

Barley Coordinated Agricultural Project Work Plan FY06 (4/1/07 – 3/31/08)

Richard D. Horsley, North Dakota State University

1. Describe the research, education, and outreach activities you are planning for the next year (4/1/07 – 3/31/08)

Research We will identify 96 six-rowed and 96 two-rowed barley lines for the “96 CAP breeding lines” for 2007 per the requirements outlined in the CAP Participants Guide. We will sow these lines in our intermediate yield trials (IYT) at six locations in North Dakota (Carrington, Fargo, Minot, Osnabrock, Tioga, and Williston) and one location in eastern Montana (Sidney). Each entry will be replicated three times at a location, including the CAP common checks Robust, Harrington, and Baronesse. We will collect data on heading date, height, stem length, lodging, and yield. Data on plump grain and grain protein concentration will be provided for those lines submitted for malting.

We will participate in a collaborative FHB trial with the four Midwest breeding programs (384 entries). We will send seed of our 192 CAP entries to Minnesota. We will sow our misted-inoculated FHB nursery at Osnabrock, ND in single 1.0 m row plots, 2 replicates per location in a RCB design including the checks Robust, Stander, MNBrite, Chevron, and CIho 4196. We will collect data on FHB severity and DON. All data collected from the above trials will be sent to Jennifer Kling in spreadsheets designed by her. We will send breeders source seed of our 96 CAP lines seed to Brian Steffenson (5 g), Blake Cooper (10g), and Tom Blake (10 g) for evaluation of other traits.

We will determine the preharvest sprouting (PHS) resistance of the CAP lines with a spring growth habitat. An experimental unit will consist of three seeds of an entry sown in a 6-inch pot in the greenhouse. Each entry will be replicated twice, along with the checks Robust (PHS resistant) and Stander (PHS susceptible). A PhD student, Ms. Jenny Bolivar, will oversee the screening of these lines and use the data for an association genetics study to identify QTL controlling this preharvest sprouting.

Outreach I will assist Dr. Schwarz and Ms. Karen Hertsgaard (IBMS Barley Communication Specialist) in preparing quarterly newsletters and a web page for the NDSU Institute of Barley and Malt Sciences. Information on the Barley CAP will be included in the newsletters and web page.

2. List specific outcomes and deliverables that will be accomplished in the first 6 months (4/1 – 9/30). These will be used as benchmarks for your bi-annual progress report.

- Send breeders seed to collaborators (Cooper, Steffenson, Blake) by April 1.
- Sow IYT and FHB collaborative trials in April or early May.
- Assist Dr. Schwarz and Ms. Hertsgaard in preparing IBMS newsletters and the web page.
- Send FHB severity data to Jennifer Kling by the end of September.

3. List specific outcomes and deliverables that will be accomplished in the second 6 months (10/1 – 3/30). These will be used as benchmarks for the bi-annual progress report.

- Submit grain samples from IYT to the USDA-CCRU for malting quality analysis in October.
- Submit grain samples from FHB trial for DON analysis in October.
- Send yield trial data to Jennifer King by the end of November.
- Sow seed for PHS trials in the greenhouse beginning in October.
- Assist Dr. Schwarz and Ms. Hertsgaard in preparing IBMS newsletters and the web page.

Barley Coordinated Agricultural Project Biannual Progress Report
FY06 (4/1/06 – 3/31/07)
Richard D. Horsley, North Dakota State University

1) Describe the research, education, and outreach activities you completed in FY06 (4/1/06 – 3/31/07)

Research: We identified the NDSU 96 six-rowed and 96 two-rowed CAP breeding lines for 2006 and 2007 per the requirements outlined in the CAP Participants Guide. For FY07, we will sow these lines in our Preliminary Yield Trials at Fargo and Osnabrock/Langdon, ND. In the FY06 experiments, entries were grown in 3-row (3m long) plots with three replicates per location, including the CAP common checks Robust, Harrington, and Baronesse. Data collected varied by location, but data for yield and heading date were collected from all locations. Plump grain and protein concentration data will come from malting quality analysis of grain samples done the USDA-ARS-CCRU. These data are expected around June 2007. We participated in a collaborative FHB trial with the four Midwest breeding programs (384 entries). We grew entries in our misted-irrigated and inoculated nursery in Osnabrock, ND. Entries were sown in single row plots, three replicates per location in a RCB design including the checks Robust, Stander, MNBrite, and Conlon. Disease levels were very low, so only data on disease incidence was recorded. Incidence was determined on each plot by counting the number of spikes out of 10 that were infected. Agronomic and FHB data were assembled and sent to Jennifer Kling in December. All plots were harvested for DON analysis will be submitted to the laboratory of Dr. Paul Schwarz for DON determination.

Seed of the spring growth habit CAP lines was received and they were sown in the greenhouse in January. Spikes will be harvested from each entry at harvest maturity and tested for dormancy. Spikes from each entry are currently being harvested as they reach harvest maturity, placed in plastic bags, and stored at -20°C. In summer 2007 we will determine percent germination of each entry to determine the level of dormancy for each entry. Ms. Jennifer Bolivar, a Ph.D. student funded by the CAP will be overseeing the dormancy screening as part of her dissertation research.

Outreach: I assisted Dr. Schwarz and the barley communications specialist in analyzing data from a survey of barley growers in North Dakota, Montana, and Idaho. To date there are over 266,000 data points in the survey. Some of the questions in the survey were developed to answer questions on how best to deliver outreach materials for the CAP.

2) List specific outcomes and deliverables accomplished in FY06 (4/1/06 – 3/31/07).

- Sent seed of FY06 CAP lines to collaborators (Cooper, Steffenson, Blake) by April 1.
- Grew 6R IYT, LP YT, 2R AYT, 2R AYT, and FHB collaborative trials in locations in North Dakota and Sidney, MT.
- Assisted Dr. Schwarz in hiring a communications specialist.
- Hired a PhD student with CAP funding to oversee dormancy screening of breeders' CAP lines in the greenhouse.
- Sowed breeders' CAP lines in the greenhouse in January for dormancy testing. Harvest of lines began in early March 2007 and dormancy screening will begin in June.
- Selected 96 six-rowed and 96 two-rowed lines for the FY07 breeders' CAP lines. Seed of these lines is being increased in Arizona and will be shipped to cooperators in mid-April.
- Assisted Dr. Schwarz and the Barley Communications Specialist in analyzing data from a four-page survey submitted to 5,000 barley growers in North Dakota, Montana, and Idaho. Preliminary results of the survey were presented at the CAP Conference in San Diego in January 2007.