



RESEARCH PAPER

Management of Cercospora leaf spot disease of urdbean

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Abstract : For the management of Cercospora leaf spot of urdbean, seven new fungicides were tested for two year during 2018 and 2019. Of all the chemical tested, foliar spray with Azoxystrobin 8.3% + Mancozeb 66.7% WG and foliar spray with Carbendazim 12% + Mancozeb 63% WP were highly effective and provided less disease severity and high yield of urdbean crop.

Key Words : CLS, Azoxystrobin, Metiram

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INTRODUCTION

Urdbean or black gram (*Vigna mungo*) is an important legume crop of India. In 2018-19, urdbean occupies about more than 4.83 million ha area in the country producing 3.36 million tonnes with productivity of 696 kg/ha (Anon, 2019). In Madhya Pradesh, urdbean is cultivating in an area of 16.69 lakh ha with a production of 13.34 lakh tonnes and productivity of 799 kg/ha during 2018-19 (Anonymous, 2019). It is a *Kharif* season crop in Central and northern India. This crop has nitrogen fixing ability due to the presence of root nodule bacteria in its roots. It serves as a rich source of protein, contains lysine many minerals, vitamins and iso-flavonoids. Being a *Kharif* season crop, it faces many biotic constraints which produces negatively impact its yield potential (Tiwari, 2020). Amongst foliar diseases of urdbean, Cercospora leaf spot caused by *Cercospora canescens* is an important disease of urdbean (Dubey and Singh, 2010 and Pandey *et al.*, 2009). It causes more than 20

per cent yield losses. Keeping in view the importance of this disease an effort was made to evaluate latest fungicides available in the market against this disease.

MATERIAL AND METHODS

Urdbean variety, IPU 94-1 used for the present study. The trial was conducted in RBD with 3 replications, plot size-25 sq.m. Sowing of the trial was done on 15th July during 2018 and 2019 both following recommended sets of package and practices. First foliar sprays of all the test fungicides were done at the initiation of the disease and second spray was done 15 days later. Spraying of water was done as untreated check. Observations on per cent disease index before spray application and subsequently after 10 days of each spray and yield at harvest were recorded for all the treatments during both the years. The per cent disease index (PDI) values were calculated using following formula and data subjected to angular transformation to analyze

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Treatments	Dose a.i. (g/ha)	Dose formulation (g/ha)
T ₁ Azoxystrobin	812.5	1250
T ₂ Carbendazim 12% + Mancozeb 63% WP	975.0	1500
T ₃ Azoxystrobin 8.3% + Mancozeb 66.7% WG	1137.5	1750
T ₄ Mancozeb 75% WP	1500	2000
T ₅ Pyraclostrobin 20% WG	100	500
T ₆ Metiram 55% + Pyraclostrobin 5% WG	1050	1750
T ₇ Untreated check (control)	-	-

statistically.

$$PDI = \frac{\text{Sum of all numerical ratings}}{\text{Total leaflets / leaves observed} \times \text{Maximum ratings scale}} \times 100$$

RESULTS AND DISCUSSION

The observations for *Cercospora* leaf spot disease

incidence recorded at different time intervals have been presented in Tables 1 and 2, respectively.

Effects of fungicides on *Cercospora* leaf spot :

The data of *Cercospora* disease recorded during 2018 and 2019 are presented under Table 1 and 2, respectively. The data after 2nd application revealed that

Treatments	Dose formulation (g/ha)	Per cent disease index			Terminal disease control (%)
		Before first spray	10 days after first spray	10 days after second spray	
T ₁ Azoxystrobin	1250	7.90 (16.25)	10.86 (19.24)	19.63 (26.29)	56.68
T ₂ Carbendazim 12% + Mancozeb 63% WP	1500	8.64 (17.03)	9.26 (17.71)	12.47 (20.67)	72.48
T ₃ Azoxystrobin 8.3% + Mancozeb 66.7% WG	1750	8.40 (16.82)	9.01 (17.46)	11.98 (20.24)	73.57
T ₄ Mancozeb 75% WP	2000	7.65 (16.04)	11.85 (20.12)	21.11 (27.34)	53.41
T ₅ Pyraclostrobin 20% WG	500	8.89 (17.26)	11.36 (19.69)	19.88 (26.47)	56.13
T ₆ Metiram 55% + Pyraclostrobin 5% WG	1750	9.38 (17.82)	10.25 (18.64)	14.20 (22.11)	68.66
T ₇ Untreated check (control)	-	8.15 (16.55)	13.58 (21.61)	45.31 (42.30)	-
S.E. ±		(1.00)	(0.48)	(0.82)	-
C.D. (P=0.05)		(NS)	(1.49)	(2.51)	-
CV (%)		10.30	4.35	5.33	-

