CONTROL OF SCLEROTINIA SCLEROTIORUM (LIB.) DE BARY AND ALTERNARIA SPP. IN SUNFLOWER SEEDS

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Abstract

The efficiency of seed treatment with different fungicides and mixtures was evaluated for the control of *Sclerotinia sclerotiorum* and *Alternaria* spp. in sunflower seeds. Achenes of the hybrid Contissol infected with *S. sclerotiorum* were treated with the following fungicides: benomyl (Benlate 50 WP) 3.5g a.i./kg; carboxin (Vitavax 75 WP) 5.25g a.i./kg; thiabendazol (Tecto 10) 1.4g a.i./kg; thiabendazol 1.4g a.i./kg + carboxin 5.25g a.i./kg; thiabendazol 0.7g a.i./kg + carboxin 2.625g a.i./kg. The treatments were evaluated by the blotter test, PDA and emergence in greenhouse. High levels of *S. sclerotiorum* and *Alternaria* spp. were observed in the untreated seeds in PDA and blotter. Carboxin 5.25g a.i. drastically reduced *Alternaria* spp. but had no effect on *S. sclerotiorum*. Thiabendazol 1.4g and benomyl 3.5g efficiently controlled *S. sclerotiorum*, but did not affect *Alternaria* spp. The mixture thiabendazol 1.4g + carboxin 5.25g was very effective in controlling the pathogens, and resulted in the best seed emergence index in greenhouse. Half dosage treatments were not efficient in controlling the pathogens. Based on the results, seed treatment with the mixture thiabendazol 1.4g + carboxin 5.25g is the most efficient way of reducing seed transmission and dissemination of those pathogens.

Introduction

The sunflower has been cultivated to some extent in Brazil for many years, but only recently special attention has been given by research institutions to this crop.

Several diseases occur in the field, and some of the most important are sclerotinia wilt and head rot, alternaria, phoma black stem, phomopsis stem blight, and more recently, downy mildew.

Sclerotinia wilt and head rot, caused by *Sclerotinia sclerotiorum*, is reported as very destructive to the crop in temperate, subtropical and tropical regions (Zimmer & Hoes 1978). According to Sackston (1960), seeds from infected heads frequently show *S. sclerotiorum*, however apparently healthy seeds may be infected by the fungus. Thus, it is recommended to utilize seeds produced in disease free fields, because infected seeds may serve as a vehicle of dissemination and introduction of the pathogen into new areas. The disease is difficult to be eradicated, since the sclerotia may remain viable in the soil for many years. Besides, the fungus is reported to attack more than 190 plant species, in 130 genera of 45 families (Adams et al 1974). Apparently, there is no genetic source of resistance, and the relative control of this disease may be achieved by the use of certain cultural

practices, such as wider row spacing, lower stand, crop rotation and different planting dates.

The alternaria diseases are considered as a limiting factor to the crop in some Brazilian regions, specially in areas where the crop was grown in the previous year. In this case, losses up to 100% has been observed. The species involved are mainly *Alternaria helianthi* (Hansf.) Tubaki & Nishihara and *Alternaria zinniae* Pape, which have been isolated from seeds and plant tissues in Brazil (Henning 1983).

This study was carried out to evaluate the efficiency of seed treatment with different fungicides and mixtures for controlling *S. sclerotiorum* and *Alternaria* spp. on sunflower seeds.

Materials and Methods

Three experiments were conducted, using achenes of the hybrid Contissol infected with *S. sclerotiorum* and *Alternaria* spp.

Experiment A: treatments were benomyl (Benlate 50 WP) 3.5g a.i./kg, carboxin (Vitavax 75 WP) 5.25g a.i./kg, thiabendazol (Tecto 10) 1.4g a.i./kg and non-treated check. One hundred seeds per treatment (four reps of 25 seeds-five Petri dishes with five seeds each) were placed on PDA (potato dextrose agar), and incubated for 30 days at 5 to 7°C. The incidence of fungus infection was recorded, and after this determination the seeds and seedlings were transfered to the greenhouse, and planted in trays containing nonsterilized soil to determine the seedling emergence.

