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Research Article

Estimation of Yield Loss Due To Powdery Mildew of Chilli Caused by *Leveillula taurica* (Lev.) Arn.

Sabeena I Bademiyya* and S. A. Ashtaputre

Department of Plant Pathology, College of Agriculture, Dharwad

University of Agricultural Sciences, Dharwad-580005, Karnataka. India

*Corresponding Author E-mail: sabeehasabeena@gmail.com

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ABSTRACT

Powdery mildew of chilli incited by Leveillula taurica was found to be one of the devasting disease of chilli. Differential set of fungicidal sprays of sulphur 80WP (0.3%) were given to estimate yield loss due to chilli powdery mildew. Results revealed that, three sprays of Sulphur 80 WP (0.3 %) at 12 days interval starting from the appearance of disease was optimum in reducing the disease with least per cent disease index and increasing the yield of 9.54 q/ha and cost benefit ratio of 1:3.03. Yield loss of 50 per cent was noticed due to powdery mildew in unsprayed control.

Key words: *Leveillula taurica, Powdery mildew, Sulphur, Per cent disease index*

INTRODUCTION

Chilli (*Capsicum annuum* L.) is an important vegetable cum spice crop grown in both tropical and subtropical regions of the world. Chilli is low in sodium, cholesterol free, rich source of vitamin A, vitamin C and E, potassium and folic acid too. Chilli is valued for its pungency (imparted by an alkaloid, capsaicin) and the red pigments (capsanthin, capsorubin and capxanthin). India is the major producer, consumer and exporter of chilli in the world. In India, the area under chilli cultivation during 2015 was 1.81 lakh ha and the production was 1.9 mt and productivity of 10.1 Mt/ha. It is the second most important spice in the Indian export market[1]. Chilli suffers from many foliar diseases like cercospora leaf spot, powdery mildew, anthracnose, murda complex and many other diseases among them powdery mildew caused by *Leveillula taurica* is a major constraint in chilli production causing yield loss of 42.82 per cent due to severe defoliation and reduction in size and number of fruits per plant[3].

Looking at the importance of chilli as a commercial crop in Karnataka and India, present study was conducted to know the severity of powdery mildew of chilli in the major chilli growing areas of northern Karnataka.

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MATERIAL AND METHODS

The field trial was conducted during *kharif* 2017 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. The experiment was laid out in Randomized Block Design (RBD) with four replications and five treatments along with untreated check. Differential set of fungicidal sprays of Sulphur 80WP (0.3%) were given in order to estimate the loss due to chilli powdery mildew. The seeds of Byadgi dabbi variety were sown in small beds and the nursery was raised. The seedlings of 35 days old were transplanted to the main field by following spacing of 60×60 cm and with plot size of 4.2 m^2. The recommended package of practice was followed for the trial.

The spray schedule was started after the onset of the disease. Number of the sprays varied among the treatments. T_1 composed of one spray, two sprays (T_2), three sprays (T_3), four sprays (T_4) of Sulphur 80WP (0.3%) were given at 12 days interval along with unsprayed control. The disease (PDI) was recorded at different stages of crop growth by selecting five plants randomly from each treatment. Further each plant was divided in to 3 parts as top, middle and bottom and then disease intensity was recorded by 0-9 scale[5]. Further the PDI was calculated by using formula given by Wheeler[8].

$$PDI = \frac{\text{Sum of individual disease ratings}}{\text{Total number of leaves observed} \times \text{Maximum disease rating}} \times 100$$

Crop was harvested at dry chilli stage and yield of net plot was recorded (kg/plot) and later expressed in q/ha. Later B:C ratio was calculated.

$$\text{Disease reduction (\%)} = \frac{\text{Disease severity in control} - \text{Disease severity in treatment}}{\text{Disease severity in control}} \times 100$$

$$\text{Yield increase (\%)} = \frac{\text{Yield in treatment plot - Yield in control plot}}{\text{Yield in control}} \times 100$$

B:C ratio was calculated by the formula.

Net returns (Rs/ha) = Gross returns (Rs/ha) – Cost of cultivation (Rs/ha)

$$\text{B: C ratio} = \frac{\text{Net returns (Rs/ha)}}{\text{Cost of cultivation}}$$

All the data related to disease severity and yield was statistically analyzed. Calculations were made after applying the test of significance of the means[6].

RESULT AND DISCUSSION

Results revealed that, at 85 DAT, the Per cent disease index was lower in all the treatments, comparatively higher incidence was observed in untreated control and all other treatments significantly differed from control. Similar trend was observed in all the observations of per cent disease index at different intervals. At 115 DAT, when plant was at full fruiting stage, the per cent disease index was more in untreated check (78.02 %) and among the different spray treatments, maximum per cent disease index (36.54 %) was noticed in treatment with one spray of Sulphur 80 WP at 0.3 per cent followed by plot with two sprays of Sulphur (28.8 %). The least per cent disease index (9.8%) was noticed in plot with four sprays of fungicide, followed by three sprays (11.11 %).

The effect of treatments on the yield of dry chilli was found significant. The maximum yield (9.63 q/ha) was recorded in four sprays of sulphur (0.3%), which was on par with three sprays (9.54 q/ha). However, there was significant difference in yield between two sprays (8.50 q/ha) and one spray (7.33 q/ha). Least yield (6.42 q/ha) was recorded in unsprayed control (Table 1a)

The maximum cost benefit ratio (1: 3.03) was recorded in chilli plot imposed with three sprays of Sulphur 80WP (0.3%) followed by four sprays (1:3.01) and least cost benefit ratio (1:2.40) was recorded in plot with one spray of Sulphur 80 %WP. Three sprays of sulphur at 0.3 per cent increased the yield of dry chilli by 50 per cent (Table 1b).

