I J T A
© Serials Publications
National Academy of Agricultural Science (NAAS) Rating : 3.03

Management of Bud Rot Disease of Coconut in Nursery

Surulirajan*, M., Rajappan, K., Satheesh Kumar, N.*, Annadurai, K.* Jeevan Kumar, K.* & Asokhan, M.***

ABSTRACT: *In the present investigation, a nursery trial was laid out at CRS, Veppankulam for the management of bud rot disease during 2011-12. Twenty seed nuts were sown in each replication and the dipping of seed nuts with talc formulation of* Trichoderma viride *(1%) and* Pseudomonas fluorescens *(1%), Metalaxyl + Mancozeb (0.2%) and Copper Oxy Chloride (0.3%) has been done before sowing for the each treatment except control Bio-control agent,* P. fluorescens- *talc formulation is found to be the promising candidate in inhibiting the growth of mycoflora on coconut seed nut and seedling growth stage. Seed nut dipping, soil drenching and foliar spray of bio-control agent* P. fluorescens *–talc (1% solution) and chemical fungicide Copper Oxy Chloride (0.3%) found best treatment for the management of bud rot in coconut nursery and this treatment may be the promising option for integrated disease management strategy.*

INTRODUCTION

In India, the bud rot disease of coconut was first reported by Butler in 1906. The bud rot disease is quite common both on west and east coast tracts (Menon and Pandalai, 1960). Radha and Joseph (1974) reported severe bud rot incidence up to 40 per cent in few gardens. In 1994, the disease appeared in serious form during south-west monsoon period in Kerala and Karnataka and upto 40 per cent plants were infected. The extent of damage depends upon climatic conditions and type of planting material (Quillec, *et.al.,* 1984). Bud rot disease is very serious in areas having high and well distributed rainfall. Gosh and Yadav (1993) also reported the bud rot incidence varying from 1.45 to 3.65 per cent in Tamil Nadu.

The first visible symptom of bud rot is the withering of spear leaf which subsequently turns brown and bends. In due course of time younger leaves closer to the spindle also show similar symptoms. The internal tissue develops discoloration assuming a pale pink color with a brown border (Quillec and Renarld, 1984). The base of the spindle rots and can be detached with a gentle pull. It emits a foul smell. One by one the inner leaves also fall away, leaving only mature leaves in the lower whorl at the trunk apex and the palm ultimately succumbs (Menon and Pandalai, 1958). Within a few weeks after infection, the buds rot. Mature leaves in the outer whorl still persist at the trunk apex along with one or two bunches carrying mature nuts. Bud rot spreads from heart leaf outwards and finally the fungus invades the entire central whole and spathes (Ashby, 1920). After a few more months the entire crown falls leaving only a headless trunk. The management practices are effective only when applied in the initial stages of the disease appearance. Regular spraying with copper fungicides at 40 days interval especially before and after monsoons is an effective preventive measure (Nambiar and Rawther, 1993). Application of microbial antagonists help in reducing the population of soil borne pathogens. To minimize the use of pesticides, bio-control becomes imperative in integrated management of the disease. Thus, there is a need for an effective broad based integrated control of *Phytophthora* diseases (Tuset *et. al.,* 1984 and 1992)

MATERIALS AND METHODS

Nursery Trial

A nursery trial was laid out at CRS, Veppankulam for the management of bud rot disease. The following treatments were allocated in RBD with four replications (Plot size: 5palms/replication). Twenty

** Coconut Research Station Veppankulam, Pattukkottai, Thanjavur-Dt.-614 906

* Sugarcane Research Station-KVK, Sirugamani,Trichy-Dt.-639 115, Tamil Nadu Agricultural University, *E-mail: suruli1974@rediffmail.com*

seed East Coast Tall- variety nuts were sown in each replication. Initially, the dipping of seed nuts has been done for the each treatment except control during 2011-12.

T_1-*Trichoderma viride* (1%)*
T_2-*Pseudomonas fluorescens* (1%)*
T_3-Metalaxyl + Mancozeb (0.2%)
T_4-Copper Oxy Chloride (0.3%)
T_5-Control
*Talc formulation

Enumeration of *T. viride* and *Pseudomonas fluorescens*

Before imposing the above treatments, soil samples were collected for the enumeration of *T. viride* and *Pseudomonas fluorescens*. Soil samples at the depth of 15cm were collected and the soil samples were processed. One gram of soil samples from each replicated treatment was used for serial dilution. The required replicated platings were done on *Trichoderma viride* Selective Medium (TSM) for the enumeration of *T.viride* under room temperature in 7 days of incubation period. The mean Colony Forming Unit (CFU) has been recorded and presented in table-1.

