records what is known of plant-parasitic nematodes in Malawi and the damage they cause. Records made since an earlier list was published [see Helm. Abs., 34, No. 2503] include the following new hosts: Meloidogyne arenaria on Bidens pilosa; Aphelenchoides ritzemabosi causing an angular leafspot on Salvia sp. and S. splendens; Anguina n.sp. [to be named and described elsewhere] causing a witches' broom of the inflorescence of Hyparrhenia spp.

0722 TERENT'EVA, T. G.; ALPAT'EV, N. M.; SERGEEV, V. N.; MAKHAREISHVILI, Z. A. [Pathogenicity of *Heterodera* on lucerne.] *Zashchita Rastenii ot Vreditelei i Bolezne*i (1974) 239, 116-118 [Ru]

The damage done by heavy *Heterodera* infection to lucerne in northern Caucasus, USSR, is described. The nematode species has not so far been identified.

0723 GRANDISON, G. S., 1965. "The stem nematode (*Ditylenchus dipsaci*) in clovers in New Zealand. (A note)." *N.Z. Jl agric. Res.*, 8 (4), 1090-1091.

Ditylenchus dipsaci is recorded from both red and white clover in New Zealand. The race infecting red clover sometimes causes serious damage to the host plant. The incidence of the white clover race is very limited; no significant damage to this crop has been detected.

0724 NORTON, D.C., 1965. "Xiphinema americanum populations and alfalfa yields as affected by soil treatment, spraying, and cutting." Phytopathology, 55 (6), 615-619.

Xiphinema americanum is commonly associated with poor growth of lucerne and red clover in Iowa. In fields known to be infested with it, plants sprayed with manganese dithiocarbamate fungicide (maneb) grew a better crop of lucerne than unsprayed plants, due to control of leaf disease and leafhoppers, and also had significantly greater numbers of Xiphinema associated with them; this difference in nematode density persisted in spite of over-all seasonal fluctuations. Soil fumigation with DBCP alone increased lucerne yields to a lesser extent than did maneb alone, but gave good control of soil nematodes, especially X. americanum. The effects of DBCP and maneb on yield were additive. Plant grown in the glasshouse in soil artificially infested with X. americanum had lower dry weights than did plants grown in uninfested soil. The nematode increased less rapidly in steam-sterilized soil than in unsterilized soil.

0725 GOOD, J.M., MINTON, N.A. & JAWORSKI, C.A., 1965. "Relative susceptibility of selected cover crops and coastal bermudagrass to plant nematodes." Phytopathology, 55 (9), 1026-1030.

Field and glass-housetrials indicated that beggarweed (Desmodium tortuosum) and coastal bermudagrass (Cynodon dactylon) diminished root-knot but increased other undesirable nematodes and that Crotalaria spectabilis decreased the density of root-knot and other nematodes but increased numbers of Pratylenchus brachyurus and may be poisonous to stock. South American mangolas (Tagetes minuta) gave the most promising results, decreasing numbers of most Meloidogyne spp. (except M. hapla and M. arenaria) and Belonolaimus, Trichodorus, Pratylenchus and Xiphinema spp.

0726 GOLDEN, A.M. & BIRCHFIELD, W., 1965. "Meloidogyne graminicola (Heteroderidae) a new species of root-knot nematode from grass." Proc. helminth. Soc. Wash., 32 (2). 228-231.

Meloidogyne graminicola n.sp. is described from the roots of the grass Echinochloa colonum at Baton Rouge, Louisiana. It differs from the most closely related species, M. hapla, in its perineal pattern, which is described as somewhat egg-shaped, the smaller stylet (10.64-11.2 microns) and the shorter distance from stylet base to dorsal oesophageal gland duct orifice (2.8-3.9 microns) in the female, and in the male having a partially areolated lateral field often with about 8 longitudinal incisures.

0727 ENNIK, G.C., KORT, J., & BUND, C.F. v.d., 1965. "The clover cyst nematode (Heterodera trifolii Goffart) as the probable cause of death of white clover in a sward." F. Br. Grassld Soc., 20 (4), 258-262.

Necrotic centres of otherwise healthy patches of white clover in 2 lawns on sandy soil were attributed to parasitism by Heterodera trifolii. The distribution of the other nematodes, Collembola and mites was not correlated with the characteristic pattern of the damaged clover.

0728 HANNA, M.R. & HAWN, E.J., 1965. "Seedling inoculation studies with the alfalfa stem nematode." Can. J. Pl. Sci., 45 (4), 357-363.

Details are given of laboratory tests done to assess the importance of variety, age of seedling, inoculum concentration, inoculum carrier and light on the degree of infestation of lucerne by Ditylenchus dipsaci in a screening programme. Nematode inoculation was most effective with seedlings up to 9 days old in which the unifoliate leaf had not appeared. Fewer nematodes infected the resistant variety (Lahontan) than the susceptible variety (Grimm). Neither light treatments nor inoculum carrier affected the number of nematodes entering shoot apices which were more readily infected than the cotyledon. However, in the case of the cotyledon, carboxymethyl cellulose carrier gave higher infestations than a water inoculum provided the seedlings were exposed to alternate light and dark treatments. There was little cotyledon infection when seedlings were kept in darkness because the stomata, which the authors presume are the means of entering the plants, are closed.

0729 MINTON, N.A., DONNELLY, E.D. & SHEPHERD, R.L., 1966. "Reaction of varieties and breeding lines of Sericea lespedeza to five root knot nematode species." Phytopathology, 56 (2), 180-182.

Several breeding lines of Lespedeza cuneata were highly resistant to one or more of the following: Meloidogyne incognita incognita, M. incognita acrita and M. hapla. One line was resistant to all 3. None of the lines was highly resistant to M. arenaria or M. javanica but individual plant ratings suggested some segregation for resistance in a number of lines. More of the sericea lines were resistant to M. hapla than to the other species. Generally, these lines reacted similarly to M. incognita incognita and M. incognita acrita, but were more resistant to the former.

*0730 KIMPINSKI, J. Population dynamics of Pratylenchus penetrans in red clover. [Abstract]. Journal of Nematology (1975) 7 (4) 325 [En] Res. Station, Agric. Canada, P.O. Box 1210, Charlottetown, Prince Edward Island, Canada, C1A 7M8.

0731 MONTEIRO, A.R., 1963. "Ocorrencia de Criconemoides ornatum no Brasil (Nemata:

Criconematidae)." Revta Agric., S. Paulo 38 (1), 21-22. [English summary p.22.]

Criconemoides ornatum, from the roots of maize infested with Pratylenchus brachyurus, is reported from 2 districts of Sao Paulo, Brazil.

0732 LOWNSBERY, B.F. & MITCHELL, J.T., 1965. "Some effects of chemical amendments and cultural conditions on population levels of Xiphinema americanum." Pl. Dis. Reptr, 49 (12), 994-998.

6 of 8 fertilizer or insecticide treatments used in soil culture of lucerne were not toxic to Xiphinema americanum parasitizing this plant. Most of these materials were harmful to the nematode in vitro. X. americanum reached greater numbers in a ground bed than it reached concurrently in 15 cm. clay pots in a temperature control box. Fluctuation in soil moisture, believed to be inimical to this nematode, was less pronounced in the ground bed than in the clay pots.

0733 MINTON, N.A., DONNELLY, E.D. & SHEPHERD, R.L., 1966. "Reaction of Vicia faba and F_5 hybrids from V. sativa x V. angustifolia to five root-knot nematode species." Phytopathology, 56 (1), 102-107.

Green-house pathogenicity tests indicated that in the interspecific cross the female parent, Alabama 1894, was highly resistant and the male parent, P.I. 121275, was susceptible to Meloidogyne incognita, M. incognita acrita, and M. javanica. 28 F_5 lines of Vicia sativa type from the interspecific cross were highly resistant to the 3 nematodes, as was Warrior (V. sativa). Auburn woolypod (V. dasycarpa), hairy vetch (V. villosa), bigflower vetch (V. angustifolia), and 8 F_5 lines of the V. angustifolia type from the interspecific cross ranged from slightly resistant to highly susceptible to the 3 nematodes. Resistance to M. arenaria and M. hapla was low in all plants tested; however, there were indications that P.I. 121275, "wild" narrow-leaved vetch, Warrior, bigflower vetch, and several V. sativa and V. angustifolia type F_5 lines were all segregating for resistance. Penetration studies indicated that fewer larvae of M. incognita acrita entered roots of Warrior, a resistant variety, than entered roots of Auburn woolypod, a susceptible variety. Histopathological studies further indicated that nematode development was greatly retarded in Warrior becauseof lack of root tissue response necessary for normal nematode development.

0734-CASTANER, D., 1963. "Nematode populations in corn plots receiving different soil amendments." *Proc. Iowa Acad. Sci.*, 70, 107-113.

The size of the nematode population in *Zea mays* plots receiving manure, lime or a fertilizer supplying N-P-K was compared with that in maize plots not so treated. Greatest numbers of *Pratylenchus* spp. were found in N-P-K-fertilized and manured plots, of *Helicotylenchus microlobus* in plots in which no N-P-K had been applied and of *Xiphinema americanum* in limed plots. Seasonal population patterns for the 3 nematodes appeared to be characterized by 2 peaks, one in the early spring before maize was planted and the other in the late summer or autumn related to the growth of maize. Only *Pratylenchus* spp. appeared to feed endoparasitically in maize roots.

0735-FUSHTEY, S. G., 1965. "The oat cyst nematode, *Heterodera avenae* Wollenweber, on corn, *Zea mays*, in Ontario." *Can. Pl. Dis. Surv.*, 45 (4), 105-106.

Observations on field material and results of laboratory experiments indicate that *Heterodera avenae* invades roots of maize and is capable of causing appreciable damage to this crop in the province of Ontario.

0736-SEINHORST, J. W. & SEN, A. K., 1966. "The population density of *Heterodera trifolii* in pastures in the Netherlands and its importance for the growth of white clover." *Neth. J. Pl. Path.*, 72 (3), 169-183. [Dutch summary p. 182.]

In a pot experiment the tolerance limit of white clover seedlings to *Heterodera trifolii* was 50 e.p.g. of soil. In other pot experiments *H. trifolii* increased to about 1,400 e.p.g. of soil without apparent damage to the growth of white clover. White clover maintained a relative density of almost 20% in a mixture with *Lolium perenne* at a density of *H. trifolii* of 80 to 200 e.p.g. of soil. Densities of this nematode in 216 samples from 74 pastures were mostly below one e.p.g. of soil and only very seldom higher than 32 e.p.g. There was a slightly higher frequency of densities over 32 e.p.g. in samples from places with a good stand of white clover than from those with a poor stand. The differences between samples from pastures with good and poor stands and between samples from places with and without clover were very small. The frequency distribution of cysts and eggs in samples from a 4-year-old pasture with a very good stand of white clover was the same as that in the samples from all other pastures. It is therefore concluded that the influence of attack by *H. trifolii* on the stand of the white clover in the sampled pastures was negligible.

0737 MULLINS, D.E. Ring nematode injury to centipedegrass lawns and possible control. Proceedings of the Florida State Horticultural Society (1973 publ. 1974) 86, 438-439. [En] IFAS Florida Cooperative Extension Service, Pensacola, Florida, USA.

