

Efficacy of Some Fungicides Against Seed-Borne Infection of *Colletotrichum* Anthracnose and Ripe Rot of Pepper (*Capsicum frutescens*)

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ABSTRACT

Complete control of seed-borne infection of *Colletotrichum piperatum* and *C. capsici* causing anthracnose and ripe rot diseases of pepper (*Capsicum frutescens*), was obtained by seed treatment with Ceresan and Delsine at 0.16 and 0.8 percent of seed weight respectively. Seed treatments with Dithane M 45, Zincofol, Manzate D, Benlate and Demosan 10 D at 0.8, 0.5, 0.8, 0.5 and 0.05 percent of seed weight were found to reduce the disease 1.25, 3.75, 4.0, 5.38 and 17.75 percent of infection, respectively.

Other seed-borne fungi of pepper such as *Alternaria tenuis*, *Cladosporium* sp. *Fusarium moniliforme* and *Phoma* sp. were also observed.

Anthracnose and ripe rot of pepper (*Capsicum frutescens* Linn.), caused by *Colletotrichum piperatum* and *C. capsici* have a wide distribution in the commercial growing areas of Thailand. The disease is characterised by various symptoms such as circular, sunken spots on green or red fruits. The depressed lesions varying in size with pink or dark masses of fruiting bodies in the bottom of lesions on fruit surface. Pepper seeds as high degree of natural infection collected from infected fruit rot in various markets in Bangkok. The experiment was conducted to control seed-borne infection. The fungicides used in the studies were drawn from some of the important groups.

Materials and Methods

The pepper seed sample carrying natural infection of *Colletotrichum* anthracnose and ripe rot were dried before using (Fig. 1). The sample was divided into five lots, four of which were treated with Benlate, Terrachlor Super X, Benlate + Terrachlor Super X, Ceresan, Demosan 10 D, Delsine, Manzate D, Dithane M 45 and Zincofol at the rate of 0.5,

0.1, (0.5 + 0.1), 0.16, 0.05, 0.8, 0.8, 0.8, and 0.5 percent of seed weight, respectively; the fifth lot was left untreated for control and four hundred seeds were used for each treatment. The fungicides are applied to seed as the quick-wet method in flasks by hand shaking for approximately 1 minute, plated on moist blotters in Petri dishes, and incubated at room temperature (25-32C) under 12 hours of alternating cycles of near ultraviolet light and darkness.

The seed was examined for *Colletotrichum* infection after 6 days of incubation as recommended by De Tempe (2) for health testing of flax seed anthracnose. The plates were kept under observation for re-examination the full infection after 10 days.

Results and Discussion

Ceresan and Delsine at 0.16 and 0.8 percent of seed weight with 47.5 and 42.75 percent seed germination respectively gave complete control of seed-borne infection of *Colletotrichum* anthracnose and ripe rot of pepper as against 28.5

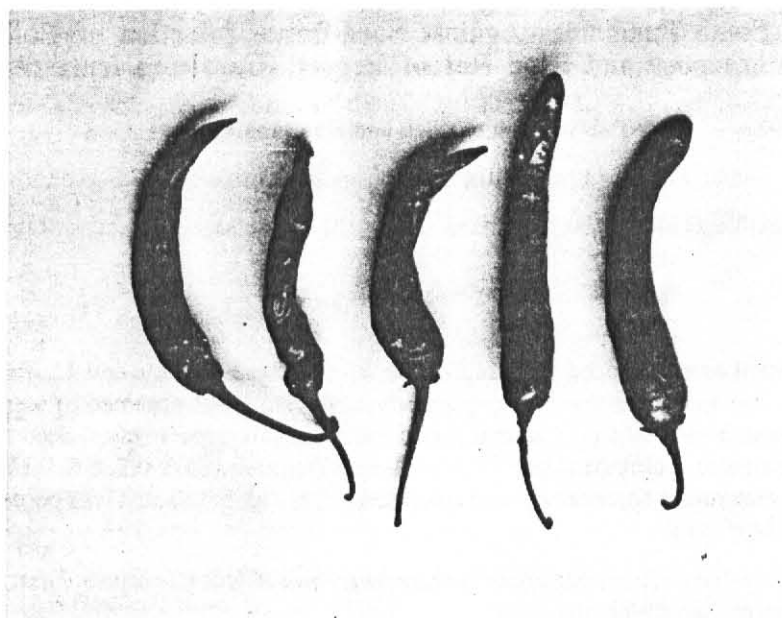


Fig. 1. Natural infection of anthracnose and ripe rot of pepper from market.

