

Barley Coordinated Agricultural Project Work Plan FY06 (3/1/06 – 2/29/07)

Patrick Hayes, Oregon 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 have identified the OSU 96 CAP breeding lines for 2006 per the requirements outlined in the CAP Participants Guide. These lines are currently in trials at multiple locations (Corvallis, Pendleton, Pullman, Aberdeen, Filer, and Parma). The CAP common checks are Strider and 88ab536. We will collect data on heading date, height, lodging, yield, plump grain, and test weight.
- We will participate in a collaborative Vernalization trial with the Virginia and Idaho programs (~ 288 entries). The spring nursery will be planted in March, 2006 and the winter version in October, 2006. Seed has been received from cooperators. We will collect data on heading date, growth habit, and Vrn allele architecture. All data collected from the above trials will be sent to Jennifer Kling in spreadsheets designed in collaboration with Jennifer.
- We will send breeders source seed of our 96 CAP lines seed to Blake Cooper (10g) for increase and subsequent evaluation for other traits. We will heads of each of the same lines to Kevin Smith for DNA extraction.
- We will analyze data from the allele re-sequencing project and prepare a manuscript for submission.
- We will develop the CAP core set of 96 lines for screening on OPA 2. We will conduct the DNA extractions on this material and send DNA to Tim Close. We will also maintain archived bagged seed from each line in this core set.
- We will analyze data from the OPA2 screening of the core set and we will share data with project participants and prepare a manuscript for submission.
- We will analyze the OPA2 and OPA3 data from the mapping populations and construct linkage maps. We will share data with project participants and prepare a manuscript for submission.
- We will perform the coordinating and organizing functions detailed in the CAP management plan.

Education A Ph.D. student (Juan Rey) who will be working with malting quality genes and phenotypes. A Research Associate (Dr. Peter Szucs) will be working with the allele sequence data and map construction. CAP Project results will be integrated into my Introductory Genetics Class.

Outreach I will make a presentation at the Eucarpia Cereals Section in November, and I will present our marker assisted selection program with specific examples from the CAP project. I will describe Barley CAP activities at Field Days in June.

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 breeder seed to Cooper by April 1
- Send seed for DNA extraction to Smith by August 1
- Yield trials and spring-planted vernalization trial completed by August 1
- Field Days in June

- Send all data to Jennifer Kling in August
- Complete manuscript on re-sequencing project
- Develop core set, extract DNA to Tim Close, and grow reference seed

2) 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 PYT to USDA-CCRU for malting quality analysis in October
- Eucarpia meeting in November
- Complete linkage maps based on OPA2 and 3 data, in cooperation with the SCR
- Prepare linkage map manuscripts

Barley Coordinated Agricultural Project Biannual Progress Report
FY06 (4/1/06 – 9/30/06)
Patrick Hayes, Oregon State University

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

Research

- We identified the OSU 96 CAP breeding lines for 2006 per the requirements outlined in the CAP Participants Guide. These lines were planted, observed, and harvested. Data were obtained from Corvallis, Pendleton, Pullman, Filer, and Parma. The Aberdeen site was lost due to hail damage. The CAP common checks are Strider and 88ab536. Data were collected on heading date, height, lodging, yield, plump grain, and test weight. Samples were submitted for malting quality analysis at the CCRU and to the CAP participants for Beta glucan (Wise), food quality (Baik), and lipoxygenase (Schwarz). Barley stripe rust disease severity (%) and scald (1 – 9 rating) were recorded at Corvallis, Oregon. All data collected from the above trials are in the process of being entered into CAP spreadsheet format for submission to Jennifer Kling.
- We organized and obtained data on the first phase of a vernalization sensitivity trial in cooperation with the Virginia and Idaho programs (288 entries). The spring nursery was planted in March, 2006 and seed is prepared for planting in October, 2006. Data were collected on heading date and growth habit.
- The process of increasing and maintaining winter habit lines was modified due to the lack of adaptation of winter material to Ft. Collins spring-sown conditions (e.g. the seed increase and DNA source nurseries maintained by Blake Cooper, BARI). Instead, we used our own purification head rows and submitted single head samples to Kevin Smith for DNA extraction.
- We have analyzed data from the allele re-sequencing project and are preparing a manuscript.
- We developed a CAP core set of 102 accessions for Pilot OPA-1, Pilot-OPA 2 and Pilot-OPA 3 screening. Six of these accessions were already in the germplasm array selected by IPK/SCRI/UCR. Therefore, we solicited accessions from CAP participants to generate a set of 96. We grew these 96 accessions at OSU; extracted DNA from each accession and sent DNA to Tim Close for Illumina genotyping. We also sent DNA from the same extraction event to Triticarte for DaRT genotyping. We archived one head of each of the 96 accessions. We provided seed of the 96 lines to Shioman Chao for Pilot-OPA 1 genotyping: she will obtain seed of the remaining 6 lines from the originators.
- We are compiling the data from Pilot-OPA 1, 2, and 3 and DaRT genotyping of this CAP core set (in cooperation with Tim Close); we will share these data with CAP participants pre-publication; and we will analyze these data and prepare a manuscript.
- We are analyzing the DaRT, Pilot-OPA2 and Pilot-OPA3 data from the mapping populations and constructing linkage maps. The Pilot-OPA2 data for the OWB mapping population were received from Tim Close and preliminary maps have been constructed. We will share these data with CAP participants pre-publication (based on an agreement reached with GrainGenes for password protected access to the map data and c-map). Based on discussions and email with UCR, SCRI, and IPK we have a

general outline of responsibility for map construction and report writing. OSU will focus on the OWBs; the SCRI on SM; and the IPK on MB. UCR will be responsible for data generation, quality control, and compilation. Publication credit will be given to all participants. There are many opportunities for research and publication with these data sets. We are keen to share the data and collaborate

- We are performing the coordinating and organizing functions detailed in the CAP management plan.

Education

- A Ph.D. student (Juan Rey) started his thesis research on marker assisted selection (MAS) for winter hardiness and human nutrition traits.
- A Research Associate (Dr. Peter Szucs) is working with the allele sequence data and map construction.
- CAP Project results are being integrated into Introductory Plant Genetics (CSS430).

Outreach

- Presented information on the Barley CAP at the August 2006 ITMI meeting
- Prepared presentation for the Eucarpia Cereals Section in November 2006
- Barley CAP was described at two Corvallis, Oregon Field Days and at the Pendleton and Moro Field Days
- Prepared feature on Oregon CAP for CAP Newsletter

List specific outcomes and deliverables accomplished in the first half of FY 06 (4/1 – 9/30). These will be used as benchmarks for your bi-annual progress report.

- Sent breeder seed to Cooper but based on lack of adaptation, proceeded to use our own seed source instead
- Sent seed for DNA extraction to Smith
- Harvest of yield trials and spring-planted vernalization trial is completed
- Field Days attended and presented CAP information
- Data formatted for submission to Jennifer Kling
- Writing of re-sequencing project manuscript in progress
- Developed CAP core germplasm set, extracted DNA and sent to UCR and Triticarte; produced archived seed samples
- Obtained Pilot-OPA 2 data and initiated map construction