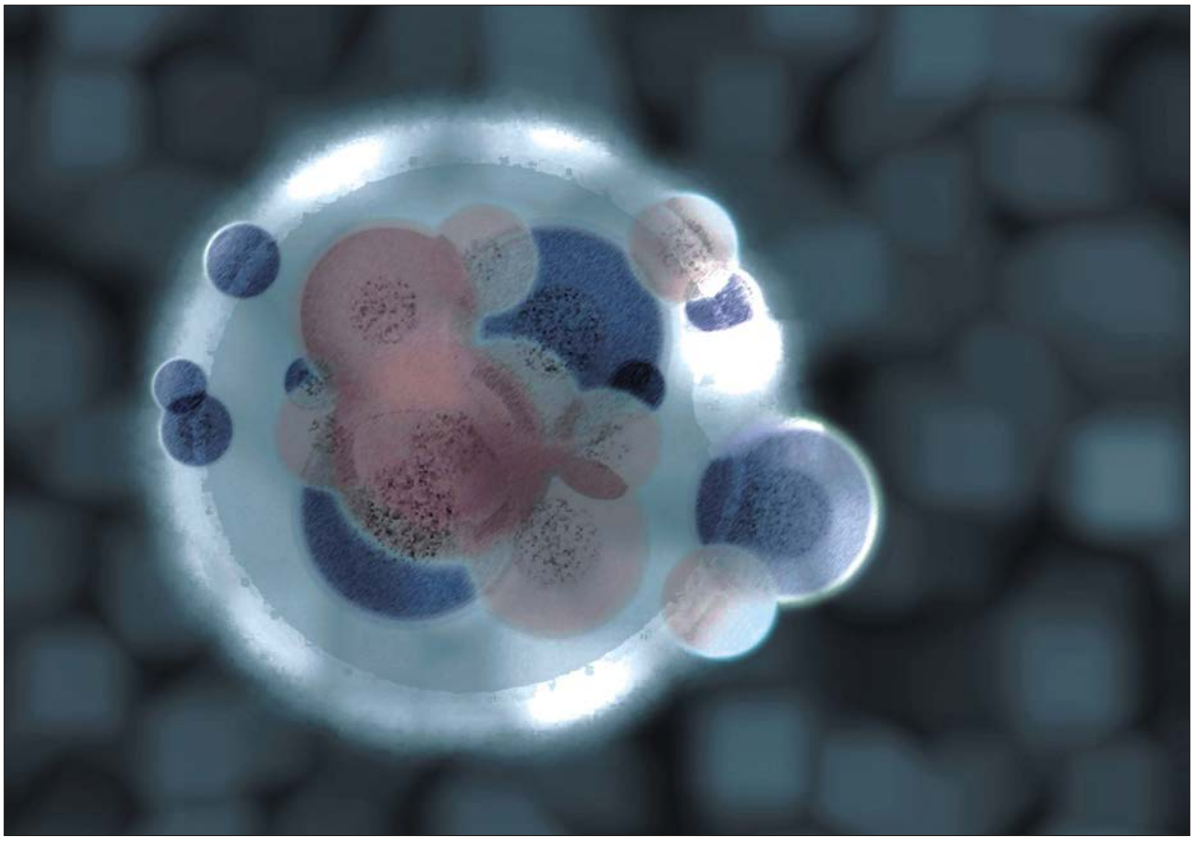

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Correlation And Path Coefficient Studies In Linseed

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Abstract: Highly significant differences existed among 17 genotypes of linseed. Seed yield per plant was positively associated with all traits, number of seed per pod and number of pods per plant had highly significant positive genotypic correlation coefficent followed by significant positive correlation coefficient of number of branches per plant. The direct effect of number of seed per pod was the highest followed by number of pods per plant and 1000 seed weight. Therefore, improvement of seed yield in the material is possible by using appropriate breeding strategy through selection for number of seed per pod, number of pods per plant, 1000 seed weight and number of branches per plant.

Key words: Linseed genotypes, correlation, path coefficient analysis, seed yield improvement, Pakistan

Introduction

Seed yield is a complexly inhereted trait as its manifestation is an outcome of intricate interaction of several traits and environment. Therefore, proper understanding of association of different traits provides more reliable criterion for selection to achieve the goal of high seed yield.

The review of results on genetic correlations among linseed agronomic traits published by Naqvi *et al*. (1987) and Sataphathia *et al*. (1987), indicate wide variation in nature and extent of association. Similarly wide variation in the magnitude of direct and indirect effects, obtained through path analysis, of various traits on seed yield have been reported by Agrawal *et al*. (1994), Khan *et al*. (1998), Mishra and Singh (1992), Muduli and Patnaik (1994) and Patil *et al*. (1989), which could be attributed to difference in genetic material and environmental conditions.

Based on information on genetic correlation and its partitioning into direct and indirect effects of material studied, aforementioned workers, devised a selection criteria, assigning different weight to number of branches per plant, number of pods per plant, number of seed per pod and 1000-seed weight, as the principal seed yield components.

The project was designed to devise workable selection scheme for ingenious genetic gain in linseed yield.

Materials and Methods

The breeding material comprised of 17 linseed genotypes viz; LS-49, LS-62, LS-63, LS-70, LS-71, LS-72, LS-73, LS-74, LS-77, LS-78, LS-79, LS-83, LS-84, LS-85, LS-86 and Chandni which were sown in November, 1998 at experimental area of AARI, Faisalabad in Randomized Complete Block Design. Each entry was provided 5×1.8 m^2 plot size keeping row to row and plant to plant distances 30 cm and 5 cm, respectively. Fertlizer at 60:60 N:P kg ha^{-1} was applied as basal dose. Ten plants were randomly selected from central four rows and data were recorded on plant height, number of branches per plant, number of pods per plant, number of seed per pod, 1000-seed weight,oil contents and seed yield per plant. Mean of 10 observations were used for statistical analysis as outlined by Steel and Torrie (1980).Correlation and path coefficient analysis was done according to Dewey and Lu (1959) and Singh and Chaudhry (1979).

