EVALUATION OF NEW FUNGICIDES, BIO-CONTROL AGENTS AND PLANT EXTRACTS AGAINST *SCLEROTIUM ORYZAE* CATT. CAUSING STEM ROT OF RICE

V. BHUVANESWARI, S. KRISHNAM RAJU,P.L.R.J. PRAVEENA, T.V. SRIDHAR,M. BHARATHA LAKSHMI

Abstract: Studies on the management of stem rot of rice caused by *Sclerotium oryzae* revealed that fungicides *viz*., hexaconazole 5% EC, tebuconazole 25.9% EC, captan 70% + hexaconazole 5% WP, metiram 70% WP, propineb 70% WP, hexaconazole 4% + zineb 68% WP, carbendazim 12% + mancozeb 63% WP, hexaconazole 5% SC and Iprodione 25% + carbendazim 25% WP @ 2.0 g (or) ml/l; propiconazole 25% EC, carbendazim 50% WP, benomyl 50% WP, difenoconazole 25% EC, picoxystrobin + propiconazole 20% SC and kitazin 48% EC @ 1.0 g (or) ml/l completely inhibited the growth of stem rot pathogen under *in vitro* conditions. Trifloxystrobin 25% + tebuconazole 50% WG @ 0.4 g/l and hexaconazole 75% WG @ 0.2 g/l also completely inhibited the growth of stem rot pathogen. Carbendazim 25% + mancozeb 50% WP @ 2.0 g/l, tricyclazole 18% + mancozeb 62% WP @ 2.0 g/l, azoxystrobin 18.2% + difenoconazole 11.4% SC @ 1.0 ml/l and validamycin 3% L @ 2.0 ml/l recorded 99.63, 98.15, 98.15 and 95.18 per cent inhibition, respectively. The bark extract of *Cinnamomum zeylanicum* @ 10% was found effective in controlling *S. oryzae*. The bio-control agents *Pseudomonas fluorescens* and *Trichoderma viride* @ 10.0 g/l recorded 66.67 and 64.81 per cent inhibition over control. Small pin head size black sclerotial production was completely inhibited by most of the test fungicides including cinnamon bark extract. Rice straw culm bits were found the best substrate for mass multiplication of *S. oryzae.* On-farm evaluation of fungicides against stem rot of rice indicated that azoxystrobin 18.2% + difenoconazole 11.4% SC @ 1.0 ml/l (7.36%) and tebuconazole 25.9% EC @ 2.0 ml/l (15.82%) were found effective against stem rot compared to control (45.48%) under farmer's field conditions at Vetlapalem during rabi 2011. Similarly, trifloxystrobin 25% + tebuconazole 50% WG @ 0.4 g/l (2.67%), benomyl 50% WP @ 1.0 g/l (3.51%) and tebuconazole 25.9% EC @ 2.0 ml/l (3.80%) were found effective against stem rot compared to control plot (18.45%) at farmer's field of Kapavaram of Ramachandrapuram mandal; tebuconazole 25.9% EC @ 2.0 ml/l (12.71%), azoxystrobin 18.2% + difenoconazole 11.4% SC @ 1.25 ml/l (13.67%), trifloxystrobin 25% + tebuconazole 50% WG @ 0.4 g/l (15.58%) and benomyl @ 1.0 g/l (20.47%) were effective against stem rot compared to control (46.09%) at Kapavaram of Samalkot mandal of East Godavari district during rabi 2012. Screening of popular varieties against stem rot of rice using stem rot inoculum tying method and mycelial bits method under pot culture studies indicated that MTU-7029, MTU -1075 and MTU-1061 varieties were found moderately tolerant against stem rot of rice.

Keywords: Stem rot, rice, *Sclerotium oryzae,* fungicides, screening techniques.

