

Announcements

SEPTEMBER

8 Walla Walla Community Hospice Pond & Garden Tour, 9 a.m.—4 p.m., \$25 per person. A self-guided tour of ten beautiful gardens in the area incorporates water features in their design. Tickets are limited, and must be purchased in advance at Bright's Candies & Gifts, 11 E Main Street; at the Walla Walla Community Hospice Office at 1067 Isaacs Avenue; or online at www.wwhospice.org. For more information, call 509-525-5561.



All proceeds from the Pond and Garden Tour will be used towards providing quality hospice care in Walla Walla, Columbia, and Northeast Umatilla Counties.

11-14 Lost Rivers Grazing Academy, Salmon, Idaho. Great class for anyone interested in learning more about management-intensive grazing of irrigated pastures. Taught by UI Extension faculty along with featured speaker Jim Gerrish from American Grazing Lands Services. For additional information visit <https://centralidahoeextension.blogspot.com/2014/08/lost-rivers-grazing-academy-offered-in.html>, call K. Scott Jensen at 208-896-4104, or email scottj@uidaho.edu.

OCTOBER

6 Experience 4-H! Learn about local 4-H Clubs at the Downtown Farmer's Market from 9 a.m. until 1 p.m. Information on current projects; how to join a 4-H Club; as well as fun, hands-on activities.



12-13 PNW Stockmanship & Stewardship, TRAC in Pasco, WA. Exciting, knowledgeable speakers and presenters will speak on a variety of topics: from low-stress cattle handling, forage management to animal health. Certified Beef Quality Assurance training will be available as well as Youth for Quality Care of Animals (YQCA) certification. Live cattle handling demonstrations and exposure to the newest industry information will be available to participants. For more information, visit: www.StockmanshipAndStewardship.org.

Updates

PALMER AMARANTH

Palmer amaranth is an aggressive, invasive weed native to the desert regions of the southwest United States and northern Mexico. It slowly infiltrated the southeast United States and has become one of the most significant weed pests of cotton and soybean producers. What makes Palmer amaranth such a problem is that **most populations are resistant to glyphosate and ALS herbicides**. More information at: <https://www.extension.purdue.edu/extmedia/ws/ws-51-w.pdf>.



The Pacific Northwest is currently one of the few areas not infested with this weed.

If this weed is brought into the Pacific Northwest, it will cost a lot of money to control.

Prevention is the key.

Do what you can to prevent this weed from moving into the Pacific Northwest:

1. Purchase and use only certified weed-free seed.
2. Obtain soil containing products and mulches from weed-free sources only.
3. Purchase only weed-free hay and other feed.

Be diligent; don't assume that seed, feed, or other products from outside the region are weed free. Ask, and get proof.



WSU VARIETY TESTING RESULTS FOR WALLA WALLA COUNTY

For current data on wheat and small grains, go to the following link: <http://smallgrains.wsu.edu/variety/variety-2018-data/>.

Farming & Livestock

SAGEBRUSH HOSPITALITY: A HOME FOR GOOD BUGS CAN SAVE VINEYARDS

Adapted from Scott Weybright, WSU CAHNRS

PROSSER, Wash. – Sagebrush is a protective home for good bugs that help fight harmful pests on grape vines, according to new research from WSU scientists.

This finding could be a huge benefit for local vineyards who want to manage pests and reduce their use of pesticides.

Number one out of 120 plants

“We’ve looked at about 120 native plants near vineyards over the last few years to see how attractive they are to different beneficial insects,” said WSU entomologist David James. “Sagebrush had the highest number of beneficial insects of any plant we’ve studied so far.”



Bugs caught in sticky traps placed in sagebrush near vineyards. David James and his team identified and counted everything caught over 966 days in many different areas.

The most common helpful insects in sagebrush were several species of parasitic wasps, tiny parasites that feed on pests that harm healthy wine grapes. One kind of parasitic wasp loves to feed on leafhoppers, a major pest for vineyards.

“The wasps don’t harm people or crops, and are often too small to even see,” said James, an associate professor with [WSU Prosser Irrigated Agriculture Research and Extension Center](#). “These aren’t yellow jackets, but they’re really helpful in combating pests.”

