GAU Res. J. 1992, 18 (1) : 31-34

# Correlation and Path Analysis in Sesamum*

H. K. Vadhvani**, M. U. Kukadia and V. L. Parmar
College Farm, Gujarat Agricultural University, Navsari-396 450

**ABSTRACT**

**Fifteen parents and their twenty-six hybrids of sesamum were evaluated for correlation and path studies involving ten metric characters. The genotypic correlations with yield were found to be significant for number of capsules/plant, days to flowering and number of branches/plant. Oil content was negative and significantly associated with yield. Capsule number had maximum direct effect towards yield alongwith its considerable indirect effect.**

*(Received on 11th Febru., 1991)*

## INTRODUCTION

Among five major oil seed crops grown in India *viz.*, groundnut, sesamum, castor, repeseed, mustard and linseed, sesamum stands next to groundnut so far production of edible oil is concerned. An efficient breeding programme is dependent on the proper selection of the parents as well as component character of grain yield. A knowledge of the association of various quantitative characters and the direct and indirect effects of yield components on grain yield would be of immense help to the breeders. Hence, a study was conducted to find-out the correlation mechanism and cause-effect relation in fifteen parents and their twenty six hybrids.

## MATERIALS AND METHODS

The experimental material consisting of fortyone genotypes (fifteen parents and twentysix hybrids) was grown at College Farm, N. M. College of Agriculture, Gujarat Agril. University, Navsari in a randomized block design with three replications during the summer season of the year 1988. Each entry was represented by one row of 5 m length planted at a row to row distance of 45 cm. Intra-row spacing was maintained 15 cm. after thinning. All the agronomic and plant protection measures were timely taken-up for successful raising of the crop. Observations were recorded on seed yield/plant ($X_1$), days to flowering ($X_2$), plant height ($X_3$), number of branches/plant ($x_4$), number of capsules/plant ($X_5$), capsule length ($X_6$), number of seeds per capsule ($X_7$), days to maturity ($X_8$), 1000 seed weight ($X_9$) and oil percentage ($X_{10}$). Path analysis was carried out following the method suggsted by Dewey and Lu (1959).

## RESULTS AND DISCUSSION

### Correlation

The genotypic correlation co-efficients among the different plant characters under study are presented in Table 1. The genotypic correlations with yield were observed to be significant with number of capsules/plant, days to flowering and number of branches/plant

* Part of M.Sc. (Agri.) thesis submitted by senior author to GAU.
**Agricultural Officer, Agricultural Research Station, GAU, Kothara -370 645.

*TABLE 1*

**The estimates of genotypic correlation co-efficients of different traits.**

| *Characters* | $X_2$ | $X_3$ | $X_4$ | $X_5$ | $X_6$ | $X_7$ | $X_8$ | $X_9$ | $X_{10}$ |
|---|---|---|---|---|---|---|---|---|---|
| $X_1$ | -0.4505** | -0.0372 | 0.5471** | 0.8192** | 0.1737 | 0.2559 | -0.2793 | 0.2768 | 0.2682 |
| $X_2$ | | 0.0104 | -0.7074** | -0.4492** | -0.2472 | -0.1883 | 0.1914 | -0.2677 | -0.2581 |
| $X_3$ | | | -0.0104 | 0.1286 | 0.3123* | 0.2287 | 0.2778 | -0.1272 | -0.2208 |
| $X_4$ | | | | 0.4268** | 0.0471 | 0.0446 | -0.2857 | 0.3453* | 0.2398 |
| $X_5$ | | | | | 0.2183 | 0.2074 | -0.3112* | 0.0030 | 0.1209 |
| $X_6$ | | | | | | 0.8595** | -0.1721 | 0.0537 | 0.2228 |
| $X_7$ | | | | | | | -0.2762 | 0.1076 | 0.2166 |
| $X_8$ | | | | | | | | -0.0195 | -0.0864 |
| $X_9$ | | | | | | | | | 0.2486 |

** Significant at 0.05

* Significant at 0.01

$X_1$ = Seed yield/pant, $X_2$ = days to flowering, $X_3$ = plant height, $X_4$ = number of branches/plant, $X_5$ = number of capsules / plant, $X_6$ = Capsule length, $X_7$ = number of seed/ capsule, $X_8$ = days to maturity, $X_9$ = 1000 - seed weight and $X_{10}$= oil percentage.