Of 112 soil samples taken from centipede grass [Eremochloa ophiuroides] lawns in Escambia County, Florida, USA, during the 3 years from April 1970, 96 contained moderate to very high nematode populations. In all but 6, ring nematodes [Criconemoides sp.] were dominant. A golf green-type nematicide injector has been modified for the application of DBCP to home lawns. Judging by the turf response, treatment by this method with 3 gal/acre of 86% DBCP gives better results than the conventional drenching method.

*0738 REDDY, D.D.R. Pathogenicity and control of root-knot nematodes (Meloidogyne spp.) infecting chick pea. Mysore Journal of Agricultural Sciences (1975) 9 (3) 434-439 [En] Univ. of Agric. Sci., Hebbal, Bangalore 560024, India.

In glasshouse experiments Cicer arietinum var. Annegeri-1, inoculated with 1,000 or 10,000 Meloidogyne incognita/plant, exhibited markedly reduced growth, drying and

shedding of leaflets and poor pod formation compared with plants inoculated with 0, 10 or 100 M. incognita. In outdoor plots infested with Meloidogyne spp., D-D, DBCP, fensulphothion, aldicarb, and methomyl at, respectively, 75 l, 15 l, 10 kg, 4 kg and 8 kg a.i./hectare gave good control and increased yields by 15 (methomyl) to 37% (fensulphothion).

0739—NIGH, Jr., E. L., 1966. "*Rhizobium* nodule formation on alfalfa as influenced by *Meloidogyne javanica*." [Abstract.] *Nematologica*, 12 (1), 96.

0740—SHER, S. A., 1966. "Revision of the Hoplolaiminae (Nematoda). VI. *Helicotylenchus* Steiner, 1945)." *Nematologica*, 12 (1), 1-56. [French summary p. 55.]

Helicotylenchus dihystera, H. multicinctus, H. erythrinae, H. pseudorobustus, H. africanus, H. platyurus, H. digonicus, H. canadensis, H. concavus, H. serenus, H. indicus, H. tunisiensis, H. retusus, H. digitatus, H. aegyptiensis, H. vulgaris, H. paxilli and *H. varicaudatus* are redescribed. 10 new synonyms are proposed. The following new species are described and figured: *H. lobus* n.sp. from soil around roots of *Veratrum californicum* and *Pinus ponderosa* in California; *H. crenacauda* n.sp. from soil around roots of *Oryza sativa* in Indonesia; *H. longicaudatus* n.sp. from soil around roots of *Imperata cylindrica* and *Sporobolus pyramidatus* in Nigeria; *H. microcephalus* n.sp. from soil around the roots of *Elaeis guineensis* in Nigeria; *H. canalis* n.sp. from jungle soil in Ceylon; *H. leiocephalus* n.sp. from soil around unknown grass in South Dakota; *H. rotundicauda* n.sp. from soil around the roots of *Cynodon dactylon* in California; *H. cavenessi* n.sp. soil from around roots of *Manihot utilissima* in Nigeria; *H. caroliniensis* n.sp. from swamp soil in South Carolina; *H. martini* n.sp. from soil around the roots of *Thea sinensis* in Southern Rhodesia; *H. exallus* n.sp. from *Triticum aestivum* soil in South Dakota; *H. hydrophilus* n.sp. from swamp soil in South Carolina; *H. californicus* n.sp. from soil around roots of *Tamarix pentandra* in California; *H. nigeriensis* n.sp. from bush soil in Nigeria; *H. dolichodoryphorus* n.sp. from virgin forest soil in Nigeria; *H. anhelicus* n.sp. from soil around the roots of *Salix* sp. in California; *H. minzi* n.sp. from soil around the roots of *Citrus* sp. in Israel; *H. belli* n.sp. from soil around the roots of *Cedrus* sp. in Utah; *H. labiodiscinus* n.sp. from soil in uncultivated woods in Virginia; *H. clarkei* n.sp. from uncultivated soil around the roots of *Pinus cembroides* and *Pinus* sp. in New Mexico. *H. steueri, H. neoformis* and *H. intermedius* are excluded from the genus *Helicotylenchus*. A key to the species is given.

0741 GRIFFIN, G.D., 1964. "Association of nematodes with corn in Wisconsin." Plant Disease Reporter, 48 (6), 458-459.

In a survey of the chief maize-growing areas of Wisconsin, U.S.A., 13 species in 6 genera of plant-parasitic nematodes were found. The commonest were Helicotylenchus digonicus, Tylenchorhynchus maximus and Xiphinema americanum. In greenhouse experiments the first 2 caused reduction in height and dry weight of maize plants. Fumigation of field plots of a black prairie loam infested with X. americanum and H. digonicus with 25 or 40 gal. per acre of dichloropropene gave 76% or 88% control, respectively, but no increase in yield of silage or shelled maize.

0742 CHAPMAN, R.A., 1964. "Effect of clover cyst nematode on growth of red and white clovers." Phytopathology, 51 (4), 117-118.

In a series of green-house pot experiments, the growth of red clover Trifolium pratense varied inversely with the number of Heterodera trifolii present and with the length of time in infested soil. The nematodes reproduced well on red clover reaching the population "ceiling level" in 129 days. Similar results were obtained with Ladino and white clover (T. repens) except that whereas virtually all the red clover had died after 265 days, the Ladino and white clovers were still growing, although significantly less well than the controls. Although H. trifolii initially reproduces well on red clover it cannot maintain itself on the host over a long period of time because of the severe injury it causes. The rate of development of injury on T. repens is somewhat slower and the nematode can maintain itself for a longer period.

0743 DICKERSON, O.J., DARLING, H.M. & GRIFFIN, G.D., 1964. "Pathogenicity and population trends of Pratylenchus penetrans on potato and corn." Phytopathology, 54 (3), 317-322.

This is an illustrated account of the pathogencity and population trends of Pratylenchus spp. on potato and maize. A survey showed that P. penetrans and P. crenatus were common in potato fields in Wisconsin, U.S.A., but only P. penetrans was associated with reduced yields. Neither soil type nor potato variety influenced population densities of P. penetrans. In mixed populations, one species was dominant and large populations of P. crenatus occurred in only sandy soils. High populations of P. penetrans in the field were characterized by circular areas (30 to 150 ft. in diameter) of stunted yellow plants. As the season progressed the population of P. penetrans increased in the potato roots of tubers and in the soil, but the population fell in the winter. P. penetrans entered and fed in the roots, rhizomes and tubers, but the rhizomes were not so severely attacked as the roots and nematodes were not found reproducing in tubers. Only cortical tissues were affected. The population of P. penetrans increased faster on maize than on potatoes. The greatest population increase was at 16°C. on potatoes and at 24°C. on maize. The length of maize roots, stalk height and stalk diameter were reduced by P. penetrans.

0744 NIGH. Jr., E.L., 1964. "The influence of host nutrition on the development of Xiphinema americanum." Dissertation Abstracts, 24 (11), 4340-4341.

The influence of host nutrition on the development of Xiphinema americanum was investigated by culturing the nematode on lucerne plants (Medicago sativa var. Moapa) in sand containing variations of minerals in Hoagland's nutrient solution. After 30 days' incubation, adult populations from complete and nitrogen-deficient treatments were significantly greater than those deficient in other minerals. When K, Mg, or Fe were eliminated from the host's nutrition a greater number of adults were found than when P or Ca were eliminated. The nutritional adjustment of the lucerne host did

not produce changes in the size of the ectoparasitic nematode. Significant differences among treatments were not observed in the lengths of adult females. Only 3 males were found during the entire investigation. 9 times normal concentration of Hoagland's solution appeared toxic, since reproduction was limited and the population declined; there were no differences between the complete or mineral-deficient treatments. Optimum pH range was between 5.6 and 7.4; above or below this optimum oviposition ceased and the population was significantly reduced.

0745–GOSTICK, K. G., 1963. "Effect of temperature on methyl bromide fumigation of lucerne seed for control of stem eelworm." **Plant Pathology, London.** 12 (2), 62–64.

Ditylenchus dipsaci can be transmitted on lucerne seed or, more often, in plant debris mixed with the seed. Gostick carried out an experiment to find a range of concentration-time products for methyl bromide which would kill the nematodes in the plant debris but not affect the germination of treated seed, and which could be suggested for commercial fumigation. Lucerne seed and chopped, dried lucerne plants ("artificial debris") were fumigated at 10, 15, 20, 25 and 30°C. using a constant concentration of fumigant but varying the time of exposure between 15 and 30 hours. After treatment, the samples of plant material were placed in a Baermann funnel and the nematodes extracted; none was recovered from the fumigated samples but up to 1,680 were extracted from controls. There was no significant difference in germination between control and treated seed, and the author, therefore, suggests concentration-time products in the following range would be suitable: 1200 mg. hr. per litre up to 20°C., reducing to 1000 mg. hr. per litre at 25°C. and 750 mg. hr. per litre at 30°C.

0746-NIELSEN, A. F., 1964. "Om spredning af staengelål (*Ditylenchus dipsaci* Kühn) med lucernefrø." **Tidsskrift for Planteavl,** 68 (3), 530–536. [English summary p. 535.]

Dissemination of *Ditylenchus dipsaci* with lucerne seed was investigated in Denmark. In 7 of 56 seed samples, stem nematodes were found in very small numbers. The importance of careful cleaning of the seed to reduce the risk of attack is stressed.

0747-MALEK, R. B. & JENKINS, W. R., 1964. "The effect of four species of plant parasitic nematodes on hairy vetch." [Abstract.] **Phytopathology,** 54 (7), 747.

The authors present data on fresh weights of tops and roots of hairy vetch and on the increase in nematode populations, 3 months after inoculation of plants separately with *Trichodorus christiei*, *Criconemoides curvatum*, *Meloidogyne incognita acrita* and *M. hapla*.

0748–KHAN, E. & BASIR, M. A., 1964. "*Bolenodorus impar* n.sp. (Nematoda: Tylenchida) from India." **Proceedings of the Helminthological Society of Washington,** 31 (2), 187–190.

E. Khan & Basir describe and figure *Bolendorus impar* n.sp. from around grass roots (*Cynodon dactylon*) at Simla, India. It differs from all other known species in the genus by the irregular shape of the terminal oesophageal bulb and the longer tail.

0749-RASKI, D. J., PRASAD, S. K. & SWARUP, G., 1964. "*Telotylenchus housei*, a new nematode species from Mysore State, India (Tylenchidae: Nematoda)." **Nematologica,** 10 (1), 83–86. [German summary p.86.]

Telotylenchus housei n.sp. from about the roots of sorghum and maize at the Government Agricultural Farm, Dhadesugar Village, Mysore State, India, is described and figured. It differs from the other 2 species in the genus in that the lip region is not set off, in being generally larger and in having a rounded cylindrical tail.

0750–EDMUNDS, J. E., 1964. "Effect of *Trichoderma viride* and *Fusarium oxysporum* upon ingress of alfalfa roots by *Pratylenchus penetrans*." [Abstract.] **Phytopathology,** 54 (8), 892.

More *Pratylenchus penetrans* entered the roots of 3-day-old lucerne seedlings previously treated with various concentrations of *Trichoderma viride*, or with higher concentrations of *Fusarium oxysporum*, than entered the roots of control plants or those treated with low levels of *F. oxysporum*. The results suggest that ingress of *P. penetrans* into lucerne roots can be influenced by fungi pathogenic and non-pathogenic to plants.

0751-RIFFLE, J. W., 1964. "Root-knot nematode on African Bermuda grass in New Mexico." **Plant Disease Reporter,** 48 (12), 964–965.

