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Screening of Maize Inbred Lines for Resistance to Stem Borer, *Chilo partellus* (Swinhoe) under Natural Infestation

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In the present study, one hundred maize inbred lines were evaluated for resistance to *C. partellus* under natural infestation during *kharif* seasons of 2012-14. The leaf injury rating ranged from 1.2 to 7.7 on 1 – 9 rating scale. The highly resistant germplasms (< 2.0 score) included HUZM-67, HUZM-70-1, HUZM-211-1, CM-211*-2-1-1, POP-34-C8-1, HUZM-597-2, HUZM-366, HUZM-714, HUZM-390-2, HUZQPM-4, HUZQPM-5, HUZQPM-6, HUZQPM-7, HUZQPM-8, while 34 inbred lines along with the resistant check were found to be resistant with damage ranging between 2 – 3. The maize inbred lines HUZM-36, HUZM-47, HUZM-58-2, HUZM-79, HUZM-242, HUZM-152-2, HUZM-265, HUZM-343-1, HUZM-350-1, HUZM-356, HUZM-386-1, HUZM-488, HUZM-513-1, HUZM-628-3, 193-1, HUZM-229, HUZM-391-2, HUZM-5, HUZM-6, HUZQPM-1 were found to be susceptible (score from 5.2 – 7.5) and remaining genotypes were found moderately resistant. Significant variations were observed in leaf injury rating (LIR), mean tunnel length, per cent dead heart and mean plant height among the different inbred lines screened. The damage parameters like mean tunnel length and per cent dead heart exhibited a significant positive correlation with foliar damage while the plant height exhibited a significant negative correlation with the foliar damage rating.

Keywords: *Chilo partellus* (Swinhoe), maize, screening, inbred lines.

Maize (*Zea mays* L.), commonly known as 'Queen of Cereals' is an important cereal and fodder crop grown all over the world. Being the highest yielding cereal crop in the world, maize is of significant importance for countries like India, where rapidly increasing population and poultry industry have already out stripped the available food and grain supplies (Lella and Srivastav, 2013). In India, among cereals, maize ranks third in acreage and production. Maize crop possesses great genetic diversity and hence can be grown under varied agro ecological zone. The area under maize crop in the country is 8.49 million hectare with annual production of 21.28 MT (FAOSTAT, 2013), contributing nearly nine per cent in the national food basket. Cultivation of this crop is, however, handicapped by a number of insect pests which take heavy toll of its production annually.

About 200 species of insects have been reported infesting maize, globally and amongst them, the spotted stem borer, *Chilo partellus* (Swinhoe) is the most destructive one (Abdalla and Raguraman, 2014). *C. partellus* attacks maize plants from two weeks after germination until crop harvest. At the seedling stage of the crop, the young larvae feed on the green leaves while the older larvae leave the leaf whorl and bore into the stem where they damage the growing point and cause a characteristic "dead heart" symptom. In older plants, the larvae feed inside the stem causing extensive tunneling, which may cause lodging and interfere with the nutrient supply to the developing grains. In case of heavy infestation, the insect

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damages up to 50 per cent of the maize crop, which is liable to secondary attack by other pathogens (Panwar *et al*., 2001).

Insecticide application for stem borer control is considered to be uneconomical under subsistence farming and is largely beyond means of resource poor farmers. This is because once the pest enters the plant tissue; it becomes difficult for most of the insecticides to reach the target (Kumar *et al*., 2006). Apart from this, extensive use of chemical insecticides is often associated with environmental hazards, development of resistance in the target species, destruction of natural enemies and outbreak of minor pests. Therefore, host plant resistance (HPR) assumes a pivotal role in controlling stem borer damage either alone or in combination with other methods of control.

Amongst the identified sources, a number of mechanisms contribute to maize resistance to the stem borer, including non-preference for oviposition, reduced feeding by the first instars on the young leaves, low dead heart formation, reduced tunneling, tolerance to leaf damage and stem tunneling (Woodhead and Taneja, 1987; Sharma and Nwanze, 1997, Kumar *et al.*, 2006). Knowledge of the resistance mechanisms and associated factors is essential for effective utilization of resistant sources in crop improvement programs. However, because of large genotype X environment interactions, it becomes difficult to quantify different mechanisms of resistance under field conditions. Hence an attempt has been made to screen different inbred genotypes of maize under field conditions, in order to identify sources of resistance against *C. partellus*.

