

EFFICACY OF BIOAGENTS AGAINST SEED BORNE FUNGI OF RICE

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

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

Email: nhalgekar21@gmail.com

ABSTRACT: The effect of different antagonist viz. *Trichoderma viride*, *Pseudomonas fluorescens* and *Bacillus subtilis* were evaluated against different seed borne fungi of rice by dual culture technique. Among three bio agents *Trichoderma viride* (42.59 to 73.33%) followed by *Bacillus subtilis* and *Pseudomonas fluorescens* over control. Significant suppression of radial mycelial growth of *Drechslera oryzae* by *Trichoderma viride*, and *Trichoderma harzianum* in dual culture and Inhibition of *Curvularia lunata* causing black kernel in rice with *Bacillus subtilis* (97.77%) followed by *Trichoderma viride* (96.44%) and *Trichoderma harzianum* (93.50%) in dual culture method.

Key words : Rice, seed borne pathogen, bio agents *in vitro*.

INTRODUCTION

Rice/Paddy (*Oryza sativa*) is the most perfect staple food crop of world. seeds are carrier of fungal either externally or internally or both. The variety and intensity of fungal flora changes area wise and depend upon climate under which seed produced storage component of seed. Several fungi have been reported by any workers in Rice. Some of the widely distributed rice diseases are brown spot caused by *Bipolaris oryzae*, blast (*Pyricularia oryzae*), bakane disease (*Fusarium moniliforme*), narrow brown leaf spot (*Cercospora janseana*), stack burn (*Alternaria padwickii*), leaf Scald (*Macrodochium oryzae*), sheath blight (*Sorocladium oryzae*), false smut (*Ustilagoidea virens*), kernel smut (*Nigrospora oryzae*), udabatta disease (*Ephelis oryzae*), scab (*Fusarium graminearum*), bunt of rice (*Tilletia barclayana*) and Leaf smut (*Entyloma oryzae*). Discolouration caused by several fungal species among them *Curvularia lunata* is the most important one and responsible for both qualitative and quantitative loss Sumangala *et al.* (2008). Sheath blight of rice is caused by *Rhizoctonia solani* kuhn is a serious threat in rice growing areas Janki Kandhari (2007). Foot rot and bakanae disease caused by *Fusarium moniliforme* has become destructive disease of paddy in different part of the country (Dodan *et al.* 1994). Rice blast incited by *Pyricularia oryzae* Cav is one of the most serious disease inflicting heavy losses (Gohel *et al* 2008).

MATERIAL AND METHODS

Seed samples of rice cultivar PKV Makar and, PKV Ganesh, PKV HMT, SKL-6 and SKL-8 were collected from Rice Research Station, Sindhewahi. and Ratna was collected from Konkan region and bioagents *Trichoderma viride* 4g/kg of seeds, *Pseudomonas fluorescens* 10g/kg of seeds, *Bacillus subtilis* 10g/kg of seeds were tested against seed borne fungi of rice.

Efficacy of Bio Agent against Seed Borne Fungi by Dual Culture Technique.

Lawn culture of test fungi and bioagents i.e. *Trichoderma viride* were prepared on PDA medium.

Bacterial Bioagents *P. fluoresces* 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 centre of petriplates. Three days old culture of *P. fluoresces* and *B. Subtilis* streaked around the disc of test fungus of 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 the maximum growth inhibition of seed borne fungi of rice were observed in *Trichoderma viride* (42.59 to 73.33%) followed by *Bacillus subtilis* and *Pseudomonas fluorescens* over control. Significant suppression of radial mycelial growth of *Drechslera oryzae* by *Trichoderma viride*, and *Trichoderma harzianum* in dual culture method reported by Kumawat *et al.* (2010). Reduction in sheath blight due to *Bacillus* spp. and *Fluorescent pseudomonas* in rice have been reported by many earlier workers. Laha and Venkantaraman (2001), Muralidharan *et al.* (2004) and Rajbir and Sinha (2004) reported Inhibition of *Curvularia lunata* causing black kernel in rice with *Bacillus subtilis* (97.77%) followed by *Trichoderma viride* (96.44%) and *Trichoderma harzianum* (93.50%) were reported by Sumangala (2008) and similar kind of observations were recorded in present investigations.