Table 1. Effect of fungicides on seed-borne infection of *Colletotrichum* anthracnose and ripe rot of pepper and seed germination.

Fungicide	Active ingredient	Dose % of seed weight	Percentage of seed germination	Percentage of infection
Untreated			43.43	28.5
Benlate	Methyl 1-(butylcarbamoyl)-2 -benzimidazolecarbamate	0.5	50.5	5.38
Terrachlor Super X	Pentachloronitrobenzene	0.1	49	20.1
Benlate + Terrachlor Super X	(mixed-)	0.5 + 0.1	63	6.25
Ceresan 3.2 Hg	Ethyl mercury chloride	0.16	47.5	0
Demosan 10 D	1-4-Dichloro-2, 5-di methoxybenzene	0.05	63.75	17.75
Delsine	Methyl 2-benzimidazole- carbamate	0.8	42.75	0
Manzate D	Manganese ethylene bisdithio- carbamate	0.8	46.25	4
Dithane M45	Manganese, zinc ethylene bisdithiocarbamate	0.8	26.5	1.25
Zincofol	Cis-N- (1,1,2,2-tetrachloroethyl) thio -4-cyclohexene -1,2-dicarboximide	0.5	50	3.75

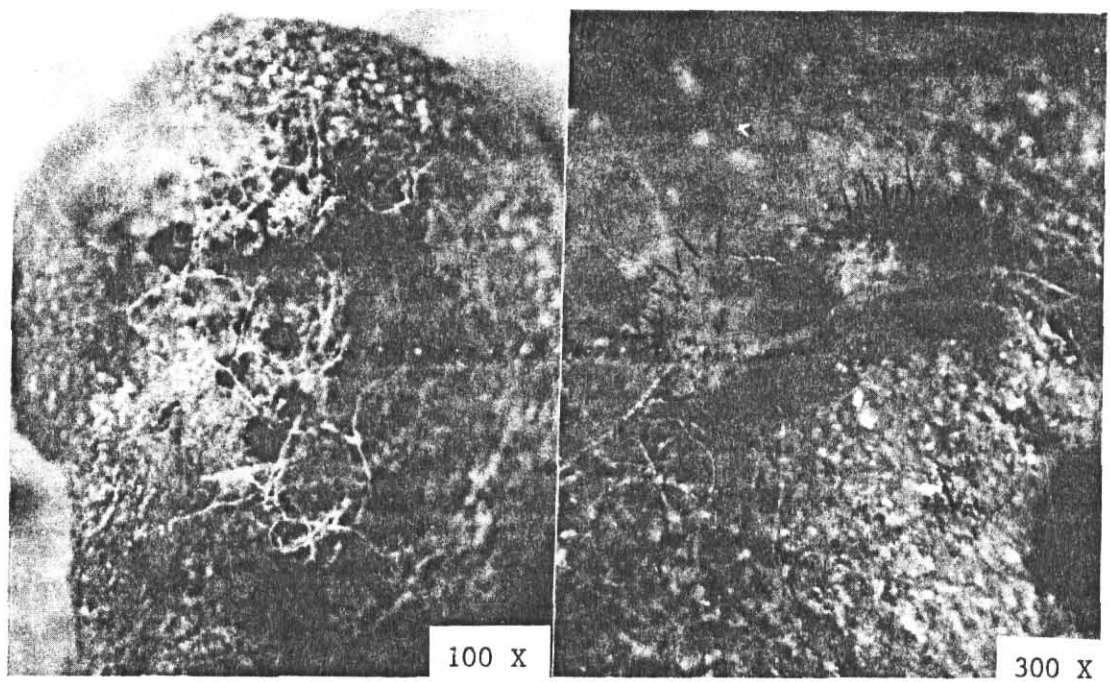


Fig. 2. Sugarlike pink spore pustules with black setae.

