

Efficacy of Pesticides in the Management of White Tip Disease of Rice

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ABSTRACT

The efficacy of pesticides in the management of white tip of rice caused by *Aphelenchoides besseyi* by seed soak and spray was investigated. Vamadothion exhibited maximum % mortality of *A. besseyi* followed by quinalphos and theometon. Carbendazim, phosphamidon, quinalphos, fenitrothion, dimethiote and phosalone seeds revealed nematode free seedlings in 32 days old nursery of rice. Spraying of fenitrothion resulted in less sterile tillers, whereas cabendazim resulted in nematode free seeds and phosphamidon showed increased grain weight, yield, nematode free seeds and less % chaffy seeds.

Key words : *Aphelenchoides besseyi*, Pesticides, Management, Rice

Aphelenchoides besseyi caused yield loss up to 46.7% in paddy crop (Yoshii & Yamamoto 1951). Prasad and Varaprasad (1992) evaluated some organophosphates and carbamates pesticide against *A. besseyi*. A study was therefore, conducted to evaluate pesticides against *A. besseyi* and the results are reported herein.

Materials and Methods

500 g paddy seeds Cv. Pusa 4-1-11-1 infested at the level of 6 to 34 nematodes/seed with *A. besseyi* were loosely tied in muslin cloth and soaked in water for 24 hrs to activate the nematodes. Seeds were later dried at room temperature (25°C) for 3 hrs and further soaked in 0.1% solution of carbendazim, dimethiote, fenitrothion, formithion, malathion, monocrotophos, phosalone, phosphamidon, quinalphos, theometon, and vamadothion for a period of 24 hrs. Four lots each, consisting of 500 seeds from each treatment, were manually teased and placed on extraction assembly for the recovery of nematodes. Seedlings were raised in 50 cm. sterilized earthen pots, having steam

autoclaved soil and seeds of each treatment, were sown, covered with autoclaved soil and moisture was regulated with the sterile water. Observations on the incidence of the nematode disease were recorded up to 32 days after emergence. Effect of pesticides on seed health was recorded by counting the germinated seeds. The % mortality was assessed on the basis of inactive (non-motile) and active (motile) nematode population and was compared with the control.

Nursery of Pusa 4-1-11-1 nematode infested paddy seeds was raised and transplanted on the 21st day after germination in 20 cm earthen pots containing 10 kg steam sterilized soil compost (3:1) mixture. The soil was supplemented with full dose of NPK in the form of fertilizers. Each pot had two seedlings and five pots were maintained. Three foliar sprays of carbendazim, phosphamidon, fenitrothion and phosalone @ 0.05% at an interval of 15 days were given. The pots were randomised and yield was recorded. Observations on number of sterile tillers, grain weight, total yield, number of infested seeds.

nematode and number of chaffy seeds/plant were recorded.

Results and Discussion:

Seed soaked with carbendazim, phosphamidon, quinalphos, dimethiote and phosalone resulted nematode free seedlings. Seed soaked with vamadothion pesticides exhibited 20.8% mortality, whereas fenitrothion resulted 6.7%. Seeds disinfested with quinalphos and theometon showed maximum toxicity. (66 nematodes/100 seeds) whereas maximum (298 nematodes/100 seeds) non motile population was found in vamadothion followed by carbendazim (288), phosphamidon (287) and phosalone (287). The treatments vamadothion recovered minimum (267) nematode followed by quinalphos and theometon (274) (Table 1). Elimination of *A. besseyi* was observed in seeds disinfested with

pesticides but adverse effect on germination was recorded in fenitrothion, quinalphos and dimethiote that showed phytotoxicity at the tested concentration. Choi *et al.* (1989) tested different pesticides as seed disinfestant and found phenthoate to be the most effective in controlling *A. besseyi*. Siva and Silva (1992) tried carbofuran, thiobendazole, benomyl, and fenitrothion against *A. besseyi* infested seeds and found low reduction of the population. In the present study, carbendazim, phosphamidon, quinalphos, fenitrothion, dimethiote and phosalone proved much effective as seed disinfestant.

The data on spraying of pesticides (Table 2) revealed that both phosphamidon and fenitrothion reduced the number of sterile and significantly increased 1000 grain weight in all the treatments. The yield was 16.8% more in

Table 1

Effect of pesticides as seed treatment against *Aphelenchoides besseyi*

Pesticides	Germination (%)	Nematode population in treated seeds	Number of nematodes affected			Mean Nematode population in seedlings after	
			Dead	Inactive	% mortality	8th day	32th day
Formithion	95	318	33	259	6.7	3.6	3.6
Carbendazim	96	288	53	288	15.5	0.0	0.0
Malathion	98	293	46	221	13.4	2.6	2.2
Phosphamidon	96	306	34	287	9.9	0.0	0.0
Quinalphos	90	274	66	272	19.3	0.0	0.0
Theometon	94	274	66	239	19.3	2.0	1.8
Fenitrothion	90	282	59	225	17.3	0.0	0.0
Monocrotophos	95	289	52	289	15.2	1.0	0.8
Dimethiote	86	295	46	266	13.4	0.0	0.0
Vamadothion	95	267	71	298	20.8	8.5	8.0
Phosalone	86	289	54	287	17.3	0.0	0.0
Control	96	336	0	0	0.00	10.0	9.8

Table 2

Efficacy of pesticides sprays on the control of *Aphelenchoides besseyi* and yield

Pesticides	Sterile tillers/ (%)	Mean count			% chaffy seeds
		1000 grain wt (g)	% increased yield	Nematode Population in seed	
Carbendazine	7.1	23.0	10.0	0	7.94
Phosphamidon	5.9	23.5	16.8	0	8.58
Fenitrothion	5.9	22.3	11.4	28	10.52
Phosalone	18.7	22.3	5.8	72	13.31
Control	-	22.0	-	360	14.35
SEM	0.042				
CD (P= 0.05)	0.089				

phosphamidon followed by fenitrothion emerged as better pesticides against this disease under field conditions. Lesser chaffy seeds were observed after the spray. Gregon and Prot (1993) found benomyl effective against *A. besseyi*. Kumar and Sivakumar (1998) reported spray of monocrotophos more effective against *A. besseyi* in reducing chaffy seeds. In the present study, monocrotophos did not prove useful even as seed disinfestant, out of 11 pesticides tested, carbendazim resulted in high degree of disease management both as seed disinfestant as well as spray, phophamidon also remained at par in all respect followed by fenitrothion.

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