MATERIALS AND METHODS

One hundred maize germplasms (inbred lines) were screened along with Basi local (susceptible check) and CM500 (resistant check) for resistance to *C. partellus* under natural infestation during *kharif* season of 2012-14 at the Agriculture Research Farm, Banaras Hindu University, Varanasi. The experiment was conducted in Randomized Block Design with three replications. Each inbred line was sown in a single row of 2.5 meter length, with a plant to plant spacing of 20 cm. The recommended cultural practices were followed as and when required. The entire crop was grown free from pesticide application.

Observations regarding mean plant height (cm), leaf injury rating, mean tunnel length (cm), dead heart per cent were recorded by selecting ten plants randomly per row from all the maize genotypes. In order to determine the leaf injury rating (LIR), the foliar damage was visually recorded at 50 days after sowing of the crop on a scale of 1 to 9, as given by Tefera *et al*., 2011, where 1 = no visible leaf damage and 9 = plants dying as a result of leaf damage. On the basis of leaf injury score, the genotypes were then placed into different categories *viz*., highly resistant (score: 1-2), resistant (score: 2-3), moderately resistant (score: 3-5) and susceptible (score: 6-9). The LIR value was also correlated with other damage parameters observed. Significance of simple correlation was estimated by using *t*-test (Saxena and Ujagir 2007).

RESULTS AND DISCUSSION

In the present study, one hundred inbred lines of maize were screened under natural unprotected conditions for their resistance to *C. partellus* along with two checks, CM 500 (Resistant check) and BASI LOCAL (Susceptible check) during *kharif* seasons of 2012-14. The performance of different inbred lines was determined on the basis of leaf injury rating. The leaf injury rating value was also correlated with other damage parameters like mean tunnel length and per cent dead heart and a growth parameter i.e. plant height.

The pooled data in Table 1 revealed that average plant height varied significantly from 93.0 cm to 146.2 cm. Among the different genotypes screened, maximum plant height was recorded in HUZM – 81 (146.2 cm) and minimum (100.8 cm) in HUZM-582-2-1 as compared to the stem borer resistant check variety, CM500 (145.3 cm) and stem borer resistant susceptible check variety, BASI LOCAL (93.0 cm). Similarly, when foliar damage was taken into consideration, the minimum foliar damage was recorded in HUZQPM-8 (LIR value = 1.2) followed by HUZQPM -5 and HUZQPM-8 (LIR value = 1.3), while the maximum foliar damage was recorded in susceptible check, BASI LOCAL (LIR value = 7.7) followed by HUZM – 5 (LIR value = 7.5).

Table 1. Screening of inbred genotypes of maize against *C. partellus* during *kharif*, 2012-14

