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Major : Genetics & Plant Breeding **Deptt.** : Genetics & Plant Breeding
Thesis title : **STUDIES ON HETEROSIS, INBREEDING DEPRESSION, COMBINING ABILITY AND GENE ACTION IN INDIAN MUSTARD (*Brassica juncea* (L.) Czern & Coss).**
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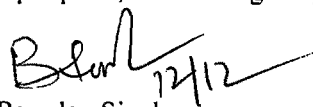
ABSTRACT

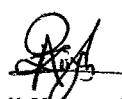
Rapeseed-mustard comprising traditionally of grown indigenous species namely *Brassica juncea*, *B. compestis*, *B. napus* and *B. carinala* is the second most important group of oil seed crops after groundnut. Indian mustard (*Brassica juncea* (L.) Czern & Coss) account for about 90 per cent of the total area under rapeseed-mustard. The present investigation was carried out during winter (rabi) season 1997-98 and 1998- 99, at the Crop Research Centre, of G.B. Pant University of Agriculture and Technology, Pantnagar. India.

The inheritance of fourteen quantitative characters was studied utilizing F_1 and F_2 10×10 diallel excluding reciprocals. The study was carried out under the head : General statistics, combining ability analysis, gene action, heritability, heterosis and inbreeding depression.

The analysis of variance revealed that significant differences existed between treatments for all the characters. The results revealed that variances due to general combining ability were higher than that of specific combining ability for all the characters studied. Kranti and PHR2 were identified best general combiners with respect to characters studied. The other good general combiners were Pusa bold; Pusa barani; RLM198 and Kranti for test weight, seed yield length of main shoot, number of siliquae on main shoot, length of siliqua and seeds per siliqua. The Zemland Divya were observed poorest whereas, Divya was good general combiner for flowering and maturity in negative direction. The majority of crosses showing high sca did not always involved good general combiners as parent, revealing the importance of non additive genetic variance. It may be concluded that cross combinations showing low gca parent can also show high sca effect. The crosses EC322090 \times EC322092 for flowering, number of secondary branches per plant and RLM198 \times PHR2 for oil content showed high sca with high gca effect. The estimates of genetic parameters obtained from numerical diallel analysis indicated that the major contribution of additive type of gene action in the inheritance of most of the characters and some of the characters showed non-additive type of gene action in the expression of yield and yield component characters.

The broad sense heritability was higher for all the characters as compared to narrow sense heritability, as expected. Most of the characters showed moderate to high heritability. The outstanding hybrids were Pusa barani \times Divya, RLM198 \times EC322090, Kranti \times Divya and Kranti \times Damo for yield per plant. The highest value of heterosis over check parent was observed by cross Zeml \times EC322090 and EC322090 \times EC322092 for number of secondary and primary branches per plant. The highest average in breeding depression was noticed for seed yield per plant, total biological yield per plant and secondary branches per plant.


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