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Bernadine Strik's research improves high-value crops that sustain small-acreage farms in Oregon

by Mitch Lies

As Bernadine Strik looks over her blueberry plot on a summer day at Oregon State University's North Willamette Research and Extension Center at Aurora, just south of Portland, she sees more than fruit growing on bushes. She sees a way of life, one worth hanging on to.



Oregon shoppers and blueberry growers are benefiting from OSU horticulture professor Bernadine Strik's research with trellising. Fewer berries are lost during harvest.

Photo: Steve Dodrill



A variety of berries.

Photo: Steve Dodrill

It's crops like blueberries, Strik said, the kind of high-value crop that sustains small-acreage family farms, that are helping keep Oregon the way it is.

"If our small farmers don't make it," Strik asked, "what's the Willamette Valley going to look like in 5 or 10 years?"

While most of the country has adopted monoculture farming, with huge fields filled with a single crop, Oregon's Willamette Valley continues to be a refuge for small farms and crop diversity. The total number of blueberry acres in the state of Oregon, 2,500, adds up to about an average-sized farm in the Midwest, where millions of acres are dedicated to producing either corn or soybeans. And unlike the large farms in the Midwest, where it takes upwards of 1,000 acres to support one family, those 2,500 acres of blueberries are supporting dozens of farm families in Oregon.

Crop diversity and small farms enhance the quality of life in Oregon in several ways, some of which are obvious every time you pass a roadside fruit and vegetable stand, and some of which are not so obvious. In addition to the potential benefits to soil, air and water quality,

crop diversity adds to the valley's rich scenery and is helping preserve a way of life that has been lost in most of the country, where the nearest neighbor is often miles away.

"This might sound corny," Strik said, "but I love Oregon and I'd like to keep it like it is."

Strik, the berry crop research leader at the research and extension center in Aurora, has introduced several innovative crop management practices over the past decade that have helped blueberry growers improve the economics of their operations.



OSU's Bernadine Strik shows off high-density plant spacing she introduced that's helping blueberry growers boost yields. They can increase returns by up to \$5,000 an acre per year.

Photo: Steve Dodrill



Harvesting Marionberries on Sam Sweeney's farm near Dayton, Oregon. While much of the country has huge farms with a single crop, the Willamette Valley continues to be a refuge for small farms and crop diversity.

Photo: Steve Dodrill

Most prominently, Strik has introduced high-density plant spacing, which has put a dramatic stamp on yields, and she has brought trellises into fields, which has tended to cause more upright growth in plants, a physiological phenomenon that is contributing to fewer machine-harvest losses.

"The economic gains from trellising are astounding," Strik said. "We've found that machine-harvest losses are reduced 3 percent to 8 percent of total yield each year. In a mature blueberry planting, that can mean an extra 1,000 pounds of fruit per acre that you are retaining. At 50 cents a pound, you've paid for the cost of installing the trellis for a 30-year planting in one year."

Strik also determined that growers can improve economic gains by planting bushes one-and-one-half feet apart and three feet apart, rather than the standard four-foot plant spacing that growers have used for decades.

"There's a slightly higher establishment cost and there's added pruning costs (as much as a few hundred dollars per acre), but you're talking an extra five tons an acre at the three-foot density, and at 50 cents a pound, you have increased returns by \$5,000 an acre per year."

Yield increases are even more dramatic at the one-and one-half-foot spacing, but not many growers have tried that, Strik said.

"Growers are a conservative bunch. They haven't gone to the one-foot density yet, but two- to three-feet is becoming widely used."

"You can see, though," she said while pointing to a highly productive row of blueberries, "that there is double the yield here in this high-density planting."

Raised on a family farm on Vancouver Island, British Columbia, Strik obtained a bachelor's degree in horticulture from the University of Victoria in British Columbia in 1983. She earned her Ph.D. in strawberry physiology at the University of Guelph in Ontario, Canada, in 1987. As a student, she was influenced by plant breeder Hugh Daubeny of Agriculture Canada, the Canadian equivalent of the U.S. Department of Agriculture. Daubeny developed Totem strawberries, the variety now grown on most of the strawberry acreage in Oregon.

"He really cared about growers and wanted to develop good varieties," she said. "He had a huge influence on my life."



Researcher and Extension educator Bernadine Strik and her technicians work closely with plant breeders to develop guidelines state growers can use to manage new berry varieties. Typically, she has about 12 projects going at one time, as well as teaching OSU students.

Photo: OSU Extension and Experiment Station Communications



The thorny stems of last year's leaves, called petioles, can contaminate the next year's Marionberry harvest. Industry members and OSU scientist Bernadine Strik have reduced the problem by 74 percent.

