



GENETIC DIVERGENCE IN YELLOW SEEDED LINSEED GENOTYPES (*LINUM USITATISSIMUM* L.) OF CHHATTISGARH PLAINS.

Sonal Upadhyay and Nandan Mehta

Department of Genetics and Plant Breeding, College of Agriculture, Raipur
Indira Gandhi Krihi Vishwavidyalaya, Raipur - 492 012 (Chhattisgarh), India.

Abstract

Sixty three (63) yellow seeded linseed genotypes taken from AICRP on linseed, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.) along with three checks (Surabhi, R-552, RLC-92) were evaluated for genetic divergence using Mahalanobis D^2 statistics. The genotypes were divided into three (3) clusters. Based on inter cluster distance, mean value of each cluster and performance of genotypes, the most diverse yellow seeded linseed genotypes were found to be RLY-2015-29 and RLY-2015-56. These genotypes could be used further in different hybridization programmes and for value addition purposes.

Key words: yellow seeded linseed, genetic divergence, Mahalanobis D^2 statistics.

Introduction

Linseed is a very important oilseed crop for our country. Every part of the crop is commercially utilized. Its oil holds a very important place in industrial aspects. However, due to its drying habit and fast oxidation, it lacks behind in edible purposes. Yellow seeded linseed has been designated as the linseed form with higher and healthy oil profile and more suitable for edible purpose. It has a thinner seed coat and hence produces clear oil. Its healthy profile and buttery taste is suited for the edible market more than the brown seeded linseed oil. Chhattisgarh is one of the major linseed producing states of India. Around the globe, linseed occupies an area of 22.70 lakh ha yielding out 22.39 lakh tones having an average productivity of 986 kg/ha. In India, it is grown in an area of 29210 ha with production and productivity being 141200 tones and 484 kg / ha respectively. In Chhattisgarh, it is grown in an area of 26200 ha, with production of 1100 tonnes and has 424 kg/ha productivity. To enhance the production and productivity of crop along with value addition of crop this work was carried out with the available yellow seeded linseed genotypes of the state. The present investigation aimed at identifying the genetically divergent genotypes of yellow seeded linseed which can be further used in breeding programmes or hybridization purposes.

*Author for correspondence: E-mail: upadhyaysonal099@gmail.com

Materials and methods

In this investigation, Sixty three (63) yellow seeded linseed genotypes from AICRP on Linseed, Raipur Chhattisgarh along with three checks namely Surabhi (yellow seeded variety), R-552 and RLC-92 were evaluated for seed yield and its contributing traits in Randomized Block Design with three replications during rabi 2015-16 at Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. Observations recorded for each genotypes were plant height, technical plant height, days to 50% flowering, days to maturity, number of capsules per plant, number of seeds per capsule, number of seeds per plant, seed length, 100 seed weight and seed yield per plant.

Genetic diversity was worked out as per Mahalanobis d^2 statistics. The genotypes were clustered as per agglomerative hierarchical clustering using software named XL-STSAT, 2016.

Results and discussion

In the present investigation, 63 yellow seeded linseed genotypes along with 3 checks were divided into three (3) clusters on the basis of Mahalanobis D^2 statistics. Maximum genotypes appeared in cluster II which possessed 40 genotypes, followed by cluster I with 24 genotypes while cluster III had minimum number of genotypes (3)

Clustering pattern of yellow seeded linseed genotypes on the basis of Mahalanobis D^2 statistics is as shown in table-1.

Table 1: Clustering pattern of yellow seeded linseed genotypes on the basis of Mahalanobis D^2 statistics during 2015-16 at Raipur (C.G)

| Cluster number | No. of entries | Accession number |
|----------------|----------------|---|
| I | 24 | RLY-2015-1, RLY-2015-7, RLY-2015-8, RLY-2015-9, RLY-2015-11, RLY-2015-12, RLY-2015-17, RLY-2015-24, RLY-2015-25, RLY-2015-27, RLY-2015-28, RLY-2015-35, RLY-2015-36, RLY-2015-40, RLY-2015-42, RLY-2015-46, RLY-2015-47, RLY-2015-49, RLY-2015-52, RLY-2015-54, RLY-2015-55, RLY-2015-56, RLY-2015-61, Surabhi(yellow seeded check) |
| II | 40 | RLY-2015-2, RLY-2015-3, RLY-2015-4, RLY-2015-5, RLY-2015-6, RLY-2015-10, RLY-2015-13, RLY-2015-14, RLY-2015-15, RLY-2015-16, RLY-2015-18, RLY-2015-19, RLY-2015-20, RLY-2015-21, RLY-2015-22, RLY-2015-23, RLY-2015-26, RLY-2015-29, RLY-2015-30, RLY-2015-31, RLY-2015-32, RLY-2015-33, RLY-2015-34, RLY-2015-37, RLY-2015-38, RLY-2015-39, RLY-2015-41, RLY-2015-43, RLY-2015-44, RLY-2015-45, RLY-2015-48, RLY-2015-50, RLY-2015-51, RLY-2015-53, RLY-2015-57, RLY-2015-58, RLY-2015-59, RLY-2015-60, RLY-2015-62, RLY-2015-63 |
| III | 2 | RLC-92, R-552(brown seeded checks) |

The maximum intra-cluster distance was obtained for cluster II (2.54) followed by cluster III (2.360) while the minimum intra cluster D^2 value was shown by cluster I (1.72). The highest inter cluster D^2 value was found between cluster I and III (6.85) followed by cluster II and III (5.52) while, lowest inter-cluster distance D^2 value was found between cluster I and II (4.17).

| Cluster | I | II | III |
|---------|------|------|------|
| I | 1.72 | 4.17 | 6.85 |
| II | | 2.54 | 5.52 |
| III | | | 2.36 |

Although maximum number of genotypes were present in cluster I but maximum intra cluster distance

was found to be present in cluster II. De. *et. al.*(1992) suggested that genotypes belonging to clusters separated by high statistical distance should be used in hybridization programme for obtaining a wide spectrum of variation among the segregants.

The mean of characters from each cluster is as shown in table 3.

Table 3: Cluster wise mean of different seed yield and its contributing traits in yellow seeded linseed-

| S.No. | Characters | Cluster I | Cluster II | Cluster III |
|-------|------------------------------|-----------|------------|-------------|
| 1 | Plant height (cm) | 52.87 | 59.7 | 63.5 |
| 2 | Days to 50% flowering | 80.66 | 70.6 | 52.5 |
| 3 | Days to maturity | 130 | 122.5 | 107.5 |
| 4 | Technical plant height (cm) | 4.37 | 4.76 | 4.5 |
| 5 | Number of capsules per plant | 71.681 | 65.95 | 54.88 |
| 6 | Number of seeds per plant | 68.68 | 64.47 | 55.61 |
| 7 | 100 seed weight | 0.65 | 0.73 | 0.85 |
| 8 | Number of seeds per capsule | 8.66 | 8.62 | 7.85 |
| 9 | Seed length(cm) | 0.39 | 0.50 | 0.56 |
| 10 | Seed yield per plant (g) | 1.67 | 2.40 | 2.40 |
| 11 | Oil% | 35.67 | 35.38 | 41.5 |

Depending upon the inter cluster distance, cluster mean and performance of the best genotypes, the most diverse yellow seeded linseed genotypes have been identified and suggested for future breeding procedures. These genotypes are RLY-2015-56 and RLY-2015-29.

References

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