

Germplasm Enhancement of Maize

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Introduction

The mission of the Germplasm Enhancement of Maize (GEM) Project is to effectively increase the diversity of U.S. maize germplasm utilized by producers, global end-users, and consumers. The mission will be achieved through a collaborative effort between USDA-ARS and both public and private research scientists by utilizing exotic, public, and proprietary maize germplasm. The resulting germplasm and associated knowledge, derived via the identification and incorporation of favorable alleles for prioritized traits from exotic sources, is utilized in private and public breeding programs and ultimately contributes to increased genetic diversity of maize grown by producers and improved product performance. In addition, the GEM project provides opportunities for training plant scientists in the enhancement and utilization of un-adapted germplasm. This contributes to the global sustainability of agricultural production, economic stability, and the nutrition and well-being of society.

Ames and Southeast Farm Highlights

Germplasm developed in the Ames nursery was top crossed to tester inbreds in isolation blocks planted in Ames. The resulting hybrids were planted and harvested with a twin plot TR88 combine at the two ISU Research Farms (Ames and Crawfordsville) and at other locations throughout the Midwest by a network of private seed companies who are GEM cooperators.

- Approximately 14,800 plots (2,330 entries) were managed or coordinated at Ames.

- Approximately 4,300 nursery rows and 1,500 isolation rows were managed at Ames.
- One hundred-seventy (170) top cross hybrids exceeded the mean yield of the check hybrids in Midwest trials in 2007. This was a significant improvement of performance over last year, when 88 yielded above the check mean. Twenty-one of these top crosses were from second year trials, and 149 were from first year trials. Twenty-six top crosses exceeded the yield of the top commercial check hybrid. Twenty-five of these were from first year trials. One was from second year testing and is the new recommended line, BVIR155:S2012-029-001, which was derived from germplasm originating from the British Virgin Islands.

Results and Discussion

Ten new GEM lines were recommended for release based on 2007 trial and quality trait lab results. Two of the lines had protein content above 13%, and one line had oil content above 5%. The lines were distributed to GEM public and private cooperators for the 2008 planting season and will be used for research and breeding programs to broaden the germplasm base.

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