Experiment B: in addition to the treatments described in Experiment A, it was included the mixture of thiabendazol (Tecto 10) 1.4g a.i./kg + carboxin (Vitavax 75 WP) 5.25g a.i./kg. The evaluations were the same as described above, with the inclusion of the blotter test, where the readings were made on eight-hundred seeds per treatment (four reps of 200 seeds-ten gerbox with 20 seeds each), after incubation for 30 days at 5 to 7°C.

Experiment C: it was conducted only on PDA, and two half dosage treatments were added: thiabendazol (Tecto 10) 0.7g a.i./kg + carboxin (Vitavax 75WP) 2.625 a.i./kg and thiabendazol (Tecto 10) 0.7g a.i./kg.

Results and Discussion

The data (Table 1) indicates that the untreated seeds (check) were heavily infected by *S. sclerotiorum* and *Alternaria* spp. (mainly *A. tenuis* Nees), except in PDA-treatment B, were *S. sclerotiorum* had overgrown the other fungi. Carboxin gave a good control of *Alternaria* spp, but had no effect on *S. sclerotiorum*. On the other hand, thiabendazol and benomyl were very effective in controlling *S. sclerotiorum*, but did not affect *Alternaria* spp. The mixture thiabendazol + carboxin, as shown in experiments B and C, completely controlled *S. sclerotiorum*, and drasticaly reduced the incidence of *Alternaria* spp, resulting in the best seedling emergence in the greenhouse. Half dosage treatments were no effective in controlling the fungi.

TABLE 1. Efficiency of the fungicide seed treatment of naturally infected sunflower seeds by *S. sclerotiorum* and *Alternaria* spp. EMBRAPA-CNPS. Londrina, PR. 1981.

Treatment	Pathogen	Infected Seed (%)				Emergence in greenhouse (%)	
		PDA			Blotter		
		A[1]	B	C	B	A	B
check	*S. sclerotiorum*	94	89	83	77	36	17
	Alternaria spp.	72	0	46	10		
carboxin	*S. sclerotiorum*	81	77	64	92	18	9
	Alternaria spp.	3	0	8	1		
thiabendazol	*S. sclerotiorum*	0	0	0	0	41	48
	Alternaria spp.	97	69	75	72		
benomyl	*S. sclerotiorum*	0	0	0	0	35	45
	Alternaria spp.	83	69	80	12		
thiabendazol + carboxin	*S. sclerotiorum*	-	0	0	0	-	62
	Alternaria spp.	-	0	13	10		
thiabendazol + carboxin[2]	*S. sclerotiorum*	-	-	3	-	-	-
	Alternaria spp.	-	-	61	-		
thiabendazol[2]	*S. sclerotiorum*	-	-	8	-	-	-
	Alternaria spp.	-	-	93	-		

[1]The capital letters A, B and C identify the three different experiments.

[2]Half dosage treatments.

Based on these results, the treatment of sunflower seeds with the mixture of thiabendazol (1.4g a.i./kg) + carboxin (5.25g a.i./kg) in an efficient measure to reduce the possibility of seed transmission of *S. sclerotiorum* and *Alternaria* spp.

References

ADAMS, P.B.; LUMSDEN, R.D. & TATE, C.J. 1974. **Galinsoga parviflora**: a new host for **Wetzelinia sclerotiorum**. **Plant Disease Reporter** 58, 700-701.

HENNING, A.A. 1983. Microflora associada com sementes de girassol (**Helianthus annuus** L.) no estado do Paraná. **In:** WETZEL, M.M.V.S. (Ed.) III Congresso Brasileiro de Sementes. ABRATES, Brasília, 88.

SACKSTON, W.E. 1960. **Botrytis cinerea** and **Sclerotinia sclerotiorum** in seed of safflower and sunflower. **Plant Disease Reporter** 44, 664-668.

ZIMMER, D.E. & HOES, J.A. 1978. Diseases. **In:** CARTER, J.F. (Ed.), Sunflower Science and Technology. American Society of Agronomy, Madison, 225-262.