Introduction: Rice production in India is severely hampered by a number of bacterial, fungal and viral diseases. Among the major diseases of rice in India, stem rot caused by *Sclerotium oryzae* Catt. (=*Magnaporthe salvinii* (Catt.) Krause and Webster) is one of the major constraints for rice production in the Indian subcontinent (Ram Singh *et al*., 2002) and so far no variety resistant to this disease is available. The disease affects the stem resulting in rotting and subsequent lodging of the crop. The fungus, *Sclerotium oryzae* produces tiny black sclerotia which are the initial source of inoculum. The disease severity may largely depend upon contributing factors like lodging or other types of wounds rather than upon the presence of the pathogen alone. Application of N and P either alone or together also increases the incidence while potash application reduces (Ou, 1982). In the state of Haryana, all the cultivated varieties suffer from this disease. In Andhra Pradesh, this disease is appearing in sporadic/regular manner on major rice varieties cultivated in Godavari delta during *kharif* and *rabi* seasons. Cultivation of resistant varieties seems to be the most economical and effective method to combat the disease. Under favourable conditions, the pathogen has been reported to cause 5-80 per cent losses in grain yield in different parts of the world (Al-Heeti and El-Bahadli, 1982; Li *et al*., 1984; Ou, 1985; Clother and Nicol, 1999) but the information on extent of losses caused by this disease in Andhra Pradesh has not been critically assessed. Meagre information is available on artificial inoculation techniques for screening genotypes and evaluation of new fungicidal molecules from the state of Andhra Pradesh. Hence, the present studies were taken up on evaluation of new fungicial molecules, bio-control agents and plant extracts against stem rot pathogen and standardization of screening techniques to screen rice genotypes against stem rot disease under field conditions to find out resistant varieties.

Materials And Methods

Isolation of stem rot pathogen: *S. ozyzae* was isolated from stem rot infected plants collected from farmers' fields of East Godavari district. Small

infected stem rot sections were placed on PDA after surface sterilization with 1.0% sodium hypochlorite followed by three washes with sterile distilled water. Similarly, small pin head sized sclerotia were directly placed on PDA after surface sterilization with 1.0% sodium hypochlorite and incubated at 25°C.

***In vitro* evaluation of fungicides, bio-control agents and plant extracts against stem rot pathogen:** In vitro study was conducted in a completely randomized design during two consecutive years 2010 and 2011 at Andhra Pradesh Rice Research Institute and Regional Agricultural Research Station, Maruteru. Twenty three fungicides, two bio-control agents, Neem Seed Kernel Extract (NSKE) powder and Cinnamon bark extract were evaluated *in vitro* for their inhibitory efficacy against *Sclerotium oryzae*. Three plates were maintained for each treatment and incubated for 96 h under uniform temperature and humidity. At the end of the incubation period, mean of three values in each case was compared with that of control. The comparative toxicity of fungicides on the growth of the fungus under *in vitro* conditions was evaluated by poisoned food technique (Bhaskaran *et al.*, 1988). Fungicides *viz.*, validamycin, hexaconazole, tebuconazole, captan 70% + hexaconazole 5% WP, metiram, tricyclazole 18% + mancozeb 62% WP, propineb, hexaconazole 4% + zineb 68% WP, carbendazim 12% + mancozeb 63% WP, carbendazim 25% + mancozeb 50% WP and Iprodione 25% + carbendazim 25% WP @ 2.0 g or ml/l; propiconazole, carbendazim, benomyl, difenoconazole, azoxystrobin 18.2% + difenoconazole 11.4% SC, picoxystrobin + propiconazole 20% SC, kitazin @ 1.0 g or ml/l; trifloxystrobin 25% + tebuconazole 50% WG @ 0.4 g/l; hexaconazole 75% WG @ 0.2 g/l and copper oxychloride and copper hydroxide @ 3.0 g/l were used. Stock solutions of fungicides were prepared in sterile distilled water and added aseptically to sterile PDA medium to get the required concentrations and then poured into Petri plates. The plates prepared without any fungicide served as control. These plates were inoculated with 7 mm disc of four day old culture of the test fungus and incubated at 25°C for four days.

