

Barley Coordinated Agricultural Project Work Plan FY06 (3/1/06 – 2/29/07)
Stephen Neate, North Dakota State University

1) Describe the research, education, and outreach activities you are planning for the next year (4/1/07 – 3/29/08)

Research We will organize delivery of the set of 384 lines from each of the CAP Midwest collaborators. To test these lines for common root rot resistance we will continue a collaboration with Scott Halley at the Langdon Research and Extension Center and negotiate access to land on which cereals have been grown continuously for at least 2 years so that common root rot inoculum is present. As well the land needs to be relatively weed free and light and friable to ensure we get the necessary seeding depth. We will negotiate for the Extension Center staff to cultivate and harrow several times to ensure a soft, deep seedbed. We will plant the Common Root Rot lines at Langdon in a single trial with 8 replications and single row x 8ft plots following the protocols developed by Kelly Tirkington AAFC Lacombe Research Centre, Canada. At mid to late dough stage we will harvest subcrown internodes from at least 10 plants per plot and they will be returned the laboratory for disease assessment.

We will also participate in a collaborative FHB trial with the four Midwest breeding programs (384 entries). We will plant two misted and inoculated FHB nurseries (Fargo and Langdon, ND) in single row plots (1.5 m long), 2 replicates per location in an augmented block 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 Jennifer Kling in spreadsheets designed in collaboration with Jennifer.

Education I have one PhD student, Sanjay Gyawali, that will be working on common root rot disease of barley . He will be involved in the common root rot disease screening trials described above. We will employ an undergraduate student from May to August 2007 and they will spend time working on the common root rot experiments and will learn about the disease and the aims of the CAP project. A second undergraduate student will be employed from September to April to assist in the laboratory and greenhouse and that student will learn about controlled environment handling of the screening and will assist with the assessment of disease samples collected from the field over summer.

Outreach I will include details about the CAP project in my presentation at the 62nd Annual ND State Barley Show at Osnabrock ND in March 2007. I will include details about the CAP project at ND Research and Extension Centre farmer meetings in July 2007.

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.

- Validate in-vitro and greenhouse screening methods for common root rot resistance
- Co-ordinate shipping, accept and catalogue breeders seed sent from collaborators by April 1
- FHB collaborative trials planted in April or early May.
- Common root rot trial planted in April or early May.

3) List specific outcomes and deliverables that will be accomplished in the second 6 months (10/1 – 3/31). These will be used as benchmarks for the bi-annual progress report.

- Submit grain samples from FHB trial for DON analysis in September.
- Send CRR resistance data to Jennifer Kling in January
- Send FHB data (severity, DON and incidence) to Jennifer Kling by February

Barley Coordinated Agricultural Project Biannual Progress Report
FY06 (4/1/06 – 3/31/07)
Stephen M. Neate North Dakota State University

1) Describe the research, education, and outreach activities you completed in the second half of the FY06 (10/1/06 – 3/30/07)

Research The subset of OPAH2 lines available with 500g of seed were tested in large scale field screening for resistance to common root rot in the summer of 2006. Throughout winter, the approximately 9000 plants from the field trial were prepared by stripping the membrane off the subcrown internode and were then assessed for disease. The results have now been tabulated and means calculated. Preliminary experiments involving in-vitro assessment of common root rot resistance in the OPAH2 line subset have been completed and show differences between lines. A subset of the OPAH2 lines has been tested in preliminary experiments in small pot trials in the greenhouse in an attempt to develop more efficient screening methods than field testing.

We participated in a collaborative FHB trial with the four Midwest breeding programs (384 entries). We planted two misted and inoculated FHB nurseries (Fargo and Langdon ND). In the last half of FY06 barley heads from each plot were threshed and subsampled for DON analysis. After grinding, DON was determined in the samples with analysis completed in February 2006. The tabulated data from field measurements and DON analysis was forwarded to leader of this research area and uploaded in February 2007.

Education One graduate student was recruited and is now working on the project. The PhD student, Sanjaya Gyawali has completed a literature survey of techniques for screening common root rot. Gyawali implemented the design, planting, maintenance and disease assessment of the common root rot controlled environment and greenhouse trials, as well as data tabulation from the field.

Outreach

The Barley CAP was described in a research in talk on “Inheritance and mapping of resistance genes to leaf rust and septoria speckled leaf blight in barley” on 27th February 2007 at Agriculture and Agri-Food Canada , University of Manitoba.

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

- Undertook in-vitro and greenhouse experiments on validating screening methods for common root rot in-vitro and in the greenhouse.
- Completed cleaning and common root rot disease assessment of 9000 sub-crown internodes
- Prepared samples and oversaw DON analysis of FHB Midwest screening population. Submitted field and DON analysis data for uploading into the database.