

Survey on Fungal Leaf Spots of Cotton in Guntur District of Andhra Pradesh

Key words: *Alternaria*, *Bipolaris*, *Corynespora*, *Cotton*, *Fungal leaf spots*, *Macrophomina*, *Myrothecium*, *Phomopsis*, *vegetative and flowering stages*.

Cotton (*Gossypium* spp.), referred as 'King of Fibre' and 'White Gold', is the most extensively cultivated commercial crop which plays a key role in economic development. India is leading producer of cotton with the highest production of 28,500 M bales followed by China, United States and Pakistan (ICAR-AICRP on Cotton, 2018). Cotton crop is affected by number of foliar, wilt and rot pathogens, in which foliar diseases account for 20 to 30% yield losses (Mayee and Mukewar, 2007). Losses due to leaf spots such as *Alternaria* leaf spot, *Corynespora* leaf spot, *Myrothecium* leaf spot were up to 26%, 100 to 200 lb/acre of lint, 15% respectively (Chattannavar *et al.*, 2006; Hagan and Sikora, 2012; Taneja *et al.*, 1989).

Keeping in view the economic importance of cotton and losses incurred due to leaf spot diseases, present investigations were put through to survey for all fungal foliar leaf spots in farmers' fields and Regional Agricultural Research Station, Lam farm of Guntur district.

MATERIAL AND METHODS

Survey of fungal foliar spots was carried out in farmers' fields of Guntur district and RARS, Lam, Guntur district during *kharif* 2017-2018. Plants were selected randomly from the four corners and center of the fields and severity of different fungal leaf spot diseases was recorded at vegetative and flowering stages. Ten leaves were selected randomly from top to bottom of the plant and were graded using 0-4 scale.

These grades were converted into Per cent Disease Index (PDI) by using the formula given by Wheeler (1969).

$$\text{PDI} = \frac{\text{Sum of individual disease ratings}}{\text{No. of observations} \times \text{Max. disease rating}} \times 100$$

RESULTS AND DISCUSSION

Survey was taken up during vegetative and flowering stage of the crop to assess the incidence of fungal foliar leaf spot diseases of cotton in farmers' and Research Station fields situated in Guntur district of Andhra Pradesh. Incidence of *Alternaria* leaf spot was persistent in all the fields at both the stages.

Table 1. Standard disease rating scale for fungal leaf spots (Mohan *et al.*, 2014)

Scale	Per cent of leaf area covered
0	No infection
1	A few spots of less than 2 mm size, leaf area covering less than 5%
2	Spots of 3 mm size, covering 6-20% of leaf area
3	Spots of 3-5 mm size, irregular in shape coalesce and covering 21-40% of leaf area.
4	Spots covering more than 40% of leaf area

Alternaria leaf spot, *Corynespora* leaf spot and *Myrothecium* leaf spot disease severity increased from vegetative to flowering stage. *Bipolaris* and *Phomopsis* leaf spots were observed during vegetative and flowering stage with PDI upto 4.0% and 8.0% respectively. *Macrophomina* leaf spot was recorded only on cotyledonary leaves of the crop in all the farmers' fields.

Alternaria and *Corynespora* leaf spots occurred together in most of the fields. *Myrothecium* leaf spot was observed in the farmers' field with 3.0 to 9.0% of PDI. *Phomopsis* leaf spot, not reported earlier was observed in the cotton fields of Guntur district upto an extent of 8.0%. The data pertaining to the survey are given in Table 1.

Observations recorded in farmers' fields revealed that *Alternaria* leaf spot appeared during 2nd week of August (6.0%) and recorded maximum PDI of 15.0% during 2nd week of October, *Corynespora* leaf spot appeared during 3rd week of August (9.0%) and increased to 33.0% during 4th week of October being highly favoured by weather conditions like high relative humidity and continuous rainy days during the period. *Myrothecium* leaf spot was initiated during 4th week of August and reached 9.0% during 1st week of October. *Phomopsis* leaf spot was observed during 4th week of August and during 3rd week of September where 8.0% PDI was recorded. During the season, PDI of *Bipolaris* was upto 3.0% where as *Macrophomina* leaf spot was upto 5.0%.

Table 2. Occurrence of cotton fungal leaf spot diseases in RARS, Lam farm and farmer's field during *kharif* 2017.

S. No.	HYBRID	Month of assessment	Phenological Stage of crop	PDI (%)					
				ALS	CoLS	MyLS	PLS	BLS	MLS
1	JAADOO	Farmer's fields	Vegetative	0 to 8	0 to 9	0 to 5	0 to 5	0 to 2	2 to 5
		7 th August -20 th September							
2	ATM	Farmer's fields	Vegetative	13	22 to 33	5 to 7	0 to 8	0 to 3	0
		25 th September t to 30 th October							
3	UN KNOWN	Farmer's fields	Vegetative	7 to 8	0 to 9	0	7 to 8	0	0 to 4
		7 th August to 20 th September							
4	JAADOO	Farmer's fields	Flowering	11 to 15	9 to 12	3	0	0	0
		25 th September to 30 th October							
5	JAADOO	Farmer's fields	Vegetative	0 to 6	0	4 to 6	0	0	0
		7 th August to 20 th September							
6	JAADOO	Farmer's fields	Flowering	10	0	9	0	0	0
		25 th September to 30 th October							
		RARS, Lam farm							
4	JAADOO	Farmer's fields	Vegetative	4 to 9	0 to 10	traces	traces	2 to 4	0
		5 th September to 15 th October							
5	JAADOO	Farmer's fields	Vegetative	12 to 13	16 to 18	0	0	0	0
		15 th October to 20 th November							
6	JAADOO	Farmer's fields	Flowering	0 to 8	0 to 5	0	traces	0	0
		5 th September to 30 th September							
6	JAADOO	Farmer's fields	Vegetative	12 to 17	11 to 17	traces	0	0	0
		15 th October to 20 th November							
6	JAADOO	Farmer's fields	Vegetative	3 to 5	0 to 9	0	0	2 to 3	0
		5 th September to 30 th September							
		RARS, Lam farm							
		Farmer's fields							
		15 th October to 20 th November	Flowering	6	21 to 28	0	0	0	0

In the research fields of RARS, Lam farm, Guntur, *Alternaria* leaf spot was initiated during 1st week of September (3.0%) and reached upto 17.0% during 3rd week of October, *Corynespora* leaf spot appeared during 1st week of September (5.0%) and recorded 28.0% during 1st week of November. *Myrothecium* and *Phomopsis* leaf spot were observed in traces PDI of *Bipolaris* leaf spot was 2.0 to 4.0%.

Leaf spot diseases of cotton are one of the major constraints limiting the yields of cotton. *Alternaria* blight is the major leaf spot disease in cotton. New leaf spots such as *Corynespora* leaf spot and *Phomopsis* leaf spot were also observed in the present studies. *Corynespora* leaf spot or leaf fall disease is mainly observed in countries like Georgia, Brazil *etc.*, but in present investigation it was noted in predominant manner due to favourable weather conditions like prolonged wet period on leaf canopy, high rainfall and high relative humidity. During the season under the survey *Phomopsis* leaf spot was also favoured by similar weather conditions. These leaf spots individually or collectively may occur in epidemics under favourable conditions if they are not managed properly leading to major yield losses.

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