



Backcrossing to increase meiotic stability in triticale

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ABSTRACT. Triticale (*X Triticosecale* Wittmack) is an intergeneric hybrid derived from a cross between wheat and rye. As a newly created allopolyploid, the plant shows instabilities during the meiotic process, which may result in the loss of fertility. This genomic instability has hindered the success of triticale-breeding programs. Therefore, strategies should be developed to obtain stable triticale lines for use in breeding. In some species, backcrossing has been effective in increasing the meiotic stability of lineages. To assess whether backcrossing has the same effect in triticale, indices of meiotic abnormalities, meiotic index, and pollen viability were determined in genotypes from multiple generations of triticale (P_1 , P_2 , F_1 , F_2 , BC_{1a} , and BC_{1b}). All analyzed genotypes exhibited instability during

meiosis, and their meiotic index values were all lower than normal. However, the backcrosses BC_{1a} and BC_{1b} showed the lowest mean meiotic abnormalities and the highest meiotic indices, demonstrating higher stability. All genotypes showed a high rate of pollen viability, with the backcrosses BC_{1a} and BC_{1b} again exhibiting the best values. Statistical analyses confirmed that backcrossing positively affects the meiotic stability of triticale. Our results show that backcrossing should be considered by breeders aiming to obtain triticale lines with improved genomic stability.

Key words: *X Triticosecale* Wittmack; Meiosis; Pollen viability; Plant breeding; Cytogenetics