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RESEARCH ARTICLE

Studies on fungicides seed treatment against damping–off in seedling of rough lemon (*Citrus jambhiri* Lush) in Nagpur Mandarin Nursery

■ **Bhupendra Thakre and Uttam Soni**

SUMMARY

Mandarin seedlings are very much susceptible to damping off disease. In most of the farmers' nursery mandarin seedlings suffer from pre-emergence and post emergence damping off causing seedling decline and is a great threat for raising seedling. Experiments were conducted in Jawaharlal Nehru Krishi Vishwa Vidyalaya, Zonal Agriculture Research Station under Technology Mission on citrus project during 2015-16. Completely Randomize Design (RBD), replicated thrice with ten treatments including control. Six fungicides viz., carbendazim WP 50 %, fostel WP 80 %, copper Oxy Chloride WP 50%, Carbendazim12% WP+ Mancozeb 63% WP, Captan 50 % WP, metalaxyl 04% WP+ mancozeb 63% WP were selected for these experiment studies. Before sowing seeds were treated with these selected fungicides. Untreated seed served as control.Damping off in rough lemon seedling of citrus nursery could easily be reduced by fungicide seed treatment by carbendazim WP 50 % and indicate that carbendazim WP 50 % increased maximum per cent in shoot length (13.37 cm / 74.47 %), root length (2.45 cm / 67.57 %) and dry weight (52.74 %) over control.

Key Words : Citrus, Rough lemon, Damping off, *Pythium* sp., Seed treatment, Fungicides

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Mandarin seedlings are very much susceptible to damping off disease. In most of the farmers' nursery mandarin seedlings suffer from pre-emergence and post emergence damping off causing seedling decline and is a great threat for raising seedling (Olsen, 1998). Almost any soil used for seedling rising is contaminated with damping-off inoculate. One of the major problems in citrus nurseries is diseases resulting in death of the young seedlings (Rangasami, 1988). The most serious of these diseases is commonly known as "damping off" or "plant wilt". Damping-off is considered the most destructive disease in coniferous seedbeds (Verma *et al.*, 1999). It occurs under many different

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Table A : Fungicides used in the experiment

Common name	Chemical name	Trade name	Company	Origin
Carbendazim WP 50 %	Methyl 1H-benzimidazole-2-ylcarbamate	Hilzim 50 % WP	Auto crop Care Ltd., Dhaka, Bangladesh	Franch
Fosteyl Al WP 80 %	Fosetyl-aluminium	Aliette WDG	Bayer Crop Science Ltd	-
Copper Oxy Chloride WP 50%	Copper chloride oxide, hydrate	Maincop 50% WP	Bayer Crop Science Ltd. Dhaka, Bangladesh	Franch
Metalaxyl 04% WP+ Mancozeb 63% WP	2-(Methoxy carboryl) – benzimidazole + Manganes zinc ethylene bisdithiocarbamate	Redomil Gold 75 % WP	Syngenta Bangladesh Ltd., Dhaka, Bangladesh	Germany
Captan 50 % WP	N-trichloromethylthio-4-cyclohexene-1	Merpan	Arista Life Scince	Amarica

climatic conditions and geographic situations. It is caused by a large number of soil borne fungi. Host of the coniferous species grown in the United States are susceptible, to varying degrees, to the damping-off pathogens. Damages in the seedbeds caused by these pathogens vary considerably 5 in some severe cases of infection complete destruction of all seedlings occurs. This, of course, will increase the cost of seedling production, and will confuse the schedules for planned projects (Ullah *et al.*, 2007). Application of fungicides is a widely used method of control in the coniferous nurseries (Babadoost and Islam, 2002). A great variety of fungicides under various trade names are used at present for this purpose. The most common means of controlling nursery diseases is industrial chemicals. It is only necessary to use sufficient amount of a compound that does not harm the plant but inhibits the pathogen (Mohamedy, 1998). However, seed dressing with certain protecting chemical is also a kind of spot treatment of soil and frequently controls soil-borne pathogens to a degree giving valuable increases in the emergence of seedlings. It may also control diseases for some time after emergence (Gade, 2012).

