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Project Title: Resistance Screening of Elite Barley Germplasm Selections from ND, MN, ICARDA/CIMMYT & Canada.

PROJECT 3 ABSTRACT

Fusarium head blight is a severe threat to the barley and malting industry in the Upper Midwest of the US. Although resistance is the most economic means of managing the disease, few sources of resistance have been identified to date, and the best resistance found in barley is in two-rowed barley which makes up only a small proportion of the barley used by the brewing industry. Both the breeders and industry are desperate to identify new and better sources of resistance.

Screening for new resistance sources had been systematically undertaken by B. Steffenson (US collection and Vavilov Institute collection), S Neate (Dutch Centre for Genetic Resources collection), Bill Legge (Agriculture Canada and various sources) and Flavio Capettini (ICARDA collection).

In the ongoing North American Barley Scab Evaluation Nursery (NABSEN) screening the PI has found that the rankings of resistance to FHB of different accessions shows significant genotype by environment interactions. This suggests that new resistance sources identified elsewhere will have to be verified in the upper mid-west before they can be used in a breeding program.

The objective of this project is to screen in replicated trials in the upper mid-west, the germplasm showing the best resistance to FHB from the four North American screening efforts with emphasis on the best germplasm that has been identified in Mexico from the ICARDA collection as it is this material which often shows a poor correlation with results from the upper mid-west in the NABSEN trials. Data on FHB reaction and DON accumulation will be collected as well as important agronomic characters like height and heading date.

Germplasm that shows good resistance in the mid-west will be genotyped using microsatellites to determine its genetic relationship to the current best resistance sources. Previously developed microsatellite markers associated with the current know resistance QTL's in barley will also be used to select for further study germplasm that potentially contains new resistance genes.