	Mean plant height (cm)			Leaf Injury Rating at 50 Days after sowing			Mean tunnel length (cm)			Mean percent dead heart		
Geno-types	2012 -13	2013 -14	Pooled Mean	2012 -13	2013 -14	Pooled Mean	2012 -13	2013 -14	Pooled Mean	2012 -13	2013 -14	Pooled Mean
HUZM-36	108.3	115.0	111.7	5.3	5.7	5.5	9.0	8.2	8.6	26.7	20.0	21.7
HUZM-46	122.0	118.0	120.0	4.0	4.3	4.2	4.1	5.1	4.6	16.7	13.3	15.0
HUZM-47	110.0	117.3	113.7	6.0	6.0	6.0	11.0	8.7	9.8	30.0	26.7	28.3
HUZM-53	127.7	120.7	124.2	5.3	4.3	4.8	2.8	1.5	2.2	13.3	10.0	11.7
HUZM-55	132.3	127.0	129.7	3.3	3.0	3.2	4.5	1.8	3.2	10.0	3.3	6.7
HUZM-58-2	138.3	132.7	135.5	6.3	6.7	6.5	8.7	7.3	8.0	43.3	30.0	36.7
HUZM-59-1	99.0	106.7	102.8	4.0	4.3	4.2	4.0	6.3	5.2	10.0	13.3	11.7
HUZM-60	143.3	137.3	140.3	3.3	4.0	3.7	0.3	4.3	2.3	6.7	3.3	5.0
HUZM-63	123.3	125.0	124.2	2.7	3.0	2.8	3.0	5.7	4.3	10.0	3.3	6.7
HUZM-65-1	135.0	120.7	127.8	2.7	2.0	2.3	0.0	2.3	1.2	0.0	0.0	0.0
HUZM-67	137.7	147.3	142.5	2.0	1.7	1.8	0.0	1.3	0.7	3.3	0.0	1.7
HUZM-70-1	136.3	135.0	135.8	1.7	2.3	2.0	0.7	1.7	1.2	0.0	3.3	1.7
HUZM-71	127.3	121.0	124.2	2.7	1.7	2.2	4.3	1.3	2.8	6.7	0.0	3.3
HUZM-77	137.0	138.0	137.5	3.7	4.3	4.0	3.7	3.4	3.5	10.0	10.0	10.0
HUZM-78-2	141.0	140.7	140.8	2.3	2.3	2.3	2.0	4.0	3.0	23.3	3.3	13.3
HUZM-79	102.7	103.7	103.2	6.3	7.3	6.8	9.3	9.7	9.5	36.7	46.7	41.7
HUZM-80-1	113.0	118.7	115.8	3.0	2.7	2.8	4.3	3.3	3.8	6.7	6.7	6.7
HUZM-81	144.7	147.7	146.2	2.0	2.3	2.2	1.3	1.6	1.5	3.3	3.3	3.3
HUZM-81-1	139.0	138.3	138.7	2.7	2.3	2.5	4.3	3.7	4.0	6.7	6.7	6.7
HUZM-85-1	120.0	123.0	121.5	3.3	3.0	3.2	3.3	2.7	3.0	6.7	6.7	6.7
HUZM-88	132.0	139.0	135.5	2.7	2.3	2.5	1.0	1.3	1.2	0.0	3.3	1.7
HUZM-90	121.0	125.7	123.3	3.7	4.7	4.2	3.0	4.0	3.5	13.3	16.7	15.0
HUZM-91-1	136.7	138.7	137.7	3.3	3.0	3.2	3.0	2.3	2.7	13.3	3.3	8.3
HUZM-97	128.0	126.3	127.2	3.3	2.7	3.0	3.0	2.3	2.7	10.0	0.0	5.0
HUZM-97-1-2	127.7	129.3	128.5	2.3	3.0	2.7	3.3	3.1	3.2	6.7	6.7	6.7
HUZM-107-1	127.0	134.0	130.5	3.0	3.3	3.2	4.2	2.7	3.4	13.3	10.0	11.7
HUZM-107-2	110.7	108.0	109.3	2.3	3.0	2.7	3.3	2.3	2.8	6.7	6.7	6.7
HUZM-121-2	114.7	114.7	114.7	2.7	2.3	2.5	3.0	2.5	2.8	6.7	3.3	5.0
HUZM-147	108.3	114.7	111.5	4.3	4.7	4.5	3.0	5.0	4.0	23.3	23.3	23.3
HUZM-148-2	116.0	117.3	116.7	2.3	2.0	2.2	3.0	3.3	3.2	3.3	0.0	1.7
HUZM-175-1-2	103.3	106.7	105.0	3.3	3.0	3.2	2.7	2.7	2.7	10.0	6.7	8.3
HUZM-175-2	120.3	108.3	114.3	2.7	2.3	2.5	2.3	2.3	2.3	0.0	0.0	0.0
HUZM-184-3	119.3	123.7	121.5	2.3	2.7	2.5	3.7	3.3	3.5	10.0	3.3	6.7
HUZM-211-1	139.0	121.7	130.3	2.0	1.3	1.7	1.2	0.7	0.9	0.0	0.0	0.0
HUZM-221	119.0	108.7	113.8	2.7	2.7	2.7	4.7	2.7	3.7	3.3	3.3	3.3
HUZM-242	109.0	111.3	110.2	5.3	6.0	5.7	10.7	9.0	9.8	26.7	36.7	31.7
HUZM-246	114.7	111.0	112.8	4.0	3.7	3.8	5.7	2.7	4.2	20.0	6.7	13.3
HUZM-152-2	122.0	115.7	118.8	7.0	6.7	6.8	11.2	11.7	11.4	43.3	40.0	41.7
HUZM-265	111.3	115.7	113.5	6.3	6.0	6.2	8.3	8.7	8.5	26.7	36.7	31.7
HUZM-281	102.3	107.7	105.0	3.7	4.3	4.0	3.7	3.7	3.7	20.0	13.3	16.7
HUZM-320	115.0	116.0	115.5	3.3	3.0	3.2	3.2	3.0	3.1	3.3	6.7	5.0
HUZM-329	114.3	118.0	116.2	2.3	2.7	2.5	3.0	2.7	2.8	6.7	0.0	3.3
HUZM-343-1	99.3	104.7	102.0	5.7	6.3	6.0	10.0	10.3	10.2	33.3	43.3	38.3
HUZM-345	113.7	117.7	115.7	3.3	3.7	3.5	3.8	4.5	4.2	13.3	6.7	10.0
HUZM-350-1	148.3	133.0	140.7	7.3	6.3	6.8	11.0	10.3	10.7	56.7	43.3	50.0
HUZM-352-1	128.0	130.0	129.0	3.0	3.3	3.2	3.8	3.0	3.4	6.7	10.0	8.3
HUZM-355-2	114.0	104.7	109.7	4.3	3.3	3.8	5.7	4.3	5.0	20.0	0.0	10.0
HUZM-356	110.0	105.0	107.5	5.7	6.0	5.8	8.3	11.0	9.7	33.3	33.3	33.3
HUZM-358	118.0	103.0	110.5	3.3	3.7	3.5	3.5	3.3	3.4	13.3	13.3	13.3

