ISMPP International Conference on

"PLANT HEALTH FOR HUMAN WELFARE"

R Prasada Memorial Celebrations

NOVEMBER
1st-4th, 2017

ABSTRACTS & SOUVENIR

ORGANIZERS

Department of Botany, University of Rajasthan, Jaipur (India)

&

Indian Society of Mycology and Plant Pathology, MPUAT, Udaipur (India)

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Invited Lectures

S. No.	Technical Session	Title
IL 01	TS-I	**Morphological and biological characterization of *Fusarium* species associated with ear rot disease of corn and their pathogenicity** ***[1]Darnetty and [2]Baharuddin Salleh*** [1]Department of Plant Pests and Diseases, Faculty of Agriculture, Andalas University, LimauManis- 25163, Padang, Indonesia; [2]School of Biological Sciences, UniversitiSains Malaysia, 11800 Minden, Pulau Pinang, Malaysia
IL 02	TS-I	**Powdery mildew of apple (*Malusdomestica*Borkh) in Uttarakhand Himalayas** ***K. P. Singh[1]*, R K Prasad[2] and A. Singh[3]*** [1]Department of Plant Pathology, College of Agriculture, G B Pant University of Agriculture & Technology, Pantnagar, Udam Singh Nagar; [2]College of Forestry, Uttarakhand University of Horticulture & Forestry, Ranichauri, Tehri Garhwal; [3]Department of Agriculture, Himalayan Institute of Pharmacy and Research, Atak Farm, Rajawala, Dehradun, Uttarakhand, India
IL 03	TS-II	**Biosystematics of cyanobacteria: current status and future perspectives** ***Pawan K. Dadheech*** Department of Microbiology, School of Life Sciences, Central University of Rajasthan, Bandarsindri-305817 Ajmer, Rajasthan
IL 04	TS-IV	**Development and screening of *in vitro* produced carrier based arbuscularmycorrhizal (AM) fungal inocula** ***B. F., Rodrigues*** Department of Botany, Goa University, Goa 403 206, India
IL 05	TS-V	**Characterisation of resistance to *Rhynchosporium commune* in UK spring barley, leading to discovery of a candidate gene for *Rrs1*** ***M Looseley[1], L Griffe[1], B Buettner[2], K Wright[1], M Bayer[1], N Kettles[3], E Byrne[3] and A Avrova[1]*** [1]The James Hutton Institute, Invergowrie, Dundee, DD2 5DA, Scotland, UK; [2]Die BayerischeLandesanstaltfürLandwirtschaft, Am Gereuth 2, Freising, Germany; [3]KWS UK Limited, Thriplow, Royston, Herts, SG8 7RE, UK
IL 06	TS-V	**Evaluation of silver nanoparticle and inducer chemicals against foliar pathogens of Solanaceous crops** ***JayashreeBhattacharjee, AbhinanditaSahoo and AmitavaBasu**** Department of Plant Pathology, Faculty of Agriculture, Bidhan Chandra KrishiViswaVidyalaya, Mohanpur-741252, Nadia, West Bengal, India
IL 07	TS-VI	**Arbuscularmycorrhizal fungi: the potential biocontrol agents against banana *Fusarium*wilt disease** ***EriSulyanti*, Darnetty and JumsuTrisno*** Department of Plant and Pests and Diseases, Faculty of Agriculture, Andalas University, 25133 LimauManis, Padang, West Sumatera, Indonesi
IL 08	TS-VI	**Anti microbial peptides in *Bacillus* species: multifaceted approach towards the management of diseases in ornamental crops under protected cultivation** ***Nakkeeran, S*., Vinodkumar, S.andRenukadevi, P.*** Department of Plant Pathology, Centre for Plant Protection Studies, Tamil Nadu Agricultural University, Coimbatore, India

Invited Lectures

IL 01

Morphological and biological characterization of *Fusarium* species associated with ear rot disease of corn and their pathogenicity

[1]Darnetty and [2]Baharuddin Salleh

[1]Department of Plant Pests and Diseases, Faculty of Agriculture, Andalas University, LimauManis- 25163, Padang, Indonesia; [2]School of Biological Sciences, UniversitiSains Malaysia, 11800 Minden, Pulau Pinang, Malaysia
Email: darnetty_06@yahoo.com

Fusarium ear rot isuniversally important and the most destructive diseases throughout the world and not only causes significant lossesbut also produced harmful mycotoxins to animals and humans. A total of 141 strains of *Fusarium*species were isolated from corn plants showing typical ear rot symptoms in Indonesia, Malaysia, and Thailand by using the semi-selective medium (peptone pentachloronitrobenzene agar, PPA). These strains of *Fusarium*were identifiedmorphologically and biologicallyand then the identified Fusarium species were tested for their pathogenicity. Three *Fusarium* species were identified morphologically as *Fusarium* in *Gibberellafujikuroi*species complex, *Gfsc* (105 strains, 74.5%) *F. verticillioides* (78 strains), *F. proliferatum* (24 strains), and *F. subglutinans* (3 strains) and five species from other section (36 strains, 25.5%), *F. graminearum* (14 strains), F. oxysporum (8 strains), F. solani (1 strains) dan*F. semitectum* (13 strains). Out of 105 Fusarium in GFsc, 63 strains were identified as *MAT-1*, 25 strains as *MAT-2*, and 17 strains could not identified and crossed with nine standars testers, three mating population of Fusarium were identified as *MP-A*, *Gibberellamoniliformis* (68 strains,64,76%), MP-D, *G. intemedia* (21 strains, 20%) and MP-E, *G. subglutinans* (3 strains, 2,9%) and 13 strains (12.38%) could not be identified. All strains mophologically identified as *F. verticillioides*, *F. proliferatum* and *F. subglutinans* were identified as *MP-A*, *MP-D* and *MP-E* respectively. The results of study indicated that the morphological identification was consistent with the biological identification. The results of pathogenicity test showed thatall*Fusarium* species caused the disease with different severities. The most aggressive of *Fusarium* species were the strains of *F. graminearum*withdisease severity (DS) (ranging from 94.3% to 98.7%). The disease severity of *F. verticilioides*, *F. proliferatum*, and *F. subglutinans* were also high enough, (17.3 - 29.1%), (9.1 - 17.2 %) and (7.3 - 15.6%) respectively, and significantly different from those inoculated with *F. graminearum* .*F. semitectum*, *F. solani*and *F. oxysporum* also infected corn ears, but with significantly less disease severity (0.93%-3.33%)