The extract of cinnamon bark was tested for its antifungal property against *S. oryzae* by poisoned food technique (Bhaskaran *et al.*, 1988). The bark pieces were thoroughly washed with sterile distilled water, crushed to small bits and fine slurry was prepared by taking 100 g sample with 100 ml of sterile distilled water. Crude extract was obtained by boiling. The resultant slurry was filtered through muslin cloth and then through Whatman No.1 filter paper and the filtrate collected was used as stock solution. From the stock solution, 10 ml was added to 90 ml of PDA medium to make 10% concentration. Formulated product of *Trichoderma viride* and *Pseudomonas fluorescens* were added to the PDA medium @ 10g/l. Similarly, neem seed kernel extract was added @ 50 ml/lit of medium. The plates prepared without any bio-control agent/plant extract served as control. These plates were inoculated with 7 mm disc of four day old culture of the test fungus and incubated at 25°C for four days.

On-farm evaluation of fungicides against stem rot of rice: On-farm field trials were conducted at farmers' fields in East Godavari district of Andhra Pradesh during *rabi* 2011 and 2012 seasons under high natural disease pressure to evaluate the efficacy of new fungicides, tebuconazole 25.9% EC, azoxystrobin 18.2% + difenoconazole 11.4% SC, trifloxystrobin 25% + tebuconazole 50% WG along with bio-agents *Pseudomonas fluorescens* and *Trichoderma viride* and standard checks validamycin 3% L and benomyl 50% WP. The trials were laid in a randomized block design with 4 treatments and 6 treatments with five replications, respectively during 2011 and 2012. Popular rice variety, MTU-3626 (Prabhat) which is highly susceptible to stem rot disease was transplanted with a spacing of 15 x 15 cm in a gross plot size of 50 sq m. A check plot was also maintained. The data on the disease incidence were collected from the date of first incidence of the disease till 15 days after final spray. The per cent disease incidence was calculated from the data collected from 25 hills of each treatment in each replication as per the standard evaluation system for rice. The disease incidence data was transformed into arc sine values before statistical analysis. The data was subjected to statistical scrutiny and the results are furnished.

The disease was first noticed in the experimental plots at maximum tillering stage to panicle initiation stage during both seasons. Two fungicidal sprays were given in both seasons with 15 days interval starting from the appearance of initial disease symptoms. A spray fluid of 500 l/ha was used to ensure thorough coverage of the plants. Symptoms of phytotoxicity, if any, were also recorded at 5 and 10 days after the imposition of the treatments.

Development of screening techniques for stem rot disease of rice: For developing artificial inoculation technique to screen rice genotypes, an experiment was conducted under pot culture by transplanting single plant per pot. Three replications were maintained for each treatment. Eleven popular rice varieties were transplanted in pots during kharif 2012 and nine during rabi 2012 seasons. Each variety was treated as a treatment and three replications were maintained per treatment. A pure culture of a virulent isolate of *Sclerotium oryzae* was multiplied

on sterilized rice straw bits and inoculation was done at maximum tillering stage to panicle initiation stage. The colonized rice straw bits were placed between the tillers of rice plant, 5-10 cm above the water level. The data on the disease incidence on tillers were collected from the date of first incidence of the disease till 15 days after inoculation. The per cent disease incidence was calculated from the data collected from each plant of each treatment in each replication. The disease incidence data were transformed into arc sine values before statistical analysis.

In another method of inoculation, a pure culture of a virulent isolate of *Sclerotium oryzae* was multiplied on sterilized PDA medium plates. The PDA discs of 7 mm size @ 6 bits were placed inside the rice culm portion after piercing with a needle and making a slit on rice culm portions, 5-10 cm above the water level. The data on the disease incidence on tillers were collected from the date of first incidence of the disease till 15 days after inoculation. The per cent disease incidence was calculated from the data collected from each plant of each treatment in each replication.

$$\text{Per cent disease incidence} = \frac{\text{No. of stem rot infected tillers}}{\text{Total No. of tillers}} \times 100$$

