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# Selection Criteria in Chilli (*Capsicum annuum* L.)

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The present study was made on a group of 50 varieties of chilli. The different discriminant functions were constructed. The genetic advance over straight selection for yield and different discriminant functions were calculated and the efficiencies over straight selection were compared. The study revealed that number of fruits per plant and number of branches per plant are the important characters that should be taken care for selection in hybridization programme.

Yield is a complex character controlled by polygenes. So selection for yield *per se* has been found to be of little significance. Selection for yield, as emphasized by Grafius (1956) should be based on the other characters which are relatively simply inherited and associated with yield. Smith (1936) initiated the use of discriminant function which could maximise the regression of phenotypic value on the genotypic value of a plant or a progeny or a line. Since then varying degree of success has been achieved by different workers (Simlote (1947) in wheat; Abraham *et al.*, (1954) in rice; Singh and Mehndiratta (1970) in Cowpea; Singh and Singh (1972) in field pea and Jha *et al.*; (1977) in wheat). So the present investigation was made on a group of varieties of chilli to know about the superiority of discriminant function technique, if any, over straight selection, and find the best function which could be used as a scoring index.

## MATERIAL AND METHODS

The data for this study were collected from a field experiment on fifty varieties of chilli conducted at Central Farm, Agricultural College and Research Institute, Madurai during 1974-75 Kharif season. The experiment was conducted in a randomised block design with three replications. Measurements were taken on five plants chosen at random from each plot. Observations on the follawing characters were made. Number of days to flowering ($X_1$), Number of branches per plant ($X_2$). Length of fruit ($X_3$), Number of fruits per plant ($X_4$) and Yield of dry fruits per plant ($X_5$). The mean of five plants per entry was used for further statistical analysis. The different discriminant functions were constructed by including different combination of characters by the methods suggested by Goulden (1959). The expected genetic advance was calculated by using the

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formula $Z/P \sqrt{b_1 g1y + b2\ g2y + \ldots bn\ gny}$ where Z/P is the selection differential in standard units, $b_1, b_2, \ldots bn$ are relative estimated weights and g1y . gny are the genotypic covariances of characters concerned with yield. The relative efficiencies were campared with selection for yield.

## RESULTS AND DISCUSSION

All the possible discriminant functions basad on the above five characters studied, with their relative efficiencies were given in Table. When the characters were considered singly, the maximum genetic gain was observed in the case of number of fruits/plant. The gain over selection on grain yield alone was 5 per cent. Such a superiority of selection index based on single character over straight selection was also observed by Jha *et al.*, (1977) in wheat. Other selection indices based on single character were not better than straight selection for grain yield. Moreover, it was seen that the relative efficiency was very high wherever number of fruits/plant was included in the various combination of characters, suggesting the importance of this character in building up the genetic gain. Whan two characters were inculded, the maximum genetic gain over selection for yield was observed in the case of number of branches and number of fruits/plant. The gain over straight selection was 73 per cent. When three characters were considered together, the maximum genetic gain was found to be for the combination, number of days to flowering, number of branches/plant and number of fruits/plant. A gain of more than 100 per cent over selection for yield

TABLE. Discriminant functions for different character combinations in chilli.

| Discriminant Function | Genetic Advance | Relative efficiency |
|---|---|---|
| 0.00085 $X_1$ | 0.00873 | 12.24 |
| 0.01495 $X_2$ | 0.06986 | 97.27 |
| 0.01579 $X_3$ | 0.04100 | 57.09 |
| 0.01187 $X_4$ | 0.07542 | 105.02 |
| 0.00174 $X_5$ | 0.07182 | 100.00 |
| 0.00076 $X_1$ + 0.01835 $X_2$ | 0.08734 | 121.62 |
| 0.00088 $X_1$ + 0.01561 $X_3$ | 0.04134 | 57.57 |
| 0.00067 $X_1$ + 0.01459 $X_4$ | 0.09432 | 131.33 |
| 0.01150 $X_2$ + 0.07315 $X_3$ | 0.11815 | 164.53 |
| 0.01593 $X_2$ + 0.01201 $X_4$ | 0.09025 | 125.67 |
| 0.01501 $X_2$ + 0.01194 $X_4$ | 0.12402 | 172.69 |
| 0.01546 $X_1$ + 0.01668 $X_2$ + 0.01190 $X_4$ | 0.13800 | 192.16 |
| 0.00086 $X_1$ + 0.01722 $X_2$ + 0.01386 $X_4$ | 0.14541 | 202.46 |
| 0.00143 $X_1$ + 0.01863 $X_2$ + 0.01568 $X_3$ | 0.10314 | 143.61 |
| 0.00119 $X_1$ + 0.01517 $X_2$ + 0.01459 $X_4$ | 0.10665 | 148.50 |
| 0.00047 $X_1$ + 0.01710 $X_2$ + 0.01530 $X_3$ | | |
| + 0.01520 $X_4$ | 0.16027 | 223.17 |

was observed in this case. When all the characters were considered a gain about 123 per cent straight selection was observed. In practice, however, the plant breeder might be interested in maximum genetic gain with minimum of characters. In such a case, number of fruits per plant and number of branches are the characters that should be taken care of for selection in hybridization programmes. Thus, our study reveals that the discriminant function method of making selection in plants appears more useful *vis-a-vis* straight selection in chilli.

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