IL 02

Powdery mildew of apple (*Malusdomestica*Borkh) in Uttarakhand Himalayas

K. P. Singh[1], R K Prasad[2] and A. Singh[3]

[1]Department of Plant Pathology, College of Agriculture, G B Pant University of Agriculture & Technology, Pantnagar, Udam Singh Nagar; [2]College of Forestry, Uttarakhand University of Horticulture & Forestry, Ranichauri, Tehri Garhwal;[3]Department of Agriculture, Himalayan Institute of Pharmacy and Research, Atak Farm, Rajawala, Dehradun, Uttarakhand
Email:kpsingh.gbpuat@gmail.com

Powdery mildew caused by *Podosphaeraleucotricha* (Ell. &Ev.)alm., has became a persistent disease problem on susceptible cultivars of apple in Uttaranchal Himalayas. Apple growing areas in Uttaranchal hills were visited more than once during the year 2002 and 2017. The overwintering mildew (initial pathogen population) is a key primary

ISMPP International Conference
"PLANT HEALTH FOR HUMAN WELFARE"
PROGRAMME
Day I :01.11.2017

Registration			8.00 – 9.30 AM	Humanities Hall
Inaugural session			10.00 – 11.30 AM	Humanities Hall
Tea			11.30- 12.00 Noon	Department of Botany
Scientific Session I			12.00-1.30PM	Humanities Hall
	Special Lecture	Prof. YL Nene		
	Key Note Address	Prof. SS Chahal		
	Presidential Address:	PK Chakrabarty		
Lunch			1.30-2.30PM	Department of Botany
Scientific Session II			2.30-4.30PM	Humanities Hall
	Prof. R Prasad Memorial lecture	Prof. BN Chakraborty	2.30-3.00 PM	
	Plenary Lecture 1	Dr. Robert Spooner Hart	3.00-3.30 PM	
	Plenary Lecture 2	Dr. H S Bariana	3-30-4.00 PM	
	Plenary Lecture 3	Prof. CManoharachary	4.00-4.30 PM	
Tea			4.30-4.45 PM	
Smt. Guman Devi Verma memorial Best Woman Scientific Award competition			4.45-5.30 PM	
Sajeena. A Ekta D. Bagde K. Malarvizhi			4.45-5.00 PM 5.00-5.15 PM 5.15-5.30 PM	
Cultural programme			6.30-8.30 PM	Humanities Hall
Dinner			8.30-9.30 PM	Department of Botany

	Lead lecture 1(IL 01) Lead lecture 2(IL 02) Lead lecture 3(IL 13) Lead lecture 4(IL 14) Oral Presentations	Darnetty TT ~~Prof K. P.~~ Singh Prof. Naresh Mehta Prof. Raghavendra K. Mesta OP 01(1-10) to OP 07(1-8)	3.00.4.30 PM	CCT
Technical Session VIII and IX Room no. 5	Microbes for abiotic & biotic stress alleviation And Climate change in relation to disease development	Chairman: ..... Co-chairman: ..... Rapporteur: Dr. Amit Kotiya and Mrs. Lalita		CCT
	Lead lecture 1(IL 15) Oral Presentations	Prof. P. D. Meena OP 08 (1-2) to OP 09(1-6)		
Dinner			8.00-9.30 PM	

Morhological and biological characteristics of *Fusarium* species associated with ear rot disease of corn and their Pathogenicity

Darnetty [1]
Baharuddin salleh [2]

[1]*Department of Plant Pests and Diseases, Faculty of Agriculture, Andalas University, Limau Manis 25163, Padang, Indonesia*
[2]*School of Biological Sciences, Universiti Sains Malaysia, 11800 Minden, Pulau Pinang, Malaysia.*
Corresponding author: E-mail: darnetty_06@yahoo.com

I. INTRODUCTION

1. Corn is one of the important crops used as foods and feeds

2. *Fusarium* ear rot is the most common fungal disease on corn all over the world, including southeast Asia

3. The disease not only reduces the quantity and quality of corn yield but also affects animal and human health because of mycotoxin production by fungus *Fusarium* (FUM, MON, ZEN, BEA)

4. So far, the research on the disease has been done intensively in the temperate countries but not in the tropical countries, including Indonesia, Malaysia and Thailand.

5. The climate is the important factor that influences the growth and spread of *Fusarium*

6. The disease is caused by several species of *Fusarium. F verticillioides* formerly known as *F. moniliforme*, is the most frequently occurring species. Others such as *F. proliferatum* and *F. subglutinans* and *F. graminearum*

II. Objectives

1. To identify *Fusarium* species from corn showing typical ear rot symptoms based on morphological characteristics (Morphological identifcation)

2. To determine the mating population (MPs) of *Fusarium* in Section Liseola i.e. based on their ability to produce perithecia (Biological identification)

3. to determine whether or not the identified *Fusarium* species isolated from corn showing typical ear rot symptoms are pathogenic.

