J. Mycopathol. Res. **44**(1) : 101-103 (2006)

Studies on factors affecting *Rhizoctonia bataticola* : VI. Insecticide

K. M. JHA AND N. D. SHARMA
Department of Plant Pathology, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur 482004, M. P.

The effect of endosulfan, monocrotophos, trizophos, cypermethrin, dimethoate, ethion and metasystox were investigated at the rate of 50 per cent of their commercially recommended rates, on the mycelial growth and sclerotial morphology of the isolates of *Rhizoctonia bataticola* in laboratory condition. In all the experiments a significant inhibition in mycelial growth was observed. Endosulfan and metasystox were the most and least effective, respectively. Monocrotophos and trizophos followed endosulfan in their fungitoxicity. Ethion, cypermethrin and dimethoate were at per with each other in their effect.

Key words : *Rhizoctonia bataticola*, insecticides, mycelial growth, sclerotia production

INTRODUCTION

Insect pests are one of the major agents causing the damage to crops. With commercialization of agriculture industry, insecticides play an important role in high crop productivity management system. It becomes an important part in sustainable agriculture. Mostly, the insecticides are being applied on foliage. Soil pathogens are more likely to be affected since all insecticides reach the soil sooner or later irrespective of their method of application. The effect of insecticides, those are widely used for insect control in soybean, cotton etc. on the mycilial growth and sclerotia production of *Rhizoctonia bataticola* has been studied.

MATERIALS AND METHODS

Six insecticides viz., dimethoate 30%E (rogar), monocrotophos 36%SL (phoskill), endosulfan 35% EC (endocel), cypermethrin 25%EC (cymbush), trizophos 40%EC (hostathion), ethion 50%EC (dhanumit) and methyl-o-demeton (meta-systox) were tested *in vitro* against seven selected isolates of *R. bataticola* (Jha, 2004) by employing poisoned food technique. The concentrations of the insecticides used for testing were 50% of their recommended dose as 1ml/1, 1.5ml/1, 0.5ml/l, 1ml/l, 1ml/l and 1ml/l. Required quantity of insecticides were dispensed aseptically in autoclaved molten Asthana and Hawker's medium so as to get requisite concentration. A control was maintained without insecticides. The amended medium was poured equally and aseptically into each sterilized petri-plates, so that three replications of each treatment can be made. After 24 h, the poured petri-plates were inoculated with eight-mm mycelial discs from the margin of seven days old cultures of *R. bataticola* isolates. The inoculated petri-plates were incubated at 29±1°C and observations for growth and morphological characters were recorded on 3rd and 5th day of incubation.

RESULTS AND DISCUSSION

It is evident from Fig. 1 and Table 1 that different insecticides showed different kinds of effects on mycelial growth and sclerotial morphology. Although all the insecticides tried inhibited the mycelial growth of the fungus, but endosulfan was most effective followed by monocrotophos and trizophos. Ethion, cypermethrin and dimethoate

Table 1 : Effect of insecticides on the morphological characters of different isolates of *R. bataticola* isolates

