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RESEARCH PAPER

Prevalence of foliar diseases in sweet corn at Karnataka state

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Abstract: Turcicum leaf blight and common rust are regularly appearing foliar diseases in sweet corn during *kharif* season in severe form. Both the diseases develop rapidly usually disease appeared and develop before flowering at knee high stage resulting complete necrosis of the leaf and premature death of plants. Intensive roving survey conducted during *kharif* 2017 in Karnataka implied that, both the diseases found in severe form but severity varied from one to another locality due to factors like, climatic conditions, soil type, cropping pattern, genotype and other cultural practices followed. Maximum severity of TLB observed in the Chikkballapur district (56.54%) at dough stage of the crop, grown under rainfed situation on red soil. Maximum severity of common rust was found in Belagavi district (43.73%) at silking stage of the crop cultivated under irrigated situation on black soil. Least severity of TLB (49.00%) was recorded in the Belagavi district and common rust (37.81%) was in Chikkaballapur district.

Keywords: Sweet corn · Turcicum leaf blight · Common rust

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Introduction

Sweet corn (*Zea mays* L. var. *saccharata*) is one of the upcoming popular vegetable, specifically bred to increase the sugar content in the kernels. The net income resulting from this variety is quite higher as compared to normal maize, since green fodder is highly succulent, palatable and digestible for dairy animals. Increasing demand, premium price make it attractive option for the farmers. But, at the mean time crop exhibiting highly susceptible reaction to foliar diseases like turcicum leaf blight (TLB) and common rust, were considered to be as major threats and causing serious economic loss to the farmers. Turcicum leaf blight caused by *Exserohilum turcicum* (Pass.) Leonard and Suggs. and common rust caused by *Puccinia sorghi* Schw. occurs often together in the crop responsible for significant reduction in the yields to the extent of 4.2 to 13.06 per cent depending upon the severity in different genotypes (Harlapur *et al.*, 2017). However, yield losses due to common rust ranges from 11.75 to 60.53 per cent under differential fungicidal spray schedule (Dey *et al.*, 2012). For knowing the prevalence of these diseases, it is necessary to conduct survey in the major sweet corn cultivating areas in Karnataka to get comprehensive information on disease distribution, level of incidence and severity. Hence, the present study was carried out to quantify the severity of both the diseases of sweet corn in Karnataka during *kharif* 2017.

Materials and methods

An intensive roving survey was conducted in major sweet corn growing areas, *viz.*, Bagalkote, Belagavi, Chikkaballapur and Dharwad districts during *kharif* 2017. In each district, blocks which were involved in extensive cultivation of crop were selected. In every village, five fields were randomly selected on both the sides of road,

Table 1. Severity of turcicum leaf blight and common rust diseases of sweet corn in northern parts of Karnataka

District	Taluk	Village	Soil type	Cultivar grown	Crop grown condition (Irrigated/ Rainfed)	Crop stage	Percent disease index (PDI)		Other iseases observed
							Turcicum leaf blight	Common rust	
Bagalkote	Mudhol	Mudhol	Black	Sugar-75	Irrigated	Silking	50.65	38.42	MLB
Belagavi	Athani	Kouthakoppa	Black	Sakata-16	Rainfed	Dough	48.33	40.65	CLS
		Sankaratti	Black	Sugar-75	Rainfed	Dough	49.66	41.85	MLB
		Saraguppi	Black	Sugar-75	Rainfed	Tasseling	46.55	38.50	MLB
		Tegnusi	Black	Sakata-16	Rainfed	Dough	50.24	40.50	MLB
		Ugarkhurd	Black	Sakata-16	Rainfed	Tasseling	49.72	41.95	MLB
		Mean					48.90	40.69	
	Bailhongal	Chikkabagevadi	Black	Sugar-75	Rainfed	Dough	49.45	48.66	CLS
		Kurugund	Black	Sugar-75	Rainfed	Dough	47.50	41.33	MLB
		Pattaylks	Black	Sugar-75	Rainfed	Dough	48.66	41.58	MLB
		Sampagam	Black	Sugar-75	Rainfed	Dough	50.38	49.85	MLB
		Mean					49.00	45.35	
	Belagavi	Hirebagevadi	Black	Sakata-16	Rainfed	Silking	51.92	45.65	CLS
		Modaga	Black	Sakata-16	Rainfed	Silking	48.33	40.10	CLS
		Sambra	Black	Sakata-16	Rainfed	Dough	49.28	41.55	CLS
		Mean					49.84	42.43	
	Gokak	Akkatangiarahal	Black	Sugar-75	Irrigated	Silking	48.50	46.86	MLB
		Sunadalli	Black	Sugar-75	Irrigated	Silking	43.89	41.56	MLB
		Tukanatti	Black	Sugar-75	Irrigated	Silking	48.29	46.88	CLS
		Tundurgi	Black	Sugar-75	Irrigated	Silking	47.16	45.75	MLB
		Mean					46.96	45.26	
	Savdatti	Margodu	Black	Sugar-75	Irrigated	Silking	49.66	44.80	MLB
		Mulavalli	Black	Sugar-75	Irrigated	Silking	49.81	43.55	MLB
		Yeragatti	Black	Sugar-75	Irrigated	Silking	51.33	46.50	MLB
		Mean					50.26	44.95	
Dharwad	Dharwad	Garag	Red	Sugar-75	Rainfed	Tasseling	46.25	42.53	CLS
		Kelageri	Red	Sugar-75	Rainfed	Tasseling	52.80	46.75	CLS
		Kogilegere	Red	Sugar-75	Rainfed	Tasseling	52.51	42.83	CLS
		Mandeyal	Red	Sugar-75	Rainfed	Dough	48.66	43.60	CLS
		Mugad	Red	Sugar-75	Rainfed	Tasseling	49.25	42.66	CLS
		Mean					49.90	43.67	
Chikkaballa-pur	Chikkaballa-pur	Gollahalli	Red	Sugar-75	Rainfed	Dough	57.77	40.80	MLB
		Marenhalli	Red	Sugar-75	Rainfed	Dough	51.77	36.66	MLB
		Nagsandra	Red	Sugar-75	Irrigated	Dough	58.88	35.66	MLB
		Yakashipura	Red	Sugar-75	Rainfed	Dough	57.77	38.15	MLB
		Mean					56.54	37.81	