III. MATERIALS AND METHODS

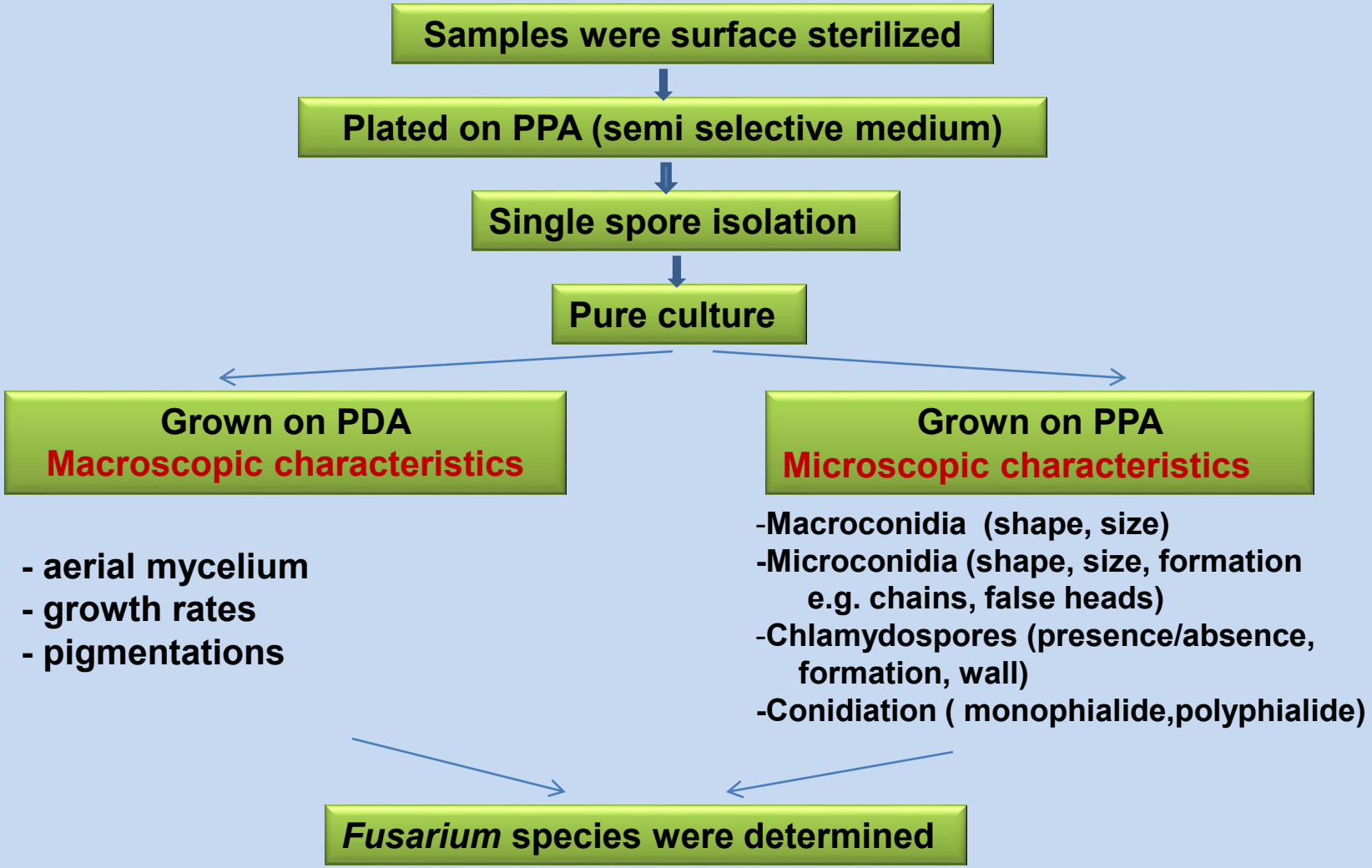
1. *Fusarium* strains

143 strains of *Fusarium* species associated with ear rot disease of corn were collected from different locations in Indonesia, Malaysia and Thailand

2. Mating Population testers

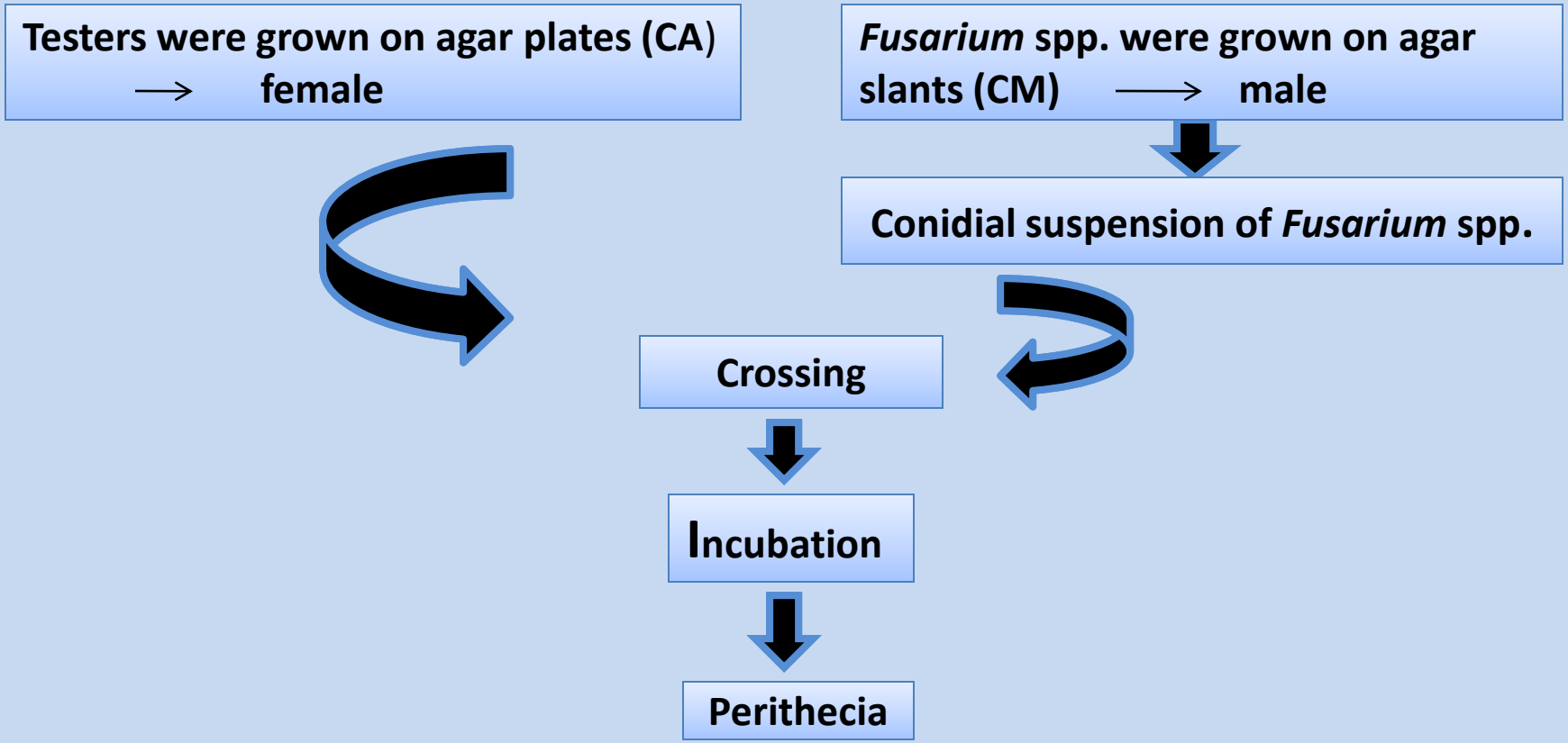
Nine Mating Population testers (MP-A to MP-I) were obtained from the Fusarium Stock Collection Section, School of Biological Sciences, USM

