



## ECONOMY



### **Green and Not With Envy: OARDC Helps \$4-Billion Green Industry Lead Growth in Ohio Agriculture**

Agriculture in Ohio is not all about corn and soybeans. And folks involved in nursery, landscape, and retail garden center operations — known collectively as the green industry — know it very well. Their industry is one of the fastest-growing segments of Ohio agriculture, increasing 48 percent between 2001 and 2005, generating \$4.13 billion in sales, employing 241,000 workers, and contributing \$491 million in taxes.

To make sure it continues to bloom, OARDC scientists conduct innovative research that benefits the green industry in multiple aspects, from basic studies at the molecular level to applied projects dealing with pest control, greenhouse engineering, and more.

One example is the work of Michelle Jones, a floriculture molecular biologist with OARDC's Department of Horticulture and Crop Science. Jones is studying molecular and biochemical ways to delay the degradation and death (also known as senescence) of plant organs, such as leaves and flowers. By understanding the regulators that control senescence, she and her colleagues hope to identify genes that could be inhibited to delay the process and increase the quality and shelf-life of flowering plants.

How is this research expected to benefit the green industry? Right now, post-production losses of ornamental plants due to premature senescence during shipping and retail sale can be as high as 30 percent. Creating plants with delayed senescence and increased quality would not only reduce these post-production losses — it could also increase customer satisfaction and encourage repeat sales.

“Senescence is a naturally occurring process for plants, but there are environmental stresses during sales and in the consumer's home and garden that can accelerate the process,” Jones said. “Creating plants with delayed senescence is a potential benefit to floriculture and nursery professionals, as well as consumers, because the plants will last longer, keep their blooms longer, and will be hardier in the retail store or in the garden.”

Jones and her colleagues used petunias to study the effects of ethylene on senescence. Petunias are popular and important bedding plants that are highly sensitive to ethylene — a plant hormone and naturally occurring gas produced by many plants. Environmental stresses tend to trigger the release of ethylene, which causes

premature degradation and death of both leaves and flowers.

Altered plants that resist the effects of ethylene — and produce flowers that last twice as long as normal flowers — are available to researchers. But these plants have decreased seed germination, decreased rooting, and increased susceptibility to disease, which makes them of limited value to the green industry. The key, Jones said, is to find a way to delay senescence without affecting other aspects of plant development. To accomplish this, Jones is identifying genes involved in flower senescence using a petunia microarray developed at Ohio State. The petunia microarray will allow researchers to identify hundreds of genes that increase in abundance as flowers die based on 4,400 petunia genes already identified and stored.

Jones' studies could have quite a significant impact on Ohio's economy. Wholesale value of floriculture crops in the state was more than \$186 million in 2004, so even if post-production losses are conservatively estimated at 10 percent, premature senescence is costing Ohio producers and retailers more than \$18 million per year — losses that could be reversed thanks to this OARDC research effort.

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