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Controlling Perennial Weeds on Organic Farms



John Cardina is leading a new study that looks at how to control perennial weeds on organic farms without using synthetic weed killers.

Ohio State University scientists have received a four-year, \$400,000 U.S. Department of Agriculture (USDA) grant to tackle a deep-rooted thorn in organic farming's side.

John Cardina, an associate professor of horticulture and crop science, and colleagues will target perennial weeds - specifically, how to control them without using synthetic weed killers and how those methods affect crops, the soil and a farmer's bottom line. The work will focus on vegetable crops, which tend to fare poorly when competing with weeds, and on the three-year transition period from conventional to organic production, a time when the farmer needs to build up the soil - a key to success in organic farming - while growing a crop to make money, too.

Funded by the [Integrated Organic Program](#) of USDA's Cooperative State Research, Education, and Extension Service (CSREES), the project will evaluate transition strategies that both improve the soil and control perennial weeds. It will share and further work with the findings in an ongoing "learning community" - of farmers, researchers and Ohio State University Extension educators.



Doug Doohan, John Cardina, and Joel Felix are investigating how to both improve the soil and control perennial weeds during the farm's transition to organic farming.

Spurring the effort: farmers' concerns, voiced at field days and other events and borne out by a survey of 22 Ohio organic vegetable farms that found perennial-weed species, not annual ones, were most likely to be poorly controlled by current methods. Farmers helped develop the plan, including selecting which treatments to study. Their farms will host some of the research.

The scientists, all with the university's [Organic Food and Farming Education and Research](#) (OFFER) program, call perennial weeds "among the most serious impediments to the adoption, expansion and sustainability of organic

farming." Reason: Long-lived vegetative parts - roots and the like - let perennial weeds regrow quickly after cultivation (a common organic way to fight weeds) and survive in a place year after year. (Annual weeds don't do that. Cultivation usually wipes them out, lock, stock, barrel and root. They survive to the next year only through their seeds.)

Quackgrass, bindweeds, Canada thistle and yellow nutsedge rank among the culprits. So do pokeweed, hemp dogbane, Johnsongrass and broadleaf dock. "Our central hypothesis," the scientists said, "is that biologically based and properly timed control efforts, integrated with soil-building measures, will provide effective and economical transition strategies that can be readily adopted by organic and transitioning farmers."

They'll test that hypothesis in "scale-appropriate" production-system experiments at the university's Ohio Agricultural Research and Development Center (OARDC) in Wooster and in on-farm studies - on a half dozen or so Ohio organic farms - of how perennial weeds respond to various practices. An outreach effort will share the new knowledge.

"The on-farm studies will follow perennial weed populations in whatever rotation and management strategy the cooperating farmers choose to use," Cardina said. "We want to learn how perennial weeds respond to real-life farming situations and how farmers respond to changes in those weed populations."

The project will look at a range of crops, including peas, squash, lettuce, sweet corn, potatoes, tomatoes and others. Each particular strategy tested will determine the crops that get used. "For example, one strategy will be clean fallow with soil-building cover crops during the three-year transition period," Cardina said. "At the other extreme will be multiple cropping with tomato and cabbage in year 1, bell pepper and broccoli in year 2, and squash and lettuce in year 3.

Cardina's co-researchers on the project are **Doug Doohan**, associate professor, and **Joel Felix**, research associate, both of the Department of Horticulture and Crop Science; **Deb Stinner**, research scientist, Department of Entomology, and OFFER coordinator; and **Marv Batte**, professor, Department of Agricultural, Environmental and Development Economics.

"Lack of relevant information," the team noted, "is a serious obstacle to the sustainability of existing organic farms and their expansion into fields where perennials are present, limiting the broader adoption of organic methods by conventional farmers and the ability of organic agriculture to meet future production and quality demands."

Watch a narrated slideshow of this story with additional photos here: [Controlling Perennial Weeds on Organic Farms Slideshow](#). Free [Quicktime](#) software is required to view the slideshow.

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