Results and Discussion

Highly significant differences among genotypic mean squares were recorded (Table 1) exhibiting sufficient genetic variability which was necessary to chalk out an effective program of crop improvement.

Correlation coefficients (Table 2) depicted that genotypic correlation coefficient were greater than phenotypic correlation coefficients for most of the parameters which have negative effect of environment on an association development. Plant height had non-significant correlation with seed yield which was minimized via negative correlation of 1000 seed weight with it. Khan *et al*. (1998) concluded same in his research.

Number of branches per plant had significantly positive correlation with number of pods per plant, number of seed per pod and seed yield per plant. Number of pods per plant had highly significant positive correlation with number of seed per pod and seed yield per plant. Similarly number of seed per pod was strongly correlated with seed yield per plant. The results are in accordance with the findings made by Agrawal *et al*. (1994), Khan *et al*. (1998), Mishra and Singh (1992) and Muduli and Patnaik (1994). 1000 seed weight and oil contents had non-significant positive correlation with seed yield per plant.

Association of various traits with seed yield was partitioned into direct and indirect effects (Table 3) as suggested by Dewey and Lu (1959) and Singh and Chaudhry (1979). Number of seed per pod had maximum direct effect on seed yield followed by number of pods per plant, 1000 seed weight and oil contents. Number of seed per pod via number of pods per plant and at some extent via oil contents also strengthened this association with seed yield. Number of pods per plant via number of seed per pod made this relationship positive and highly significant with seed yield. Agrawal *et al*. (1994), Khan *et al*. (1998), Mishra and Singh (1992), Muduli and Patnaik (1994) and Patil *et al*. (1989) concluded same results. Number of branches had although negative direct effect on seed yield but its indirect effect via number of seed per pod and number of pods per plant made this linkage significantly positive with seed yield.

Table 1: Mean squares for analysis of variances for seed yield and its components in linseed

S.O.V.	DF	Plant height	Number of branches per plant	Number of pod per plant	Number of seed per pod	1000 seed weight	Oil %age	Seed per plant
Genotypes	16	129.43**	3.95**	2828.80**	235810.30**	0.97**	2.66**	7.1**
Replications	3	11.02NS	0.72 NS	3801.77**	33758.67NS	0.238*	0.81 NS	1.36NS
Error	48	16.70	0.66	747.73	17289.75	0.07	0.35	0.50

** = Highly significant, * = Significant, NS = Non-significant

Table 2: Genotypic and phenotypic correlations of various traits with seed yield of linseed

Trait		Plant height	Number of branches per plant	Number of pods per plant	1000-seed weight	Number of seed per pod	Oil %age	Seed yield per plant
Plant height	rg	-	0.122 NS	0.216 NS	-0.485 *	0.299 NS	0.203 NS	0.052 NS
	rp	-	0.146 NS	0.236 NS	-0.317 NS	0.134 NS	0.113 NS	0.041 NS
Number of branches per plant	rg	-	-	0.736 **	-0.434 NS	0.747 **	0.017 NS	0.589 *
	rp	-	-	0.545 *	-0.221 NS	0.500 *	0.033 NS	0.451 NS
Number of pods per plant	rg	-	-	-	-0.068 NS	0.927 **	0.070 NS	0.919 **
	rp	-	-	-	-0.042 NS	0.569 *	0.021 NS	0.581 *
1000-seed weight	rg	-	-	-	-	-0.300 NS	0.033 NS	0.056 NS
	rp	-	-	-	-	0.299 NS	0.218 NS	0.060 NS
Number of seed per pod	rg	-	-	-	-		0.265 NS	0.938 **
	rp	-	-	-	-		0.180 NS	0.916 **
Oil %age	rg	-	-	-	-		-	0.380 NS
	rp	-	-	-	-		-	0.251 NS

* = Significant, ** = Highly significant, NS = Non-significant

Table 3: Direct and indirect effects of various traits on seed yield per plant of linseed

Trait	Plant height	Number of branches per plant	Number of pods per plant	1000-seed weight	Number of seed per pod	Oil %age	Seed yield per plant
Plant height	-0.113	-0.020	0.050	-0.0901	0.207	0.018	0.052 NS
Number of branches per plant	-0.014	-0.164	0.171	-0.081	0.675	0.001	0.589 *
Number of pods per plant	-0.024	-0.121	0.233	-0.013	0.838	0.006	0.919 **
1000-seed weight	0.055	0.071	-0.016	0.188	-0.271	-0.029	0.056 NS
No. of seed per pod	-0.026	-0.123	0.216	-0.0576	0.904	0.023	0.938 **
Oil %age	-0.023	-0.003	0.016	0.063	0.240	0.087	0.380 NS

* = Significant, ** = Highly significant, NS = Non significant

Oil contents had positive but non-significant correlation with seed yield per plant and contributed positive effect directly and via number of seed per pod, number of pods per plant, number of branches per plant and1000 seed weight. Similarly plant height showed non-significant association with seed yield.

So efficient selection for seed yield improvement could be made considering number of seed per pod and number of pods per plant keeping certain level of 1000 seed weight and number of branches per plant.

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