3. Morphological characteristics

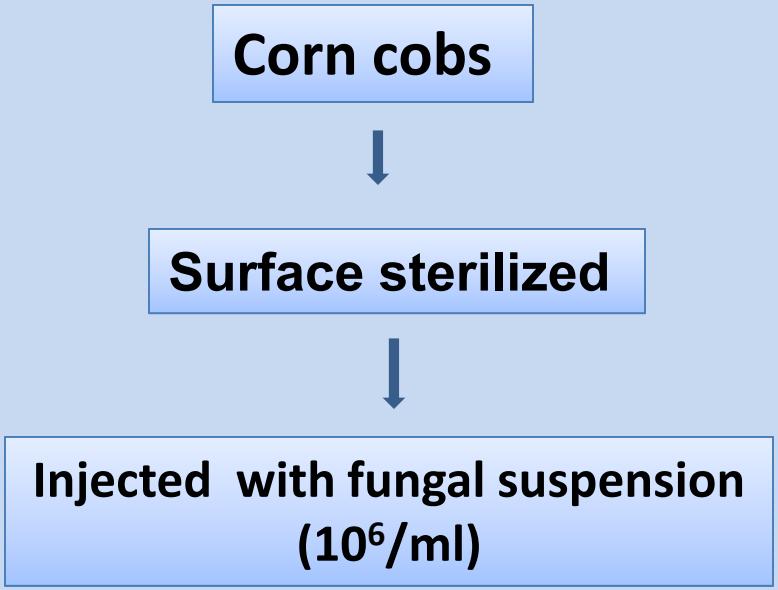


4. Mating populations (MPs)

Before crosses performed, mating type *MAT-1* and *MAT-2 of* *Fusarium* strains had been diagnosed by molecular methods



4. Pathogenicity Test



IV. RESULTS

1. Morphological characteristics

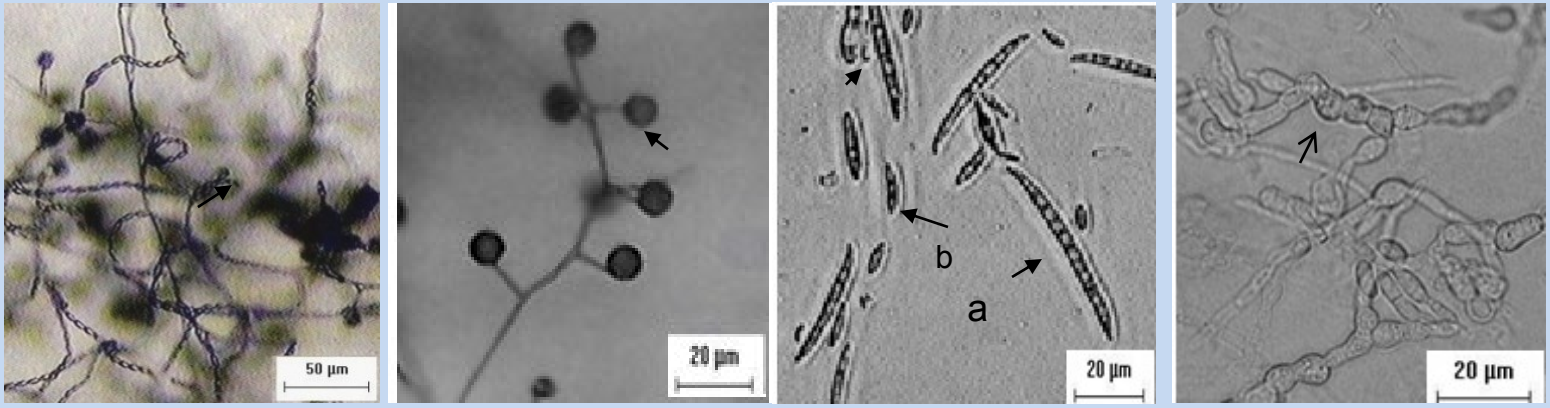
143 *Fusarium* strains

8 *Fusarium* species

1. ***F. verticillioides* (79, 55.24%)**
2. ***F. proliferatum* (24, 16.76%)**
3. ***F. subglutinans* (3, 2.1%)**
4. ***F. graminearum* (9.79%)**
5. ***F. oxysporum* (5.59%)**
6. ***F. solani* (0.7%)**
7. ***F. semitectum* (9.09%)**
8. ***F. chlamydosporum* (0.7%)**

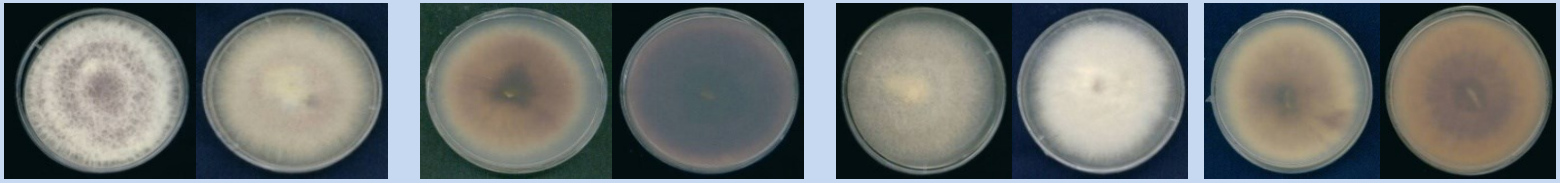
Section Liseola (106 strains,74.13%)

F. verticillioides



A **B** **C** **D**

Morphological characteristics of *F. verticillioides.* A-B. Microcondia *in situ*, C.Macroconidia (a), Microconidia (b), D. Swollen hyphae

