ASSESSMENTOF COMBINING ABILITY FOR DIVERSE TRAITS OF ECONOMIC SIGNIFICANCE USING LINE × TESTER DESIGN IN OPIUM POPPY(*PAPAVERSOMNIFERUM* L.)

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ABSTRACT

60 hybrids were developed by using line × tester mating design from 12 female (lines) and 5 male (tester) diverse parents of *Papaversomniferum* L. collected from different places of India and foreign country were assess for fourteen economical traits. The GCA and SCA effects were significant for all the traits except no. of leaves/plant for SCA variance, indicated the importance of additive as well as non-additive genetic components playing a significant role in controlling the expression of all the characters. The ratio GCA/SCA was less than unity for all the attributes indicated predominance of non-additive gene action in the inheritance of the traits and also suggested worthy potential of the exploitation of variation for yield and yield attributes useful for genetic improvement of studied characters. Yet, dominant genes were more important than the additive genes because variance due to SCA was high than GCA.Amongst all parents i.e.in line and tester for improving economically significant yield contributing traits the maternal line L_4 and L_{12} was good combiner for no. of capsule/plant. Whereas, maternal line L_{10}, L_{12} and paternal tester T_1 was good combiners for traits seed yield/plant and dry husk yield/plant. In alkaloids the maternal line L_{12} are better combiner for morphine, thebaine, papervine and nosacapine except codeine while L_{10} is best for morphine, thebaine and papervine; L_6 for thebaine and papervine; L_8 for morphine and nosacapine. However, in terms of paternal testers T_2 for codeine, T_3 for thebaine, papervine and T_5 for nosacapine were found to be good general combiners which can be taken up to generate desirable segregates for further selection. In this study, none of the crosses showed significant SCA effects for all the characters. On the basis of per se performance and high SCA effects the crosses $L_{10}\times T_2$ and $L_{12}\times T_3$ was excellent specificcombiner for no. of capsule/plant, seed yield g/plant and dry husk yield g/plant and for alkaloids the crosses $L_{12}\times T_3$ and$L_{12}\times T_4$ was best specific combiner for all studied alkaloids i.e. Morphine, codeine, thebaine, papervine and nosacapine content. These best parents and cross combinations could be effectively utilized for the improvement of yields component in *Papaversomniferum* L.

Keywords: Genetic components, GCA, Line × tester design, Opium poppy and SCA.