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EFFECT OF SEED TREATMENT WITH FUNGICIDES AND INSECTICIDES ON THE VIABILITY OF PEARL MILLETSEEDS DURING STORAGE

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Seeds treated with carbendazim at 2 g+ thiram at 6 g per kg and thiram at 6 g per kg of seed recorded higher germination than untreated seeds. A standard slurry treatment of DDT 50% WPat 200mg with 2 g of thiram per kg of seed also recorded higher germination. However germination in seeds treated with HCH and malathion at 10 g per kg of seed recorded lower germination.

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Nowadays it has become a general practice to treat the seeds with fungicides to control the seed borne fungi. In Denmark a profit of 8 to 9 million dollars was obtained in a single year by cereal seed treatment with fungicides (Stapel, 1966). Sivaprakasam *et al.*, (1975) reported higher germination in sorghum seeds treated with thiram, benomyl, carboxin and captan at 0.2 per cent throughout the period of 8 months of storage. The present study reports the efficacy of fungicides and insecticides on the viability of pearl millet seeds during storage.

MATERIALS AND METHODS

Freshly harvested pearl millet seeds of cultivar Co. 7 were dried to 10 per cent moisture content and treated with fungicides, insecticides and also their combinations. Five hundred grams of seeds were treated with fungicids *viz.*, carbendazim at 2 g per kg thriam at 6 g per kg and carbendazim at 2 g + thiram at 6 g per kg and insecticides *viz.*, HCH 10% dust, malathion dust and activated kaolin at 10 g per kg as dry seed dressing. The seeds were shaken with fungicides and insecticides in a plastic container for 15 minutes. In the combination of seed treatment with fungicides and insecticides the seeds were treated first with fungicides and 24 hours later with insecticides and stored. A standard slurry treatment of DDT 50% WP at 200 mg with 2 g of thiram per kg of seed. In the

Table 1. Interaction between fungicides and periods on the viability of seeds in per cent

Fungicide	Period after seed treatment in months						
	0	1	2	3	4	5	Mean
Carbendazim	81.50 (64.84)	81.00 (64.46)	80.75 (64.32)	83.00 (65.78)	78.50 (62.55)	73.50 (59.20)	79.71 (62.53)
Carbendazim+Thiram	88.00 (70.17)	83.00 (65.96)	84.50 (67.09)	80.50 (64.32)	81.50 (65.09)	78.00 (62.24)	82.58 (65.81)
Thiram	88.00 (70.10)	84.00 (67.13)	83.50 (66.61)	82.00 (66.26)	77.50 (62.00)	75.50 (60.76)	81.75 (65.48)
Control	78.00 (62.10)	80.50 (63.95)	80.00 (63.60)	78.00 (62.22)	76.50 (61.45)	76.50 (61.08)	78.25 (62.40)
Mean	83.88 (66.80)	82.13 (65.38)	82.19 (65.40)	80.88 (64.65)	78.50 (62.77)	75.88 (60.82)	

(Figures in parentheses represent transformed values)

	S. E.	C. D. (P=0.05)
Comparison of significant effects		
Periods	0.71	1.99
Fungicides	0.58	1.63
Fungicides and Periods	1.42	N. S.

Table 2. Interaction between insecticides and periods on the viability of seeds in per cent

Insecticides	Period after seed treatment in months						
	0	1	2	3	4	5	Mean
HCH	82.00 (65.17)	80.50 (63.98)	83.00 (65.82)	80.00 (63.53)	77.50 (61.95)	74.50 (59.80)	79.58 (63.38)
Malathion	81.00 (64.36)	77.50 (61.77)	77.25 (61.75)	77.50 (61.87)	73.50 (59.18)	70.00) (56.91)	76.13 (60.97)
Activated Kaolin	85.50 (68 01)	83.50 (66.31)	85.00 (67.59)	84.50 (67.03)	81.00 (64.36)	78.00 (62.08)	82.92 (65.90)
Control	87.00 (69.67)	87.00 (69.45)	83.50 (66.45)	81.50 (66.15)	82.00 (65.60)	81.00 (64.50)	83.17 (66.97)
Mean	83.38 (66.80)	82.13 (65.38)	82.19 (65.40)	80.88 (64.65)	78.50 (62.77)	75.88 (60.82)	

(Figures in parentheses represent transformed values)

Comparison of significant effects

	S. E.	C. D. (P=0.05)
Periods	0.71	1.99
Insecticides	0.58	1.63
Insecticides and Periods	1.42	N.S.

slurry treatment the seeds were treated with chemicals in a flask in which 0.125 g of gum and 5 ml of water per kg of seed were added and shade dried for one day. One lot of seed was left untreated to serve as control. The treated and untreated seeds were stored in gunny bags for five months at laboratory conditions (30±2°C) and relative humidity varying from 60 to 90 per cent. The germination test was conducted by roll towel method proposed by International Seed Testing Association (1976).

