Supporting Fruit Production

OHIO FRUIT NEWS

Research and Recommendations from Experts at The Ohio State University

January 2023

Spotted Lanternfly Study Tour Educates Extension on Recognizing and Detecting Spotted Lanternfly

By Ashley Kulhanek, Extension Educator, Agriculture and Natural Resources, OSU Extension Medina County

The word has spread about Ohio's newest invasive pest, Spotted Lanternfly (SLF) (*Lycorma delicatula*). This large planthopper feeds on wild and cultivated grapes, hops, and many tree and shrub species including willow, maple, birch, fruit trees and the invasive Tree-of-Heaven (*Ailanthus altissima*). First detected in Pennsylvania in 2014, it has quickly spread to 14 surrounding states and four confirmed counties in Ohio. It is a pest of concern for grape producers in high numbers, and we are learning more about how it might stress other crops. It is known to be a nuisance to the public. The heavy production of honeydew leads to sooty mold coverage on homes, cars, and landscaping in addition to attracting nuisance insects such as yellow jackets, wasps, ants and hornets to these sugary secretions (Figure 1). They have been a nuisance to residents in Pennsylvania, and they are coming to a town near you.

Figure 1. Yellow Jacket attracted to the honeydew excrement from Spotted Lanternfly (SLF). *Courtesy of A. Kulhanek, OSU Extension.*

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A team of OSU Extension Educators recently received a grant to travel into quarantine areas in Pennsylvania this past October for a study tour to learn from those combatting SLF infestations firsthand. Seven educators met with Rich Vrboncic and Jason Rihn of Bartlett Tree Experts for a Pittsburgh tour of three managed

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sites. They covered pesticide treatments used, challenges and successes of each and scouted for new egg masses and live adult SLF.

Across the treated locations, the team found new adults and fresh egg masses, illustrating the difficulty in controlling the pest. New adults may have moved into the area, or incomplete control was experienced, suggesting repeat control would be necessary. Bartlett felt they had a 2-month window of control. The tour also revealed the difficulty in containing the pest, whose egg masses were abundant on all types of surfaces. Egg masses and adults were often seen in inaccessible places making scouting, collecting, and treating very challenging. Hot spots included steep hills, walls, busy roadsides, train corridors (Figure 3), and populated areas.

Figure 3. OSU Extension Educators collecting Spotted Lanternfly from Tree-of-Heaven along a trainline in the Pittsburg area. *Courtesy of A. Kulhanek, OSU Extension.*

Figure 2. Egg masses (white arrows) of the Spotted Lanternfly on a maple tree. *Courtesy of A. Kulhanek, OSU Extension.*

This late in the season, the team was surprised to find the heaviest populations of adults and eggs on maple trees (Figure 2). Also notable was heavy infestation on Boston ivy (*Parthenocissus tricuspidata*) but not English ivy (*Hedera helix*). These observations will help guide where scouting efforts will be conducted in Ohio.

The tour ended at infestation sites in Cleveland, Ohio, where educators scouted quarantine areas after treatments by the Ohio Department of Agriculture. Using the Great Lakes Early Detection App (GLEDN), we reported sightings of adult SLF and egg masses. As was the case on the Pennsylvania tour, even after pesticide treatment by the ODA, new adults and egg masses were found.

With this new knowledge and connections to frontline professionals in Pennsylvania, OSU Extension is better positioned to continue spreading the word and preparing the public to identify and report infestations of this new invasive species. This pest will not be confined to production areas. If you find a suspected SLF, reach out to your county extension office or report it directly to the Ohio Department of Agriculture (Ohio Plant Pest Reporter), which has a site devoted to reporting sighting details online. Ohio State University is continuing to prepare for this pest. Our newest specialty crop entomologist, Ashley Leach, is actively researching the pest in grape production and collaborating with fellow entomologists across the region to learn more about its long-term effects. Find out more at her research site, https://www.ashleybleach.com/.

Disease Management Strategies for an Emerging Disease of Strawberry in Ohio.