HUZM-363	121.3	117.0	119.2	3.3	3.7	3.5	3.6	4.0	3.8	16.7	10.0	13.3
HUZM-379	107.3	103.7	105.5	3.7	3.3	3.5	3.8	3.7	3.8	16.7	6.7	11.7
HUZM-384	129.0	124.3	126.7	2.7	2.3	2.5	3.7	3.0	3.3	6.7	0.0	3.3
HUZM-386-1	110.0	99.3	104.7	5.7	5.0	5.3	8.7	10.7	9.7	30.0	26.7	28.3
HUZM-427	108.0	104.7	106.3	3.7	3.3	3.5	3.8	3.3	3.6	10.0	3.3	6.7
HUZM-432	121.3	118.0	119.7	3.7	3.0	3.3	4.3	5.7	5.0	13.3	10.0	11.7
HUZM-446	124.0	121.7	122.8	3.0	2.7	2.8	3.3	4.0	3.7	13.3	0.0	6.7
HUZM-454	104.7	114.7	109.7	4.0	3.7	3.8	3.3	4.3	3.8	10.0	10.0	10.0
HUZM-457	117.0	123.7	120.3	3.3	3.0	3.2	4.3	3.3	3.8	13.3	6.7	10.0
HUZM-461-1	107.7	102.3	105.0	3.3	3.7	3.5	4.3	3.8	4.1	6.7	10.0	8.3
HUZM-478	120.7	115.0	117.8	3.0	2.3	2.7	4.3	4.7	4.5	10.0	3.3	6.7
HUZM-488	105.3	111.0	108.2	6.7	6.3	6.5	10.7	11.0	10.8	40.0	43.3	41.7
HUZM-509	103.3	110.3	106.8	2.7	2.3	2.5	3.2	3.7	3.4	10.0	0.0	5.0
HUZM-513-1	98.0	106.7	102.3	5.0	5.3	5.2	11.3	10.0	10.7	36.7	26.7	31.7
CM-211*-2-1-1	118.3	108.7	113.5	1.7	1.3	1.5	0.7	1.3	1.0	0.0	0.0	0.0
POP-34-C8-1	101.3	110.7	106.0	1.3	1.7	1.5	1.3	1.0	1.2	0.0	0.0	0.0
POP-34-C8-3	112.3	108.0	110.2	2.7	2.3	2.5	3.3	3.5	3.4	6.7	6.7	6.7
HUZM-561	127.0	121.7	124.3	3.7	3.0	3.3	3.0	2.7	2.8	10.0	16.7	13.3
CML-163-1-1	118.7	114.3	116.5	4.3	4.0	4.2	4.3	4.0	4.2	13.3	20.0	16.7
HUZM-582-2	115.0	110.0	112.5	2.7	2.3	2.5	5.3	6.3	5.8	3.3	0.0	1.7
HUZM-582-2-1	98.3	103.3	100.8	3.3	4.0	3.7	4.7	5.0	4.8	10.0	30.0	20.0
HUZM-597-1	114.3	109.0	111.7	3.3	3.0	3.2	3.0	4.3	3.7	10.0	6.7	8.3
HUZM-597-2	108.3	112.7	110.5	2.3	1.3	1.8	0.7	2.4	1.6	0.0	0.0	0.0
HUZM-628-3	137.3	127.7	132.5	6.0	6.7	6.3	10.3	10.0	10.2	43.3	50.0	46.7
HUZM-655-2	114.7	109.0	111.8	2.0	2.3	2.2	3.0	1.8	2.4	0.0	3.3	1.7
193-1	119.3	121.7	120.5	6.7	6.0	6.3	7.3	10.3	8.8	40.0	46.7	43.3
488-3	108.3	107.0	107.7	3.7	3.0	3.3	2.7	4.0	3.3	10.0	3.3	6.7