RESULTS AND DISCUSSION

Seeds treated with carbendazim+ thiram and thiram recorded higher germination percentages of 82.58 and 81.75 respectively as against 78.25 in control. There was no significant change in germination percentage upto a period of two months after seed treatment (Table 1). Gewal and Kapoor (1966) reported that treatment with fungicide prolonged the viability of seeds. The beneficial effect of seed treatment with fungicides on germination was reported by Suhag (1973) in soyabean and Sivaprakasam *et al.*, (1975a, 1976a, 1976b and 1977) in sorghum and sunflower. Mahendre Pal and Grewal (1985) found that seed treatment with a combination product of carbendazim + thiram had beneficial effects on germination in

Table 3. Interaction between treatments (DDT+Thiram (standard) and rest of treatments) and periods on the viability of seeds in per cent

Treatment	Period after seed treatment in months						
	0	1	2	3	4	5	Mean
Rest of treatments	83.88 (66.80)	82.13 (65.38)	82.19 (65.40)	80.88 (64.65)	78.50 (62.77)	75.88 (60.82)	80.58 (64.30)
DDT+Thiram (Standard)	86.00 (68.08)	90.00 (71.65)	84.00 (68.08)	86.00 (68.50)	84.00 (66.58)	84.00 (63.42)	85.67 (67.72)
Mean	84.00 (66.88)	82.59 (65.77)	82.29 (65.55)	81.18 (64.87)	78.82 (63.00)	76.35 (61.18)	

(Figures in parentheses represent transformed values)

Comparison of significant effects

	S. E.	C. D. (P=0.05)
Periods	0.71	1.99
Treatments	0.29	0.81
Periods and Treatments	0.71	N.S

pigeonpea. Seeds treated with DDT + thiram also recorded higher germination (Table 3). Ramadoss and Sivaprakasam (1987) reported that seed treatment with carbendazim in combination with an insecticide carbosulfan increased the germination of cowpea seeds. In the present study, germination in seeds treated with HCH and malathion recorded lower germination (Table 2). Minton (1972) reported that seed treatment with quintozene and disulfoton used alone and in combination reduced the germination of cotton seeds. Reduction in seed germination due to treatment with chlorpyriphos was also reported by Ramadoss and Sivaprakasam (1987).

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PATHOTYPE GROUPING OF *XANTHOMONAS CAMPESTRIS* PV. *ORYZAE* ISOLATES OF MADHYA PRADESH

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Bacterial blight (BB) of rice caused by *Xanthomonas campes ris* pv. *oryzae* (Dye *et. al.*, 1980) produces leaf blight and kresek. Blight form is more serious in rice growing districts of Madhya Pradesh (M. P.). Weather conditions *viz.*, average monthly, maximum temperature (31°c); minimum temperature (22°c) and relative humidity (92%) favour BB during the panicle initiation stage of the crop. Pathogenic variability of the organism from country to country and from location to location within a country has been fully recognised (Buddenhagen and Reddy, 1972 and Mew *et. al.*, 1982). Earlier Mohiuddin and Kauffman (1975) classified the Indian isolates in to eight groups, but later studies at All India CO-ordinated Rice Improvement Project, Hyderabad (1979) (presently Directorate of Rice Research) suggested only two pathotypes. Later studies at Punjab, Haryana, North West India and Tamilnadu indicated the prevalence of pathotype 1 only (Reddy, 1980, Mariappan *et. al.*, 1981, Durgapal, 1985 and Ahuja *et. al.*, 1986). Pathotypes of M. P. have been studied for the first time through this note.

Naturally occuring BB inoculum from five locations, representing major rice growing area of M.P. was used for the study. The differential varieties used for BB were inoculated at 50days affer seeding following clip inoculation method as suggested by Kauffman *et al.*, (1973). The tips of rice leaves are clipped off with scissors which have bacterial blight suspension on

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