By Melanie Lewis Ivey, Associate Professor, Extension Fruit Pathologist, Department of Plant Pathology; Dr. Francesca Rotondo – OSU Plant and Pest Diagnostic Clinic, Interim Director, Department of Plant Pathology

Neopestalotiopsis disease, caused by *Neopestalotiopsis* spp., is an aggressive disease of strawberry that was first observed in 2021 in Ohio. The disease causes leaf spotting and rapid plant decline (Figure 1). The symptoms on the leaves can easily be confused with common leaf spot, leaf scorch and / or Phomopsis leaf blight. However, Neopestalotiopsis disease symptoms progress much faster, especially when conditions are wet and cool. Unlike these other foliar diseases of strawberry, *Neopestalotiopsis* spp. can cause fruit lesions. There is minimal information of the susceptibility of common varieties planted in Ohio, the primary source of inoculum, or the ability of the pathogen to overwinter in Ohio. The Ohio Vegetable and Small Fruit Research and Development Program (OVSFRDP) supported a variety trial to determine the susceptibility of varieties commonly planted in Ohio.

The study evaluated 'Allstar', 'Honeoye', 'Jewel', and 'Earliglow' for susceptibility to *Neopestalotiopsis* spp. Plants were grown in 6-inch pots and maintained in a greenhouse under high humidity conditions. The leaves were inoculated with a spore solution. We measured disease incidence (number of diseased plants) 7- and 17 days after we inoculated and severity (percentage of the leaves with symptoms) 17 days after inoculation.

Figure 1. Late-stage foliar symptoms of Neopestalotiopsis disease on strawberry.

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Grower's Corner

What weather station would you recommend I purchase for my orchard for use with NEWA?

NEWA is compatible with special configurations of **Onset** and **KestrelMet** (previously RainWise) weather instruments. They basic models for both are about the same price, have cellular or WIFI options, and have a yearly cellular plan fee. My program has two Rainwise and two Hobo stations and both perform equally well. The Onset stations use cellular because they are in a chestnut orchard in Carroll county and WIFI is not readily available. Whichever model you choose it will perform optimally and provide optimal data integrity if it is maintained in good working condition. A weather station maintenance guide is available on the NEWA website (https://newa.cornell.edu/maintenance-guide) or you can contact the vendor for assistance.

Onset Data Loggers
Matt Sharp, Strategic Sales Representative
Environmental & Agricultural Monitoring
508-473-3126; **matt_sharp@onsetcomp.com**

KestrelMet
Brad Luscombe, Manager
Support, Sales, and Service
207-801-4043; **bluscombe@rainwise.com**

Figure 2. Neopestalotiopsis disease symptoms on four varieties of strawberry commonly grown in Ohio. Plants also show symptoms of mite injury.

Jewel was the most susceptible variety with 92% incidence and 12% foliar disease severity (Table 1). In 10 days, disease incidence in Jewel doubled, indicating that the disease can rapidly spread when humidity is high. Allstar was the least susceptible with 20% disease incidence and disease did not spread to other plants within 10 days under high humidity conditions. Disease incidence for Honeoye and Earliglow was high at 56% and 49%, respectively. Severity after 17 days for Allstar, Honeoye, and Earliglow was between 5 and 8%. Jewel plants were also more visibly stunted (Figure 2) than the other varieties, however stunting was not evaluated in this study.

Although this study should be repeated and additional information on the primary source of inoculum is needed, preliminary results indicate that Jewel is very susceptible to *Neopestalotiopsis* spp. and fields planted with Jewel should be monitored for disease symptoms frequently and samples submitted to the Plant Diagnostic Clinic (Wooster, OH) for accurate identification.

This research was supported by the 2022 Ohio Vegetable and Small Fruit Research and Development Program.

Table 1. Mean Neopestalotiopsis disease incidence and severity of four strawberry varieties commonly grown in Ohio.

	Mean Disease*		
Variety	Incidence (7 dpi**)	Incidence (17 dpi)	Severity (17 dpi)
Jewel	48.3 a	91.6 a	11.6 a
Honeoye	46.7 ab	55.8 b	7.5 b
Earliglow	33.3 ab	49.2 b	5.0 b
Allstar	20.0 b	20.0 c	5.0 b
P value	0.049	<0.0001	0.0003

* Means that do not share a letter are significantly different.
** dpi = Days post-inoculation

CFAES

OHIO STATE UNIVERSITY EXTENSION

OSU Good Agricultural Practices (GAPs) Online Course

An educational course that covers good agricultural practices or 'GAPs', which help reduce the risk of on-farm produce contamination

- This self-paced on-line course provides produce growers with the knowledge and tools needed to implement best management practices to reduce microbial food safety hazards in vegetable and fruit operations.
- Participants will receive a certificate of participation after completing this course.
- The cost of the course is $50.