Year-round surprise

The entire team was surprised by how hospitable the sagebrush is to beneficial insects, he said. One reason was that the bugs don’t just live in the sagebrush when it’s flowering and has nectar in the autumn. The team found insects throughout the spring and summer as well.

“It’s a year-round benefit,” James said. “We suspect that’s because sagebrush is the dominant plant in much of the Inland Northwest, and beneficial insects have evolved to rely on it as a refuge from the heat or wind.”

James now recommends that vineyards leave sagebrush in as many areas as possible. More sagebrush nearby means more beneficial insects to feed on pest bugs and less need to apply pesticides.



Sagebrush plants near a vineyard in central Washington.

James said he’s been asked if sagebrush attracts pest insects as well as the beneficial ones. Not an issue, he said.

“The parasitic wasps and other natural enemies seem to provide sagebrush with good protection from pests,” James said. “Sagebrush in eastern Washington appears to rarely suffer from pest damage. Given the likely long association between beneficial insects and sagebrush, this makes perfect sense.”

Not as prevalent as before

One problem is that sagebrush isn’t nearly as common as it once was, James said. “Central Washington and Oregon used to be a virtual sea of sagebrush, but the ecosystem is threatened and fragmented now,” he said. “Everybody takes sagebrush for granted. It doesn’t necessarily look very nice, but it’s a valuable resource. And can be really useful in helping agriculture.”

REVEALING HOW BACTERIA, GRASSES FIX NITROGEN TARGET

Adapted from Maegan Murray, WSU Tri-Cities

RICHLAND, Wash. – Reducing synthetic fertilizer use, pollution, farming costs, while freeing up nitrogen, mark possible benefits of a research project by Sarah Roley, assistant professor with the School of the Environment, Washington State University Tri-Cities.

[Roley](#), and her two colleagues, recently landed a \$483,000 research grant from the National Science Foundation, to pursue a more detailed understanding of how bacteria work with perennial grasses to fix nitrogen.



Every living organism requires nitrogen to survive, and nitrogen fixation is a critical step in biology. Fixation is the conversion of nitrogen in the atmosphere to ammonia, a form of nitrogen that can be used by plants and microbes, and subsequently move up the food web.

“Nitrogen goes into our protein and DNA,” Roley said. “From bacteria, to plants, to humans, we all need it, and we need a lot of it.”

Little is known, however, about nitrogen fixation in perennial grasses, Roley said. By better identifying how that process occurs, significant progress may be made in reducing the amount of synthetic nitrogen needed for fertilizing crops, as well as the amount of pollution that stems from the creation and use of synthetic fertilizers.

Roley’s research will focus on switchgrass. But, study findings may apply to other perennial grasses

— ryegrass, bluegrass, fescues. The research may potentially lead to discoveries about a variety of other plants and how nitrogen fixation occurs within them.

Little known about how nitrogen fixation occurs

While Earth has a lot of nitrogen in its atmosphere, it is tied up in a triple-bonded molecule, which only bacteria can convert to a useable form. Legumes, like soybeans, peanuts and clover, have special root nodules where nitrogen-fixing bacteria live. These bacteria provide the plant with nitrogen in exchange for carbon to eat. But there is a diverse population of bacteria living outside root nodules that also fix nitrogen.

“We’ve known about this phenomenon for a long time, but it’s never been clear how important it is,” Roley said. “We can look at it indirectly by measuring all of the nitrogen coming in and going out of the ecosystem. But in some places, there is more going in than we can account for. We want to figure out how important this process really is.”

In the early 1900s, scientists figured out how to create a synthetic nitrogen fertilizer through the Haber-Bosch process using large amounts of energy, high pressure and the right catalysts. Fertilizer produced through this process boosted crop yields, but also led to secondary effects like greenhouse gas emissions and downstream pollution that leads to devastating algae blooms in lakes, rivers and oceans.



By identifying how much nitrogen fixation occurs naturally with perennial grasses, and by determining how nitrogen-fixing bacteria interact with plants, researchers could potentially discover ways to use less synthetic fertilizer to fertilize crops.

“We would have fewer undesirable effects while saving growers money,” Roley said.

Creating a nitrogen fixation experiment

By measuring nitrogen fixation in a range of conditions, researchers hope to identify when nitrogen fixation occurs and how much nitrogen the process adds to the ecosystem each year.