MLB: Maydis leaf blight; **CLS:** Curvularia leaf spot

when crop was from tasselling to dough stage. Such selected fields were subjected to severity assessment. Severity of both the diseases were recorded based on 0-9 modified diseases rating scale proposed by Mayee and Datar (1986). Further, per cent disease index (PDI) was calculated by applying the formulae given by Wheeler (1969).

Results and discussion

Survey was carried out during *kharif* 2017 in major sweet corn growing areas of Karnataka by adopting roving survey methodology as mentioned in material and methods. The mean per cent disease severity data recorded at various locations is presented in Table 1 and 2. Results from the present investigation revealed that, TLB and common rust were prevailing in all major sweet corn growing areas in low to severe form with the severity ranging from 43.89 to 58.88 per cent for TLB and 35.66 to 49.85 per cent for common rust. Such variations from one to another locality were mainly attributed to cropping pattern, varied environmental conditions prevailing soil type and inoculum build up.

The mean maximum severity of TLB (58.88%) was observed from Nagsandra village of Chikkaballapur district, whereas, minimum mean disease severity (43.89%) was noticed in Sunadalli village of Belagavi district. The mean maximum severity of common rust (49.85%) was recorded from Sampagam village of Belagavi district, whereas, minimum mean severity (35.66%) was noticed in Nagsandra village of Chikkaballapur district (Table 1). Of the blocks, maximum mean severity of turcicum leaf blight was recorded in Chikkaballapur block (56.54%), along with minimum mean disease severity was noticed in Gokak (46.96%) block. The maximum mean common rust disease severity was observed in Bailhongal (45.35%) block, along with mean minimum severity was noticed in Chikkaballapur block (37.81%). Among districts surveyed, the mean maximum severity of turcicum leaf blight was observed in Chikkaballapur (56.54%) district followed by Bagalkote (50.65%) and Dharwad (49.90%) districts, whereas, minimum mean severity was recorded in Belagavi (49.00%) district. The mean maximum common rust severity was recorded in Belagavi (43.73%) district followed by Dharwad (43.67%) and Bagalkote (38.42%) districts, the mean minimum severity was observed in Chikkaballapur district (37.81%) (Table 2). Across the locations, the maximum severity of TLB (52.85%) was observed in red soil, whereas, common rust (43.32%) was observed in black soil. With respect to crop grown condition, maximum severity (53.28%) of TLB was recorded in the rain fed situation. Maximum severity of common rust (44.30%) was observed in the crop grown under irrigated situation. Disease severity with respect to stage of the crop indicated that maximum severity (51.41%) of TLB was observed at dough stage of crop. Maximum severity of common rust was recorded at silking stage (44.00%) of crop. Maximum severity of TLB (50.31%) and common rust (42.85%) were recorded in the genotype Sugar 75 due to increased susceptibility than genotype Sakata 16 (Table 1). The outcomes from the present investigation revealed that, highest per cent disease index for TLB was recorded at Chikkaballapur district due to varietal susceptibility, increased relative humidity, frequent and heavy rainfall have created congenial environmental condition. Maximum severity of common rust was observed in Belagavi district because of the factors like, intensive cultivation of crop season after season, increased relative humidity, minimum temperature and susceptible stage of the crop. The areas which have recorded low disease pressure was might be due to failure in establishment of favorable environmental conditions.

Similar observations were also made by several workers, Gowda *et al.* (1989), Raid (1991), Reddy *et al.* (2013) and Dalavai and Kalappanavar (2017). Earlier survey report (Harlapur *et al.*, 2012) indicated that turcicum leaf blight and common rust were severe and predominately found in the areas of northern Karnataka. Cultivar susceptibility, weather parameters and other cultural practices followed plays major role in resulting the maximum disease pressure. This study concludes that turcicum leaf blight and common rust were prevalent in all the sweet corn growing areas of Karnataka at varied severity rates. Maximum severity of

Table 2. District and taluka wise severity of turcicum leaf blight and common rust diseases in northern parts of Karnataka

District	Taluk	Mean percent disease index	
		Turcicum leaf blight	Common rust
Bagalakote	Bagalakote	50.65	38.42
Belagavi	Athani	48.90	40.69
	Bailhongal	49.00	45.35
	Belagavi	49.84	42.43
	Gokak	46.96	45.26
	Savadatti	50.26	44.95
	Mean	49.00	43.73
Dharwad	Dharwad	49.90	43.67
Chikkaballapur	Chikkaballapur	56.54	37.81

TLB (58.88%) observed in Chikkaballapur district. Least severity of TLB (43.89%) was noticed in Belagavi district. Maximum severity of common rust (49.85%) was exhibited by Belagavi district. Least severity of common rust (37.81%) found in Chikkaballapur district.

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