To register for the course, go to go.osu.edu/gapscourse

For questions about the course contact Ashley Kulhanek at kulhanek.5@osu.edu

Attending the OSU GAPs class does not equate to being ''GAPS Certified' or fulfill the FSMA 7-hour training requirement. The class gives you the skills and knowledge to reduce on-farm food safety risks.

2022 Fruit Disease Diagnostic Report

By Melanie Lewis Ivey, Associate Professor, Extension Fruit Pathologist, Department of Plant Pathology; Dr. Francesca Rotondo – OSU Plant and Pest Diagnostic Clinic, Interim Director, Department of Plant Pathology

In 2022, the Fruit Pathology and Plant Disease Diagnostic Clinic diagnosed 87 fruit, nut or hop samples (Figure 1) from 20 counties in Ohio, and one from Iowa. Most of the samples were small fruit (including grape), while the remaining were tree fruit, and hop or nut. Fungal diseases represented 65% of the diagnoses, followed by abiotic injuries (20 %) insect related injuries (10%) and bacterial disease (5%) (Table 1, page 9). Unlike previous years all the samples in 2022 arrived in good to excellent condition, allowing us to complete the diagnosis. Information on collecting, holding, and sending fruit samples to the lab for diagnosis are available at the Fruit Pathology website. You can also call or email the lab to get assistance.

If a grower suspects that the disease is present in their plantings, they should contact their county Extension Educator or send a sample to the OSU Plant and Pest Diagnostic Clinic in Wooster, OH.

Two of the more interesting diseases identified in 2022 included ripe rot of grape and oak wilt of chestnut.

- **Ripe rot of grape is** caused by the fungus *Colletotrichum*. The primary symptom of ripe rot is the rotting of fruit after veriason. Diseased berries develop circular, reddish-brown spots that rapidly enlarge to cover the entire berry (Figure 2).

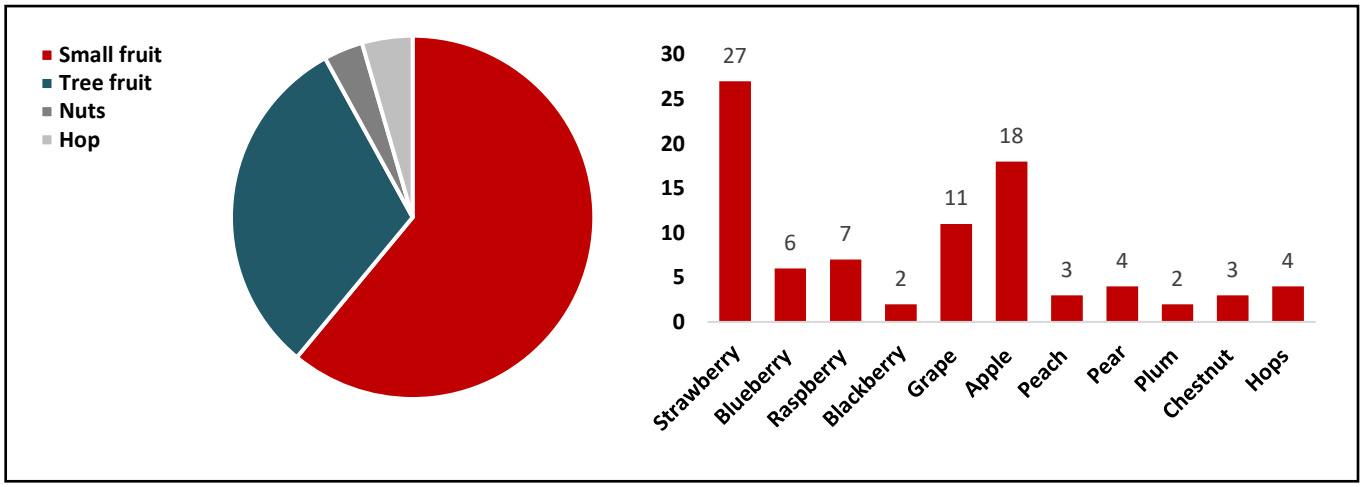

Figure 1. Number of fruit, nut and hop samples diagnosed in 2023.

