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RELATIVE SUSCEPTIBILITY OF DIFFERENT CULTIVARS OF TOMATO TO *ROTYLENCHULUS RENIFORMIS* IN RELATION TO CHANGES IN PHENOLICS

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Tomato is considered to be a good host for the reniform nematode *Rotylenchulus reniformis* Linford & Oliveira, 1940 and little work has been carried out to determine resistance to the nematode among cultivars. Rebois, Eldridge and Webb (1977) tested several tomato cultivars and wild *Lycopersicon pimpinellifolium* with the reniform nematode and reported some degree of resistance only in the wild species. Without resistant cultivar, it becomes necessary to determine the variety which is least affected by infection. Hence our objective was to determine the least inoculum densities at which significant reduction in growth of plant is observed in different cultivars. Changes in phenolics in different cultivars occurring with *R. reniformis* were determined to ascertain if there is any relationship between the damage of plants and the phenolics as a result of infection.

MATERIALS AND METHODS

Two-week-old seedlings of twelve cultivars of tomato, raised in autoclaved soil, were transplanted in 15 cm clay pots filled with 1 kg autoclaved soil, sand and compost mixture (70 : 20 : 10) and a week later they were inoculated with 10, 100 and 1 000 juveniles of *R. reniformis*. There were six replicates of each treatment. The pots were randomised on a glass house bench. Uninoculated plants served as control.

After 60 days plant growth in terms of total (foliage and roots) dry weight was determined and the population of the nematode counted from 200 g soil sample by using Oostenbrink elutriator together with Baermann funnel technique.

Total phenols were estimated from 100 mg of dry powdered sample of the whole plant by the method of Biehn, Kuc and William (1968) using Folin Ciocalteau reagent (Bray & Thorpe, 1954) in the Bausch and Lomb spectronic 20-Colorimeter at 660 nm. The standard curve was plotted against paracresol. The total O-dihydroxy phenols were estimated from 100 mg sample by the method of Johnson and Schaal (1954), using Arnows reagent. The standard curve was plotted against catechol.

The data were analysed by ANOVA and least square differences calculated.

RESULTS AND DISCUSSION

All the cultivars of tomato tested were susceptible to *R. reniformis* to a varying degree (Tab. 1). Significant reduction in growth of tomato cvs. BCVI, Labonite, Marglobe, N-Tropic and Trope GRO-7 was observed even at the inoculum level of ten juveniles per kg soil and in all the remaining cultivars viz. Anahu, 67-B-1169, Burpees Heinz, Chicogrande, N-Pinky, Nemared and Sioux showed significant reduction in growth at inocula of 100 and 1 000 juveniles per kg soil (Tab. 1). All the cultivars of tomato supported the multiplication. The nematode reproduced on all the cultivars but the rate of multiplication varied between cultivars.

It therefore, appears that tomato cultivars Anahu, 67-B-1169, Burpees Heinz, Chicogrande, Nemared, N-pinky and Sioux have greater minimum threshold for damage to *R. reniformis* and can be recommended in the event of the absence of a tolerant/resistant variety.

The content of phenols and O-dihydroxy phenols (Tab. 1) increased in all the cultivars of tomato as a result of infection at all the inoculum levels. Cultivars indicating more increase in phenolic showed less reduction in plant growth together with low multiplication of reniform nematode. It is thus concluded that as a result of infection with reniform nematode the level of phenolics increased. The increase in the level of these substances in different cultivars was directly related to growth of plants. Similar correlation between the degree of resistance and the rise in phenolic contents due to infection have been observed by several other workers (Giebel, 1974).

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Table1

Effect of different inoculum levels of *Rotylenchulus reniformis* on growth of tomato cultivars : changes in phenolics and nematode multiplication

