

RESEARCH ARTICLE

Survey for severity of maydis leaf blight of maize in northern Karnataka

■ HULAGAPPA*, S.I. HARLAPUR AND UTPAL DEY

Department of Plant Pathology, University of Agricultural Science, DHARWAD (KARNATAKA) INDIA

ARTICLE INFO

Received : 23.10.2012
Revised : 21.05.2013
Accepted : 26.05.2013

Key Words :

Maize, *Drechslera maydis*, Maydis leaf blight, Survey

*Corresponding author:

Email: hulagappaagri@gmail.com

ABSTRACT

During *Kharif* 2011 survey, maximum disease severity was recorded in Ranebennur (56.26%). Least severity was noticed in Kushtagi (33.88%). During *Rabi* 2011 survey, maximum disease severity was observed in Ranebennur (50.26%). Least severity was noticed in Kushtagi (27.88%).

How to view point the article : Hulagappa, Harlapur, S.I. and Dey, Utpal (2013). Survey for severity of maydis leaf blight of maize in northern Karnataka. *Internat. J. Plant Protec.*, 6(2) : 285-288.

INTRODUCTION

Maize (*Zea mays* L.) is the most versatile crop, adapted to different agro-ecological and climatic conditions. In India, maize is an important cereal crop next to rice, wheat and sorghum. It is mainly grown in Karnataka, Andhra Pradesh, Maharashtra, Uttar Pradesh, Bihar, Rajasthan, Madhya Pradesh and Punjab (Anonymous, 2011). Maize is widely cultivated throughout the world and a higher quantity of maize is produced each year than any other grain. In 2011, over 168.2 mha of maize was planted worldwide with a yield of 5,081.29 kg/ha. In India it is grown over an area of 8.50 mha, total production of about 21 mt with a productivity of 2,470 kg/ha. During 2011 Karnataka state accounted for 12.37 lakh ha area with the production of 33.67 lakh tonnes and 2,721 kg/ha productivity (Anonymous, 2011).

Maydis leaf blight (MLB), a fungal disease caused by *Drechslera maydis* (Nisikado) Subram and Jain, is an important foliar disease in almost all the maize growing regions of India. The maize growing regions in Karnataka, Andhra Pradesh, Bihar, Maharashtra, Uttaranchal and Tamil Nadu have been identified as endemic areas for the disease. Losses up to 40 per cent or more have been demonstrated in inoculated yield trials (Byrnes *et al.*, 1989). The incidence of this disease was first reported by Drechsler (1925) from United States. In India,

it was reported for the first by Munjal and Kapoor (1960) from Maldah, West Bengal. In India the disease is present in almost all the major maize growing states. Globally, three races of the pathogen designated as race O, race T and race C are predominant in China are known to occur. In India, the race O is the predominant race. Race T is highly virulent to the hybrids having Texas male sterility (Tms) gene. The crop is grown throughout the year in irrigation and rainfed areas. Until recently the crop was suffering from turicum leaf blight and charcoal stalk rot diseases. In recent years maydis leaf blight caused by *Drechslera maydis* was observed in several districts of Karnataka. Losses in the grain yield due to maydis leaf blight disease ranging from 6.40 to 36 per cent have been reported from different parts of the country.

For knowing the severity of the disease, survey for severity of the disease in the major maize cultivating areas will give a definite idea about the disease status and distribution. It is necessary to conduct survey of the disease to get comprehensive information on disease distribution, level of incidence and severity so as to locate hot spots for testing of genotypes in disease resistance screening programme. Studies on variability of *Drechslera maydis* have a greater significance in breeding for resistance against Maydis leaf blight (MLB).

Studies on variability in the pathogen and host are important for documenting virulent race resistant sources.

The reasons for lack of substantial durable resistance in the material may be attributed to presence of variability in the population (Pandurangowda *et al.*, 1993). In order to develop the disease resistant and high yielding cultivars, it is imperative to analyse and understand the variability in the pathogen.

MATERIAL AND METHODS

To assess the extent of maydis leaf blight disease severity, intensive roving survey was conducted during *Kharif* and *Rabi* 2011 in major maize growing districts of northern Karnataka. In each district, major maize growing taluks were selected and in each village, five fields were randomly selected

| Scale | Description |
|-------|---|
| 1 | Very slight to slight infection, one or two to few scattered lesions on lower leaves. |
| 2 | Light infection moderate number of lesion on lower lesions only. |
| 3 | Moderate infection, abundant lesions on lower leaves, few on the middle leaves. |
| 4 | Heavy infection, lesions abundant on lower and middle leaves extending to upper leaves. |
| 5 | Very heavy infection, lesions, abundant on almost all leaves. |

on both sides of road when the crop was in flowering to grain filling stage. Such fields were assessed for maydis leaf blight severity by recording the disease on 1-5 disease ratings scale. Further PDI was calculated by using the following formula (Wheeler, 1969). :

$$PDI = \frac{\text{Sum of all individual ratings}}{\text{Total no. of leaves observed} \times \text{Maximum disease grade}} \times 100$$

RESULTS AND DISCUSSION

Survey was carried out during *Kharif* and *Rabi* 2011 in major maize growing areas of northern Karnataka by adopting roving survey methodology as mentioned in materials and methods. The mean per cent disease severity data recorded at various locations are presented in Table 1, 1a and 1b. The present work was initiated with survey to know the severity and distribution of maydis leaf blight of maize. Survey of farmers' fields in major maize growing regions of northern Karnataka revealed that, MLB severity varied from one locality to another, due to varied environmental conditions prevailing, cropping pattern and inoculum build up. During *Kharif* season the disease survey revealed that maydis leaf blight of maize was prevalent in all the maize growing areas of the northern Karnataka in low to severe form with the severity ranging

