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## INTSORMIL: International Expertise Benefits U.S. Sorghum and Pearl Millet Producers

INTSORMIL

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# INTSORMIL: International Expertise Benefits U.S. Sorghum and Pearl Millet Producers

# INTSORMIL



**In 2005 INTSORMIL germplasm contributed to \$680 million worth of grain sorghum production in the U.S.**



## Battelle

*The Business of Innovation*



While USAID is focused on international assistance and outreach, the Collaborative Research Support Programs (CRSPs) also benefit farmers in the United States. By establishing strong relationships with national agricultural research systems in other nations, U.S. research collaborators gain access to knowledge and expertise in crops native to these countries. Thus, the CRSPs effectively operate as a two way street, extending U.S. scientific and research expertise to collaborating nations while receiving valuable insight and access to germplasm from other production environments for U.S. agricultural deployment.

INTSORMIL CRSP principal investigators, located at leading U.S. universities (Kansas State, Mississippi State, Nebraska, Purdue, Texas A&M and West Texas A&M) and the USDA leverage their skills in sorghum and millet to help boost the economic viability and productivity of these crops for American farmers. Both sorghum and pearl millet are produced in a dynamic environment in which new diseases and insects emerge, insect pests evolve resistance to pesticides, climatic conditions change, and market demands and preferences change. Within this changing environment, INTSORMIL plays a critically important role in predicting U.S. issues and needs relating to sorghum and millet and proactively works to develop new grain or forage hybrids, diagnostic tools, and strategies to keep these crops at the cutting edge of agricultural productivity. What are some specific examples as to how the INTSORMIL program has benefited U.S. farmers and the U.S. agricultural research community?



**USAID**  
FROM THE AMERICAN PEOPLE

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**Institutional Capacity Building-** The INTSORMIL program has trained more than 1,000 U. S. and national program scientists to MSc. and Ph.D. degrees and these scientists are actively involved in sorghum and millet technology development and transfer programs both in the U.S. and in developing countries. INTSORMIL has been proactive in human capital capacity building through the establishment of a well-linked, international network of sorghum and millet scientists. This is illustrated in the photo, taken at a 2006 congress in Ethiopia, with four generations of INTSORMIL trained U.S. and national scientists who are all currently contributing to sorghum and millet research programs in Ethiopia and at Purdue and Kansas State University.



**Mentors from left to right: Dr. Brhane (VA Tech, Ethiopia), Dr. Gebisa Ejeta, Purdue, Dr. Mitch Tuinstra, Kansas State University, Dr. Tesfaye Tesso, Ethiopia and current Ph.D. student, Taye Tadesse, Ethiopia.**

**Exotic Germplasm: Sorghum and Pearl Millet Hybrids for U.S. Producers-** Research conducted at INTSORMIL institutions forms the core germplasm for which a high percentage of the sorghum grain and forage hybrids is grown in the United States. At least 60 percent of sorghum hybrids in the United States have at least one parent from the INTSORMIL-affiliated Texas A&M program. Since 1996, the INTSORMIL program at Texas A&M has released to private industry 213 sorghum lines.

**Pest and Disease Resistant Hybrids for U.S. Producers-** Many hybrids demonstrate susceptibility to diseases and insects such as sorghum downy mildew or the greenbug. Damage by greenbug (see photos) to sorghum is estimated to cost U.S. producers \$248 million annually. Economic gains to the U.S. from greenbug-resistant sorghum hybrids, developed by Texas A&M University and DeKalb Plant Genetics Corp. using germplasm from Russia, were \$389 million in 1991.



#### **Food and Feed Quality Sorghums for U.S.**

**Consumers-** There is a growing U.S. domestic and export market demand for new white grain and tan plant i.e. food-grade sorghums for use in ethnic foods, snack foods, and gluten-free food applications. Originated from African varieties, specialized varieties of pearl millet are being introduced for U.S. market uses. The U.S. bred pearl millet hybrid, Tifgrain 102, with Senegalese parentage, has high value as a poultry feed, as a feed for rearing bobwhite quail used in the recreation industry and as an efficient bioenergy source (higher extraction return than ethanol produced from corn grain). More than 4,000 acres of the new hybrid Tifgrain



102 were grown in the U.S. in 2005 and more acres would have been planted if seed had been available.

The development of food-grade sorghums is contributing to the development of new value-added industries in the United States. In Kansas, for example, the Sorghum Technologies Initiative, a farmer owned company, was established in 2005. Using food-grade sorghums, new food products (waffles, pizza

dough mixes, sorghum bread flour [see photo of apple bread fresh from the oven, Gnow Bone Sorghum Mill, Nashville, TN] etc.) are being developed and marketed to the U.S. food products manufacturing industry. Annual return on research investment to develop food grade grain sorghum has been estimated to be about 40%.



#### **Drought Resistance-** Water

shortages and drought are a common threat to crop production on the semi-arid midwestern plains (See photo: Dry Platte River in Nebraska). Compared to corn and soybeans, sorghum and



millet have high tolerance to drought. "Stay-green" sorghum hybrids bred by U.S. scientists have demonstrated significant yield increases in the United States versus standard sorghum hybrids/ varieties in drought-stress conditions. Yield trials showed

production of 4,060 kg/ha with stay-green hybrids versus just 2,289 kg/ha for standard hybrids under drought-stress conditions and the stay-green hybrids also yielded slightly better under non-drought conditions.

**U.S. Sorghum Production-** In 2005, INTSORMIL-related grain sorghum germplasm contributed to \$679.6 million worth of grain sorghum production in the U.S. Since INTSORMIL began operations in 1979, sorghum yields in the U.S. have trended from 59 bushels per acre to 65 bushels per acre in 2005, the direct value of which is \$71.5 million. Considering the annual budget of INTSORMIL, it can be seen that just in terms of yield increases for U.S. sorghum the U. S. is achieving a substantial real net return on its investment in INTSORMIL. These benefits accruing to the United States are in addition to the central mission of INTSORMIL: to increase research and development capacity and improve sorghum and millet production in the developing world.



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