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IDENTIFICATION OF VULNERABLE STAGE OF MAIZE TO *CHILO PARTELLUS* (SWINHOE)

Maize stem borer, *C. partellus* is an important pest of maize across the world. It also attacks sorghum, millets, rice, sugarcane, pearlmillet and other graminicious grasses. It is an internal stem borer and once larvae enter inside the stem then become difficult to manage with insecticide therefore, efforts are regularly being made to develop the resistance varieties. The developed germplasms are screened against the artificial infestation of maize stem borer after data recorded on LIR. The LIR is totally dependent upon the selection of plant stage for release of either eggs or larvae of *C. partellus*. The release of *C. partellus* in the early stage of plant may transform the plants to dead hearts while delayed releases do not cause significant damage.

So for no systematic work has been done on identification of vulnerable stage of maize plant for release of *C. partellus* and their impact on damage parameters *viz*., LIR, plant height and yield. Therefore, present investigation was planned to find out the most susceptible stage for artificial release of *C. partellus*.

The proposed investigation was conducted at Instructional Farm of Rajasthan College of Agriculture, Udaipur, during 2011. The test germplasm Pratap Maize–5 were sown on 29th June, 2011 at 60 × 60 and 25 × 25 cm row to row and plant to plant spacing. There were 12 plants in each row and only 10 plants were selected for recording the data. The fifteen neonate larvae were released at 7, 9, 11, 13, 15, 17, 19 and 21 days after germination to achieve all categories of leaf injury rating (1–9). One row with three replications were sown for every infestation dose. Thus thirty plants were taken in consideration for observation of each infestation level. One row was kept control after every infestation row. After one month of release of neonate larvae of maize stem borer leaf injury rating (1–9) was recorded. Further, plant height (cm) up to tassel base and yield were recorded at 14 per cent moisture.

The data on Leaf injury rating (LIR) showed that highest LIR, 9.00, was recorded up to 11 days after germination in T_1, T_2 and T_3 and were statistically at par followed by 8.33, 7.67, 6.67, 4.67 and 3.67 in T_4, T_5, T_6, T_7 and T_8 (13, 15, 17, 19 and 21 DAG) respectively. It is also clear from the table that LIR, 8.33 recorded in T_4 (13 DAG) was at par with T_1, T_2, T_3 and T_5 (7, 9, 11 and 15 DAG) respectively but significantly different from T_6, T_7 and T_8 (17, 19 and 21 DAG). LIR recorded in T_5, T_6, T_7 and T_8 also differ statistically to each other.

It is evident from the data that minimum plant height, 18.53 cm was recorded in T_1 (7 DAG) followed by 19.92, 22.75 and 26.48 cm in T_2, T_3 and T_4 (9, 11 and 13 DAG) but were statistically at par. The plant height recorded in other treatments T_5, T_6, T_7 and T_8 (15, 17, 19 and 21 DAG) were 49.13, 98.82, 139.70 and 160.58 cm respectively and were statistically differ to each other.

The data on yield (g /plant) showed that maximum plant yield, 102.22 g /plant was recorded at 21 days after germination (T_8) followed by 88.39, 54.82 and 26.87 g / plant in T_7, T_6 and T_5 (19, 17 and 15 DAG) respectively and was statistically different to each other. No yield was recorded in the remaining treatments, T_1 to T_5.

Table 1. Effect of plant age on damage parameters caused by *C. partellus* and yield in maize

S.No.	Treatments (DAG)	LIR	Plant height (cm)	Plant yield (g/plant)	Total yield (q/ha)
T_1	7	9.00	18.53	0.00 (0.71)	0.00 (0.71)
T_2	9	9.00	19.92	0.00 (0.71)	0.00 (0.71)
T_3	11	9.00	22.75	0.00 (0.71)	0.00 (0.71)
T_4	13	8.33	26.48	0.00 (0.71)	0.00 (0.71)
T_5	15	7.67	49.13	26.87 (5.21)	17.91 (4.29)
T_6	17	6.67	98.82	54.82 (7.41)	36.54 (6.07)
T_7	19	4.67	139.70	88.39 (9.42)	58.92 (7.71)
T_8	21	3.67	160.58	102.22 (10.13)	68.14 (8.28)
SEm±		0.271	5.642	0.221	0.153
CD (P = 0.05)		0.822	17.113	0.670	0.465
CV (%)		6.473	14.587	8.749	7.291

Figures in parentheses are square root transformed values; DAG = Days after germination

The data computed for total yield showed similar trends wherein maximum yield, 68.14 q/ ha was achieved in T_8 (21 DAG) followed by 58.92, 36.54 and 17.91 q /ha in T_7, T_6 and T_5 (19, 17 and 15 DAG) respectively and was significantly different to each other. No yield was recorded in remaining test treatments. The data clearly indicates that though release of larvae up to 11 DAG, completely transform the plants to dead hearts but plants are very susceptible to *C. partellus* up to 15 days where no yield could be recorded.

The present findings are in agreement with the work of Sarup *et al*. (1977) who reported that the most critical stage of maize crop is 10 day old plants. Similarly, Maredia and Mihm (1990) also reported that damage caused by southwestern corn borer varies as per the plant stage. They observed that infestation was highest at 4–5 leaf stage and declined with the age of plants at infestation, the decline was less between the 4–5 and 6–8 leaf stage than between the 6–8 and 9–11 leaf stages. They also reported that 6–8 fully extended leaf stage would be the best stage for artificial infestation of southwestern corn borer. Davis *et al*. (1991) observed that degree of resistance or susceptibility in maize against southwestern corn shift with plant growth stage and found low level of resistance when infested in the reproductive stage of growth.

Kumar (1994) of the opinion that artificial infestation by 1st generation of *C. partellus* on maize during the early whorl stage resulted in significantly greater population and more damage than released on anthesis.

Lourencao and Santos (2005) supported the present investigation that maize plants at 8 and 10 leaf stages were more susceptible to *S. frugiperda* with losses of 11.1 to 15.4 per cent respectively. Similarly, Farid *et al*. (2007) also reported that early vegetative stage is most susceptible to the stem borer *C. partellus* and no increase in damage at tasseling. Jindal and Hari (2010) was also of the opinion that artificial release of *C. partellus* in maize up to at 2.5 week after germination resulted in better explanation of resistance because different components of resistance expressed at this stage.

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