Recently, the sugarcane aphid has had sorghum farmers and breeders biting their nails as the tiny green pest bullies its way from Louisiana to Kansas, destroying sorghum fields along the way. The aphid was originally identified in Florida in 1977, but it wasn’t a major sorghum pest in the U.S. until just two years ago. A known pest in some parts of Africa, the sugarcane aphid got its first taste of American sorghum 2013 and didn’t look back.

After crossing into the Beaumont area of South Texas in late 2013, the aphid worked its way through the Rio Grande Valley in northern Mexico and devastated sorghum. In fact, growers lost up to 50 percent of grain sorghum yield in infested fields during 2013. This represented a nearly $8 million loss for growers in 2013 alone.

The sugarcane aphid has been progressively expanding its range ever since. It has proven to overwinter well in the sorghum-producing areas of the U.S., and is now identified as a pest in the entire sorghum production region south of the Mason Dixon Line and east to the Atlantic Ocean. Its impact has been seen in all major sorghum-producing states, including Texas, Oklahoma and Kansas.

The most promising line of defense against the sugarcane aphid is in the development of resistant sorghum lines. However, breeding for resistance is a slow and painstaking process that can take years. Luckily for U.S. sorghum producers, breeders have been working on this problem for nearly 30 years through germplasm exchange and international collaboration, long before the aphid began wreaking havoc on American soil.

INVESTING IN RESEARCH FOR FUTURE BENEFIT

This isn’t the first time long-term research investments have paid off for the sorghum industry. In the 1980s, a similar pest called the greenbug aphid infested U.S. sorghum fields, leaving significant economic losses in their wake. However, thanks to the INTSOR MIL® program and the exotic germplasm collection it funded, host plant resistance was developed, saving an estimated $389 million in economic losses for the United States in 1989 alone (equivalent to nearly $750 million in 2015 dollars). The investments made in Kansas, Texas and Nebraska on greenbug resistance is estimated to have generated a 48.2 percent rate of return on investment.

INTSOR MIL was a USAID-funded program aimed at improving opportunities for sorghum and millet throughout the developing world and was in existence from 1979-2013 before being transitioned into the Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet (SMIL). Its existence supported the work of researchers like Gary Peterson, a sorghum breeder who first started working on sorghum pest resistance under the program.
Peterson’s first area of focus was on the greenbug sorghum pest, and he, along with numerous other researchers, conducted countless screenings of thousands of sorghum lines in search of resistance. While screening for greenbug resistance, they also identified some of the best lines for sugarcane aphid resistance, a quality that is now proving to be very important in addressing the needs of today’s sorghum industry.

**SOLUTIONS FROM ABROAD**

With the rise in prevalence of the sugarcane aphid, Peterson and a long list of other breeders have been looking harder at the sorghum lines they have developed and screened, and they have found those that show great promise for resistance. The origin of many of these lines is far from American soils.

According to Peterson, investment by INTSORMIL supported significant amounts of germplasm exchange from around the world, and it was through the lines introduced from Africa that breeders identified sugarcane aphid resistance.

The main line of focus for this resistance now is the Tx2783, which was developed in majority from Ethiopian sorghum lines. Already known for its greenbug resistance, Peterson and his team had Tx2783 sent to Botswana for evaluation and, as hoped, it showed sugarcane aphid resistance as well.

Many of the experimental lines currently being evaluated for resistance derive from Tx2783 or a Tx2783 derivative, and breeders are hopeful that the resistance found in Tx2783 can be applied in the development of new sorghum varieties to combat the devastating pest.

**MAKING THE SUGARCANE APHID A PROBLEM OF THE PAST**

Peterson is actively working with other researchers to evaluate these lines and identify those that are the most promising. Just as many of the genetics originate in African countries that have been dealing with the sugarcane aphid for decades or centuries, U.S. researcher partnerships also extend to the African and international experts in the area.

The hope, says Peterson, is to pull together all the resources possible to develop sorghum varieties that display resistance and make the economic devastation caused by the sugarcane aphid a thing of the past. Because of the years of investment by INTSORMIL and SMIL, the focus they have placed on international collaboration and information sharing, the development of those varieties may not be far away.

No one knew when the sorghum breeding research first started that screenings for aphid resistance would be so needed three decades into the future. But the investments that were made and sustained now have important implications to sorghum growers and their bottom line. Likely, future investments in such research will yield similar benefits.

*The International Sorghum and Millet Collaborative Research Support Program (INTSORMIL) is the predecessor to the Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet.*

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**Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet**

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