A fresh look on breeding hybrids for the RYE BELT

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For many centuries rye has been the common and basic food resource for European peoples as can be recognised by closely related names for rye in diverse Germanic languages which can be traced back to the original slavic word “rosh”. Thus rye can be considered as a true European crop constitutive at the same time for tradition and scientific progress for the sake of European agriculture.

With the advent of hybrid breeding in rye considerable genetic progress for grain yield can be observed. Estimates from the Polish National list trials show that the yearly yield increase achieved with hybrid rye cultivars can easily compete with that of other cereals such as wheat, barley and triticale.

Since 2005 PollenPlus® hybrids gained a steadily growing market share in countries such as Germany and Poland. PollenPlus® as a trade mark is the comprehensible result of a KWS LOCHOW research project in which advanced DNA marker and breeding technology led to the detection of a specific genome segment containing a highly efficient gene for the restoration of male fertility in the final hybrid. Because at the same time PollenPlus® safeguards the hybrid plants against infection from ergot the technology plays a key role ensuring rye to be the cereal species with the lowest level toxin contamination at all.

The RYE BELT zone covers a multitude of ecologically highly diverse areas. Consequently breeding strategies are needed which provide the farmer with cultivars excelling by robustness and high yield stability. As main putative causes for genotype x environment interactions winter hardiness, reaction on different length of pre- and post anthesis periods and water use efficiency are discussed.

Recent development of cost effective genotyping techniques allow for profiling the whole genome. Using these new molecular tools the performance of candidate lines for complex inherited traits including grain yield can be predicted and a ranking of the candidates can be built up. Subsequent genomic selection will revolutionize the architecture of breeding programmes and will lead to higher genetic gains.

Rye is a species considered as most recalcitrant to tissue culture techniques. Nevertheless recent results achieved in research projects open a more optimistic perspective for the development of double haploid lines (DHL) in rye. With the DHL technique being at the breeders disposal a fast and reliable use of the genetic variability will be feasible.

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Finally KWS LOCHOW is along the way to develop even more custom-tailored cultivars for human food and animal feed consumption. New technologies enhance a target oriented use of the native variability inherent in the species but also to create new variability from mutagenesis.
With progress from breeding and biotechnology the long chain of tradition in growing and consuming rye as a healthy European food resource can be kept vital and enforced.

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