PG NLB-3-1-2	109.7	115.0	112.3	2.7	3.3	3.0	4.0	2.2	3.1	3.3	10.0	6.7
POOL 15 C 7	121.3	113.7	117.5	3.3	2.7	3.0	2.7	1.3	2.0	10.0	0.0	5.0
HUZM-253	109.3	119.7	114.5	2.3	3.3	2.8	4.0	4.0	4.0	6.7	6.7	6.7
HUZM-229	122.7	113.3	118.0	6.3	6.0	6.2	10.7	9.0	9.8	36.7	43.3	38.3
HUZM-343	126.7	125.0	125.8	2.3	2.3	2.3	3.9	3.0	3.5	3.3	0.0	1.7
HUZM-366	128.7	118.0	123.3	1.7	1.7	1.7	4.2	2.7	3.4	0.0	0.0	0.0
HUZM-708	112.3	120.7	116.5	2.3	3.3	2.8	1.5	1.8	1.7	0.0	16.7	8.3
HUZM-713	127.3	118.0	122.7	2.7	2.3	2.5	0.3	4.7	2.5	6.7	6.7	6.7
HUZM-714	116.3	119.7	118.0	1.3	1.7	1.5	5.0	0.3	2.7	10.0	0.0	5.0
HUZM-536	110.3	103.7	107.0	2.7	3.0	2.8	3.0	2.7	2.8	3.3	16.7	10.0
HUZM-391-2	112.0	107.7	109.8	6.3	6.7	6.5	10.3	10.0	10.2	40.0	60.0	50.0
HUZM-390-2	109.3	114.3	111.8	2.0	1.7	1.8	1.7	3.1	2.4	0.0	0.0	0.0
HUZM-38-2	107.3	107.3	107.3	3.7	3.7	3.7	3.3	3.0	3.2	10.0	13.3	11.7
HUZM-53	113.0	119.7	116.3	2.0	2.3	2.2	3.3	3.2	3.3	0.0	3.3	1.7
HUZM-1	113.0	118.3	115.7	2.3	2.0	2.2	2.8	3.7	3.3	0.0	0.0	0.0
HUZM-5	105.0	101.0	103.0	7.3	7.7	7.5	11.7	13.3	12.5	46.7	63.3	55.0
HUZM-6	112.7	115.0	113.8	5.7	4.7	5.2	10.3	7.3	8.8	30.0	26.7	26.7
HUZQPM-1	111.7	105.7	108.7	5.0	6.3	5.7	8.7	9.3	9.0	36.7	40.0	38.3
HUZQPM-2	128.3	117.0	122.7	2.3	2.7	2.5	5.3	4.3	4.8	3.3	6.7	5.0
HUZQPM-4	116.0	122.7	119.3	2.0	1.3	1.7	0.7	5.0	2.8	6.7	0.0	3.3
HUZQPM-5	126.3	121.0	123.7	1.7	1.0	1.3	1.0	3.7	2.3	0.0	0.0	0.0
HUZQPM-6	137.0	131.7	134.3	1.7	1.7	1.7	0.7	0.3	0.5	0.0	0.0	0.0
HUZQPM-7	135.3	132.7	134.0	1.0	1.7	1.3	2.7	1.0	1.8	0.0	3.3	1.7
HUZQPM-8	127.7	123.0	125.3	1.0	1.3	1.2	1.7	1.0	1.3	0.0	0.0	0.0
CM 500 (R)	144.3	146.3	145.3	2.3	2.3	2.3	3.7	1.0	2.3	6.7	13.3	8.3
BASI LOCAL (S)	93.3	92.7	93.0	7.0	8.3	7.7	13.3	11.3	12.3	50.0	66.7	58.3
SEM±	8.9	7.2	7.6	0.5	0.7	0.4	1.6	1.4	1.2	4.9	5.8	3.7
CD 5%	24.7	20.1	21.1	1.4	2.1	1.1	4.6	4.1	3.3	13.7	16.1	10.3

