

Scab resistance in durum wheat

September 16 2011

Durum wheat is a valuable cereal crop widely used for human consumption in the United States, Canada, and several European countries. Scab or Fusarium head blight is one of the crop's most serious diseases, reducing its grain yield and quality. Current durum cultivars don't have resistance to this widespread disease.

While working on the Durum Germplasm Enhancement Project (DGE), Dr. Prem Jauhar and staff at the USDA-ARS Northern Crop Research Laboratory, Fargo, ND discovered that a diploid wheatgrass contains the genes needed for scab resistance. The team produced a new wheat line called DGE-1 by incorporating a specific wheatgrass chromosome 1E into durum cultivars. Released in 2008, the DGE-1 line has 30 chromosomes, 28 coming from durum wheat and a pair from wheat grass. This is the first time a wheat line with enhanced scab tolerance was produced by Dr. Jauhar's DGE project.

For stable scab resistance, however, it's necessary to transfer the [resistance genes](#) from the added wheatgrass chromosome into related durum wheat chromosomes. This transfer is most likely to occur when the [target](#) chromosomes are in a single dose, but normally chromosomes are in pairs. Through several crosses involving the DGE-1 line, Dr. Jauhar was able to produce hybrid strains of durum wheat in which the grass chromosome 1E substituted its counterparts 1A and 1B of durum wheat. Jauhar's team used a technique to identify wheatgrass chromosomes incorporated into durum. By using [molecular markers](#) for these specific chromosomes, the scientists were able to identify these chromosomes rapidly and economically.

"These studies on chromosome engineering will help bring about genomic reconstruction that will have far-reaching implications in both basic and applied research on wheat," said Jauhar. This research is ongoing in the Cereal Crops Research Unit of the USDA-ARS Northern [Crop Research](#) Laboratory in Fargo.

More information: www.crops.org/publications/tpg/articles/4/2/102

Provided by American Society of Agronomy

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