“So far, we know that fixation appears to occur episodically,” Roley said. “Sometimes the rates are fairly high, and at other times they are not detectable at all. We want to figure out if fixation occurs in response to wet and dry events. After rainfall, microbes can get really active, and many microbial processes will increase.”

Scientists will also be measuring fixation at different stages of plant growth to determine if plant processes influence fixation.

“Measuring at a much smaller scale before, we observed high rates in the fall after the plants dried out, so maybe it happens at a time when we don’t expect it,” Roley said. “We plan to take more measurements to determine when and how much fixation occurs.”

Contacts: Sarah Roley, assistant professor in the WSU School of the Environment, 509-372-7449, sarah.roley@wsu.edu. Maegan Murray, WSU Tri-Cities public relations specialist, 509-372-7333, maegan_murray@wsu.edu.

STUDENT DEPLOYS TINY, FEISTY SAMURAI WASPS TO FIGHT STINK BUG INVADER

WSU CAHNRS News

His Toyota Prius loaded with tiny wasps, Josh Milnes is about to make life very difficult for an invasive stink bug threatening Washington fruit growers.



“The brown marmorated stink bug isn’t supposed to be in Washington,” explains Milnes, entomology student at the WSU Tree Fruit Research and Extension Center in Wenatchee.

Native to eastern Asia, the brown marmorated stink bug, shortened by Milnes and other scientists to “BMSB,” arrived in the U.S. in the 1990s. Discovered in Portland, Ore., in 2004, it spread from a single Washington county, Clark County, to more than half of Washington counties in just five years.

A prolific feeder, BMSB dines on more than 300 plants, including apples, peaches, cherries, berries, row crops and cereals.

It’s an urban pest, too, overwintering in people’s homes—and sometimes coming inside by the millions.

“On the east coast of the U.S., some homeowners use snow shovels to get them out of their homes,” Milnes said. “That’s the reality we might face in Washington.”

One bad bite

BMSB costs U.S. farmers millions annually in damaged crops, and poses a danger to Washington’s \$2.4 billion apple industry.

Equipped with a sharp, straw-like snout called a proboscis, the stinkbugs pierce the apple’s skin and spit digestive juices into the apple, leaving a small, brown, mushy wound. Most of the apple remains perfectly fine—but it’s damaged goods.

“Growers can’t sell their crops,” said Milnes. “Consumers want perfect apples. But one bite from a

stink bug, and our premium eating varieties aren't good for anything but juice."

Chemical-free controls

Thanks to its long proboscis, BMSB is safe from most targeted, sprayed pesticides.

"You have to use a broad-spectrum pesticide to deal with it," said Milnes. "But that wrecks havoc with Washington's long-established integrated pest management systems"—holistic approaches that rely on beneficial insects, habitat changes and other sustainable techniques to manage pests.



A newly released Samurai wasp lands on a maple leaf. Milnes says the wasps are devastatingly effective against invasive stink bugs, but won't harm people.

"You can't kill it without killing all the good bugs and running the risk of pesticide resistance," said Milnes. "That's what we're

destined to do if we don't find another way to fight BMSB. We need better tools and we need them soon."

Funded by grants from the USDA and the Washington Tree Fruit Research Commission, Milnes and his advisor, WSU Entomology Professor Elizabeth Beers, are developing biological controls for BMSB. Scientists elsewhere had already discovered one such living weapon—a tiny wasp, *Trissolcus japonicus*, a.k.a. the Samurai wasp, that preys on the bug in its native Asia.

"It's BMSB's natural enemy—a little wasp that packs a big punch," Milnes said.

An effective weapon

Samurai wasps lay their eggs inside stink bug eggs. The young wasps, called larvae, then devour the developing stink bugs, called nymphs, before they can hatch. A single wasp can eliminate an entire egg cluster, making it a promising, natural pest control.

"The Samurai wasp is so effective, it will wipe out 70 to 100 percent of those eggs," Milnes said.



Only about a millimeter long, the Samurai wasp only targets stink bugs, not humans.

"They're so small that if they did try to sting you, you'd never feel anything," Milnes said.

