SELECTION CRITERIA FOR SEED YIELD IN BRASSICA CAMPESTRIS L.

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The yield potential of oleiferous Brassica particularly Yellow Sarson has remained unrealized, as little work has been done on breeding for high yielding varieties. But there seems to be ample scope for the breeding, as is evident from the yield levels attained in the All-India Coordinated Research Project on Oilseeds. The emphasis in recent years, therefore, has been to develop strains with high yielding ability which may respond to improved agronomic practices. To achieve this programme a knowledge of genetic association among components of economic value and between these and other traits is necessary. The yield components have effects on seed yield directly and indirectly through one another. In the present study, an attempt was made to utilize the biometrical techniques like correlations (both genetic and phenotypic) and the path analysis as an aid for selection for seed yield in Brassica campestris L. var. Sarson Prain where such information is limited (Ramanujam and Rai 1963, Singh and Singh, 1974).

MATERIALS AND METHODS

The material for the present study comprised 20 elite strains of Yellow Sarson obtained from different research centres under the All-India Coordinated Research Project on Oilseeds. They were sown in the field during the autumn of 1973 at the Dry Farming Research Centre of this University at Bawal in a randomized block design with three replications. In each replication, a plot was represented by 7 rows of 6 m length. Each row was spaced 30 cm. apart with a plant to plant distance of 15 cm. The entire crop was raised under rain-fed conditions. Ten plants from each culture were selected at random and tagged. Observations on days to 50% flowering, maturation days, plant height (cm), length of the mainshoot (cm), number of primary branches, number of siliqua on the mainshoot, length of siliqua (cm) and number of seeds per siliqua were made. The seed yield (gm) was recorded on plot basis after eliminating the border-row plants from each replication. Plot means were used for statistical analysis.

Correlation coefficients and path coefficient were worked out between characters under study. The procedure given by Panse and Sukhatme (1961) was followed for calculating genotypic correlation coefficients and path coefficients following Dewey and Lu (1959).

RESULTS AND DISCUSSION

Data in respect of genetic correlations and path analysis are presented

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in Fig. 1. The number of siliqua on the mainshoot showed a strong positive genetic correlation with seed yield (0.98) followed by the number of seeds per siliqua (0.90) and maturation days (0.79). Positive correlations between the seed yield and plant height (0.44), the height of the mainshoot (0.39) and the number of primary branches (0.24) were also observed. These positive correlations suggest that the aforesaid plant attributes, particularly the number of siliqua on the mainshoot, the number of seeds per siliqua, maturation days and plant height are very important for the improvement of the seed yield of Yellow Sarson. These findings are in accord with earlier observations of Ramanujam and Rai (1963) and Singh and Singh (1974) on Yellow Sarson.

The genetic correlation was partitioned into direct and indirect effects. Seed yield was considered as a resultant variable while the other plant attributes as causal variables. As is evident from Fig. 1., the number of siliqua on the mainshoot and the plant height had a high direct influence on seed yield, as has been found from the genetic correlations also. On the other hand, with some other plant attributes the path analysis gave a somewhat different picture. For example, a strong positive correlation between the number of seeds per siliqua and seed yield (0.90) and maturation days and seed yield (0.79), gave a misleading impression that the aforesaid characters were important in influencing the seed yield. The path analysis exposed that these characters had a negligible direct influence on seed yield but had indirect influence through plant height. The apparent contradiction is due to the fact that the correlation coefficient simply measures mutual association without taking causation into account whereas the path analysis specifies the causes and measures their relative importance thereby giving a true picture of genetic association.

The number of seeds per siliqua and plant height were demonstrated to be the most important component determining the seed yield in Yellow Sarson, followed by the number of primary branches which influenced the seed yield both directly and indirectly through the number of siliqua on the mainshoot.

