

EFFICACY OF BIOAGENTS AGAINST SEED BORNE FUNGI OF BLACK GRAM

C. Ashwini, G.K. Giri and N.Y.Halgekar

Department of Plant Pathology, Post graduate Institute, Dr. PDKV, Akola 444001

Email: chilkuriashwini@gmail.com

ABSTRACT: The effect of different antagonists' viz. *Trichoderma viride*, *Pseudomonas fluorescens* and *Bacillus subtilis* were evaluated against different seed borne fungi of black gram by dual culture technique. Among three bioagents, *Bacillus subtilis* exhibited maximum mycelial growth inhibition of *Phoma medicaginis* (73.70%), *Fusarium solani* (57.60%), *Curvularia lunata* (44.53%) followed by *Pseudomonas fluorescens* with *Macrophomina phaseolina* (62.41%) and *Fusarium oxysporum* (59.97%) respectively.

Key words: Black gram, seed borne pathogens, bioagents, *In vitro*

INTRODUCTION

Black gram [*Vigna mungo* (L.) Hepper] is the important pulse crop of India next to Pigeon pea belongs to family leguminosae. Seeds are carrier of fungal flora either externally or internally or both. The variety and intensity of fungal flora changes area wise and depends upon climate under which seed produced storage condition and component of seed. Several fungi have been reported by many workers in black gram viz. *Aspergillus flavus*, *Aspergillus niger*, *Curvularia lunata*, *Colletotrichum* sp, *Fusarium moniliforme*, *Fusarium semitectum*, *Fusarium solani*, *Phoma medicaginis*, *Macrophomina phaseolina*, *Penicillium* sp etc., some of these are seed borne in nature and seed transmissible (Shamsur Rahman *et al.* 1999, Raut and Ahire, 1983). Present study was undertaken to know the efficacy of some fungal and bacterial bioagents against seed borne fungi of black gram.

MATERIAL AND METHODS

Seed samples of five varieties viz., PPU-4, TAU-1, TAU-2 T-9 and AKU-15 and fungal and bacterial bioagents, *Trichoderma viride*, *Pseudomonas fluorescens* and *Bacillus subtilis* were collected from Pulses Research Unit and Department of Plant Pathology, Dr. PDKV, Akola.

Isolation of seed borne fungi

Structure of seed borne fungi growing over incubated seed was observed under stereoscopic microscope and their identification was confirmed under compound microscope and with published literature. The pre dominant fungi, *Curvularia lunata*, *Fusarium oxysporum*, *Fusarium solani*, *Macrophomina phaseolina*, *Phoma medicaginis* were lifted with sterilized needle and transferred aseptically on PDA medium. The fungi were purified by hyphal tip method and maintained on PDA slants for further studies.

Efficacy of bioagents against seed borne fungi by dual culture technique.

The lawn culture of fungal bio agent *T. viride* was prepared on PDA medium.

Bacterial bioagents, *P. fluorescens* and *B. subtilis* were prepared by inoculating a loopful culture in sterilized conical flask containing hundred ml nutrient broths. Broth culture was incubated at room temperature for three days. Autoclaved PDA poured in sterilized petriplates and allowed to solidify. Four petriplates each bio agents were used. Six mm disc of seven days old test fungus and bio agent were cut with the help of cork borer lifted and transferred in petriplates. Four discs of bio agents were inoculated at four peripheral points of the plates and test fungi were placed in center of petriplates. Three days old culture of *P. fluorescens* and *B. subtilis* streaked around the disc of test fungus at two sites. Control plates were kept where; culture disc of test fungus was grown in same condition on potato dextrose agar without bio agents. The plates were incubated at room temperature for seven days. After an expiry of incubation period the mycelial inhibition was calculated.

RESULT AND DISCUSSION

Table-1 indicates that maximum growth inhibition of *P. medicaginis* observed in *B. subtilis* (73.70%) followed by *P. fluorescens* (71.70%) whereas lowest mycelial growth observed in *T. viride* (68.83). Highest growth of inhibition of *Fusarium solani* was observed in *B. subtilis* (57.60%) followed by *T. viride* (38.95%).

Lowest mycelial growth recorded in *P. fluorescens* (24.01%). Similar finding observed by Selverajan and Jayrajan (1996) who recorded maximum zone of inhibition due to *B. subtilis*, *P. fluorescens*, *T. viride* against *F. solani*. Maximum inhibition *C. lunata* observed in *B. subtilis* (44.53%) followed by *P. fluorescens* (41.08%) and *T. viride* (31.50%). Sumangala et al. (2008) who observed the mycelial inhibition of *C. lunata* (97.66%) due to *B. subtilis* followed by *T. viride* (96.44%).

Table: Efficacy of different bio agents against seed borne fungi of black gram by dual culture technique.

Treatments	<i>M. phaseolina</i>		<i>F. oxysporum</i>		<i>F. solani</i>		<i>C. lunata</i>		<i>P. medicaginis</i>	
	MCD	PGI (%)	MCD	PGI (%)	MCD	PGI (%)	MCD	PGI (%)	MCD	PGI (%)
<i>T. viride</i>	43.07	44.94	48.80	37.59	48.96	38.95	39.73	31.50	28.50	68.33
<i>P. fluorescens</i>	29.40	62.41	31.30	59.97	60.94	24.01	34.17	41.08	25.40	71.70
<i>B. subtilis</i>	41.23	47.29	40.80	47.82	34.00	57.60	32.17	44.53	23.67	73.70
Control	78.23		78.20		80.20		58.00		90.00	
'F test	Sig.		Sig.		Sig.		Sig.		Sig.	
SE(m)±	0.17		0.27		0.22		0.17		0.16	
CD (P=0.01)	0.86		1.37		0.93		0.88		0.82	

MCD- Mean colony diameter (mm), PGI- Percent growth inhibition (%)

Highest mycelial inhibition of *M. phaseolina* recorded in *P. fluorescens* (62.41%) followed by *B. subtilis* (47.29%). Lowest growth was observed in *T. viride* (44.94%). The present findings are in confirmation with earlier workers; Shanmugam et al. (2003) reported *P. fluorescens* was most effective against *M. Phaseolina* in vitro in urdbean. Mycelial inhibition of *F. oxysporum* recorded in *P. fluorescens* (59.97%) followed by *B. subtilis* (47.82%) and *T. viride* (37.59%). Present result *F. oxysporum* confirmed with Muthukumar et al. (2007) who reported *P. fluorescens* reduced the growth of pathogen to an extent of 51.78% in *F. oxysporum*, the cause of tuber rot in tuberose (*Polyanthus tuberosa* L.) in vitro. Overall, *P. fluorescens* followed by *B. subtilis* were found most effective against seed borne fungi of black gram.

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