



## MANAGEMENT OF FOLIAR BLIGHT (*Alternaria Chrysanthemi*) OF CHRYSANTHEMUM

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### ABSTRACT

Field experiments were carried out for three consecutive years *i.e.* 2009-2010, 2010-2011 and 2011-2012 at Horticultural College and Research Institute, Anantharajupeta, to study the effect of different fungicides for the management of foliar blight of chrysanthemum. Among different fungicides tested, tebuconazole @ 0.1% recorded lowest per cent disease index (PDI) and highest flower yield followed by propiconazole @ 0.1% and azoxystrobin @ 0.075%. The PDI was highest with lowest flower yield in control. In other fungicides PDI was in the range of 26.66 - 31.10. The B : C ratio of tebuconazole, propiconazole and azoxystrobin was 5.55, 4.56 and 4.19 respectively.

**KEYWORDS:** Chrysanthemum, Foliar blight, *Alternaria*, Management

### INTRODUCTION

Chrysanthemum is one of the oldest flowering plants, commercially grown in different parts of the world. It is important both as cut flower and as potted plant in the international market. There has been constant demand for chrysanthemum flowers particularly from European markets during winter months and throughout the year in our country. However, it is not possible to produce quality cut flowers all the year round under open field conditions. For these several factors have been identified in India. The most important factors identified are, the diseases like alternaria leaf blight, septoria leaf spot, rust, wilt, bacterial blight and non availability of leading varieties which are resistant to biotic and abiotic stresses. Among several diseases, alternaria leaf blight caused by *Alternaria chrysanthemi* (Simmons, 1965) is most destructive and cause heavy losses under field as well as market conditions (Kumar, 2008).

Generally, farmers use fungicides like mancozeb and carbendazim, but with the use of same fungicides repeatedly there is a possibility of development of tolerance in pathogens. So it is essential to identify and test new alternate fungicides other than regularly used fungicides to avoid resistance in pathogens so that farmers can reap good harvest with export quality.

### MATERIALS AND METHODS

A field experiment was carried out for three consecutive years during 2009-10, 2010-11 and 2011-

2012 at Horticultural College and Research Institute, Anantharajupeta, Kadapa district to assess the efficacy of different fungicides for the control of *Alternaria* blight of chrysanthemum under natural field conditions. The experiments were laid out in Randomized Block Design with three replications. The experiment comprised seven treatments *viz.*, chlorothalonil (0.2%) captan (0.2%) azoxystrobin (0.075%), propiconazole (0.1%), tebuconazole (0.1%) and benomyl (0.1%) and untreated check served as control. The chrysanthemum crop was raised and maintained by following recommended package of practices. Each fungicide was sprayed 4 times starting from the appearance of disease in the field at 15 days interval. Data pertaining to the disease severity and flower yield were recorded. Ten plants were examined randomly and scored for disease severity by following 0-5 scale (Kumar *et al.*, 2011). The details of scale are shown below.

- 0- No disease symptoms.
- 1- A few spots towards tip covering 10 per cent leaf area.
- 2- Several dark brown patches covering up to 20 per cent leaf area
- 3- Several patches with paler outer zone covering up to 40 per cent leaf area
- 4- Covering up to 40 percent leaf area
- 5- Complete drying of the leaves or breaking of the leaves from center.

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**Table 1. Effect of different fungicides on *Alternaria* blight disease of chrysanthemum**

Treatments	Per cent Disease Index (PDI)			
	2009-2010	2010-2011	2011-2012	Mean
Chlorothalonil (0.2%)	26.7 (31.1)	28.3 (32.1)	24.9 (29.9)	26.6 (31.0)
Captan (0.2%)	29.3 (32.8)	31.3 (34.0)	26.8 (31.2)	29.2 (32.7)
Azoxystrobin (0.075%)	16.6 (24.1)	19.3 (26.0)	12.7 (20.9)	16.24 (23.7)
Propiconazole (0.1%)	16.6 (24.0)	18.0 (25.1)	11.7 (20.0)	15.48 (23.1)
Tebuconazole (0.1%)	5.90 (14.0)	6.0 (14.1)	6.2 (14.5)	6.06 (14.2)
Benomyl (0.1%)	31.7 (34.2)	31.9 (34.4)	29.6 (33.0)	31.1 (33.8)
Control	52.5 (46.4)	58.3 (49.8)	40.9 (39.7)	50.6 (45.3)
SEm ±	0.5	0.5	0.3	1.0
CD at 5% level	1.5	1.7	1.0	3.0