In the absence of fungicide treatment, powdery mildew reduced the yield of chilli by 50. These findings are in agreement with Ashtaputre[2], Ramesh *et al.*[7], and Marthand[4]. Ramesh *et al.*[7], reported that, five sprays against powdery mildew of chilli, recorded minimum per cent disease index (3.92 %) followed by four sprays (6.17 %), three sprays (7.63 %), two sprays (16.61 %), and one spray (39.23 %). Maximum yield recorded in the plot with five sprays (13.3q/ha) followed by four sprays (12.91 q/ha) and three sprays (12.42 q/ha). The cost benefit of plot with three sprays got B: C ratio (2.36) followed by four sprays (2.38) and five sprays (2.38).

Earlier workers *viz.*, Ashtaputre[3] reported that, comparatively lower per cent disease index with increase in dry chilli yield and also maximum B: C ratio was recorded in plots receiving three sprays of penconazole. Yield loss of 42.82 per cent was noticed due to powdery mildew in unsprayed plots. Marthand[4] reported that, azoxystrobin (94.38 t/ha) at 0.05 per cent recorded maximum yield followed by tebuconazole (91.59 t/ha) at 0.05 per cent with three sprays at 15 days interval. Least yield was recorded in untreated check (81.57t/ha). Three sprays of azoxystrobin (0.05 %) were found optimum for reducing the disease increasing yield and B: C ratio. In the absence of fungicide treatment, powdery mildew reduced the yield of capsicum by 15.13 per cent.

Table 1a. Yield loss estimation due to powdery mildew of chilli caused by *Leveillula taurica*

Treatments (Sulphur 80 WP @ 0.3 %)	**DAT and Per cent disease index**						**Per cent reduction over control**	**Dry chilli yield (q/ha)**	**Percent yield increase over control**	**Cost benefit Ratio**
	70	**85**	**100**	**115**	**130**	**145**				
T_1: One spray	5.92 (14.08) *	9.80 (18.24)	19.25 (26.02)	36.54 (37.18)	55.5 (48.16)	67.4 (55.18)	51.98	7.33	14.17	1:2.40
T_2: Two sprays	5.18 (13.16)	8.14 (16.58)	17.03 (24.37)	28.8 (32.46)	49.2 (44.54)	51.11 (45.64)	59.33	8.50	32.39	1:2.74
T_3: Three sprays	3.7 (11.09)	4.69 (12.51)	5.92 (14.08)	11.11 (19.47)	27.7 (31.76)	39.25 (38.79)	76.44	9.54	48.59	1:3.03
T_4: Four sprays	3.45 (10.70)	4.44 (12.16)	5.92 (13.16)	9.8 (18.24)	25.92 (30.61)	36.54 (37.18)	77.73	9.63	50.00	1:3.01
T_5: Untreated control	17.03 (24.37)	62.96 (52.51)	74.81 (48.19)	78.02 (62.04)	79.25 (62.9)	84 (66.39)	-	6.42	-	1:2.14
S.Em. ±	**0.43**	**0.34**	**0.31**	**0.41**	**0.44**	**0.61**		**0.35**		
C.D. at 5 %	**1.23**	**1.02**	**0.94**	**1.25**	**1.33**	**1.85**		**1.06**		

Table 1b: Cost of cultivation and cost benefit ratio for loss estimation against powdery mildew of chilli

Treatments (Sulphur 80 WP @ 0.3 %)	Cost of cultivation	Gross income (Rs.)	Net income (Rs.)	Cost benefit ratio
T_1: One spray	30475	73300	44525	1:2.40
T_2: Two sprays	30950	85000	54050	1:2.74
T_3: Three sprays	31425	95400	63975	1:3.03
T_4: Four sprays	31900	96300	65400	1:3.01
T_5: Untreated control	30000	64200	34200	1: 2.14

REFERENCES

1. Anonymous., *Horticultural Statistics at a Glance*, *National Horticulture Board, Gurgaon,* p198 (2017).
2. Ashtaputre, S. A., Studies on loss assessment, epidemiology and management of powdery mildew of chilli caused by *Leveillula taurica* (Lev.) Arn. *Ph. D Thesis,* Univ. *Agric. Sci., Dharwad, Karnataka (India).* (2006).
3. Ashtaputre, S. A., Assessment of yield loss due to powdery mildew of chilli. *Trend Biosci.,* **7(11):** 1138- 1141 (2014).
4. Marthand, Studies on powdery mildew of capsicum caused by *Leveillula taurica* (Lev.) Arn. under protected cultivation. *M. Sc. (Agri.) Thesis,* Univ. *Agric. Sci., Dharwad, Karnataka (India).* (2016).
5. Mayee, C. D. and Datar, V. V., *Phytopathometry*. *Tech. Bull. No. 1* (*Special Bull. -3*), Marathwada Agric. *Univ., Prabhani, Maharashtra, India*, p. 29 (1986)
6. Panse, V. G. and Sukhatme, P. V., Statistical Methods for Agricultural Workers, ICAR Publications, New Delhi, India, p. 143 (1978).
7. Ramesh., Patil, M. B., Bheemaray., Amaresh, Y. S. and Hussain, A., Estimation of yield loss due to powdery mildew *Leveillula taurica* on chilli in TBP and UKP- command area of Karnataka. *Environ. Ecol*., **31(10):** 350-354 (2013)
8. Wheeler, B. E. J., An Introduction to Plant Disease. John Wiley and Sons Ltd., London, p. 301 (1969).