MANAGEMENT OF ALTERNARIA LEAF BLIGHT OF SUNFLOWER (*HELIANTHUS ANNUUS*)

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Abstract

Field evaluation of a systemic triazole, Propiconazole (250 EC) of Novartis India Limited for management of *Alternaria helianthi* causing blight of sunflower at varying concentrations was carried out during the rainy season, 1998-99. As a spray @ 0.2% it reduced the leaf blight significantly, recording 12.08 PDI (Percent Disease Index) followed by Mancozeb 0.2% (80WP) and Propiconazole (Tilt 250 EC) 0.15%. However, seed yield was non-significant in different treatments, but test weight was found significant. Numerical seed yield increase of 39.53 to 43.82% was recorded in Propiconazole-treated plots and test weight to the extent of 2.89-14.06%.

Introduction

Sunflower (*Helianthus annuus* L.) is one of the important oilseed crops of India. The crop is cultivated over an area of 1.33 m ha with production of 0.733 million tons. (Anon., 2001) In Karnataka, the crop occupies an area of 4.78 lakh ha with production of 2.31 lakh tons (Anon., 2002). A major area is concentrated in northern districts accounting for 85% of total acreage but with reduced yield of 400 kg/ha. Low productivity is partly due to biotic stresses. Alternaria leaf spot and blight caused by *Alternaria helianthi* (Hansf.) Tubaki and Nishahara has been considered as a potential and destructive disease in India and other countries like Yugoslovia, Australia, Tanzania, Uganda and North Africa (Balasubrahmanyam and Kolte, 1980; Zimmer and Hose, 1978) and is devastating under humid tropical conditions (Hiremath et al., 1990). The disease can cause severe leaf spots, stem spots and blight resulting in premature defoliation and stem breakage. It can also infect other parts such as capitulum, disc and ray florets. It is more serious in India and yield losses go up to 80% (Agrawal et al*.,* 1979; Balasubrahmanyam and Kolte, 1980). The disease also occurs in epidemic form at Dharwad and management strategies are not available. In view of the above facts the present research on management of the disease using new fungicide molecules such as Propiconazole (Tilt 250 EC) and Difenaconazole (Score 10 WP) of Novartis India Limited was tested for this economically important disease and results are presented here.

Materials and Methods

The experiment was conducted on the research farm of the University of Agricultural Sciences, Dharwad (Karnataka) during the rainy season of 1998-99. The trial was laid out in

medium black soils in a completely randomized block design (CRBD) with eight treatments (Table 1) and replicated thrice. Planting was done on 12-7-1998 adopting spacing of 45 x 30 cm between rows and plants in rows respectively, in a plot measuring 1.2 x 4.0 m using susceptible cultivar Morden. Normal practices like seed treatment with Captan 2.5 g/kg, NPK application, thinning, intercultivation and top dressing were followed by successful growing of the crop. The test fungicide Propiconazole (Tilt 250 EC) was diluted @ 0.25, 0.5, 1.0, 1.5 and 2.0 ml per litre of water to concentrations of 0.025, 0.05, 0.1, 0.15 and 0.2%. Difenaconazole (Score 10 WP) @ 2.0 g per litre and Mancozeb (Dithane M-45 80 WP) @ 2.0 g/litre were also maintained as separate treatments along with an unsprayed plot as control for comparison. First application was made soon after noticing the disease symptoms on 21-8-1998, subsequently two more sprays were applied at 10-day intervals on 1-9-1998 and 10-9-1998 using a high volume sprayer (Knapsack back pack sprayer). Two liters of spray solution were used for treating each plot. This spray tank was washed thoroughly each time while imposing the new treatments to the plots. Endosulfan 30 EC was applied as spray to all the plots @ 0.07% for management of *Helicoverpa armigera* Flubner, a head borer pest. For the disease assessment, leaf samples were collected 20 days before harvest (23-9-1998). All the leaves from five randomly selected plants from each plot were cut along with petiole, and individual leaves assessed for blight severity on 1-9 disease rating scale (Mayee and Datar, 1986). Percent disease index (PDI) for each plot was worked out by the formula (Wheeler, 1969)

$$PDI = \frac{\Sigma \text{ No. of leaves} \times \text{disease severity grade}}{\text{Total no. of leaves} \times \text{maximum disease grade}} \times 100$$

Percent disease reduction over untreated treatment was also computed. From the plot of each treatment, the crop was harvested and seeds were separated from the head, cleaned, dried and weighed. Mean weight of each treatment over replications was recorded and expressed in kg/ha. Mean test weight of 100 seeds was also recorded. Data was analyzed statistically. Percent increase over the control was also calculated and furnished in Table 1.

