The Pharma Innovation Journal 2017; 6(8): 318-319

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating 2017: 5.03
TPI 2017; 6(8): 318-319

www.thepharmajournal.com
Received: 09-06-2017
Accepted: 10-07-2017

Asheesh Kumar Tiwari
Department of Genetics & Plant Breeding, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, Uttar Pradesh, India

Sanjay Kumar Singh
Department of Genetics & Plant Breeding, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, Uttar Pradesh, India

Amit Tomar
Department of Genetics & Plant Breeding, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, Uttar Pradesh, India

Mahak Singh
Department of Genetics & Plant Breeding, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, Uttar Pradesh, India

Correspondence
Amit Tomar
Department of Genetics & Plant Breeding, Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, Uttar Pradesh, India

Genetic components analysis in Indian mustard (*Brassica juncea* L. Czern & Coss)

Asheesh Kumar Tiwari, Sanjay Kumar Singh, Amit Tomar and Mahak Singh

Abstract
The present experiment was carried out at Oil Seeds Research Farm, Kalyanpur of Chandra Shekhar Azad University of Agriculture and Technology, Kanpur during 2011-12. Twenty lines namely; RK9101, RK9102, RK9201, RK9202, RK9301, RK9302, RK9401, RK9402, RK9501, RK9502,RK9601, RK9602, RK9701,RK9702, RK9801, RK9802, RK9803, RK9804, RK9901and RK9902 and 3 testers namely; Varuna, NDR 8501 and Ashirwad were crossed in L x T mating design. The results indicates that non-additive type of gene actions are more prevalent than additive type of gene actions for most of the traits.

Keywords: additive, *Brassica juncea*, genetic components, gene action, Indian mustard and non-additive

1. Introduction
Oilseed crops play an important role in agricultural economy of India. Our country is the fourth largest oil economy in the world after the U.S., China and Brazil in terms of vegetable oils. Annual commercial cultivation of seven edible and two non-edible oilseed crops along with many other minor oilseed crops has been possible due to favorable agro ecological conditions. Rapeseed–mustard group of crops is the major oilseed crop of India. India holds the premier position in rapeseed-mustard economy of the world with 2nd and 3rd rank in area and production, respectively. Thus the estimated area, production and productivity of rapeseed-mustard in the world was 26.79 lakh ha. 46.27 million Tones and 1730 kg/ha. Respectively in 2010-11. In India the estimated area, production and productivity of rapeseed-mustard is 6.49 lakh ha. 7.41 million Tones and 1197 kg/ha, respectively during the 2010-11. In India, it is mainly cultivated in Rajasthan, Uttar Pradesh, Madhya Pradesh, Gujarat, Haryana, West Bengal, Assam, Bihar and Punjab. In Uttar Pradesh, rapeseed-mustard is grown in an area of 7.9 lakh ha with the production of 0.99 million tones and productivity is 1300 kg/ha. In UP, it is mainly cultivated in Agra, Aligarh, Mathura, Kanpur Nagar, Kanpur Dehat, Ethawah, Firozabad, Bulandshahar, Meerut, Muzaffar Nagar and Saharanpur. (Anonymous, 2015).

2. Materials & Methods
The present experiment was carried out at Oil Seed Research Farm, Kalyanpur of C.S. Azad University of Agriculture and Technology, Kanpur during 2011-12. 20 lines Namely; RK9101, RK9102, RK9201, RK9202, RK9301, RK9302, RK9401, RK9402, RK9501, RK9502,RK9601, RK9602, RK9701,RK9702, RK9801, RK9802, RK9803, RK9804, RK9901and RK9902 and 3 testers namely; Varuna, NDR 8501 and Ashirwad were crossed in L x T mating design. 83 treatments including 60 F_1s + 23 Parents were evaluated in Randomized Block Design (RBD) with three replications. The entries were sown in a single row plot of 3 m with inter and intra-row spacing of 45 cm and 15 cm, respectively. To avoid the border effects, the plots falling on the border were surrounded by non-experimental rows of varieties/strains. Recommended agronomic practices were adopted to raise a good crop. The following observations were recorded viz., days to 50% flowering, days to maturity, plant height (cm), number of primary branches per plant, number of secondary branches per plant, number of siliquae per plant, number of seeds per siliqua, biological yield per plant (g), harvest index (%), 1000-seed weight (g), oil content (%) and seed yield per plant (g). The line x tester analysis as outlined by O. Kempthorne, 1957 [1].

