

FUNGICIDAL CONTROL OF ASCOCHYTA CHRYSANTHEMI

G. L. CRANE AND C. JACKSON

Yoder Bros. of Florida, Inc.
Ft. Myers

ABSTRACT

Four materials, Daconil, Benlate, Phaltan, and TBZ were compared to Captan as weekly sprays for the control of *Ascochyta chrysanthemi*. Six week old plants of Oregon, Mrs. Roy, and Giant No. 4 Indianapolis White were inoculated. Four separate harvests were made, each harvest was stored two weeks and then rooted. After the cuttings were rooted the disease incidence was recorded.

Daconil was generally superior to Captan as a weekly spray, while Benlate and TBZ, were superior to the other three spray materials. Phaltan was no better than Captan. No phytotoxicity appeared on the above three varieties, but TBZ in other trials was phytotoxic on the varieties Iceberg and Bluechip.

INTRODUCTION

Ascochyta chrysanthemi Stev. (*Mycosphaerella ligulicola* Baker, Dimock, and Davis) has a wide distribution and may be present wherever chrysanthemums are grown (2). Alfieri (1) attributes its wide distribution to year-around growing of chrysanthemums, persistence under a wide range of conditions, ineffective disease control and shipment of infected cuttings. Since Yoder Brothers is primarily interested in cuttings, we studied the control of *A. chrysanthemi* on cuttings with some of the newer fungicides compared to Captan.

MATERIALS AND METHODS

Stock plantings of Giant No. 4 Indianapolis White, Oregon, and Mrs. Roy, three of the more susceptible varieties, were made on October 10, 1968 in a randomized block design. The plants were pinched on October 25th and inoculated on November 19, 1968 by spraying the plots with a conidial and mycelial suspension of *A. chrysanthemi*. Each treatment consisted of four replications. Cuttings were harvested from the plots on November 20, 1968, December 26, 1968, January 8, 1969, and February 20, 1969. After har-

vest, the cuttings were placed in polyethene wrappers and stored at 34° for two weeks before being propagated.

The first sprays were applied to the plots on November 11, 1968 and were applied weekly thereafter until February 20, 1969. The materials used were Benlate 50 W.P. 1 lb, TBZ 60 W.P. ¾ lb, Daconil 75 W.P. 1½ lb, Phaltan 60 W.P. 1½ lb, and Captan 50 W.P. 2 lb. The above rates of the materials are given in pounds of formulated materials per 100 gallons of water and included 4 oz of Ortho Spreader Sticker.

One week after placement in the propagating bed, the plants were observed for disease development. Twenty-five cuttings from each plot were propagated and the percent disease on the middle ten plants recorded for each of the four dates.

Observation for phytotoxicity from any of the materials was made on the cuttings and stock plants. Further tests for phytotoxicity were made on varieties Iceberg and Bluechip in the summer of 1969. These rooted cuttings were planted May 26, 1969 and sprayed weekly until July 28, 1969. Cuttings were harvested as in a normal field planting.

RESULTS

At the time of the first harvest of cuttings, there were no visible symptoms of the disease present in the sprayed plots or in the non-sprayed check plots. Cuttings from the first harvest showed no significant difference in disease among the non-sprayed plots and the five treatments.

At the time of the second harvest, on December 26, 1968, there still were no signs of *A. chrysanthemi* in the stock plants. But, cuttings stored two weeks and then propagated showed that all treatments gave significant control compared to the non-sprayed cuttings, except Captan (Table 1).

Cuttings harvested on January 8, 1969, stored two weeks and then propagated, showed an increase in disease in all treatments (Table 2). At this time there were symptoms visible on the stock plants. On Giant No. 4 Indianapolis there was significant control of the disease with all materials except Captan and Phaltan. On Oregon, there was significant control with all

Table 2. The Percent of Disease on Cuttings Harvested 2/8/69. ¹

TREATMENTS	PERCENT DISEASE			
	Gt. #4	Ind. White	Oregon	Mrs. Roy
Benlate	12.5 ^a	12.5 ^a	20.0 ^a	
TBZ	5.0 ^a	12.5 ^a	22.5 ^a	
Daconil	7.5 ^a	17.5 ^a	59.5 ^b	
Phaltan	28.3 ^b	36.5 ^a	41.3 ^b	
Captan	20.0 ^b	65.8 ^b	33.8 ^b	
Non-sprayed	38.5 ^b	75.0 ^b	61.5 ^b	

¹A number in one vertical column not followed by the same letter is significantly different at 5% level according to Duncan's Multiple Range Test.