Riffle reports *Meloidogyne* on *Cynodon transvaalensis* at Albuquerque, New Mexico. In July, 1963, egg masses, larvae, males and females were found in areas where the grass was thin, chlorotic and dying out in places. The nature of the perineal patterns of mature females suggests that the species is *M. arenaria*.

0752 BIRCHFIELD, W., 1964. "Histopathology of nematode-induced galls of Echinochloa colonum." [Abstract.] **Phytopathology,** 54 (8), 888.

Larvae of what appears to be a new species of Meloidogyne [not named in this abstract] were found feeding on the phloem parenchyma of barnyard grass, Echinochloa colonum. Each nematode produced one to several syneytia. Nuclei from host cells dissolving in advance of the nematode aggregated in the syneytia, and maintained their nuclear membranes intact. Nuclei and nucleoli became enlarged and older syneytia became necrotic. Extensive hypertrophy and hyperplasia occurred in the cortical parenchyma in which eggs were deposited. Several grasses and oats were good hosts in greenhouse tests but cotton, pepper (California Wonder), water-melon, corn and tomato were non-hosts.

*0753 SINGH, N. D. Effect of oxamyl applications on eelworm penetration into roots of tomato, lettuce and pigeon pea. *Tropical Agriculture* (1975) 52 (4) 369-373 [En] Dep. of Crop Sci., Univ. of West Indies, St. Augustine, Trinidad.

In glasshouse tests, the foliage of tomato, lettuce or pigeon pea (*Cajanus cajan*) seedlings was sprayed with oxamyl at 600, 1,250, 2,500 or 5,000 ppm and 24 hours later the seedlings were transplanted into soil infested with *Meloidogyne incognita* or *Rotylenchulus reniformis*. Two days after transplanting the lowest dose was found to have significantly inhibited penetration of *M. incognita* into tomato; penetration of this nematode into lettuce was inhibited 2, 4 and 5 days after transplanting by 2,500, 600 and 600 ppm, respectively. Penetration of *R. reniformis* into pigeon pea was significantly reduced, 2, 4 and 5 days after transplanting by doses of 2,500, 2,500 and 1,250 ppm, respectively. In a field test in Trinidad, 3 foliar applications of oxamyl at 1,250 ppm given 10, 25 and 35 days after transplanting, following dipping in 1,250 ppm before transplanting, significantly reduced the number of *M. incognita* and *Pratylenchus zeae* recovered from tomato roots.

0754 RADEWALD, J.D., PAULUS, A.O. & HOFFMAN, E.C., 1964. "Effect of preplant soil fumigation on stubby-root nematode control on alfalfa in southern California." [Abstract.] Phytopathology, 34 (2), 1436.

Yields of lucerne were greatly increased after pre-planting fumigation of the soil with methyl bromide-chloropicrin mixtures or Telone, due to the satisfactory control of Trichodorus christiei and Pratylenchus scribneri.

0755 FIDDIAN, W.E.H. & ALDRICH, D.T.A., 1961. "The susceptibility of red clover varieties to clover stem eelworm." Plant Pathology. London, 13 (4), 139-143.

The susceptibility of 21 varieties of red clover to Ditylenchus dipsaci was assessed in field and glasshouse trials. In the field, small plots were sown in a randomized block layout in infested soil; assessment was made of ground cover at intervals after sowing and dry matter yield was determined from cuts taken when 25% of the heads were flowering. In the glasshouse, the clover varieties were sown in pots and as soon as the cotyledons were unfolded a drop of nematode suspension, about 25 nematodes, was placed at their junction; susceptibility was then assessed from symptoms, such as swelling and stunting, which appeared from about the sixth day after germination. Percentage ground cover and dry matter yield, obtained from fields tests, were good measures of resistance and correlated well with glasshouse susceptibility tests. More than half the varieties tested were highly susceptible to stem eelworm, but 2 doublecut varieties showed a high degree of resistance and 9 of the singlecut and late-flowering varieties showed moderate to good resistance.

0756 FISHER, J.M., 1965. "Telotylenchus whitei n.sp. from S. Australia with observations on Telotylenchus hastulatus (Colbran 1960) n.comb." Nematologica, Year 1964, 10 (4), 563-569. [German summary p.568.]

Telotylenchus whitei n.sp., female and male, is described from about the roots of Acacia armata at Kangaroo Island, South Australia. It differs from other species of Telotylenchus in having a lip cap and a stylet 57-72 microns long. To accommodate T. whitei, the generic diagnosis of Telotylenchus is emended to include a stylet of variable length and a lip region with or without a lip cap. The head characters of Belonolaimus Steiner, 1949, as described by other authors are discussed and it appears that this genus has a lip cap with six lips and that the head is divided into four lobes by deep grooves. Other characters of Belonolaimus are the presence of titillae on the gubernaculum, female tail at least 3 times the anal-body-width long, lateral field demarcated by a single line and a male cloaca surrounded by cuticularized plates. T. hastulatus n.comb. for Belonolaimus hastulatus Colbran, 1960, is redescribed and figured; it is transferred to Telotylenchus because it lacks a lip cap and the above listed characters of Belonolaimus.

0757 AYALA, A., 1962. "Parasitism of bacterial nodules by the reniform nematode." Journal of Agriculture of the University of Puerto Rico, 46 (1), 67-69.

The attachment of mature specimens of female Rotylenchulus reniformis to the bacterial nodules of pigeon pea roots (Cajanus indicus) is recorded and illustrated.

0758 KHERA, S. & ZUCKERMAN, B.M., 1962. "Studies on the culturing of certain ecto-parasitic nematodes on plant callus tissue." Nematologica, 8 (4), 272-274. [French summary p.274.]

Tylenchus agricola and Tylenchorhynchus claytoni reproduced rapidly on lucerne callus tissue grown under aseptic conditions at 23°C. on nutrient medium. They did not reproduce on callus tissue of tomato, broccoli, carrot, cabbage or rye. The following nematodes failed to reproduce on callus tissue: Hennicycliophora surilis, Tylenchus christiei, Tetylenchus joctus, Helicotylenchus erythrinae, and Atylenchus decolineatus.

0759 WINCHESTER, J.A., 1963. "The effect of Pangolagrass, Digitaria decumbens Stent, on the cotton root-knot nematode, Meloidogyne incognita acrita Chitwood." Dissertation Abstracts, 23 (10), 3586-3587.

In pot tests, Pangolagrass (Digitaria decumbens) was more effective than clean fallow or flooding in reducing a population of Meloidogyne incognita var. acrita. Coastal Bermudagrass reduced the population to a low level but certain other grasses, sedge, white clover and okra maintained large populations. Extracts of older roots of Pangolagrass were toxic to M. incognita var. acrita in laboratory tests; extracts of younger roots increased larval emergence from the egg-shell. In field tests in Florida, U.S.A., Pangolagrass was as effective as clean follow in reducing the nematode population; Coastal Bermudagrass was slightly less effective and native weeds [unnamed] had no effect. Populations of Belonolaimus longicaudatus increased in the presence of both Pangolagrass and Coastal Bermudagrass under field conditions.

0760 KILPATRICK, R.A., CHEN, T., RICH, A.E., & RODRIGUES, L., 1963. "Root symptoms and anatomical changes in clovers and lettuce resulting from injury by Pratylenchus penetrans and 2,4-dichlorophenoxyacetic acid." [Abstract.] Phytopathology, 53 (3), 349.

Seeds of Trifolium angustifolium, T. repens and Lactuca sativa were sterilized for 3 minutes in 1% mercury bichloride, germinated and transferred to modified agar. If Pratylenchus penetrans or 2,4-D were added on the same day the seedlings were severely stunted and died early. If 48 hours elapsed before inoculation less severe seedling injury was observed. Sectioning and staining of the injured roots showed hypertrophy of the epidermis and cortex followed by total breakdown of the tissues.

0761 SINGH, N. D. Influence of oxamyl application on *Meloidogyne incognita* and *Rotylenchulus reniformis* penetration into roots of tomato, lettuce and pigeon peas. [Abstract]. *Nematropica* (1975) 5 (2) 29 [En] Univ. of the West Indies, St. Augustine, Trinidad, West Indies.

In greenhouse experiments, single foliar applications of oxamyl at 600 ppm significantly inhibited penetration of roots of tomato and lettuce seedlings by *Meloidogyne incognita*. Penetration of *Rotylenchulus reniformis* into pigeon pea seedlings was inhibited by 2500 ppm. In a field trial, 3 foliar applications of oxamyl at 1250 ppm significantly reduced the numbers of *M. incognita* and *Pratylenchulus* [= *Pratylenchus*] *zeae* subsequently recovered from tomato roots.

0762 MILLER, R.E., BOOTHROYD, C.W. & MAI, W.F., 1963. "Relationship of Pratylenchus penetrans to roots of corn in New York." Phytopathology, 53 (3), 313-315.

A brief outline is given of the relationship between Pratylenchus penetrans in the soil and in the roots of maize. Root and rhizosphere soil samples were taken at fortnightly intervals throughout the growing season. The amount of root rot in the field was directly correlated with the number of P. penentrans obtained from the roots and from the soil. P. crenatus was found in small numbers at one location. The numbers of Pratylenchus spp. were higher than those of 6 other named genera. 2 population peaks of Pratylenchus occurred, the first in early July and the second late in August. There was an inverse correlation between the number of Pratylenchus adults in the roots and the number in the soil.

0763 CHAPMAN, R.A., 1963. "Development of Meloidogyne hapla and M. incognita in alfalfa." Phytopathology, 53 (9), 1003-1005.

Top growth of lucerne was reduced significantly by Meloidogyne hapla but not by M. incognita. Cutting the top growth limited the number of nematodes because cutting virtually stopped root growth. Total top growth weight was greater in plants cut at 4-week intervals than in those which were uncut. Effects of M. hapla and cutting on top growth were about equal in amount and opposite in effect. Root weight was not altered significantly by either of the 2 species. M. hapla caused more galling than did M. incognita, especially in cut plants.

0764 HAWN, E.J., 1963. "Transmission of bacterial wilt of alfalfa by Ditylenchus dipsaci (Kuhn)." Nematologica, 9 (1), 65-68. [German summary p.67.]

Ditylenchus dipsaci transmitted Corynebacterium insidiosum into crown buds of lucerne resulting in an increased bacterial wilt in the wilt-susceptible variety "Grimm." Observations indicate that C. insidiosum is carried on, rather than within, the nematode.

0765 MORIARTY, F., 1963. "A population experiment with Heterodera goettingiana Lieb. and a relatively inefficient host, broad bean." Nematologica, 9 (1), 152-156. [German summary p.156.]

A linear regression of yield on the logarithm of the initial egg density of Heterodera goettingiana was obtained for Vicia faba grown in 24 garden plots of sandy clay loam. Plant growth was measured by the yield of pods and beans and the initial and final eelworm densities were determined by cyst and egg counts from samples taken before and after the experiment. V. faba is shown to be a poor host of H. goettingiana, being able to support a low population of this eelworm. It is suggested that maximum production of new eggs occurred at an intermediate initial egg density, when plant growth was still vigorous, with few new eggs being produced above an initial density of 400 e.p.g.

0766 TOBAR JIMENEZ, A., 1962. "La Heterodera goettingiana Liebscher, 1892, parásito de las habas (Vicia faba) granadinas." Revista Ibérica de Parasitología, 22 (3/4), 323-328. [English summary p.327.]

