



MANAGEMENT OF CHRYSANTHEMUM LEAF BLIGHT CAUSED BY *ALTERNARIA ALTERNATA* (FR.) KEISSLER UNDER FIELD CONDITION

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Abstract

In field evaluation of fungicides, botanicals and bio-agent, Hexaconazole (0.1%) effectively controlled the disease incidence which recorded very less per cent disease index (4.49) followed by Chlorothalonil (0.2%) and Mancozeb (0.2%). Hexaconazole recorded highest yield (76.25 q/ha) and incremental benefit: cost of 7.16. Hence, it can be recommended to the farmers for the efficient management of *Alternaria* leaf blight of chrysanthemum.

Key words : *Alternaria alternata*, chrysanthemum, leaf blight and PDI .

Introduction

Chrysanthemum {*Dendranthema indicum* (= *Chrysanthemum indicum* L.)}, the golden flower (Chryos = golden; anthus = flower), is one of the most beautiful and perhaps the oldest flowering plants commercially grown in different parts of the world. Chrysanthemum belongs to the family Asteraceae. 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 difficult to get good quality exportable blooms, higher yields and long lasting post harvest life of the cultivars under open conditions. For this several factors have been identified in India. The most important factors responsible 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 these diseases *Alternaria* leaf blight caused by *Alternaria alternata* (Fr.) Keissler is one of the most destructive diseases, commonly prevailing in almost all chrysanthemum growing pockets of India, which causes heavy losses under field as well as market conditions. It is necessary to have information regarding *in vivo* evaluation of fungicides, botanicals and bioagents.

Materials and Methods

The experiment was conducted at Kurabagatti village of Dharwad taluk during *Kharif/Rabi* season of 2007-08 with seven fungicides, viz. Hexaconazole (Contaf plus), Carbendazim 12% + Mancozeb 63% (Saaf), Propineb (Antracal), Chlorothalonil (Kavach), Mancozeb (Dithane M-45) and Carbendazim 25% + Iprodione 25% (Quintal). One commercial formulation of bioagents *Pseudomonas fluorescens* (Stanes Biocure- B), two botanicals out of which one commercial formulation of neem *i.e.*, Nimbicidin and one was garlic clove extract were tested. Totally five sprays were given at 15 days interval starting from the initiation of the disease (30 days after planting). The experiment was laid out in Randomized Block Design (RBD) with three replications. The observations on *Alternaria* leaf blight were recorded before each spray. Ten plants were examined randomly and scored for disease severity by following 0-5 scale. The details of scales are as shown below.

- 0 No disease symptoms.
- 1 A few spots towards tip covering 10 per cent leaf area.
- 2 Several dark brown patches covering upto 20 per cent leaf area
- 3 Several patches with paler outer zone covering upto 40 per cent leaf area.

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Table 1 : Field efficacy of fungicides, botanicals and bioagent in the management of *Alternaria* leaf blight of chrysanthemum.

Treatments	Per cent Disease Index (PDI)				
	30 DAS	45 DAS	60 DAS	75 DAS	Mean
Hexaconazole @ 0.1%	2.88 (9.77)*	4.92 (12.81)	4.89 (12.74)	5.27 (13.25)	4.49 (12.14)
Carbendazim 12%+Mancozeb 63@0.2%	28.47 (32.23)	34.73 (36.08)	48.41 (44.09)	58.30 (49.76)	42.48 (40.54)
Propineb @0.2%	21.17 (27.36)	33.10 (35.10)	51.11 (45.37)	55.51 (48.16)	40.22 (39.00)
<i>Pseudomonas fluorescens</i> @ 5 g/l	17.80 (24.88)	36.31 (36.98)	68.88 (56.19)	72.37 (58.39)	48.84 (44.11)
Nimbecidin @0.5%	27.27 (31.46)	43.17 (41.06)	70.66 (57.19)	74.88 (59.71)	53.99 (47.35)
Garlic clove extract @5%	19.93 (26.49)	26.67 (31.06)	46.22 (42.79)	53.73 (47.13)	36.64 (36.87)
Chlorothalonil @0.2%	17.42 (24.65)	21.78 (27.80)	34.66 (35.90)	37.12 (37.49)	27.74 (31.46)
Mancozeb @0.2%	19.66 (26.30)	22.57 (28.35)	40.00 (39.14)	44.22 (41.65)	31.61 (33.86)
Carbendazim 25%+Iprodione 25% @0.2%	32.00 (34.43)	45.47 (42.38)	68.44 (55.88)	74.72 (59.86)	55.15 (48.14)
Control.	46.5 (42.98)	56.95 (48.97)	84.55 (66.87)	87.44 (69.22)	68.86 (57.01)
Mean	23.31	32.57	51.78	56.35	41.00
	S.Em±		CD at 5%		
Treatments (T)	1.16		3.26		
DAS (D)	0.73		2.06		
T × D	2.32		6.52		

