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Research Article

Management of cercospora leaf spot of sesame

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ABSTRACT

Sesame (*Sesamum indicum* L.) is an important oilseed crop. The crop suffers from many fungal, bacterial, viral and phytoplasma diseases in which the Cercospora leaf spot caused by *Cercospora sesami* infects all parts of the plant resulting into complete defoliation which leads to severe economic losses. The experiment was laid out during *Kharif* 2009 and 2010 using a susceptible variety DS-1 in a randomized block design with three replications at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. The experiment results from *Kharif* 2009 revealed that Carbendazim @ 0.1 per cent and Quintal @ 0.1 per cent recorded lowest per cent disease index (PDI) of 48.45 and 44.41, respectively and were found at par with each other. The fungicidal spray of Quintal @0.1 per cent and carbendazim @ 0.1 per cent recorded highest yield of 470 kg/ha and 352 kg/ha, respectively. The experimental results from *Kharif* 2010 also revealed the same trend wherein, the fungicides, Carbendazim @0.1 per cent and Quintal @0.1 per cent recorded lowest per cent disease index of 54.00 and 49.00, respectively and were found promising in the management of Cercospora leaf spot of sesame. The pooled analysis of *Kharif* 2009 and 2010, the fungicides Carbendazim and Quintal were found on par with each other. However, the yield data revealed the significant difference between carbendazim (667 kg/ha) and Quintal (818 kg/ha).

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INTRODUCTION

Sesame (*Sesamum indicum* L.) is an important oilseed crop. The crop is cultivated both in tropical and subtropical regions. Among the sesame growing countries in the world, India ranks first in area. India is the largest exporter of sesame. Sesame is described as the "Queen of oilseeds" because of its high oil content (38-54%), protein (18-25%), calcium, phosphorus, oxalic acid and excellent qualities of the seedoil and meal (Prasad, 2002). Sesame oil also contains high level of unsaturated fatty acids which has a reducing effect on the plasma cholesterol (Banerjee and Kole, 2006).

The productivity of sesame is low due to its low harvest index, indeterminate growth habit, shattering, susceptibility to pests and diseases (Ashri, 1998). The crop suffers from fungal, bacterial, viral and phytoplasma diseases. Among the fungal diseases, Cercospora leaf spot caused by *Cercospora sesami* (Zimm.) is one of the most economically important diseases of sesame in almost all the production areas (Akpa *et al*., 1988; Poswal and Misari, 1989). The crop is affected by the pathogen at all stages of the growth (Schmutteerrer and Kranj, 1965; Bhowmick, 1987) and causes heavy economic losses (Vyas, 1981). Due to lack of resistant sources, the released varieties are highly susceptible to Cercospora leaf spot causing considerable yield losses. To combat the disease and maximize the production, there is an urgent need to manage the Cercospora leaf spot of sesame using chemicals.

MATERIALS AND METHODS

The experiment was conducted during *Kharif* 2009 and 2010 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad. The variety DS-1 highly susceptible to Cercospora leaf spot of sesame was planted in a randomized block design of plot size 3 × 2.4m and replicated four times.

The fungicidal treatments were imposed immediately after appearance of the disease and subsequent sprays were given

at an interval of 15 days. The observations were recorded at physiological maturity on five randomly selected plants using 0-5 scale (Kushwaha and Kaushal, 1970). The per cent disease indexe was calculated using the formula :

$$\text{Per cent disease index} = \frac{\text{Sum of numerical ratings}}{\text{Total no. of leaves scored} \times \text{maximum grade}} \times 100$$

At physiological maturity (capsules turning to yellow colour) the plants were harvested, dried and per plot yield was recorded to compute the yield per hectare. The data on per cent disease index were subjected to angular transformations and analyzed using standard statistical procedures.

RESULTS AND DISCUSSION

The experiment results from *Kharif* 2009 revealed that the fungicides *viz*., Carbendazim @ 0.1 per cent and Quintal @ 0.1 per cent recorded lowest per cent disease index (PDI) of 48.45 and 44.41, respectively and were found at par with each other. The remaining fungicides were found infective and differed significantly from that of control. The fungicidal spray of Quintal @ 0.1 per cent and carbendazim @ 0.1 per cent recorded highest yield of 470 kg/ha and 352 kg/ha, respectively and differed significantly with each other (Table 1).

The experimental results from *Kharif* 2010 also revealed the same trend wherein, the fungicides, Carbendazim @0.1 per cent and Quintal @0.1 per cent recorded lowest per cent disease index of 54.00 and 49.00, respectively and were found promising in the management of Cercospora leaf spot of sesame. In all the treatments yield levels were encouraging due to delay infection of disease. However, Quintal @ 0.1 per cent spray recorded 1166 kg/ha followed by Carbendazime 0.1 per cent (981 kg/ha) and were found significant with each other.

