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Studies on the Seed Disinfection of White Tip Nematode, *Aphelenchoides besseyi* Christie with Certain Common Pesticides

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ABSTRACT

Seed disinfection studies were conducted in the laboratory for the control of rice white tip nematode with different pesticides. Among the wettable powders, carbofuran, aldicarb sulfone and methomyl (Lannate) had shown high percentage of nematode mortality with 11 to 29 per cent reduction in germination. The granular formulations of phorate, aldicarb, carbofuran and fensulfothion had recorded highest mortality of nematode with 90 per cent germination. Among emulsifiable concentrates, parathion, methyl demeton, fenthion, fenitrothion and Ortho-Bux caused 47.5 to 51.9 per cent mortality of nematode. There was 100 per cent germination in fenthion treated seeds whereas it ranged from 78 to 99 per cent in other treatments.

INTRODUCTION

The presence of white tip nematode of rice *Aphelenchoides besseyi* Christie, in Tamil Nadu was first reported by Muniappan and Seshadri (1964). The loss in yield due to nematode infection at the earhead stage was estimated to range from 401 to 768 kg/ha in the varieties ADT 27, Co 25 and TKM 6 by Muthukrishnan *et al.* (1974) and they also reported the efficacy of parathion spray during crop growth period in the plots raised with hot water treated seeds. As the primary source of infection being the seeds, through which the nematode is carried over from season to season and in view of certain practical difficulties in adopting hot water treatment, evaluation of certain pesticides was taken up.

MATERIALS AND METHODS

Five sets of laboratory studies with 18 emulsifiable concentrates, and one each with seven wettable powders and eleven granular formulations were carried out with the rice variety TKM 4. Ten g of seeds were steeped in 0.1 per cent concentration of E. C. and W. P. preparations. Similarly, the required quantity of granules at 1 kg a. i./ 100 kg of seeds was powdered and mixed with water and used. In all the cases steeping the seeds in water formed the untreated control. After 48 hours of soaking, the seeds were washed throughly with water,

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their husks were gently separated and left in petridishes with adequate water for examination of nematode population on the subsequent day. The treated seeds were divided into four lots of 25 each and maintained separately in petridishes. In each treatment 100 seeds selected at random were maintained separately over a moist blotting paper to study the effect on germination and growth vigour of sprouts and these observations were recorded on the 7th day after treatment. Mortality data were subjected to Abbott's correction and zero values were converted to 0.01 per cent before converting them into corresponding angles for statistical interpretation.

RESULTS AND DISCUSSION

The data on the mortality of nematodes in different treatments, percentage germination and growth measurements of sprouts are furnished in Tables I-III. Among the wettable powders, carbofuran, aldicarb sulfone and methomyl (Lannate) had shown high percentage of mortality of 76.1, 64.8 and 50.2 respectively. However there was 11 to 29 per cent reduction in the germination of seeds, maximum being with carbofuran. In aldicarb sulfone and methomyl, the growth of sprouts was found to be better than other treatments. Of the granular formulations, phorate, aldicarb, carbofuran and fensulfothion have recorded 56.9 to 64.6 per cent mortality of nematodes as well as more than 90 per cent germination. In general, growth vigour of sprouts was affected in varying degrees by the granular formulations. Diazinon, chlorfenvinphos and endosulfan have severely affected growth of germinating sprouts. In the case of emulsifiable concentrates, parathion, methyl demeton, fenthion, fenitrothion and Ortho-Bux

TABLE I Efficacy of Wettable powders of certain pesticides on the seed disinfection of white tip nematode

Treatment (0.1%)	Mean % mortality	Germination %	Plumule length (cm)	Radicle length (cm)	No. of fibrous roots
BHC	27.7 (30.6)	91	6.3	7.8	4.1
DDT	14.0 (20.3)	98	6.5	9.3	5.7
Carbaryl	31.1 (31.6)	80	4.1	7.3	3.7
Bavistin	25.0 (28.9)	85	6.5	5.8	7.6
Aldicarb Sulfone	64.8 (54.0)	89	8.6	10.1	7.4
Carbofuran	76.1 (61.4)	71	7.3	9.2	5.9
Methomyl	50.2 (45.1)	85	8.9	10.1	7.7
Control	0.0 (0.6)	100	7.1	9.5	4.7
Leave of significance	0.01	—	—	—	—
C.D. (P=0.05)	13.9	—	—	—	—

Figures in parantheses are transformed values

TABLE II Efficacy of Granular Formulations of Certain Pesticides on the Seed Disinfection of White Tip Nematode

