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Present status of *Alternaria* leaf blight disease of sunflower in north eastern Karnataka

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Abstract

Sunflower is one of the most important edible oilseed crops in India. Among the major diseases of sunflower, *Alternaria* leaf blight caused by *Alternaria helianthi* (Hansf.) Tubaki and Nishihara is most devastating disease in Karnataka. A roving survey was conducted to assess the severity of *Alternaria* leaf blight during *Kharif* season 2018 in Raichur, Ballari, Koppal and Gulbarga districts of North Eastern Karnataka. The survey results revealed that disease severity was noticed in all locations surveyed with a range of 13.33 to 65.60 per cent. Maximum disease severity was observed in Koppal district (45.34 %) and least severity was noticed in Kalburgi district (22.43 %).

Keywords: survey, sunflower, *Alternaria* leaf blight, severity

Introduction

Sunflower (*Helianthus annuus*) is one of the important oilseed crops in India, popularly known as “Surajmukhi” which belongs to the botanical family “Compositae”. It was originated in North America. Sunflower is a major source of vegetable oil in the world, which contains about 39 to 49 per cent oil in the seed. It ranks second to soybean in worldwide vegetable oil production. It is a richest source of linoleic acid which is good for heart patients. Leaf blight caused by *Alternaria helianthi* is the most devastating disease in Karnataka. The disease is known to cause more than 80 per cent of yield loss under severe epiphytotic conditions in Northern Karnataka (Shankergoud *et al.*, 2006) ^[11].

Hansford (1943) first reported the fungus causing leaf spot of sunflower from Uganda and described the causal organism as *Helminthosporium helianthi*. Tubaki and Nishihara (1969) ^[12] isolated this fungus from diseased leaves of cultivated sunflower crop and confirmed causal organism as *A. helianthi*. First record of this disease in India was simultaneously reported by Narain and Saksena (1973) ^[9]; Kolte and Mukhopadhyay (1973) ^[5] from Uttar Pradesh; Anilkumar *et al.* (1974) ^[1] reported this disease from Karnataka.

This disease has been reported from different parts of the world including India and is known to cause reduction in flower size, number of seeds per head, seed yield per plant, test weight and also oil content (Balasubramanyam and Kolte, 1980) ^[2]. The loss in yield varies from 11.30 to 73.33 per cent depending on the extent of infection and crop stage of infestation (Reddy and Gupta, 1977) ^[10]. In India, the disease appears in the states of Karnataka, Maharashtra, Bihar, Andhra Pradesh, Haryana and Tamil Nadu. In Karnataka, the disease occurred in epidemic form in 1987, with a disease severity of 95 to 100 per cent (Hiremath *et al.*, 1990) ^[4]. In these areas, yield losses may range from 15 to 90 per cent, with oil losses from 20 to 30 per cent. *Alternaria* is reported to cause losses from 50-60 per cent in more humid areas.

Material and Methods

A roving survey for severity of *Alternaria* leaf blight in sunflower was taken in major sunflower growing areas during *Kharif* 2018 in two taluks of Raichur, three taluks of Koppal, two taluks of Ballari and four taluks of Kulbarga. In each taluka, minimum of three villages were selected and in each village three farmers fields and in each field five spots were selected per acre to assess the severity of the disease. The survey was carried during star bud to

harvesting stage. Per cent severity of the disease was recorded in each field and averaged for each village.

Scoring of the disease was done in field by using 0-9 scale given by Mayee and Datar (1986) [7].

Disease rating scale of *Alternaria* leaf blight of sunflower

Grade	Disease description	Disease reaction
0	No symptoms on the leaf	Immune
1	1 per cent or less of the area infected	Highly resistant
3	1-10 per cent of leaf area infected	Resistant
5	11-25 per cent of leaf area infected	Moderately resistant
7	26-50 per cent of the leaf area infected	Susceptible
9	More than 50 per cent or more leaf area infected	Highly susceptible

The per cent disease index (PDI) was calculated by using the formula given by Wheeler (1969).

$$\text{PDI (\%)} = \frac{\text{Summation of all numerical ratings}}{\text{Total number of leaves scored} \times \text{maximum rating scale observed}} \times 100$$

Results and Discussion

The total surveyed villages of four districts reported that maximum disease severity of 65.60 per cent was observed in Banahalli village of Koppal taluk and minimum disease severity of 13.33 per cent was observed in Yadrami village of Jewargi taluk. The village-wise disease severity has been presented in Table 1.

In Raichur district highest disease severity of 40.50 per cent was recorded in Hirekotnal, followed by Tappaladoddi with severity of 38.30 per cent and least disease severity of 20.50 per cent was observed in Bandisunkapur village. In Koppal district highest disease severity was observed in Banahalli with 65.60 per cent, followed by Alavandi village with disease severity of 63.00 per cent while minimum disease severity of 15.50 per cent was obtained in Hosur village. In Bellari district maximum disease severity of 43.55 per cent was recorded in Itagi village followed by Gaddikere with 42.20 per cent and minimum disease severity was observed in Morigere with 36.93 per cent. In Kalburgi district maximum disease severity was observed in Melkunda with 33.55 per cent followed by Hadagil with disease severity of 30.33 per cent and minimum disease severity of 13.33 per cent was observed in Yadrami village.