TABLE 2

**Partition of genotypic correlation in to direct (Diagonal) and indirect effect in sesamum.**

| | *Effect through* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | *Days to flower-ing* | *Plant height* | *Number of bra-nches/plants* | *Number of cap-sules/plants* | *Capsule length* | *Number of seeds /capsule* | *Days to maturity* | *1000 seed weight* | *Oil percen-tage.* | *Correla-tion with yield.* |
| Days to flowering | 0.0806 | -0.0013 | -0.1511 | -0.3502 | 0.0558 | -0.0583 | 0,0363 | -0.0458 | -0.0165 | -0.04505 |
| Plant height | 0.0008 | -0.1211 | -0.0022 | -0.1003 | -0.0705 | 0.0708 | 0.0205 | -0.0218 | 0.0141 | 0.0372 |
| Number of branches/plant | -0.0570 | 0.0013 | 0.2136 | 0.3327 | -0.0106 | 0.0138 | -0.0211 | 0.0591 | 0.0153 | 0.5471 |
| Number of capsules/plant | -0.0362 | -0.056 | 0.0912 | 0.7796 | -0.0493 | 0.0642 | -0.0230 | 0.0005 | 0.0077 | 0.8192 |
| Capsule length | -0.0199 | -0.038 | 0.0101 | 0.1702 | -0.2257 | 0.2662 | -0.0127 | 0.0092 | 0.0142 | 0.1737 |
| Number of seed/capsule | -0.0152 | -0.0277 | 0.0095 | 0.1617 | -0.1940 | 0.3097 | -0.0204 | 0.0184 | 0.0138 | 0.2559 |
| Days to maturity | 0.0396 | -0.0336 | -0.0610 | -0.2426 | 0.0388 | -0.0855 | 0.0740 | -0.0033 | -0.0055 | -0.2793 |
| 1000-seed weight | -0.0216 | 0.0154 | 0.0739 | 0.0023 | -0.0121 | 0.0333 | -0.0014 | 0.1712 | 0.0159 | 0.2768 |
| Oil percentage | -0.0208 | 0.0267 | 0.0512 | 0.0943 | -0.0503 | -0.0671 | -0.0064 | 0.0426 | 0.0639 | 0.2682 |

R=0.1396

indicating inherent associations with yield. Sanjeevaiah and Joshi (1975), also reported similar findings. The correlation co-efficients between length of capsule and most of other traits (including seed yield) were positive, though significant. Oil content, another character of direct economic importance, was found associated negatively and significantly with seed yield which suggested that high-yielding varieties possessing high oil content might not be possible.

**Path analysis**

Path analysis (Table 2) revealed that most of the characters had direct effect even more than respective correlation with yield. Capsule number had maximum direct effect for higher seed yield. Further, it is significant that almost all the components contributed towards yield through this character. Palaniswamy *et al.* (1978) and Yadav *et al.* (1980) however reported this character contributing much less towards yield. Highest negative direct effect on yield was shown by oil content. Similar picture is true with respect to its correlation with seed yield also.

Yield being a complex entity, is influenced by several components and selection based primarily on simple correlations without considering cause and effect relationship can be misleading. For instance, in the present investigation 1000-seed weight had significant correlation with seed yield but path analysis revealed negative direct contribution.

This seems to be due to its indirect influence via plant height and oil content. In addition to showing maximum negative association with yield, days to maturity contributed much less and its indirect effect through other components were also negative or very negligible. Conversely, days to flower had considerable direct effect and its corrlation with yield was also negative and significant.

## REFERENCES

Deway, D. R. and K. H. Lu (1959). A correlation and path analysis of components of crested wheat seed production. *Agron. J.* **51** : 515-8.

Palaniswamy, K. M. , Govinda Dass, G. and Subramaniam, A. S. (1978). Correlations and path analysis of yield and yield components in sesamum. *Indian J. Agric. Sci.* **48** : 681-3.

Sanjeevaiah, B. S. and M. S. Joshi (1975). Correlation and genetic variability in sesamum. *Current Res.* **11** : 144-45.

Yadava, T. P. Prakashkumar and A. K. Yadav (1980). Association of yield and its components in sesamum. *Indian J. Agric. Sci.* **50** (4) ; 317-19.