The pooled analysis of *Kharif* 2009 and 2010 revealed the significant difference between Quintal and Saff (a combi product of Carbendazim and Mancozeb) whereas Carbendazim and Quintal were found on par with each other. However, the yield data revealed the significant difference between carbendazim (667 kg/ha) and Quintal (818 kg/ha) (Table 1). Similar results were reported in the studies made by Tripathi *et al.* (1996) and Palakshappa *et al*. (2009) who reported that the carbendazim at 0.1 per cent was effective against Cercospora leaf spot of sesame.

Table 1: Efficacy of fungicides for the management of Cercospora leaf spot of sesame

Sr. No.	Treatments	Per cent disease index				Yield (kg/ha)			
		2009	2010	Mean	Pooled data *Kharif* 2009 and 2010	2009	2010	Mean	Pooled data *Kharif* 2009 and 2010
1.	Carbendazim 50WP@0.1%	48.45	54.00	51.22	50.98	352.60	981.58	667.09	667.08
		(43.79)	(47.30)*	(45.54)	(45.57)				
2.	Chlorothalonil 75% WP@ 0.2%	70.31	71.00	70.65	70.65	240.37	789.60	514.98	514.99
		(56.97)	(57.47)	(57.22)	(57.23)				
3.	Copper oxychloride 50% WP	72.06	76.00	74.03	74.03	210.47	803.45	506.96	506.96
	@0.25% + Streptocycline @ 0.01%	(58.12)	(61.30)	(59.71)	(59.43)				
4.	Mancozeb 75% WP@ 0.2%	69.46	71.00	70.23	70.22	270.80	828.92	549.86	549.86
		(58.48)	(57.42)	(57.95)	(56.95)				
5.	Propiconazole 25% EC@ 0.1%	68.54	71.00	69.77	69.79	251.60	783.20	517.40	517.40
		(55.93)	(57.47)	(56.70)	(56.72)				
6.	Wettable sulphur 80% WP@ 0.2%	71.56	79.00	75.28	75.28	204.60	848.25	526.43	526.44
		(57.10)	(64.34)	(60.72)	(60.33)				
7.	Quintal 50%WP	44.41	49.00	46.70	45.95	470.00	1166.32	818.16	818.19
	(Carbendazim+Iprodion) @0.1%	(39.23)	(44.42)	(41.82)	(42.68)				
8.	Saff (Carbendazim 12	68.55	58.00	63.27	63.27	361.65	879.52	620.59	620.59
	WP+Mancozeb 63 WP) @ 0.2%	(56.00)	(49.70)	(52.85)	(52.74)				
9.	Control	88.22	81.00	84.61	84.61	215.26	654.87	435.07	435.07
		(73.12)	(64.32)	(68.72)	(66.97)				
S.E.±		2.52	2.44	-	1.28	16.27	48.24	-	24.43
C.D. (P=0.05)		7.26	7.11	-	3.73	46.82	140.79	-	71.30
C.V. %		9.04	8.70	-	4.61	11.47	11.21	-	8.53

Table 2 : Economics of fungicidal spray in the management of Cercospora leaf spot of sesame - *Kharif* 2010-11

Sr. No.	Treatments	Income in treatments	Additional income	Total cost of production	Net returns	B:C ratio
1.	Carbendazim 50WP@0.1%	39240	13080	10718	28522	3.66
2.	Chlorothalonil 75 % WP@ 0.2%	31560	5400	12118	19442	2.60
3.	Copper oxychloride 50% WP@0.25% + Streptocycline @ 0.01%	32560	6400	11518	21042	2.82
4.	Mancozeb 75%WP@ 0.2%	33120	6900	10758	22362	3.07
5.	Propiconazole 25%EC@ 0.1%	31320	5160	11318	20002	2.77
6.	Wettable sulphur 80%WP @ 0.2%	33920	7760	10258	23662	3.30
7.	Quintal 50%WP (Carbendazim+Iprodion) @ 0.1%	46640	20480	11418	35222	4.08
8.	Saff (Carbendazim 12% WP+Mancozeb 63% WP) @ 0.2%	35040	8880	10678	24362	3.28
9.	Control	26160	-	10118	16042	2.59

Fig. 1 : Fig 1. Management of cercospora leaf spot using quintal@0.1 per cent, a view at capsule stage)

From Table 2, it is evident that highest income in treatments (Rs.46,640), additional income (Rs.20480), net returns (Rs.35222) and B.C ratio 4.08 have encouraged the recommendation of Quintal @ 0.1 per cent for efficient management of Cercospora leaf spot of sesame.

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