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Varietal Performance of Maize Against Stem Borer (*Chilo partellus* Swin.)

Said Mir Khan and Muhammad Amjad
Department of Entomology, Faculty of Agriculture, Gomal University, D.I.Khan, (Pakistan)

Abstract: The results reveal that sarhad white was found the least susceptible on the basis of number of dead hearts and percent infestation compare to the other three tested varieties.
Sarhad white variety was also found significantly better than Kisan, Pirsabak experimental variety No. 1 and Pirsabak experimental variety No. 4 on the basis of average plant height, weight of stalk (kg/plot), average number of cobs/plant, weight of cobs (kg/plot) and weight of grains (kg/plot).

Key words: Maize Varieties, Resistance, Stern borer, *Chile partellus*

Introduction

Maize crop is attacked by many insect pests which include, maize stem borer *Chile partellus,* European corn borer *Ostrinia nutabilalus,* Pink borer *Sesamia inferens,* shoot fly *Atherigona soccata* and cutworm *Agrotis* app. Among these insects maize stem borer *Chile partellus* is the key pest in Pakistan, causes loss upto 75 percent and in severe infestation at seedling stage a total failure of this crop. It attack all parts of the crop except roots, (Anonymous, 1986).

Sekhon *et al.* (1991) conducted field studies in Punjab, India during 1984-85 to evaluate 88 maize germplasms (including 77 exotic and 2 indigenous germplasms) for resistance to artificial infestation of *C. partellus.* The germplasms pool 15, pool 27, pool 16, JA long ear Syn and Honey June were the least susceptible and pool 30, pool 19, pool 23, pool 29, pool 25, pool 28, NC 59663, pool 24, tuxperete × tropical QPM (dent), pool 17, pool 26, tuxpeno QPM and BS-20 showed moderate damage.

Reddy and Sun (1982) studied three maize cultivars, INB-A, V-237 and ICZ-2 infested with freshly hatched larvae of *C. partellus* at rate of 1, 2, 6, 8, or 10 larvae/plant, at 21, 28, 35 or 42 days after crop emergence. The yield infestation relationship was best exploited by linear density/damage function of the form $Y = a + bx$, for all cultivars and crop growth stages, as opposed to log linear and quadratic function tested. Economic injury level (EIL) was calculated on the basis of each linear infestation yield relationship, cost of 3 insecticides applied twice and prevailing market price of maize. EIL values were lowest in the susceptible variety INB-A, following by the tolerant V-37, the resistant ICZ-2 had the highest EIL. EIL values increased with progressive crop growth stages.

Kumar (1994) measured the resistance in maize (*Zea mays* L.) to C. *partellus* (Swin) under artificial infestation at whorl stage and at anthesis. When infested at whorl stage (2.5 wk after emergence), the cultivars MMV 400, MBR 8650, MBR 8668, MBR 8637, MMV 600, ER 29SVR, Poza Rica 7832, Bulk CG 4141, Katumani Composite B and ICZ-CM showed leaf feeding resistance, dead heart resistance and stern feeding resistance to *C. partellus.* The plants of MBR 8637, ER-29SVR and Poza Rica 7832 caused significant adverse effect on the growth of *C. partellus.* The plants of these three cultivars lost very little biomass per unite larval weight gain and lost little grain yield under infestation with *C. partellus* in the field, indicating that tolerance mode of resistance also contributed to the overall resistance of ER-29SVR, MBR-8637 and Poza Rica 7832. When the cultivars were infested at enthesis, the cultivars MBR-8637, MMV-400 and Poza Rica 7832 showed stem feeding resistance to *C. partellus.* The rate of larval development on MBR-8637 and Poza Rica-7832 was significantly lower than the other cultivars. Such genotypes possessing genes for resistance to *C. partellus* would be very useful for improving the overall level of resistance in the existing commercial varieties or developing new resistant hybreds of maize. The present research was conducted to evaluate performance of four maize varieties against stem borer *C. partellus.*

Materials and Methods

An experiment was conducted at the Farm of agricultural Faculty, Gomal University, D.I.Khan to determine the least susceptible maize variety to the attack of maize stem borer *Chile partellus* (Swin.).

The experiment was laid out in randomized complete block design and replicated 3 times. Maize varieties viz. Sarhad white, Kisan, Pirsabak experimental variety No. 1 and Pirsabak experimental variety No. 4 were sown in plots measuring 3×2 m^2 at tar wetter condition with row to row and plant to plant distance 60 cm and 25 cm respectively. All agronomic practices were carried out uniformly in of the plots as and when needed.

The data was recorded on the basis of number of dead hearts, number of infested plants, average height of plant, weight of cobs/plant dnd weight of grains kg/plots, average number of cobs/plant and weight of grains kg/plot. The data was subjected to the statistical analysis and comparison of varietal means was done by LSD test.