The major sunflower growing areas of North Eastern Karnataka surveyed shows that, maximum PDI of 45.34 per cent was observed in Koppal followed by Ballari district with disease severity of 40.46 per cent and minimum mean district disease severity of 22.43 was observed in Kalburgi district. Further, among all the taluks of four districts shows that maximum disease severity of 57.30 per cent was observed in Koppal taluk of Koppal district and minimum disease severity of 16.34 per cent was observed in Aland taluk of Kalburgi district (Table 2).

The results confirmed with earlier reports of Mesta *et al.*

(2009) [8] conducted survey during 2004 to 2006 in North Karnataka districts and reported that *Alternaria* leaf blight disease was ranges from 13.10 per cent to 45.60 per cent in sunflower crop. The maximum disease severity of 45.60 per cent was observed in Bagalkot taluk due to high rainfall with 384 mm was major factor for development of high amount of disease in Bagalkot taluk compared to the other taluks of Northern Karnataka where as minimum rainfall of 373 mm and disease severity of 30.10 per cent was recorded in Lingasugur taluk. It indicates rainfall is important weather factor to obtain high *Alternaria* leaf blight disease in sunflower crop.

Koppal district shows maximum disease severity of *Alternaria* leaf blight in *Kharif* 2018 which was due to uneven rainfall with more relative humidity had built up, higher inoculum level and it was agreement with the results of Kolte (1984) [6] as reported that, higher rainfall and relative humidity to cause severe epidemics of *Alternaria* leaf blight of sunflower. In Koppal district, farmers usually do not practice fungicidal spray against *Alternaria* leaf blight of sunflower and flooded irrigation may also favor for the development of disease in sunflower.

The lowest disease severity of 16.34 was observed in Aland taluk of Kalburgi district due to growing of Kargil 413 hybrid lead to less susceptible for *A. helianthi* and rainfed practices without irrigation, where sunflower crop not grow continuously may also leads to minimum *Alternaria* leaf blight disease in sunflower crop. This results confirmed with the results of Chaube and Singh (2001) [3] reported that, continuous cultivation of any crop over the season and years will build up inoculum level and cause more disease, but in Aland taluk farmers did not grow sunflower crop continuously over the season that shows lowest disease severity in sunflower. It indicates monocropping carry disease inoculum from season to season but rotating the crops can be avoid the infection of *A. helianthi* in sunflower crop.

The *Alternaria* leaf blight disease severity varied from one locality to another, due to prevailing varied environmental conditions, cropping pattern and amount of inoculum build up in susceptible cultivars of sunflower crop to cause more disease severity in the farmer's field. The sunflower was cultivated in three season viz., *Kharif*, *rabi* and summer which was recorded during 2018 survey and there is no definite sowing date for sunflower crop. This not only exhausts the nutrients from the soil but also paves the way for continuous survivability of the pathogen. The infected debris left in the field serve as major source of infection, thus causing epidemic throughout the season. Crop stage was also found to be closely related to disease severity and the susceptibility increases with increase in age of the crop and cause more disease severity in sunflower where the stage of crop was at maturity and harvesting time than compared to flowering stage.

Table 1: Prevalence of *Alternaria* leaf blight of sunflower in different districts of North Eastern Karnataka during *Kharif* 2018

Sl. No.	District	Talukas	Villages	Soil type	Variety	Stage of the crop	Irrigated/Rainfed	PDI (%)
1	Raichur	Manvi	Hirekotnal	Black soil	Kaveri	Maturity	Rainfed	40.50
			Gudidini	Black soil	Kaveri	Maturity	Rainfed	33.50
			Tappaladoddi	Black soil	Kaveri	Maturity	Rainfed	38.30
			Chincharaki	Black soil	Kaveri	Maturity	Rainfed	24.50
		Lingasugur	Hamminagadda	Red soil	LG hybrid	Maturity	Rainfed	32.50
			Bommanahal	Red soil	LG hybrid	Maturity	Irrigated	22.30
			AsihalTanda	Red soil	LG hybrid	Maturity	Rainfed	21.50
			Bandisunkapur	Red soil	LG hybrid	Maturity	Rainfed	20.50
2	Koppal	Koppal	Alavandi	Red soil	Kaveri	Maturity	Irrigated	63.00

