

SURVEY OF TURCICUM LEAF BLIGHT OF MAIZE IN MAJOR MAIZE GROWING AREAS OF ANDHRA PRADESH

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ABSTRACT: Northern corn leaf blight or turcicum leaf blight caused by *Exserohilum turcicum* (Pass.) Leonard and Suggs is one of the important diseases affecting photosynthesis with severe reduction in grain yield to an extent of 28 to 91%. Disease symptoms first appear on the leaves at any stage of plant growth, but usually at or after anthesis. The studies on survey reveals that high intensity of the disease was noted in the district where mean maximum temperature was below 32^oC and relative humidity was above 85 percent during the cropping season (June-October). The maximum PDI of 51 percent was recorded in Khammam district where the maximum temperature of 31.82^oC and the relative humidity of 87.5 percent was recorded whereas minimum (33 percent) PDI was recorded in Guntur district and it was due to high maximum temperature of 35.22^oC and low relative humidity of 76 percent.

Key words: Maize, disease severity, survey, turcicum leaf blight.

INTRODUCTION

Maize is one of the important cereal crops and it is 3rd major crop in India after rice and wheat. It is one of the major crops of Andhra Pradesh and is being cultivated under rainfed and irrigated conditions. Maize hybrids and few composites are commercially cultivated in various parts of Andhra Pradesh. The crop is affected by number of fungal diseases of which leaf blight or northern corn leaf blight or turcicum leaf blight is one of the important diseases affecting photosynthesis with severe reduction in grain yield to an extent of 28 to 91%. Disease symptoms first appear on the leaves at any stage of plant growth, but usually at or after anthesis. Turcicum leaf blight (TLB) of maize caused by *Exserohilum turcicum* (Pass.) Leonard and Suggs [Syn. *Helminthosporium turcicum* Pass., Leonard and Suggs; *Drechslera turcica* (Pass.) Subram. and Jain, *Setosphaeria turcica* (Lutrell), Leonard and Suggs]. The disease (TLB) is endemic in all maize growing areas of Karnataka and considered as a limiting biotic factor for successful cultivation of maize. Jordhan *et al.* (1983) conducted survey and collected turcicum leaf blight isolates from corn fields of Florida, Illinois, Indiana, Iowa, Minnesota, New York and Pennsylvania. Laxminarayana and Shankerlingam (1983) identified the endemic areas (hot spots) of the disease such as Arabhavi and Nagenahalli in Karnataka, Kolhapur in Maharashtra, Karimnagar in Andhra Pradesh, Dholi in Bihar and Almora in Uttarakhand. An epidemic appeared in North Carolina (USA) destroying up to 75 per cent of leaf areas by the second week of August (Leonard *et al.*, 1985). Babu *et al.* (2004) reported turcicum leaf blight incidence on maize at Almora and it attained epidemic proportion resulting in 83 per cent yield reduction.

A survey was conducted in different villages of Dharwad and Belgaum districts, and observed maximum disease incidence in Mugad (45 %) followed by Madihal (43 %) and Devarahuballi (38 %) of Dharwad taluks (Dharanendra Swamy 2003). Harlapur (2005) conducted survey during 2003 and 2004 in all the maize growing areas of Karnataka. Among the 11 districts surveyed, maximum disease incidence was observed in Belgaum district (55.89 %) followed by Mysore (54.76 %), Davanagere (53.86 %), Mandya (53.85 %) and Haveri (53.85 %). In present study, survey was conducted to know the disease severity of turcicum leaf blight of maize in major maize growing areas of Andhra Pradesh

MATERIALS AND METHODS

To assess the extent of turcicum leaf blight disease severity, intensive roving survey was conducted in major maize growing areas of Andhra Pradesh during the *Kharif* 2011-12. Survey was conducted when the crop was at flowering stage to grain filling stage. The details of the districts surveyed are given in Table 1. Data was also collected on weather parameters in the surveyed areas. During survey the data on per cent disease index (PDI) was calculated by turcicum leaf blight severity (Payak and Sharma, 1983) was recorded. The following formula was used to calculate per cent disease index.

$$\text{PDI} = \frac{\text{Sum of numerical rating}}{\text{Total number of plants observed} \times \text{Maximum rating}} \times 100$$

RESULTS AND DISCUSSION

A roving survey was carried out in major maize growing areas of Andhra Pradesh viz., Karimnagar, Guntur, Warangal, Khammam, Mahaboobnagar and RangaReddy districts during *Kharif* 2011-12 to assess the disease severity. The differences observed in PDI in the districts were significant. Perusal of weather data (Table 1) reveal that high intensity of the disease was noted in the district where mean maximum temperature was below 32°C and relative humidity was above 85 percent during the cropping season (June-October).