Results and Discussion

Percent dead hearts: Results (Table 1) of dead hearts percentage reveal that minimum dead hearts were recorded in Sarhad white variety while maximum percentage of dead hearts were found in the Kisan variety. The number of dead hearts in pirsabak experimental variety No. 4 and pirsabak experimental variety No. 1 were recorded 8.33 and 8.80 percent respectively. The mean percent number of dead hearts found in these two varieties were not significantly different from each other. Sarhad white variety of maize was found significantly least susceptible, compared to kisan variety which was recorded significantly most susceptible to the attack of maize stern borer.

Percent infestation: It is clear from Table 1 that minimum infested plant were found in Sarhad white variety, followed by pirsabak experimental variety No. 1, kisan and pirsabak experimental variety No. 4 having 17.67, 18.30 and 20.49 percent infestation respectively. Sarhad white, pirsabak experimental variety No. 1 and kisan were found non-significantly different from each other, while pirsabak experimental variety No. 4, kisan and pirsabak experimental variety No. 1 were also found non-significantly different from each other from maize stem borer infestation point of view.

Table 1: Showing varietal performance of different varieties of maize against maize stem borer *Chile partellus* (Swin.)

Varieties	Dead heart (% age)	Infestation (% age)	Average plant height (metre)	Stalk weight (kg/plot)	Average No. of cobs/plant	Cob weight (kg/plot)	Grain weight (kg/plot)
Sarhad white	7.718	15.33B	1.68A	5.75A	0.84A	4.00A	2.99A
Kisan	10.34A	18.30AB	1.608	5.25AB	0.688	3.258	2.44B
P.S.E.V.No.1	8.80AB	17.67AB	1.55BC	5.00BC	0.64B	3.088	2.31B
P.S.E.V.No.4	8.33AB	20.49A	1.50C	4.580	0.628	2.75C	2.02C

Means followed by different letters are significantly differed from each others of 1 percent level of probability

Average plant height: It is evident from the Table 1 that maximum plant height 1.68 miplant was recorded in Sarhad white variety, followed by pirsabak experimental variety No. 1, kisan and pirsabak experimental variety No. 4 having 1.55, 1.60 and 1.50 m/plant respectively. Sarhad white variety was found significantly tallest, followed by kisan and pirsabak experimental variety No. 1. These two varieties were found non-significantly different from each other. Pirsabak experimental variety No. 4 was recorded significantly dwarf variety, followed by pirsabak experimental variety No. 1.

Weight of stalk (kg/plot): Table 1 shows that maximum stalk weight was recorded from plot of Sarhad white, wile minimum stalk weight was obtained of pirsabak experimental variety No. 4 plots. Pirsabak experimental variety No. 1 and Kisan provided 5.00 and 5.25 kg/plot stalk weight respectively. Sarhad white and Kisan were found non-significantly different from each others, white kisan and pirsabak experimental variety No. 1 were also found non-significant in term of stalk weight/plot. Pirsabak experimental variety No. 4 and pirsabak experimental variety No. 1 also provided stalk weight/plot which were non-significantly differed from each other.

Average number of cobs/plant: It is obvious from the Table 1 that maximum average number of cobs/plant were found in plots of Sarhad white variety, followed by Kisan, Pirsabak experimental variety No. 4 and pirsabak experimental variety No. 1 in which average number of 0.68, 0.64 and 0.62 cobs/plant were recorded respectively. Sarhad white was found significantly more cobs producing variety than the rest of tested varieties. Kisan, Pirsabak experimental variety No. 4 and pirsabak experimental variety No 1 were found non-significantly different from each others in respect of average number of cobs/plant.

Weight of cobs/kg/plot: Results (Table 1) regarding weight of cobs kg/plot of tested varieties show that the highest cobs weight was recorded in case of Sarhad white and the lowest in case of Pirsabak experimental variety No. 4. In case of Kisan and Pirsabak experimental variety No. 1 varieties 3.25 and 3.08 kg/plot were recorded as cobs weight respectively. The cobs weight/plot in case of Sarhad white variety was found significant different from other varieties. Kisan and Pirsabak experimental variety No. 1 varieties were ranked intermediate while Pirsabak experimental variety No. 4 produced cobs which were found significantly lowest among the tested four maize varieties.

Weight of grains (kg/plot): Table 1 shows that the highest grain yield was obtained from Sarhad white, followed by kisan, Pirsabak experimental variety No. 4, which produced 2.44, 2.31 and 2.12 kg/plot grains respectively. Statistically sarhad white produced significantly more grains/plot, while Pirsabak experimental variety No. 4 produced significantly less grains. The other two varieties kisan and Pirsabak experimental variety No. 4 ranked intermediate between sarhad white and Pirsabak experimental variety No. 4 in term of grains production.

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