MATERIAL AND METHODS

Experiment detail :

The experiment was carried out in JNKVV, Zonal Agricultural Research Station, Chhindwara (Madhya Pradesh) under technology mission on citrus project Chhindwara (Madhya Pradesh) with object "Studies on fungicides seed treatment effect on seedling damping – off of rough lemon (*Citrus Jambhiri lush*) in nagpur mandarin nursery" during year 2015-16. Rough lemon root stock was used for the experiment. A disease free nursery of rough lemon was grown in sterilized soil and maintained in ploy carbonate shed nets. Potting media was prepared with 1:1:1 (Sand: fertile soil: FYM) was done in the month of April – May up to 45 days. Beds were moistened by irrigation at field capacity level, these beds were covered with 100 micron UV stabilize polyethylene sheet and the edge of sheet was buried in soil so as to prevent escape of heated air. Then potting media mixture pored were plastic cerates (60 x 30 x 10 cm) with proper hole for well daring and placed 2.5 feet height plat from in the ploy carbonate shed nets. The seeds of rough lemon were sown in lines @ 18 seeds / line and 10 line / plastic cerates. Completely Randomize Design (RBD), replicated thrice with ten treatments including control. six fungicides *viz.*, carbendazim WP 50 %, fosteyl Al WP 80 %, copper oxy chloride WP 50%, carbendazim12% WP+ mancozeb 63% WP, captan 50 % WP, metalaxyl 04% WP+ mancozeb 63% WP were selected for these experiment studies. Before sowing seeds are treated with these selected fungicides. Untreated seed served as control.

Statistical analysis :

The data obtained on disease intensity, pre and post emergence damping off, shoot length (cm) / per cent increase over control, root length (cm)/ per cent increase over control, dray weight (g) / per cent increase over control parameters were analyzed statistically to test the significance of each character at 5 % level of significance using procedure.

RESULTS AND DISCUSSION

The data on pre – and post – emergence damping off of rough lemon seedling in (Table 1 and Fig. 1) showed that minimum pre – and post – emergence damping off of 5.50 percent and 7.50 per cent was registered by seed treatment by carbendazim WP 50 % compared to 24.75 and 26.50 per cent in control. Carbendazim12% WP+ Mancozeb 63% WP caused 67.60 per cent and 64.15 per cent reduction in pre – and post – emergence damping off. The effect off captan 50 % WP in reducing the damping off of rough lemon seedling was at par with

Table 1 : Effect of fungicides seed treatment effect on seedling damping–off

Treatments	Damping off disease (%)			
	Pre- emergence	Percent reduction over control	Post – emergence	Percent reduction over control
Copper Oxy Chloride WP 50%	10.25 (18.62)	58.50	11.25 (19.55)	57.54
Fosteyl Al WP 80 %	09.50 (17.92)	61.60	11.00 (19.32)	58.49
Carbendazim WP 50 %	05.50 (13.49)	77.70	07.50 (15.85)	71.69
Carbendazim12% WP+ Mancozeb 63% WP	08.00 (16.35)	67.60	09.50 (17.85)	64.15
Captan 50 % WP	11.25 (19.55)	54.50	13.25 (21.28)	50.00
Metalaxyl 04% WP+ Mancozeb 63% WP	10.50 (18.82)	57.57	12.00 (20.19)	54.71
Control	24.75 (29.81)		26.50 (30.96)	
C.D. (P = 0.05)	2.56	-	2.54	-

*Figures in parentheses are arcsine transformed values. ** Mean of replications

Table 2 : Effect of fungicides seed treatment on growth of rough lemon seedling under poly carbobate shed nets

Treatments	Shoot length (cm)	Per cent increase over control	Root length (cm)	Per cent increase over control	Dray weight (g)	Per cent increase over control
Copper Oxy Chloride WP 50%	12.85	79.35	2.27	77.30	0.936	57.76
Fosteyl Al WP 80 %	12.80	79.82	2.15	83.79	0.930	58.67
Carbendazim WP 50 %	13.37	74.47	2.45	67.57	0.969	52.74
Carbendazim12% WP+Mancozeb 63% WP	13.12	76.81	2.32	74.60	0.953	55.17
Captan 50 % WP	11.60	91.08	1.87	98.92	0.922	59.88
Metalaxyl 04% WP+Mancozeb 63% WP	12.32	84.32	2.27	77.30	0.939	57.30
Control	10.65		1.85		0.658	
C.D. (P = 0.05)	0.460		0.345		0.0614	

