International Journal of Chemical Studies

P-ISSN: 2349–8528
E-ISSN: 2321–4902
www.chemijournal.com
IJCS 2020; 8(4): 2434-2436

Received: 13-05-2020
Accepted: 15-06-2020

Avneesh M Tripathi
Institute Of Agriculture Science, Bundelkhand University, Jhansi, Uttar Pradesh, India

Binita Devi
Institute Of Agriculture Science, Bundelkhand University, Jhansi, Uttar Pradesh, India

Bhanu P Ghosh
Institute Of Agriculture Science, Bundelkhand University, Jhansi, Uttar Pradesh, India

Akanksha Bisht
Ph.D. Scholar, College of Forestry, SHUATS, Prayagraj, Uttar Pradesh, India

Corresponding Author:
Avneesh M Tripathi
Institute Of Agriculture Science, Bundelkhand University, Jhansi, Uttar Pradesh, India
Email id: avneesh90tripathi@gmail.com

Estimation of genetic variability parameters for different traits in Indian mustard [*Brassica juncea* (L.)] in Bundelkhand Zone (Jhansi)

Avneesh M Tripathi, Binita Devi, Bhanu P Ghosh and Akanksha Bisht

DOI: https://doi.org/10.22271/chemi.2020.v8.i4ab.10000

Abstract
There has been a slow progress in production of oilseeds. The oil crops occupy an important place in the economy of Indian agriculture. They have seen grown traditionally to the lands of poor soil fertility and moisture stress without adequate use of chemical fertilizers and pesticides. The production of rapeseed/mustard has been increasing at a rapid rate in several countries of the world. The global demand of edible oils and its products is increasing continuously. When compared to other edible oils, the rapeseed/mustard oil has the lowest amount of harmful saturated fatty acids. It also contains adequate amounts of the two essential fatty acids, linoleic and linolenic, which are not present in many of the other edible oils. The experiment was carried out to derived information on variation between the character in mustard during rabi 2015-16 at the field Experimentation Centre of the Department of Genetics and Plant Breeding, Bundelkhand University, Jhansi U.P The experimental material was consisted of 35 diverse genotypes of Indian mustard (*Brassica juncea*) considering each genotype to represent one treatment the experiment was laid randomized block design with three replications.

Keywords: Edible oil, Indian mustard, oil crops, fatty acids

Introduction
Indian mustard *(Brassica Juncea* (L.) *& Coss)* is an important rabi crop extensively grown as rainfed as well as under irrigated conditions. On the Indian subcontinent, *B. juncea* is the dominant species grown, although large areas are also sown to *B. rapa* types toria and sarson (Parkash, 1980) [4]. India is one of the largest rapeseed and mustard growing country in the world, occupying the first position in area and third position in production after China and Canada. In India, mustard and rapeseed are grown largely in Uttar Pradesh, Rajasthan, Haryana, Assam, Gujarat, Punjab, West Bengal, and Madhya Pradesh. The success of any breeding programme depends upon the genetic variability engraved in the breeding material. The oil crops occupy an important place in the economy of Indian agriculture. Next to food grains, they hold a sizeable share of the country's gross cropped area 13% contribute around 5% of its national product and 10% of the value of all agricultural products. In India, Uttar Pradesh is the second largest rapeseed-mustard growing state after Rajasthan. The total area, production and productivity of mustard and rapeseed are 6.70 million hectare, 7.96 million tones and 1188 Kg per hectare in India and in Uttar Pradesh the total area, production and productivity are 0.66 million hectare, 0.77 million tones and 1162 Kg per hectare, respectively (Agriculture Statistics at a stance, Ministry of Agriculture 2013-14). The seeds are used as medicine, spices, preparation of salad, juices, curries and pickles. The seeds of mustard contain 40 to 45% oil and 38 to 41% anoeein. Mustard oil is an important component of the Indian diet and cake as livestock feed.

Methodology
The experiment was carried out to derived information on variation between the character in mustard during Rabi 2015-16 at the field Experimentation Centre of the Department of Genetics and Plant Breeding, Bundelkhand University, Jhansi, U.P. The experimental material was consisted of 35 diverse genotypes of Indian mustard *(Brassica juncea)* considering each genotype to represent one treatment the experiment was laid randomized block design with three replications. Experiment was sown on 14 oct. 2015 in a 5 row plot of 5 meter length.

The row to row spacing was 45 cm and plant to plant distance was maintained at 15 cm by proper thinning. The border rows were also planted neutralize the border effect. All cultural practices essential for the good crop of mustard were applied for obtaining healthy and competitive crop strand.

