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Effect of chemical treatment of tuber in relation to tuber yield and development of scurfed tuber

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Eight chemicals viz ; acetic acid + zinc sulphate (1 : 1), agallol, emissan, thiram, indofil M-45, bavistin and companion were evaluated as tuber treatment to study their effect on plant stand, disease development and tuber yield in field. Tuber treated with acetic acid + zinc sulphate (1 : 1) or companion took minimum time of 11 days after planting for the seedling emergence. These were followed by tuber treatment with bavistin, agallol, emissan and indofil M-45. Similar statistical trend was also detected regarding the final plant stand in the field in case of all tested chemicals. However, tuber yield had been observed as the highest (252 q/ha) in case of tuber treated with companion and also minimum disease incidence (2%) and intensity (1.0) of scurfed tuber at the time of harvest were recorded by this treatment.

INTRODUCTION

Black scurf is one of the major constraints in the profitable cultivation of potato. The disease drastically reduces the yield and deteriorates the market quality thus hitting both the grower and consumers. Many varieties have gone out of cultivation due to black scurf. Literature on management of this disease through tuber treatment is fragmentory and also contradictory. The present study has, therefore, been undertaken as an attempt to examine efficacy of different chemicals on *Rhizoctonia solani* in field conditons.

MATERIALS AND METHODS

The experiment was conducted at Tirhut College of Agriculture farm, Dholi (Muzaffarpur), a campus of Rajendra Agricultural University, Pusa (Samastipur), Bihar during winter (*Rabi*) season of 2001-2002. A susceptible variety of potato (Ashoka) infected with sclerotia of *Rhizoctonia solani*, having almost similar type of infection pattern, was selected. These tubers were dipped for 20 minutes in the solution of under noted treatments and concentration as per the response recorded in case of sclerotial treatment in laboratory condition. The treatments are acetic acid + zinc sulphate (1.0%), agallol (1.0%), emissan (0.5%), thiram (0.2%), indofil M-45 (0.2%), bavistin (0.05%), companion (0.2%) and distilled water (check). All these eight treatments were planted in randomised block design with 3 replications. The gross and net plot size was 4.8 × 4 m and 3.6 × 3.6 m respectively with plant spacing of 60 × 20 cm. Responses of these treatments were correlated with the speed of tuber germination, plant stand in the field and scurfed tuber. Benefit : cost ratio was also calculated to find out the most effective and economical chemical for the management of the disease.

RESULTS AND DISCUSSION

On the plant stand and tuber yield

It is very much clear from the data presented in Table 1 that seed material treated with acetic acid + zinc sulphate (1:1) @ 1% or companion (0.2%) took minimum time of 11 days after planting for seedling emergence. These were followed by seed treatment with bavistin, agallol, emissan and indofil M-45. Treatment of tubers in distilled water took 17 days for emergence of seedling after planting. However, statistical comparison of data regarding inter-

val of seedling emergence after planting indicate statistically similar response in case of all tested chemical except thiram. These findings are closely related to the findings of Jalali *et al.* (1981) and Gupta *et al.* (1981). However, tuber yield has been observed as the highest (252 q/ha) in case of tuber treated with companion. In this case also the yield trends in all the tested chemicals were statistically at per and significantly superior to check.

Table 1 : Effect of chemical treatment of tuber on plant stand and tuber yield

Chemical	Concentration	Interval of seedling appearance after planting (days)	Fine plant stand (%)	Tuber yield (q/ha)
Acetic acid + Zinc sulphate (1 : 1)	1.0	11	97	248.0
Agallol	1.0	14	98	247.0
Emissan	0.5	14	98	248.0
Thiram	0.2	15	96	245.0
Indophil M-45	0.2	14	97	246.0
Bavistin	0.05	12	97	250.0
Companion	0.2	11	98	252.0
Check	Distilled water	17	92	215.0
CD at 5%		3.0	2.0	8.0

On disease development

Data presented in Table 2 revealed that seed treatment with companion showed the minimum incidence (2%) of scurfed tubers at the time of harvest and was followed by emissan, agallol and bavistin. However, thiram proved least effective showing incidence and intensity as 10 per cent and 1.5 respectively. These findings are closely related to the findings to Jhooty and Bains (1973) who concluded that the isolates of *R. solani* were more sensitive to systemic than to non-systemic fungicides. Tuber seed used as check by treating in distilled water proved statistically inferior to all treatments indicating scurfed incidence and intensity of 15 per cent and 1.8 respectively.

Table 2 : Effect of chemical treatment of tuber on the development of scurfed potato

Chemical	Concentration	Disease development	
		Incidence (%)	Intensity (0.4)
Acetic acid + Zinc sulphate (1 : 1)	1.0	8	1.2
Agallol	1.0	7	1.4
Emissan	0.5	7	1.3
Thiram	0.2	10	1.3
Indophil M-45	0.2	8	1.3
Bavistin	0.05	4	1.0
Companion	0.2	2	1.0
Check	Distilled water	15	1.8
CD at 5%		2	0.1

REFERENCES

Gupta R. B. L. ; Mahrishi, R. A. and Shivpuri, A. 1981. Combating black scurf (*Rhizoctonia solani*) of potato through chemicals. Proc. Third Intern. Symp. Plant Path. New Delhi, India, pp. 271.

Jalai, I. ; Singh, C. B. and Pandita, M. L. 1981. Effect of fungitoxicant and soil amendment on the control of Black scurf (*Rhizoctonia solani*) on Potato PROC. third International. Symp. Plant Path. ; New Delhi, India, pp. 271.

Jhooty, J. S. and Bains, S. S. 1973. Evaluation of different systemic and non-systemic fungitoxicants for the control of damping off of mung caused by *Rhizoctonia solani*. *Indian Phytopath.* **25** : 509-512.

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