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HORTICULTURE & CROP SCIENCE IN VIRTUAL PERSPECTIVE - THE OHIO STATE UNIVERSITY
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Soybean Breeding Program Growing

The Ohio State OARDC Soybean Breeding Program includes: (back row) Glen Mills, Andy Spring, Marcia Feller, Scott McIntyre, (front row) Steve St. Martin and Xie Futi.

Growing demand for food-grade and industrial-use soybean varieties has spurred an expansion of Ohio State University's soybean breeding program -- a welcome boost in a highly competitive industry.

The program, part of Ohio State's Ohio Agricultural Research and Development Center (OARDC), has expanded its personnel and technology over the past four years, enabling researchers to increase the number of test plots, genetic crosses and varieties released.

"Right now is a nice time to be in soybean breeding," said **Steve St. Martin**, an OARDC soybean breeder and professor in the Horticulture & Crop Science Department. "There has been no other time in my career that our breeding program has gotten so much attention and support."

Through grant support from the Ohio Soybean Council and funding and marketing opportunities through Ohio State's Ohio Bioproducts Innovation Center (an organization that links university resources with industry), OARDC's soybean breeding program has been able to keep the state's soybean industry thriving with high performance, improved yield, disease-resistant field or food-grade varieties.

With the expansion, St. Martin said that researchers have been using marker technology through OARDC's Molecular and Cellular Imaging Center (MCIC) to identify genes in a variety that exhibit specific characteristics.

The soybean breeding project plants more than 10,000 plots annually, and each plot requires a packet with a specific number of seed, labelled, and boxed in planting order.

"Marker technology is an easy way to identify those plants that carry the gene you want, whether it's resistant to disease or low in saturated fat," said St. Martin. "The technology helps you get those varieties developed faster. Using technology at MCIC, we can conduct two cycles of genetic crosses a year, instead of only one a year."

Because of marker technology, the number of genetic crosses made in the breeding program has increased 48 percent in two years.

In addition to conducting breeding techniques like genetic crosses, the OARDC soybean breeding program also analyzes varieties tested in the field for performance, most notably yield increase and disease resistance.

"Growers are constantly looking for varieties that are resistant to diseases, such as Phytophthora, and those that yield well. No one wants to grow a variety if it's low-yielding, no matter how much the industry wants it," said St. Martin. "We are still the leader in the industry for Phytophthora-resistant varieties."

In response to such production demands, the number of test plots in Ohio has increased 30 percent over the past four years. The result of breeding efforts is the release of soybean varieties for research, consumer consumption, and industry use.

Steve St. Martin and Marcia Feller discuss potential planting strategies at the Waterman Farm Soybean Breeding Laboratory.

OARDC has released 13 soybean varieties over the past five years. They include: food production varieties Ohio FG3, Ohio FG4, Ohio FG5, HS96-3136, and Wyandot; low linolenic acid variety HS98-3818; conventional varieties Dilworth, HS0-3243, and Dennison; and HF9667-2-4, HF9667-2-15, HF9665-2-15, and HF9670-3-10, varieties resistant to glyphosate that are high in protein.

Ohio is ranked 7th in the nation in soybean production with an annual value of over $1 billion. New varieties produced by the OARDC soybean breeding program and introduced to the market add additional value to the state's agricultural economy.

For example, Dilworth certified seed has contributed $150,000 to Ohio growers in its sales during 2004 and 2005, based on a $5 per bushel soybean price and a 1.5 bushel per acre advantage over the average conventional variety.

Soyfood production varieties Ohio FG4 and Ohio FG5 have been adopted by several growers and are benefiting those who produce soybeans for export to the Japanese tofu market. Additionally, OARDC research has revealed that Ohio FG5 is high in sucrose content, which has led at least one soyfood manufacturer to adopt the variety.

The 2005 release of HS0-3243 is being sold by five different Ohio seed companies. Dennison, released in 2006, is expected to replace the variety Kottman. Kottman, released in 1999, is a popular variety that contributed to 1,800 acres of seed production in 2005 alone and contributes about $300,000 per year to producers' revenue.

The OARDC soybean breeding program has been in existence since 1977, and since that time has released 47 varieties. Current members of the program include: **Glenn Mills, Andy Spring, Marcia Feller, Scott McIntyre** and **Xie Futi**.

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Published June 12 2007 - http://HCS.OSU.EDU