

Barley Coordinated Agricultural Project Work Plan for Year 4 (4/1/2009-3/30-2010)
Brian J. Steffenson, University of Minnesota

1) Describe the research, education, and outreach activities you are planning for Year 4 (4/1/2009-3/30-2010)

Research We will complete the assigned disease evaluations of 2009 Barley CAP germplasm as per the requirements outlined in the CAP Participants Guide. This includes the evaluation of spring germplasm for resistance to spot blotch at St. Paul where the lines and controls will be planted as short rows in two replicates. We will collect data on disease severity and infection response according to our standard laboratory protocols. Additionally, we will evaluate all of the 2009 Barley CAP germplasm for seedling resistance to spot blotch, Septoria speckled leaf blotch, and stem rust (race TTKS or isolate Ug99). These evaluations will be conducted at the seedling stage in the greenhouse and will include two replicates. Plants will be scored for their infection responses according to our standard laboratory protocols. All data collected from the above evaluation tests will be sent to Jennifer Kling in spreadsheets customized for her database manipulations. In addition, we will retest any CAP line that gave variable results from previous year's phenotyping tests. Association mapping analyses for the three disease datasets will be completed.

Education I have two graduate students who have participated in the association mapping analyses of disease resistance in Barley CAP. They have and will continue to participate in all CAP meetings and workshops. Hao Zhao's dissertation will be on the association mapping of spot blotch, stem rust and Septoria resistance in cultivated barley. I will prepare a unit in my host-parasite genetics class on association mapping of disease resistance.

Outreach At suitable venues where I am invited to speak, I will talk about Barley CAP activities in general and my project specifically. Also, I will coordinate outreach activities with Peggy Lemaux and other members of Barley CAP and guide the extension evaluator Sue White in the assessment of these activities. We will develop posters and other printed materials on association mapping of disease resistance.

2) List specific outcomes and deliverables that will be accomplished in the first 6 months. These will be used as benchmarks for your bi-annual progress report.

- Spot blotch, Septoria, and stem rust evaluations will be completed for 2009 CAP germplasm
- Additionally, we will complete the retesting of any CAP line that gave variable results from previous year's phenotyping tests
- We will work on the development of new outreach materials and the refinement of established ones.

3) List specific outcomes and deliverables that will be accomplished in the second 6 months. These will be used as benchmarks for the bi-annual progress report.

- Summarized spot blotch, Septoria, and stem rust phenotypic data will be sent to Jennifer Kling
- Association mapping analyses of disease resistance will be completed and manuscripts submitted
- We will work with the extension evaluator to make assessments of our outreach outcomes and impacts.

**Barley Coordinated Agricultural Project Six-Month Progress Report
(4/1/08 – 9/30/08)**

Brian J. Steffenson, University of Minnesota

1) Describe the research, education, and outreach activities you completed (4/1/08 – 9/30/08)

Research We collated, analyzed, and submitted data for the 2007 Barley CAP germplasm evaluations for disease resistance as per the requirements outlined in the CAP Participants Guide. This included the evaluation of spring CAP germplasm for adult plant resistance to spot blotch and the entire CAP germplasm for seedling reaction to spot blotch and Septoria speckled leaf blotch. Analysis of reaction data to stem rust (race TTKS or isolate Ug99) for the 2006 and 2007 Barley CAP germplasm are in progress. Additionally, a number of 2007 CAP lines that showed variable reactions in the seedling tests were re-evaluated. Evaluations of the 2008 Barley CAP germplasm for adult plant spot blotch reaction have been completed. Association mapping analyses for spot blotch resistance are in progress. All reaction data (except those to stem rust) have been sent to Jennifer Kling.

Education Hao Zhao is a graduate student on my project who is working on the association mapping of disease resistance in Barley CAP germplasm. Hao, Ben Alsop (another graduate student who has worked on Barley CAP), and Joy Roy (post-doctoral research associate working on association mapping in wild barley) attended the 2008 Barley CAP Workshop on Association Mapping to Marker Assisted Selection in mid-June.

Extension I am the Co-Team Leader for Barley CAP Education and Extension with Peggy Lemaux. I helped develop and coordinate various education and extension activities with members of Barley CAP and guided our extension evaluator Sue White in the assessment of these activities. I also coordinated a small grants program for extension educators.

2) List specific outcomes and deliverables accomplished (4/1/08 to 9/30/08).

- Collated and submitted reaction data of 2007 CAP germplasm to spot blotch (both seedling and adult plant) and Septoria speckled leaf blotch
- Completed evaluation of 2007 CAP germplasm to stem rust
- Conducted repeat disease evaluations of lines giving variable results
- Completed first round of small grants program for extension educators
- Assisted in the development of new extension materials and refinement of established ones
- Guided extension evaluator Sue White in the assessment of various education and extension activities