Results and Discussion

The results indicated that the disease was at a low severity in Propiconazole (Tilt 250 EC) treated plots (12.08-27.01 PDI) except in Difenaconazole (Score 10 WP) @ 0.2% (40.59 PDI) and unsprayed plot (44.51 PDI)(Table 1). The plot sprayed with Propiconazole (Tilt 250 EC) @ 0.2% recorded significantly lower disease severity (12.08 PDI) and indicated its superiority to Alternaria blight control. The reduction in disease over the control was to the tune of 72.86%.

However, the impact of spray applications of fungicides on sunflower seed yield was non-significant. Propiconazole (Tilt 250 EC) and Mancozeb (Dithane-M-45 80 WP) each @ 0.2% were recorded with numerically higher seed yield of 1090 and 1055 kg/ha respectively, compared to other treatments. Three unsprayed plots recorded lower yield of 846 kg/ha. The seed yield increase over the unsprayed treatment ranged from 1.65 to 28.84% in various fungicide treated plots.

Table 1. Evaluation of Propiconazole (Tilt 250 EC) against Alternaria blight of sunflower.

No	Spray treatments	Disease severity (PDI)	Per cent reduction over control	Seed yield kg/ha	Per plant increase over control	Test weight (100 seed)	Per cent increase over control
1	Propiconazole (Tilt 250EC) @ 0.025%	27.01	39.32	860	1.65	39.53	2.89
2	Propiconazole (Tilt 250EC) @ 0.05	25.06	43.70	875	3.43	39.86	3.75
3	Propiconazole (Tilt 250EC) @ 0.1%	18.48	58.48	968	2.60	40.17	4.55
4	Propiconazole (Tilt 250EC) @ 0.15	18.08	59.38	992	5.44	42.16	3.74
5	Propiconazole (Tilt 250EC) @ 0.2%	12.08	72.86	1090	28.84	43.82	14.06
6	Difenaconazole (Score 10 WP) @ 0.2%	40.59	8.81	916	8.27	39.10	1.77
7	Mancozeb (Dithane M-45 80 WP) @ 0.2%	15.63	64.88	1055	24.70	41.86	9.21
8	Unsprayed (Control)	44.51	-	846	-	38.42	-
	SEm±	1.15	-	72	-	0.42	-
	C.D. (5%)	3.51	-	NS	-	1.26	-

Fungicide treatment effect on test weight of 100 seeds was significant. Propiconozole (Tilt 250 EC) @ 0.15 and 0.2% and Mancozeb (Dithane M-45 80 WP) @ 0.2% were found to increase the test weight of seed by 3.74, 14.06, and 41.96%, respectively.

Propiconazole (Tilt 250 EC) @ 0.2% was found useful for management of Alternaria blight of sunflower. In the present study, Mancozeb (Dithane M-45 80 WP) was found equally effective. Many times disease control with it is not possible. The rain during the cropping season was moderate (392.2 mm with 25 rainy days), hence, Mancozeb (Dithane M-4580 WP) was able to control the disease. Being a protectant fungicide, it is easily washed away by rain. Propiconozole (Tilt 250EC) is systemic in nature, absorbed by the plant quickly and capable of distributing in the plant system, rendering protection over an extended period of crop growth. Better disease control effects could be achieved with Propiconazole (Tilt 250 EC) @ 0.2% and it gives better crop insurance in a season with high rainfall and severe onslaught of Alternaria on sunflower than Mancozeb (Dithane M-45 80 WP).

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