3. Results & Discussion
The analysis of variance for 23 parents and their 60 F_1s was computed for all the 12 characters

and mean sum of squares are presented in table-1. Highly significant differences were observed among the treatments for all the 12 characters under the study. This indicated the presence of an appreciable amount of variability in the base material as well as in the material generated. The estimates of components of variance *viz.*, variances and $\hat{\sigma}^2$ g and $\hat{\sigma}^2$ s were calculated from the variances of all the 12 characters. The ratio of $\hat{\sigma}^2$ g and & $\hat{\sigma}^2$s [$\hat{\sigma}^2$ g /$\hat{\sigma}^2$ s] and average degree of dominance expressed as [$\hat{\sigma}^2$ s/ $\hat{\sigma}^2$ g]$^{0.5}$ were also worked out The ratio of 1 : 1 between $\hat{\sigma}^2$ g and $\hat{\sigma}^2$ s indicated an equal importance of both the additive and non-additive genetic variability for expression of the characters while the deviation from 1:1 ratio indicated more importance of either $\hat{\sigma}^2$ g or $\hat{\sigma}^2$ s depending upon the magnitude of the ratio. The estimate of the genetic components, variance, their ratio and the average degree of dominance are presented in table-2. The estimates of $\hat{\sigma}^2$ g were lower than $\hat{\sigma}^2$ s for all the characters except oil days to maturity. The ratio of $\hat{\sigma}^2$ g/ $\hat{\sigma}^2$ s was less than 1.0 in all the attributes except days to maturity which the ratio of $\hat{\sigma}^2$ g/ $\hat{\sigma}^2$ s was greater than unity. The average degree of dominance ($\hat{\sigma}^2$s/ $\hat{\sigma}^2$g) was more than unity for eleven characters *viz;* days to flowering, plant height, number of primary branches, number of secondary branches, number of siliquae per plant, number of seeds per siliqua, biological yield, harvest index, 1000-seed weight, oil content and seed yield per plant showing over dominant in these attributes. This parameter was less than unity for days to maturity reflecting the nature of dominance as partial. Similar findings were also observed by Thakral *et al.* (2000) [6], Mondal *et al.* (2000) [3], Nupur *et al.* (2009) [4], Singh *et al.* (2011) [5] and Khosepatil *et al.* (2012) [2].

Table 1: ANOVA For 12 Characters involving parents and F_1s in Indian mustard: mean sum of squares.

Source of Variation	d.f.	Days of Flowering	Days to Maturity	Plant height	Number of Primary Branches	Number of secondary branches	Number of siliquae per plant	Number of seeds per siliqua	Biological yield per Plant	Harvest index	1000 seed weight	Oil content	Seed yield per plant
Replication	2	6.29**	217.18**	38.42**	1.16**	27.96**	496.57**	0.064**	5.87**	1.44**	0.019	1.97**	1.40**
Treatment	82	20.14**	14.78**	52.61**	14.75**	10.88**	9.50**	7.16**	3.95**	15.47**	18.93**	2.95**	22.10**
Parents	22	43.14**	43.00**	287.49**	2.07**	14.23**	979.81**	2.50**	41.62**	50.67**	0.93*	3.08**	40.54**
Females	19	63**	45.86**	121.70**	2.336**	11.46**	591.03**	2.67**	2952**	50.70**	0.70*	3.06**	37.94**
Males	2	10.33**	24.78**	225.47**	0.33**	3.44**	5162.15**	2.11**	4.33**	11.36**	3.19**	4.81**	22.33**
Females vs. males	1	1447.53**	25.06**	3561.40**	0.55**	88.41**	2.75	244.14**	346.09**	128.87**	0.70*	0.02**	126.26**
Hybrids	59	16.77**	118.89**	53.31**	3.22**	12.09**	4749.13**	2.92**	11.78**	25.79**	1.27*	1.54**	16.10**
Parents vs. Hybrids	1	166.37**	3496.12**	467.00**	1010.71**	646.25**	794.00**	543.42**	1320.50**	4548.04**	1.50*	110.67**	4956.44**
Error	164	2.31	9.44	23.09	1.03	1.87	387.95	1.31	9.04	5.65	0.062	1.11	3.75

