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ASSOCIATION AMONG AGRONOMICAL AND QUALITY TRAITS IN LINSEED (*Linum usitatissimum* L.)

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The correlation coefficient and path coefficients were assessed from 50 varieties of linseed. The varieties showed highly significant differences for all the characters studied. The analyses revealed that biological yield, harvest index and number of capsules/plant had maximum contribution towards seed yield/plant.

An understanding of the nature and the magnitude of character association is desirable to achieve rational improvement in complex character like yield. Although the knowledge of the correlation plays a very important role in guiding selection strategy it becomes very ambiguous, if number of variables are more. In such situation it is essential to partition the correlation coefficients into components of direct and indirect effects in order to provide the relative importance of causal factors.

MATERIAL AND METHODS

The experimental material consisting 50 lines of diverse origin was sown on 17th October, 1980 in randomised block design with three replications in the CSAU of Agric. & Tech. Kanpur. Each line was sown in a single row of 3.0m long. The spacing adopted was 0.4m. between rows and 0.1m. within row. Recommended cultural practices were followed Observations were recorded on twelve important yield and quality component viz., days to first flower, plant height (in cm), number of tillers/plant, number of primary branches/plant, number of capsules/plant, biological yield (in g), number of seeds/capsule, seed yield/plant (in g), 1000 seed weight (in g.), harvest index (%), oil content (%) and iodine value. Path coefficient analysis was adopted as suggested by Dewey and Lu (1959).

RESULTS AND DISCUSSION

The analyses of variance revealed that the differences between the genotypes were highly significant for all the twelve characters under study indicating need for further genetic analyses. To determine the nature and magnitude of correlations, all possible genotypic and phenotypic correlations among the

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twelve characters were worked out and results are tabulated in table-1.

Seed yield/plant had strong positive association with number of primary branches/plant, number of capsules/plant, biological yield, number of seeds/capsule and harvest index at both the levels but number of tillers/plant showed significant positive association with yield only at genotypic level. Number of tillers/plant had high positive association with number of capsules/plant but had negative carrelation with 1000 seed weight at phenotypic and genotypic level. Numb-r of primary branches/plant showed strong positive association with number of capsules/plant. The number of capsules/plant showed significant positive association with biological yield, seeds/capsule and harvest index and negative association with 1000 seed weight. The seeds/capsule had positive association with biological yield and significant negative association with 1000 seed weight. Days to first flower had significant positive correlation with plant height, number of tillers plant, number of capsules/plant, biological yield and number of seeds/capsule but negatively correlated with 1000 seed weight. Plant height had significant positive correlation with biological yield and seeds/capsule but negatively associated with harvest index. These finding are in agreement with Singh (1980) and Patil *et. al.* (1980) except the association of biological yield and harvest index with seed yield/plant, days to first flower, plant height, tillers plant, primary branches/plant, capsules plant, seeds/capsule, 1000 seed weight oil content and iodine value.

The association between yield and its components revealed that the simultaneous improvement of yield and its components is not difficult and a suitable plant should be characterised by more number of tillers, more no. of primary branches, more number of capsules, more seeds/ capsule, high biological yield and high harvest index along with smaller seed size. The selection can be made on the basis of these different attributes.

1000 seed weight had strong positive correlation with oil content and negative correlations with iodine value. Oil content had strong negative association with the iodine value. These findings are in agreement with of Chu and Culbertson (1951). Biological yield and harvest index had high positive direct effects (0.7824 and 0.6756 respectively) on seed yield/plant which resulted in high positive association with the same (Table-2). Positive direct effect (0.0564) of number of capsules/plant on seed yield/plant and indirect high positive effects via biological yield (0.4293) and harvest index (0.3553) resulted in high positive association between number of capsules/plant and seed yield/plant. Number of seeds/capsule had high positive association with seed yield/plant. This is due to high positive indirect effect via biological yield (0.5338). Plant height and days to first flower had weak association with seed yield/plant and this may be due to the fact that negative direct effect of plant height and days to first flower as well as nagative indirect effect via harvest index (-0.2385) was reduced

by positive indirect effect mainly by biological yield. The direct effect of 1000 seed weight, oil content and iodine value on seed yield/plant were positive, though very low.

