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Discriminant Function in Chilli (*Capsicum annuum* L.)

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The different discriminant functions were calculated in 45 strains of chillies grown in the year 1972. The genetic advance cover straight selection for yield and discriminant functions were calculated and efficiency over straight selection worked out. The discriminant function based on single character was less efficient. The best selection index was obtained when based on the seven characters. The comparision of different discriminant functions revealed that number of branches and fruit thickness are major yield components in chillies.

Chillies occupy a formost position among the spices and play a major role in the diet of majority of people as a condiment. In pedigree breeding programmes, selection of superior genotypes is based on phenotypic appearence which is subject to variation due to fluctuating environmental factors. Yield is a complex character controlled by polygenes. Grafius (1959) has emphasized that selection for yield should be based on the characters which are relatively simple in inheritance and associated with yield. Smith (1936) reported that in making selection for a complex character like yield, difference due to genotype are very largely masked by the non-heritable variation such as soil, climate and location. He suggested the use of the disriminant function in breeding programme for maximising the regression of phenotypic value of a plant or a progeny or line. Therefore the present study was undertaken to evaluate discriminant function technique *vis-a-vis* straight selection and to find out the best function which could serve as a selection index.

MATERIALS AND METHODS

The present study was conducted on 45 strains of chilli (*Capsicum annuum* L.) at U. P. Institute of Agricultural Sciences (Vegetable section) Kalianpur, Kanpur. The strains were grown during the year 1972 in complete randomised block design with three replications. Each plot consisted of single row of five meter length. Inter and intra row spacing were maintained at 50 and 50 cm. Observations were recorded on ten randomly selected plants in each plot on the following characters: Plant height (x_1) number of branches (x_2), days to flower (x_3), days for maturity (x_4), fruit length (x_5). Fruit size (thickness) (x_6), number of fruits per plant (x_7) and fresh yield of ripened fruits (x_8).

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The means of 10 plants per entry were used for further statistical analysis. The different discriminant functions were constructed by the method suggested by Goulden (1959). The genetic advance for these sets were calculated and their relative efficiencies compared with that obtained under straight selection for yield.

RESULTS AND DISCUSSION

Different discriminant functions, their expected genetic advances and relative efficiency in per cent of each function over straight selection are given in Table. No clear cut information on efficiency could be obtained when two characters were included in discriminant function. It was found that function based on number of branches and fruit size was more efficient (the efficiency being 88.91 per cent). It was further noted that functions like fruit number per plant and fruit length were less efficient than straight for yield. The functions based on all

TABLE. Discriminant function genetic advance and relative efficiencies on different characters in chillies

Discriminant function	Genetic advance through straight selection (s)	Genetic advance through discriminant function (D)	Relative efficiency in percentage as compared to straight selection
$Y=0.000\ x_8$	268.680		
$Y=13.841\ x_2$		178.295	66.35
$Y=5.941\ x_3$		198.210	73.77
$Y=3.163\ x_4$		76.879	28.61
$Y=8.800\ x_5$		51.888	19.31
$Y=9.168\ x_6$		171.336	63.73
$Y=0.031\ x_7$		14.497	5.39
$Y=8.268\ x_2+4.369\ x_3$		218.813	81.44
$Y=13.200\ x_2+1.934\ x_4$		184.203	68.55
$Y=14.473\ x_2+3.537\ x_5$		179.327	66.74
$Y=12.955\ x_2+8.529\ x_6$		238.884	88.91
$Y=14.255\ x_2+(-0.085)\ x_7$		182.511	69.04
$Y=5.724\ x_3+1.976\ x_4$		203.816	75.85
$Y=6.860\ x_3+10.471\ x_5$		205.328	76.42
$Y=5.126\ x_3+7.359\ x_6$		239.715	89.21
$Y=6.112\ x_3+0.059\ x_7$		200.036	74.45
$Y=3.152\ x_4+(-8.730)\ x_5$		92.522	34.43
$Y=2.881\ x_4+9.015\ x_6$		185.069	68.88
$Y=3.187\ x_4+(-0.036)\ x_7$		78.749	29.30
$Y=2.982\ x_5+8.975\ x_6$		172.198	64.09
$Y=-8.824\ x_5+(0.033)\ x_7$		54.107	20.13
$Y=9.188\ x_6+0.007\ x_7$		171.375	80.81
$Y=2.342\ x_1+8.974\ x_2+4.620\ x_3+0.577\ x_4+16.732\ x_5+8.292\ x_6+0.015\ x_7$		284.792	105.99

the seven characters at a time, namely plant height, number of branches, days to maturity, fruit length, fruit size and fruit number per plant were more efficient (105.99 per cent) than staight selection for yield. Thus, it may be inferred from the present study that maximum gain can be achieved by making selection on the basis of number of fruit per plant. The discriminant function method of making selection in plants appears to be more rational as the function shows the extent by which each character is genetically related to yield.

Abraham *et al* (1954) in rice, Malhotra (1973) in soybean, Murthy and Pavate (1962) in tobacco and Shukla and Singh (1967) in jute have emphasized the importance of selection indices over straight selection in different crops. Similarly the results of present investigation also indicate the superiority of selection indices over direct selection for yield in chilli.

On the basis of results of the present investigation, it is suggested that plant height number of branches, days of flower, days to maturity, fruit length, fruit size and fruit number per plant are the characters on which selection may be based to evolve high yielding lines in chillies.

REFERENCES

ABRAHAM, T. P., W. T. BULANY and R. L. M. GHOSH. 1954. Discriminant function in rice. *Indian J. Genet.* **14** : 51-53.

GOULDEN, G. H. 1959. Methods of statistical analysis. John, Willey, and sons Inc. New York.

GRAFIUS, J. E. 1959. Heterosis in barley. *Agron. J.* **51** : 551-54.

MALHOTRA, R. S. 1973. Genetic variability and discriminant function in Soybeans. *Glycine max.* (L) Merrill. *Madras agric. J.* **60**: 225-28.

MURTHY, G. S. and M. V. PAVATE. 1962. Studies on quantitative inehritance in N. tabacum L. I varietal classification and selection by multivariate analysis. *Indian J. Genet.* **22** : 68-80.

SHKULA, K. G. and D. P. SINGH. 1967. Studies on heritability correlation and discriminant function selection in Jute. *Indian J. Genet.* **27** : 220-25.

SMITH, H. F. 1936. A discriminant function for plant selection. *Ann. Eng.* **7** : 240-50.