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Correlation and Path Analyses over Environments in Sesamum (*Sesamum indicum* L.)

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ABSTRACT

Correlation and path coefficient analyses were carried out using 10 genotypes of sesamum in 6 environments. Plant height, number of capsules per plant, number of seeds per capsule, 1000 seed weight and harvest index were positively correlated with seed yield over environments. The positive correlation of number of capsules per plant, number of seeds per capsule and 1000 seed weight with seed yield and among themselves was observed suggesting that these are the major yield contributing traits. Path coefficient analysis also showed direct positive contribution of number of primaries, number of secondaries, number of capsules per plant, number of seeds per capsule, 1000 seed weight on seed yield. These traits deserve special emphasis in selection while selecting for improvement in seed yield of sesamum

Key words : Correlation, Path Analysis, Sesamum

. Sesame (*Sesamum indicum* L.) is an important ancient oil seed crop cultivated extensively in India, after groundnut, mustard and rape seed. An efficient breeding programme is dependent on the proper selection of the parents as well as component characters of grain yield. A knowledge on 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 (Sarvaiya *et al*., 1982). Therefore in the present study the association between yield and its component characters through correlations and the magnitude of direct and indirect effects of component characters on yield through path analysis were estimated in fourteen environments.

MATERIAL AND METHODS

Ten genotypes were grown during *kharif* 2006 (3 dates of sowing) and *rabi* 2006 (3 dates of sowing) thus providing 6 environments for study in Agricultural College Farm, Bapatla. The experimental material was grown in randomized block design with 3 replications of 2 m long plots of 3 rows was used with 30 cm x 10 cm spacing. Data were recorded on 12 characters *viz.,* number of primaries, number of secondaries, plant height, days to 50% flowering, number of capsules per plant, days to maturity, number of seeds per capsule, 1000 seed weight, harvest index, oil content, seed yield per plant and seed yield per plot. The means of the data were utilized for statistical analysis of correlations (Falconer, 1964) and path analysis (Dewey and Lu, 1959).

RESULTS AND DISCUSSION

The trait, yield per plant, showed positive association in most of the environments with the characters, *i.e.,* plant height (r_g= 0.504), number of capsules per plant (r_g= 0.895, r_p= 0.900), number of seeds per capsule (r_g= 0.738, r_p= 0.778), harvest index (r_g= 0.938, r_p= 0.926) and oil content(r_g= 0.562, r_p= 0.434) in environment I; number of secondaries (r_g= 0.765, r_p= 0.769), number of capsules per plant (r_g= 0.908, r_p= 0.910), number of seeds per capsule (r_g= 0.756, r_p= 0.772), 1000-seed weight (r_g= 0.616, r_p= 0.604) and harvest index(r_g= 0.981r_p= 0.960) in environment II; number of primaries (r_g= 0.572, r_p= 0.636), number of secondaries (r_g= 0.627, r_p= 0.657), plant height (r_g= 0.402, r_p= 0.555), number of capsules per plant (r_g= 0.721, r_p= 0.752), number of seeds per capsules (r_g= 0.723, r_p= 0.703), 1000-seed weight (r_g= 0.757, r_p= 0.753) and harvest index (r_g= 0.949, r_p= 0.939) in environment III; number of secondaries (r_g= 0.605, r_p= 0.649), plant height (r_g= 0.851, r_p= 0.592), number of capsules per plant (r_g= 0.809, r_p= 0.832), number of seeds per capsule (r_g= 0.782, r_p= 0.796), 1000-seed weight (r_g= 0.711, r_p= 0.757) and harvest index (r_g= 0.989, r_p= 0.976) in environment IV; number of capsules per plant (r_g= 0.893, r_p= 0.904), number of seeds per capsule (r_g= 0.640, r_p= 0.679), 1000 seed weight (r_g= 0.882, r_p= 0.866), harvest index (r_g= 1.000, r_p= 0.987) and oil content (r_g= 0.455, r_p= 0.389) in environment V; number of secondaries (r_g= 0.714, r_p= 0.728), plant height (r_g= 0.521, r_p= 0.563), number of capsules per plant (r_g= 0.805, r_p= 0.796), number of seeds per capsule

(r_g= 0.757, r_p= 0.751), 1000 seed weight (r_g= 0.716, r_p= 0.757), harvest index (r_g= 0.989, r_p= 0.973) and oil content (r_g= 0.468, r_p= 0.396) in environment VI.

This type of positive association between yield and its components is highly desirable and selection for number of capsules per plant, number of seeds per capsule,1000 seed weight and seed yield per plant would be useful in getting simultaneous improvement of these traits including yield. The results obtained in the present study are in conformity with Alam *et al*. (1999), Rami Reddy and Sundaram (2002), Ratnababu *et al*. (2004) and Thiyagu *et al*. (2007). Seed yield per plant showed negative significant association with days to maturity in all the environments with the values r_g= -0.655, r_p= -0.563 in environment I; r_g= -0.774, r_p= -0.709 in environment II; r_g= -0.639, r_p= -0.456 in environment III; r_g= -0.775, r_p= -0.662 in environment IV; r_g= -0.767, r_p= -0.703 in environment V; and r_g= -0.884, r_p= -0.732 in environment VI.

Path analyses revealed that the following characters exhibited predominant positive direct effect on yield per plant both at phenotypic and genotypic levels in most of the environments, *i.e*., number of primaries in III (0.2506p, 0.6834g) and VI (0.0753p, 0.0688g) (Ashokavardhan Reddy, 2001); number of secondaries in II (0.0109p, 0.0927g) and III (0.1532p, 0.4530g) (Ashokavardhan Reddy, 2001); number of capsules per plant in II (0.7074p, 0.2695g); III (0.0904p, 0.8765g);IV (0.3426p, 0.5127g); V (0.3654p, 0.8771g) and VI (0.2709p, 0.2855g) (Ratnababu *et al*., 2004 and Thiyagu *et al.,* 2007); number of seeds per capsule in II (0.2975p, 0.1126g); IV (0.4428p, 0.7184g); V (0.1117 p, 0.4949g) and VI (0.2999p, 0.2342g) (Alam *et al.,* 1999), 1000 seed weight in II (0.1627p, 0.216g); IV (0.2307p, 0.3968g); V (0.1379p, 0.4978g) and VI (0.2934p, 0.2081g) (Ratna babu *et al.,* 2004) coupled with high positive correlation with yield indicating suitability of these traits for selection in improving the yield. Hence greater emphasis may be placed on these traits during selection for yield improvement. The residual effects are minimum in the environments, *i.e.,* 0.0658 (p) and 0.1805 (g) for environment I, 0.0733 (p) and SQRT (1-1.0003) (g) for environment II, 0.1885 (p) and SQRT (1-1.0767) (g) for environment III, 0.0446 (p) and SQRT (1-1.0005) (g) for environment IV, 0.1111 (p) and 0.1104 (g) for environment V and 0.0772 (p) and 0.0182 (g) for environment VI.

The other traits showed positive and negative direct effects even through the correlation was positive in all environments. Consequently care has to be taken in effecting selection by maintaining balance among these traits so that genotypes with more desirable attributes can be developed.

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