

USWBSI Durum CP Planning Meeting Report

Fargo, ND

March 24, 2009

The Durum CP planning meeting was held on the North Dakota State University campus, Fargo, ND on March 24, 2009. The meeting was announced through the Scab Listserv and durum researchers and stakeholders were invited to participate in the meeting. Nine of them attended the meeting, including Brant Baker (WestBred, LLC), Xiwen Cai (NDSU), Shiaoman Chao (USDA-ARS), Elias Elias (NDSU), Prem Jauhar (USDA-ARS), Shahryar Kianian (NDSU), Frank Manthey (NDSU), Rachel McArthur (NDSU), Steven Xu (USDA-ARS), and Shaobin Zhong (NDSU). Brad Miller did not make it to the meeting due to flooding on the road. Jim Quick could not attend the meeting because of time conflict. Marcia McMullen was not able to attend the meeting due to time conflict with another meeting.

Upon the request of Marcia McMullen, the meeting began with the demonstration of the Scab Smart and discussion of what information the DUR-CP could submit to the website. Attendees felt that recently released durum varieties and related information should be posted on this website, which allows growers and industries to have a better access to the varieties. Brant Baker mentioned that the variety “DG Star” they developed with FHB resistance could be posted on this website. Brad Miller also indicated their willingness to post “DG Star” on this website in an email to Marcia McMullen and Xiwen Cai. Prem Jauhar brought up a disomic durum-*Thinopyrum elongatum* addition line he developed with FHB resistance. But it may not be suitable to be posted on this website because it is a germplasm line with an entire alien chromosome, rather than a variety.

After that attendees discussed the milestones, research progress, and future plans of individual durum projects. The attendees felt that the urgent needs of the DUR-CP are to identify effective sources of resistance and to implement effective resistance genes in the superior durum varieties. Individual PIs talked about their FHB research results and plans for future FHB research.

Elias Elias has developed advanced durum breeding lines from the crosses of the adapted durum varieties with Tunisian lines resistant to FHB and Sumai 3. Some of these lines exhibited improved resistance and are in advanced yield trials. Lines that have higher yield than the current grown durum cultivars with similar quality will be released as improved cultivars. Lines with improved FHB resistance but undesirable yield or quality will be released as germplasm. His group will continue to identify novel sources of resistance and to develop superior durum varieties with enhanced resistance to FHB.

Shahryar Kianian, in collaboration with Elias Elias, has identified DArT markers associated with FHB resistance and FHB resistance QTLs in the Tunisian lines through association mapping. His group has been converting the DArT markers to STS markers. He plans to analyze more Tunisian lines-derived breeding materials using molecular markers and to verify the QTL they have identified.

Steven Xu has evaluated about 1,000 accessions of tetraploid relatives of durum and identified *Triticum dicoccum* and *T. carthlicum* accessions with better resistance than current durum

varieties. His group developed five DH populations from the resistant relatives and adapted durum varieties. These populations have been utilized for mapping of the FHB resistance QTL and selection of breeding materials with improved resistance. To date, they have developed about 20 durum lines derived from the resistant *T. dicoccum* and *T. carthlicum* accessions through backcrossing with adapted durum varieties. He will continue to make efforts toward the development of elite durum germplasm lines with enhanced resistance from the tetraploid relatives.

Prem Jauhar developed several disomic durum-*Thinopyrum elongatum* addition lines with FHB resistance. But they cannot be utilized directly in durum breeding because they contain one pair of *Th. elongatum* chromosomes that harbor undesirable genes in addition to FHB resistance genes. Further chromosome manipulation is needed to introgress the alien chromatin containing FHB resistance genes into wheat genomes.

Shaobin Zhong has screened durum breeding materials and germplasm for FHB resistance for Elias Elias and Steven Xu in the greenhouse and fields. He provides a newly-prepared FHB inoculum containing four *Fusarium graminearum* isolates to several FHB research groups at NDSU. He plans to screen more *T. timopheevii* accessions for FHB resistance and to transfer resistance genes from *T. timopheevii* accessions with FHB resistance to durum.

Frank Manthey has collaborated with Elias Elias in evaluating durum breeding materials with FHB resistance for quality traits.

Shiaoman Chao has indicated her consistent support to durum FHB research groups in genotyping of durum breeding and genetic materials at the molecular marker loci of interest.

Brant Baker mentioned the durum variety DG Star with FHB resistance and indicated willingness to post “DG Star” on the Scab Smart website.

Xiwen Cai has identified new STS marker loci within the chromosomal interval harboring the FHB resistance QTL *Qfhs.ndsu-3AS* derived from *T. dicoccoides*. Fine mapping of this resistance QTL has been performed in the large F₂ population with 2,000 individuals segregating at the QTL. He plans to transfer FHB resistance genes from hexaploid wheat and alien species to durum and to develop elite durum germplasm with improved resistance.

In summary, attendees discussed progress, milestones, and future plans of the DUR-CP. Also attendees provided constructive suggestions to individual research projects and discussed collaboration opportunities among the projects. Thereby, this meeting allows attendees to better understand durum FHB research progress and to better coordinate durum FHB research within the USWBSI.