Heterodera goettingiana was the predominant nematode found in soil and root samples of Vicia faba in Granada, Spain. Helicotylenchus, Meloidogyne, Pratylenchus, and Tylenchorhynchus larvae were also found; P. neglectus and T. parvus caused damage. T parvus occurred in higher numbers inside the roots than in the surrounding soil. Great emphasis is laid on the potentiality of Meloidogyne sp. as a pest.

0767 TOLER, R.W., THOMPSON, S.S. & BARBER, J.M., 1963. "Cowpea (southern pea) diseases in Georgia, 1961-1962." Plant Disease Reporter, 47 (8), 746-747.

Meloidogyne arenaria, M. hapla, M. incognita, M. incognita var. acrita and M. javanica were found on cowpea.

0768 GRANDISON, G.S., 1963. "The clover cyst nematode (Heterodera trifolii Goffart) in New Zealand. (A note)." New Zealand Journal of Agricultural Research, 6 (5), 460-462.

The occurrence of Heterodera trifolii on Trifolium repens in New Zealand is the first record of this nematode for the Southern Hemisphere. The nematode appears to be wide-spread in New Zealand and may contribute to the death of clover. The New Zealand pedigree strain of T. repens is highly resistant to the nematode, possibly due to its high cyanogenetic glucoside content.

0769 McGLOHON, N.E. & MINTON, N.A., 1963. "Alfalfa stem nematode in Alabama." Plant Disease Reporter, 47 (6), 573.

Ditylenchus dipsaci on lucerne is recorded for the first time in Alabama. Infestations were found at 4 locations during 1962. There was wide-spread stunting of plants and loss of stand at one site but damage was confined to localized areas at the others.

0770 GOSTICK, K.G., 1963. "Control of seed-borne lucerne stem eelworm with Phorate." Annals of Applied Biology, 51 (3), 503-507.

The nematotoxicity of insecticides and nematicides as dressings on lucerne seed inoculated with Ditylenchus dipsaci were tested in pots and small plots. Phorate (diethyl S-(ethylthiomethyl) phosphorothiolothionate) was the most nematotoxic treatment but concentrations above 4% decreased germination and further tests are necessary. Liquid dressings are safer than dust formulations.

0771 KILPATRICK, R.A., CHEN, T., RICH, A.E. & RODRIGUES, L., 1963. "Root symptoms and anatomical changes in Trifolium species and lettuce resulting from injury by Pratylenchus penetrans and 2,4-dichloro-

phenoxyacetic acid." Plant Disease Reporter, 47 (6), 497-501.

Test-tube experiments on the effect of Pratylenchus penetrans and 2,4-D on 7 varieties of lettuce (Lactuca sativa) and 6 species of clover (Trifolium spp.) are reported. Nematode injury resulted in necrosis and swelling of roots, stunting of plants and increased secondary root formation. Injury from 2,4-D caused stunting of plants, necrosis, malformation of roots and cell hypertrophy. The difference between nematode and 2,4-D injury was observed only in the early stages of growth. Seedlings treated with callus tissue containing 2,4-D and nematodes which had been reared on callus tissue, transferred sufficient 2,4-D after their death to cause swelling of roots and reduction in growth.

0772 CHEN, T. & RICH, A.E., 1963. "Attraction of Pratylenchus penetrans to plant roots." Plant Disease Reporter, 47 (6), 504-507.

White clover (Trifolium repens) seedlings were grown under aseptic conditions in one limb of a U-tube containing 0.5% agar and Pratylenchus penetrans were added to the other limb. Within 5 hours some nematodes had migrated the 15 to 20 cm. to the root zone. If clover was absent on either side or if plants were present on both sides the nematodes did not migrate. The nematodes orientated themselves towards the attractant produced by the root and migrated towards it, both vertically and horizontally. The concentration gradients in the agar are highest near the roots.

0773 CHAPMAN, R.A., 1963. "Population development of Meloidogyne arenaria in red clover." Proceedings of the Helminthological Society of Washington, 30 (2), 233-236.

The rate of population development of Meloidogyne arenaria in red clover growing in soil infested with 500 larvae per 500 gm. was greater than in plants growing in soil infested with 100 larvae per 500 gm. This indicates a direct relationship between the infestation level and population development of M. arenaria in red clover. The former set of plants, i.e. that with the higher infestation level, was injured by the nematodes whereas the latter was not. A significant stimulation of root growth in young plants occurred at the higher infestation level.

0774 GOLDEN, A.M. & COBB, G.S., 1963. "Heterodera lespedezae (Heteroderidae), a new species of cyst-forming nematode." Proceedings of the Helminthological Society of Washington, 30 (2), 281-286.

Heterodera lespedezae n.sp. (20 females, male unknown), collected from roots of Kobe lespedeza, Lespedeza striata, near Monroe in Union County, North Carolina, U.S.A., is described and figured. The common name of "Lespedeza cyst nematode" is suggested for this species. It is said to be closely related to H. trifolii, but differs in having shorter stylets in both larvae and females, the outlet of the dorsal oesophageal gland near the stylet base, by differences in the general shape of the larval tail and by the stylet knobs sloping posteriorly and measuring 5 microns in width in the female. It differs from H. glycines in the absence of males, in having a longer larval stylet, and in the length of the larval tail in hyaline tail terminal. The larval tail terminal is also relatively narrower and has an almost acute terminus.

0775 NORTHERN IRELAND, AGRICULTURAL RESEARCH INSTITUTE. Forty-eighth Annual Report 1974-1975. Hillsborough, Co. Down; (1975) 49 pp. [En, Plant Nematology pp. 17, 18]

The effect of Heterodera trifolii infestation on the growth of red (Trifolium pratense) and white (T. repens) clovers in Northern Ireland is being studied. Mention is made of the role of Dytilenchus dipsaci in reducing red clover yields.

0776 HOLTZMANN, O.V. & ARAGAKI, M., 1963. "Clover cyst nematode in Hawaii." Plant Disease Reporter, 47 (10), 886-889.

The authors report the first record of a cyst nematode in the State of Hawaii. Heterodera trifolii was found attacking Trifolium repens in pastures and on roadsides in several districts. In pot tests, using an inoculum of 10 non-desiccated cysts or gravid females of the nematode, Beta vulgaris var. cicla, Lathyrus tingitanus, Sesbania grandiflora and Trifolium semipilosum were found to be very susceptible; Brassica juncea, Desmodium caninum, D. uncinatum and tomato were slightly susceptible. All these are said to be new host records. Pathogenicity tests showed the yield of Trifolium repens inoculated with H. trifolii to be reduced severely after the first 2 months' growth, as compared with uninoculated plants. The authors discuss earlier records of Heterodera in Hawaii, which may possibly have referred to a species of Meloidogyne. H. trifolii appears to be a potentially serious pest in Hawaii.

0777 LEACH, C.M., DICKASON, E.A. & GROSS, A.E., 1963. "The relationship of insects, fungi and nematodes to the deterioration of roots of Trifolium hybridum L." Annals of Applied Biology, 52 (3), 371-385.

The possible relationships of insect, fungus and nematode injury to the deterioration of roots of alsike clover, Trifolium hybridum were investigated. Randomized plots with sixfold replication of the following treatments and their combinations were used: (i) the insecticide heptachlor (at 4 lb. per acre) sprayed on to the soil surface and rototilled to a depth of 4 inches; (ii) the soil fumigant chloropicrin (at 450 lb. per acre) applied by chisel harrow to a depth of 8 inches and sealed by rolling; (iii) the nematicide EDB (at 6 gallons of Dowfume W-85 per acre) applied as for chloropicrin. The plots were sown with clover seeds 2 weeks after treatment. The insecticide together with either of the soil fumigants improved stand uniformity, plant height and flowering and decreased the number of weeds. In the second year this treatment greatly increased the dry-weight yield. Both Meloidogyne incognita var. acrita and Pratylenchus sp. were present but only very few of the former. No

direct relationship was revealed between nematode injury and root rots although the beneficial effect of soil fumigation suggests that the nematodes may be involved in the complex.

0778 WARDOJO, S., HIJINK, M.J. & OOSTEBRINK, M., 1963. "Schade bij witte klaver door inokulate met Heterodera trifolii, Meloidogyne hapla en Pratylenchus penetrans." Mededelingen van de Landbouwhogeschool en de Opzoekingsstations van de Staat te Gent, 28 (3), 672-678. [English summary p.678. Discussion p.678.]

White clover, Trifolium repens, was grown in sterilized soil inoculated with either Heterodera trifolii, Meloidogyne hapla or Pratylenchus penetrans. At monthly intervals the clover was cut and weighed; crude protein was estimated once. All 3 species were found to damage white clover. Leaf production was reduced to 30% of that in the controls by H. trifolii and M. hapla and to 45% by P. penetrans. H. trifolii infestation caused a reduction in the number of Rhizobium nodules on the roots and in the crude protein extent of roots and leaves.

0779 HUNG, Y.P., 1963. "Studies on the life cycle and host range of the lespedeza cyst nematode." [Abstract.] Phytopathology, 53 (8), 878-879.

The life-cycle of Heterodera lespedezae (a new species to be described later) was studied on Kobe lespedeza at 75°F. Second-stage larvae entered the roots in 2 days and after 8 days had swollen and begun the second moult. By the tenth day third-stage larvae were fully developed, the fourth-stage had developed by the 16th day and the lemon-shaped adult by the 22nd day. Eggs were deposited on the 36th to 38th day. No males were found. Both Kobe and Korean lespedeza were hosts and also red and white clovers: 3 other leguminous plants and 3 cereals were not hosts.

0780 SIDDIQI, M.R., 1963. "Two new species of the genus Helicotylenchus Steiner, 1945 (Nematoda: Hoplolaiminae)." Zeitschrift fur Parasitenkunde, 23 (3), 239-244.

Helicotylenchus serenus n.sp. (15 hermaphrodites) collected from Thuja sp. near Post & Telegraph Colony, Haripur, West Pakistan, is described and figured. It is said to be distinctive among all known hermaphrodite species of the genus by its labial framework having conspicuous outer margins which extend posteriorly about 4 body annules. It comes closest to H. canadensis but differs in the labial framework, has a more posteriorly located orifice of the dorsal oesophageal gland and a conoid tail measuring more than one anal body width in length. H. indicus n.sp. (15 hermaphrodites) collected from grass, Cynodon dactylon, in the lawn facing Research Laboratories, Department of Zoology, Aligarh University, Aligarh (U.P.), India, is described and figured. It is said to differ from all known digonic hermaphrodite species of the genus by the phasmids being located at anal latitude and in having a dorsally convex-conoid tail not bearing a peg or process at terminus. It is recorded as resembling H. digonicus and H. canadensis, but differs from the former in its smaller body size, smaller buccal spear, by having more annules on the tail and by the location of the phasmids. From H. canadensis it differs in its smaller body size, smaller buccal spear, and in having a comparatively longer tail. Helicotylenchus is placed in the subfamily Hoplolaiminae.

0781 SIDDIQI, M.R., 1963. "Four new species in the sub-family Tylenchinae (Nematoda) from North India." Zeitschrift fur Parasitenkunde, 23 (4), 397-404.

