

Development and evaluation of winter wheat breeding lines carrying Fusarium head blight resistance QTL from spring wheat

A. SALAMEH, B. ALMAGHRABI and H. BUERSTMAYR

Introduction

Fusarium head blight (FHB) is a fungal disease in many wheat (*Triticum aestivum* L.) production areas worldwide. Classical breeding for FHB resistance is hampered by tedious and costly resistance screening. In addition, highly resistant germplasm is not adapted to central European conditions. Molecular marker assisted-selection (MAS) appears a promising tool to introgress chromosome segments carrying FHB resistance genes from exotic donors into adapted genetic backgrounds.

Materials and Methods

A series of BC₂ derived lines were developed from crosses of CM-82036 (spring wheat from CIMMYT-Mexico, resistance donor) with 11 winter wheat lines and cultivars as recurrent parents. After each backcross, double heterozygous plants were selected based on linked SSR markers: Xgwm493, Xgwm533 and Xbarc133 were used to predict presence of Qfhs.ndsu-3BS and Xgwm156,

Xgwm293 and Xgwm1057 for Qfhs.ifa-5A at various stages of the backcrossing procedure (BUERSTMAYR et al. 2002, 2003). Double heterozygous BC₂F₁ plants were selfed and among the BC₂F₂ progeny we attempted to obtain at least one homozygous plant for each of the four possible QTL classes. The derived BC₂F₂₋₄ lines were tested in a field experiment in 2005/06 at the IFA-Tulln using artificial inoculation. FHB severity was assessed by visual scorings.

Preliminary results

The general trend was that FHB severity on the backcross derived families carrying different combinations of Qfhs.ndsu-3BS and Qfhs.ifa-5A decreased most when both QTL were present and less when only one QTL was present. BC₂ derived lines with the winter wheat alleles at both QTL regions showed generally more disease severity than lines with one or both QTL from spring wheat, but less disease than the recurrent parent. A possible drawback is that pre-

sence of Qfhs.ifa-5A increased plant height by 5-15 cm, depending on the recurrent parent, which is possibly due to linkage. The FHB resistance evaluations will be repeated in the 2006/07 season.

References

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Acknowledgments

Dr. A. SALAMEH was supported by a North-South Dialogue grant, funded by the Austrian Ministry of Foreign Affairs and managed by the Austrian Academic Exchange Service (OEAD).

Autoren: Dr. Aziz SALAMEH, Hebron University, Palestine; Bachar ALMAGHRABI, Dr. Hermann BUERSTMAYR, hermann.buerstmayr@boku.ac.at, BOKU-University of Natural Resources and Applied Life Sciences, Vienna, Department IFA-Tulln, Institute for Biotechnology in Plant Production, Konrad Lorenz Straße 20, A-3430 TULLN