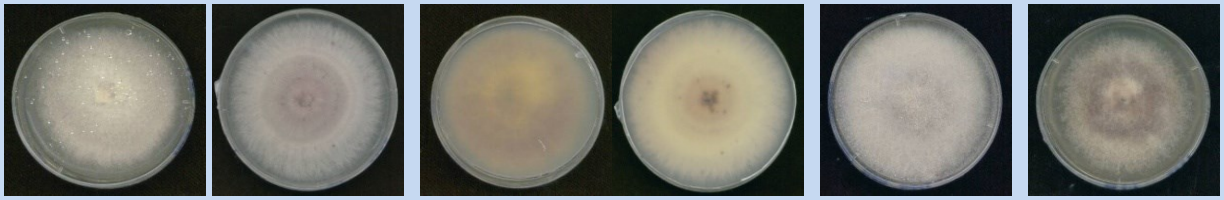


Colony features of some strains of *F. verticilioides*

F. proliferatum

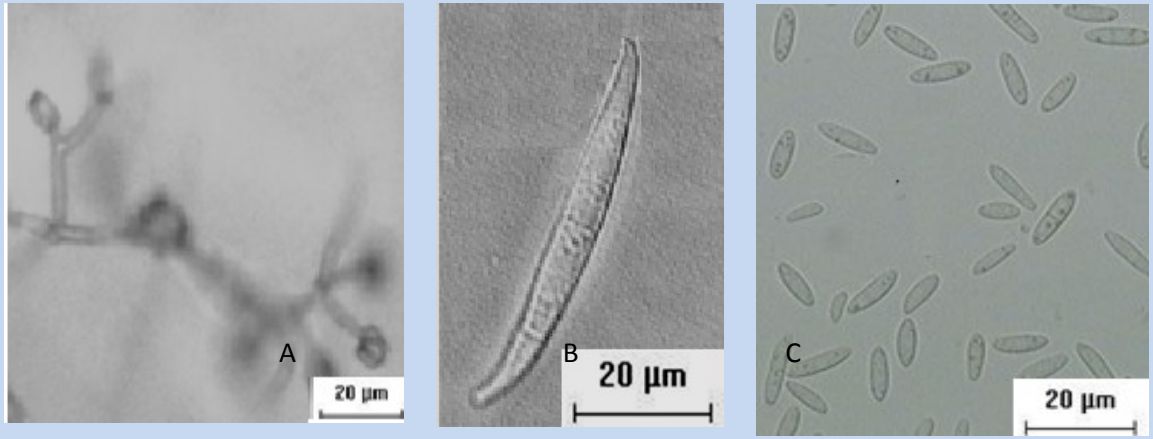
A B C D

Morphological chcracteristicistics of *F. proliferatum.* A-B. Microcondia *in situ*, C. Macroconidia, D.Microconidia: Peer shape (a). Obovoid (b)



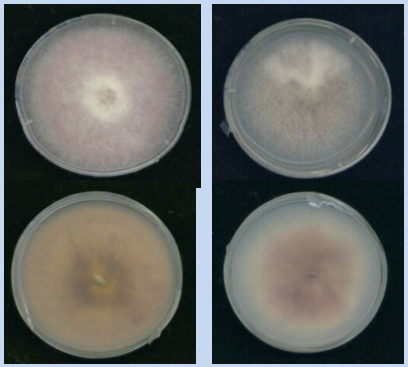
Colony features some strains of *F. proliferatum*

F. subglutinans



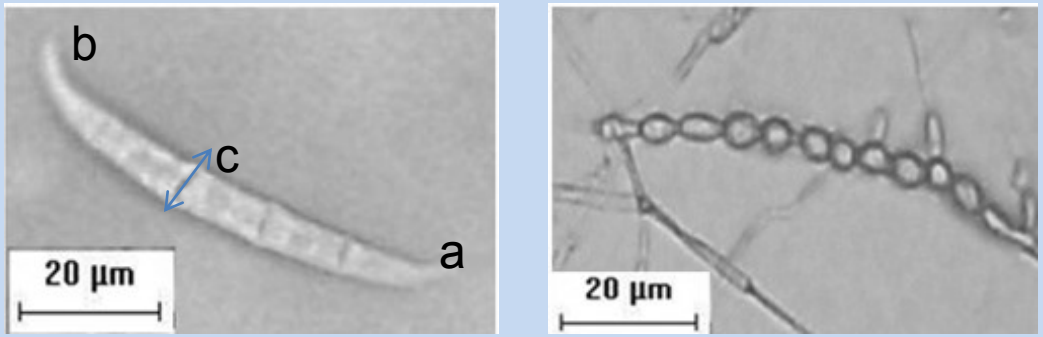
A B C

Morphological characteristics of *F. subglutinans.* A. Microconidia *in situ*, B. Macroconidia and C. Microcondia



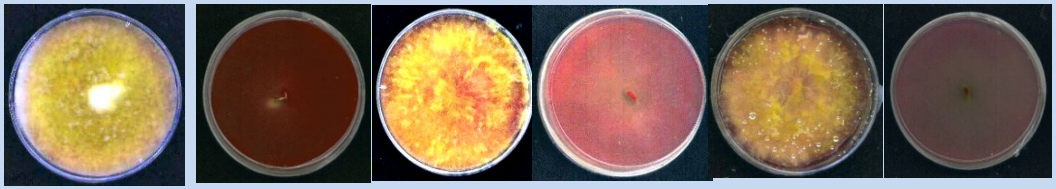
Colony features of some strains *F. subglutinans*

F. graminearum



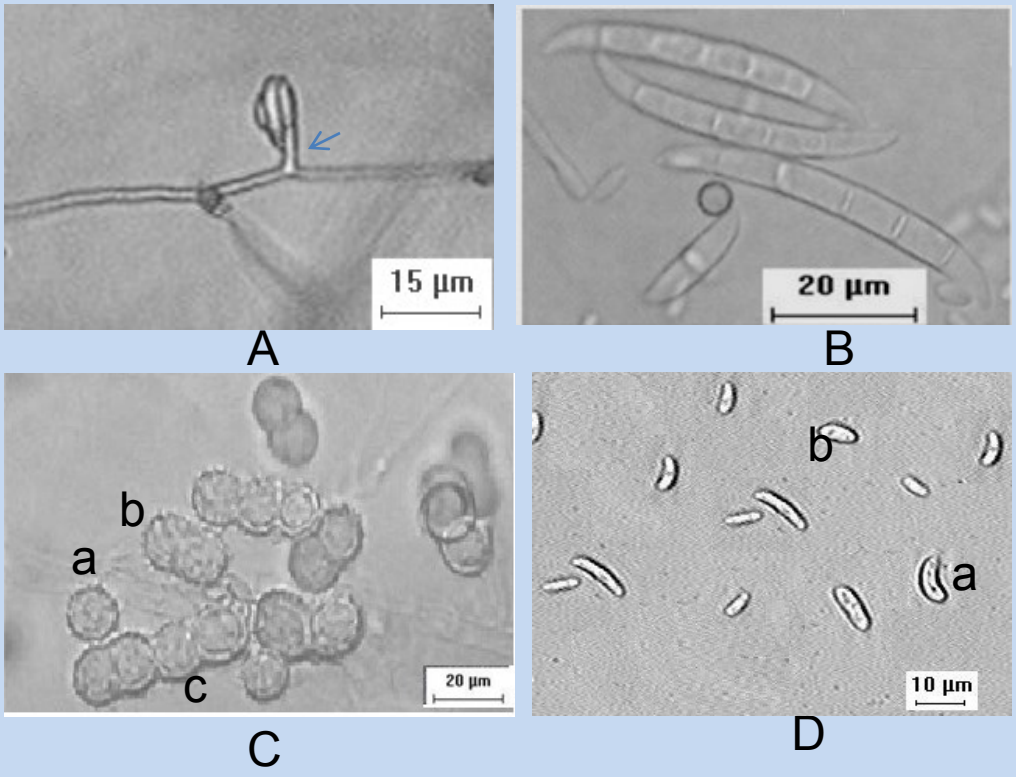
A B

Morphological characteristics of *F. graminearum*. A. Macroconidium: (a) food-shaped basal cell, (b) tapered apical cell, (c) widest part of macroconidia at the upper region B. Chlamydospores in chain (arrow)

