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Analysis of phenotypic and genotypic coefficient of variability for seed yield and its contributing traits in Linseed (*Linum usitatissimum* L.)

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Abstract

Moderate percentage of GCV and PCV was observed for capsules per plant followed by biological yield per plant, seed yield per plant, harvest index and primary branches per plant. Phenotypic coefficient of variation (PCV) were higher than genotypic coefficient of variation (GCV) for all the characters studied. Generally, genotypic and phenotypic coefficient of variation for most of the characters studied revealed a relatively similar contribution of the genotypic variation in determining the phenotypic variation.

Keywords: GCV, genetic variability, Linseed, PCV, variance.

1. Introduction

Linseed is unique among oilseeds as it has a high content of Omega-3- fatty acid, alpha linolenic acid (ALA). Linseed contains 35 to 45 % oil with the ALA making of about 57 % of the total fatty acids. Omega-3 fatty acids lower the levels of triglycerides in the blood, thereby reducing heart disease, and also show promise in the battle against inflammatory diseases such as rheumatoid arthritis. Linolenic acid (LA), and Omega- 6- essential fatty acid is also found in linseed. Linseed oil contains three times as much Omega -3- fatty acid than Omega-6 -fatty acid. Development of high yielding varieties requires the knowledge of existing genetic variability. The large spectrum of genetic variability in segregating population depends on the amount of the genetic variability among genotypes and offer better scope for selection. The magnitude of heritable variation in the traits studied has immense value in understanding the potential of the genotype for further breeding programme. Assessment of variability for yield and its component characters becomes absolutely essential before planning for an appropriate breeding strategy for genetic improvement. Genetic parameters such as genotypic coefficient of variation (GCV) and phenotypic coefficient of variation (PCV) are useful in detecting the amount of variability present in the germplasm.

2. Materials & Methods

The present experiments were involving thirty-five genotypes of linseed was undertaken to examine the genetic variability, heritability, genetic advance, correlation coefficient, path coefficient analysis and genetic divergence. Thirty five genotypes of linseed were sown in a Randomized Complete Block Design with three replications during *rabi* season 2015-16 at Crop Research Centre, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (UP). Each genotype was sown in 3 rows plot of 3 meters length, spaced 20 cm apart with plant to plant distance of 5-6 cm. All recommended agronomic practices and plant protection measures were followed to raise the good crop. Observations were recorded for days to 50 per cent flowering, plant height (cm), number of primary branches per plant, number of capsules per plant, number of seeds per capsule, days to maturity, biological yield per plant (g), seed yield per plant (g), harvest index (%) and 1000 seed weight.

3. Results & Discussion

Phenotypic coefficient of variability (PCV) and genotypic coefficient of variability (GCV): The results of phenotypic and genotypic coefficient of variability are given in table-1. It is apparent from Table-1 that phenotypic coefficient of variation (PCV) were higher than genotypic coefficient of variation (GCV) for all the characters studied. Generally, genotypic and phenotypic coefficient of variation for most of the characters studied revealed a relatively

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similar contribution of the genotypic variation in determining the phenotypic variation. Moderate percentage of PCV was observed for capsules per plant (20.968) followed by biological yield per plant (20.576), seed yield per plant (20.109), harvest index (16.238), primary branches per plant (15.510) and 1000 seed weight (12.645). And low PCV was obtained for days to 50% flowering (8.059), seeds per capsules (7.232), plant height (6.934) and days to maturity (1.397). Moderate GCV was observed for capsules per plant (19.452) followed by biological yield per plant (19.148), seed yield per plant (16.716), primary branches per plant (11.452) and harvest index (10.207). For 1000 seed weight (8.770), days to 50% flowering (7.899), plant height (6.442), seeds per capsules (5.550) and days to maturity (1.024) a low range of GCV was observed. These results were also similar to Wakjira *et al.* (2004) ^[9], Reddy *et al.* (2013) ^[6], Rafiq *et al.* (2014) ^[5], Choudhary *et al.* (2015) ^[11], Fida *et al.* (2015) ^[3], Kumar *et al.* (2015) ^[4], Dash *et al.* (2016) ^[2], Shalini *et al.* (2016) ^[7] and Siddiqui *et al.* (2016) ^[8].

Table 1: Analysis of phenotypic coefficient of variability (PCV) and genotypic coefficient of variability (GCV) for ten characters of 35 genotypes in Linseed (*Linum usitatissimum* L.).

Characters	GCV	PCV
Days to 50% flowering	7.899	8.059
Plant height (cm)	6.442	6.934
Primary branches per plant	11.452	15.510
Capsules per plant	19.452	20.968
Seeds per capsule	5.550	7.323
Days to maturity	1.024	1.397
Biological yield per plant (g)	19.148	20.576
Seed yield per plant (g)	16.716	20.109
Harvest index (%)	10.207	16.238
1000 seed weight (g)	8.770	12.645

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