

Status of banded leaf and sheath blight of maize in North Karnataka*

Maize (*Zea mays*) is one of the major crops of North Karnataka and is being cultivated under rainfed and irrigated conditions. Maize hybrids and few composites are commercially cultivated in various parts of North Karnataka. About 112 diseases of maize have been reported so far from different parts of the world of these, 65 are known to occur in India. The diseases of maize caused by fungi are of great economic importance in North Karnataka. The banded leaf and sheath blight (BLSB) caused by *Rhizoctonia solani f. sp. sasakii* Exner, (Tel: *Thanatephorus sasakii* (Shirai) Tu and Kimbro) is a very destructive disease of maize and considered to be the major constraint for production in North Karnataka. The disease BLSB is sporadic in major growing areas of North Karnataka. Singh and Sharma (1976) estimated 40.5 per cent loss in grain yield with 71 per cent disease index. However, the magnitude of grain loss may reach as high as 100 per cent if the ear rot phase of the disease predominates. In India, losses in grain yield have been estimated varying from 23.9 to 31.9 per cent in ten cultivars (Lal *et al.*, 1980). Payak and Sharma (1981) reported BLSB from Himachal Pradesh, Uttar Pradesh, Haryana, Punjab, Madhya Pradesh and Rajasthan. In recent years BLSB of maize was observed in many districts of North Karnataka. Lack of detailed information on symptomatology and status of the disease in North Karnataka made an impetus to undertake the present investigations.

Maize plants were closely observed from 25 days old seedlings till maturity and changes occurring in the diseased plants on leaves were monitored during the survey of BLSB in farmer's fields on commercially grown maize cultivars at various locations of different agro-climatic zones in North Karnataka. Symptoms were recorded in five stages of crop growth and photographs were taken.

To assess the extent of BLSB disease severity, intensive roving survey was conducted during *kharif* 2012 in major maize growing districts of Northern Karnataka. In each district important maize growing talukas were selected, in each village five fields were randomly selected on both sides of road when the crop was in flowering to grain filling stage. Such fields were assessed for BLSB severity by recording the disease on 1-5 disease rating scale. Disease severity was recorded using scale given by Ahuja and Payak (1978). Further, per cent disease index was calculated as given by Payak and Sharma (1981).

The fungus, *R. solani f. sp. sasakii* is capable of infecting maize plants in all the stages of crop growth right from seedling to maturity. The symptoms started appearing as large, discoloured areas alternating with irregular dark bands. The disease was developed on leaves and sheaths and spread to the ears. Characteristic symptoms include concentric bands and rings on infected leaves and sheaths that are discoloured, brown, tan or grey in colour. Typically, disease develops on the first and second leaf sheath above the ground and eventually spreads to the ear causing ear rot. Ear rot is characterized by light brown, cottony mycelium on the ear and the presence of small, round,

black sclerotia. Ears dry prematurely and caking of the ear sheaths is common (Plate 1).

Saxena (1997) observed symptoms of the BLSB on all aerial parts of maize plant except tassel. Under natural conditions, disease appeared at pre flowering stage on 30 to 40 days old plants but infection can also occur on young plants which may subsequently result in severe blighting and death of apical region of growing plants. Buddemeyer *et al.* (2004) observed round to elliptical, yellow to tan or black lesions on seminal, crown and brace roots. Depending on disease severity, parts of the roots were completely rotten. Terminal decay was frequently observed in juvenile plants. A limited number of plants exhibited small medallion lesions on shoots.

Survey was carried out during *kharif* 2012 in major maize growing areas of Northern Karnataka by adopting roving survey methodology. The mean per cent disease severity data recorded at various locations is presented in table 1.

The survey revealed that the banded leaf and sheath blight disease was prevalent in major maize growing areas of the North Karnataka in a low to severe form with the incidence ranging from 10.75 to 52.45 per cent. The mean per cent disease incidence was worked out to be 46.67 per cent. Among the four districts



Plate 1. Symptoms of banded leaf and sheath blight of maize

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Table 1. Severity of banded leaf and sheath blight in major maize growing areas of Northern Karnataka during *Kharif* 2012

District	Taluk	Location	Soil type	Rainfed/ irrigated	Hybrid	Stage of crop	% disease index
Dharwad	Dharwad	Dharwad	Black	Rainfed	CP 818	Maturity stage	29.75
	Kalaghatagi	Kalaghatagi	Red	Irrigated	DKC 8101	Maturity stage	52.45
	Hubli	Hubli	Black	Rainfed	900 M	Harvesting stage	15.72
							Average
Belgaum	Bailhongal	Bailhongal	Black	Irrigated	CP 818	Knee height stage	10.75
	Soudatti	Soudatti	Black	Irrigated	900 M	Knee height stage	12.57
	Gokak	Gokak	Black	Irrigated	DKC 8101	Maturity stage	29.87
							Average
Haveri	Haveri	Haveri	Black	Irrigated	CP 818	Flowering stage	43.25
	Haveri	Shiggaon	Black	Rainfed	DKC 8101	Flowering stage	31.50
	Haveri	Savanoor	Black	Rainfed	900 M	Knee height stage	20.81
	Ranebennur	Halgeri	Black	Irrigated	DKC 8101	Flowering stage	41.65
							Average
Uttara Kannada	Mundagod	Mundagod	Red	Rainfed	DKC 8101	Maturity stage	51.54
	Mundagod	Pala	Red	Rainfed	CP 818	Maturity stage	50.67
							Average

surveyed, maximum disease severity was observed in Uttara Kannada district (51.10%), followed by Haveri district (34.30%) and the lower disease severity (17.73%) in Belgaum district. The highest BSLB severity was observed in Kalaghatagi taluka of Dharwad district (52.45%) followed by Mundagod taluka of Uttara Kannada district (51.54%), Haveri taluka of Haveri district (43.25%) and Ranebennur taluka of Haveri (41.65%). Incidence was low in Bailhongal taluka of Belgaum district (15.72%) followed by Saundatti taluka of Belgaum district (12.57%).

Sharma *et al.* (2002) reported that BLSB caused by *R. solani* was serious in recent years. During last two decades or so far the disease had continuous devastating advance, causing epidemic outbreak in maize growing countries *viz.*, Bhutan, China, India, Indonesia, Philippines, Vietnam and Nepal, as well as in several countries of Africa and Latin America. The disease causes severe loss in several countries of Asia. Saxena (2002) identified Pantnagar as the endemic area for BLSB disease. Patra (2007) conducted survey on incidence of BLSB disease of maize during

2005-06 indicated that, disease intensity was moderate to severe on male inbred line CML-163 and female inbred line CML-193-1 of hybrid maize (HQPM-1) at pre-flowering stage in West Bengal. Which was first report of BLSB from West Bengal. Akhtar *et al.* (2009) surveyed during *kharif*, 2005 and 2006, recorded occurrence of disease and diversity in *R. solani* among the naturally occurring populations and revealed that BLSB caused by *R. solani* was found to be wide spread with the disease severity ranging from 30.30 to 80.46 per cent and gaining the economic importance in the state of Jharkhand.

The present investigation revealed that the locations *viz.*, Kalaghatagi, Mundgod and Haveri were found severely attacked by for BLSB. Environmental conditions, 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 the reasons for higher incidence of disease in these areas of Northern Karnataka.

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