

WSU's Green Times: Cider, Water, Cultural Diversity, and Grains

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Promising technology could expand hard cider industry

A new study by researchers at Washington State University shows that mechanical harvesting of cider apples can provide labor and cost savings without affecting fruit, juice, or cider quality.

The study, published in the journal HortTechnology in October, is one of several studies focused on cider apple production in Washington State. It was conducted in response to growing demand for hard cider apples in the state and the nation.

Quenching a thirst for cider

Hard cider consumption is trending steeply upward in the region surrounding the food-conscious Seattle, and Washington is leading the nation's hard cider revival. The amount of cider produced in the state tripled between 2007 and

2012.

The rapid expansion of the industry means cider apple growers are hard pressed to keep pace with demand. Because cider apples are smaller than dessert apples—the kind we find in the grocery store for fresh eating—it takes longer to harvest them. In fact, harvest labor can account for nearly half of the annual costs of an orchard in full production.

The cost of labor isn't the most difficult aspect, though.

“We simply don't have a dedicated agricultural labor market in Western Washington,” said horticulturalist Carol Miles, the lead author of the study. “High quality and affordable labor to hand-harvest cider apples is difficult to come by and costly.”

Miles leads one of only a handful of cider apple research programs in the nation, located at the WSU Northwestern Washington Research and Extension Center in Mt. Vernon.

Over-the-row harvesting

Mechanical harvest is a logical solution to this challenge but for two things. First, such a machine currently doesn't exist for apples, which are now generally grown in compact trellis systems and hand-picked and carefully handled to avoid any bruising.

The other issue is that mechanical harvest is likely to damage the fruit but just what this means for the final product is unknown.

To address the first challenge, Miles and her team used a mechanical raspberry harvesting machine to harvest a variety of cider apple called Brown Snout grown at the research center. The machine passes over fruit trees that are no higher than six feet, knocking the apples from trees and carrying them onto a conveyer belt for collection by workers in to tote bins.

Researchers assessed the level of damage to the trees and tested the fruit to see what impact bruising had, if any, on fruit and juice quality.



Over-the-row small fruit harvester passing over cider apple trees at WSU in Mt. Vernon. Photo by Carol Miles, WSU.

Olive harvester might be suitable

The two-year study showed that machine harvesting required as little as a quarter of the labor compared to hand harvesting, resulting in an average cost savings of \$324 per acre. Bruising did occur on all of the fruit, but it didn't effect on the quality of fruit or juice whether the apples were processed immediately or cold-stored for two to four weeks before pressing.

Miles noted that modifications to the small fruit mechanical harvester could further improve efficiencies for apple harvest. She dreams of one day testing an olive harvester which can pass over trees that are ten to twelve feet tall – the common height for modern apple orchards.

If suitable equipment is available and affordable, then mechanical harvesting could be just what the industry needs to expand and keep up with demand for locally grown cider apples.

Learn more about cider research and education at WSU at: <http://bit.ly/1psgmBD>.

Journal reference: Miles, C. and King, J. (2014) Yield, Labor, and Fruit and Juice Quality Characteristics of Machine and Hand-harvested 'Brown Snout' Specialty Cider Apple. *HortTechnology*, 24:519–526.

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– Sylvia Kantor



Bruising from mechanically harvesting cider apples did not affect fruit or juice quality. Photo by Carol Miles, WSU.

Water conservation research recognized nationally

Water scarcity – one of the toughest challenges predicted for the 21st century – is being addressed by Washington State University. As part of a multistate research program, WSU is among 19 land-grant universities honored recently for their efforts to help farmers irrigate their land more efficiently, especially during droughts and water shortages.

“A safe, reliable supply of water is inextricably linked to food security,” said

Sonny Ramaswamy, director of the USDA National Institute of Food and Agriculture.

“The five-fold increase in irrigated acres that took place during the 20th century cannot be repeated in the 21st century —there isn’t the space. Instead, we must increase efficiency of the irrigated farmland we have, and that is what this project is doing.”



Subsurface microirrigation system for 12-year-old grape vines at WSU Roza Research Farm. Photo by Pete Jacoby, WSU.

The national Microirrigation for Sustainable Water Use W-2128 research program was presented the 2014 Experiment Station Section Excellence in Multistate Research Award by the USDA National Institute of Food and Agriculture and the Experiment Station Committee on Organization and Policy at the Association of Public and Land-Grant Universities annual meeting in Orlando, Florida.

The award recognizes outstanding efforts of researchers and extension specialists who have come together to tackle a priority issue that no one institution can address on their own.

More crop per drop

Irrigation systems that apply high volumes of water over wide areas can lose a lot to runoff, wind, or evaporation and result in over- or under-watered plants. In contrast, microirrigation systems reduce water waste and can produce more crop per drop. These systems use special timers, sensors, and a network of narrow tubes to deliver the right amount of water and nutrients to plants at the right time.

Microirrigation also decreases contaminants carried to surface water and groundwater and can improve the quality of agricultural crops.

