

Effect of new seed dressing fungicides on seedling mortality and yield parameters of soybean

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Studies on effect of some new seed dressing fungicides on germination per cent, seedling mortality, nodulation, plant height and yield of soybean was studied. Data revealed that seed treatment with captan + carbendazim was found best in terms of emergence, mortality, plant height, nodulation and yield followed by thiram + carbendazim and thiram alone. Seed treatment with carboxin showed some phytotoxicity.

Key words : Soybean, seed dressing fungicide

INTRODUCTION

Soybean [*Glycine max* (L.) Merr.] is an most important kharif crop of Madhya Pradesh, but from last 3-4 years it is suffering severely from many seed and soil borne pathogens which reduce the plant population in the field. *Rhizoctonia solani*, *Rhizoctonia bataticola*, *Sclerotium rolfsii* and *Fusarium solani* are the major pathogens responsible for seedling mortality. Elimination of soil borne inoculum is very difficult due to prolonged saprophytic survival ability of the pathogens. Seed treatment with fungicides is the cheapest method of plant disease management. It not only protects the seed and seedlings from soil-borne inoculum but also provides protection from seed borne pathogens. In the present investigation effect of different new seed dressing fungicides and their combinations were evaluated.

MATERIALS AND METHODS

A field experiment was conducted during kharif season of 2000. Soybean var-JS. 80-21 was sown on 5th July 2000 with eight different treatments (Table 1) of seed dressing fungicides at the LSF area Adhartal of J. N. Krishi Vishwa Vidyalaya, Jabalpur. Seeds without fungicide treatment were considered as control. Three replications of each treatment were arranged in a randomized block design with 1.5 × 3 m plot size.

Observations on emergence percentage (20 days after sowing), seedling mortality at 20 days interval till maturity were recorded and total per cent mortality was calculated. Plant height of 5 plants was recorded by uprooting randomly selected plants at maturity from each replication of each treatment and finally grain yield was also recorded at the time of harvest.

For nodulation studies, fungicide treated seeds from the same lot were inoculated with peat based inoculant of *Rhizobium japonicum* prior to sowing and then sown in pots separately. Five plant samples were randomly uprooted from each pot after 50 days of sowing. The roots were carefully washed with water and nodule counts were made after detaching from roots of the plants.

RESULTS AND DISCUSSION

Advantages of the fungicidal seed treatment are well known and various workers have reported improvement in seedling emergence and yield as also reduction in the seed-borne diseases of soybean with various fungicidal seed treatments (Duke *et al.*, 1968 ; Nene *et al.*, 1969 ; Krikpatrick *et al.*, 1973 ; Singh *et al.*, 1973 ; Chamberlain and Grayk, 1974).

The present investigation revealed that (Table 1) plant emergence was highest in thiram followed by

thiram + carbendazim and captan. Increased emergence and nodulation were observed in soybean with captan and thiram seed treatment (Nene, 1969). Vitavax 200WP showed minimum (1.67%) mortality followed by captan + carbendazim (2.4%) and carbendazim + mancozeb (3.9%). Captan + carbendazim was found superior for plant height, yield and number of nodules/plant. Similar observations were recorded by Thomas (1983).

Table 1 : Effect of new seed dressing formulations on emergence, mortality, plant height, no. of nodule/plant and yield of soybean

Treatment	Emergence %	Mortality %	Height (cm)	No. of nodules/plant	Yield (kg/ha)
Carboxin 37%+Thiram37% Vitavax 200WP@0.2%(T ₁)	67	1.6	52	10.90	615
Carboxin 20%+Thiram20% Vitavax 200WP@0.25(T ₂)	57	5.2	56	11.92	644
Carbendazim 12%+Mancozeb 37% (SAFF) @ 0.25 (T ₃)	69	3.9	61	13.50	800
Thiram @ 0.2%+Carbendazim @ 0.1% (T ₄)	82	4.0	63	19.00	888
Captan @ 2% + Carbendazim @ 0.1% (T ₅)	79	2.4	65	21.00	888
Carboxin 75 WP @ 0.2% (T ₆)	53	15.0	54	12.75	680
Thiram 75 WP @ 0.3% (T ₇)	84	5.5	61	18.87	888
Captan 75 WP @ 0.3% (T ₈)	81	6.8	60	18.00	837
Untreated control (T ₉)	63	7.4	64	12.10	740

SEM ± 111.11
CD 331.1

The yield differences were non-significant due to drought condition. However, the highest yield was achieved in case of three treatments viz ; thiram @ 0.2% + carbendazim @ 0.1%, captan @ 0.2% + carbendazim @ 0.1% and thiram 75 WP @ 0.3%. Poor and delay in emergence and poor nodulation were recorded by the treatments vitavax 200 wp at @ 0.2 (67%), vitavax 200 FF @ 0.25% (57%) and carboxin 75 WP @ 0.2% (53%) as compared to control 63%. Furtodes (1977) also observed that seed treatment with oxycarboxin and carboxin decreased nodulation in soybean. These treatments

also caused drastic reduction in height as recorded 52, 56 and 54 cm respectively in comparison to control 64 cm. Phytotoxicity was observed only in vitavax 200 FF @ 0.25%. Overall treatments of captan @ 0.2% + carbendazim @ 0.2% was found best among seed dressing formulations. The treatment by thiram @ 0.2% + carbendazim @ 0.2% and thiram 75 WP @ 0.3% were also found suitable for soybean seed treatment. Our results agree with the findings of Thomas (1983) and Ganacharya (1978).

As some of the treatments have shown delay and poor emergence, reduction in height and phytotoxicity, it is suggested that more study is needed involving more genotypes popular in cultivation. Moreover this study should be taken over years.

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