R = Resistant check, S = Susceptible check

Table 2. Category of different maize genotypes against *C. partellus* during *kharif*, 2012-14

Highly Resistant	Resistant	Moderately resistant	Susceptible
HUZM-67, HUZM-70-1, HUZM-211-1, CM-211*-2-1-1, POP-34-C8-1, HUZM-597-2, HUZM-366, HUZM-714, HUZM-390-2, HUZQPM-4, HUZQPM-5, HUZQPM-6, HUZQPM-7, HUZQPM-8,	HUZM-63, HUZM-65-1, HUZM-71, HUZM-78-2, HUZM- 80-1, HUZM-81, HUZM-81-1, HUZM-88, HUZM-97, HUZM-97-1-2, HUZM-107-2, HUZM-121-2, HUZM-148-2, HUZM-175-2, HUZM-184-2, HUZM-221, HUZM-329, HUZM-384, HUZM-446, HUZM-478, HUZM-509, POP-34-C8-3, HUZM-582-2, HUZM-665-2, PG NLB-3-1-2, POOL 15 C 7, HUZM-253, HUZM-343, HUZM-708, HUZM-713, HUZM-536, HUZM-53, HUZM-1, HUZQPM-2, CM 500(Resistance check)	HUZM-46, HUZM-53, HUZM-55, HUZM-59-1, HUZM-60, HUZM-77, HUZM-85-1, HUZM-90, HUZM-91-1, HUZM-107-1, HUZM-147, HUZM-175-1-2, HUZM-246, HUZM-281, HUZM-320, HUZM-345, HUZM-350-1, HUZM-355-2, HUAM-358, HUZM-363, HUZM -379, HUZM-427, HUZM-432, HUZM-454, HUZM-457, HUZM-461-1, HUZM-561, CML-163-1-1, HUZM-582-2-1, HUZM-597-1, 488-3, HUZM-38-2,	HUZM-36, HUZM-47, HUZM-58-2, HUZM-79, HUZM-242, HUZM-152-2, HUZM-265, HUZM-343-1, HUZM-350-1, HUZM-356, HUZM-386-1, HUZM-488, HUZM-513-1, HUZM-628-3, 193-1, HUZM-229, HUZM-391-2, HUZM-5, HUZM-6, HUZQPM-1, BASI LOCAL (Susceptible check)

Apart from this, ten other inbred lines namely HUZM-47, HUZM-58-2, HUZM-152-2, HUZM-265, HUZM-343-1, HUZM-350-1, HUZM-488, HUZM-628-3, HUZM-229 and HUZM-391-2 also exhibited high foliar damage due to *C. partellus* with LIR value – 6.0, 6.5, 6.8, 6.2, 6.0, 6.8, 6.5, 6.3, 6.2 and 6.5 respectively as compared to the resistant check, CM 500 (LIR value = 2.3) (Table 1). A significant variation in LIR value was also recorded during both the years. The results are in agreement with Abdalla and Raguraman (2014) who evaluated thirty four maize genotypes on the basis of LIR value for resistance to *C. partellus* and found four genotypes highly resistant against *C. partellus*.

