



Estimation of gene effects for yield components and oil content in Indian \times exotic crosses of [*Brassica juncea* (L.) Czern & Coss.]

K. Sridhar and R. N. Raut

Division of Genetics, Indian Agricultural Research Institute, New Delhi 110 012

(Received: December 1999; Revised: December 2002; Accepted January 2003)

Among the various *Brassic*as, [*Brassica juncea* (L.) Czern & Coss.] is the most predominantly grown species in India. The available exotic collections/accessions of *B. juncea* (introduced from Sweden) with improved fatty acid composition are late maturing and low yielding than the standard varieties viz., Pusa Bold and Varuna. In order to develop strains with early maturity and increased yield levels an attempt was made to estimate the gene effects for different plant characters and oil content in different Indian \times exotic crosses.

The experiment was laid out in RBD with two replications. The parental and back cross generations were grown in one row each whereas F_2 's in four rows each. The observations on various morphological characters and oil content were recorded on five randomly selected plants per row. The gene effects (m, d, D, i, j) were estimated in different Indian \times exotic crosses of *B. juncea* based on generation mean analysis with some modifications. However, only additive effects for all characters and additive \times additive and additive \times dominance effects for 1000-seed weight were presented as they were found to be significant.

The importance of different components of variance differed according to cross and trait [1]. Additive effects were found to be significant and negative in all crosses for days to first flowering, days to 50% flowering, days to maturity and in five crosses for plant height there by indicating a desirable trend for these characters (Table 1). This is in agreement with the studied reported earlier [2-6]. Similar trend was found with respect to primary branches in two crosses and secondary branches in one cross respectively [3, 4, 6]. Length of the main fruiting axis was observed to show significant additive effects in crosses PB \times EC 333564, PB \times EC 333565, Va \times EC 333564 and Va \times EC 333576 where as the number of siliquae on main shoot showed significant additive effects in PB \times EC 333564, PB \times EC 333565, PB \times EC 333571, Va \times EC 333565 and Va \times EC 333571. Seed yield per plant showed additive

effect in only two crosses PB \times EC 333564 and Va \times EC 333565. Similarly additive effects were reported for these traits [2-4].

With respect to 1000-seed weight, both additive and non-additive (additive \times additive and additive \times dominance) interactions were found to be significant which is on par with the earlier reports [2, 5]. Additive effects were found to be significant for oil content in all crosses except Va \times EC 333576 and Va \times EC 333577. The effects were positive which is a desirable trend. Limited studies have suggested predominantly additive gene action for oil content in *Brassica* [7].

Since the additive effects are fixable and showed desirable trend in most of the crosses, further selections could be exercised to obtain desirable strains in later generations. Besides, erucic acid content was analyzed in some of the exotic collections EC 333565, EC 333576 and EC 333577 and was found to be in traces, 15.27 and 8.0 per cent, respectively compared to Pusa Bold (47.42%) and Varuna (43.93%). Therefore, the crosses involving these exotic parents provide greater scope for selection of strains with both increased yield and low erucic acid in future plant breeding programmes.

References

1. **Thukral S. K., Yadava A. K., Yadava T. P. and Kumar P.** 1986. Genetics of seed yield and some important attributes in Indian mustard. *Cruciferae Newslett.*, **11**: 31-33.
2. **Anand I. J. and Reddy W. R.** 1987. Estimates of gene effects for seed yield and its components in Indian \times exotic mustard. *J. Oilseeds Res.*, **4**: 1-8.
3. **Yadava O. P., Yadava T. P. and Prakash Kumar.** 1992. Combining ability studies for seed yield, its component characters and oil content in Indian mustard [*Brassica juncea* (L.) Coss]. *J. Oilseeds Res.*, **9**: 14-20.
4. **Badwal S. S. and Labana K. S.** 1987. Diallel analysis for some metric traits in Indian mustard. *Crop Improv.*, **14**: 191-194.