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CORRELATION AND PATH ANALYSIS STUDY IN UTERA CONDITION IN LISEED (*LINUM USITATISSIMUM* L.)

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ABSTRACT

The present investigation was carried out to estimate correlation and path coefficient in linseed genotypes under *utera* condition. The eighteen genotypes of linseed were evaluated in complete randomized block design with three replications during rabi 2008-09 at Agricultural Research Institute, Patna Farm of Rajendra Agricultural University, Pusa, Samastipur. Analysis of variance revealed significant differences among genotypes for all the characters indicating the presence of considerable amount of genetic variability. Phenotypic correlation showed that grain yield per had significant and positive association with number of primary branches per plant, number of capsules per plant, number of seeds per capsule and 1000-seed weight. Path coefficient analysis revealed that number of primary branches per plant had maximum positive direct phenotypic effect towards seed yield per plant followed by number of capsules per plant and number of seeds per capsules.

Key words : *Linseed, path analysis, correlation, utera*

Linseed (*Linum usitatissimum* L.) is the oilseed crops raised during *rabi.* Every part of the linseed plant is utilized commercially, either directly or after processing. It is the richest source of alpha-linolenic acid. Linseed has also great medicinal values including anti-hyper cholesterolenic and anti-carcinogenic effects and is also beneficial for development of brain and retinal tissue of infants (Payne 2000). The oil cake is a good feed for milch cattle and poultries due to rich in protein content (36%). Linseed fibres is used for raw material for textile and paper industries.. The linseed is a self-pollinated *rabi* oil seed crop and it is grown three growing condition *viz;* rainfed, irrigated and utera. In the utera condition, linseed is broad casted in standing crop of rice before one week of harvesting. The crop grows well on residual moisture and fertilizer of previous crop. Improvement in genetic architecture of crop depends upon the nature and extent of genetic variability which is a prerequisite for selection. Proper knowledge of association of different traits provides more reliable selection criteria to achieve a high seed yield (Akbar *et al.* 2001). Nevertheless, selection for yield via highly correlated characters becomes easy, if the contribution of different characters to yield is quantified using path coefficient analysis (Dewey and Lu, 1959).

Keeping this in view, the present investigation was aimed at to study associations and their cause-effect relationship among seed yield, yield related traits in linseed genotypes under utera condition.

MATERIALS AND METHODS

The present investigation was carried out at Agricultural Research Institute, Patna Farm of Rajendra Agricultural University, Pusa, Samastipur during rabi, 2008-09. The materials comprising of 18 genotypes of linseed, namely, NL 119, PKDL 75, BAU-06-17, NDL 2005-34, RLC 121, LMSP 5, PCL -1-06, LCK 7034, NL 260, PKDL 74, BAU-06-08, KL 219, SLS 71, EC 552, EC 534, Shekhar, Garima and T 397 were evaluated in complete randomizedb design with three replications during rabi 2008-09. Each entry was grown in two rows of four five length with row to row spacing of 25cm and plant to plant spacing of 05cm, within row. The recommended agronomic practices were followed to ensure a good crop. The data were recorded number of primary branches per plant, number of capsules per plant, number of seeds per capsule and grain yield per plant on ten randomly selected plants from each plot of each replication. Days to 50 per cent flowering and days to 50 per cent maturity recorded on the plot basis, while 1000-grain weight and oil content per cent were taken from bulk seeds of each plot of each replication. The oil content in seeds was determined by NMR.

The replication wise mean values of character were subjected to statistical analysis using INDOSTAT software. The correlation coefficient between different characters was worked out according to method

Table-1 : Analysis of variances for eight quantitative characters under utera conditions in linseed.

Source of variation	D.F.	Mean sum of squares							
		Days to 50% flowering	Days to 50% maturity	Number of primary branches per plant	Number of capsules per plant	Number of seeds per capsule	1000-seed weight	Oil content	Grain yield per plant
Replication	2	3.68	6.12	1.07	107.24	0.52	0.19	0.02	0.27
Genotypes	17	84.76**	61.62**	2.14**	184.74**	3.78**	5.35**	87.45**	0.24**
Error	34	4.15	29.38	0.16	16.64	0.18	0.05	0.10	0.02

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

Table-2 : Phenotypic and genotypic correlation coefficient between pairs of quantitative characters under utera condition in linseed.

