MAPPING RESISTANCE GENES FOR COMMON BUNT IN WHEAT

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Organic wheat production is increasing in Denmark, Europe and in wheat producing areas, in general. The seed borne disease common bunt is a particular challenge for organic seed production because systemic pesticides that is used to control common bunt in conventional agriculture is not permitted in organic farming. Therefore, selecting and breeding for resistance to common bunt in wheat has high priority for organic breeding but have been neglected in conventional breeding. As result little is known about the underlying genetic mechanisms, and the number and chromosomal locations of the resistance factors for common bunt resistance in wheat.A double haploid (DH) population segregating for common bunt resistance was used to identify the chromosomal location of common bunt resistance gene Bt9. DH lines were phenotyped in three environments, and genotyped with DArTseq and SSR markers. Bt9 was mapped to the distal end of chromosome 6D. Since wheat common bunt resistance gene Bt10 is also located on chromosome 6D the possibility of their co-location was investigated. Comparison of marker sequences linked to Bt9 and Bt10 on physical maps of chromosome 6D confirmed that Bt9 and Bt10 are two distinct resistance factors located at the distal (6DL) and proximal (6DS) end of chromosome

6D, respectively. Flanking markers for Bt9 can now be developed and used in marker assisted selection. A search for new resistance genes was also carried out by a genome-wide association study of 248 wheat accessions phenotyped in 2 growth seasons for the reaction to common bunt and two QTL could be identified. The possibilities for maintaining a sustainable wheat production will be discussed.

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