Table 1. Turcicum leaf blight disease incidence and weather conditions from June to October 2011-12 in major maize growing areas of Andhra Pradesh

Name of the district	sample collected place	Month	Maximum Temperature (°C)	Minimum Temperature (°C)	Maximum Relative humidity (%)	Minimum Relative humidity (%)	Rain Fall (mm)	No.of Rainy days	Percent Disease Index
Karimnagar	Jagtial								36
		June	37.2	25.2	61.5	41.5	48.6	6	
		July	32.3	23.9	79.2	64.6	207.8	12	
		August	31.3	23.5	83.8	72.1	244.3	14	
		September	31.6	23.2	82	63	105.5	6	
		October	33.9	20.6	75.2	45.2	9.6	2	
		Total	166.3	116.4	329.3	286.4	615.8	40	
Mean	33.26	23.28	76.34	57.28					
Guntur	Tenali								33
		June	38.8	27.8	79	53	52.4	6	
		July	35.7	25.9	70	54	212.6	12	
		August	32.6	25.4	79	63	244.6	14	
		September	34.7	25.8	75	54	64	8	
		October	34.3	24.3	77	60	62.8	5	
		Total	176.1	129.2	380	284	636.4	45	
Mean	35.22	25.84	76	56.8					
Warangal	Ragunathapally								41
		June	34.1	25.7	77	56.3	28.2	5	
		July	32	23.7	82.9	61.2	157.7	10	
		August	30.6	23.6	85.9	70.2	79.6	11	
		September	31.4	24.8	84	64.9	110.7	5	
		October	32.5	23.8	79.8	53	5.2	1	
		Total	160.6	121.6	409.6	305.6	381.4	32	
Mean	32.12	24.32	81.92	61.12					
Khammam	Yellandu								51
		June	35.0	24.2	81	66	87.7	8	
		July	31.8	23.9	89	77	12.5	1	
		August	30.0	24.16	93	84	178	10	
		September	30.5	25.12	90	82	206	14	
		October	31.8	23.1	84	80	12	2	
		Total	159.1	120.48	437	389	496.2	35	
Mean	31.82	24.096	87.4	77.8					

Mahaboobnagar	Palem								43.66
		June	35.5	24.5	72.5	45	38	5	
		July	32	22.6	83.9	57.8	138	12	
		August	30.5	22.3	89	65	170.6	13	
		Septeber	31.3	21.9	91	62	47.6	4	
		October	31.0	21.9	89	56	21.2	4	
		Total	160.3	113.2	425.4	285.8	415.4	38	
		Mean	32.06	22.64	85.08	57.16			
Ranga Reddy	Rajendranagar								48
		June	35	24.4	75	45	40.7	4	
		July	31.2	22.7	86	62	191	11	
		August	30.2	22.7	90	71	147.3	9	
		Septeber	30.7	22	88	74	68.1	5	
		October	32.1	20.3	90	69	47.9	4	
		Total	159.2	112.1	429	321	495	33	
		Mean	31.84	22.42	85.8	64.2			
CD at 5%									1.95

The maximum PDI of 51 percent was recorded in Khammam district where the maximum temperature of 31.82^oC and the relative humidity of 87.5 percent was recorded followed by Ranga Reddy district and Mahaboobnagar district with PDI of 48 and 43.3 percent respectively and which recorded a mean maximum temperature of 31.84^oC and 32.06^oC and relative humidity of 85.8 and 85.08 percent in cropping season respectively. The PDI in Warangal district was 41 percent where the mean maximum temperature of 32.12^oC and relative humidity of 81.92 percent was observed. Whereas minimum (33 percent) PDI was recorded in Guntur district and it was due to high maximum temperature of 35.22^oC and low relative humidity of 76 percent during the cropping season (June - October) followed by the Karimnagar district with PDI of 36 with mean maximum temperature of 33.26^oC and relative humidity of 76.34 percent. From the weather data it appears that the disease incidence is negatively correlated with low maximum temperature and positively correlated with high relative humidity. The mean minimum temperature had no effect on the disease development. Similarly the amount of rainfall and the number of rainy days had no significant influence on the disease development. The findings of the present study are in agreement with earlier workers (Harlapur, 2005 and Khedekar *et al.* 2010) who stated that prevailing environmental conditions during cropping season could be a reason for higher incidence of disease in these areas. Ullstrup (1966) reported that TLB incidence vary in prevalence and severity from year to year and from one locality to another, depending largely on environmental conditions. Humid weather along with heavy dew favoured the spread and development of the disease in an epidemic form. Earlier survey reports (Harlapur *et al.*, 2000) indicated that, cultivar susceptibility, weather parameters play an important role for the high severity of the disease. Similar observations were also made by several workers (Gowda *et al.*, 1989; Laxminarayana and Shankarlingam, 1983 and Babu *et al.*, 2004). Studies on turcicum leaf blight of maize in Uganda by Adipala *et al.*, (1993) found that the disease occurred in all areas sampled and was more severe in wet areas with relative humidity of more than 80 percent in comparison to dry areas.

CONCLUSION

The present investigation reveal that high per cent disease index is due to environmental conditions in cropping season, intensive cultivation of maize crop season after season, 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.

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