

EFFECT OF SEED TREATMENT WITH FUNGICIDES, INSECTICIDES AND THEIR COMBINATIONS ON PERCENT SEEDLING EMERGENCE AND DEVELOPMENT OF DEAD HEARTS IN SORGHUM

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Sorghum (AKMS-14A) seed sample of kharif 1995 affected by rain and having 62 percent germination was treated with fungicide, insecticide alone and in combinations and stored. Seed treatment with Thiram + Bavistin was most effective resulting in 93% field emergence followed by 57.0% in Bavistin and 51.1% in Thiram. seed treatment as against 39.8% in control carbofuran exhibited synergist effect in improving seedling emergence when combined with Thiram, captan and Bavistin. Percentage dead hearts in field was (11, 7 to 17.9%) in seeds treated with fungicide as against 26.9% in untreated control. Thiram + carbaryl and Thiram Monocrotophos combinations exhibited antagonistic reaction.

Keywords : Antagonistic; Fungicides; Insecticides compatibility, sorghum; synergist.

Introduction

Grain mould is a major limiting factor in sorghum seed production especially when rain coincide with grain maturity. As a result of development of seed borne fungi, there is rapid deterioration in seed quality if such seeds are stored untreated. The mould on seed causes loss in germination and results in subsequent disease development in field. To prevent damage due to seed borne fungi and insect pests during storage and seedling stage, seed is often treated with fungicide as well as insecticide. Experiments were carried out during 1995-96 at Department of plant pathology Dr Panjabrao Deshmukh Krishi Vidyapeeth Akola to evaluate the compatibility of certain insecticides with fungicides sorghum seed treatment.

Materials and Methods

Sorghum (AKMS - 14A) seed sample of kharif 1995 resulted in discolouration and development of seed borne fungi due to late rains were selected for the study. Four fungicides viz. TMTD -75 SD @ 3g/kg, captan @ 3g/kg, carbendazim 50 WP @ 2g/kg and a mixture of TMTD + carbendazim @ 2 g each and five insecticides viz endosulfan 35 EC @ 5 ml, carbaryl 50 WDP @ 5 G, Monocrotophos 36 WSC @ 5 ml, BHC 10% @ 5g and carbofuran 50 sp @ 5g Per kg seed were used for seed treatment as alone and in combination also. After seed

treatment the seeds were stored in cloth bags under ambient conditions in laboratory (temp 22 to 41° C) for six months. For recording field emergence one hundred seeds in four rows were sown in field the next day after the seed treatment (before storage) Percentage seed germinated (seedlings emerged) were recorded after 7 days. Development of dead hearts in the seedling in field, was recorded at weekly interval and the final observation, at the end of third week.

Results and Discussion

It was observed that, Thiram + Bavistin seed treatment was most effective in improving field emergence (93.0%) followed by Bavistin (57.0%) and Thiram (51.1%) as against control (39.8%) (Table 1). Among the insecticides, only endosulfan seed treatment resulted in significant improvement of seedling emergence (42.2%). Seed treatment with other insecticides particularly, carbaryl was most harmful. Efficacy of Bavistin (57%) was enhanced by combination of carbofuran (84.3%), Monocrotophos (67%) and endosulfan (66%). Effect of captan (50.2%) was enhanced by combination of carbofuran and that of Thiram + Bavistin 65%), by carbaryl (60.1%) and endosulfan (58.9%). Effect of Thiram was improved when it was combined with carbofuran and carbaryl.

Table 1. Effect of interaction of fungicides insecticides and their combinations on percent seedling emergence and percent dead hearts due to shootfly in field.

Fungicide	Control	Insecticides						Mean
		Endosulfan 35 EC @ 5 ml	Carbaryl 50% WDP @ 5 g	Monocrotop hos 36WSC @ 5 ml	BHC 10% @ 5 gm	Carbofuran 50 SP @ 5 gm		
F1 Control	11	12	13	14	15	16		
Percent emergence	39.8	42.2	29.1	37.9	39.1	35.9	37.3	
Percent dead hearts	26.9	25.2	14.2	17.0	18.8	5.2	17.9	
F2 Thiram 75 SD @ 3 gm	51.1	62.2	59.1	50.2	50.2	59.1	55.3	
Percent seedling emergence	15.9	23.1	17.9	19.8	19.1	5.4	16.3	
Percent dead hearts	50.2	58.9	60.1	50.0	65.0	71.0	59.2	
F3 Captan 50 WP @ 3 gm	17.9	19.3	18.6	16.5	23.0	5.4	16.2	
Percent seedling emergence	57.0	66.6	57.9	67.0	56.0	84.3	65.2	
Percent dead hearts	11.7	22.8	14.2	12.9	10.6	4.4	12.2	
F4 Bavistin 50% WP @ 2 gm	93.0	80.0	35.9	71.2	81.9	90.0	77.1	
Percent emergence	13.1	16.5	15.1	20.7	12.7	5.4	13.5	
Percent dead hearts	59.9	62.1	48.3	55.4	58.9	69.6	5.2	
Mean	16.8	21.2	15.9	17.2	17.2	16.6		
Percent emergence	S.E. (m) ± CD(5%)	0.38 1.10	Fungicides (F) 0.38 1.10	Insecticides (I) 0.41 1.20	Fungicides x Insecticides (F x I) 0.93 2.7			
Percent dead hearts	S.E.(m) ± CD (5%)	0.25 0.73	0.28 0.80	0.63 1.80				

Although most of the test insecticides were compatible with fungicidal seed treatments, carbofuran exhibited synergistic effect with Thiram captan and Bavistin Peshney¹ had however observed enhanced fungitoxicity of Thiram and Ziram when combined with insecticides in seed treatment. Udaybhan *et al.*² reported compatibility of Endosulfan with Bavistin in wheat seed, Compatibility of Bavistin and Monocrotophos was reported by Shukla and Lal³. Patil⁴ noticed favourable effect of Endosulfan seed treatment on germination and yield.

In present study one of the object and treating the seeds with insecticide was to protect the seedling against shootfly incidence. It was observed that the test fungicides alone reduced the dead hearts (11.7 to 17.9%) as against (26.9%) in untreated seeds. Carbofuran was most effective in which only 5.2% dead hearts developed. Insecticide could also significantly reduced the dead heart percentage except that in endosulfan. Most favourable combination was Carbofuran with Bavistin (4.4% dead hearts). Thiram + Bavistin resulted in compatible reaction instead of synergism. While Thiram + Cabaryl and Thiram + Monocrotophos resulted in Antagonistic reaction. Carbofuran reduced dead hearts to 13.1% Jotwani⁵ had also reported effective control of shootfly with carbofuran seed treatment endosulfan however resulted in increased incidence of shootfly to 21.2% as against in

control. Patil *et al.*⁴ on the contrary reported 16.6% reduction in dead hearts due to endosulphan seed treatment. Thobbi and Jagan Mohan⁶ had reported compatibility of Furadan with Thiram. Mittal *et al.*⁷ also had obtained reduction in dead hearts due to carbofuran seed treatment. Compatibility of carbofuran with Thiram and Captan was earlier reported by Ramchandran and Reddy⁸. Anahosur *et al.*⁹ reported efficacy of carbofuran with captafol in reducing dead hearts and increase in yield.

Men *et al.*¹⁰ had reported control of dead hearts by Monocrotophos but more effectively by carbofuran seed treatment. Thus it can be concluded that for the control of dead hearts particularly carbofrun can be safely combined in seed treatment with thiram, bavistin or Thiram + Bavistin.

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