

USWBSI Durum CP Planning Meeting Report

Fargo, ND

April 4, 2011

The 2011 Durum CP Planning meeting was held in Loftsgard Hall on the North Dakota State University Campus, Fargo, ND on April 4, 2011. The meeting was announced through the USWBSI Scab listserve, both researchers and stakeholders were invited to attend. There were eight attendees present, including Larry Swanson (Durum Grower, ND), Xiwen Cai (NDSU), Shahryar Kianian (NDSU), Elias Elias (NDSU), Marcia McMullen (NDSU), Rachel McArthur (NDSU), Steven Xu (USDA-ARS), and Shaobin Zhong (NDSU). Brad Miller was unable to attend the meeting due to a family emergency. Shiaoman Chao was unable to attend due a scheduling conflict.

The meeting began with a discussion led by Marcia McMullen about what the changes would be in the upcoming year concerning the funding on the Scab grants. Funding for 2011 would be cut by 14%. For 2012 money would no longer be earmarked, but go directly into the USDA budget. She then went on to discuss new changes and additions to the Scab Smart website.

The members then discussed the recent progress, future plans, and continued collaborations between the durum projects. Individual PIs talked about their ongoing collaborations between projects and which areas each project should focus on. They also discussed their FHB results for the past year and their individual and collaborative plans for the coming year.

Marcia McMullen has continued to promote the Scab Smart website and add in important information regarding new durum cultivars and fungicides. She has also conducted several durum integrated management studies at the Carrington and Langdon Research Extension Centers on optimum fungicide use. This study indicated that the durum cultivar Divide had the lowest FHB severity among the ND durum cultivars, and that when Prosaro fungicide was used there was a significant reduction in FHB severity. Also as part of this durum integrated study it was found that durum wheat fields which had Canola planted as the previous year's crop showed a significant increase in yield. She plans to continue promoting the Scab Smart website for use by growers, commodity groups, breeders, and researchers.

Elias Elias has continued to advanced durum breeding lines from crosses between ND Durum cultivars and Tunisian lines which have exhibited resistance to FHB. These derivatives exhibited 30% disease severity in the field, but didn't maintain quality values. He and Sharyar Kianian believe that there is possibly a suppressor to the resistance gene on the 2A chromosome. His project has screened approximately 8,000 durum lines from the world collection, and have screened approximately 3,000 of 15,000 ICARDA accessions for FHB resistance. His group will continue to identify new sources for resistance and to develop durum varieties with greater FHB resistance.

Shaobin Zhong has evaluated 42 accessions of the *T. timopheevii* subsp. *timopheevii* with spring growth habit for FHB resistance in the scab nursery at Fargo, ND. The accessions showed varying degree of susceptibility/resistance to FHB infection, with disease severity ranging from 30% to 83%. Another 240 accessions of *T. timopheevii* subsp. *armeniicum* with winter growth

habit are currently being grown with plans from FHB screening in the summer of 2011. He continues to provide FHB inoculum to several durum research groups at NDSU, including but not limited to the research groups of Xiwen Cai, Elias Elias, and Sharyar Kianian.

Sharyar Kianian with the help of Elias Elias conducted genetic and phenotypic characterization of a collection of advanced breeding lines derived from a Tunisian source. Lines were evaluated in several field locations and the greenhouse. These lines were genotyped using approximately 8,000 DArT markers. Several lines have showed good resistance in these two populations and will be forwarded on to Elias' breeding project. A second greenhouse screening is underway and at the conclusion of the screening, genome-wide association analysis for identification of important regions will begin.

Steven Xu has recently identified two major FHB resistance QTLs on chromosome arms 5AS and 5AL in the hexaploid wheat accession PI 277012. He has transferred two major QTLs into the durum cultivar "Lebsock". In addition a BC₁F₅ line with two QTLs has been crossed with Lebsock, Tioga, and two other advanced durum breeding lines. He has also developed several advanced lines from the backcrosses of *T. carthlicum* and *T. dicoccum* with ND durum cultivars which have consistently showed low disease severity. Three of these lines have been sent to the Wheat breeder at Virginia Tech, and three lines have been given to Elias Elias; for use in their breeding projects. His group has evaluated approximately 1,800 DH and BC lines derived from *T. carthlicum* and *T. dicoccum* with ND durum varieties in several ND field nurseries to further confirm FHB resistance. He will continue to develop elite durum germplasm lines with enhanced resistance from tetraploid and hexaploid relatives.

Xiwen Cai has selected several hundreds of durum segregants with improved FHB resistance from the crosses between resistant hexaploid wheat and durum in the greenhouse. In addition, some of the segregating materials at early generations (F₂, F₃, and BC₁F₂) have been planted in the scab nurseries to select resistant segregants at Jianyang, China and Fargo, ND. Also, they have observed that FHB resistance QTL exhibit less effectiveness of resistance in durum than hexaploid wheat. By collaborating with Steven Xu, they have found that D genome of hexaploid wheat might contain the gene with the capacity to enhance the effectiveness of FHB resistance QTL. They will evaluate a complete set of disomic durum "Langdon"-D genome substitution lines for FHB resistance in the greenhouse. This will potentially provide a better understanding of the role D-genome chromosomes play in FHB resistance and enhance resistance of durum to FHB.

Frank Manthey has continued to collaborate with Elias Elias in evaluating durum breeding materials that have showed some FHB resistance for quality traits. Shiaoman Chao has continued to support durum FHB research groups in the genotyping of durum breeding and genetic materials at the various molecular marker loci of interest.

The attendees discussed suggestions on current and future research and discussed possible future collaborations between projects. Current progress, future plans, challenges, and milestones were discussed by the attendees. The ability to meet in this fashion allows for the researchers to get a good grasp on what one another is doing in their respective research and how they can help one another to solve the various challenges they each face in their FHB research within the USWBSI.