Psilenchus minor n.sp. from soil about the roots of Prunus amygdalus near Islamia College, Srinagar differs from P. hilarus in being smaller, with a shorter spear, more anteriorly located vulva, more smoothly rounded head and a tail of 11 anal body widths long. Tylenchorhynchus rugosus n.sp. from soil around roots of Salix babylonica near Islamia College, Srinagar, resembles 6 other species of the genus in having longitudinal striae on the body and 6 incisures in the lateral field but is distinguished from them by various characters. Ditylenchus namus n.sp., collected from soil and root samples of guava tree, Psidium guayava, in Jamalpur village near University Campus, Aligarh, can be recognized by its short body, spear 7.0 to 7.5 microns long, vulva at 82 to 85%, large post-uterine sac, shape of female tail and dimensions of the spicules. D. mirus n.sp., from soil about roots of Zea mays in Jamalpur village, is distinguished from all the known species of the genus by its small body size (0.54 to 0.72 mm.), spear 8 to 9 u long, vulva at 83 to 85%, uterine-sac extending half-way between vulva and anus, a short conoid tail with broadly rounded terminus and size of the spicules.

0782 AYALA, A., 1962. " Occurrence of the nematode Meloidogyne javanica on pigeonpea roots in Puerto Rico." Journal of Agriculture of the University of Puerto Rico, 46 (2), 154-156.

Ayala reports Meloidogyne javanica on pigeon pea (Cajanus cajan) roots for the first time in Puerto Rico. One of the symptoms was pronounced proliferation behind attacked root tips.

0783 SKARBILOVICH, T.S., OVECHNIKOV, G.T. & AFANASEV, D.I., 1960. [The more important nematode diseases of clover and maize and their distribution on collective farms in central R.S.F.S.R.] Trudi Vsesoyuznogo Instituta Gelmintologii im. K.I. Skryabina, 8, 215-230. [In Russian.]

The authors have made a survey of 94 farm units in the Moscow, Voronezh, Lipetsk, Smolensk, Gorkov and Yaroslav regions of the U.S.S.R. and have studied the distribution of the more important nematode diseases of clover and maize. For clover they list Ditylenchus "trifolii", Hexatylus vigissi, H. consobrinus and Aphelenchoides spinocaudatus, and for maize D. dipsaci, H. vigissi and A. spinocaudatus.

0784 SWARUP, G., PRASAD, S.K. & RASKI, D.J., 1964. "Some Heterodera species from India." Plant Disease Reporter, 48 (3), 235.

Heterodera trifolii is reported from 3 localities in India, occurring on the roots of Cajanus cajan at New Delhi and near Aligarh (Uttah Pradesh) and also association with the roots of meadow grass at Gulmarg, Kashmir, at an elevation of 8,700 ft. H. sacchari was found on the roots of Saccharum spontaneum near Delhi. Both these species of Heterodera are new records for India. Maize is recorded as a new host for H. avenae.

0785 YOUNG, P.A., 1964. "Control of corn nematodes with Vorlex and D-D." Plant Disease Reporter, 48 (2), 122-123.

D-D and Vorlex (20% methyl isothiocyanate plus 80% D-D) was applied to soil infested with Trichodorus christiei, Pratylenchus brachyurus, P. zeae, Xiphinema americanum, Criconemoides and Belonolaimus. The growth and yield of maize was greatly improved by these pre-planting treatments.

0786 WINCHESTER, J.A., 1961. "Preliminary investigations on the mode of action of pangolagrass roots in reducing cotton root-knot nematode (Meloidogyne incognita acrita) populations." Proceedings. Soil and Crop Science Society of Florida, 20th Annual Meeting (1960), pp.178-182.

Water extracts of mature roots of pangolagrass (Digitaria decumbens) prevented galling of cucumber roots growing in soil infested with Meloidogyne incognita acrita, whereas extract of young roots of pangolagrass increased galling compared with a water check. Pangolagrass sod leachate eliminated root-knot on white clover in 4 weeks. Leachate from newly planted pangolagrass increased the nematode population. In small plots and in commercial fields the effectiveness of the grass in reducing root-knot nematodes has been confirmed.

0787 KRUSBERG, L.R., 1964. "Effect of galling by Ditylenchus dipsaci on pectins in alfalfa." Nematologica, Year 1963, 9 (3), 341-346. [German summary p.346.]

The results of various histochemical tests on healthy lucerne tissue and on tissue infected with Ditylenchus dipsaci are given. Galled and healthy seedling tissues stained similarly with ruthenium red, but the galled tissues stained more deeply than did the healthy tissues with hydroxamic acid reagent. There were no consistent differences in quantities of pectins from galled or healthy tissues in established plants or seedlings. Neither galled nor healthy lucerne tissues contained detectable amounts of free galacturonic acid or polygalacturonase. D. dipsaci extract with a high polygalacturonase activity by viscometric assay did not macerate lucerne seedlings during incubation. It is concluded that pectinolytic enzymes are not of major importance in the diseases caused by this nematode in lucerne.

0788 KABLE, P.F. & MAI, W.F., 1964. "Ingress of Pratylenchus penetrans into alfalfa roots in relation to soil moisture content." [Abstract.] Phytopathology, 54 (2), 128.

An experiment, showing that Pratylenchus penetrans in a sandy soil does not enter roots of lucerne seedlings when the soil is saturated (pF0) but does so more readily as the pF is raised to 2, is briefly reported.

0789 NEMATODES. Pest Articles and News Summaries (1975) 21 (4) 416-418 [En].

In this short report of work done by Dr. R.O. Ogbuji in Nigeria the results are given of tests for infectivity of 5 maize cultivars by a population of Meloidogyne incognita from Corchorus olitorius. Only sweet corn, variety GCB, showed resistance but it is thought that resistance might break down after repeated exposure to the nematodes.

0790 AYOUB, S.M., 1961. "Pratylenchus zeae found on corn, milo, and three suspected new hosts in California." Plant Disease Reporter, 45 (12), 940.

An infestation of Pratylenchus zeae in a field of milo (Sorghum vulgare) is reported. P. zeae were also obtained from roots of Cynodon dactylon, Tribulus terrestris and Echinochloa crus-galli which were growing in the same field. There was a P. zeae infestation in a nearby corn (Zea mays) field. Previously published hosts of P. zeae are listed.

0791 CHAPMAN, R.A., 1962. "Effect of Heterodera trifolii on the growth of Trifolium pratense and T. repens." [Abstract of paper presented at the 53rd Annual Meeting of the American Phytopathological Society, 1961.] Phytopathology, 52 (1), 6.

In Kenland red clover infested with larvae of Heterodera trifolii at rates of 500, 1,000 and 6,000 larvae per half gallon of soil, significant reductions in top growth occurred at 76, 116 and 116 days respectively, and total yield during 6 months was reduced by 59, 57 and 76%. Injury caused by an infestation level of 300 larvae per 4 in. pot was 13% in Pilgrim Ladino clover, 31% in Louisiana white clover and 58% in Kenland red clover.

0792 MARTIN, G.C., 1961. "Root-knot nematodes infecting black wattle (Acacia mearnssi de Wild) in the Eastern Highlands of Southern Rhodesia." Rhodesia Agricultural Journal, 58 (6), 374-375.

Sampling shows that root-knot is generally distributed in the wattle-producing areas of the Eastern Highlands of Southern Rhodesia. The monoculture of black wattle (Acacia mearnsii) and the practice of growing it in ground formerly under intensive cultivation results in severe infections of Meloidogyne javanica. In some samples M. arenaria was found.

0793 MILLER, R.E., BOOTHROYD, C.W. & MAI, W.F., 1962. "Plant parasitic nematodes associated with corn roots in New York." [Abstract of paper presented at the 53rd Annual Meeting of the American Phytopathological Society, 1961.] Phytopathology, 52, (1), 22.

Samples of roots and soil from 5 major maize-growing areas affected by maize root-rot revealed high populations of plant-parasitic nematodes. Samples were taken

bi-monthly from June to October. Large numbers of Pratylenchus penetrans were found at 4 of the sites; at the 5th site P. crenatus was the most numerous. The population of Pratylenchus spp. in the roots increased 3 to 7-fold during the growing season. Tylenchus spp., Helicotylenchus spp. and Aphelenchus sp. were also found consistently in smaller numbers together with occasional Paratylenchus spp., Tylenchorhynchus spp., Xiphinema spp. and Heterodera spp. The total population of plant-parasitic nematodes was initially high, decreased rapidly and then built up steadily to the end of the growing season.

0794 PALO, A.V., 1962. "Translocation and development of stem eelworm, Ditylenchus dipsaci (Kuhn) in lucerne, Medicago sativa L." Nematologica, 7 (2), 122-132. [German summary pp.131-132.]

Palo gives the results of experiments on the ecology of the lucerne stem eelworm. Two-week-old lucerne seedlings (Du Puits variety) were inoculated with 200 eelworms (all stages) and, on later examination, eelworms were found in all parts of one-month-old plants; the second and third-month-old plants showed irregular infection in the main stem and infections in the side shoots appeared to be independent of the position of the main stem infection. Eelworms are carried in the flower debris and not within the seeds themselves and are also carried up passively as the plant grows. The viability of narcissus, tulip and lucerne races in dried plant material decreased as the humidity at which they were stored increased. Lucerne seedlings grown for 2 months in pots of artificially infested soil decreased in weight by 10.2 mg. for each 10-fold increase in inoculum and also there was 28-fold increase in final eelworm population in the plant for unit increase in the initial inoculum. Ten eelworms scattered at random over 120 sq. cm. surface of 1 kg. of potted soil was sufficient to cause serious infection of the seedlings. There was no evidence of parthenogenesis.

0795 RIGGS. R.D., DALE, J.L. & HAMBLEN, M.L., 1962. "Reaction of Bermuda grass varieties and lines to root-knot nematodes. "Phytopathology, 52 (6), 587-588.

Ten pasture types and 6 lawn types of Bermuda grass (Cynodon spp.) were tested against the root-knot nematodes Meloidogyne arenaria, M. hapla, M. incognita, M. incognita var. acrita and M. javanica. The most damaging was M. incognita var. acrita, resistance being shown in one lawn and 4 pasture types. M. hapla did least damage, galls with egg masses being found on only 4 of the pasture types. Coastal and Midland were the most resistant of the pasture types, Midland being attacked only by the M. incognita group. Uganda was the best lawn type, only M. incognita var. acrita causing a few galls, but no egg masses were found.

0796 ROIVAINEN, O., TINNILA, A. & KANERVO, V., 1962. "Observations on the stem nematode Ditylenchus dipsaci (Kuhn) Filipjev as a pest of red clover in Finland." Annales Agriculturae Fenniae, 2, 127-132.

Ditylenchus dipsaci has been found in red clover at 6 different places in Finland where it was shown that the nematode could be spread by seed. Mechanical cleaning of nematode-infested red clover seed reduced the degree of infestation but all nematodes were not removed. It is recommended that imported red clover seed should be treated with methyl bromide.

0797 SASSER, J.N., VARGAS GONZALES, O.F. & MARTIN, A., 1962. "New findings of plant-parasitic nematodes in Peru." Plant Disease Reporter, 46 (3), 171.

Plant-parasitic genera encountered in Peru by Krusberg & Hirschmann, 1958 [for abstract see Helm. Abs., 27, No.143e] were again found in a survey made in 1961. New findings included Ditylenchus dipsaci on lucerne, Rotylenchulus reniformis in large numbers from soil from the rhizospheres of several crop plants, Radopholus similis causing severe damage in banana plantations and a Dolichodorus (undescribed species) associated with a mahogany tree. In the coastal region Meloidogyne incognita and R. similis were the most important economically, causing severe damage to cotton and banana respectively, and there was evidence of an interrelationship between these nematodes and certain fungal diseases. In some areas Heterodera rostochiensis caused severe losses to potato and in one area of the selva M. exigua on coffee was the most damaging nematode.