Replicated platings were done on King's B medium for the enumeration of *Pseudomonas fluorescens* under room temperature in 5 days of incubation period. The mean Colony forming Unit (CFU) has been recorded and presented in table 1.

Soil samples were collected for the post experimental enumeration of *T. viride* and *Pseudomonas fluorescens* population same as that of pre experimental enumeration of bio-agents and results were recorded and presented in the following table 1.

Evaluation of Growth Parameters and Seedlings Performances

The mean germination percentage, mean height, girth and recovery of seedlings were recorded. The population of bio-agents was recorded after 3 months of biocontrol agent's application. Dipping of seednuts, soil drenching and foliar spray was done for each treatment except control.

RESULTS AND DISCUSSION

The mean initial population of *T. viride* ranged from 0.625 to $1.3x10^3$ cfu/g dry soil. Whereas after 3 months of treatment it ranged from 0.625 to 2.5×10^3cfu/g dry soil. The mean initial populaltion of *Pseudomnonas fluorescens* ranged from 0.55 to $1.25x10^5$ cfu/g dry soil. Whereas after 3 months of treatment it ranged from 0.625 to 2.12×10^5 cfu/g dry soil.

The germination per centage, height and girth of ECT coconut seedling was recorded and the results are presented in the table 2. The mean germination 6 months after sowing (87.5%) was high in the treatment of Copper Oxy Choloride (0.3%). The mean height of the seedlings (52.cm) after 7 months was high in the above said treatment as well. The mean girth of the

Table 1
Post Experimental Enumeration of *Trichoderma viride* and *Pseudomonas fluorescens* in Nursery Trial during 2010-11

S. No	*Treatments*	**Mean colony Forming Unit of Trichoderma viride (x 10^3) / g dry soil*			*Mean colony* Forming Unit Pseudomonas fluorescens (x 10^5) / g dry soil*		
		Pre treatment	*Post treatment*	*% increase or decrease over the control*	*Pre treatment*	*Post treatment*	*% increase or decrease over the control*
1.	T_1-*Trichoderma viride* (1%)**	0.875 (1.170)	2.5 (156.40)	156.40	1.25 (1.322)	1.15 (1.284)	9.52
2.	T_2-*Pseudomonas fluorescens* (1%)**	0.975 (1.212)	1.7 (74.35)	74.35	0.775 (1.126)	2.12 (1.618)	101.9
3.	T_3-Metalaxyl + Mancozeb (0.2%)	1.300 (1.341)	1.3 (1.341)	33.33	0.525 (2.397)	0.625 (1.058)	-40.47
4.	T_4-Copper Oxy Chloride (0.3%)	0.975 (1.214)	0.625 (1.06)	- 35.8	0.700 (1.095)	0.625 (1.058)	-40.47
5.	T_5-Control	0.625 (1.058)	0.975 (1.214)	-	0.550 (1.024)	1.05 (1.224)	-
	SEd	**0.20**	**1.44**	**-**	**0.22**	**0.23**	-
	CD (p=0.05)	**0.438 NS**	**3.08**	**-**	**0.48**	**0.49**	-

* Mean of four replications, (+) – Increase, (-) – Decrease
** Talc formulation

Table 2
Germination Percentage, Height and Girth of ECT Coconut Seedlings in Nursery Trial during 2010-11

S. No	Treatments	6 months after sowing		7 months after sowing	
		No of seednuts germinated*	Germination percentage	Height of seedlings* (cm)	Girth of seedlings* (cm)
1.	T_1-*Trichoderma viride* (1%) **	17.0	85.0	47.3	6.7
2.	T_2-*Pseudomonas fluorescens* (1%)**	17.0	85.0	49.4	6.9
3.	T_3-Metalaxyl + Mancozeb (0.2%)	16.75	83.75	49.3	7.2
4.	T_4-Copper Oxy Chloride (0.3%)	17.50	87.5	52.0	6.9
5.	T_5-Control	16.50	82.5	47.0	6.6
	SEd	**0.995**	**-**	**5.60**	**0.52**
	CD (p=0.05)	**2.169**	**-**	**12.21**	**1.14**

* Mean of four replications
** Talc formulation

seedling (7.2cm) 7 months after sowing was high in the treatment of Metalaxyl+Mancozeb (0.2%).

