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INTRODUCTION
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Rapeseed and mustard are the major rabi oil seed crops of India. Oils and fats are essential components of our daily diet and also a major source of raw material for a wide range of products required in our life. It also plays a very important role in the present agricultural economy of India because of their obvious importance. Fortunately our country is endowed with a variety of oilseed crops. Of these oleiferous Brassicae commonly referred as rapeseed-mustard in India and groundnut are the major oil seed crops accounting for 75% of the total oil seed production and 80% of the edible oilseeds production.

Botanically oil seed Brassicas constitute different crops comprising two distinct forms from their breeding point of view. One is self compatible and predominantly self pollinated form, comprising yellow sarson, tora type brown sarson (Brassica campestris L.) and Indian mustard (Brassica juncea (L) Czern and Coss).

Other group consists of self incompatible and highly cross pollinated crops viz., lotni type brown sarson, Toria (Brassica campestris L.) and taramira (Eruca sativa L.). Apart from these there is yet another autogamous cultivated species, Brassica napus (gobhi sarson) which in recent years has gained some popularity in Punjab. All these crops are grown under wide range of agro climatic conditions. However, mustard occupies the largest acreage and accounts for more than 75 per cent of the area under oilseed Brassicas (Kumar and Kumar, 1989). This is primarily because among these crops, mustard has higher biomass production, better yielding potential, drought hardiness, better built-in genetic tolerance to leaf blight disease, aphid infestation and frost injury and responds well to the given dose of fertilizer and irrigation than other
cultivated oleiferous _Brassicae_. So it has an edge over other oleiferous _Brassicae_ both under irrigated as well as under rainfed conditions. Rapeseed and mustard are extensively cultivated in Asia, Western Europe and Canada. China is the largest producer of rapeseed and mustard together with India and Pakistan. They produce about 90 per cent of the world production. India is the second largest country in the world with respect to the land area (6.32 m ha) under oilseed Brassicas. China being first, but India with an average productivity of 903 kg/ha lags behind than other major rapeseed – mustard growing countries like France, Canada and China. In India, the oilseeds Brassicas are largely grown in Northern States. Uttar Pradesh covers the maximum acreage but considerable acreage is also found in Rajasthan, Madhya Pradesh, Haryana, Assam, West Bengal, Orissa, Gujarat, Punjab and Bihar. During 1999-2000, out of 25.2 m ha area under oil seeds, rape seed mustard occupied about 6.32 m/ha. In terms of production, rapeseed and mustard produced 6.12 mt out of total production of 21.54 mt (1999-2000). In U.P. rapeseed-mustard contained area and production of 6.76 lakh ha and 6.89 lakh metric tonnes, respectively. In eastern U.P. the area was 1.03 lakh ha and production was 0.75 lakh metric tonnes and productivity was 7.29 q/ha (2000-2001). The oil content varies in between 30-45 per cent of the seed, depending upon the variety and the agro climatic conditions under which it is grown. The oil is used mostly for edible purposes and is the principal cooking oil in the areas of production in India. It is used in soap making, in mixtures with mineral oils for lubrication. Rapeseed oil is used in the manufacture of greases. The oil cake is used as a cattle feed and as manure. The leaves of young plants are used as green vegetables. They supply enough sulphur and minerals in the diet. A leafy type of _B. Juncea_ var. ruqosa, is a popular vegetable in the Himalayan foot hills.

In past, some improvement in the genetic potential of varieties have been obtained with the use of conventional breeding techniques like mass selection, pure line selection, disruptive selection and inter-varietal hybridization. But the selection and reselection were extensively followed
in the low yielding local land races and progenies of hybrids. As a result, the rate of increase in yield per unit area has been slow. The yield level has almost reached a plateau in these crops. Therefore, a precise genetic understanding of process of inheritance of yield and of physiological characters that determine the potential yield could be helpful in developing future high yielding varieties/hybrids of these crops. It has also been realized that reassessment of traditional breeding methods based on valid genetic information of crop yield would be necessary for obtaining visible gains in their production (Thurling, 1974). Survey of genetic variability is a logical way to initiate any breeding programme. Variation is the secret of success in plant breeding programme because it widens the scope of selection. The genetic facts are inferred from observations on phenotypes. Since phenotype is determined by the joint effect of genotype and environment, non genetic part exerts large influence on genetic variability. The exploitable variability is therefore, required to be judged through various genetic parameters like heritability, genetic advance and others. Such a study appears to be extremely necessary for planning genetic improvement in Indian mustard.

The variability study ensures identification of traits that offer substantial scope for improvement through selection. In crop improvement programme the importance of a character is determined by the magnitude of its influence on the economic product. A statistically sound and widely used methodology to measure such influence is the analysis of correlation coefficients. Different workers have reported different degrees of correlations between different pairs of characters in mustard (Wahhab and Bechyne 1977, Labana et al 1980; Singh 1986, Kumar 1988, Chaudhary 1990, Reddy and Reddy 1990, Singh et al 1990, Sharma et al 1990 and Yadav, 1990).

Further probe on this aspect in existing elite Indian mustard germplasm might prove useful. Besides measurement of direct and indirect cause of association to unfold the specific forces acting to produce
a total correlation facilitating thereby, true assessment of the magnitude of dependence of a trait on correlated variables is also of great significance. The path coefficient analysis devised by Wright (1921) provides an effective means for arriving at such conclusion.

Hence correlation in conjunction with path coefficient analysis better serves the purpose of ascertaining traits that define and describe the end product. For a sound breeding programme, it is also essential to assess the nature of gene action involved in the expression of desirable agronomic traits, ascertain the potentiality of the parents in hybrid combinations, and in the isolation of promising F1 hybrids for further exploitation in heterosis breeding programmes. In this regard the precise information on combining ability is rather essential in identifying the parents for their usefulness in hybridization programme. It is also worth mentioning that in Indian mustard the option was previously restricted only to the production of pure line cultivars. With the availability of cytoplasmic male sterility- fertility restoration systems (Banga, 1992), the development of commercial hybrid cultivars is now a real possibility. The available reports indicate that there is a good reservoir of exploitable economic F1 heterosis of more than 50 per cent in these crops. (Labana et al., 1975; Gupta 1976; Banga and Labana 1984; Dhillon et al., 1990; Rai 1979, 1989, Kumar and Kumar, 1989).

As a result of extensive research efforts in this direction a number of experimental hybrids have been developed and these are now being tested under field conditions in All India Coordinated Yield trials. However, further studies are required which could help to identify still better and superior performing experimental hybrids with high values of heterosis (Anand, 1990).

In view of the above, the present investigation in Indian mustard was initiated, planned and conducted with following major objectives.
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(i) To estimate general and specific combining ability variances and their effects.

(ii) To work out gene action and degree of dominance.

(iii) To estimate heterosis over standard parent.

(iv) To work out selection parameters (Correlation and path coefficients, heritability and expected genetic advance)