0798 ALIEV, A.A., 1961. [Infectivity of Meloidogyne sp. to varieties of maize.] Trudi Vsesoyuznogo Instituta Zashchiti Rasteni, No. 16, pp.89-92. [In Russian: English summary p.92.]

Two-year observations on 29 maize varieties, planted in soil heavily infected with Meloidogyne sp., showed that different varieties became infected to different degrees but that development and fruiting of the plants were unaffected.

0799 OOSTENBRINK, M., 1960. "Einige Grundungunsfragen im Hinblick auf pflanzenparasitare Nematoden." International Congress of Crop Protection (4th), Hamburg, September 1957. Proceedings, Vol. I, pp.575-577. [English summary p.577.]

Red clover, Trifolium pratense, caused considerable build-up of Pratylenchus penetrans in fields already infested and itself suffered from attack. However, if African marigolds, Tagetes sp., were grown before crops susceptible to P. penetrans, these nematodes were suppressed and Tagetes could be used as a green manure.

0800 EPPS, J.M. & CHAMBERS, A.Y., 1959. "Mung bean (Phaseolus aureus), a host of the soybean cyst nematode (Heterodera glycines)." Plant Disease Reporter, 43 (9), 981-982.

Two varieties of Mung bean (Phaseolus aureus), Oklahoma 12 and Kiloga, were very susceptible to Heterodera glycines but a "jumbo strain" tested appeared to show a high resistance to white female development.

0801 GRUNDBACHER, F.J. & STANFORD, E.H., 1962. "Effect of temperature on resistance

of alfalfa to the stem nematode (Ditylenchus dipsaci)." Phytopathology, 52 (8), 791-794.

The resistance of seedling and clonal plants of lucerne to infestation by Ditylenchus dipsaci varied in resistant strains with temperature. At 50°F. Lahontan was more resistance than at 60°F. and 70°F. but selections of an introduced variety from Iran and the variety Talent did not vary at these 3 temperatures.

0802 GRUNDBACHER, F.J., 1962. "Testing alfalfa seedlings for resistance to the stem nematode Ditylenchus dipsaci (Kuhn) Filipjev." Proceedings of the Helminthological Society of Washington, 29 (2), 152-158.

Germinated lucerne seedlings were grown on filter paper rolls wrapped around glass vials in a breaker of tap-water or dilute Hoagland's solution kept in a controlled environment. Ditylenchus dipsaci were extracted from dried lucerne tops and suspended in 1% sodium carboxymethylcellulose, a droplet of which was placed between the cotyledons. Inoculated seedlings were then kept under continuous light for 5 days, preventing the cotyledons from closing, which resulted in a greater concentration of D. dipsaci in the shoot apex. Microscopical examinations of stained seedlings showed that D. dipsaci could reproduce in the hypocotyl, cotyledons and petioles of both susceptible and resistant plants. In susceptible plants, one month after inoculation and grown at 52°F., there was swelling of the meristematic tissue at the shoot apex and large numbers of eggs were produced by the nematodes; resistant seedlings usually showed little swelling and nematode reproduction did not usually occur. The primary shoot often remained rudimentary and a secondary shoot was produced which overcame the nematode attack. It is concluded that hypersensitivity to D. dipsaci often inhibits meristematic growth of resistant plants.

0803 O'BANNON, J.H. & REYNOLDS, H.W., 1962. "Resistance of alfalfa to two species of root-knot nematodes." Plant Disease Reporter, 46 (8), 558-559.

The reactions of 13 breeding lines of African lucerne and a Sirsa selection to Meloidogyne javanica and M. incognita var. acrita were tested. The African lines all had very light infestations of both root-knot species, the Sirsa selection was lightly to moderately infested and the check variety, Lahontan, was moderately to heavily galled. It is claimed that when highly resistant varieties are grown the nematode population of an infested field is reduced so that succeeding crops in the rotation will remain relatively free from root-knot damage.

0804 CHEN, T. & RICH, A.E., 1962. "Pathogenicity of Pratylenchus penetrans on strawberry and Ladino white clover seedlings." [Abstract.] Phytopathology, 52 (9), 922-923.

Seedlings of Ladino white clover and strawberry were grown aseptically in tubes on modified Hoagland's and Knop's solutions. Pratylenchus penetrans cultured on clover callus tissue were added to the tubes containing the seedlings. Nematodes feeding on the root hairs and epidermis just behind the root cap resulted in disappearance of root hairs, swelling of root tips, darkening of roots and stunting of plants. These experiments demonstrate that P. penetrans is pathogenic to Ladino white clover and strawberry seedlings in the absence of all other organisms.

0805 HEYNS, J., 1962. "A report on South African nematodes of the families Longidoridae, Belondiridae and Alaimidae (Nematoda: Dorylaimoidea), with descriptions of three new species." Nematologica, 8 (1), 15-20. [French summary p.20.]

Longidorus elongatus, Xiphinema americanum, X. hallei, X. brevicaudatum and Dorylaimellus tenuidens are recorded from South Africa. The 2 female specimens of X. americacum more closely resemble those from Aligarh, India, described by Siddiqi, 1959 [see Helm. Abs., 29, No. 322] than American material. X. vanderlindei n.sp., Amphidelus n.sp. and D. projectus monohystera n.sp. are described and illustrated. X. vanderlindei (females only) was found around the roots of maize and cowpeas in the Orange Free State and also around the roots of cowpeas and peanuts in the Transvaal. It differs from X. hallei in having a flattened lip region, shorter spear, a shorter and almost straight tail and a longer basal bulb, and from X. attodororum in the much shorter spear and spear extension, the more posterior location of the vulva and the longer tail. The vulva of X. vanderlindei is a conspicuous transverse slit (V = 47 to 52%) more than half the body width. Both uteri have one or more large pouches. D. projectus was found in cultivated soil at the Tobacco Research Station, Rustenburg, Transvaal. It is distinguished by the amalgamated inner parts of the lips being set off as a prominent labial disc slightly more than half the width of the lip region; it differs from D. striatus in the hemispherical tail ending, shorter pre-rectum and smaller size. A. monohystera is described from a single female from soil in a citrus orchard in Transvaal. This species belongs in the group of Amphidelus spp. having relatively short tails. It differs from A. uniformis in having no anterior uterine branch, amphids located slightly more anteriorly and by the sub-acute tail terminus.

0806 ROIVAINEN, O. & TINNILA, A., 1963. "The resistance of certain Finnish red clover varieties to the stem nematode Ditylenchus dipsaci (Kuhn) Filipjev." Annales Agriculturae Fenniae, 2 (1), 1-6.

Stem nematode resistance was investigated in a large quantity of Finnish red clover and compared with the Swedish variety Merkur and some other foreign varieties. Lucerne, alsike clover and white clover were also inoculated but they were very resistant to the nematode population used. A few Finnish local varieties, especially Kangasala and Taipalsaari, showed some degree of resistance and although not as resistant as Merkur they are considered valuable for further breeding.

0807 HAGUE, N.G.M. & CLARK, W.C., 1959. "Fumigation with methyl bromide and chloropicrin to control seed-borne infestations of the stem telwonm (Ditylenchus dipsaci) on lucerne (Medicago sativa)." Mededelingen van de Landbouwhogeschool en de Gpzoekingsstations van de Staat te Gent, 24 (3/4), 628-636. [French & German summaries p.635.]

Hague & Clark describe fumigation experiments with methyl bromide and chloropicrin to control seed-borne infestations of stem eelworm on lucerne. Adequate control is obtained with both gases at concentration-time products not appreciably phytotoxic to the seed. Technical problems involved in the use of these gases and seed moisture content levels are also discussed.

080 RHOADES, H.L. & LINFORD, M.B., 1961. "Biological studies on some members of the genus Paratylenchus." Proceedings of the Helminthological Society of Washington, 28 (1), 51-59.

The life-cycle of Paratylenchus projectus was studied on red clover seedlings growing in agar. Four moults occurred, the first within the egg. The second and third-stage larvae fed as ectoparasites on epidermal cells and root hairs similarly to adults, but the fourth-stage larvae did not feed. This stage is morphologically distinct with a short delicate stylet and weakly developed oesophagus. The stage was of short duration on red clover in agar and young pot cultures, but accumulated for unknown reasons in old pots and was the predominant stage under most field conditions. Fourth-stage larvae were more tolerant of desiccation and exposure to low temperatures.

0809 ELGIN, J.H., JR.; EVANS, D.W.; FAULKNER, L.R. [FAULKNER, L.R.] Variations in pathogenicity of regional strains of stem nematodes on alfalfa. [Abstract]. In Twenty-fourth alfalfa improvement conference, University of Arizona, Tucson, 8-10 October, 1974. Peoria, USA; US Department of Agriculture. (1975) 19-20. [En] ARS, USDA, Wash., Prosser, USA.

Eight of 9 isolates of Ditylenchus dipsaci from different areas in the USA and Canada performed similarly at 3 temperatures and in 4 lucerne varieties; Lahontan and Caliverde were resistant to the isolates and Ranger and Moapa were susceptible. It was concluded that resistant lucerne developed in a breeding programme using one isolate would be likely to be resistant to isolates from other regions.

0810 MANKAU, R. & LINFORD, M.B., 1961. "Host-parasite relationships of the clover cyst nematode, Heterodera trifolii Goffart." Bulletin. Illinois Agricultural Experiment Station, No. 667, 50 pp.

Mankau & Linford review the literature on the cytology of the host-parasite relationships in species of Heterodera and Meloidogyne and describe their own methods used in the study of the development of H. trifolii in plants of various host status. They describe fully the entry of larvae into the roots of a good host, Ladino clover, and the process of feeding by larvae and mature females, the development of the syncytia or giant cells is traced from the earliest stages and there are numerous photographs showing their appearance in various positions in the root and at different stages of root development. Some syncytia reached a length of 2 mm. and some occupied the entire stele in the vicinity of the stylet. A nematode failed to thrive when a syncytium arose in the cortex unless it extended into the stele. No nuclear division was observed within a syncytium and, except in the early stages, the number of nuclei was less than the number of cells that had merged, because disintegration of nuclei occurred. The development of H trifolii in pea, red clover and soya bean (all poor hosts), amongst other plants, is discussed and a new host Polygonum persicaria, also a host of H. weissi Steiner, is recorded. H. trifolii and M. hapla developed close together in roots of Ladino clover without apparently influencing each other. The syncytia developed in association with each species differed strikingly from one another, even when the two types of pathological tissue lay in contact.

0811 MARTIN, G.C., 1961. "The susceptibility of clovers (Trifolium spp.) and trefoils (Lotus spp.) to the common root-knot nematode Meloidogyne javanica." Rhodesia Agricultural Journal, 58 (1), 62-65.

Martin grew two species of Lotus and 17 of Trifolium in a field heavily infested with Meloidogyne javanica. All were heavily galled except three varieties of L. corniculatus, namely Cascade, Empire and Granger, which had a few galls; Douglas, Viking and Tana were moderately to heavily galled. The other heavily galled test plants were: Lotus uliginosus, Trifolium alexandrinum, T. cheranganiense, T. hirtum, T. hybridum (two varieties), T. incarnatum (two varieties), T. lappaceum, T. pratense (17 varieties), T. masaiense, T. repens (nine varieties), T. rueppellianum (normal and small types), T. resupinatum, T. steudneri, T. semipilosum, T. subterraneum (two varieties), T. usambarense, and T. tembense.