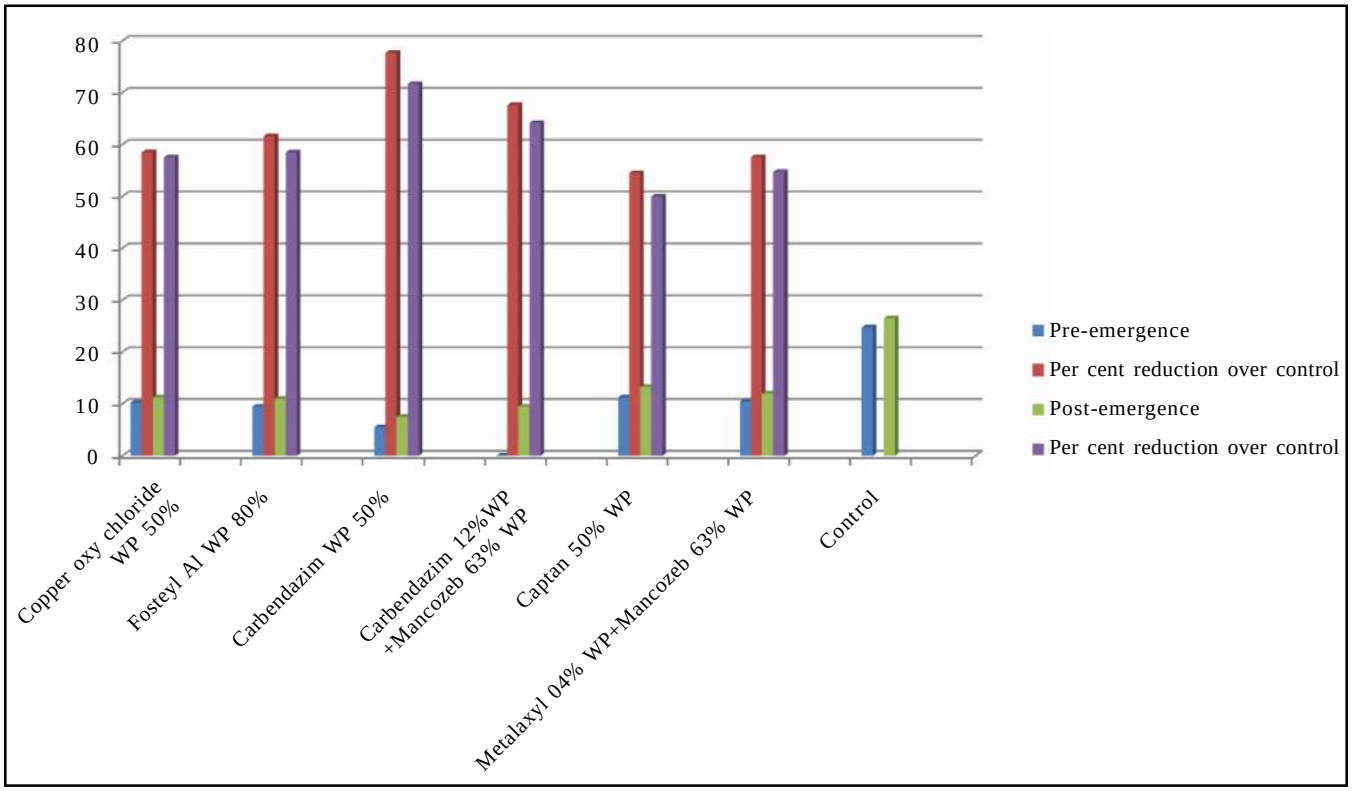

Fig. 1 : Damping off disease % (Pre- emergence and Post- emergence)

