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Survey for the Turcicum Leaf Blight Disease Incidence in Southern Karnataka

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ABSTRACT

Maize (Zea mays L.) is an important food and feed crop which ranks third after wheat and rice in India and in the world. It is cultivated under diverse environmental conditions. It is affected by more than 60 diseases, among them foliar disease, turcicum leaf blight is one of the important disease causing moderate to severe losses in yield. Hence, to know its damage and the extent of severity, a survey was carried out in seven major maize growing districts of southern Karnataka. The highest disease index was noticed in Chickmagalur district, which is having a mean PDI of 55.07 succeeded by Hassan and Chitradurga district with a mean PDI of 51.2 and 48 respectively. However, the least per cent disease index was recorded in Mysore (42.4) followed by Kodagu district with a PDI of 44.5.

Key words: *Turcicum leaf blight, Exserohilum turcicum, Survey, Maize diseases*

INTRODUCTION

In Indian agriculture, maize occupies an important place after wheat and rice. Maize is not only utilized as a staple food by the lower strata of the society, but it is also used as a crop par excellence for industrial use. Maize is cultivated under diverse environmental conditions. Among the cereals, maize cultivated in India, occupies fifth place in area, third place with respect to production and productivity. In Karnataka, maize occupies an area of 13.22 lakh hectares with the production of 34.55 lakh tones and productivity of 28.34 q/ha, which is highest when compared to other states in the country[1]. In Karnataka, Area under maize is increasing rapidly because of congenial environment, high yield and ease with which the crop is cultivated. Thus, there is scope to increase maize productivity in Karnataka to a global level of 49.20 q/ha (FAOSTAT[4]). With the introduction of high yielding hybrids both indigenous and exotic and use of chemical fertilizers, there has been a phenomenal increase in the area and production, but at the same time, it is prone to the attack of several foliar and stalk rot diseases[11]. Among the foliar diseases affecting maize, the turcicum leaf blight also called as Northern leaf blight caused by *Exserohilum turcicum* (Pass.) Leonard and Suggs. (syn. *Helminthosporium turcicum* Pass.) is of worldwide importance[3] causing moderate to severe losses in yield.

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Several authors in the past studied on turcicum leaf blight and is considered to be one of the most devastating foliar diseases in Karnataka resulting in reduction of grain yield by 28 to 91 per cent[7,10]. Hence a survey was undertaken to know the present status of this disease in major maize growing areas of southern Karnataka, to identify hotspots for this disease and to formulate location specific studies on turcicum leaf blight disease.

MATERIAL AND METHODS

A systemic intensive roving survey for incidence of turcicum leaf blight was conducted in major maize growing districts of southern Karnataka during 2014 and 2015. In each district two to three taluks were selected, in each taluk two to three villages were identified and in each village three fields were surveyed. During survey, in each field 20 plants were randomly selected and the severity of the disease was recorded by following 1 to 5 scale given by Payak and Sharma[12] (Table) and later the per cent disease index was calculated by the formula given by Wheeler[15].

$$PDI\ (\%) = \frac{\text{Total sum of numerical rating}}{\text{No. of leaves examined x Maximum grade value}} \times 100$$

Table: Disease scoring scale for turcicum leaf blight disease of maize

Grade	Degree of infection	Category
1	Very slight infection, one to two restricted spots (lesions) on lower leaves or traces	Resistant
2	Slight to moderate infection on lower leaves, a few scattered lesions on lower leaves	Moderately Resistant
3	Abundant lesions on lower leaves, few on middle leaves	Moderately Susceptible
4	Lesions abundant on lower and middle leaves extending to upper leaves	Susceptible
5	Lesions abundant on all leaves. Plants may be prematurely killed by blight.	Highly Susceptible

RESULTS AND DISCUSSION

The roving method of survey was conducted to assess the severity of turcicum leaf blight of maize in major maize growing regions of Shivamogga, Davanagere, Chikmagaluru, Chitradurga, Kodagu, Hassan and Mysuru districts taking three villages in each taluks of districts.

Among the different villages surveyed, the per cent disease index (PDI) varied from 20.00 to 90.00 in different villages. The highest per cent disease index was observed in Harohalli village of Hassan district with a PDI of 90.00 followed by Siddarahalli village of Taikere taluk, Chickmagaluru district with a PDI of 82.00 succeded by Kommanalu village of Shivamogga taluk, Harogoppa village of Shikaripura taluk and Bhavikere village of Tarikere taluk, Chikmagaluru district with a PDI of 70.00. Whereas, the lowest PDI was recorded in Mumbaru, Iginbail and Ulluru villages of Sagara taluk, Shivamogga district with a PDI of 20.00 followed by Hale Kumsi of Shivamogga, Nyamathi of Davanagere and Doddahalli of Mysuru with a PDI of 26.00, 30.00 and 30.00 respectively (Table 1).

Among the different taluks surveyed, the PDI ranges from 20.00 to 68.00. The highest per cent disease index was recorded in Hassan taluk of Hassan district with a PDI of 68.00 followed by Tarikere taluk of Chickmagaluru and Shikaripura taluk of Shivamogga, these taluks had a mean PDI of 59.60 and 58.67 respectively. The lowest PDI was observed in Sagara taluk of Shivamogga with a PDI of 20.00 followed by Honnali of Davanagere (34.67), Krishnarajanagar of Mysuru (36.00) and Virajpet taluk of Kodagu (36.00).

The highest disease index among the seven districts was noticed in Chickmagaluru district, which is having a mean PDI of 55.07 followed by Hassan and Chitradurga district with a mean PDI of 51.20 and 48.00 respectively. The lowest per cent disease index was recorded in Mysuru (42.40) and Kodagu (44.50) districts.