Photo: Steve Dodrill

Strik began working at OSU in 1987.

Perhaps because of the lessons she learned while being raised on a small farm, Strik has taken a practical approach to research. Strik said she believes it is important for scientists from the public and private sectors to work closely on research projects. More important, she said, is working closely with growers.

"Some of the best ideas come from growers," she said. "By talking to growers and trying to be ahead of the curve, I believe a researcher can have a big impact on a grower's success.

"I consider myself an applied researcher," she added. "There is no advantage for a grower to get a boost in yield, for instance, if it costs him an arm and a leg. I monitor establishment costs, picking costs and processor costs. And I think it is important to follow through with research and to work closely with Extension to see that the research gets out to the industry."

While Strik has contributed to dramatic gains in blueberries, her work with Marionberries also is proving beneficial for small farmers. Recently, she introduced two new crop-management practices that are expected to boost yields and reduce problems with contaminants.

Through her work in research plots, Strik has found that cutting back first-year canes in late spring improves the cold hardiness of the next flush of canes. Also, she has noticed that the shorter canes have a higher percentage of bud break. Because of these findings, Strik has theorized that Marionberries have a greater cold hardiness when grown under high-density planting with shorter canes.

To date, her theories are proving true and her high-density plantings are gaining the attention of Oregon's Marionberry growers. Ultimately, Strik said, researchers hope to develop a more cold-hardy Marionberry plant. In the meantime, Strik may have found an interim solution.

"We've found that we can increase cold hardiness by 5 degrees Fahrenheit," she said. "That could have a tremendous influence on yields."

Strik and some farmers also may have found a solution to what has been a thorny issue in growing Marionberries. Machine-harvested fruit has better flavor and better color than hand-harvested fruit, but a problem has developed with the harvest. During a mild winter, many leaves survive and their stems, or petioles, can fall into machine-harvested fruit and contaminate it. Strik brainstormed about how to solve the problem with members of the industry such as Norm Johnson of Littau Harvesters in Stayton, Oregon, and Rufus LaLone of Smuckers, Inc., in Woodburn, Oregon. They thought of knocking off leaves by running harvesters or brushes through Marionberry fields during the winter, and she and Johnson tested a machine harvester equipped with brushes. Suddenly, the Marionberry industry had a solution to this sticky problem.

"It is very satisfying," Strik said. "We've done this for two years now and found that we can reduce the presence of thorny petioles by 74 percent."

Marionberry growers who perform this practice are in line to receive a five-cent-per-pound premium because of the reduced contamination. Given that this cultural practice was used on about 600 of the 4,500 acres of Marionberries this past winter, this research may have a benefit of \$300,000 this year alone.

As an added benefit, Marionberry growers have begun collecting the debris removed by their machine harvester in winter. This has led to a reduction in leaf roller larvae, which over-winter in the dead leaves, and could reduce the use of insecticides.

"I like the fact that this was a cooperative effort between an agricultural experiment station, a machine harvest company, processors and growers," Strik said. "Through this kind of cooperation, we can really get things accomplished."

Strik, who has about 12 projects going at any one time, has three appointments at the university: researcher, Extension specialist and teacher. "The three appointments blend nicely," she said, "in that they each benefit the other." Strik noted that in carrying out her research projects she relies heavily on the help of research assistant Gil Buller and research technician Connie Pace.

Among her 12 projects, Strik is working on nitrogen management in raspberries, blackberries, blueberries and strawberries. Her work in nitrogen management is designed to improve the efficiency of existing fertility programs and reduce any impact on the environment. Strik also works closely with breeders at the North Willamette Research and Extension Center in developing management guidelines for new varieties of berries. "My goal is to be able to advise growers on how to manage these new varieties when they are released," she said.

Strik also is working on an idea that may find its way into strawberry fields soon.

Typically, growers have planted strawberries in April and early May. Harvest is in June the following year. Strik's research is showing that growers can plant strawberries as late as July with no adverse effect on yields the following year. In fact, the fruit is bigger and more economical to harvest.

She is experimenting with crops such as meadowfoam, whose seeds provide a valued oil, and green pears in hopes of finding a crop growers can harvest from their acreage in June, before they plant strawberries.

"We want to find something that can give the grower income in the planting year," she said.

Unlike the research of scientists working on experiments with huge monoculture crops such as corn and soybeans, the research of Bernadine Strik will never have an impact on hundreds of thousands of acres. All told, the production of small berries in Oregon covers less than 25,000 acres. But her research has a lot to do with sustaining a way of life in a state where small farms are very much a part of the landscape—and where small farmers still contribute to the economic and cultural fabric of rural life.

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