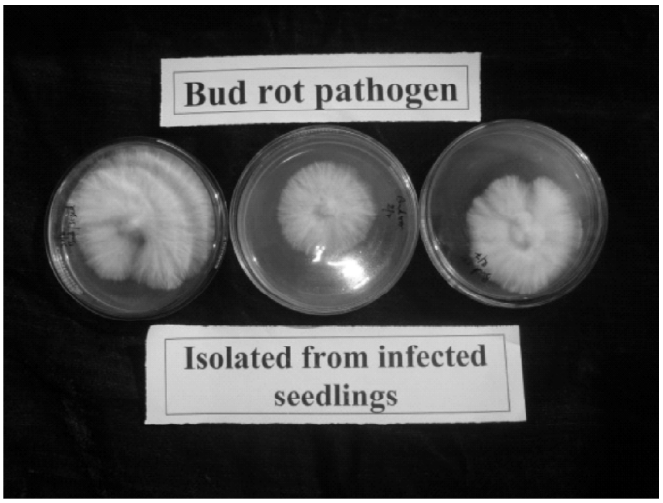
In the nursery trial for the management of bud rot disease in coconut, mean number of broad leaves per seedlings and number of ungerminated seed nuts observations were recorded and the results are presented in the following tables 3.

The recovery of seedlings from the nursery trial conducted at CRS, Veppankulam for the management of bud rot in coconut was recorded. In each treatment 20 seed nuts were planted. The maximum mean recovery of seedlings was recorded as 17.75 in the treatment of Copper Oxy Chloride (0.3%) out of 20 seed nuts sown in each replication and the results are presented in the following table 3. According to Tuset *et. al.*, (1984 and 1992) To minimize the use of pesticides,bio-control becomes imperative in integrated management of the disease. Thus, there is a need for an effective broad based integrated control

Table 3
Nursery Evauvation with Respect to Number of Broad Leaves / seedling, Number of Ungerminated Seed Nuts and the Recovery of Seedlings from the Nursery Trial Conducted at CRS, Veppankulam during 2010-11

	Treatments	No. of broad leaves / seedling	No. of ungermi-nated seed nuts	No. of seedlings recovered
1.	T_1-Trichoderma viride (1%) **	4.5	2.75	15.75
2.	T_2-Pseudomonas fluorescens (1%)**	5.25	2.25	17.25
3.	T_3-Metalaxyl + Mancozeb (0.2%)	6.0	2.75	17.25
4.	T_4-Copper Oxy Chloride (0.3%)	5.0	2.50	17.75
5.	T_5-Control	4.5	2.50	16.00
	CD (p=0.05)	2.31	2.37	2.77

*Talc formulation



***In vitro* isolation of Rot causing pathogen from infected samples under PDA medium at room temperature.**

Nursery trial for the management of bud rot conducted at CRS,Veppankulam during 2011-12.

of *Phytophthora* diseases. Thus, the seed nut dipping, soil drenching and foliar spray of bio-control agent *P. fluorescens* –talc (1% solution) and chemical

fungicide Copper Oxy Chloride (0.3%) found best treatment for the management of bud rot in coconut nursery and this treatment may be the promising option for integrated disease management strategy.

REFERENCES

Ashby, S. F. (1920), Notes on two diseases of coconut palm in Jamaica. **11**: 162-167.

Gosh and Yadav (1993), *Nariyal ka kali sadan rog*. Bharatiya nariyal patrika. (Hindi version *Indian Coconut Journal* 4(3): 4-6.

Menon and Pandalai, (1960), *The Coconut Palm,* A Monograph 133. *Indian Central Coconut Committee*, Ernakulam, India.

Nambiar, K. K. N. and Rawther, T. S. S. (1993), Fungal diseases of coconut in the world: In: **Advances in coconut research and development**. (Ed., M. K. Nair, H. H. Khan, P. Gopalsundaram and E.V.V.B. Rao), Oxford and IBH Publishing Co Ltd, New Delhi, pp. 545-561.

Quillec, Renard, J. L., Ghesquire, H. (1984), *Phytophthora heveae* of Coconut. Role in bud rot and nut fall. *Oleagineux* **39**: 477-485.

Quillec, U. and Renard, J. L. (1984), *Phytophthora* rot of coconut. *Oleagineux* **39**: 143-147.

Radha, K. and Joseph, T. (1974), Investigation on the bud rot disease (*Phytophthora palmivora*) of Coconut. Final Report PL-480 Scheme.32pp.CPCRI, Kayangulam.

Tuset, J.J, Hinare Jos, C., Buj,A., Molins,A and Cebolla, V. (1992), *Myrothecium roridum* and *M.verrucaria*, as potential antagonists of *Phytophthora spp.* on coconut. Coconut *Phytophthora* Workshop Proc., 26-30 Oct., 1992, Manado, Indonesia. pp. 171-176.

Tuset, J. J., Ainarejos, C, and Garcia, J. (1984), Present status of *Phytophthora* disease of Citrus in Spain. Proc. International Soc. Citriculture **2**: 338-343.