Figures in the parentheses are angular transformed values NS – Non significant

Treatments	Dose formulation (g/ha)	Percent disease index			Terminal disease control (%)
		Before first spray	10 days after first spray	10 days after second spray	
T ₁ Azoxystrobin	1250	5.93 (14.06)	11.11 (19.46)	21.98 (27.95)	53.16
T ₂ Carbendazim 12% + Mancozeb 63% WP	1500	6.67 (14.95)	9.14 (17.59)	13.21 (21.30)	71.84
T ₃ Azoxystrobin 8.3% + Mancozeb 66.7% WG	1750	6.17 (14.37)	8.89 (17.34)	12.72 (20.89)	72.89
T ₄ Mancozeb 75% WP	2000	5.80 (13.93)	12.10 (20.34)	22.59 (28.37)	51.84
T ₅ Pyraclostrobin 20% WG	500	6.30 (14.51)	11.60 (19.90)	22.22 (28.12)	52.63
T ₆ Metiram 55% + Pyraclostrobin 5% WG	1750	6.67 (14.96)	9.88 (18.30)	14.07 (22.01)	70.00
T ₇ Untreated check (control)	-	6.79 (15.09)	14.69 (22.52)	46.91 (43.23)	-
S.E. ±		(0.52)	(0.51)	(0.68)	-
C.D. (P=0.05)		(NS)	(1.58)	(2.10)	-
CV %		6.16	4.60	4.30	-

Figures in the parentheses are angular transformed values NS = Non- significant

Table 3 : Effect of fungicides on blackgram yield during Kharif 2018 and 2019

Treatments	Seed yield	Per cent increase in seed yield	Seed yield	Per cent increase in seed
	(q/ha)	over control	(q/ha)	yield over control
	2018	2018	2019	2019
T ₁	6.20	27.97	6.43	31.11
T ₂	8.34	72.04	8.57	74.70
T ₃	9.13	88.51	9.27	88.86
T ₄	6.07	25.22	6.34	29.28
T ₅	6.19	27.78	6.64	35.42
T ₆	8.00	65.12	8.13	65.76
T ₇	4.84	-	4.91	-
S.E.±	(0.55)	-	(0.59)	-
C.D. (P=0.05)	(1.69)	-	(1.80)	-
CV %	13.63	-	14.10	-

the foliar spraying of T₃ i.e. Azoxystrobin 8.3% + Mancozeb 66.7% WG @1500 g /ha recorded the minimum severity of the Cercospora disease which was at par with T₂ i.e. Carbendazim 12% + Mancozeb 63% WP @ 1750 g/ha. Both these chemicals though provided good control followed by T₆ i.e. Metiram 55% + Pyraclostrobin 5% WG @ 1750 g/ha but were significantly superior to the rest of spray fungicides. The terminal disease index under T₂ and T₃ treatments during 2018 and 2019 was 11.98, 12.47 and 12.72, 13.21 per cent, respectively as compared to disease index of 45.31 and 46.91 per cent recorded under unsprayed plots during 2018 and 2019, respectively. The data on terminal disease control also gave the same trend and controlled the disease upto the extent of 73.57 – 53.41 and 72.89 – 51.84 % by spraying of different chemicals during 2018 and 2019, respectively. Maximum control of disease was provided by T₃ and T₂ followed by application of T₆. Minimum control of disease was recorded under the treatment of Mancozeb 75% WP @ 2000 g/ha dose which exhibited disease control of 53.41 and 51.84 per cent during 2018 and 2019 year, respectively.

Effect on yield :

The data on seed yield of black gram was recorded at each harvest and cumulative yield has been presented in Table 3. Yield ranging between 4.84 to 9.13 q/ha and 4.91 to 9.27 q/ha was recorded during 2018 and 2019 by spraying different chemicals on black gram against powdery mildew and Cercospora disease. Treatment, T₃ recorded the maximum yield of 9.13 q/ha and 9.27 q/ha during 2018 and 2019, respectively, which was at par with T₂ (8.34 q/ha and 8.57 q/ha). Untreated control yielded only 4.84 and 4.91 q/ha during 2018 and 2019

year, respectively.

In previous studies also, various researchers have advocated the efficacy of carbendazim in controlling Cercospora leaf spots (Shailbala and Tripathi, 2010). Several other reports also supports the efficacy of carbendazim in controlling fungal foliar diseases of urdbean (Basandari *et al.*, 2016 and Madhuri and Sagar, 2020). Efficacy of fungicide Azoxystrobin 8.3% + Mancozeb 66.7% WG for the management of urdbean cercospora leaf spot disease has been reported for the first time.

Based on present studies, it is concluded that foliar spray of both the treatments T₃ (Azoxystrobin 8.3% + Mancozeb 66.7% WG) and T₂ (Carbendazim 12% + Mancozeb 63% WP) were equally effective to control Cercospora leaf spot diseases in urdbean crop and increasing the yield. Economic viability of both these doses was also at par.

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