

TIER 1 EVALUATION OF CROSSABILITY BETWEEN TRITICALE (X *TRITICOSECALE* WITTMACK) AND COMMON WHEAT, DURUM WHEAT AND RYE. Linda M. Hall, Melissa J. Hills, Francois Eudes, Research Scientist and Adjunct Professor, Alberta Agriculture and Food/University of Alberta, 410Ag/ForBuilding, Edmonton, AB, T6G 2P5, Instructor, Grant MacEwan, 10700-104 Avenue, Edmonton, AB T5J 4S2, Research Scientist, Alberta Agriculture and Food, Lethbridge, AB.

Development of transgenic triticale as a platform for novel bio-industrial products is predicated on an environmental biosafety assessment that quantifies the potential risks associated with its release. Pollen-mediated gene flow to related species and conventional triticale varieties is one pathway for transgene movement. A tier 1 quantification of triticale hybridization was conducted by emasculating and hand pollinating flowers under greenhouse conditions. Approximately 2000 manual pollinations were conducted for each cross and its reciprocal between two triticale genotypes: a modern triticale cultivar (AC Alta) and primary triticale (89TT108), and common wheat, durum wheat and rye. The frequency of outcrossing, hybrid seed appearance and weight, and F₁ emergence and fertility were recorded. Outcrossing, F₁ emergence and fertility rates were high from crosses between triticale genotypes. Outcrossing in inter-specific crosses was influenced by the species, and the genotype and gender of the triticale parent. In crosses to common and durum wheat where triticale was the male parent, outcrossing was $\geq 73.0\%$ and $\geq 69.5\%$, respectively, but $\leq 23.9\%$ and $\leq 3.0\%$ when triticale was the female parent. Overall, outcrossing with rye was lower than with common and durum wheat. F₁ hybrid emergence was greater when triticale was the female parent. With the exception of a single seed, all wheat-triticale F₁ hybrid seeds were non-viable when triticale was the male parent in the cross. Only 7 durum wheat-triticale F₁ hybrids emerged from 163 seeds sown and all were produced with triticale 89TT108 as female parent. With rye, 8 F₁ hybrids emerged from 38 seeds sown and all were produced from crosses to AC Alta; 5 with AC Alta as the female parent and 3 as the male. Interspecific F₁ hybrids were self-sterile, with the exception of those produced in crosses between common wheat and triticale where triticale was the female parent. Tier 2 hybridization quantification will be conducted under field conditions.

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