

Genetic analysis of preharvest sprouting associated alpha-amylase activity in barley

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Preharvest sprouting (PHS) is defined as the germination of grains on the mother plant prior to harvest due to wet and humid summer conditions. Barley genotypes with low level of seed dormancy are susceptible to PHS, leading to increased alpha-amylase activity and starch degradation that causes substantial grain yield and quality losses. Therefore, there is a need to develop PHS resistant barley cultivars. This study is aimed at identifying genetic factors that regulate PHS induced alpha-amylase activity in barley seeds using genome-wide association study of diverse barley genotypes over several environments in Western Canada. The genotypes were examined for variations in alpha-amylase activity using a Rapid Visco Analyser and genotyped using a 50K iSelect genotyping array. Our study identified several genetic markers being significantly associated with PHS-induced alpha amylase activity in a specific genomic region. These genetic markers may aid in the development of PHS-resistant barley cultivars.