Insec -ticide	Isolate	Conc. (ml/l)	Colony	Hyphae	Sclerotia			
			Pattern / Margin	Pattern / Colour	L × W (μ)	Size / Shape	Pattern / Initiation	Colour
Control	Rb1	Nil	Appr./Even	Dn/LB to B	112.11 × 99.26	Md/R to O	Dn / Ely	DB
	Rb2		Flocc./Wavy	Dn/LB to B	106.44 × 92.21	Md/R to O	Dn / Ely	DB
	Rb3		Cottony/Wavy	Dn/B	85.61 × 75.05	Small/R to O	Dn / Ely	DB
	Rb4		Appr./Even	Sp/B	127.21 × 108.29	Large/R to O	Dn / Ely	Bl
	Rb5		Flocc./Even	Dn/LB	108.32 × 100.11	Md/R to O	Dn / Ely	DB
	Rb6		Appr./Even	Dn/B	119.34 × 109.69	Md/Irre	Dn / Ely	DB
	Rb7		Cottony/Wavy	Dn/B	100.88 × 85.54	Md/R to O	Sp / Ely	DB
Dimethoate (Roger)	Rb1	1	Appr./Abrupt	Dn/B	95.46 × 79.21	Md/Irre	Dn (c)* / Ely	DB
	Rb2		Flocc./Even	Dn/B	106.52 × 90.27	Small/R to O	Dn / Ely	DB
	Rb3		Flocc./Even	Dn/H to LB	72.44 × 64.59	Small/R to O	Sp / Ely	B1
	Rb4		Flocc./Irre	Sp/H to LB	103.59 × 83.68	Md/O to E	Dn / Ely	B1
	Rb5		Flocc./Irre	Dn/B	72.69 × 62.43	Small/R to O	Dn / Ely	B1
	Rb6		Appr./Wavy	Sp/H to LB	67.13 × 60.72	Small/Irre	Dn / Ely	B1
	Rb7		Flocc./Irre	Dn/B	108.69 × 96.31	Md/R to O	Dn / Ely	DB
Endosulphan (Endocel)	Rb1	1.5	Appr./Wavy	Sp/H	93.70 × 82.33	Md/Irre	Dn (c)* / Ely	B1
	Rb2		Flocc./Wavy	Sp/B	123.00 × 92.85	Large/E	Dn (c)* / Ely	DB
	Rb3		Flocc./Wavy	Dn/B	92.33 × 81.39	Md/R to O	Sp / Ely	DB
	Rb4		Flocc./Irre	Dn/B	104.81 × 90.18	Md/R to O	Dn / Ely	DB
	Rb5		Flocc./Even	Dn/B	62.00 × 57.30	Small/R to O	Dn / Dly	B1
	Rb6		Appr./Irre	Sp/H to LB	94.93 × 84.67	Md/R to O	Dn / Ely	B1
	Rb7		Flocc./Even	Dn/B	83.38 × 73.55	Small/Irre	Sp / Ely	B1
Cypermethrin (Cymbush)	Rb1	0.5	Appr./Even	Sp/H to LB	95.95 × 88.98	Md/Irre	Dn / Dly	B1
	Rb2		Flocc./Even	Sp/H	105.62 × 92.08	Md/R to O	Dn / Dly	B1
	Rb3		Flocc./Wavy	Dn/B	85.22 × 76.02	Small/R to O	Sp / Ely	B1
	Rb4		Flocc./Irre	Sp/H to LB	110.90 × 92.62	Md/Irre	Dn / Dly	B1
	Rb5		Flocc./Even	Dn/H to LB	108.61 × 99.21	Md/R to O	Dn / Dly	B1
	Rb6		Appr./Even	Sp/H to LB	97.50 × 91.00	Md/Irre	Dn / Dly	B1
	Rb7		Flocc./Wavy	Dn/LB1	82.90 × 73.55	Small/R to O	Dn / Dly	B1
Triazophos (Hostathion	Rb1	1	—	—	—	—	—	—
	Rb2		Flocc./Wavy	Sp/H to LB	90.52 × 78.92	Md/R to O	Sp / Dly	B1
	Rb3		Flocc./Irre	Dn/LB	70.42 × 60.32	Small/R to O	Sp / Ely	B1
	Rb4		Flocc./Irre	Dn/LB	114.56 × 93.43	Md/Irre	Dn / Ely	B1
	Rb5		Flocc./Wavy	Dn/B	93.13 × 81.75	Md/R to O	Sp / Dly	B1
	Rb6		—	—	—	—	—	—
	Rb7		Cottony/Irre	Dn/LB1	77.82 × 70.13	Small/Irre	Dn / Dly	B1
Monocrotophos (Phoskill)	Rb1	1	Appr./Irre	Sp/H to LB	101.36 × 89.76	Md/Irre	Dn (c)* / Ely	B1
	Rb2		Flocc./Wavy	Sp/LB	108.33 × 95.96	Md/R to O	Dn / Dly	DB
	Rb3		Flocc./Even	Dn/LB	75.69 × 63.84	Small/R to O	Sp / Ely	B1
	Rb4		Flocc./Irre	Sp/B	176.31 × 138.53	Large/E	Dn / Dly	DB
	Rb5		Flocc./Even	Dn/B	58.50 × 52.81	Small/R to O	Sp / Dly	B1
	Rb6		Appr./Even	Sp/H to LB	59.72 × 51.19	Small/R to O	Sp / Dly	B1
	Rb7		Flocc./Even	Dn/B	105.19 × 94.93	Md/R to O	Dn / Ely	B1
Ethion	Rb1	1	—	—	—	—	—	—
	Rb2		Flocc./Wavy	Dn/B	120.25 × 108.33	Large/R to O	Dn (c)* / Dly	DB
	Rb3		Flocc./Even	Dn/B	80.06 × 73.34	Small/R to O	Sp / Ely	DB
	Rb4		Flocc./Wavy	Dn/H to LB	133.65 × 107.65	Large/Irre	Dn / Ely	B1
	Rb5		Flocc./Irre	Dn/LB	113.75 × 99.21	Md/R to O	Dn / Ely	B1
	Rb6		Appr./Irre	Sp/H to LB	106.05 × 98.35	Md/Irre	Dn / Ely	B1
	Rb7		Cottony/Wavy	Dn/B	83.68 × 75.23	Small/Irre	Dn / Ely	B1
Metasystox (Methyl-O-dimeton)	Rb1	1	Appr./Irre	Sp/H to LB	96.25 × 83.33	Md/Irre	Dn / Dly	B1
	Rb2		Flocc./Wavy	Dn/B	160.36 × 117.36	Large/E	Dn / Ely	B1
	Rb3		Flocc./Irre	Dn/H to LB	102.11 × 94.76	Md/Irre	Sp / Ely	B1
	Rb4		Flocc./Irre	Dn/B	171.43 × 138.93	Large/E	Dn / Ely	DB
	Rb5		Flocc./Irre	Dn/B	171.90 × 135.13	Large/O to E	Dn / Ely	B1
	Rb6		Appr./Irre	Dn/B	118.41 × 105.61	Md/Irre	Dn / Ely	B1
	Rb7		Cottony/Irre	Dn/LB	121.61 × 108.92	Large/R to O	Dn / Ely	B1

Appr. — Appressed, Flocc. — Floccose, Irre — Irregular, Dn — Dense, Sp — Sparse, B — Brown, DB — Dark Brown, Bl — Black, LB — Light Brown, LB1 — Light Black, Md — Medium, R — Round, O — Oval, E — Elongated, Ely — Early, Dly — Delayed, H — Hyaline, (c)* — Coalescence present : individual sclerotia has the identity.

