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Raghavender Yelgurti

Department of Plant Pathology,
College of Agriculture,
University of Agricultural
Sciences, Raichur, Karnataka,
India

SK Jayalkshmi

Department of Plant Pathology,
College of Agriculture,
Kalaburgi, Karnataka, India

B Zaheer Ahamed

Department of Plant Pathology,
ICAR-Krishi Vigyan Kendra,
Kalaburagi, Karnataka, India

Sreedevi S Chavan

Department of Plant Pathology,
AICRP on Groundnut, MARS,
UAS, Raichur, Karnataka, India

G Girish

Department of Genetics and
Plant Breeding, AICRP on
Sorghum, ARS, Hagari,
Karnataka, India

Correspondence**Raghavender Yelgurti**

Department of Plant Pathology,
College of Agriculture,
University of Agricultural
Sciences, Raichur, Karnataka,
India

Survey on severity of turcicum leaf blight (*Exserohilum turcicum*) of sorghum in major sorghum growing regions of Northern Karnataka

Raghavender Yelgurti, SK Jayalkshmi, B Zaheer Ahamed, Sreedevi S Chavan and G Girish

Abstract

A roving survey was carried out to assess severity of turcicum leaf blight (TLB) in major sorghum growing regions of Northern Karnataka during *kharif* and *rabi* 2016-2017. The results revealed that the turcicum leaf blight caused by *E. turcicum* was observed in all the three districts surveyed and during *kharif* maximum TLB disease severity was observed in Kalaburagi, ARS (58.00%) followed by Gabbur (56.00%), Nandihal (52.00%), Andola (50.00%), Ganwar (48.00%), Devur (46.00%), Jalihal (42.00) and Huvinahippargi (40.00%) villages. The least disease severity was district. noticed in Mallapur (38.00%) of Raichur district. During *rabi* maximum disease severity was noticed in Sannur (22.00) followed by Jevoor (20.00%), Ganihar (18.00%), Polkamdoddi (12.00%) and Ankanhal (10.00%) villages. The least disease severity was noticed in Uttnal (04.00) of Vijayapura.

Keywords: Sorghum, turcicum leaf blight, survey, *Exserohilum turcicum*

Introduction

Sorghum (*Sorghum bicolor* Linn. Moench) popularly known as Jowar, is the major cereal consumed in India and ranks fifth after wheat, rice, maize and pearl millet. The world production of grain sorghum is 70.83 million tons from 44.8 million ha area of land (FAOSTAT, 2014) [7]. In India it is cultivated in 6.16 million hectares in both *kharif* (2.26m.ha) and *rabi* (3.89m.ha) with an annual production of 5.44 million tons of grain with productivity of 8.44 kg per hectare (INDIASTAT, 2015) [9]. Major sorghum growing states of India were Maharashtra, Karnataka and Andhra Pradesh and grown as rainfed crop to an extent of 85 per cent (4.93m.ha). In Karnataka sorghum production is about 1.32 million tons in an area of 1.04 million ha with the average productivity of 1180 kg per ha. The sorghum is the main food crop of Hyderabad-Karnataka region and occupies an area of 5.6 lakh hectares with production of 5.5 lakh tons and productivity of 1122kg per ha (Anon., 2014-15). [2] As the *rabi* sorghum produces the white pearly grains which is mainly used for food in India for the preparation of roti. It is also an important animal feed (swine, poultry and cattle) used in countries like U.S., Mexico, South America and Australia. Sorghum, as a food, feed and bio fuel crop with excellent drought resistance compared to other cereals, is considered as a "failsafe crop" (Burke *et al.*, 2010) [4]. Sorghum grain is a principal source of energy, protein, vitamins and minerals for the poor people living in the semi-arid tropics. It is nutritionally superior to rice because of its high mineral and fiber content. Starch (60-75%) is the main component of sorghum grain, followed by proteins (7-15%), non-starch polysaccharides (2-7%) and fat (1.5-6%). (Dicko *et al.*, 2006) [5]. Even though the crop is robust and versatile, it has faced drawbacks in terms of yield and reduction in acreage due various diseases.

The major diseases that affect sorghum include downy mildew, turcicum leaf blight, anthracnose and sorghum smuts (covered kernel smut, loose smut, long smut and head smuts). Turcicum leaf blight (TLB) is one of the most destructive foliar diseases of maize and sorghum. It can cause yield reduction more than 50 % in susceptible varieties and is favoured by mild temperatures and humid weather conditions with heavy dews (Bergquist, 1986) [3]. The disease occurs as long elliptical tan lesions that develop on lower leaves and progress upwards. Susceptibility to *Exserohilum turcicum* is reported to decrease with crop maturity (Frederiksen, 1980) [6]. In Northern Karnataka, sorghum cultivation is becoming popular in recent years and not much information is available with respect of turcicum leaf blight of

sorghum. Hence roving survey of the disease was undertaken to have definite idea about the disease status, distribution, level of severity, extent of spread and to locate hot spots for testing of genotypes in disease resistance programme.