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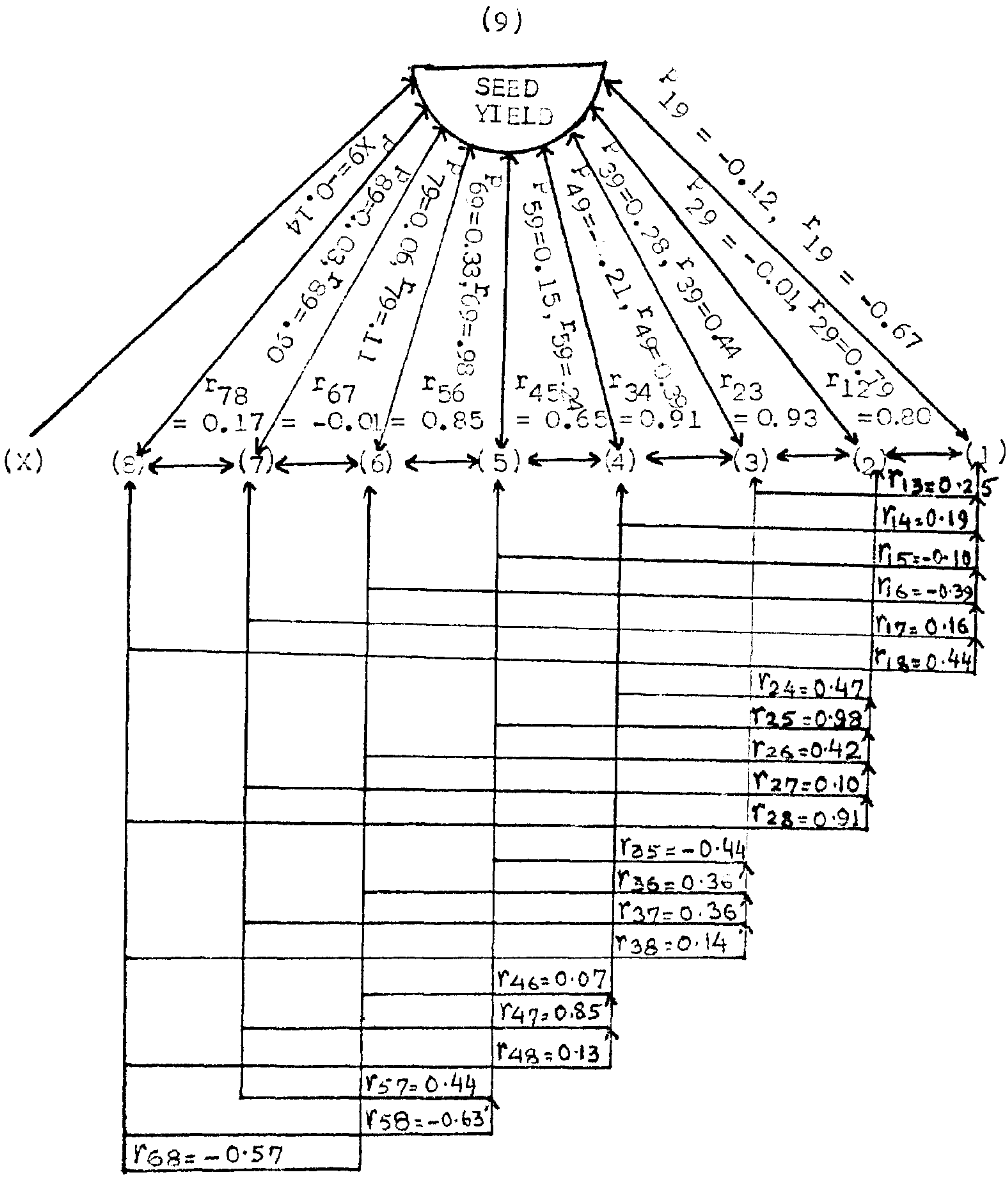

CHARACTERS

(1) Days to 50% Flowering
(2) Days to maturity
(3) Plant height
(4) Height of mainshoot
(5) Primary branches
(6) Siliqua on mainshoot
(7) Length of siliqua
(8) Seeds per siliqua
(X) Residual factors

FIG. 1.

PATH DIAGRAM OF SEED YIELD AND ITS COMPONENTS IN YELLOW SARSON