Table: Evaluation of different bio agents against seed borne fungi of rice by dual culture method.

Bio agents	Dose g/kg seed	<i>C. lunata</i>		<i>B. oryzae</i>		<i>M. roridum</i>		<i>A. strictum</i>		<i>F. moniliforme</i>		<i>D. oryzae</i>	
		MCD (mm)	PGI	MCD (mm)	PGI	MCD (mm)	PGI	MC D (mm)	PGI	MCD (mm)	PGI	MCD (mm)	PGI
<i>T. viride</i>	4.00	32.00	64.4 4	24.0 0	73. 33	31.0 0	42.5 9	24.0 0	52. 94	36.00	21. 73	29.0 0	67. 77
<i>B. subtilis</i>	10.00	51.00	43.3 3	69.0 0	23. 33	51.0 0	5.5 5	35.0 0	31. 37	38.00	17. 39	45.0 0	50. 00
<i>P. fluorescens</i>	10.00	51.00	43.3 3	74.0 0	17. 77	52.0 0	3.7 0	34.0 0	33. 33	45.00	2.1 7	54.0 0	40. 00
Control	-	90.00	0	90.0 0	0	54.0 0	0	51.0 0	0	46.00	0	90	0
'F test	-	sig	-	Sig	-	Sig	-	Sig	-	Sig	-	Sig	-
SE(m)±	-	0.47	-	0.34	-	0.55	-	0.53	-	0.57	-	0.38	-
CD(P=0.01)	-	2.40	-	1.74	-	2.18	-	2.61	-	2.89	-	1.91	-

MCD = Mean Colony Diameter PGI = Per cent Growth Inhibition

ACKNOWLEDGEMENT

The authors are thankful to the chairman Department of plant pathology Akola Dr. Panjabrao Deshmukh krishi Vidyapeeth University of providing laboratory facilities to carry out the present research work

REFERENCES

- Dodan, D. S. Ram Singh and S. Sunder. (1994). Survival of *Fusarium moniliforme* in infected Rice Grain and its chemical control. Indian J. Mycol. Pl. Path. 24 (2): 135 -138.
- Gohel, N. M., H. L. Chauhan and A. N. Mehta. (2008). Bio -Efficacy of Fungicides against *Pyricularia oryzae*. The Incitant of Rice Blast. J. Pl. Dis. Sci. 3 (2): 189- 192.
- Janki Kandhari. (2007). Management of Sheath Blight of rice Through Fungicides and Botanicals. Indian Phytopath. 60 (2): 214- 217.
- Kumawat Girdhari Lal, S. K. Biswas and Mohd Rajik. (2010). Antagonistic Evaluation of *Trichoderma* spp. and their effect on Seed Germination and Growth of paddy seedling. J. Pl. Dis. Sci. 5(1): 203-207.
- Laha G. S., S. Venkantaraman 2001. Sheath blight management in rice with Biocontrol agents. Indian Phytopath. 54(4): 461-464.
- Muralidharan, K., C. S. Reddy, D. Krishnanaveni and G.S. Laha. (2004). Field Application of *Fluorescent Pseudomonas* Product to control Blast and Sheath Blight Disease in rice. J. Mycol. Pl. Path. 34(2): 411-414.
- Singh Rajbir and A. P. Sinha (2004). Comparative efficacy of local Bioagent, commercial Bioformulation and Fungicide for the management of sheath blight rice, under glass house condition. Indian Phytopath. 57 (4): 494 -496.
- Sumangala, K., M. B. Patil, V. B. Nargund and G. Ramegowda. (2008). Evaluation of Fungicides, Botanicals and Bio - Against *Curvularia lunata*, A Causal agent of grain Discoloration in Rice. J. Pl. Dis. Sci. 3 (2): 159 - 164.