**Barley Coordinated Agricultural Project Work Plan FY07 (4/1/09 – 3/31/10)**
**Kevin P. Smith, University of Minnesota**

## 1) Describe the research, education, and outreach activities you are planning for the next year (4/1/09 – 3/31/10)

Research We will identify the UM 96 CAP breeding lines for the 2009 growing season per the requirements outlined in the CAP Participants Guide. We will plant these lines in our preliminary yield trials at 3 locations (Saint Paul, Morris, Crookston, MN) in 2-row (3m long) plots with two replicates per location, including the CAP common checks Robust, Harrington, and Baronesse and additional checks Lacey, Drummond, Tradition, Stellar-ND, and Conlon. We will collect data on heading date, height, lodging, yield, plump grain, test weight, and grain protein concentration. We will submit selected lines for malting quality analyses to the USDA Cereal Crops Research Unit in Madison, WI. We will submit field data the curator by Dec 1, 2009.

We will also participate in a collaborative FHB trial with the four Midwest breeding programs (384 entries). We will send seed from our 96 entries to North Dakota. We will plant two misted and inoculated FHB nurseries (Crookston and Saint Paul, MN) in single row plots (1.5 m long), 2 replicates per location in a RCB design including the checks Robust, Stander, MNBrite, Chevron, CI 4196. We will collect data on heading date, FHB severity, and DON. All data collected from the above trials will be sent to the curator (FHB and heading date by Dec 1 and DON by June 1) in spreadsheets designed in collaboration with Jennifer Kling.

We will collect breeders' source seed from all of the 2009 lines from each of the ten participating breeding programs. We will conduct the DNA source grow out for all 960 CAP lines. We will plant 4 seeds per pot (from breeders' source seed) in the greenhouse in August. Winter lines will be vernalized for six weeks at 6° C. We will thin to one plant per line, harvest leaf tissue from each plant, freeze dry, and ship to Shiaoman, Chao for SNP genotyping. We will harvest all the seed from each individual plant for the DNA source seed to be stored at the USDA facility in Aberdeen, ID. We will use the rest of the breeders' source seed to grow out the spring habit lines in Minnesota for seed multiplication in single 3 m rows. We will harvest this seed in early August and distribute it to collaborators as described in the Barley CAP Participants Guide.

Education I have one PhD student, Carol Powers, that is working on malting quality traits. She will be involved in mapping malting quality with data from the yield trials described above.

Outreach I will provide a brief update on the Barley CAP at field days in Morris and Crookston. I will provide input and feedback to Peggy Lemeax in the revision of brochures, posters, and powerpoint presentations etc… as needed. I will organize a workshop on association mapping and marker assisted selection.

## 2) List specific outcomes and deliverables that will be accomplished in the first 6 months (3/1 – 8/31). These will be used as benchmarks for your bi-annual progress report.

- Submit DON and quality data from 2008 crop to curator by June 1.
- Identification of QTL for malting quality and FHB based on year 1-3 data sets.
- Plant seed multiplication, preliminary yield, and FHB collaborative trials in April or early May.
- Plant out seed for DNA source in August.
- Field Day Presentations in July.
- Barley CAP Workshop
- Initiate crosses for MAS based on QTL identified for FHB and malting quality.

## 3) List specific outcomes and deliverables will be accomplished in the second 6 months (9/1 – 2/29). These will be used as benchmarks for the bi-annual progress report.

- Re-distribution of seed to collaborators by Oct 15.
- Submit grain samples from PYT to USDA-CCRU for malting quality analysis in October.
- Submit grain samples from FHB trial for DON analysis in October.
- Send yield data and FHB data (severity and HD) to Kling by Dec 1.
- Send leaf tissue from (Year 4) 960 CAP lines to Chao in December.

**Barley Coordinated Agricultural Project Biannual Progress Report**
**FY06 (4/1/08 – 9/30/08)**
**Kevin P. Smith, University of Minnesota**

**1) Describe the research, education, and outreach activities you completed in the first half of the FY06 (4/1/06 – 9/30/06)**

Research We sent seed from our 2008 CAP lines to collaborators for spring planted trials. We planted these lines in our preliminary yield trials at 3 locations (Saint Paul, Morris, Crookston, MN) in 2-row (3m long) plots with two replicates per location, including the CAP common checks Robust, Harrington, and Baronesse. We lost our Morris location due to herbicide damage. At the other two locations, we collected data on heading date, lodging, height, yield, and test weight. We are in the process of cleaning grain samples for submission to USDA quality lab in Madison, WI. We participated in a collaborative FHB trial with the four Midwest breeding programs (384 entries). We planted the 2008 CAP lines in two misted and inoculated FHB nurseries (St. Paul and Crookston, MN) in single row plots, two replicates per location in a RCB design including the checks Robust, Stander, MNBrite, Chevron, CI 4196. Disease was very uneven at St. Paul because of plant stress likely due to herbicide carryover. This location was not useful. We collected good quality disease data from Crookston. The data is being assembled and will be sent to Jennifer Kling in October. All plots from Crookston were harvested for DON analysis.

We are conducting the DNA source seed grow-out for the 2008 CAP lines. Nearly all lines have been harvested and tissue will be sent to Fargo in the next few weeks for genotyping. We also planted a nursery with all the 2008 spring lines in two row plots in Crookston for seed multiplication. That seed has been harvested and has been shipped out to collaborators. We did not ship seed to Lee Jackson as he is retiring and will not be planting a nursery this year. We will be shipping out seed of CAP I (2006) to Dr. Do Mornhinweg (USDA, Stillwatrer OK) who will be conducting two new greenhouse screens for insect resistance.

Education Two graduate students are working on the project. One PhD student, Carol Powers, is studying malting quality and MS student, Jon Massman just defended his MS thesis on FHB. Both students are involved in carrying out field trials and collecting data.

Outreach I gave two presentations at field days that mentioned the Barley CAP work. At one field day in Crookston, we also displayed a poster and distributed Barley CAP fact sheets. I helped organize a workshop called "Association Genetics and Marker-Assisted Selection" June 16-18 at the University of Minnesota. This workshop featured presentations and hands on sessions lead by myself, Jean Luc-Jannink, Rex Bernardo, and Shiaoman Chao. The workshop was was attended by 60 people (students, breeders, other researchers).

**2) List specific outcomes and deliverables accomplished in the first half of FY06 (4/1 – 9/30).**

- Sent breeders seed to collaborators (Cooper, Steffenson, Blake) by April 1.
- Planted preliminary yield trials and FHB collaborative trials in April.
- Collected breeder trait data from preliminary yield trials.
- Collected FHB severity and heading date data from FHB trials in Crookston.
- Harvested FHB plots in Crookston for DON analysis.
- Seed increase on 2008 Spring lines.
- Barley CAP workshop
- Planted 2008 CAP lines for DNA isolation.