Results And Discussion

***In vitro* evaluation of fungicides, bio-control agents and plant extracts against stem rot pathogen :** The efficacy of fungicides on the growth of the stem rot fungus is presented in Table 1. Among the tested fungicides, hexaconazole 5% EC, tebuconazole 25.9% EC, captan 70% + hexaconazole 5% WP, metiram 70% WP, propineb 70% WP, hexaconazole 4% + zineb 68% WP, carbendazim 12% + mancozeb 63% WP, hexaconazole 5% SC and Iprodione 25% + carbendazim 25% WP @ 2.0 g (or) ml/l completely inhibited the growth of stem rot pathogen under *in vitro* conditions and were found effective against *S. oryzae.* The fungicides *viz*., propiconazole 25% EC, carbendazim 50% WP, benomyl 50% WP, difenoconazole 25% EC, picoxystrobin + propiconazole 20% SC and kitazin 48% EC @ 1.0 g (or) ml/l also recorded 100% growth inhibition over control. Trifloxystrobin 25% + tebuconazole 50% WG @ 0.4 g/l and hexaconazole 75% WG @ 0.2 g/l also completely inhibited the growth of stem rot pathogen. Carbendazim 25% + mancozeb 50% @ 2.0 g/l, tricyclazole 18% + mancozeb 62% WP @ 2.0 g/l, azoxystrobin 18.2% + difenoconazole 11.4% SC @ 1.0 ml/l and validamycin 3% L @ 2.0 ml/l recorded 99.63, 98.15, 98.15 and 95.18 per cent inhibition respectively. Copper fungicides *viz*., copper oxychloride and copper hydroxide recorded 67.77 and 64.82 per cent reduction over control of the test pathogen. These findings are in accordance with other workers findings. Nishant Prakash and Smita Puri (2012) reported that among the five systemic fungicides tested, Contaf was found highly effective in reducing mycelial growth of S. oryzae at low concentration. Of the four non-systemic (contact) fungicides Chlorothalonil was highly effective against the pathogen *in vitro*. *Trichoderma* and *Pseudomonas* isolates showed variable responses against the tested fungicides *in vitro*. The results indicated that Bavistin was comparatively less inhibitory to the bio-agents and it also gave satisfactory inhibition to the pathogen growth.

The bark extract of *Cinnamomum zeylanicum* @ 10% was found effective in controlling the pathogen and recorded 100% inhibition over control after 96 h of incubation. Pramanick *et al*. (1998) found that plant extract of *Azadirachta indica* very effective in inhibiting the growth of *R. solani* at 20% concentration. Of the two bio-control agents tested, *Trichoderma viride* and *Pseudomonas fluorescens,* @ 10g/l recorded 64.81 and 66.67 per cent inhibition over control.

Small pin head size black sclerotia production was completely inhibited by validamycin, hexaconazole, propiconazole, carbendazim, benomyl, tebuconazole, captan 70% + hexaconazole 5% WP, trifloxystrobin 25% + tebuconazole 50% WG, metiram, tricyclazole 18% + mancozeb 62% WP, propineb, hexaconazole 4% + zineb 68% WP, carbendazim 12% + mancozeb 63% WP, difenoconazole, copper oxychloride, copper hydroxide, azoxystrobin 18.2% + difenoconazole 11.4% SC, picoxystrobin + propiconazole 20% SC, kitazin, hexaconazole 75% WG, carbendazim 25% + mancozeb 50% WP, iprodione 25% + carbendazim 25% WP and cinnamon bark extract. Rice straw bits media was found effective for mass multiplication of *S. oryzae.* Sundar raj *et al.* (1996) reported the efficacy of garlic extract against *R. solani,* the cause of sheath blight of rice. Meena *et al.* (2002) reported that carbendazim and kitazin completely inhibited the mycelial growth of the *Rhizoctonia solani f. sp. Sasaki* causing banded leaf and sheath blight of maize at 1.0 ppm concentration.