Regulations are strict when it comes to release of an exotic natural enemy. Milnes was able to skip years of process after discovering an already-

established population of Samurai wasps attacking stink bugs in a park in Vancouver, Wash., in 2015.

Now, he is releasing wasps in Walla Walla, Yakima, Prosser, White Salmon, and other urban areas where the bug is already well established. "I'm trying to intercept BMSB before it can get into our fruit industries and cause major damage," he said.

Wasps on the loose

Back at his Prius, Milnes arrives at his destination. He's found the perfect spot to release about 100 adult Samurai wasps: a stand of crabapple trees in Walla Walla's 40-acre Pioneer Park, ground zero for that city's population of invasive stink bugs.

Buzzing under petri-dish lids taped atop recycled soup containers, these Samurai wasps have a single goal in mind.

"They're ready to parasitize!" says Milnes, who doesn't need to do anything but lift the soup can lids and let the wasps fly out. Samurai wasps can sense volatiles coming from BMSB egg masses: "If there are stink bug eggs here, the wasps will find them."

A week later, Milnes will return, find some BMSB eggs, and see if his wasps survived.

"Once I confirm they're established, I let nature do its job."

Picky eater

Milnes is making sure that, once introduced, Samurai wasps won't prefer to chow down on native stink bugs.

"When you introduce a new, exotic species, you run the danger of screwing up your local ecosystem," he said. That's why, for the past two years, Milnes has experimented with a menu of sorts for the wasps, offering them a choice between BMSB eggs and native stink bug eggs. So far, they've always chosen their longtime host.

To determine the best times of year to release the wasps, Milnes is studying the life cycle of the stink bug—how often it reproduces, where it lives, how fast it matures.

"I live and breathe stink bug," he said. "Somebody's got to do it. I'm glad it's me."

"My goal is to get brown marmorated stink bug under control," Milnes added. "Now that it's spread across Washington, we may never be able to eradicate it. But we can keep it from harming our agriculture and taking over our homes.

"Thanks to the Samurai wasp, we may be able to do that without resorting to damaging pesticides—the nuclear option."

Family Living

FRESH UNHEATED APPLE CIDER FOR HOME USE

Several outbreaks of illnesses from *E. coli* O157:H7 have been caused by drinking apple cider which had not been pasteurized. The most likely way that apples get contaminated with *E. coli* O157:H7 is from cow, sheep, or deer manure when they fall onto the ground in the orchard.



Anytime cider is made from fresh apples, there is a risk that *E. coli* or other bacteria will be in the finished products. The most effective way to kill the bacteria is to pasteurize the cider or juice by heating it. Pasteurization is particularly important when using apples which have dropped from the trees.

WSU recommends the following cautions when making apple cider:

If you make fresh apple cider which is unpasteurized:

(The following steps will reduce the risk associated with fresh cider, but will not completely eliminate the risk of *E. coli* O157:H7).

- Use apples that are picked directly from trees. Do not use any apples that have touched the ground.
- Wash the apples thoroughly with water containing a small amount of soap or detergent.
- For additional safety, the apples can be soaked for one minute in a solution containing 1 to 2 tablespoons chlorine bleach per gallon of water. After the soak, rinse the apples to remove the bleach taste.
- Squeeze the apples to make cider.
- Keep the cider refrigerated.



CAUTION: It is advised that young children should not drink fresh apple cider unless it has been heated to at least 160° F.

If you make apple juice from apples which have fallen on the ground:

- Wash the apples thoroughly with water containing soap or detergent. Rinse well.
- Squeeze the apples to make juice.
- Pasteurize the apple juice by heating to at least 160°F to kill any harmful bacteria (such as *E. coli* O157:H7) which may have been on the apples.

- Keep the cider refrigerated.

Source: Val Hillers & Richard H. Dougherty, WSU Extension Food Specialists, 9/97

GROWING A FALL GARDEN

Adapted from Ervin Evans, NC State

Preparing the Site

Before preparing the soil for a fall garden, you must decide what to do with the remains of the spring garden. In most cases, the decision is not difficult because the cool-season crops have already matured and the warm-season vegetables are beginning to look ragged. Remove the previous crop residue and any weed growth. Prepare the soil by tilling or spading to a depth of at least 6 to 8 inches.