Path coefficient analyses revealed that the characters viz., biological yield, harvest index and capsules/plant appear to be the most valuable characters for selecting genotype for further breeding programme in linseed crop.

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Table 1 Phenotypic and genotypic correlation coefficients between different character combinations in linseed.

Characters	Days to first flower	Plant height	Tillers/ Plant	Primary branches/ plant	Capsules/ plant	Biological yield	Seed/ capsule	1000 seed weight	Harvest index (%)	Oil content (%)	Iodine value
Seed yield/ plant	NS	NS	NS	**	**	**	**	NS	**	NS	NS
	NS	NS	*	**	**	**	**	NS	**	NS	NS
Day to first flower		**	**	NS	NS	**	**	**	NS	NS	NS
		**	**	NS	NS	**	**	**	NS	NS	NS
Plant height			NS	NS	NS	**	**	NS	*	NS	NS
			NS	NS	NS	**	**	NS	*	NS	NS
Tillers/plant				NS	**	NS	NS	**	NS	NS	NS
				**	**	NS	NS	**	NS	NS	NS
Primary branches/ plant					**	NS	NS	NS	NS	NS	NS
					**	NS	NS	NS	NS	NS	NS
Capsules/plant						**	**	**	**	NS	NS
						**	**	**	**	NS	NS
Biological yield							**	SN	NS	NS	NS
								NS	SN	NS	NS
Seeds/Capsule								**	SN	NS	NS
									NS	NS	NS
1000 seed weight									NS	**	**
									NS	**	**
Harvest index (%)										NS	NS
										NS	NS
Oil content (%)											**
											**

NS—Not significant *—significant at 5% **—significant at 1% (—) Indicates negative relationship Values in upper row phenotypic and those in lower row genotypic correlation.

Table 2 Direct (diagonal) and indirect effects of characters on seed yield/plant in linseed.

Characters	Days to first flower	Plant height	Tillers/ plant	Primary branches/ plant	Capsule/ plant	Biological yield	Seeds/ capsule	1000 seed capsule	Harvest index (%)	Oil content (%)	Iodine value	Genotypic correlation with seed/ yield/plant
Days to first flower	*—0 024*	—0 019	0.014	—0.008	0.021	0.452	—0,037	0,002	—0.169	—0.011	0,002	0,132
Plant height	—0,015	*—0.142*	0,000	0,007	0.005	0.488	—0.046	0,001	—0,231	—0.005	0,001	0,056
Tillers/plant	—0.010	—0.000	*0.033*	—0.306	0.029	0,198	—0,017	0,002	0,079	—0,002	—0,030	0,282*
Primary branches/plant	—0.004	0.023	0.023	*—0 044*	0,025	0,196	0,026	0,000	0.183	0.010	0,013	0,416**
Capsules/plant	—0.009	—0,014	0.017	—0,020	*0,356*	0,429	—0,038	0,003	0,355	—0,065	0,000	0,775**
Biologicalyield	—0,014	—0,088	0.008	—[illegible]11	0,309	*0,782*	—0 051	0,001	—0,018	—0,001	0,000	0,638
Seed/capsule	—0,012	—0,068	0,007	0.001	0.028	0,533	*—0 075*	0.002	0,060	0.008	0,000	0,451**
100 seed wt.	0.010	0,024	0,015	0.005	—0,023	0,196	0.032	*0 006*	0.035	0.022	—0,004	—0,108
Harvest index (%)	0.006	0,050	0.004	0.012	0,029	—0,021	—0,006	—0,000	*0.675*	0 005	—0,001	0,730**
Oil contant (%)	0.006	0,017	—0.001	—0,009	—0,008	—0.022	0.013	—0,003	0.086	*0,045*	—0,005	0,118
Iodine value	—0,006	—0,018	—0.019	0.006	0,004	0.008	—0,005	0,003	—0,131	0 029	*0 091*	—0,155

* and ** significant at 5% and 1% level of significant.