In the last five years, the W-2128 microirrigation research program has led to new equipment and tools that are easier to install, more durable, and more precise. Engaging farmers around these advances has encouraged adoption of microirrigation systems and led to significant economic and environmental impacts.

Wine grapes sip water

WSU scientists and extension specialists have assisted farmers with microirrigation for over two decades. Pete Jacoby, professor of crop and soil sciences and the project lead, said that as a result, most of the 50,000 acres of wine grapes in Washington are grown under microirrigation. The use of microsprinklers in combination with surface drip systems continues to increase in tree fruit and juice grape production, he said.



Pete Jacoby
WSU Crop and Soil
Sciences

New research funded as a continuation of the W-2128 project, referred to as W-3128, is under way to determine the role of new and advanced methods of subsurface drip irrigation in cooperation with Washington wine grape growers. The study will compare plant responses to water applied at subsurface depths of up to four feet and water applied via surface drip irrigation. This research could help reduce costs associated with pumping water and help conserve water resources by curtailing water loss to weeds and evaporation.

“If this new technique of subsurface microirrigation proves effective, I believe wine and juice grapes can be grown with less than half the water required to do so with current surface drip irrigation systems,” Jacoby said.

Other land-grant institutions participating in the national project include: Auburn University; University of Arizona; University of California, Davis; University of California, Division of Agriculture and Natural Resources; Colorado State University; University of Florida; University of Hawaii; University of Idaho; Iowa State University; Kansas State University; Mississippi State University; University of Nebraska; New Mexico State University; Cornell University; Oregon State University; University of Puerto Rico; Texas A&M AgriLife Research; University of the Virgin Islands; Natural Resources Conservation Service and Agricultural Research Service.

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–Sylvia Kantor

Advocate promotes agricultural, cultural diversity

Gary Paul Nabhan, an expert on the cultural and plant diversity stewarded by

farming communities around the world, will present the free public Harvest Seminar at 7 p.m. Thursday, Nov. 20, at the Washington State University Northwestern Washington Research and Extension Center in Mount Vernon.

Nabhan is a co-founder of Native Seeds/SEARCH, a nonprofit working to protect crop seeds of Native American and other ethnic cultures, and of Renewing America's Food Traditions, a network dedicated to rescuing diverse foods and food traditions.



“Agriculture is under increasing pressure in today’s economy to expand and homogenize, and the number of crop varieties in production across North America is declining,” said Stephen Jones, NWREC director and plant breeder. “This impoverishment is a cultural loss, but also makes agriculture more vulnerable.

“It is vitally important to understand that the diversity arising within cultures and regions has relevance on a wider scale and needs to be protected,” Jones said. “Gary Nabhan has a unique power to communicate this.”

The annual event organized by graduate students provides an opportunity for growers, researchers and the community to come together and think about the big picture of food and farming. The seminar is sponsored by PCC Natural Markets and NWREC.

“This is an agricultural region sensitive to the power of diversity, both culturally and botanically,” said Kelly Ann Atterberry, graduate student in horticulture. “Farmers in Skagit County alone grow more than 90 different crop types, and many farmers collaborate with breeding programs at the research center to develop plant varieties adapted for the region.”

In his book, “Where Our Food Comes From,” Nabhan argues that the conservation of plant varieties can help humanity adapt to changes in the environment, as well as bring color and enjoyment to our physical and culinary landscapes.

Spanish language simultaneous translation will be provided. For information contact Louisa Winkler at louisa.winkler@wsu.edu or 360-848-6129.

Registration open for 2015 Cascadia Grains Conference

The Cascadia Grains Conference brings together farmers, bakers, brewers, distillers, brokers, investors, policy-makers and others to strengthen the role of grains in our local food economy by sharing the latest science, techniques, and developments, as well as by creating a space in which new business, policy and research relationships can form and existing ones can be strengthened.



The first two conferences held in Tacoma, Washington hosted nearly 400 participants from across the Cascadia region and beyond.

This year the conference will be held on Saturday, January 10, 2015 in Olympia, Washington and will feature workshops covering crop production, end-use quality, financing and enterprise development, marketing, and risk management planning. Also included will be a resource fair and networking session.

For more information visit <http://cascadiagrains.com>.

Guide updated: Building Sustainable Farms, Ranches, and Communities

A newly updated publication is available from the National Sustainable Agriculture Information Service. [Building Sustainable Farms, Ranches, and Communities: A Guide to Federal Programs for Sustainable Agriculture, Forestry, Entrepreneurship, Conservation, Food Systems, and Community Development](#) is a one-stop guide for details on federal programs in agriculture and forestry and how to apply for them.

This publication describes nearly 70 individual programs, and outlines the eligibility and application requirements for each. Ranging from grants and loans to technical assistance and informational resources, these federal programs can help farmers, entrepreneurs, community developers, private landowners, conservationists, as well as private and public organizations to develop and expand their operations.

The digital version is free. Printed copies are available for three dollars. For more information, visit the National Center for Appropriate Technology at attra.ncat.org.

Green Times

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