Wyoming raspberries under attack!

Wyoming and other western states have recently had a population surge of rose stem girdler (RSG) that really have a taste for raspberry plants.

Raspberry-preferring RSG were present in Utah in 1955 and were described as "… a major factor in the abandonment of raspberry plantings" in a 1964 publication by Davis and Raghuvir. Since 2015, RSG have become an increasingly common and damaging pest for raspberry and blackberry growers in Washington and Oregon.

In the summer of 2019, University of Wyoming's plant pathologist Bill Stump had a sample of damaged raspberry plants that had been submitted for diagnosis. The damage was initially suspected to be cane blight (*Leptosphaeria coniothyrium*). This fungal disease causes the infected cane to wilt and die as the caonker encircles the stem and kills the cambium. It turned out the plant damage was caused by RSG (Figure 1). It was the first time a RSG sample had been sent for diagnosis in 17 years—maybe ever.

Now, raspberry growers in Wyoming have RSG to pile on top of the already severe losses caused by the spotted wing drosophila, a fly that attacks ripening fruit.

Hanna Royals, Screening Aids, USDA APHIS PPQ, Bugwood.org

Figure 1. An adult rose stem girdler (*Agrilus cuprescens*) beetle.

RSG lifecycle

After identifying, the next step in Integrated Pest Management (IPM) is learning the vulnerabilities of an insect's lifecycle. This helps determine the optimum control methods. Adult RSG are very small and slender beetles with an iridescent bronze to copper sheen and are at most ¼-inch in body length. The RSG produces a single generation per year. Its larva overwinter inside a raspberry cane it killed by first girdling it. The larva then chews its way into the cane's pith when it has reached the 3rd stage of development. The RSG larvae then waits out the winter weather in the cane (Figure 2).

Scott Schell, UW Extension

Figure 2. A raspberry cane at the site of the rose stem girdler larva's feeding damage under the bark before it chewed its way into the cane's pith to finish its development

Rose stem girdler may have been imported

There can be many reasons an insect species becomes a crop pest.

Perhaps the most common is when a species from another part of the world arrives in a country without the predators and pathogens that kept its population in check back in its region of origin.

That is case with the *Agrilus cuprescens* beetle (Figure 1). Its accepted common name is rose stem girdler (RSG). It is likely RSG was accidentally moved from Europe via the plant trade to the U.S. in the early 1900s. RSG was first identified in New Jersey in 1914 where it was inflicting damage on rose canes.

There has been and still is confusion among entomologists about the RSG's exact identity as it has been known by many scientific and common names in older horticulture and scientific literature. The following illustrates how confusing the identity of some members of the species in the genus *Agrilus* is.

In 2015, researchers, using DNA-based identification technology, revealed that the idea RSG also attacked currants (*Ribes* spp.) was wrong. An almost identical looking species from Eurasia with distinct DNA, called *A. ribesi*, had been in North America, unrecognized since at least 1940. It was the true culprit doing the damage on the currants, but it wasn't distinguished as a different species until researchers did the DNA work on it. In the Old World, six subspecies of the RSG are recognized and probably are associated with different preferred host plants and habitats.

The 4th stage larvae will pupate and change into the adult form inside the dead cane when average daytime temperatures are greater than 50 degrees F in the spring. The new adult RSG then wait and start to emerge only when daytime temperatures are greater than 65 F. The emergence of the RSG adults can stretch out over three weeks, which in Wyoming can range from late May to mid-June, depending on region.

An adult RSG's lifespan is only a week and must include some leaf feeding on rose or raspberry leaves for the females to produce eggs. Then, after mating, the females select canes to glue their eggs on individually, usually on the lower third of the cane. The adults die off naturally after living about a week.

Within two weeks, the tiny 1st stage RSG larvae chew through their egg's shell and directly into the bark of the cane. The larvae feeds on the cambium as it spirals around under the bark of the cane, causing swelling at the site of the attack and wilting of the leaves above it. By midsummer, the larvae have developed into 3rd stage, which then chew into the pith of the cane to develop into the 4th and last larval stage and remain there through pupation where metamorphosis occurs and emerge as an adult beetle the following spring.

RSG control

If RSG is present in a raspberry patch, the canes killed by them need to be removed and destroyed before the next spring. "Destroy" means more than just throwing them on top of the compost pile. The RSG will survive that and would emerge to plague the raspberries the next spring.

When the temperature in the region has reached the daily minimum of 65 F, raspberries in the patch should be monitored for the adult RSG activity (leaf feeding, mating, and egg laying) on warm mornings. The adult females must feed on the leaves before they can produce their eggs. Foliage treatment of labeled insecticides (synthetic or organic) can reduce their populations and the resulting cane losses.

This action may be required in addition to cane destruction if RSG are flying into the raspberry patch from habitat off property. Insecticides directed at adult RSG can be applied on the plants pre-bloom to just before blossoms open to protect pollinators. The length of the insecticide residual control product chosen should try to cover the period of active feeding by the adult RSG. Table 1 lists insecticides labeled for homeowner use on insects feeding on the leaves of raspberries and was compiled by Utah State University Extension.

If you have not discovered this pest in your raspberries, congratulations! Try to be very careful and not accidentally import them with new introductions of RSG-infested raspberry or rose plants. Raspberry patches isolated from possible sources of RSG have the opportunity to use prevention and exclusion on this pest. They are the best IPM tactics of all to manage pests.

Scott Schell is immersed in flowers and fruits this edition. You'll find his article about grape pests on page 15 of this magazine. He is the University of Wyoming Extension entomologist and can be reached at (307) 766-2508 or at sschell@uwyo.edu.

Table 1. Insecticides labeled for leaf feeding insects on raspberries in home gardens.

Chemical Name	Examples of Brand Names	Insecticide Class*
carbaryl	Sevin, Bonide Fruit Spray	Carbamate (1A)
malathion	Malathion	Organophosphate (1B)
gamma-cyhalothrin	Spectracide, Triazicide	Pyrethroid (3)
permethrin	Hi-Yield Lawn, Garden, and Livestock Insect Control	Pyrethroid (3)
acetamiprid	Ortho Max Flower, Fruit, and Vegetable Spray	Neonicotinoid (4A)
neem oil	Neem Oil†, Garden Safe†	Anti-feedant, Insect Growth Regulator (UN)
pyrethrin	Pyganic†	Botanical (3)

*Insecticide Resistance Action Committee (IRAC) mode of action classification codes. To minimize resistance development in the insect population, rotate among classes.
†OMRI approved for organic production.

All brands are registered trademarks. Examples of brands may not be all-inclusive, but are meant to provide examples. The availability of insecticides changes frequently. ALWAYS READ THE LABEL FOR REGISTERED USES, APPLICATION AND SAFETY INFORMATION, AND PROTECTION, RE-ENTRY, AND PRE-HARVEST INTERVALS.

Table: Utah State University, http://bit.ly/usu-ent-178-15