Table 1 : Severity of maydis leaf blight in major maize growing areas of northern Karnataka during *Kharif* 2011

| District | Taluk | Location | PDI(1-5 scale) |
|----------|------------|------------|----------------|
| Belgaum | Gokak | Arabhavi | 48.25 |
| | Gokak | Gokak | 52.20 |
| | Hukkeri | Sankeshwar | 53.00 |
| | Soundatti | Yargatti | 48.53 |
| | Bailhongal | Bailhongal | 51.50 |
| | Gokak | Mudalagi | 53.25 |
| | Soundatti | Soundatti | 50.75 |
| Average | | | 51.06 |
| Dharwad | Dharwad | Dharwad | 51.65 |
| | Navalgund | Navalgund | 53.25 |
| Average | | | 52.45 |
| Gadag | Gadag | Gadag | 45.32 |
| Haveri | Haveri | Haveri | 54.60 |
| | Ranebennur | Ranebennur | 56.26 |
| | Hirekerur | Hirekerur | 54.20 |
| Average | | | 55.23 |
| Bagalkot | Mudhol | Mudhol | 49.12 |
| | Jamakhandi | Jamakhandi | 47.80 |
| | Bagalkot | Bagalkot | 44.58 |
| Average | | | 46.19 |
| Koppal | Koppal | Koppal | 39.65 |
| | Kushtagi | Kushtagi | 33.88 |
| Average | | | 36.76 |

| Table 1a : Severity of maydis leaf blight in major maize growing areas of northern Karnataka during <i>Rabi</i> 2011 | | | |
|--|------------|------------|----------------|
| District | Taluk | Location | PDI(1-5 scale) |
| Belgaum | Gokak | Arabhavi | 32.93 |
| | Gokak | Gokak | 29.28 |
| | Hukkeri | Sankeshwar | 36.68 |
| | Soundatti | Yargatti | 33.35 |
| | Bailhongal | Bailhongal | 34.54 |
| | Gokak | Mudalagi | 40.56 |
| | Soundatti | Soundatti | 36.05 |
| Average | | | 34.77 |
| Dharwad | Dharwad | Dharwad | 45.65 |
| | Navalgund | Navalgund | 47.25 |
| Average | | | 46.45 |
| Gadag | Gadag | Gadag | 34.50 |
| Haveri | Haveri | Haveri | 48.60 |
| | Ranebennur | Ranebennur | 50.26 |
| | Hirekerur | Hirekerur | 48.20 |
| Average | | | 49.02 |
| Bagalkot | Mudhol | Mudhol | 32.50 |
| | Jamakhandi | Jamakhandi | 30.25 |
| | Bagalkot | Bagalkot | 31.00 |
| Average | | | 31.25 |
| Koppal | Koppal | Koppal | 33.65 |
| | Kushtagi | Kushtagi | 27.88 |
| Average | | | 30.76 |

| Table 1b : Average disease severity in various districts of northern Karnataka during <i>Kharif</i> 2011 and <i>Rabi</i> 2011 | | | | |
|---|----------|--------------------|------------------|-------|
| Sr. No. | District | PDI | | PDI |
| | | <i>Kharif</i> 2011 | <i>Rabi</i> 2011 | |
| 1. | Bagalkot | 46.19 | 31.25 | 38.72 |
| 2. | Belgaum | 51.06 | 34.77 | 42.92 |
| 3. | Dharwad | 52.45 | 46.45 | 49.45 |
| 4. | Gadag | 45.32 | 34.50 | 39.91 |
| 5. | Haveri | 55.23 | 49.02 | 52.13 |
| 6. | Koppal | 36.76 | 30.76 | 33.76 |
| | Mean | 47.83 | 37.79 | |

from 33.88 to 56.26 per cent. The mean per cent disease severity was 47.83 per cent (Table 1b). Among the 18 locations surveyed, maximum disease incidence was observed in Ranebennur (56.26%) followed by Haveri (54.60%). Minimum severity was noticed in Kushtagi (33.88%) (Table 1). During *Rabi* season the disease survey revealed that maydis leaf blight maize was prevalent in all the maize growing areas of the northern Karnataka in low to severe form with the severity ranging from 27.88 to 50.26

per cent. The mean per cent disease severity was 37.79 per cent (Table 1b). Maximum disease severity was observed in Ranebennur (50.26%) followed by Haveri (48.60%). Minimum severity was noticed in Kushtagi (27.88%).

REFERENCES

Anonymous (2011). Maize monthly report. Indian Agri-business Systems Pvt. Ltd., pp. 1-8.

Byrnes, K.J., Pataky, J.K., and White, D.G. (1989). Relationships between yield of three maize hybrids and severity of southern leaf blight caused by race of *Bipolaris maydis*. *Pl. Dis.*, **73** (10) : 834-840.

Drechsler, C. (1925). Leaf spot of maize caused by *Ophiobolus heterosrophus*, the ascigenous stage of *Helminthosporium* exhibiting bipolar germination. *J. Agric. Res.*, **31**:701-726.

Munjal, R.L. and Kapoor, J.N. (1960). Some unrecorded diseases

of sorghum and maize from India. *Curr. Sci.*, **29** (11) : 442-443.

Pandurange Gowda, K.T., Shetty, H.S., Gowda, B.J., Prakash, H.S. and Sangamlal (1993). Comparison of two methods for assessment of yield losses due to turicum leaf blight of maize. *Indian Phytopath.*, **45** (3) : 316-320.

Wheeler, B.E.J. (1969). *An introduction to plant disease*. John Wiley Sons Limited, London, 301pp.

★ ★ ★ ★ ★ 6th Year of Excellence ★ ★ ★ ★ ★