Table 1. The Percent of Disease on Cuttings Harvested 12/26/68. ¹

TREATMENTS	PERCENT DISEASE			
	Gt. #4	Ind. White	Oregon	Mrs. Roy
Benlate	0.0 ^a	0.0 ^a	3.0 ^a	
TBZ	0.0 ^a	0.0 ^a	5.0 ^a	
Daconil	0.0 ^a	0.0 ^a	0.0 ^a	
Phaltan	0.0 ^a	0.0 ^a	0.0 ^a	
Captan	2.5 ^a	15.0 ^b	12.5 ^b	
Non-sprayed	10.0 ^b	22.5 ^b	20.0 ^b	

¹A number in one vertical column not followed by the same letter is significantly different at 5% level according to Duncan's Multiple Range Test.

materials except Captan, while on Mrs. Roy, Benlate and TBZ were the only materials which gave significant control.

Cuttings harvested on February 20, 1969, showed no significant control of the disease by any of the materials. The amount of disease on the cuttings was very erratic. At this time there were very evident disease symptoms present in all of the stock plantings. Generally, there was less disease in the Benlate and TBZ sprayed plots.

In the disease trial run from October 1968 to February 1968 there was no phytotoxicity from any of the materials used. In summer trials, using the same rates of Benlate and TBZ on Iceberg and Bluechip as weekly sprays, TBZ produced marginal chlorosis on both varieties while Benlate showed no injury.

DISCUSSION

From our trial, it appears that Benlate and TBZ provide the most consistent disease control on the three varieties under moderate and severe disease stress. Daconil provided marginal control under severe disease stress and adequate control under moderate disease conditions. Captan and Phaltan were most ineffective materials under both moderate and severe disease conditions.

The exact climatic conditions which favor development of *A. chrysanthemi* are not completely known. Because of this we cannot explain the difference in disease on the cuttings harvested on the four dates tested. Further studies are needed to determine the conditions necessary for best disease development and then

more effective fungicide evaluations for control of this disease can be made.

There was considerable variation in the disease incidence on the three varieties used. But it appears from the disease on the non-sprayed plots that Mrs. Roy and Oregon are more vulnerable to *A. chrysanthemi*. This may be attributed to their compact growth habit compared to the more erect growth of Giant No. 4 Indianapolis White. Inconsistency of some of the materials to provide adequate control on all varieties may also be due to the difference in growth habits among the three varieties.

Since TBZ and Benlate are systemic in some plants (3), further studies with these materials are necessary to determine what extent these systemic properties can be applied to the control of *A. chrysanthemi*. It is possible that systemic materials, which remain within the plant, will provide better control since they are not weathered away as are materials on the surface of the plant.

Thus, further trials are necessary using less frequent application and/or lower rates to determine the potential of these systemic materials. It must be determined how systemic materials can be better utilized as fungicides, in contrast to the standard weekly sprays presently employed.

LITERATURE CITED

1. Alfieri, S. A. Jr. 1966. *Ascochyta* disease of chrysanthemum. Plant Path. Circular 48. Fla. Department of Agriculture.
2. Baker, K. F., A. W. Dimock and L. H. Davis. 1961. Cause and prevention of the rapid spread of the *Ascochyta* disease of Chrysanthemum. *Phytopathology* 51: 96-101.
3. Gilpatrick, J. D. 1969. Systemic activity of Benzimidazoles as soil drenches against powdery mildew of apple and cherry. *Plant Dis. Repr.* 53: 721-725.