*significant at =0.05;**significant at p=0.01

Table 2: Estimates of genetic components their ratios ($\hat{\sigma}^2$ g /$\hat{\sigma}^2$ s) and degree of dominance [$\hat{\sigma}^2$ s/ $\hat{\sigma}^2$ g]$^{0.5}$

Characters/ Components	Days of Flowering	Days to Maturity	Plant height	Number of Primary Branches	Number of secondary branches	Number of siliquae per plant	Number of seeds per siliqua	Biological yield per Plant	Harvest index	1000 seed weight	Oil content	Seed yield per plant
$\hat{\sigma}^2$f	0.01	13.32	-1.00	-0.14	1.24	760.47	0.16	0.59	-2.30	0.08	0.03	-1.61
$\hat{\sigma}^2$m	-0.15	10.94	-0.68	0.02	0.11	-42.84	-0.03	-0.04	0.24	0.12	0.11	0.06
$\hat{\sigma}^2$fm	4.83	16.83	11.86	0.85	2.13	740.78	0.38	0.52	8.67	0.25	0.06	5.93
$\hat{\sigma}^2$A	-0.26	22.50	-1.45	-0.01	0.52	123.88	-0.02	0.08	-0.19	0.23	0.20	-0.31
$\hat{\sigma}^2$D	4.83	16.83	11.86	0.85	2.13	740.78	0.38	0.52	8.67	0.25	0.06	5.93
$\hat{\sigma}^2$g /$\hat{\sigma}^2$s	-0.05	1.33	-0.12	-0.01	0.24	0.16	-0.05	0.15	-0.02	0.92	3.33	-0.05
[$\hat{\sigma}^2$s/ $\hat{\sigma}^2$g]$^{0.5}$	-4.30	0.86	-2.85	-2.91	2.02	2.44	-4.35	2.54	-6.75	1.03	0.54	-4.35

*significant at =0.05;**significant at p=0.01

4. References

1. Kempthorne O. An Introduction to Genetical Statistics John Wiley and Sons, Inc. New York, USA, 1957.
2. Khosepatil PR, Thakker DA, Khule AA, Rathod AH, Vaghela PO, Rathore BS. *et al.* Gene effects for yield, yield attributes and quality parameters in Indian mustard *Brassica juncea* L. Czern and Coss by generation mean analysis. *Crop Research,* Hisar. 2012; 43(1/2/3):35-38.
3. Mondal SK, Khajuria MR. Genetic analysis for yield attributes in mustard. Environment and Ecology. 2000; 18(1):1-5.
4. Nupur Malviya, Kumar K, Verma OP. Detection of epistatic, additive and dominance variation for seed yield, its components and oil content in Indian mustard *Brassica juncea L. Czern* and *Coss*. Research on Crops. 2009; 10(2):340-342.
5. Singh Mahak, Tomar Amit, Mishra CN, Srivastava SBL. Studies on genetic components for seed yield and its contributing traits in Indian mustard (*Brassica juncea*). Journal of Oilseed Brassica. 2011; 2(2):83-86.
6. Thakral NK, Kumar P, Singh A, Singh A. Genetic architecture of yield components in Indian mustard *Brassica juncea* L. Czern & Coss. Intern. J Tropi. Agri. 2000; 18(2):177-180.