The district wise result showed that, there was a significant variation in disease incidence and index in different taluks based on their climatic conditions and type of cropping system. The results indicated that monocropped area like Hassan has shown more disease index compared to others.

The maximum disease grade was observed in many villages irrespective of the taluks and districts. Maximum disease grade of 5 was noticed in Bhavikere and Siddarahalli villages of Tarikere taluk, Chikmagaluru district and Harohalli village of Hassan district. Whereas, the least disease grade of 1 was observed in all the maize growing villages of Sagara taluk, Shivamogga district.

This variation in the occurrence of turcicum leaf blight of maize is attributed to varying climate conditions at different locations surveyed, different hybrids cultivated etc. The results of present study were in agreement with Harlapur[6] and Khedekar *et al.*[8] who stated that, prevailing environmental conditions during cropping season could be a reason for higher incidence of disease in these areas. Ullstrup[14] reported that TLB incidence and severity varied from year to year as well as one locality to another, depending on prevalence of environmental conditions. Earlier survey reports[7] indicated that, cultivar susceptibility and weather parameters play an important role for the high severity of the disease. Similar observations were also made by several workers like Gowda *et al.*[5]; Laxminarayana and Shankarlingam[9]; Babu *et al.*[2] and Reddy *et al*[13].

This high per cent disease index is due to favorable environmental conditions during cropping season; intensive cultivation of maize, year after year; narrow genetic makeup of the commercial hybrids and non-adoption of disease management practices by the farmers could be a reason for higher incidence of disease in these areas.

Table 1: Survey for the incidence of turcicum leaf blight disease of maize in southern Karnataka

District	Taluk	Village	Max grade	PDI	Taluk mean	District mean
Shivamogga	Shivamogga	Kommanalu	4	70	53.50	46.87
		Shivamogga	4	64		
		Ayanuru	3	54		
		Hale Kumsi	2	26		
	Bhadravathi	Holehonnuru	3	48	50.67	
		Bhadravathi junction	4	52		
		Mallapura	3	52		
	Shikaripura	Harogoppa	4	70	58.67	
		Kalmane	4	54		
		Ittigehalli	4	52		
	Sagara	Mumbaru	1	20	20.00	
		Iginbail	1	20		
		Ulluru	1	20		

	Soraba	Tatturu	4	54	49.33	
		Chatradahalli	3	52		
		Kolgunsi	3	42		
Chickmagaluru	Chickmagaluru	Magadi	4	60	54.50	55.07
		Muggulavalli	3	52		
		Byrapura	3	46		
		Chickmagaluru	4	60		
	Tarikere	Bhavikere	5	70	59.60	
		Siddarahalli	5	82		
		Ajjampura	4	54		
		Beguru	3	52		
		Sokke	3	40		
	Kadur	Antaragatta	3	50	51.00	
		Nidagatta	3	52		
	Biruru	Doddagatta	3	50	49.00	
		Biruru	3	48		
Davanagere	Honnali	Nyamathi	2	30	34.67	45.20
		Balmuri	3	40		
		Kanchikoppa	3	34		
	Harihara	Kodihalli	3	52	50.00	
		Doggali	3	50		
		Bhanuvalli	3	48		
		Avaragolla	3	50		
	Harapanahalli	Haluragalli	3	50	52.00	
		Nitturu	3	54		
		Telagi	3	54		
		Nanelyala	3	50		
	Chennagiri	Masti	3	36	41.50	
		Mavinkatte	3	44		
		Ajjihalli	3	44		
		Masadi	3	42		
Chitradurga	Chitradurga	Attikatte	3	40	45.33	48.00
		Bevinahalli	3	44		
		Madure	3	52		
	Hosadurga	Baguru	3	56	48.67	
		Honnekere	3	46		
		Mahali	3	44		
		Palyadahalli	3	44		
		Nagenhalli	3	48		
		Hosadurga	3	54		
	Hiriyur	Burujanaroppa	4	54	49.33	
		Aimangala	3	40		
		Tamatadahalli	3	54		
Hassan	Hassan	Masuru	4	66	68.00	51.20
		Harohalli	5	90		
		Sunenahalli	4	60		
		Kuppahalli	4	56		

	Holenarasipura	Hangarahalli	3	40	37.00	
		Doddakaadanuru	3	34		
		Hosahalli	3	44		
		KB Palya	2	30		
	Beluru	Dummenahalli	4	56	51.33	
		Channapura	4	50		
		Karagada	4	48		
	Channarayapatna	Chanarayapatna	3	50	49.00	
		Biruru	3	48		
	Arasikere	Bendekere	3	50	48.00	
		Chikbanavara	3	46		
Mysuru	KR Nagara	Bachnanahallikoplu	3	40	36.00	42.40
		Harakere	3	38		
		Doddahalli	2	30		
	Hunasuru	Bekya	3	54	52.00	
		Harinahalli	3	50		
Kodagu	Somavarpete	Karinakoppa	3	44	46.00	44.50
		Kudige	3	48		
	Madikeri	Kushalnagara	3	50	50.00	
	Virajpete	Ponnampete	3	36	36.00	

CONCLUSION

By the results it was concluded that turcicum leaf blight incidence was increasing in all the maize growing areas. Chickmagaluru and Hassan districts were found to be hot spots for this disease due to the continuous monoculturing of maize coupled with congenial environmental conditions. Hence, proper management practices has to be taken up by the farmers in order to avoid the economical losses.

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