Cultivars	*Nematode per pot*	*Growth of plant Total dry wt. (g)*		*Total phenolics mg per 100 mg sample*		*R = Pf/pi*
				Phenols	*O.D.*	
Anahu	0	6.35	—	0.500	0.245	—
	10	5.99	(5.66)	0.585	0.283	77.5
	100	5.18	(18.42)	0.635	0.320	28.5
	1 000	4.75	(25.19)	0.700	0.375	7.2
	L.S.D. (1 %)	0.255		0.009	0.004	
	L.S.D. (5 %)	0.168		0.006	0.003	
67-B-1169	0	6.10	—	0.415	0.201	—
	10	5.25	(13.93)	0.478	0.226	119.3
	100	4.20	(31.140	0.518	0.250	43.8
	1 000	3.70	(39.34)	0.575	0.304	10.2
	L.S.D. (1 %)	0.229		0.009	0.007	
	L.S.D. (5 %)	0.157		0.006	0.004	
BCVI	0	5.75	—	0.393	0.185	—
	10	4.70	(18.26)	0.446	0.208	133.0
	100	3.60	(37.39)	0.493	0.230	46.9
	1 000	3.00	(47.82)	0.541	0.283	10.5
	L.S.D. (1 %)	0.180		0.007	0.003	
	L.S.D. (5 %)	0.119		0.004	0.002	
Burpees Heinz	0	7.00	—	0.480	0.225	—
	10	6.40	(7.85)	0.556	0.257	86.8
	100	5.50	(21.42)	0.601	0.290	41.2
	1 000	5.00	(28.57)	0.665	0.345	8.2
	L.S.D. (1 %)	0.745		0.007	0.004	
	L.S.D. (5 %)	0.491		0.004	0.002	
Chicogrande	0	6.80	—	0.465	0.220	—
	10	6.22	(7.85)	0.538	0.252	98.5
	100	5.30	(22.05)	0.583	0.284	34.2
	1 000	4.75	(30.140	0.645	0.337	8.9
	L.S.D. (1 %)	0.109		0.007	0.011	
	L.S.D. (5 %)	0.072		0.004	0.007	
Labonite	0	6.00	—	0.423	0.205	—
	10	5.10	(15.00)	0.488	0.230	117.2
	100	4.05	(32.50)	0.531	0.255	43.8
	1 000	3.50	(41.66)	0.588	0.310	10.0
	L.S.D. (1 %)	0.196		0.006	0.007	
	L.S.D. (5 %)	0.129		0.004	0.004	
Marglobe	0	5.80	—	0.355	0.179	—
	10	4.70	(18.96)	0.395	0.190	149.1
	100	3.60	(37.93)	0.445	0.210	43.8
	1 000	3.00	(48.27)	0.480	0.255	10.9
	L.S.D. (1 %)	0.306		0.003	0.004	
	L.S.D. (5 %)	0.202		0.002	0.002	
Nemared	0	6.50	—	0.498	0.240	—
	10	6.07	(6.60)	0.578	0.275	75.5
	100	5.10	(21.50)	0.623	0.311	29.0

Table 1 (cont.)

	1 000	4.60	(29.23)	0.691	0.365	7.3
	L.S.D. (1 %)	1.276		0.009	0.005	
	L.S.D. (5 %)	0.842		0.006	0.003	
N-pinky	0	6.20	—	0.450	0.215	—
	10	5.50	(11.29)	0.520	0.242	104.1
	100	4.60	(25.80)	0.565	0.270	36.0
	1 000	4.10	(33.87)	0.625	0.325	9.4
	L.S.D. (1 %)	0.584		0.010	0.005	
	L.S.D. (5 %)	0.386		0.006	0.003	
N-tropic	0	5.70	—	0.365	0.178	—
	10	4.70	(17.54)	0.410	0.198	140.3
	100	3.60	(36.84)	0.455	0.220	49.9
	1 000	3.00	(47.36)	0.500	0.268	10.9
	L.S.D. (1 %)	0.201		0.007	0.003	
	L.S.D. (5 %)	0.133		0.004	0.002	
Sioux	0	6.30	—	0.435	0.212	—
	10	5.55	(11.90)	0.503	0.237	108.8
	100	4.65	(26.19)	0.548	0.265	36.2
	1 000	4.15	(34.12)	0.596	0.322	9.4
	L.S.D. (1 %)	0.259		0.009	0.003	
	L.S.D. (5 %)	0.170		0.006	0.002	
Trope GRO-7	0	5.80	—	0.400	0.193	—
	10	4.90	(15.51)	0.455	0.216	125.1
	100	3.80	(34.48)	0.500	0.240	43.6
	1 000	3.30	(43.10)	0.550	0.293	10.3
	L.S.D. (1 %)	0.279		0.007	0.006	
	L.S.D. (5 %)	0.184		0.004	0.004	

Each value is a mean of five replicates.
In parenthesis are given per cent reduction over control.
R = Reproduction factor of the nematode, Pf = Final population, Pi = Initial Population, O.D. = O-dihydroxy phenols.

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THE POTENTIAL OF HIGH RESOLUTION VIDEO-ENHANCED CONTRAST MICROSCOPY IN NEMATOLOGICAL RESEARCH

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High power interference contrast ciné-microscopy is an important tool for studying nematode behaviour and is, perhaps, indispensable for detailed analysis of functional morphology (e.g. Robertson & Wyss, 1979; Seymour, 1983*a*, *b*). Video recordings are very useful for an immediate analysis, provided the resolution is of suf-

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