Table 1: List of Indian mustard genotypes and their origin

S. No.	Germplasm	Source
1	Chamtkar	CSAUA&T, Kanpur
2	Maya	CSAUA&T, Kanpur
3	Mathura rai	CSAUA&T, Kanpur
4	Pusajagnath	IARI, New Delhi
5	Kranti	GBPUA&T, Pantnagar
6	Varuna	CSAUA&T, Kanpur
7	Krishna	CSAUA&T, Kanpur
8	Pusa bold	IARI, New Delhi
9	Ashirwad	CSAUA&T, Kanpur
10	Pusa bahar	IARI, New delhi
11	Vaibhav	CSAUA&T, Kanpur
12	Arvali	RAU, ARS Navgao
13	Basanti	CSAUA&T, Kanpur
14	Vardan	CSAUA&T, Kanpur
15	Pusa beran	IARA, New Delhi
16	VM-2008-2	SVPUA&T, Meerut
17	VM-2008-1	SVPUA&T, Meerut
18	BSH-1	NRCRM, Bharatpur
19	EC-39930	NBPGR, New Delhi
20	EC-387881	NBPGR, New Delhi
21	EC-441	NBPGR, New Delhi
22	EC-365404	NBPGR, New Delhi
23	EC-14673	NBPGR, New Delhi
24	EC-365442	NBPGR, New Delhi
25	EC-386781	NBPGR, New Delhi
26	EC-385011	NBPGR, New Delhi
27	EC-38509	NBPGR, New Delhi
28	EC-39902	NBPGR, New Delhi
29	EC-401467	NBPGR, New Delhi
30	EC-386781	NBPGR, New Delhi
31	EC-401467	NBPGR, New Delhi
32	EC-599298	NBPGR, New Delhi
33	EC-389298	NBPGR, New Delhi
34	EC-39930	NBPGR, New Delhi
35	EC-87882	NBPGR, New Delhi

Result and Discussion

For initiating any breeding programme for plant improvement, the one and most important aspect is to look for sufficient genetic variability for various characters of economic importance. Selection which is the basis of every breeding programme operates only on variation which is of genetic nature (Johansen, 1909) [1]. A wide range of variability present in any crop always provides the better chances of selecting desired types (Vavilov, 1951) [6]. The success of plant improvement lies in careful management of variability and techniques to be employed in each case will depend upon clear understanding of the extent and nature of variability. According to Fisher (1918), the continuous variation exhibited by quantitative traits with which most of the plant breeders have to deal with, includes the heritable and non-heritable components. The heritable component is the consequence of genotypes and the non-heritable part is mainly due to unknown environment factors. As it is very difficult to assess the genotypes directly, it is possible only through the assessment of phenotypic expression (which is an outcome of genotype and environmental interaction) in the existing material. Therefore the study of phenotypic variability for various traits under investigation is of great importance. A through screening of the material study under present investigation exhibited sufficient variability for all the fourteen characters, namely days to 50% flowering, days to maturity, plant height, number of primary branches per plant, number of secondary branches per plant, number of siliquae on main raceme, number of siliquae per plant, number of seed per siliqua, length of main raceme, 1000-seed weight, biological yield per plant, seed yield per plant, harvest index and oil content. High amount of genetic variability for many of these traits has also been reported earlier by Pant and Singh, 2001 [3]; Nigam *et al*, 2009 [2]; Singh and Singh, 2010 [5]; Yadava *et al*, 2011 [7]. The genotypic and phenotypic variances are of little meaning as they do not have any clear limit or celling and at the same time the categorization of the genotypic variance as low or high is difficult, rendering them unsuitable for comparison of two populations with desired precision when expressed in absolute values. To overcome this difficulty, the genotypic and phenotypic coefficient of variation, which are free from the unit of measurement, can be conveniently employed for making comparison between populations and different metric characters of population.

Table 2: Estimates of variability parameters for different traits in Indian mustard

S. No.	Character	GCV (%)	PCV (%)	Heritability% (broad sense)	Genetic advance	Genetic advance (% of mean)
1	Days to 50% flowering	6.48	6.68	94.21	7.66	12.96
2	Days to maturity	2.86	2.92	96.28	7.96	5.79
3	Plant height (cm)	8.23	8.26	99.46	29.29	16.92
4	No. of primary branches per plant	12.42	14.54	72.97	1.34	21.86
5	No. of secondary branches per plant	17.89	18.25	96.07	5.41	36.11
6	No. of siliquae on main raceme	12.56	13.02	93.09	9.85	24.96
7	No. of siliquae per plant	20.51	20.52	99.91	68.28	21.64
8	No. of seed per siliqua	4.17	4.36	91.96	1.10	8.23
9	Length of main raceme (cm)	15.22	15.33	98.60	16.52	31.14
10	Biological yield per plant (g)	25.89	25.96	97.88	28.90	32.01
11	Seed yield per plant (g)	27.57	27.66	97.58	22.38	35.40
12	Harvest index (%)	29.65	29.77	97.56	14.11	31.64
13	1000-Seed weight (g)	28.30	28.31	99.61	10.63	37.06
14	Oil content (%)	2.27	3.20	50.34	1.27	3.32

References

1. Johansen WL. Elements der exakten Erblickkeits. Fischer verlag, Jena, 1909.
2. Nigam R, Alka, Srivastava A. Effect of genetic variability on seed yield and oil content in Indian mustard (*Brassica juncea* L. Czem & Coss). Asian Journal of Bio Science. 2009; 4(2):180-182.

3. Pant SC, Singh P. Genetic variability in Indian mustard. Agric. Sci. Digest. 2001; 21(1):28-30.
4. Prakash S. Cruciferous Oilseeds in India. In: Brassica Crops and Wild Allies: Biology and Breeding, Tsunoda. S., K. Hinata and C. Gomez-Campo (Eds.). Japan Scientific Society Press, Tokyo, 1980, 151-163.
5. Singh SK, Singh AK. Inter-relationship and path analysis for seed yield in Indian mustard. Indian Journal of Ecology. 2010; 37(1): 8-12.
6. Vavilov NI. The origin, variation, immunity and breeding of cultivated plants. Translated from Russian by K.S. Chester, New York, The Ronald Press Co, 1951.
7. Yadava DK, Giri SC, Vignesh M, Sujata Vasudev, Yadav AK, Dass B *et al*. Genetic variability and trait association studies in Indian mustard (*Brassica juncea*). Indian J. of Agric. Scien. 2011; 81(8):712-716.