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Anther culture properties of oat x wild red oat progenies and a search for RAPD markers associated with anther culture ability

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Abstract

A study was carried out to improve anther culture ability of the non-responsive cultivated oat, Avena sativa L. cv. Puhti by introgressing favourable alleles from the responsive wild red oat, Avena sterilis L. acc. CAV 2648. Anther culture ability of these parental lines and F2 progenies of their cross and two backcrosses was tested. Genotype effects were significant on all anther culture traits measured. The number of anther culture derived embryo-like structures was highest in acc. CAV 2648, and the number of green regenerants from the Puhti × CAV 2648 progeny. Anther culture response was greatly reduced in backcross progeny and was least in cv. Puhti. Random amplified polymorphic DNA (RAPD) was used to test for marker associations with oat anther culture traits in a population of 38 F2 progenies. Two RAPD markers were putatively associated with improved production of green regenerants (one derived from acc. CAV 2648 and the other from cv. Puhti). One marker putatively associated with decreased albino plant regeneration (derived from acc. CAV 2648). These markers might be useful for selecting alleles for better anther culture ability among progeny of planned crosses. In addition, three markers, derived from acc. CAV 2648, were putatively associated with decreased anther culture response rates.

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