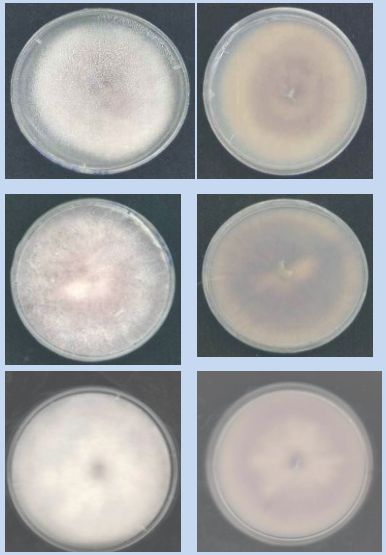


Colony features some strains of *F. gramnearum*

F. oxysporum

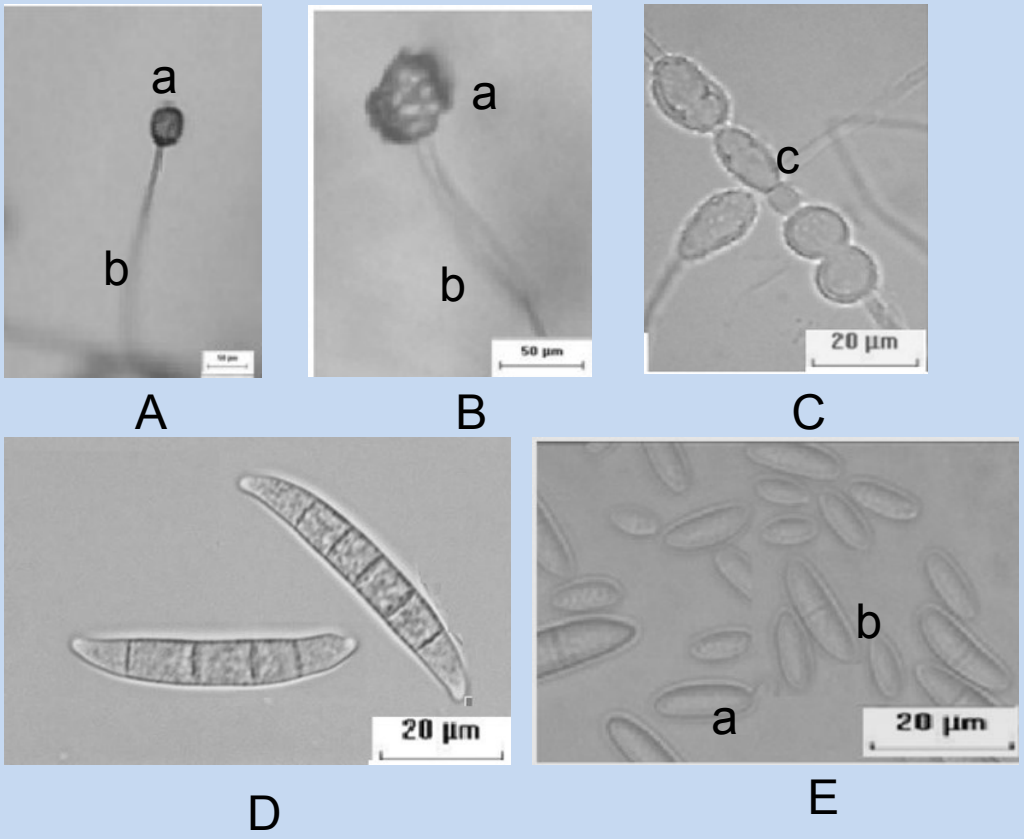


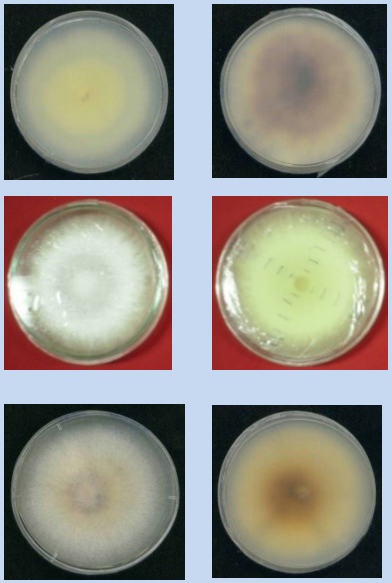
Morphological characteristics of *F. oxysporum*. A. Microconidia in false head from short monophialide (arrow), B. Macroconidia (arrow), C. Chlamydospores: (a) single, (b) in pair (c) in chain, and D. Microconidia: (a) Kidney shape, (b) Oval shape



Colony features some strains of *F. oxysporum*

F. solani

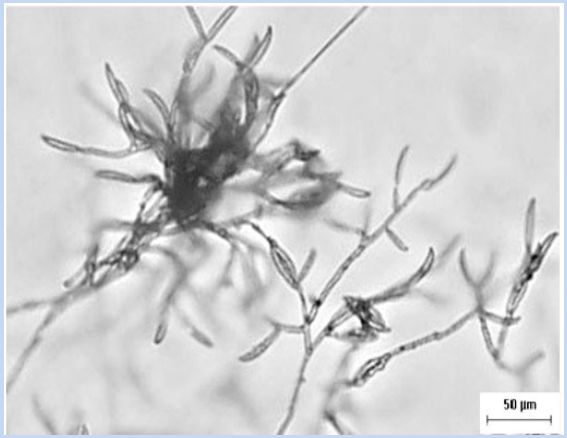




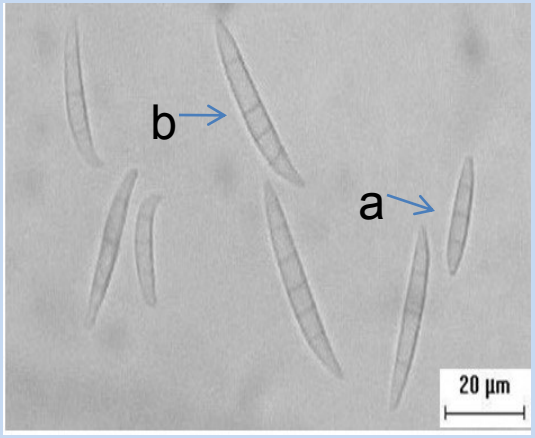
Colony features some strains of *F. solani*

Morphological characteristics of *F. solani. (*A-B) Microconidia in false head (a) with long monophialide (b), C. Chlamydospore in chain, D. Macroconidia and E. Microconidia; (a) 1 cell, (b) 2 cells.