The study revealed that validamycin, hexaconazole, propiconazole, carbendazim, benomyl, tebuconazole, captan 70% + hexaconazole 5% WP, trifloxystrobin 25% + tebuconazole 50%, metiram, tricyclazole 18% + mancozeb 62% WP, propineb, hexaconazole 4% + zineb 68% WP, carbendazim 12% + mancozeb 63% WP, difenoconazole, copper oxy chloride, copper hydroxide, azoxystrobin 18.2% + difenoconazole 11.4% SC, picoxystrobin + propiconazole 20% SC, kitazin, hexaconazole 75%

WG, carbendazim 25% + mancozeb 50% WP, iprodione 25% + carbendazim 25% WP and cinnamon bark extract can be used against the stem rot of rice. The results of the present study were further exploited for on-farm evaluation of fungicides to formulate disease management schedule for stem rot of rice.

On-farm evaluation of fungicides against stem rot of rice: On-farm evaluation of fungicides against stem rot of rice indicated that azoxystrobin 18.2% + difenoconazole 11.4% SC @ 1.0 ml/l (7.36%) and tebuconazole 25.9% EC @ 2.0 ml/l (15.82%) were found effective against stem rot compared to control (45.48%) under farmer's field conditions at Vetlapalem of Samalkot mandal during rabi 2011 (Table 2).

Similarly, trifloxystrobin 25% + tebuconazole 50% WG @ 0.4 g/l (2.67%), benomyl 50% WP @ 1.0 g/l (3.51%) and tebuconazole 25.9% EC @ 2.0 ml/l (3.80%) were found effective against stem rot compared to control plot (18.45%) at farmer's field of Kapavaram of Ramachandrapuram mandal (Table 3); tebuconazole 25.9% EC @ 2.0 ml/l (12.71%), azoxystrobin 18.2% + difenoconazole 11.4% SC @ 1.25 ml/l (13.67%), trifloxystrobin 25% + tebuconazole 50% WG @ 0.4 g/l (15.58%) and benomyl @ 1.0 g/l (20.47%) were effective against stem rot compared to control (46.09%) at Kapavaram of Samalkot mandal of East Godavari district during rabi 2012 where stem rot is a endemic problem on susceptible variety MTU-3626 (Prabhat) (Table 4).

Development of screening techniques for stem rot disease of rice: Screening of popular varieties against stem rot of rice using stem rot inoculum tying method and mycelial bits method under pot culture studies indicated that MTU-7029, MTU -1075, MTU-1061 varieties were found moderately tolerant varieties (Table 5 and 6).

The study revealed that tebuconazole 25.9% EC, trifloxystrobin 25% + tebuconazole 50% WG, azoxystrobin 18.2% + difenoconazole 11.4% SC and benomyl 50% WP were found effective against stem rot under on-farm evaluation studies at farmers' fields of East Godavari district of Andhra Pradesh. The results of the present study were further exploited for formulating integrated disease management schedule for stem rot of rice.

References:

1. Al-Heeti, M.B. and El-Bahadli, A.H. (1982). Estimation of yield losses caused by *Sclerotium oryzae* Catt. on rice in Iraq. College Agric. Univ. Baghdad, Abu Gharid, Iraq: 113-114.
2. Bhaskaran, R., Ramadoss, N. and Ramachandran, T.K. (1988) Biological control of Thanjavur wilt disease of coconut. *Indian Coconut Journal* 19: 3-8.
3. Clother, E. and Nicol, H. (1999). Susceptibility of Australian rice cultivars to stem rot fungus *Sclerotium oryzae*. *Australasian Pl. Pathol*. 28: 85-91.
4. Li, Y.G., Kang, B.J., Feng, Y.X., Huang, D.J., Wu, D.B. and Li, T.F. (1984). A brief report on the studies of rice stem rot. *Guangdong agric. Sci*. 5: 35-37.
5. Meena R.L., Rathore R.S. and Kusum Mathur (2002). Evaluation of Fungicides and Plant Extracts against sanded leaf and sheath blight of maize (Zea Mays): *Journal of mycology and Plant Pathology* 32(3): 397.
6. Nishant Prakash and Smita Puri (2012). Efficacy of combination of systemic and non-systemic fungicides against stem rot of rice. *The Bioscan* 7(2): 291-294.
7. Ou, S.H. (1985). Rice Diseases. CMI, Kew, Surrey. England, 380 pp.
8. Ram Singh, Kumar, A. and Jalali, B.L. (2002). Variability predisposing factors and management of stem rot of rice caused by Sclerotium oryzae Catt. *An overview. Annu. Rev. Pl. Pathol*. 1: 275-289.
9. Sundar raj T, Kurucheve V. and Jayaraj J. (1996). Screening of higher plants and animal forces for the fungitoxicity against Rhizoctonia solani. *Indian Phytopathology* 49:398-403.

