

Barley Coordinated Agricultural Project Work Plan FY06 (3/1/06 – 2/29/07)
Richard D. Horsley, North Dakota State University

1) Describe the research, education, and outreach activities you are planning for the next year (3/1/06 – 2/29/07)

Research We will identify the NDSU 6-rowed barley 96 CAP breeding lines for 2006 per the requirements outlined in the CAP Participants Guide. We will sow these lines in our intermediate yield trials (IYT) at 7 locations in North Dakota (Carrington, Fargo, Minot, Osnabrock, Ray, Richardton, 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, lodging, yield, plump grain, test weight, and grain protein concentration.

We will participate in a collaborative FHB trial with the four Midwest breeding programs (384 entries). We will send seed of our 96 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 3 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). Spikes will be harvested at harvest-maturity, placed into plastic bags without further drying, sealed, and stored at -20°C until tested. For the PHS test, 100 kernels from each experimental unit will be randomly selected, placed into a petri dish containing two pieces of filter paper, and 4ml distilled water. The petri dishes then will be placed in a plastic bag and sealed, and the plastic bag will be placed into a dark growth cabinet set at $\approx 20^{\circ}\text{C}$. The total number of germinated kernels after 72 h will be recorded as the data determining PHS resistance. I will recruit and hire one PhD student that will work on determining the PHS resistance of the spring CAP lines and assist Dr. Paul Schwarz on his project determining LOX activity of all CAP lines.

Outreach I will assist Dr. Schwarz in hiring a communication specialist for the NDSU Institute of Barley and Malt Sciences. Responsibilities of this specialist will include development of a Web page and production of educational and promotional materials for the CAP.

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.

- 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 in hiring a communications specialist by July.
- Send FHB severity data to Jennifer Kling in August.

3) List specific outcomes and deliverables that will be accomplished in the second 6 months (9/1 – 2/29). 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 in October.
- Sow seed for PHS trials in the greenhouse beginning in October.

Barley Coordinated Agricultural Project Biannual Progress Report
FY06 (4/1/06 – 9/30/06)
Richard D. Horsley, North Dakota State University

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 identified the NDSU 96 six-rowed and 96 two-rowed CAP breeding lines for 2006 per the requirements outlined in the CAP Participants Guide. We planted these lines in our Intermediate Six-rowed Malting Barley Yield Trial (6R IYT) and the Low-Protein Malting Barley Yield Trial (LP YT) for the six-rowed lines and the Two-rowed Advanced Yield Trial (2R AYT) and the Two-rowed Intermediate Malting Barley Yield Trial (2R IYT) for the two-rowed lines. The 6R IYT was grown at seven locations (Carrington, Fargo, Minot, Osnabrock, Tioga, and Williston, ND; and Sidney, MT) and the LP YT was grown at four locations (Minot, Tioga, and Williston, ND; and Sidney, MT). The 2R AYT and 2R IYT were each grown at five locations (Carrington, Langdon, Minot, and Tioga, ND; and Sidney, MT). In all 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 in the 2nd half of the FY.

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. Data are being assembled and will be sent to Jennifer Kling in October. All plots were harvested for DON analysis.

We are waiting for seed of the spring growth habit CAP lines so we can sow them in the greenhouse in October. Spikes will be harvested from each entry at harvest maturity and tested for dormancy.

Education An offer for a PhD assistantship funded through the CAP was made in September to Ms. Jennifer Bolivar. Her dissertation research would include measuring the dormancy of the spring growth habit CAP lines and to use the data for association mapping.

Outreach I assisted Dr. Schwarz in hiring a communication specialist for the NDSU Institute of Barley and Malt Sciences. Responsibilities of this specialist will include development of a Web page and production of educational and promotional materials for the CAP. The specialist will begin work on November 1, 2006.

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.
- Grew 6R IYT, LP YT, 2R AYT, 2R IYT, and FHB collaborative trials in locations in North Dakota and Sidney, MT.
- Assisted Dr. Schwarz in hiring a communications specialist.