Material and methods

An intensive roving survey was conducted during *karif* and *rabi* season of 2016-17 in major sorghum growing areas of Raichur, Vijayapura and Kalaburgi districts of Northern Karnataka. In each district, four important sorghum growing taluks were selected, in each village three fields were randomly selected when the crop is at earhead formation to earhead maturity stage. Turcicum leaf blight severity was recorded in their fields by recording the disease on 1-5 disease rating scale (Adipala *et al.*, 1993) [1]. Per cent Disease Index (PDI) was calculated by using the following formula (Wheeler, 1969) [13].

$$\text{(PDI)} = \frac{\text{Sum of all the individual disease ratings}}{\text{Total number of plants observed} \times \text{Maximum grade}} \times 100$$

Results and discussion

Survey was carried out during *kharif* and *rabi* seasons of 2016-17 in major sorghum growing areas of Vijayapura, Raichur, and Kalaburgi districts by adopting roving survey at earhead formation to earhead maturity stage. The mean per cent disease index (PDI) recorded at various locations is presented in Table 1 and 2. Turcicum leaf blight (TLB) disease was prevalent in all the sorghum growing areas of Vijayapura, Kalaburgi and Raichur districts in low to severe form ranging from 4.00 to 58.00 per cent. Among 24 locations surveyed, during *kharif* maximum TLB disease severity was observed in ARS, Kalaburagi (58.00%) followed by Gabbur (56.00%), Nandihal (52.00%), Andola (50.00%), Ganwar (48.00%), Devur (46.00%), Jalihal (42.00%) and Huvinahippargi (40.00%) villages. The least disease severity

was noticed in Mallapur (38.00%) of Raichur district. During *rabi* maximum disease severity was noticed in Sannur (22.00%) followed by Jevoor (20.00%), Ganihar (18.00%), Polkamdoddi (12.00%) and Ankanhal (10.00%) villages. The least disease severity was noticed in Utal (04.00%) of Vijayapura district. The maximum severity of TLB in ARS, Kalaburgi recorded 58 per cent during *kharif* season was mainly due to good rainfall (355.0mm) received during September month. In Raichur, during *rabi* season the severity was quite low because of unfavourable conditions *viz.*, low rainfall, hot temperature and no dews in the cropping season.

The results supported by the work of Nataraj (2014) [11] who reported that, the maximum disease severity was observed in Davanagere, Ballari districts and least in Raichur district. Similarly these results are substantiated with the research work on TLB of maize by various workers across the state. Pandurangegowda (1987) [12] who conducted survey during *Kharif* and summer seasons in 21 taluks of major maize growing districts of South Karnataka. The disease incidence was very low in four taluks, 11 taluks had moderate disease severity and 6 taluks had severe disease severity. Harlapur (2005) [8] conducted survey during 2003 and 2004 in eleven districts of Karnataka and observed similar trend with highest disease incidence due to continuous cultivation of same crop in Belgaum district. The locations in Haveri, Sankeshwar, Arabhavi and Dharwad were identified as "hot spots" for TLB due to higher incidence and severity. Khedekar (2009) [10] conducted survey during *Kharif* 2008 where in turcicum leaf blight disease was prevalent in all the maize growing areas of the North Karnataka in low to severe form with the incidence ranging from 30 to 60 per cent. The mean per cent disease incidence was worked out to be 48.15 per cent.

In the present investigation, among the four districts surveyed, the severity of TLB was maximum in Kalaburagi district (25.97), Vijayapura district (24.17%) and least was observed in Raichur district (23.20 %).

Table 1: Severity of turcicum leaf blight of sorghum in Northern Karnataka during *kharif* and *rabi* 2016-17

Sl. No	District	Taluk	Location	Crop stage	PDI village
1.	Vijayapura	Vijayapura	Utal (R)	Earhead maturity	4.00
			Hittinahalli (R)	Earhead formation	6.66
		Sindagi	Korhalli (K)	Dough stage	46.00
			Ganihar (R)	Post earhead Formation	18.00
		Indi	Jevoor (R)	Preharvest stage	20.00
			Zalaki (R)	Earhead maturity	6.66
		Basavana Bagewadi	Nandihal (K)	Earhead maturity	52.00
			Huvinahippargi (K)	Earhead maturity	40.00
Mean PDI (District)					24.17
2.	Raichur	Raichur	RARS, Farm (R)	Earhead formation	8.00
			Polkamdoddi (R)	Earhead formation	12.00
		Devadurga	Gabbur (K)	Earhead maturity	56.00
			Mallapur (K)	Earhead maturity	38.00
		Lingasugur	Ankanhal (R)	Earhead maturity	10.00
			Hosur (R)	Praeharvest stage	11.60
		Sindhaur	Balaganur (R)	Praeharvest stage	8.00
			Jalihal (K)	Praeharvest stage	42.00
Mean PDI (District)					23.20
3.	Kalaburagi	Kalaburagi	ARS, Kalaburagi (K)	Earhead maturity	58.00
			Sannur(R)	Earhead maturity	22.00
		Sedam	Malkhed (R)	Earhead maturity	7.46
			Beeranhalli (R)	Earhead maturity	5.60
		Jevargi	Andola (K)	Earhead maturity	50.00
			Ganwar (K)	Earhead maturity	48.00
		Chittapur	Tengli (R)	Earhead maturity	7.73
			Evani(R)	Earhead formation stage	9.00
Mean PDI (District)					25.97

(K) = *Kharif*, (R) = *Rabi*

Table 2: Severity of turcicum leaf blight of sorghum in major sorghum growing regions of Northern Karnataka taluka wise during 2016-2017

Sl. No.	District	Taluk	Mean PDI (Taluk)
1	Vijayapura	Vijayapura	5.33
		Sindagi	32.00
		Indi	13.33
		Basavana Bagewadi	46.00
2	Raichur	Raichur	10.00
		Devadurga	47.00
		Lingasugur	10.80
		Sindhaur	25.00
3	Kalaburagi	Kalaburagi	40.00
		Sedam	13.06
		Jevargi	49.00
		Chittapur	8.36

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