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Genetic diversity and combining ability studies in oat (*Avena sativa* L.) for agro-morphological, yield and quality traits

Amit Rana*, V. K. Sood, Priyanka, Sawan Kumar and H. K. Chaudhary
CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur-176062, India
*Corresponding author e-mail: amitrana.gpb@gmail.com
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Abstract
The present research endeavour entailed diversity studies among 14 oat genotypes using 50 SSR primers (molecular markers) and 18 agro-morphological, yield and quality traits. Both morphological and molecular data observed using principal component analysis, cluster analysis, and STRUCTURE revealed significant genetic divergence among parents. Based on these studies, ten diverse lines were crossed with four testers of oat following a line × tester mating design and 40 F_1 hybrids along with parents and standard check PLP-1 were evaluated in RBD with three replications during *Rabi* 2018-19. Genetic variance due to lines, testers and their interactions were significant for most of the traits. A higher magnitude of dominance variance along with low heritability estimates for almost all the traits revealed a preponderance of non-additive gene action. Among parents, EC-528865, UPO-130, HJ-8, JPO-46 and HFO-52 were good combiners for green fodder yield, dry matter yield, crude protein yield per plant-fodder, acid detergent fibre and â-glucan content. The best specific cross combinations were EC-605834 × UPO-30 followed by PLP-14 × HFO-52 for green fodder yield, while UPO-130 × PLP-1 for acid detergent fibre and neutral detergent fibre. Based on mean performance and specific combining ability (SCA), cross combinations HJ-8 × UPO-30, Kent × JPO-46 and PLP-14 × UPO-30 were found best for most traits and are expected to throw transgressive segregants.

Keywords: Cluster, Diversity, GCA, Oat, SCA, SSR markers