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SHORT COMMUNICATION

PHYSIOLOGICAL TRAITS ASSOCIATED WITH HIGH YIELD IN LINSEED (*LINUM USITATISSIMUM* L.)

R.S. RAM AND V.K. SINGH

Department of Crop Physiology, C.S. Azad University of Agric. & Tech., Kanpur-208 002

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Analysis of various physiological traits revealed positive effect of biological yield on seed yield . RGR and NAR though had positive association but influenced seed yield via biological yield. Leaf area affected seed yield directly but it was nullified by all other characters whereas DLW and LAD had negative direct effect on yield. Hence, biological yield may be taken as a primary criteria for high seed yield in linseed.

Growth analysis and identification of desirable characters is an important tool which can be utilized by the breeders in the selection and breeding programmes. The importance of leaf area, leaf area duration and net assimilation rate in crop productivity was emphasized by Watson (1952). Very little information is available on physological traits governing seed yield in linseed . Present investigation was conducted to study the physiological traits at post anthesis stage of crop growth in retation to seed yield.

Observations on leaf area, dry leaf weight (DLW) and total biological yield during post anthesis period were recorded in 16 genotypes of linseed raised under standard agronomic practices in randomized block design with three replications . The physiological determinants, *viz*, net assimilation rate (NAR),relative growth rate (RGR) and leaf area duration (LAD) were calculated as described by Radford (1967), phenotypic and genotypic correlation coefficients as discribed by Miller *et al.* (1958) and the path coefficient analysis according to Singh and Chaudhary (1979).

Generally, genotypic correlation coefficient values were greater than the corresponding phenotypic values for most of the characters (Table-I). Biological yield and RGR were found to be significantly and positively correlated with seed yield. RGR also showed significant positive association with NAR. Leaf area, DLW and LAD were significantly correlated among themselves however LAD alone had significant negative correlation with NAR

Path coefficient analysis indicated maximum direct effect of biological yield on seed yield whereas leaf area, RGR and NAR also did so but at a lesser magnitude. On the other hand, DLW and LAD showed negative association with seed yield.

Physiological traits like leaf area, DLW and LAD had no phenotypic correlation with yield in linseed whereas direct positive association of leaf area with seed yield was neutralized by its indirect effects via all other characters studied. Therefore. leaf area, DLW and LAD had little significance so for as desirable traits are concerned and improving these characters in plants have limited scope for seed yield improvement in linseed. Biological yield, on the other hand, had highly significant positive correlation with seed yield and it was predominantly due to its high direct effect. RGR and NAR also contributed considerably towards seed yield as they significanbly affected biological yield. It may thus, be concluded that biological yield in linseed is most important physiological trait for obtaining higher seed yield.

Table-I. Path coefficient analysis shwoing direct (underlined) and indirect effects of some physiological characters, at anthesis on seed yield of lineseed. Figures in parentheses indicate the phenotypic (above diagonal) and genotypic (below diagonal) correlations between all pairs of different traits.

Characters	Leaf area/ plant	Dry Leaf weight/ plant	Leaf area dura- tion	Relat- ive growth rate	Net assimi- lation rate	biologi- cal yield/ plant	Geno- typic correl- ation with plant
Leaf area/ plant	0.8407 -	– 0.1516 (0.5500)+	–0.3762 (0.7886)+	–0.0099 (–0.4142)	–0.0006 (–0.4232)	–0.2247 (–0.2605)	–0.0777 (–0.0691)
Dry leaf weight/plant	0.8514 (1.0127)	–0.1497 -	–0.4458 (0.5530)+	–0.0123 (–0.2654)	0.0021 (–0.2684)	–0.2525 (–0.0084)	–0.0080 (0.0550)
Leaf area duration	0.8061 (0.9589)	–0.1701 (1.1365)	–0.3923 -	–0.0036 (–0.2991)	-0.0009 (–0.4976)+	–0.2096 (–0.1405)	0.0296 (0.0344)
Relative growth rate	–0.3601 (–0.4283)	0.0801 (–0.5352)	0.0610 (–0.1555)	0.0231 -	0.0004 (0.0666)	0.7959 (0.6391)+	0.6004+ (0.4691)+
Net assimi- lation rate	–0.3052 (–0.3631)	–0.1767 (1.1805)	0.2097 (–0.5346)	0.0050 (0.2171)	0.0018 -	0.5514 (0.4492)	0.2860 (0.2600)
Biological yield/plant	–0.1952 (–0.3222)	0.0392 (–0.2620)	0.0850 (–0.2166)	0.0190 0.8225)	0.0010 (0.5699)	0.9676 -	0.9166++ (0.7032)++

+ + and + indicate significance at 1 and 5% probability respectively. Residual effects + 0.2093.

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