SAT Trends

Issue 105, October 2011

Search for the sorghum stoics

Scientists search for drought resistant sorghum varieties

Performance of IS 12531 under WW and WS conditions.

Sorghum is the fifth most important cereal crop, widely grown for food and feed purposes. The crop is frequently subjected to drought, particularly during the grain-filling period, which causes leaves to dry, leading to poor grain quality and reduced yields. In a study led by ICRISAT, scientists evaluated a sorghum reference set (http://www.generationcp.org) under well-watered (WW) and water-stressed (WS) conditions to identify drought tolerant lines.

Scientists developed and molecularly profiled a composite collection (3372 accessions) from ICRISAT's entire sorghum collection (33,100 accessions) using 41 simple sequence repeat (SSR) markers, and constituted a reference set (384 accessions) representing all five races, ten intermediate races and geographic regions/countries.

Using 2007/08 postrainy season data on days to 50% flowering (DTF) at Patancheru, India, the reference set accessions were grouped into seven phenological groups based on two week intervals from the earliest flowering accessions (36) with 54-68 DTF, to the very late flowering accessions (8) with 139-149 DTF. Each group of accessions with controls was evaluated in a split-plot design with three replications during the 2008/09 and 2009/10 postrainy seasons at Patancheru. WS and WW moisture regimes were the main plots, while accessions within moisture regimes were the subplots.

In another experiment, 152 selected reference set accessions and 58 QTL introgression lines were evaluated for water extraction (WE) and transpiration efficiency (TE) under terminal

WS and WW conditions in PVC cylinders during the 2008-09 and 2009-10 postrainy seasons under rainout shelters.

The reference set was also evaluated at ICRISAT Mali and Kenya to identify promising drought tolerant accessions. The promising accessions were evaluated across multi-locations by NARS in Asia and Africa for stover/grain yield and component traits.

Scientists observed a large range variation for SPAD Chlorophyll Meter Reading (SCMR), grain iron (Fe) and zinc (Zn) contents, WE, and TE among accessions. Five accessions had higher SCMR both at flowering and 30 days after flowering and four accessions had high Fe and Zn both under WW and WS conditions. Wild type had higher Fe and Zn contents than cultivated types. Scientists have now identified 15-30 promising drought tolerant lines for different locations in Asia and Africa based on least reduction in grain yield or good performance under WS, stay-green, SCMR, TE and rate of water loss per unit of leaf area under terminal drought conditions.

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