If the spring crops were heavily fertilized, you may not need to make an initial pre-plant fertilization. Otherwise, 1 to 2 lb of a complete fertilizer such as 10-10-10 may be applied per 100 square feet of bed space. Thoroughly incorporate the fertilizer.

Planting the Fall Garden

Direct seeding (planting seeds rather than using transplants) for crops such as broccoli, cabbage, and collards is often used in the fall. However, the success of this planting method depends on having adequate moisture available to keep the young seedlings actively growing after germination. If you do not have an irrigation source available, you would be wise to buy vegetable transplants from a local garden center.

Seeds should be planted deeper in the fall because the moisture level is lower in the soil and the surface temperature is higher. In many cases, the planting depth may be 1½ to 2 times as deep as for spring planting of the same crop.

Our summers can be hot and dry. Soils may form a hard crust over the seeds which can interfere with seed germination, particularly in heavy clay soil. Seeds of lettuce and spinach will not germinate if the soil temperature exceeds 85°F. You may need to cover the seeded area with burlap cloth, newspapers, or boards to keep the soil cool and moist. Shading the soil or using a light mulch over the seed row will help keep the temperatures more favorable for germination. The shading material must be removed as soon as the seeds begin to germinate. Another useful technique is to open a



furrow, seed, and cover the seeds with potting soil or vermiculite. Young transplants may also benefit from light shading for the first few days after transplanting.

Watering/Fertilizing

Most vegetables require 1 inch of water per week. It's best to make a single watering that penetrates deeply rather than frequent shallow applications. Young seedlings and germinating seeds may need more frequent, light waterings. Do not allow seedlings to dry out excessively. New transplants may also benefit from frequent light waterings until they develop new roots.



Many fall maturing vegetables benefit from the same sidedressing with nitrogen as spring maturing vegetables do. Most leafy vegetables will benefit from an application of nitrogen three and six weeks after planting.

Insects and Diseases

It is not uncommon for insects and diseases to be more abundant in the fall. Most problems from insects and diseases result from a buildup in their populations during the spring and summer. There is hope of keeping these pests at tolerable levels, however, if a few strategies are followed. Strive to keep fall vegetables healthy and actively growing; healthy plants are less susceptible to insects and diseases. Check the plants frequently for insect and disease damage. When sufficient damage is detected, use an approved pesticide. You may decide not to grow vegetables, such as squash, corn, and cucumbers, that are especially insect and disease prone during late summer and fall.

Frost Protection

You can extend the season of tender vegetables by protecting them through the first early frost. In North Carolina, we often enjoy several weeks of good growing conditions after the first frost. Cover growing beds or rows with burlap or a floating row cover supported by stakes or wire to keep the material from directly touching the plants. Individual plants can be protected by using milk jugs, paper caps, or water-holding walls.

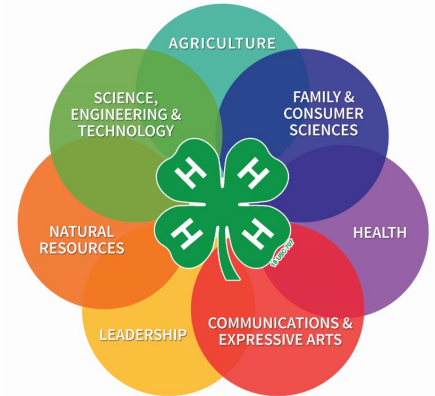
Most of the semi-hardy and hardy vegetables will require little or no frost protection. Semi-hardy vegetables should be harvested before a heavy freeze. Root crops such as carrots and radishes should be harvested or mulched heavily before a hard freeze. The harvest of mulched root crops can often be extended well into the winter. During mild winters, harvest may continue until spring.



Fair was a tremendous success and we want to thank the many volunteers that gave countless hours of their time to help make it all happen!

October marks the beginning of the new 4-H year. Join us October 6th to explore the opportunities that 4-H has to offer. Experience 4-H takes place at the Downtown Farmer's Market from 9 a.m.—1 p.m. It is a wonderful opportunity to learn more about the opportunities that 4-H has to offer and also join in some fun activities.

Take the opportunity to explore the possibility of becoming a 4-H leader. They are the foundation of 4-H, and play a key role in helping young people grow and become active members of their communities. Consider becoming a 4-H leader!



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