* Figures in parentheses are arc sin transformed values.

Table 2 : Economic analysis of management of *Alternaria* leaf blight of chrysanthemum.

Treatments	PDI	Yield (Q/ha.)	C : B ratio
Hexaconazole @ 0.1%	4.49 *(12.14)	76.25	7.16
Carbendazim 12% + Mancozeb 63% @ 0.2%	42.48 (40.54)	63.5	4.25
Propineb @ 0.2%	40.22 (39.00)	63	4.09
<i>Pseudomonas fluorescens</i> @ 5 g/l	48.84 (44.11)	60.5	3.09
Nimbecidin @ 0.5 %	53.99 (47.35)	60	3.02
Garlic clove extract @ 5%	36.64 (36.87)	63	4.82
Chlorothalonil @ 0.2%	27.74 (31.46)	72	5.55
Mancozeb @ 0.2%	31.61 (33.86)	66	5.46
Carbendazim 25% + Iprodione 25% @ 0.2%	55.15 (48.14)	58	2.01
Control.	68.86 (57.01)	55	2.02
S.Em±	1.16	3.17	-
C D at 5%	3.26	9.43	-

*Figures in parentheses are arcsine transformed values.

4 Leaf blight covering upto 75 per cent leaf area or breaking of the leaves from center.

5 Complete drying of the leaves or breaking of the leaves from center.

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

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

Results and Discussion

The data on Per cent Disease Index (PDI) of *Alternaria* leaf blight is presented in table 1. From the

data, it is observed that at 30, 45, 60 and 75 days after spray (DAS) all the treatments differ significantly over unprotected check. Maximum per cent disease index of *Alternaria* leaf blight was noticed in untreated check (68.86%). It was followed by Carbendazim 25% + Iprodione 25% (55.15%) and least PDI was observed in Hexaconazole (4.49%) which is followed by Chlorothalonil (27.74%). The days after spraying also differ significantly. Maximum PDI was noticed in 75 DAS (56.35%) and minimum was noticed in 30 DAS (23.31%).

Experimental results revealed that Hexaconazole (0.1%) was effective in minimizing the per cent disease index and getting higher yields. Mesta *et al.* (2003) and

Mesta (2006) have reported triazoles as effective fungicides against *Alternaria* blight of sunflower.

Chlorothalonil (0.2%) and Mancozeb (0.2%) were next to Hexaconazole in terms of efficacy. However, Kamanna *et al.* (2010) observed that Chlorothalonil (0.2%) was effective for the control of chrysanthemum leaf blight under field conditions. Mancozeb has been reported to be effective fungicide against *A. alternata* (Singh and Milne, 1974; Amaresh, 1997; Desai, 1998 and Sood and Sharma, 2002).

Economics of fungicides, botanicals and bio agent evaluation

The economics of cost benefit ratio has been worked out for different fungicides, botanicals and bioagent are presented in table 2. In the present investigation, Hexaconazole has given highest total returns, net returns and additional returns over control than any other fungicides. Hexaconazole has recorded very lowest PDI (4.49), highest yield (76.25 q/ha.) and incremental benefit: cost of 7.16 followed by Chlorothalonil over control. Since present day economists are advising for net return concept, Hexaconazole @ 0.1% can be recommended to the farmers for the efficient management of *Alternaria* blight of chrysanthemum.

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