The mean tunnel length also varied significantly from lowest of 0.5 cm on HUZQPM-6 to highest of 12.5 cm on HUZM-5 among the genotypes tested, as compared to 2.3 cm and 12.3 cm on checks CM500 and BASI LOCAL, respectively. There were also significant differences in per cent dead heart among the genotypes and check and it ranged from minimum (0 per cent) on 11 inbred lines (HUZM-65-1, HUZM-175-2, HUZM-211-1,CM-211*-2-1-1, POP-34-C8-1, HUZM-366, HUZM-390-2, HUZM-1, HUZQPM-5, HUZQPM-6 and HUZQPM-8) to maximum 58.3 per cent in susceptible check, BASI LOCAL (Table 1).

Results in Table 2 show that the 14 genotypes HUZM-67, HUZM-70-1, HUZM-211-1, CM-211*-2-1-1, POP-34-C8-1, HUZM-597-2, HUZM-366, HUZM-714, HUZM-390-2, HUZQPM-4, HUZQPM-5, HUZQPM-6, HUZQPM-7 AND HUZQPM-8, were highly resistant (d" 2.0 rating on LIR scale) with score of 1.8, 2.0, 1.7, 1.5, 1.5, 1.8, 1.7, 1.5, 1.8, 1.7, 1.3, 1.7, 1.3 and 1.2 respectively. Thirty four genotypes were found to be resistant

Table 3. Simple correlation coefficient between Leaf Injury Rating (LIR) of different maize genotypes and other damage parameters under field conditions

Parameter taken into consideration	Leaf Injury Rating (LIR value)
Mean tunnel length (cm)	0.920**
Per cent dead heart	0.957**
Mean plant height (cm)	-0.411**

** Significant at 1%

with LIR score ranging between 2 and 3, including the resistant check CM-500, while the score of thirty two genotype ranged from 3.2, to 4.8 and grouped as moderately resistant. Susceptible check BASI LOCAL showed highest foliar damage rating score of 7.7. Abdalla and Raghuraman (2014) also reported that susceptible check BASI LOCAL exhibited highest foliar damage rating score of 7.00. The remaining twenty genotypes also recorded LIR score ranging between 5.2 to 7.5 and were grouped as susceptible. Chavan, *et al.*, (2007) tested 77 genotypes and found that the least susceptible germplasm (d" 3.0 rating including CM 500.

Correlation coefficient was worked between leaf injury rating value and other parameters like mean tunnel length, per cent dead heart and mean plant height of maize genotypes along with the resistant check CM 500 and susceptible check BASI LOCAL (Table 3). Significant and positive correlation was observed between leaf injury rating and mean tunnel length (r =0.920**) and per cent dead heart (r=0.957**) where as a significant and a negative correlation was found with plant height (r = - 0.411**). Thus it can be concluded that those genotypes which were having higher foliar damage also exhibited higher mean tunnel length and higher per cent dead heart. But these genotypes with lower damage by *C. partellus* exhibited higher plant height.

Dhillon and Gujar (2013) have evaluated 18 diverse maize inbred lines against maize stem borer and found that maize genotypes CPM 1, CPM 2, CPM4, CPM 8, CPM 15, and CPM 18 were resistant to *C. partellus* and these genotypes also possessed desired agronomic traits. Several other workers also reported differential levels of resistance/ susceptibility of maize lines derived from CIMMYT (Bergvinson, *et al*., 2002. Panwar, *et al*., 2001 and Sekhar, *et al*., 2004) Panwar *et al.*, 2000, Awan and Khaliq, 2003, Khan and Monobrullah, 2003, *Chavan, et al., 2007*, Afjal, *et al*., 2009 and Dillon *et al., 2013* have also reported significant differences in infestation level of *C. partellus*.

Various scientists (Kanta and Shekhon, 1994, Rai and Sharma, 1998; Kanta and Kaur, 2000 and Chand and Kumar, 2004) have screened different maize germplasm and identified promising cultivars in different agro-climatic condition.

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