0812 OOSTENBRINK, M., 1961. "Nematodes in relation to plant growth. III. Pratylenchus penetrans (Cobb) in tree crops, potatoes and red clover." Netherlands Journal of Agricultural Science, 9 (3), 188-208.

The results of five rotation and fumigation experiments together with additional field surveys show that Pratylenchus penetrans is a serious cause of sickness symptoms and has crop rotational effects on many woody plants, red clover and potatoes. It is wide-spread in light and medium soils especially in nurseries and fruit orchards; 9% of the fields examined contained more than 100 specimens per 100 ml. of soil. Results demonstrate a significant linear relationship between the log. of initial population density or of population density within roots and growth deficit of susceptible crops. There was some indication that heavy infestations of P. penetrans in red clover roots impaired nitrogen fixation. The cultivation of rye, oats and red clover should be avoided in infested land as they are good hosts. Beet or mangolds are advised to be grown on

infested arable land just before potatoes or red clover as they suppress P. penetrans. Nematicides give effective control of P. penetrans but their cost restricts their use to land growing valuable crops. Other plant nematode relationships indicated by the results were that grass, red clover, oats, rye, and swede were efficient hosts of Tylenchorhynchus dubius; red clover was a good host of Rotylenchus robustus; potatoes were a better host for Meloidogyne hapla than red clover, mangold or oats; mangold was an efficient host of P. neglectus but suppressed P. penetrans and P. crenatus; mangold and grass were efficient hosts of Paratylenchus spp.

0813 RHOADES, H.L. & LINFORD, M.B., 1961. "A study of the parasitic habit of Paratylenchus projectus and P. dianthus." Proceedings of the Helminthological Society of Washington, 28 (2), 185-190.

Observations were made on Paratylenchus projectus and P. dianthus on the roots of clover and tobacco in agar. Feeding was mainly ectoparasitic on root hairs and epidermal cells in the young mature region. Pre-adult larvae of both species and males of P. dianthus did not appear to feed. Some larvae and females were seen to feed on one cell for several days. Insertion of the stylet took several minutes and was followed by a period of relative inactivity when saliva was seen to flow forward from the dorsal side of the basal bulb to fill the salivary duct and ampulla. Saliva was not observed passing through the stylet but a granular dome built up around the stylet during feeding; this appeared to have little effect on the cell contents but protoplasts of red clover root hairs disappeared after prolonged feeding. A rhythmic pulsation of the median bulb occurred some time after stylet insertion and lasted for more than a week in some specimens until the nematode was ready to retract its stylet.

0814 ANON., 1961. "An alfalfa stem nematode (Ditylenchus dipsaci) (Kuhn, 1857) Filipjev, 1936)." Canadian Insect Pest Review, 39 (4), 165.

Infestations of Ditylenchus dipsaci were first reported on lucerne plots at the Research Station at Lethbridge in 1950. No infestations were noticed after 1952 until 1958; since then it has persisted and has also been noted in several lucerne fields in the area.

0815 BINGEFORS, S., 1961. "Stem nematodes in clovers and lucerne and their control by breeding for resistance." International Grassland Congress (8th), Reading, July 11-20, 1960. Proceedings, pp.78-81.

Bingefors mentions the races of Ditylenchus dipsaci that attack red clover, white clover and lucerne and the symptoms and spread of the disease in red clover crops and discusses the introduction of resistant varieties into Sweden. The resistance of plants was increased rapidly by selection but it is not inherited as a single gene. The reproduction of eelworms is inhibited in resistant varieties and, since the number in the soil declines when a resistant variety is grown, the incidence of disease in a subsequent susceptible variety is reduced. In southern Sweden in 1958, 80% of all the early red clover sown belonged to resistant varieties compared with only 10% in 1939. Bingefors considers that screening plants for resistance in the field is no longer reliable and must be replaced or supplemented with artificial infection methods, probably using eelworms reared in culture.

0816 McBRIDE, J.M., JOHNS, D.M. & CARTER, C.R., 1981. "Relative host responses of interplanted weeds and corn to Pratylenchus zeae and P. brachyurus (Nematoda, Tylenchida)." [Abstract of paper presented at the 37th Annual Meeting of the Southern Division, American Phytopathological Society.] Phytopathology, 51 (9), 644.

Roots of various transplanted weeds, representing 33 species, growing with maize were sampled for Pratylenchus zeae and P. brachyurus. The maize roots had Pratylenchus infections of 30 to 200 per gm. and in weeds the infections were two to 14 per gm. The ratio of P. zeae to P. brachyurus in maize roots was 18:1 and in weeds roots 10:1. Roots of several weed species were not infected and weeds that had infected roots were considered to be uncongenial hosts. There was no evidence that the weed roots were antibiotic to the nematode populations in the maize roots.

0817 TANASIJEVIC, N., 1980. "Pojava i rasprostranjeje nematode stabla (Ditylenchus dipsaci Kuhn) na lucerki u nasoj zemlji." Zashtita Bilja. Belgrade, No. 57/58, pp.225-227. [English summary p.227.]

A short account of the distribution of Ditylenchus dipsaci attacking lucerne in Yugoslavia is given. Typical symptoms of swollen stem, deformed crown buds and stunted growth are described.

0818 TOWNSHEND, J.L. & MULVEY, R.H., 1961. "An occurrence of Heterodera trifolii Goffart, 1932 in the Niagara Peninsula, Ontario." Canadian Plant Disease Survey, 41 (5), 290.

Cysts of Heterodera trifolii were found in concentrations of 35 and 40 per 200 gm. soil sample. Ladino clover was reported as the host crop.

*0819 CHEN, T., KILPATRICK, R.A. & RICH, A.E., 1962. "Stylet-bearing nematodes associated with white clovers in New Hampshire 1960-1961." Plant Disease Reporter, 46 (5), 346-347.

Pratylenchus penetrans was found to be the predominant stylet-bearing nematode in and around the roots of white clover (Trifolium repens) at two New Hampshire (U.S.A.) localities. Populations of this nematode were higher in heavy loam than in fine sandy loam. Experimental plots in the two localities were treated with (i) methyl bromide, (ii) dieldrin dust (50%), (iii) both chemicals combined, (iv) untreated control. Methyl bromide gave good control for three years after the initial treatment. High populations of P. penetrans were found in the dieldrin-treated plots,

possibly resulting from the control of nematode predators. The root-knot nematode (Meloidogyne spp.) is recorded for the first time on clover from field plots in New Hampshire.

0820 BINGEFORS, S., 1961. "Stem nematode in lucerne in Sweden." II. Resistance in lucerne against stem nematode." Lantbrukshogskolans Annaler, 27, 385-398.
The lucerne variety Lahontan showed a high degree of resistance to Ditylenchus dipsaci; reactions in susceptible and resistant varieties were similar to those in red clover. The eelworms penetrated resistant plants and were found in cavities within them but no, or very little, multiplication occurred in resistant plants. Many lucerne varieties were tested for resistance, most being very susceptible. Lahontan, Nemastan and an introduction from Iran were highly resistant while Kayseri (from Turkey) showed an appreciable degree of resistance. Some samples of Provence and two varieties from Eastern Europe also showed some resistance. In field tests Nemastan and Lahontan were poorly adapted to Swedish conditions while Kayseri was fairly good.

0821 CHEN, T., KILPATRICK, R.A. & RICH, A.E., 1961. "Sterile culture techniques as tools in plant nematology research." Phytopathology, 51 (11), 799-800.
The authors describe a method for culturing aseptic Pratylenchus penetrans on seedlings of Trifolium repens growing in nutrient agar. The nematodes were sterilized by immersion in a solution of 0.1% streptomycin sulphate and 30 p.p.m. malachite green and the population increased on sterile corn roots before being transferred to the seedlings in the agar cultures. The method provides a pure culture technique for studying actual damage to roots caused by nematodes alone. The effect on aerial symptoms as well as on roots can be observed without disturbing the plants or the nematodes.

0822 McGLOHON, N.E., 1962. "Investigations of plant-parasitic nematodes associated with forage crops in North Carolina." Dissertation Abstracts, 22 (7), 2145.
Many plant-parasitic nematodes were found associated with forage crops. M. hapla failed to reproduce on any of the 20 grasses tested for susceptibility to five species of Meloidogyne and other genera. The suitability of several other plant hosts for different nematode genera was investigated and green-house tests determined the best soil for the reproduction of eelworms as well as their effects on foliage and roots. Their feeding habits and viability in various soils at different temperatures were observed.

0823 GOPLEN, B.P. Alfalfa research in western Canada. [Abstract]. In Twenty-fourth alfalfa improvement conference, University of Arizona, Tucson, 8-10 October, 1974. Peoria, USA; US Department of Agriculture. (1975) 32-34 [En] Res. Sta., Canada Agric., Saskatoon, Sask., Canada. From Plant Breeding Abstracts 46, 1505, 1514.
Two varieties of lucerne have been developed from Vernal and Lahontan with resistance to Ditylenchus dipsaci and Corynebacterium insidiosum: one is due for release in 1975.

* 0824 GRIFFIN, G.D., ELGIN, J.H., JR. Comparisons of pathology caused by Meloidogyne hapla on alfalfa selections. [Abstract]. Journal of Nematology (1975) 7 (4) 323 [En] USDA, ARS, Crops Res. Lab., Utah State Univ., Logan 84322, USA.
Invasion of Meloidogyne hapla larvae of cuttings of the lucerne selection M-4 from var. Vernal was 80% compared with 100% for the susceptible cv. Ranger, and 85% for a resistant control variety M-9. Soil temperature had only a slight effect on invasion of 3-week-old cuttings. Infection declined after 6 days when 2-week-old seedlings of the resistant selection No. 298 were grown at 20 to 32 C. The resistant line Nev. Syn. XX contained only occasional larvae after 2 weeks' growth but no sign of attack after 6 weeks.

0825 HINE, R.B. Root and crown diseases of alfalfa in the southwest. [Abstract]. In Twenty-fourth alfalfa improvement conference, University of Arizona, Tucson 8-10 October, 1974. Peoria, USA; US Department of Agriculture. (1975) 16-17 [En] Dep. Plant Path., Univ. of Arizona, Tucson, USA. From Plant Breeding Abstracts 46, 1505, 1509.
Mention is made of a new lucerne cultivar with a high degree of resistance to Ditylenchus dipsaci.

0826 MILLER, L.I. Susceptibility of Norman pigeon pea (Cajanus cajan) to certain isolates of Heterodera glycines. [Abstract]. Virginia Journal of Science. (1974) 25, 51 [En] Virginia Polytechnic Inst. and State Univ., Blacksburg, Virginia, 24061, USA.

