

Studies on Heritability and Genetic advance in Bhendi (*Abelmoschus esculentus* (L) Moench)*

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Heritability and genetic advance were of lower magnitude for all the six characters studied, nearly half of the crosses exhibiting negative estimates. Genetic gain of perceptible magnitude combined with high mean expression has been recorded by the cross AE 712 x 180 for number of branches per plant, AE 593 x 180 for fruit width and AE 719 x 100 for yield of fruits and these crosses would be useful for further selection programmes.

In any crop improvement programme, the magnitude of heritable variability and more particularly its genetic component has a close bearing on selection. Robinson *et al.* (1949) emphasised that heritability of the characters is the main concern to the breeder, since it indicates the possibility and extent to which improvement is possible through selection. It has been suggested by Johnson *et al.* (1955) that heritability together with genetic advance will bring out the advance expected from selection. In bhendi, the heritability and genetic advance were studied in 56 F₂ crosses and the results are reported in this paper.

MATERIAL AND METHODS

Fifty six F₂ crosses resulted by crossing 14 lines and four testers, were raised from the selfed seeds collected from F₁ plants. The experimental lay-

out was a randomized block design with seven replications. A population of 14 plants was maintained in each cross under each replication and thus a total of 98 plants were observed in each cross. Recommended agronomic practices and plant protection measures were adopted to raise a normal crop.

Six characters, namely plant height (cm), Number of branches per plant, Fruit length (cm), Fruit width (cm), Number of fruits per plant and Yield of fruits per plant were observed.

Heritability in the broad sense was computed for each character following the method of Lush (1940). Heritability for each cross was separately calculated following the parent - F₂ method as outlined by Mahimud and Kramer (1951).

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Genetic advance for each character and cross was computed as suggested by Johnson *et al.*, (1955).

RESULTS AND DISCUSSION

The heritability and genetic advance studied for the six characters indicated that the plant height has registered the highest estimates of 25.03 and 33.22 per cent respectively (Table 1). Such a result suggests that in a selection programme, plant height has to be given the top most consideration. Arumugam and Muthukrishnan (1977) have also reported the plant height to be one of the most reliable indices for improving the yield of fruits in bhendi, since it showed high estimates of heritability and genetic advance. A high heritability and genetic advance for plant height suggests that this character is governed by additive genes. Such a view also is shared by Panse (1957). The heritability and genetic advance were of low magnitude in respect of the other characters.

The heritability and genetic advance worked out for each cross following the parent - F₂ method exhibited negative values for most of the crosses. For negative heritability and genetic advance, the role played by the environmental influence may be quite considerable as suggested by Mahmud and Kramer (1951) and Alikhan and Weibel (1969). However, Sivasubramanian (1975) has attributed that the existence of negative values for heritability and genetic advance might be due to sampling error.

Out of 56 crosses, heritability and genetic advance were registered in 22

crosses for plant height, in 26 crosses for number of branches per plant, in 28 crosses for fruit length, in 31 crosses for fruits width, in 27 crosses for number of fruits per plant and in 24 crosses for yield of fruits per plant.

For plant height, the crosses AE 406 X 142 (55.40 per cent) and AE 406X100 (44.80 per cent) recorded the highest estimates of heritability and genetic advance respectively. For number of branches per plant, the highest estimates of heritability (86.62 per cent) and genetic advance (86.28 per cent) were recorded by the crosses AE 981X180 and AE 712X180 respectively. It was the cross AE 593X180 to register the highest values for heritability and genetic advance for fruit length (64.20 and 54.66 per cent) and fruit width (84.86 and 83.25 per cent). The cross AE 800X106 showed the highest estimates of heritability and genetic advance (51.90 and 41.69 per cent) for number of fruits per plant. Regarding yield of fruits, the cross AE 719X100 showed the highest heritability and genetic advance (65.60 and 88.04 per cent.).

The crosses involving the line AE 406 for plant height and number of branches per plant, AE 719 for fruit length, AE 988 for fruit width, AE 722 and AE 800 for number of fruits per plant and AE 719 and AE 722 for yield of fruits per plant, recorded heritability and genetic advance when crossed with all the four testers.

Likewise, the crosses involving the tester AE 100 for fruit length,

AE 142 for plant height and yield of fruits and AE 180 for number of branches and fruit width exhibited heritability and genetic advance with most of the lines.

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TABLE - 1.

Estimates of heritability, genetic advance and genetic advance as per cent mean for over all population in the F2 generation bhendi crosses.

| Characters | Heritability (per cent) | Genetic Advance | Genetic advance as per cent mean |
|------------------------------|-------------------------|-----------------|----------------------------------|
| Plant height | 25.03 | 33.19 | 33.22 |
| Number of branches per plant | 19.14 | 0.54 | 23.84 |
| Fruit length | 8.70 | 1.91 | 12.66 |
| Fruit width | 19.50 | 0.59 | 31.54 |
| Number of fruits per plant | 19.67 | 5.72 | 26.82 |
| Yield of fruits per plant | 3.10 | 14.88 | 3.66 |