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SOME STUDIES ON THE PHYSICO-MORPHOLOGICAL CHARACTERS CONTRIBUTING TOWARDS RESISTANCE IN SOME MAIZE CULTIVARS AGAINST STEM BORER *Chilo Partellus* (S.)

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Ten maize cultivars, MS-512. EX-295. Cargel-727. FHY-319. 1Z-1l, DTC, Golden, Sonehri, Gilgit 'olnd PopCorn were tested on physico-morphic basis for relative resistance to *Chtlo partel/us S'.* which showed that MS-512 was comparatively more resistant, while Pop Corn had the least resistance to the pest attack. It was found that greater hair density on leaf lamina. longer tassel length, comparatively less plant height. less number of internodes, less third internode length and low moisture contents contributed towards resistance in maize cultivars against stem borer *Chilo partel/us* S.

Key words: maize cultivars, physico-morphic characters. stem borer

INTRODUcnON

Evolution of resistant varieties offers a compelling alternative to insecticides. Therefore. with all its complexities varietal resistance has a significant importance in 1PM strategies against insect pests of maize. Efforts have been made to sort out the physical characters which contribute towards resistance in maize cultivars against *Chilo partel/us* S. (Kundu, 1985: Ampofo et al., 1986: Sajan and Sekhon. 1992). The present studies were undertaken to investigate the role of various physico-morphic characters viz. plant height. number of internodes, diameter of stem. length of third internode. tassel length. leaf hair density. tunnel length. number of tunnels. leaf area. and moisture contents of some maize cultivars viz. hybrids: Cargel-727, FHY-319: inbred lines: MS-512, Ex-295 and composite: *IZ-II,* DTC, Golden. Sonehri. Gilgit and Pop Corn towards resistance against *Chilo partel/us* S.

MATERIALS AND METHODS

The experiment was laid out in a randomized complete block design in three replications at the University of Agriculture. Faisalabad. Ten plants were selected from each replication to record the infestation. The observations were recorded at weekly interval during the growth period of the crop. Percentage borer infestation was obtained on the basis ofleafinjury. Plant height. length of third internode. tassel length and diameter of stem were measured in centimeters. The hair on lower surface of leaf were counted per square centimeter under microscope. Number of tunnels and tunnel length were measured after dissecting the plant. Leaf area was measured with the help of a leaf area meter. Moisture contents (%) were determined by applying the formula:

$$\text{Moisture contents (\%)} = \frac{\text{Wt. of fresh leaves - Wt. of dry leaves}}{\text{Wt. of fresh leaves}} \times 100$$

RESULTS AND DISCUSSION

The data recorded have been given in Tables I and 2. It is seen from Table 1 that minimum stem borer infestation was 12.95% on MS-512 and maximum 24.02'~;, on Pop Corn. followed by FHY-319, EX-295, 1Z-ll, Cargel-727. Sonehri. Gilgit, Golden and DTC having 14.03, 14.07. 15.16. 16.65. 17.01. 19.93.20.68 and 21.46% respectively. The varieties MS-512. FRY-319. Ex-295. bearing borer infestation range 12.95-14.07% were rated as resistant. The genotypes 1Z-11, Cargel-727 and Sonehri bearing infestation range 15.16-17.01% were rated as' moderately resistant. while Gilgit, Golden. DTC and Pop Corn bearing infestation range 19.93-24.02% were rated as susceptible varieties. The correlation studies (Table 2) revealed that their infestation has a positive and significant correlation between plant height. number of intern odes. length of third internode, tunnel length. number of tunnels, and moisture contents and non-significant correlation with diameter of stem and leaf area. while there was significantly negative correlation with tassel length and leaf hair. Plant height and borer infestation had significant correlation as also supported by Rafique (11)86). These findings are not in conformity with those of Sharma and Chatterji (1972) who showed a negative correlation between plant height and borer infestation. Number of internodes was significantly correlated with borer infestation. These findings are in line with those of Hardin (1984) who reported that the length of internodes was significantly correlated with borer infestation. Length. 0f third inleruode. tunnel length. number of tunnels and moisture contents are positively and significantly correlated with borer infestation. These findings are in line with those of Rafique (llJ86). Kishore (1991) and Kumar et al. (1993). Leaf area was not significantly correlated' with borer infestation. Leaf hair density was negatively but significantly correlated with borer infestation as reported by Panel. (llJ90) and Kumar (1992).

Table 1. Physico-morphic characters of different

Varieties	Infestation	Plant height (cm)	No. of internodes	Diameter of stem (cm)	3rd internode length (cm)	Tassel length (cm)	Leaf hair (No.)	Tunnel length (cm)		Leaf area (mm^2)	Moisture contents (%)
IZ-11	15.16 bcd			6.800 a					0.867 d		55.48 de
DTC	21.46 ab			4.800 c					1.233 abc		72.62 a
Golden	20.68 abc			5.433 bc					1.267 ab		60.81 bcde
Sonehri	17.01 bcd			5.500 bc			68.53 abc		0.867 d		54.12 e
Gilgit	19.93 abc			5.667 abc			51.40 bcd		1.400 a		65.06 abcd
FHY-319	14.03 cd			6.167 ab			45.60 cd		0.933 bcd		66.32 abc
Pop Corn	24.07 a			5.700 abc	12.13 a		36.73 d		1.267 ab		69.79 ab
Cargel-727	16.65 bcd			5.967 abc	8.533 bc		68.33 abc				58.68 cde
MS - 512	12.95 d			5.000 bc	8.267 c		80.73 a			185.4	59.48 cdec
EX - 295	14.07 cd	162.80 bc		5.267 bc	9.400 bc		51.67 bcd			189.1 e	52.21 e

Means with similar letters do not differ at 5% level of significance

Table 2. Correlation between borer infestation and resistance factors

Treatments				Diameter of stem	3rd internode length		Leaf hair	Tunnel length		Leaf area	Moisture contents
Infestation	1.000										
P. height	0.3273*	1.000									
No. of internodes	0.5945**	0.2212									
Diam. of stem	0.0346	0.1700		1.000							
Length of 3rd	0.5732**	0.2309	0.4410*	-0.2107	1.000						
Tassel length	-0.2205	0.2297	-0.0197	0.1390	-0.2832	1.000					
Leaf hair	-0.4091*	-0.3672*	-0.4574*	0.0469	-0.4381*	-0.1055	1.000				
Tunnel length	0.3927*	0.2579	0.2255	-0.0210	0.2525	0.3821*	-0.2484	1.000			
No. of tunnels	0.4631*	0.1931	0.0668	-0.2449*	0.2334	0.0952	-0.3769*	0.6074**	1.000		
Leaf area	0.0641	0.3356	0.1503	0.1289	-0.2928	0.3433	0.0266	0.0389	-0.0621	1.000	
Moisture contents	0.4225*	0.1565	0.0731	-0.2850	0.5182**	-0.1841	-0.3594	0.1789	0.5086**	-0.0572	1.000

Critical region: $|r|$ P > 0.321 (significant at 5% level of probability);
P > 0.463 (highly significant at 5% level of probability).

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