Figures in parentheses are angular transformed value

**Table 2. Effect of different fungicides on flower yield of chrysanthemum**

Treatments	Flower yield (q/ha)			
	2009-2010	2010-2011	2011-2012	Mean
Chlorothalonil (0.2%)	50.7	48.4	49.4	49.5
Captan (0.2%)	52.3	43.5	40.3	47.4
Azoxystrobin (0.075%)	69.7	54.9	50.2	58.3
Propiconazole (0.1%)	67.2	57.3	54.0	59.5
Tebuconazole (0.1%)	78.4	71.8	70.2	73.4
Benomyl (0.1%)	48.6	39.6	44.9	44.4
Control	37.3	31.0	30.7	33.0
SEm±	0.6	0.9	0.7	1.8
CD at 5% level	2.0	2.6	2.2	5.4

**Table 3. Economic analysis of management of *Alternaria* leaf blight of Chrysanthemum**

Treatments	Yield	B:C ratio
Chlorothalonil (0.2%)	49.5	3.4
Captan (0.2%)	45.4	3.5
Azoxystrobin (0.075%)	58.3	4.1
Propiconazole (0.1%)	59.5	4.5
Tebuconazole (0.1%)	73.4	5.5
Benomyl (0.1%)	44.4	3.4
Control	33.0	2.6

Per cent Disease Index (PDI) was calculated by using the following formula (Wheeler, 1969).

$$\text{PDI} = \frac{\text{Sum of numerical ratings}}{\text{Total number of leaves examined}} \times \frac{100}{\text{Maximum grade value}}$$

**Economic analysis:** B: C ratio was obtained by calculating the extra income (benefit) and the additional cost of application of fungicides and other costs based on market prices of inputs.

## RESULTS AND DISCUSSION

### Foliar blight disease

During first year of experimentation (2009-10) the lowest PDI of 5.90 was recorded in tebuconazole sprayed plots followed by propiconazole (16.62) and azoxystrobin (16.68). The highest PDI of 52.58 was recorded in control plot. With regard to other fungicides the PDI recorded was in the range of 26.70 to 31.70. In second and third year also, the highest PDI was recorded in control plot (58.37 and 40.93) and the lowest was recorded with tebuconazole (6.00 and 6.28) followed by propiconazole (18.05 and 19.30) and azoxystrobin (11.78 and 12.76) (Table.1). The mean data of three years in terms of PDI showed that the lowest PDI of 6.06 was recorded in tebuconazole treated plots and was significantly superior to all other treatments in reducing the disease severity. This was followed by propiconazole (15.48) and azoxystrobin (16.24). The highest PDI was recorded in control plot (50.62). Based on the results achieved, the fungicides may be arranged as tebuconazole, propiconazole, azoxystrobin, chlorothalonil, captan and benomyl in order of their efficacy in managing foliar blight of chrysanthemum.

### Flower yield

In the first year, the flower yield was recorded in the range of 37.35 to 78.42 q ha<sup>-1</sup>. The highest flower yield was recorded in tebuconazole (78.42 q ha<sup>-1</sup>) treated plot and lowest was recorded in control plot (37.35 q ha<sup>-1</sup>). During second year, and third year also tebuconazole gave the highest flower yield (71.80 and 70.26 q ha<sup>-1</sup>) with lowest PDI. The pooled data of three years revealed that tebuconazole was effective in increasing flower yield (73.49 q ha<sup>-1</sup>) by minimizing the foliar blight (6.06 PDI) disease (Table 1 and 2) .

The economic analysis of data (Table 3) revealed that tebuconazole recorded highest B: C ratio (5.55) with lowest percent disease index (6.06) and highest flower

yield (73.49 q ha<sup>-1</sup>) followed by propiconazole and azoxystrobin (4.56 and 4.19 B : C ratio, respectively)

Based on the observations made during three years of experimentation, foliar blight of chrysanthemum caused by *Alternaria chrysanthemi* could be effectively controlled by tebuconazole which recorded lowest PDI and highest flower yield. Next to this was propiconazole and azoxystrobin compared to the other fungicides. These results are in agreement with the findings of Mesta *et al.*, (2003) who reported that the triazole fungicides are the effective fungicides to alternaria leaf blights. Villanueva-couoh *et al.* (2005) reported that treatment of chrysanthemum with azoxystrobin reduced the epidemiological intensity of the disease by 50% and showed the lowest level of apparent infection. Kumar *et al.* (2008) revealed that propiconazole and hexaconazole fungicides completely inhibited the mycelial growth of *Alternaria alternata* causing leaf blight in chrysanthemum under laboratory conditions. Kamanna *et al.*,(2010) reported that three sprays of chlorothalonil @ 0.2% sprayed at an interval of 15 days starting from the onset of disease symptoms can effectively control the leaf blight of chrysanthemum caused by *Alternaria alternata*. So based on the results these fungicides are more effective in controlling foliar blight in chrysanthemum.

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(Received on 22-01-2016 and revised on 14-02-2016)