Character	Days to maturity	Number of primary branches per plant	Number of capsules per plant	Number of seeds per capsule	1000-seeds weight	Oil content	Grain yield per plant
Days to 50% flowering	0.440 (0.723)	-0.186 (-0.289)	-0.196 (-0.272)	0.064 (0.093)	-0.425 (-0.468)	-0.068 (-0.089)	-0.098 (-0.125)
Days to maturity		0.068 (-0.098)	0.025 (0.285)	0.253 (0.498)	0.238 (0.398)	0.265 (0.395)	0.235 (0.354)
Number of primary branches per plant			0.678** (0.983)	0.436 (0.584)	0.438 (0.542)	-0.078 (-0.068)	0.678** (0.856)
Number of capsules per plant				0.685** (0.740)	0.432 (0.469)	0.285 (0.366)	0.786** (0.872)
Number of seeds per capsule					0.235 (0.295)	0.343 (0.386)	0.678** (0.848)
1000-seeds weight						0.248 (-0.262)	0.194* (0.221)
Oil content							0.236 (0.265)

*,** significant at 5% and 1 % levels of probability, respectively. Genotypic correlation coefficients are shown under parentheses.

proposed by Johnson *et al.* (1955). The correlation coefficients were partitioned into direct and indirect effects using the path coefficient analysis according to method developed by Wright (1921) and elaborated by Dewey and Lu (1959).

RESULTS AND DISCUSSION

Analysis of variance (Table-1) was done for eight quantitative characters under utera condition. The mean squares due to genotypes were highly significant for all characters under study. This suggested existence of significant difference in mean performance of the genotypes with respect to all the characters.

The results of genotypic and phenotypic correlation coefficients (Table-2) for pair of eight characters of linseed genotypes for utera conditions indicated that genotypic correlation coefficients were higher in magnitude with the respective phenotypic correlation coefficient value having same direction. Phenotypic correlation showed that grain yield per had significant and positive association with number of primary branches per plant, number of capsules per plant, number of seeds per capsule and 1000-seed weight. Number of primary branches per plant had also significant and positive correlation with number of capsules per plant whereas as number of capsules per plant had significant and positive correlation with number of seeds per capsule.(Rabindra *et al*. 2009, Tadesse *et al*. 2009,)

According to Wright (1921) path analysis is a standardized partial regression analysis by means of which correlation coefficients can be portioned into measures of direct and indirect effects to understand the causal relationship among the interrelated

Table-3 : Direct (digonal) and indirect phenotypic effect of different characters on seed yield under utera condition in linseed.

Character	Days to 50% flowering	Days to maturity	Number of primary branches per plant	Number of capsules per plant	Number of seeds per capsule	1000-seeds weight	Oil content	Grain yield per plant
Days to 50% flowering	0.138	0.056	-0.091	-0.047	0.005	-0.061	-0.098	-0.098
Days to maturity	0.015	0.015	0.008	0.098	0.072	0.012	0.015	0.235
Number of primary branches per plant	-0.009	0.008	0.368	0.045	0.124	0.145	-0.003	0.678**
Number of capsules per plant	-0.037	0.002	0.162	0.334	0.194	0.083	0.048	0.786**
Number of seeds per capsule	0.015	0.092	0.112	0.12	0.258	0.08	0.016	0.678**
1000-seeds weight	-0.038	0.021	0.038	0.037	0.016	0.098	0.022	0.194
Oil content	-0.001	0.113	-0.001	0.054	0.009	0.034	0.028	0.236

*,** significant at 5% and 1% levels of probability, respectively.

variables. Path coefficient analysis (Table-3) revealed that number of primary branches per plant had maximum positive direct phenotypic effect towards seed yield per plant followed by number of capsules per plant and number of seeds per capsules whereas number of seeds per capsule had maximum positive indirect effect towards on grain yield per plant. Several workers have also confirmed results for most of the characters (Adugna and Labuschagne, 2003; Akbar *et al*. 2003).

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