



Research article

## Assessment of induced genetic variability for yield traits and powdery mildew resistance in oat

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### Abstract

To induce genetic variability in oat for powdery mildew resistance and yield traits, two cultivars of oat viz., HJ-8 and Kent were treated with gamma rays (200 Gy, 300 Gy and 400 Gy), EMS (0.3%, 0.6% and 0.9% v/v) and their respective combinations. Powdery mildew disease reaction, germination (%) and survivability (%) were recorded for  $M_1$  generation during *Rabi* 2018.  $M_2$  generation was screened in augmented block design for various yield traits, chlorophyll mutants and powdery mildew resistance in *Rabi* 2019.  $LD_{50}$  values of EMS-treated HJ-8 and Kent cultivars were 1.40% and 0.84%, respectively using Probit analysis, which indicated that  $LD_{50}$  value varied from genotype to genotype. The highest number of powdery mildew-resistant putative mutants for both cultivars was observed for combined treatments in  $M_1$  generation. Five chlorophyll mutants were observed in  $M_2$  generation. The highest mutagenic effectiveness for HJ-8 was observed for 0.9% EMS, while in case of Kent, it was 0.3%. Analysis of variance revealed sufficient variation was generated in the treatments for all the traits. High heritability coupled with high genetic advance recorded for days to flowering initiation, biological yield per plant, grain yield per plant, harvest index and 100-grain weight indicated additive gene action with negligible environmental effects. Grain yield per plant showed a significant positive correlation and direct effect with biological yield per plant and 100-grain weight. Maximum  $M_2$  mutants were unique as they fall in different quadrants of PCA-biplot. Thirty-three putative mutants resistant to powdery mildew were obtained in  $M_2$  generation. These putative mutants could be used in oat improvement programme.

**Keywords:** Genetic variability, Mutagenesis, Oat, Powdery mildew