

Combining ability for shoot and fruit borer resistance and other quantitative traits in brinjal (*Solanum melongena* L.)

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SUMMARY

Brinjal shoot and fruit borer (*Leucinodes orbonalis* Guenee) is a serious pest which causes up to 70% yield loss and fruit infestation to the tune of 23% by either boring into the young tender shoots or fruits. Breeding for resistance to this pest is difficult. In the present study, combining ability of tolerance to brinjal shoot and fruit borer infestation was done along with other yield attributes to identify the nature of gene action operative for these traits. Three female and five male parents for hybridization were selected on the basis of susceptibility towards the infestation of shoot and fruit borer from forty genotypes of brinjal mated in line x tester design. Observation was recorded for plant height, number of primary branches per plant, days to 50% flowering, fruits per plant, fruit length, fruit girth, fruit weight, fruit yield per plant and percentage fruit and shoot infested. Prevalence of additive variance was found for most of the traits. In all the crosses the σ^2_{gca} was much higher than σ^2_{sca} . Predictability ratio was more than 0.5 for all the traits indicating predominance of additive genetic effects for those traits. So, conventional breeding approaches like pedigree, single seed descent and recurrent selection methods can be used to improve these characters. In case of shoot and fruit infestation percentage by the borer, negative gca effect was shown by the parents like BCB 38, BCB 23 and BCB 14 but, no cross showed significant negative sca effect. So, this trait was predominantly governed by additive gene action. It also suggests that heterosis breeding approach would not be possible for this trait as no cross found to have significant negative sca effect.

Key words : Combining ability, Brinjal, Fruit and shoot borer resistance

Brinjal shoot and fruit borer (*Leucinodes orbonalis* Guenee) is a serious pest which causes up to 70% yield loss and fruit infestation to the tune of 23% (Nair and Abraham, 1988) by either boring into the young tender shoots or fruits. Breeding for resistance to this pest is difficult because of various limitations such as non availability of resistance source, meagre information on the morphological, biochemical and molecular factors responsible for resistance or tolerance and complex genetic control for the host tolerance. Though, many investigations were done on combining ability and tolerance to shoot and fruit borer infestation on brinjal separately, very few workers had actually tried to combine these experiments in a single experiment. So, in the present study combining ability of tolerance to brinjal shoot and fruit borer infestation was done along with other yield attributes to identify the nature of gene action operative

for these traits.

MATERIALS AND METHODS

Three female (line) and five male parents (tester) for hybridization were selected on the basis of susceptibility towards the infestation of shoot and fruit borer from forty genotypes of brinjal. The three selected female parents were HE 12 (BCB 38), Uttara (BCB 75) and Pusa Purple Cluster (BCB 43) which were relatively tolerant towards infestation and the five male parents viz., Muktakeshi (BCB 14), Bhangar (BCB 15), Nadia Local (BCB 23), Duli (BCB 24) and Makra (BCB 87) were all susceptible one. Crossing was made in line x tester mating design and the hybrids were evaluated for two successive seasons for different yield attributes as well as resistance towards infestation of brinjal fruit and shoot borer and pooled data was taken for combining ability analysis. Field experiment was conducted at Central Research Farm, Gayeshpur, Bidhan Chandra Krishi Viswavidyalaya, lying at 23°N latitude, 89°E longitude and 9.75 m above mean sea level. The layout of the experiment was Randomized Block Design with three replications. Observation on five plants from each replication were recorded on plant height, number of primary branches per plant, days to 50% flowering, fruits per plant, fruit length, fruit girth, fruit weight, fruit yield

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