

SPEAKER AND POSTER ABSTRACTS



2010 U.S. Wheat Genomics Workshop

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SESSION I: MARKER-BASED BREEDING STRATEGIES

Marker-assisted breeding and the harsh reality of cultivar development.

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The promise envisioned decades ago for marker-assisted selection (MAS) in plant breeding has been only partially realized. First proposed as a means to improve complex traits with low heritability, MAS has been primarily employed for improving traits with simple inheritance and high heritability. This talk will address using MAS in the present for simple traits and the potential utilization for complex traits in the near future. The Ohio State University wheat breeding program currently uses MAS for improving some key traits where single genes or major QTL are available and effective. The program primarily uses an aggressive backcrossing (BC) scheme where backcrossing is initiated early in the variety-development phase using many recurrent parents. The annual fate of any BC population depends on the performance of the recurrent parent in ongoing cultivar-development evaluations. This scheme and the reasons for using it will be presented.

Most key traits for Ohio, such as yield, are truly quantitative and there are few, if any, useful QTL such that traditional MAS has had little impact. A recent analysis of yield gain in the U.S. indicates that the rate of yield improvement needs to be increased by 25 to 50% to increase yield by 35% in 25 years. A plan to utilize historical trends, association analysis, and genomic selection to attain that rate of gain will be presented.