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Tomato Genes for Health and Profit: Francis Wins OARDC 'Innovator' Award

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David Francis has received the 2012 Director's Innovator of the Year Award from OARDC. (K.D. Chamberlain image.)

WOOSTER, Ohio -- David Francis, an associate professor in Ohio State University's Department of Horticulture and Crop Science, yesterday (4/26) received the 2012 Director's Innovator of the Year Award from the Ohio Agricultural Research and Development Center (OARDC). The award honors innovation and entrepreneurship by OARDC scientists either individually or in teams. The center is part of Ohio State.

Francis is a tomato breeder and geneticist who "has introduced innovations that will impact agricultural production, develop business, enhance rural communities, and improve the health and well-being" of people, a nominator said.

Specifically, the nominator continued, "Dr. Francis is nationally and internationally recognized for his application of bioinformatics, gene expression arrays and next-generation sequencing technology to the development of tomato varieties that are more resistant to common diseases in the Great Lakes region and that may improve human health and nutrition."



Among his achievements, Francis successfully led an effort to develop the first high-density genotyping tool for tomato, which resulted in the selection of a subset of single nucleotide polymorphisms, or SNPs, optimized for use in cultivated tomato populations. Researchers from Cornell University, Michigan State University and the University of California, Davis, also were part of the effort.

The new SNPs were subsequently commercialized through a consortium with the biotechnology company Illumina, whose “SolCAP SNP array” allows the simultaneous detection of 7,700 variants across the tomato genome. The International Seed Federation recommends the new array as the standard for hybrid identity testing. University scientists and commercial seed companies “from Japan to Spain” are using the array, a nominator noted. And genetic service providers in the U.S. and Europe have repackaged and commercialized subsets of the SNPs. Last year, Francis and the project received the U.S. Department of Agriculture’s Honor Award for Excellence.

Meanwhile, in his tomato breeding program, Francis has used the SNPs to identify new resistance to diseases such as bacterial spot, which cost the Ohio tomato industry an estimated \$10 million in yield losses in 2010 alone.

His work also has led to the development of tomato germplasm with increased levels of beneficial compounds such as lycopene and carotenoids, and he collaborates with the Department of Food Science and Technology and the College of Medicine, both at Ohio State, to test the potential nutritional and health benefits of tomatoes with enhanced antioxidant content. A nominator said Francis’s goal is to “have commercial-quality tomato varieties in place for Ohio growers” should the studies suggest such benefits.

During his 17-year career with OARDC, Francis has participated in 28 grants totaling \$12.9 million. His patents include “Identification of Soybeans Having Resistance to *Phytophthora sojae*” and “Methods for Coupling Resistance to Tomato Spotted Wilt Virus (TWSV) and *Phytophthora infestans* (Ph3)” (application filed in 2010).

He has previously received the Indiana Horticulture Society’s Red Tie Award and the Tomato Achievement Award from the Mid-America Food Processors Association.

He holds a doctorate from UC Davis and a bachelor’s degree from Pomona College (Calif.).

The OARDC award carries with it a plaque, \$1,000 and \$2,500 added to the operating expense account of Francis’s research program. OARDC Director Steve Slack presented the award during a ceremony at the center’s annual research conference in Wooster.

In addition to Slack, the speakers at the conference included John Oliver, president of Maple Leaf Bio-Concepts, Oshawa, Ontario, Canada; Brian Cummings, Ohio State’s vice president for technology commercialization and knowledge transfer; and Bobby Moser, Ohio State’s executive vice president for agricultural administration and dean of the College of Food, Agricultural, and Environmental Sciences (CFAES).

OARDC is the research arm of CFAES and is the largest university agricultural bioscience research center in

the U.S. The center works not just on food and farming but also, for example, on biofuels, bioproducts, health, nutrition, sustainability and the environment.

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