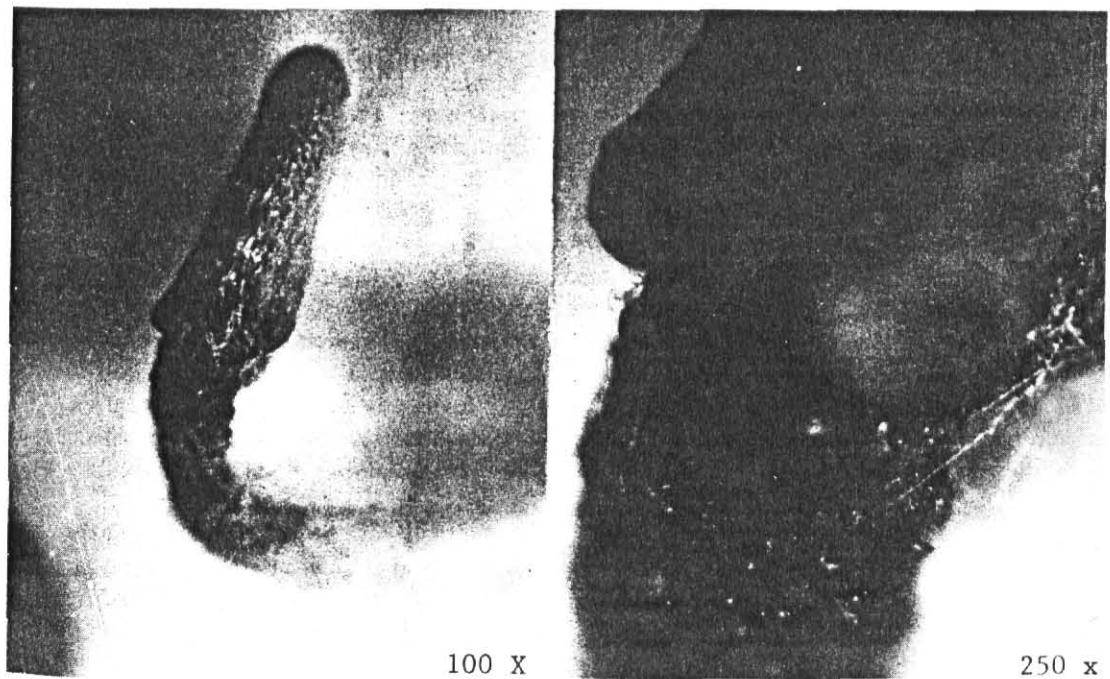


Fig. 3. Infected tissue of seedling cover with black setae.

percent infection and 43.43 percent seed germination in the untreated seed. This is similar to the report of Luksana and Anong (1) who found that pepper seed treatment with Ceresan 2 grams per 1 kilogram of seed weight gave complete control for *Colletotrichum* sp. and *Gloeosporium* sp. while 4.33 and 0.91 percent of infection were recorded in untreated seeds.

Seed treatments with 0.8 percent of Dithane M 45, 0.5 percent of Zincofol, 0.8 percent of Manzate D, 0.5 percent of Benlate and 0.05 percent of Demosan 10D showed the effective control to reduce the infection of 1.25, 3.75, 4.0, 5.38 and 17.75 percent with 26.5, 50, 46.25, 50.5 and 63.75 percent of germination, respectively. The results are given in Table 1.

Under the stereo-microscope detection after six days incubation of both treated and untreated seeds. The *Colletotrichum* acervuli are observed small sugarlike pink or whitish spore pustules with black setae (Fig. 2).

The seedling developed are appeared on infected tissue in dark-brown cover with black setae in 10 days (Fig. 3)

Based on an annotated list of seed-borne diseases by International Seed Testing Associa-

tion (3), the seed-borne fungi such as *Alternaria tenuis*, *Cladosporium* sp., *Fusarium moniliforme* and *Phoma* sp. were observed at 0.19, 2.29, 9.14 and 5.9 percent of infection in untreated seeds, respectively. The other fungi, *Aspergillus* sp., *Curvularia* sp., *Drechslera* sp., *Nigrospora* sp., *Chaetomium* sp., *Penicillium* sp. and *Memnomilla* sp. were also observed.

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