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Inheritance of fruit yield and its component characters in Okra (*Abelmoschos esculentus* (L.) Monech)

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SUMMARY

Partitioning of the gene effects for plant height, branches per plant, fruits per plant, single fruit weight and fruit yield per plant were done by developing P_1, P_2, F_1, F_2, B_1 and B_2 generations of three crosses of okra viz., Parbhani Kranti; x Arka Anamika, Mohanur Local x Arka Anamika and Mohanur Local x Parbhani KrantiThe scaling and joint scaling tests indicated the presence of non-allelic interaction for yield and its contributing characters in all the three crosses of okra. The dominance (h), additive x additive (i) and dominance x dominance (l) gene effects were important for yield and yield contributing traits in all the three crosses. Duplicate dominant epistasis played an important role in the inheritance of all the characters studied.

Key words: Okra, gene action, allelic interaction, fruit yield.

A working knowledge of the gene action controlling the traits related to fruit desirable, before undertaking characters are desirable, before understanding any major endeavour in okra improvement. Such information is necessary to plan an effective breeding programme. The present study was conducted to partition the gene effects for fruit yield and its components in six generations of three crosses of okra.

MATERIALS AND METHODS

The present investigation was carried out over six generations viz., P_1, P_2, F_1, F_2, B_1 and B_2 generated from three crosses viz., Parbhani Kranti; x Arka Anamika, Mohanurn Local x Arka Anamika and Mohanur Local x Parbhani Kranti. Six generations of each cross were grown in a Randomized Block Design with three replications, at Plant Breeding Farm, Faculty of Agriculture, Annamalai University, Annamalai Nagar during August – November, 2001. The material comprising of P_1, P_2 and F_1 were grown with 2 rows each and of B_1 and B_2 with 5 rows each and of F_2 with 11 rows of 3 m length, having 45 cm and 30 cm spacing between and within rows, respectively for each replication. The joint scaling test as proposed by Cavalli (1952) was applied to test the adequacy of additive-dominance model. The gene effects were estimated following Mather and Jinks, (1971).

RESULTS AND DISCUSSION

The simple additive-dominance model was inadequate in respect of all the evaluated characters, in all the three crosses, revealing the existence of epistasis in the inheritance of the characters studied (Table 1). A perusal of six parameter model indicated that additive effect (d) was significant for all the characters, and in all the crosses, while dominance effect (h) was significant for all the characters in all the crosses except in the cross Mohanur Local x Arka Anamika for the trait single fruit weight. But the magnitude of the (h) effects were greater than the (d) effects in all the three crosses for all the traits studied.

The additive x additive (i) effect was significant for all the traits in all the crosses except in the cross Parbhani Kranti x Arka Anamika for the trait number of branches and in the cross Mohanur Local x Arka Anamika for the trait single fruit weight.

The dominance x dominance (l) effect was significant in all the crosses for the traits number of fruits, single fruit weight and fruit yield per plant. The lesser magnitude of additive x dominance (j) effect than the additive x additive (i) effect indicated that the dominance and dominance x dominance effects were more important in all the three crosses for all the traits studied.

The dominance and dominance x dominance took opposite sign in all the three crosses for all the traits of interest. It indicated the presence of duplicate dominant epistasis in the inheritance of traits investigated. The additive x additive and dominance x dominance took opposite sign, indicating the predominantly dispersed alleles at interacting loci in all three crosses for the yield and yield contributing characters. The presence of duplicate dominant epistasis in the inheritance of the characters studied was earlier reported by Korla and Sharma (1987), Panda and Singh (1999), in okra. When non-additive gene effects are more than additive gene effects, biparental mating or recurrent selection generate more heritable variation. It is therefore, suggested that for simultaneous improvement of fruit yield and its important components, the use of biparental mating may be undertaken, in early segregating generations to break possible linkages.

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