

Screening Of Maize Germplasms against Stalk Rot Diseases In The Intermediate Zone Of Jammu Region

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ABSTRACTS: Stalk rot of maize caused by *E chrysanthemi* pv. *chrysanthemi* is one of the most destructive disease in several maize growing regions of India. In recent years, the average yield of maize is declined and this is accounted for biotic, abiotic and nutritional stresses. Bacterial stalk rot of maize caused by is one of the most destructive disease in several maize growing regions of India. Most of the maize hybrids and composite released in the country as well as local varieties have been found highly susceptible to this diseases. Local maize collected from Kalaban (Poonch) gave marginally moderately resistant reaction which recorded 19.41 % incidence followed by local maize Kasblari, Kari, and Thera with 22.16, 25.00 and 33.33%.

Key words: *Zea mays*, Bacterial stalk rot, *E chrysanthemi* pv. *Chrysanthemi*.

INTRODUCTION : Maize (*Zea mays* L.) occupies an important place among the cereal crops and ranks next to wheat, rice and sorghum in production and productivity . It occupies an area of 140 million hectares producing grain yield of 577 million metric tonnes in the world . In terms of acreage, India stands next to United States of America , Brazil, China and Mexico with the cultivation in an area of 61 m hectares with a production of 86 m tones (Food and Agriculture organization, 1996. In India, unlike western countries, maize is chiefly used as food for human consumption and only a small portion is used as green fodder, animal, poultry feed and industrial raw material. In Jammu and Kashmir , maize being the staple food of intermediate zone is grown approximately in 3 m ha with an acreage of 2 m ha in Jammu division. The district wise area in Jammu division under this crop in Udhampur , Doda, Rajuori, Jammu, Poonch and Kathua is 55.58. 4819, 44.89, 2677,23.67 and 15.89 thousand ha respectively (Directorate Economic and statistics J&K, 1999).

In recent years, the average yield of maize is declined and this is accounted for biotic, abiotic and nutritional stresses Ahamad *et al.* (1998); Ahamad *et al.* (2000); Ahamad (2005); Ahamad (2007); Ahamad (2009), Ahamad (2012), Ahamad (2013) . Among different stresses, biotic factors are the major constraints in the production and productivity of maize Desai and hedge (1990). Due to the attack of several plant disease caused by fungi, bacteria, viruses and nematodes, yield are often reduced considerably Rangarajan and Chakravati (1969).

Bacterial stalk rot of maize caused by *E. carotovora* var. *zeae* Sabet is one of the most destructive disease in several maize growing regions of India. Most of the maize hybrids and composite released in the country as well as local varieties have been found highly susceptible to this nemesis Lal and Saxena (1978). There are many reports of losses caused by stalk rot disease in maize. The disease was extremely destructive on Single crosses growing in double cross production fields at Tarai state farm UP (15-22 %).Christensen and wilcoxson (1966) reported that stalk rot and lodging are major problem of corn (*Zea mays* L.) with annual losses estimated at 5 to 20 p

MATERIALS AND METHODS:

An experiment was laid out at RARS, Rajouri during Kharif – 2007, 2008 wherein 21 cultivars were sown each in field one row (3.5 m) replicated thrice. Row to row and plant to plant distance was 75 cm and 25 cm respectively. Plants were raised under rainfed condition using SKUAST-Jammu Package of Practices. The cultivars were artificially inoculated and screened against predominant pathogen (*Erwinia chrysanthemi* pv. *chrysanthemi*). The inoculation was done on 36 plants (3x12) of each variety during flowering period maintaining control plants. The inoculated sites were sealed with petroleum jelly to avoid external infection. Observation for incidence of bacterial stalk rot were recorded on 14th day of inoculation. Twenty one genotypes including hybrids, composite and local maize varieties were artificially inoculated with *Erwinia chrysanthemi* pv. *chrysanthemi* having inoculum concentration of 2×10^8 cfu^{-ml} under field condition. The genotypes were one month old when subject to inoculation of all the entries (Table 1).

RESULT AND DISCUSSION:

Local maize collected from Kalaban (Poonch) gave marginally moderately resistant reaction which recorded 19.41 % incidence followed by local maize Kasblari, Kari, and Thera with 22.16, 25.00 and 33.33% respectively showing susceptible reaction. Whereas all the hybrids, composites under rigorous screening were found either susceptible or highly susceptible giving disease incidence from 38.83 % (Super composite) to as high as 100% (Pro-agro-4210, Him-123 and Pioneer XOG-79). This indicated that local maize germplasms still behaved better against bacterial stalk rot than the hybrids and composites cultivars being recently introduced into the area.

Twenty one genotypes including hybrids composite and local cultivars were screened during Kharif 2007-08 under artificial inoculation using *E. chrysanthemi* pv. *chrysanthemi* the most predominant pathogen with hypodermic syringe method at Regional Agricultural Research Station, Rajouri. The result obtained (Table 1) indicated that no cultivar was found resistant to bacterial stalk rot. Hybrid like Him-123 and Pioneer XOG-79 were highly susceptible whereas one local variety collected from Kalaban area of Poonch district was marginally moderately resistant showing 19.11 % incidence followed by local maize collected from Kasblari, Kari and Thera. This clearly showed that local germplasm proved better as compared to the newly introduced maize cultivars in the area so far as the resistance to bacterial stalk rot is concerned.

An extensive work has been done on screening of maize cultivars against stalk rot of maize by previous workers. They have already screened most of these cultivars against bacterial stalk rot and concluded that all of them were either susceptible or highly susceptible except CM101, CM110, Rudrapur local and Basi which were tolerant to *E. chrysanthemi*. Similarly Screening procedure against bacterial as well as fungal stalk rot have also been reported (Rangrajan and Chakravarti (1969), Anwar-ul- Haq and Nasir (1994), Saxena and Lal (1984). The Present observation are in agreement to those of above workers.

CONCLUSIONS: Local maize collected from Kalaban gave marginally moderately resistant reaction which recorded 19.41 % incidence followed by local maize Kasblari, Kari, and Thera with 22.16, 25.00 and 33.33%. This indicated that local maize germplasm

still behaved better against bacterial stalk rot than the hybrids and composites cultivars being recently introduced into the area.

Table 1. Response of maize genotypes to hypodermal inoculation with *Erwinia chrysanthemi* under field condition during Kharif, 2007-08.

Genotype	Percent disease incidence	Reaction
Local (Kalaban)	19.41	S
Local (Kasblari)	22.16	S
Local (Kari)	25.00	S
Local (Thera)	33.33	S
Super composite-I	38.33	S
NE composite	41.66	S
Mahi kanchan	50.00	HS
Arun	55.50	HS
Pro-agro3436	61.08	HS
Sury	66.66	HS
Gujarat macca-2	66.66	HS
Proagro 4640	66.66	HS
Proagro 3438	72.16	HS
Apna macca	75.00	HS
Pro-agro 3431	75.00	HS
Pro-agro 4642	86.08	HS
YM-004	86.08	HS
Bio-9691	94.41	HS
Pro-agro 4210	100.00	HS
Him -123	100.00	HS
Pioner XoG-79	100.00	HS

On the basis of 36 plants

Scale upto 10%- Resistant (R)

11-20 %- Moderately resistant (MR)

21-50%- Susceptible (S)

>51% - Highly susceptible (HS)

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