Table 1. Effect of fungicides on growth of *Sclerotium oryzae* of rice				
Technical name	**Trade Name**	**Dose (g or ml/L)**	***Per cent inhibition over control**	**Sclerotial production**
Validamycin 3% L	Sheathmar	2.0	95.18 (77.40)	-
Hexaconazole 5% EC	Contaf 5E	2.0	100 (90.00)	-
Propiconazole 25% EC	Tilt	1.0	100 (90.00)	-
Carbendazim 50% WP	Bavistin	1.0	100 (90.00)	-
Benomyl 50% WP	Benofit	1.0	100 (90.00)	-
Tebuconazole 25.9% EC	Folicur	2.0	100 (90.00)	-
Captan 70% + hexaconzole 5% WP	Taqat	2.0	100 (90.00)	-
Pseudomonas fluorescens	--	10.0	66.67 (54.74)	-
Trichoderma viride	--	10.0	64.81 (53.62)	-
Neem seed kernel extract	NSKE	5%	0.00 (0.00)	+++
Trifloxystrobin 25% + tebuconazole 50% WG	Nativo	0.4	100 (90.00)	-
Metiram 70% WP	Sanit	2.0	100 (90.00)	-
Tricyclazole 18% + mancozeb 62% WP	Merger	2.0	98.15 (82.46)	-
Propineb 70% WP	Propinex	2.0	100 (90.00)	-
Hexaconazole 4% + zineb 68% WP	Avtar	2.0	100 (90.00)	-
Carbendazim 12% + mancozeb 63%	Saaf	2.0	100 (90.00)	-
Difenoconazole 25% EC	Score	1.0	100 (90.00)	-
Hexaconazole 5% SC	Contaf plus	2.0	100 (90.00)	-
Cinnamomum zeylanicum	--	10 %	100 (90.00)	-
Copperoxy chloride 50% WP	Blitox	3.0	67.77 (55.5)	-
Copper hydroxide 77% WP	Kocide	3.0	64.82 (53.62)	-
Azoxystrobin 18.2% + difenoconazole 11.4% SC	--	1.0	98.15 (82.27)	-
Picoxystrobin + Propiconazole 20 SC	--	1.0	100 (90.0)	-
Kitazin 48% EC	Kitazin	1.0	100 (90.00)	-
Hexaconazole 75% WG	RIL-012/F1	0.2	100 (90.00)	-
Carbendazim 25% + mancozeb 50% WP	Sprint	2.0	99.63 (87.98)	-
Iprodione 25% + carbendazim 25% WP	Quintal	2.0	100 (90.0)	-
Untreated			0.00 (0.00)	+++
		CD	2.109	
		SEm+/-	0.746	

Figures in parentheses are arcsine transformed values. **Mean of three replications. *Tebuconazole formed inhibition zone around mycelia disc.

Table 2. On farm evaluation of fungicides against rice ot disease at Vetlapalem of Samarlakot Mandal during rabi 2011.		
Treatments	**Dose/l**	***Stem rot incidence (%)**
Tebuconazole 25.9% EC (Folicur)	2.0 ml	15.82 (22.79)
Azoxystrobin 18.2% + difenoconazole 11.4% SC (Amistar top)	1.0 ml	7.36 (15.57)
Validamycin 3% L	2.0 ml	26.60 (30.07)
Control	-	45.48 (42.39)
	CD (*P*=0.05)	11.12
	CV	29.14

*Mean of five replications. Figures in the parentheses are arc sine transformed values.