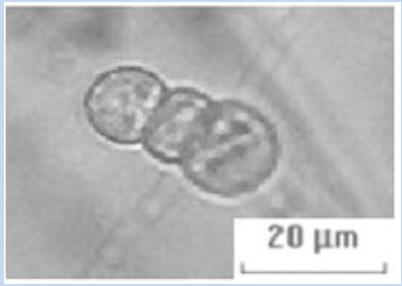
F. semitectum



A

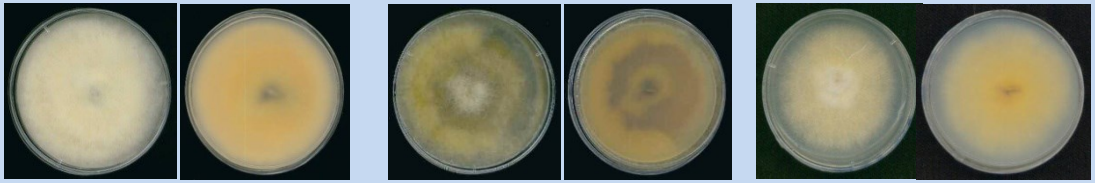


B



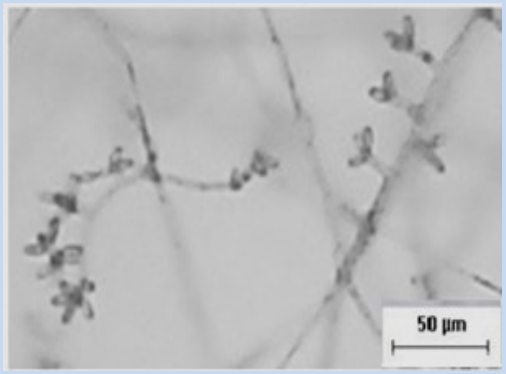
C

Morphological characteristics of *F. semiectum.* A. Mesoconidia *in situ*, B. Macroconidia (a). Mesoconidia (b), C. chlamydospores (arrow)

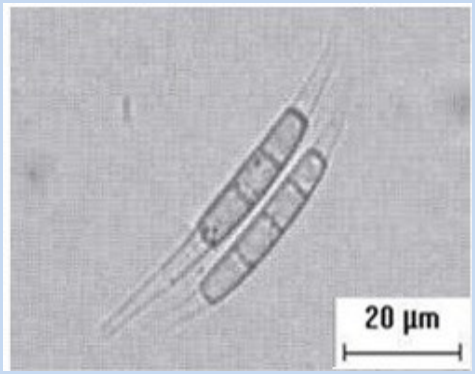


Colony features some strains of *F. solani*

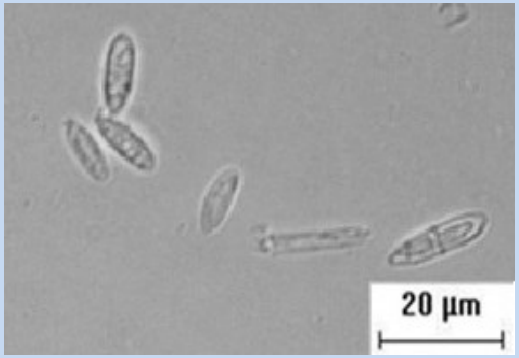
F. chlamydosporum



A

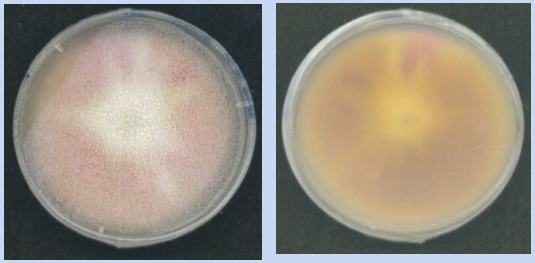


B



C

D



Colony features some strains of *F. chlamydosporum*

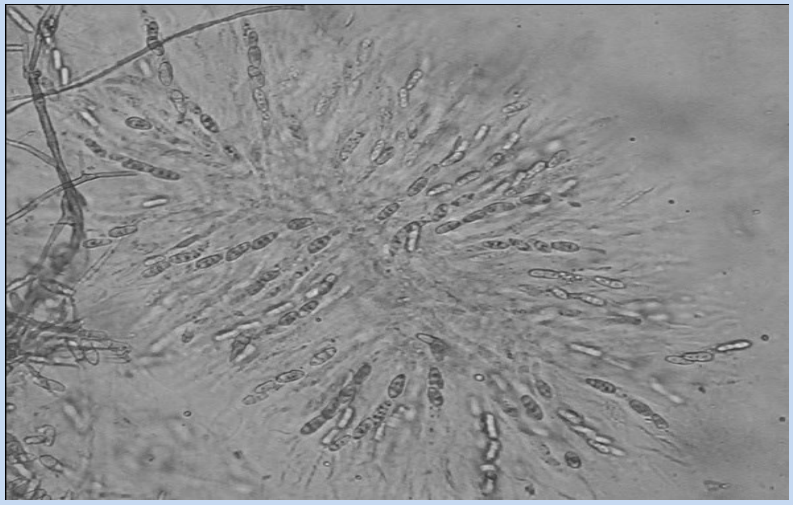
Morphological characteristics of *F. chlamydosporum.* A. Microconidia *in situ* (arrow), B. Macroconidia, C. Oval microconidia; (a) 1 cell, (b) 2 cells and D. Chlamydospores in pair

2. Mating Populations (MPs)

***Fusarium* spp**	**MP-A**	**MP-D**	**MP-E**	***ND***
F. verticillioides (78 strains)	68			10
F.proliferatum (25strains)		19		6
F. subglutinans (3 strains)			3	0