			Banahalli	Red soil	Kaveri	Harvesting	Irrigated	65.60
			Bikanahalli	Red soil	Kaveri	Harvesting	Irrigated	52.60
			Sindhogi	Red soil	Kaveri	Harvesting	Irrigated	48.00
		Kushtagi	Nawalahalli	Red soil	Kaveri	Harvesting	Rainfed	44.50
			Gumgera	Red soil	Kaveri	Harvesting	Rainfed	47.30
			Ganganala	Red soil	Kaveri	Harvesting	Rainfed	50.60
		Yelburga	Hiremannapur	Red soil	Kaveri	Harvesting	Rainfed	54.30
			Hirearlihalli	Red soil	Kaveri	Harvesting	Rainfed	34.30
			Hosur	Red soil	Kaveri	Flowering	Rainfed	15.50
			Yalburga	Red soil	Kaveri	Maturity	Rainfed	38.90
3	Bellari	Hadagali	Holgundi	Red soil	Kaveri	Maturity	Rainfed	41.33
			Itagi	Red soil	Kaveri	Maturity	Irrigated	43.55
			Uttangi	Red soil	Kaveri	Maturity	Rainfed	39.27
		Hagaribommanahalli	Gaddikere	Red soil	Kaveri	Maturity	Rainfed	42.20
			Morigere	Red soil	Kaveri	Maturity	Rainfed	36.93
			Sonna	Red soil	Kaveri	Maturity	Rainfed	39.50
4	Kalburgi	Jewargi	Andola	Black soil	Sunbred	Maturity	Rainfed	15.55
			Yadrami	Black soil	Sunbred	Maturity	Rainfed	13.33
			Kellur	Black soil	Sunbred	Maturity	Rainfed	20.22
		Kalburgi	Bhimalli	Black soil	Sunbred	Maturity	Rainfed	28.33
			Melkunda	Black soil	Sunbred	Maturity	Rainfed	33.55
			Hadagil	Black soil	Sunbred	Maturity	Rainfed	30.33
		Chittapur	Malkhed	Black soil	Kargil-413	Maturity	Rainfed	24.10
			Dandothi	Black soil	Kargil-413	Maturity	Rainfed	28.50
		Aland	Narona	Black soil	Kargil-413	Maturity	Rainfed	14.30
			Kadaganchi	Black soil	Kargil-413	Maturity	Rainfed	13.50
Salagar	Black soil		Kargil-413	Maturity	Rainfed	21.22		

Table 2: Per cent disease index of *Alternaria* leaf blight of sunflower at survey in different districts and taluks of North Eastern Karnataka during Kharif 2018

Sl. No.	District	Taluk	Mean per cent disease index (%)	
			Taluks	Districts
1	Raichur	Manvi	34.20	29.2
		Lingasugur	24.20	
2	Koppal	Koppal	57.30	45.34
		Kustagi	49.17	
		Yelburga	29.56	
3	Ballari	Hadagali	41.38	40.46
		Hagaribommanhalli	39.54	
4	Kalburgi	Jewargi	16.36	22.43
		Kalburgi	30.73	
		Chittapur	26.30	
		Aland	16.34	

References

1. Anilkumar TB, Urs SD, Seshadri VS, Hegde RK. *Alternaria* leaf spot of sunflower. Curr. Sci. 1974; 43:93-94.
2. Balasubramanyam N, Kolte SJ, Effect of *Alternaria* blight on yield components, oil content and seed quality of sunflower. Indian J. Agric. Sci. 1980; 50:701-706.
3. Chaube HS, Singh R, Introductory Plant Pathology, International Book Distributing Company, Lucknow. 2001, p.132.
4. Hiremath PC, Kulkarni MS, Lokesh MS. An epiphytotic of *Alternaria* blight of sunflower in Karnataka. Karnataka J. Agric. Sci. 1990; 3:277-278.
5. Kolte SJ, Mukhopadhyay AN. Occurrence of some new sunflower disease in India. Pesticides Abstracts and News Summary. 1973; 19:392-396.
6. Kolte SJ. Diseases of annual edible oilseed crops. CRC Press, Florida. 1984; 3:9-96.
7. Mayee CD, Datar VV. Phytopathometry. Tech. Bull.-1, Marathwad Agric. Univ., Parbhani. 1986, p. 251.

8. Mesta RK, Benagi VI, Shankergoud I, Megeri N, Survey for the status of *Alternaria* blight of sunflower in Northern Karnataka. Karnataka J. Agric. Sci. 2009; 22 (5):1032-1037.
9. Narain A, Saksena HK. Occurrence of *Alternaria* leaf spot of sunflower in India. Indian J. Mycol. Pl. Pathol. 1973; 3:115-116.
10. Reddy PC, Gupta BM. Disease loss appraisal due to leaf blight of sunflower incited by *Alternaria helianthi*. Indian Phytopathol. 1977; 30:569-570.
11. Shankergoud I, Shadakshari YG, Parameshwarappa KG, Chandranath HT, Katti P, Mesta RK. Sunflower and Castor research in Karnataka- An overview, Univ. Agric. Sci., Dharwad, 2006, pp. 1-41.
12. Tubaki K, Nishihara N. *Alternaria helianthi* (Hansf.) Comb. Nov. Trans. British Mycol. Soc. 1969; 53:147-149.