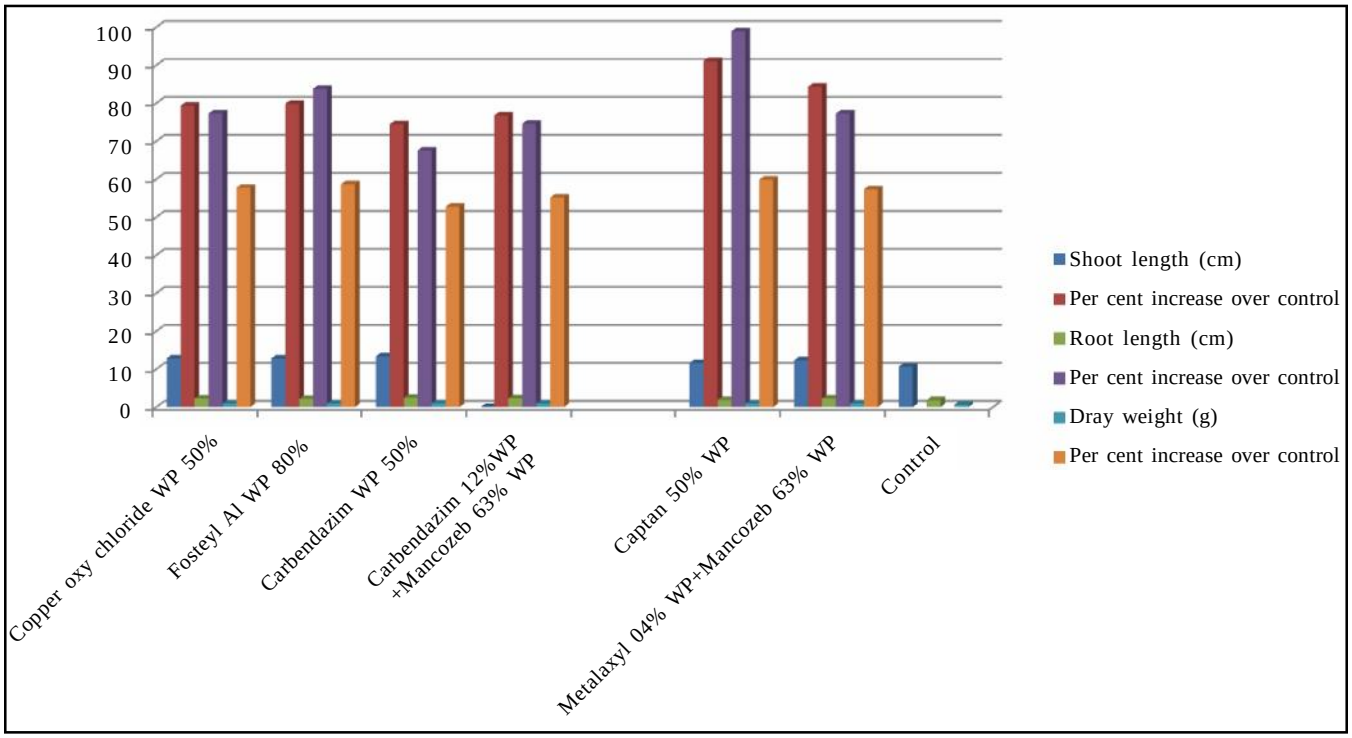

Fig. 2 : Shoot length (cm), root length (cm), dry weight (g) of rough lemon seedling

rest of treatment. Seed treatment of antagonists significantly reduced the pre – and post – emergence damping off of rough lemon (Navqvi, 2001). Reported seed treatment to fungicides more effective than seed palling for the control pre – and post – emergence damping off in citrus nursery (Howell, 2007).

The data regarding the effect of antagonists on the growth of rough lemon seedling presented in (Table 2 and Fig. 2) indicate that Carbendazim WP 50 %that maximum per cent in shoot length (13.37 cm / 74.47 %), root length (2.45 cm / 67.57 %) and dry weight (52.74 %) over control. This was closely followed Carbendazim12% WP+ Mancozeb 63% WP. The effect of Copper Oxy Chloride WP 50% in enhancing the growth of rough lemon seedlings was at par with fungicide Metalaxyl 04% WP+ Mancozeb 63% WP (Mehrotra and Garg, 1977).

Conclusion :

CONCLUSION

The present study it may be concluded that damping off in rough lemon seedling of citrus nursery could easily be reduced by fungicide seed treatment by Carbendazim WP 50 % and indicate that Carbendazim WP 50 %that maximum percent in shoot length (13.37 cm / 74.47 %), Root length (2.45 cm / 67.57 %) and dry weight (52.74 %) over control.

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