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EVALUATION OF DIFFERENT DISEASE INOCULATION TECHNIQUES FOR BANDED LEAF AND SHEATH BLIGHT DISEASE OF MAIZE (*ZEA MAYS* L.) IN SRI LANKA *

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INTRODUCTION

Maize (*Zea mays* L.) is ranked as the second most important cultivated cereal and the foremost feed grain in Sri Lanka (Karunarathna, 2006). The yield of maize cultivation is highly affected by biotic stresses. Among the maize diseases, Banded Leaf and Sheath Blight (BLSB) disease caused by *Rhizoctonia solani* is a serious disease in Sri Lanka. The disease causes direct losses resulting in premature death of the plant, stalk breakage and ear rot besides causing indirect losses by reducing the yield from 40 – 100% (Singh and Sharma, 1976). Identification of disease resistant/tolerant germplasm/varieties is the primary and essential component of a successful breeding programme. Since, natural infections vary from time to time due to many reasons; use of artificial inoculation methods can provide more uniformity in screening process facilitating the elimination of highly susceptible genotypes from the breeding program (Shekhar and Kumar, 2012). In Sri Lanka, screening for this disease had been done by detached leaf disk method (Anon, 1994). However, this is not practical as the leaf disks become yellow and dry before scoring. An experiment was carried out with the objective of identifying a non-destructive, accurate and rapid screening technique for the disease using three maize varieties.

MATERIALS AND METHOD

Pot experiments were conducted during *Maha* 2012/13, *Yala* 2013, *Maha* 2013/14 and *Maha* 2014/15 seasons at the Field Crops Research and Development Institute, Mahailluppallama. Five inoculation methods, namely spraying mycelium

* *See "Tropical Agriculturist" Volume 164 for details.*

suspension into soil, incorporation sclerotia into soil very closure to the plant, injecting mycelium suspension to sheath, inserting five to six sclerotia into 3rd internode of the sheath and detached leaf disk method were practiced in first two seasons one month after planting. Four inoculation methods, namely inserting sclerotia into 3rd internode of the sheath, inserting culture grown on paddy straw into 3rd internode, inserting culture grown on sorghum grain into 3rd internode and floating leaf disk method were practiced in next seasons. The inoculated plants and leaf disks were observed daily for the development of sheath blight symptoms. Number of days taken to appear symptoms, disease incidence (DI) and disease severity index (DSI) were recorded as given below. Data were analyzed in the Statistical Analysis Software using CATMOD procedure.

$$DI = \frac{\text{No. of infected plants per treatment}}{\text{Total number of plants per treatment}} \times 100$$

$$DSI = \frac{\text{Total sum of numerical ratings}}{\text{No. of observation x maximum disease rating scale}} \times 100$$

RESULTS AND DISSCUSION

Leaf disks discoloured and withered without giving clear symptoms in T_5 treatment. T_4 treatment showed characteristic, uniform and significantly ($p<0.05$) superior symptoms in most of the plants while the other techniques did not show uniform and rapid symptoms. All the varieties are showing same response for the inserting sclerotia to the sheath technique giving higher DSI values. When selecting a technique for the varietal screening, it should perform well in all the varieties among the techniques tested. Results revealed that technique of inserting sclerotia into sheath shows disease severities prominently without depending on the varieties. Considering used three varieties, inbred variety Ruwan showed slightly higher DSI value than other local hybrid variety Sampath and exotic hybrid variety Pacific 984 saying susceptibility of open pollinated variety Ruwan for the BLSB than used hybrid varieties. But all the tested varieties were susceptible for the BLSB. Since the BLSB is becoming a problem in maize cultivation, hybrid breeding programmes should prefer to use the moderately susceptible/resistant lines as parents and identified technique is giving more

disease severities under favourable environment giving accurate germplasm screening.

CONCLUSIONS

Among the used inoculation techniques, inserting sclerotia to maize sheath was significantly superior to other techniques tested. Therefore, the above technique can be adopted as a rapid screening technique for evaluating maize germplasm/varieties against banded leaf and sheath blight disease in Sri Lanka.

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