Treatment (1 kg a.i./100 kg)	Mean % mortality	Germination %	Plumule length (cm)	Radicle length (cm)	No. of fibrous roots
Carbofuran	62.1 (52.1)	94	6.6	8.9	9.0
Mephosfolan	21.6 (27.7)	94	4.5	7.1	6.3
Phenamiphos	6.4 (11.7)	97	6.1	5.1	5.3
Fensulfothion	64.6 (53.5)	91	6.0	5.5	6.3
Diazinon	23.1 (27.6)	4	0.9	2.6	4.1
Phorate	56.9 (49.1)	98	6.7	7.9	8.7
Phorate + BHC	23.9 (28.9)	91	6.1	8.0	8.6
Chlorfenvinphos	41.0 (40.1)	87	2.3	4.3	5.9
Aldicarb	59.0 (50.3)	96	4.6	6.4	6.7
Toxaphene	16.0 (23.4)	98	6.7	7.1	7.3
Endosulfan	4.5 (10.0)	95	2.7	3.5	7.9
Control	0.0 (0.6)	99	7.1	9.1	5.2
Level of significance	0.01				
C.D. (P=0.05)	8.7				

Figures in parentheses are transformed values

caused 47.5 to 52.0 per cent nematode mortality. There was 100 per cent germination in fenthion treatment while in others it ranged from 78 to

TABLE III Efficacy of Emulsifiable Concentrates of Certain Pesticides on the Seed Disinfection of White Tip Nematode

Treatment (0.1%)	Mean % mortality	Germination %	Plumule length (cm)	Radicle length (cm)	No. of fibrous roots
Phosphamidan	20.2 (26.4)	98	5.6	6.1	10.7
Fenthion	51.7 (46.0)	100	5.2	8.5	7.8
Fenitrothion	47.9 (43.8)	94	3.6	5.3	4.8
Endosulfan	20.3 (25.2)	85	6.1	9.5	8.1
Monocrotophos	13.0 (19.2)	100	5.2	6.8	9.6
Dichlorvos	26.2 (30.0)	78	6.6	8.7	5.8
Quinalphos	9.5 (16.4)	100	5.4	8.5	6.8
Methyldemeton	52.0 (46.2)	98	6.9	7.9	6.1
Chlorfenvinphos	15.6 (21.0)	98	5.6	7.7	5.2
Leptophos	32.5 (34.8)	99	5.7	8.2	6.6
Oxamyl	9.6 (15.9)	97	6.2	6.4	8.5
Parathion	49.4 (49.5)	96	4.2	9.9	7.2
Carbophenothion	5.9 (16.3)	56	8.1	7.6	5.2
Valexon	2.4 (8.6)	40	2.6	4.8	3.3
Ortho-Bux	47.5 (43.6)	93	6.6	4.3	5.1
Methamidophos	12.2 (17.6)	100	7.6	6.6	6.1
Chlorpyrifos	30.2 (33.4)	100	7.9	10.2	8.3
Phosalone	8.6 (14.7)	100	6.2	9.9	5.8
Control	0.0	100	6.3	6.9	10.3
Level of significance	0.01				
C.D. (P=0.05)	10.3				

Figures in parantheses are transformed values

99 per cent. The germination percentage in carbophenothion (trithion) and valexon treatments was conspicuously low. In general there was slight set back in the root growth with all the emulsifiable concentrates.

Gomi and Nakazato (1962) recommended steeping seed rice in 1 per cent solution of parathion for 8 hr after presoaking for 24 hr or 24 hr without presoaking. Sassen (ethyl thiocyano acetate) was found to be useful for disinfecting seeds (Yasu, 1968). Effectiveness of soaking seeds in Sassen 40, Dimecron 50 and Thibenzole 75 per cent was also reported by Vuong and Rodriguez (1970). It was also found by Templeton *et al.* (1971) that seed coating with Benlate 50 at 2-4 oz. per bushel to be effective while soaking for 12 hr in 1000 ppm solution did produce desired effect. The present studies have shown that the systemic products-carbofuran, aldicarb sulfone, fensulfothion, fenthion and phorate as well as parathion have high degree of nematocidal effect.

REFERENCES

GOMI, M. and H. NAKAZATO. 1962. Studies on the control of white tip disease of rice plants. *IV Proc. Kanto-Tesam Plant Prot. Soc.* 9 : 73.

MUNIAPPAN, R. and A. R. SESHADRI. 1964. On the occurrence of the white tip nematode of rice, *Aphelenchoides besseyi* in Madras State. *Madras agric. J.* 51 : 510-511.

MUTHUKRISHNAN, T. S., G. RAJENDRAN and J. CHANDRASEKARAN. 1974. Studies on the white tip nematode of rice. *Aphelenchoides besseyi* in Tamil Nadu. *Indian J. Nematol.* 4 : 188-193.

TEMPLETON, G. E., T. H. JOHNSON and J. T. DANIEL. 1971. Benomyl controls rice white tip disease. *Phytopathology* 61 : 1522-1523.

VUONG H. H. and H. RODRIGUEZ. 1970. Lutte Centre les nematodes du riz a Madagaskar. *Agron. trop.* 25 : 52-66.

YASU, M. 1968. Disinfection of rice seeds. *Japan agric. Res.* 3 : 6-9.