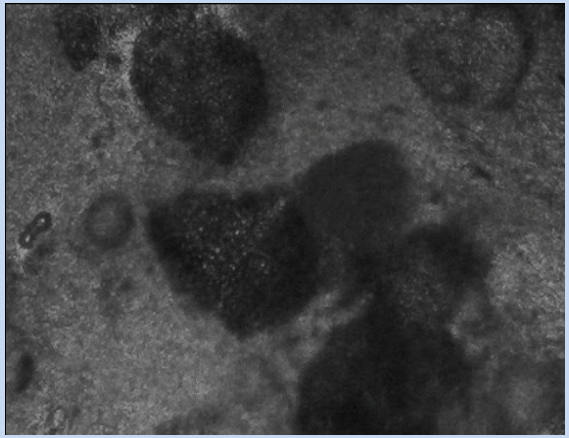
ND: Not Detected

MP- A
G. moniliformis



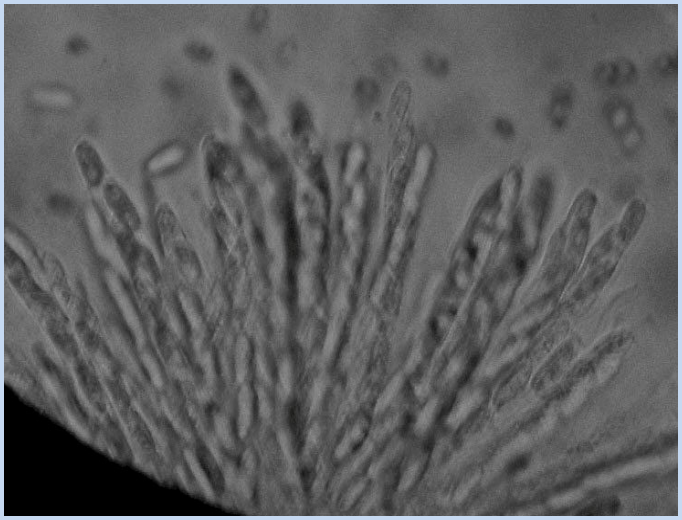
MP- D

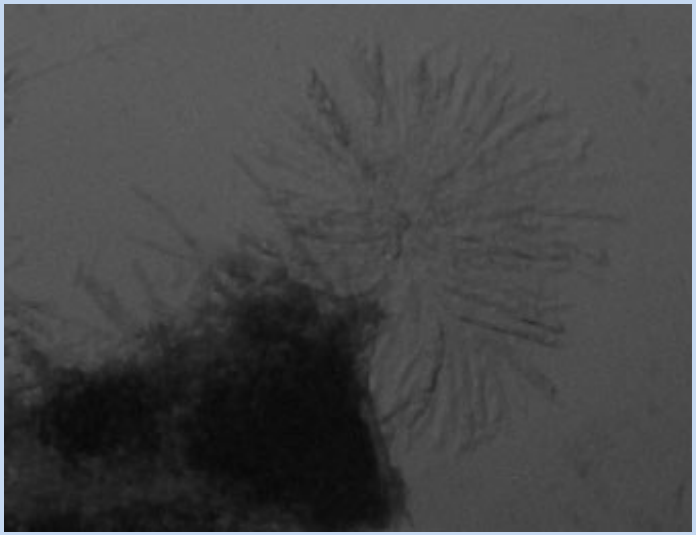
G. intermedia



MP-E

G. subglutinans





3. Pathogencity Test

Disease severity (DS) of corn ear rot at two weeks after inoculation with strains of *Fusarium* spp.

Fusarium species	Strain	Location	DS (%)	
F. verticillioides	Q5569O	Sarawak, Malaysia	18.57	ef
	OLN0200O	East Java, Indonesia	20.03	def
	OLN0215O*	West Sumatra, Indonesia	22.00	de
	OLN0229O	North Sumatra, Indonesia	29.13	c
	HLN0155O	Tak Fa, Thailand	17.30	efg
	OLN0282O	West Sumatra, Indonesia	25.17	cd
F. proliferatum	S5273O	Sabah, Malaysia	11.43	hij
	HLN0151O*	Buri, Thailand	17.20	efg
	OLN0295O	West Sumatra, Indonesia	15.20	fgh
	OLN0280O	North Sumatra, Indonesia	9.17	ij
F. subglutinans	S4895O*	Sabah, Malaysia	7.33	jk
	OLN0319O	West Sumatra, Indonesia	13.20	ghi
	OLN0339O	West Sumatra, Indonesia	15.63	fgh
F. graminearum	OLN0301O	West Sumatra, Indonesia	98.67	a
	OLN0305O	West Sumatra, Indonesia	96.83	a
	OLN0311O	West Sumatra, Indonesia	94.27	a
	OLN0312O	West Sumatra, Indonesia	97.50	a
	OLN0313O	West Sumatra, Indonesia	96.60	a
F. oxysporum	R473O	Perlis, Malaysia	2.07	l
	OLN0382O	Aceh, Indonesia	1.57	l
F. solani	HLN0069O*	Takhli,Thailand	1.23	l
	OLN0228O	North Sumatra, Indonesia	0.93	l
F. semitectum	OLN0294O	West Sumatra, Indonesia	3.33	l
F. chlamydosporum	OLN0283O	West Sumatra, Indonesia	79.23	b NO
Control	OLN0320O	West Sumatra, Indonesia	0.00	l

Ear rot symptom on corn cobs at 2 weeks after inoculation with *F. raminearum*

V. CONCLUSSIONS

1. Ear rot disease on corn have been distributed in Indonesia, Malaysia and Thailand

2. Eight Seven species of *Fusarium* with ear rot disease on corn were identified
   (*F. verticillioides, F. proliferatum, F. subglutinans, F. graminearum, F. oxysporum, F.solani, F. semitectum, F. chlamydosporum.*

3. Three mating population (MP-A, MP-D and MP-E) were discovered in Section Liseola

4. MP-A (*F. verticillioides*) was the most dominant species associated with ear rot disease of corn

5. *F. graminearum* is the most virulent and followed by *F. chlamydosporum and F. Verticillioides*

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Thank you

ISMPP International Conference on
"Plant Health for Human Welfare"
(1st to 4th November, 2017)

Department of Botany
University of Rajasthan, Jaipur (Rajasthan) India

Certificate

This is to certify that Prof./Dr./Ms./Mr. Darnetty
of H. Manggis No. 35 D. Pures Bau, Indonesia has actively participated and presented oral/paper/poster titled 'Morphological and biological - - - - - - - - - - - - - - and their pathogenicity' in section Plant disease diagnostics during the ISMPP International Conference on "Plant Health for Human Welfare" organised by Department of Botany, University of Rajasthan, Jaipur and Indian Society of Mycology & Plant Pathology, MPUAT, Udaipur from 1st to 4th November, 2017.

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