0827 SIURHAN, D. [Investigation of Vicia faba varieties for resistance to stem eelworm (Ditylenchus dipsaci).] Untersuchung von Vicia faba-sorten auf Resistenz gegenuber Stengelalchen (Ditylenchus dipsaci). [27th Int. Symp. Fytofarm. en Fytiat., Gent, 1975. Deel I.]. Mededelingen van de Faculteit Landbouwwetenschappen Rijksuniversiteit Gent (1975) 40 (2, Pt. 1) 443-450 [De; en] Biol. Bundesanstalt, Inst. fur Hackfruchtkrankheiten und Nematodenforschung, Munster, B.R., Germany.
Tests were carried out with 7 biological races and populations of Ditylenchus dipsaci on 23 varieties of field and broad beans to determine their susceptibility. 2 of the nematode populations were of the giant race from Vicia faba in Morocco and Bavaria. No extensive resistance was found but there were differences in susceptibility and most varieties were non-hosts of some nematode populations. Nematode multiplication was generally less in field beans than in broad beans. There were obvious differences in aggressivity and virulence between the nematode populations. The rye race was the most aggressive while

the lucerne race reproduced to a limited extent in only some varieties. The giant race from Morocco multiplied in all bean varieties but that from Bavaria failed to reproduce in 2 varieties.

0828 JAMAL, A. Studies on the relationship between Meloidogyne incognita and galling behaviour of Cicer arietinum roots. [Correspondence]. Current Science (1976) 45 (6) 230-231 [En] Phytomedicine Res. Lab., Dep. of Botany, Aligarh Muslim Univ., Aligarh 202 001, India.

Examination of the roots of one-week-old Cicer arietinum seedlings inoculated with 1,000 larvae of Meloidogyne incognita showed that larvae enter the root tips within 3 hours but slight swelling was not observed until 6 hours after inoculation. Distinct galls were seen after 24 hours and were confined to root tips.

0829 SINGH, N.D. Evaluation of nematode population in pigeon pea. In Bird, J.; Maramorosch, K. (Editors) Tropical diseases of legumes. (xiii + 171 pp). New York, USA; Academic Press. (1975) 147-149 ISBN 0-12-099950-1 [En, Price £5.25] Dept. of Crop Science, Univ. of West Indies, Trinidad, West Indies.

In the West Indies, 3 varieties of Cajanus cajan were sown in plots infested with various species of plant-parasitic nematodes. The seeds were sown at distances apart of 15, 30 or 45 cm and the nematode populations were assessed 5 months later by soil sampling. Rotylenchulus reniformis was found in the greatest numbers and was most numerous on the variety Trinidad Tall. Populations of Tylenchorhynchus sp. and Meloidogyne incognita were not significantly affected by variety or sowing distance. For all varieties, the numbers of Pratylenchus spp., R. reniformis and Helicotylenchus dihystera were significantly lower on plots with plants spaced 30 cm apart, than 15 or 45 cm apart. The University of West Indies Dwarf variety supported the largest populations of the above 3 genera and of M. incognita at a sowing distance of 15 cm. The Indian variety gave similar results, except for R. reniformis.

0830 HUGHES, R.G. The scope for efficient pesticide use on oil rape and maize. In British Insecticide and Fungicide Conference (8th). Brighton, 17-20 November, 1975. Proceedings, Volume 3. London, UK; British Crop Protection Council. (1975) 1019-1024 [En, fr] Agric. Development and Advisory Service, Coley Park, Reading, UK.

Although Heterodera avenae populations do not increase on maize, the nematode can cause poor growth of maize following intensive oat or barley production, that has resulted in increased nematode numbers. Avoidance of damage by crop rotations rather than by pesticides is implied. There is no mention of nematode pests of oil rape.

0831 NORTON, D.C.; HINZ, P. Relationship of Hoplolaimus galeatus and Pratylenchus hexincisus to reduction of corn yields in sandy soils in Iowa. Plant Disease Reporter (1976) 60 (3) 197-200 [En] Dep. of Bot. and Plant Path., Iowa State Univ., Ames 5011, USA.

In experiments in 1973 and 1974 in Iowa, USA, various nematicide treatments, using 1,3-D, carbofuran or CGA 12223, were applied to plots of find sand where the most important nematode parasites of maize were Hoplolaimus galeatus and Pratylenchus hexincisus. Numbers of H. galeatus were reduced most by 1,3-D and of P. hexincisus by carbofuran. The best crop increase and nematode control were obtained when both nematicides were used: increases of 12.7% and 20.4% above the control were obtained in 1973 and 1974, respectively. It is concluded that H. galeatus and P. hexincisus cause yield losses to maize in Iowa.

*0832 WALKER, J.T.; MOTSINGER, R.; MELIN, J. Effects of repeated annual and semi-annual nematicide applications to centipedegrass. [Abstract]. Journal of Nematology (1975) 7 (4) 331 [En] Univ. of Georgia, Experiment, GA 30212, USA.

Although nematode populations (Criconemoides ornatus was most numerous) under centipede grass [Eremochloa ophiuroides] were reduced by various nematicide treatments, the average ratings of grass coverage and appearance on treated plots were no different from those on control plots. This is thought to indicate that the nematode numbers present are insufficient to cause damage to centipede grass.

*0833 ELGIN, J.H., JR.; EVANS, D.W.; FAULKNER, L.R. Factors affecting the infection of alfalfa seedlings by Ditylenchus dipsaci. Journal of Nematology (1975) 7 (4) 380-383. [En] Field Crops Lab., ARS, USDA, Beltsville, MD 20705, USA.

In experiments to assess the factors affecting the invasion of lucerne seedlings by Ditylenchus dipsaci relevant to tests for resistance, the authors found that to confine seedlings and nematodes in small vials of sand had no advantage over growing them in sand in metal trays 38 x 54 x 7.5 cm in size; penetration was better in a very fine sandy-loam soil (particle size 100 to 250 cm) than in fine sand (particles less than microns); more nematodes invaded seedlings that were not watered immediately after inoculation than those that were lightly watered after inoculation; greatest numbers of nematodes penetrated seedlings with radicles 0.6 to 1.3 cm long and when the inoculum was placed directly on them rather than on the soil surface. The optimum number of nematodes for use in inoculations is considered to be 50 because at this inoculum level only 2 of 40 plants contained fewer than 10 nematodes 7 days after inoculation.

0834 MULK, M.M.; JAIRAJPURI, M.S. Nematodes of leguminous crops in India. III. Three new species of Hoplolaimus daday, 1905 (Hoplolaimidae). Indian Journal of Nematology (1975 publ. 1976) 5 (1) 1-8 [En] Section of Nematology, Dep. of Zool., Aligarh Muslim Univ., Aligarh, India.

Hoplolaimus seshadrii n.sp. from soil around roots of Arachis hypogaea from Bundi, Rajasthan, India, resembles H.

columbus but has a differently shaped bilobed head, basal annule of lip region marked with 20 to 22 longitudinal lines, excretory pore in front of level of oesophago-intestinal junction and intestine partially overlapping the rectum. No males were found. H. cephalus n.sp., from soil around roots of Cymopsis tetragonolobus from Kota, Rajasthan, is unique in having a smooth lip region. It differs from the closely related H. indicus by the absence of overlap of intestine over rectum and the absence of lateral fields. H. dimorphicus n.sp. from around roots of Cicer arietinum and Phaseolus aconitifolius from Mirzapur, U.P. and Amer, Rajasthan respectively, differs from the closely related H. indicus essentially in the sexual dimorphism in the striation of the basal annule of the lip region. In females the basal annule of the lip region has 18 to 21 longitudinal lines while the males have only 6.

0835 ADCOCK, R.E. Screening for root-knot nematode resistance in mungbeans. Dissertation Abstracts International (1973) 33B (12) 5614 [En]

None of the Phaseolus aureus strains tested appeared to be resistant to Meloidogyne incognita. Plant losses from fungal attacks terminated more than half of the tests but seedlings grown in distilled water within plastic envelopes were successfully screened.

0836—CAVENESS, F. E., 1967. "Shadehouse host ranges of some Nigerian nematodes." *Pl. Dis. Reptr*, 51 (1), 33–37.

84 species of plants were found to be hosts to one or more of 30 species of plant-parasitic nematodes tested in Western Region, Nigeria. *Stylosanthes gracilis* was resistant or immune to an undescribed species of *Pratylenchus*.

*0837 HUTTON, E.M.; WILLIAMS, W.T.; BEALL, L.B. Reactions of lines of Phaseolus atropurpureus to four species of root-knot nematode. Australian Journal of Agricultural Research (1972) 23 (4) 623-632 [En] Div. of Tropical Pastures, CSIRO, Cunningham Laboratory, St. Lucia, Queesland 4067, Australia.

A comparison of the resistance of 36 lines of Phaseolus atropurpureus to Meloidogyne arenaria, M. incognita, M. javanica and M. hapla was made, using P. lathyroides and Lycopersicon esculentum as controls. Resistance may be present in all lines of P. atropurpureus, a major and a minor tendency being noticed. The major tendency showed itself as resistance to the first 3 species of Meloidogyne but not to M. hapla, the minor tendency as reduced resistance to M. hapla coupled with increased resistance to M. javanica.

0838 MINTON, N. A., FORBES, I. & WELLS, H. D., 1967. "Susceptibility of potential forage legumes to *Meloidogyne* species." *Pl. Dis. Reptr*, 51 (12), 1001–1004.

In glasshouse experiments high levels of resistance were obtained for *Stizolobium deeringianum* to *Meloidogyne incognita incognita*, *M. incognita acrita*, *M. javanica*, *M. arenaria* and *M. hapla*. 3 *Glycine javanica* cultivars were highly resistant to *M. incognita incognita*, *M. incognita acrita*, and *M. javanica*, but susceptible to *M. arenaria* and *M. hapla*. 3 species of *Desmodium* differed in their response to the 5 nematodes. *D. intortum* was most resistant, *D. uncinatum* was least resistant, while *D. tortuosum* was intermediate. *Lupinus angustifolius* entries were severly galled by all 5 nematode species, while entries of *L. albus* and *L. luteus* appeared to have some resistance to one or more nematode species. *Stylosanthes humilis*, *Indigofera hirsuta*, *Cajanus cajan*, *Phaseolus atropurpureus*, *Aeschynomene americana*, *Alysicarpus vaginalis*, and *Dolichos lablab* showed varying degrees of resistance to one or more nematode species.

0839 SHARMA, R. D. [Nematodes associated with graminaceous forage crops in cerrado soils.] Nematóides associados com gramíneas forrageiras em área de cerrado. In *Mendes, B.V. (Editor), Resumos dos trabalhos científicos e conferencias, III Reunião Brasileira de Nematologia, Sociedade Brasileira de Nematologia et da Escola Superior de Agricultura, Mossoró, 1978.* Mossoró, RN, Brazil. (1978) 87 [Pt, Coleção Mossorense Vol. 62] EMBRAPA, Centro de Pesquisa Agropecuária dos Cerrados, Brazil.

0840 FREIRE, F. DAS C. O.; PONTE, J. J. DA [Root-knot nematodes, *Meloidogyne* spp., associated with plant parasitism in the State of Bahia (Brazil).] Nematóides das galhas, *Meloidogyne* spp., associados ao parasitismo de plantas no Estado da Bahia (Brasil). *Boletim Cearense de Agronomia* (1976) 17, 47-55 [Pt. en] Cent. de Pesquisa Agropecuária do Trópico Úmido, EMBRAPA, Belém, Pará, Brazil.

In a survey carried out in Bahia, Brazil, 103 wild and cultivated plants were found to be infected with *Meloidogyne* spp. The species found were *M. incognita*, *M. javanica*, *M. thamesi*, *M. arenaria*, *M. hapla* and *M. exigua*. *M. incognita* occurred on 75% of the plants and *M. javanica* on 22%. 18 plants are considered to be new host records for *Meloidogyne* spp.

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SECTION 2B

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