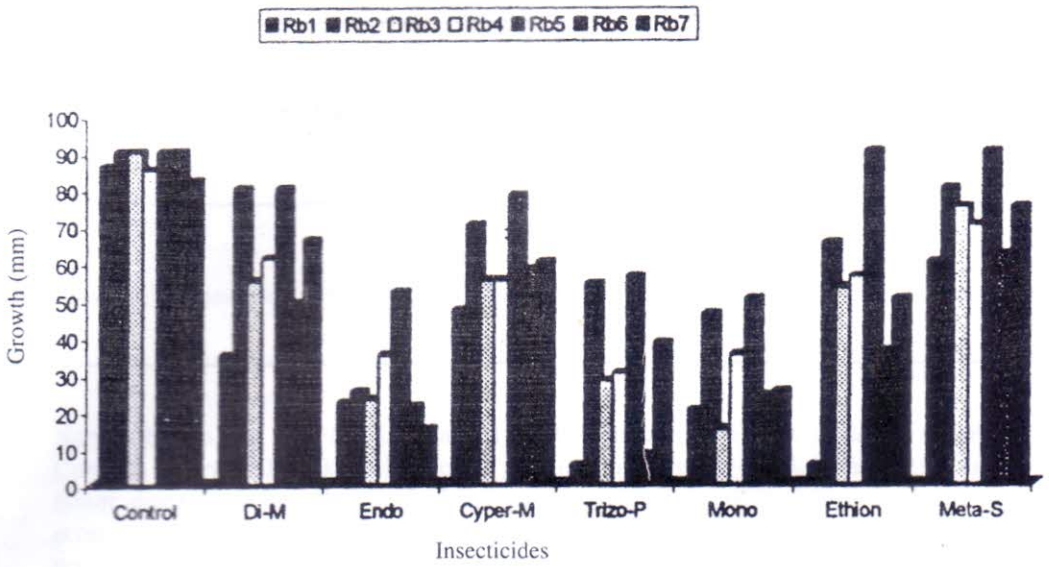

Fig. 1 : Effect of insecticides on the growth of different isolates of *R. bataticola*

were at par with each other in their effect. Very poor mycelial growth inhibition was observed in metasystox. Rai *et al.* (2000) reported that cypermethrin, endosulfan, monocrotophos and metasystox significantly inhibited the growth of *Rhizoctonia solani* at 500, 100 and 50 ppm concentrations. Dubey (1991) reported endosulfan and monocrotophos were found effective in reducing saprophytic survival of *Macrophomina phaseolina* in soil.

Sensitivity and tolerance of isolates were found to vary in different treatments. Isolates Rb2 and Rb5 were observed some what tolerant that other isolates in all the treatments. No or least growth only over the disc was observed in isolates Rb1 and Rb6 in trizophos and Rb1 in ethion.

Such behaviour of the isolates may be due to strain difference, providing them to be sensitive or to tolerate the different chemical nature of insecticides. Sclerotial characters of a few isolates were also observed to vary in different insecticides. In most of the treatments, the affected sclerotia were reduced in size, abnormal shaped, coalesced and were delayed in initiation. In some of the isolates sclerotial morphology remained unaltered in treatments but in metasystox sclerotial size was abnormally increased, indicating the presence of sclerotial size promoting factors in metasystox.

The fungitoxic properties of insecticides with primary target for the insects, may perhaps be due to their cuticular penetration abilities, may extend to fungal mycelia (Bhonde *et al.*, 1998). Precise mode of fungitoxic action of such chemicals needs to be elaborated by detailed studies.

REFERENCES

Bhonde, S. B., Deshpande, S. G. and Sharma, R. N. 1998. Fungitoxicity of some insecticides. *Curr. Sci.* **74** : 1039-1040.

Dubey, R. C. 1991. Effect of pesticides on saprophytic survival of *Macrophomina phaseolina* in soybean stems in soil. *Acta Botanica Indica.*, **19** : 36-40.

Jha, K. M. 2004. *Studies on factors affecting growth and sclerotial morphology of Rhizoctonia bataticola (Taub.) Butler (Macrophamina phseolina (Tassi) Goid.* M. Sc. Thesis, JNKVV, Jabalpur, India.

Rai, J. P., Dubey, K. S. and Sinha, A. 2000. Non-target effect of some insecticides on *Rhizoctonia solani*, the incitant of aerial blight of soybean, *Indian Phytopath.* **53** : 331-332.

(Accepted for publication November 9, 2005)