. On farm evaluation of fungicides against rice stem rot disease at Kapavaram of Ramachandrapuram Mandal during rabi 2012.		
Treatments	Dose/l	*Stem rot incidence (%)
Benomyl 50% WP (Benofit)	1.0 g	3.51 (10.64)
Tebuconazole 25.9% EC (Folicur)	2.0 ml	3.80 (11.08)
Trifloxystrobin 25%+ tebuconazole 50% WG (Nativo)	0.4 g	2.67 (9.01)
Pseudomonas fluorescens	10.0 g	12.01 (19.68)
Trichoderma viride	10.0 g	17.22 (24.20)
Control	1.0 ml	18.45 (24.96)
	CD (*P*=0.05)	6.07
	CV	28.21

*Mean of five replications. Figures in the parentheses are arc sine transformed values.

Table 4. On farm evaluation of fungicides against rice stem rot disease at Kapavaram of Samarlakot Mandal during rabi 2012.		
Treatments	**Dose/l**	***Stem rot incidence (%)**
Benomyl 50% WP	1.0 g	20.47 (26.71)
Tebuconazole 25.9% EC	2.0 ml	12.71 (20.85)
Trifloxystrobin 25% + tebuconazole 50% WG (Nativo)	0.4 g	15.58 (22.54)
Azoxystrobin 18.2% + difenoconazole 11.4% SC (Amistar top)	1.25 ml	13.67 (21.52)
Pseudomonas fluorescens	10.0 g	24.17 (29.37)
Control	-	46.09 (42.72)
	CD (*P*=0.05)	5.77
	CV	16.29

*Mean of five replications. Figures in the parentheses are arc sine transformed values.

Table 5: Screening of varieties against stem rot under pot culture (*Kharif* 2012)			
Variety	***Stem rot incidence (%)**		**Mean**
	Mycelial bits method	**Inoculum tying method**	
MTU-1001	0.0 (0.0)	43.48 (41.25)	21.74
MTU-1010	10.0 (18.43)	28.57 (32.31)	19.29
MTU-3626	4.48 (9.86)	14.29 (22.21)	9.39
IR-64	19.05 (25.88)	65.0 (53.76)	42.03
MTU-7029	0.0 (0.0)	7.69 (16.10)	3.85
MTU-1061	7.14 (15.5)	6.25 (14.48)	6.70
MTU-1064	0.0 (0.0)	12.5 (20.70)	6.25
BPT-5204	16.67 (24.10)	46.15 (42.79)	31.41
MTU-1075	0.0 (0.0)	12.5 (20.70)	6.25
PLA 1100	0.0 (0.0)	50.5 (45.0)	25.3
NLR 34449	0.0 (0.0)	36.36 (37.08)	18.2
CD (*P*=0.05)	4.58	2.60	
CV	31.74	4.87	

*Mean of three replications.
Figures in the parentheses are arc sine transformed values.

Table 6: Screening of varieties against stem rot under pot culture (*Rabi* 2012)			
Variety	***Stem rot incidence (%)**		**Mean**
	Mycelial bits method	**Inoculum tying method**	
IR 64	85.19 (67.37)	85.19 (67.37)	85.19
MTU 1061	23.08 (28.71)	8.69 (17.14)	15.89
MTU 1075	21.05 (27.31)	38.89 (38.55)	29.97
BPT 5204	46.67 (43.09)	39.29 (38.80)	42.98
MTU 1064	55.00 (47.88)	28.57 (32.31)	41.79
MTU 7029	30.77 (33.69)	12.50 (20.70)	21.64
MTU 3626	59.96 (50.75)	65.39 (53.98)	62.68
MTU 1001	73.08 (58.78)	66.67 (54.74)	69.88
MTU 1010	65.00 (53.73)	45.71 (42.54)	55.36
CD (*P*=0.05)	2.56	2.21	
CV	3.71	2.86	

*Mean of three replications. Figures in the parentheses are arc sine transformed values.

***

Dept of Plant Pathology, Andhra Pradesh Rice Research Institute & Regional Agricultural Research Station, Maruteru – 534122, West Godavari district, Acharya N.G. Ranga Agricultural University, Andhra Pradesh, India.