0203-BA-002 Molecular Characterization of QTL for Scab Resistance in Wheat Cultivar Wangshuibai.

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PROJECT ABSTRACT
(1 Page Limit)

Wheat head scab (*Fusarium graminearum*) significantly reduced grain yield and quality of wheat. Growing resistant cultivars is the most effective measure to control the disease. However, resistance genes used in breeding programs worldwide are mainly from Sumai 3, resistance genes from other sources will enhance genetic diversity and facilitate resistance genes pyramiding from different sources. Our objectives in this proposal are (i) to characterize resistance QTL from Wangshuibai, a resistant cultivar having genes different from those in Sumai 3, (ii) to develop high-throughout DNA markers for scab resistance QTL in Wangshuibai, (iii) to locate the QTL on chromosomes using nullitetrasomic lines. The $F_{7:9}$ RI population derived from the cross between Wangshuibai and Alondra's (highly susceptible to scab) will be repeatedly evaluated for scab resistance in the greenhouse. An AFLP linkage map developed from the same population will be used for initial QTL scanning. AFLP and SSR markers coupled with bulked segregant analysis will be implemented for further QTL identification and fine mapping in the QTL regions. Markers closely linked to QTL will be identified for marker-assisted selection through fine mapping in the major QTL regions. All DNA markers will be analyzed in an automated sequencer to improve throughput of marker analyses. The results will gain new knowledge on the inheritance of scab resistance, provide a new tool for marker-assisted breeding, and diversify scab resistance genes in breeding programs, which perfectly meets the research goals proposed by the US Wheat and Barley Scab Initiative: develop effective measures to control scab epidemics.