In 2022, growers continued to struggle with **Neopestalotiopsis disease** of strawberry and for the first time we observed this disease on blueberry. Neopestalotiopsis disease on blueberry was also reported in Michigan in 2022. On blueberry, Neopestalotiopsis disease resembles Phomopsis tip blight, but is much more aggressive. Growers, crop consultants and Extension Educators should continue to be on the lookout for symptoms of disease beginning in in early spring and throughout the entire season, including post-harvest.

The berries become covered with salmon-colored spore masses as they rot. Like other diseases of grape, the berries eventually shrivel and become mummies. The fungus overwinters on the mummies so removing clusters from the vineyard is a good practice (although not always practical). Fungicides can slow disease development but because symptoms most often occur when the fruit begins to ripen, finding a fungicide with an appropriate pre-harvest window can be challenging.

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Figure 2. Ripe rot on berries and clusters (cv. Marquette). Courtesy of B. Hed, *Department of Plant Science, Penn State Extension.*

- **Oak wilt** caused by the fungus *Ceratocystis fagacearum* is an aggressive disease of oaks and was reported for the first time in Ohio on Asian chestnut in Carrol county. The first symptoms of oak wilt are browning leaves at the top of the tree, that prematurely fall off. Very rapidly the twigs and branches die back. Sap-feeding and bark beetles spread the spores of the fungus short distances, but the most important means of spread is through natural grafting of roots. Managing spread via root grafting is very difficult and expensive so it is recommended that an accurate diagnosis is made first. Leaf and twig samples can be sent to OSU Plant and Pest Diagnostic Clinic in Wooster, OH for diagnosis. It is strongly recommended that you contact the clinic first to find out the best way to collect a sample.

This research was supported by the 2022 Ohio Vegetable and Small Fruit Research and Development Program.

State of the Spotted Lanternfly (SLF) Update

By Amy Stone, Extension Educator, Agriculture and Natural Resources, OSU Extension Lucas County

As Ashley Kulhanek explained in her article on the Spotted Lanternfly (see Spotted Lanternfly Study Tour, page 1), the word is spreading, and unfortunately the insect is too. Figure 1 shows the most recent SLF map produced by the New York IPM Program.

While it is important to see the big picture, which the national map provides, that is only a snap-shot. Maps can change as new detections are discovered and reported. It is important to stay up-to-date on any latest SLF developments.

If we drill down to what is happening in Ohio, a map produced and provided by the Ohio Department of Agriculture (ODA) (Figure 2) provides the status of SLF in the state.

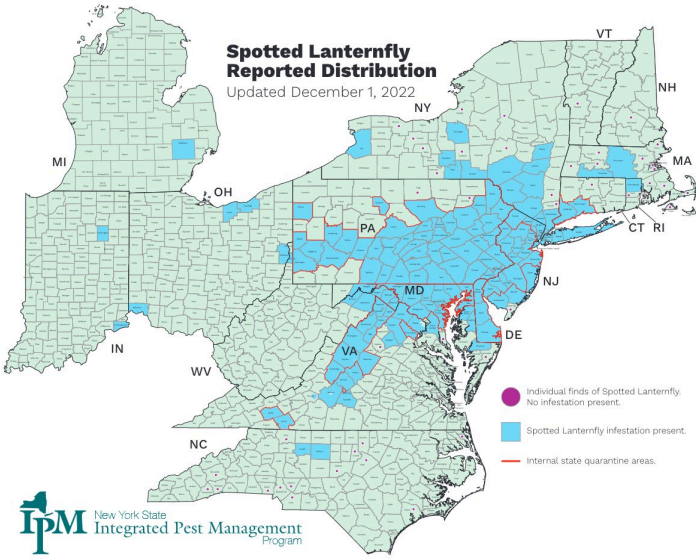

Figure 1. Reported distribution of the Spotted Lanternfly as of December 2022.

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Counties colored red are those where an active and reproducing population has been detected, reported and confirmed. Currently those counties are Jefferson, Cuyahoga, Lorain and Hamilton.

The yellow counties are locations where a single stage of the insect has been found, for example the adult stage, but no egg masses have been detected, so a reproducing population has not been confirmed at this time. Those counties include: Belmont, Butler, Columbiana, Clermont, Erie, Franklin, Lake, Lucas, Mahoning, Muskingum, Ottawa, Portage, Summit, and Trumbull.

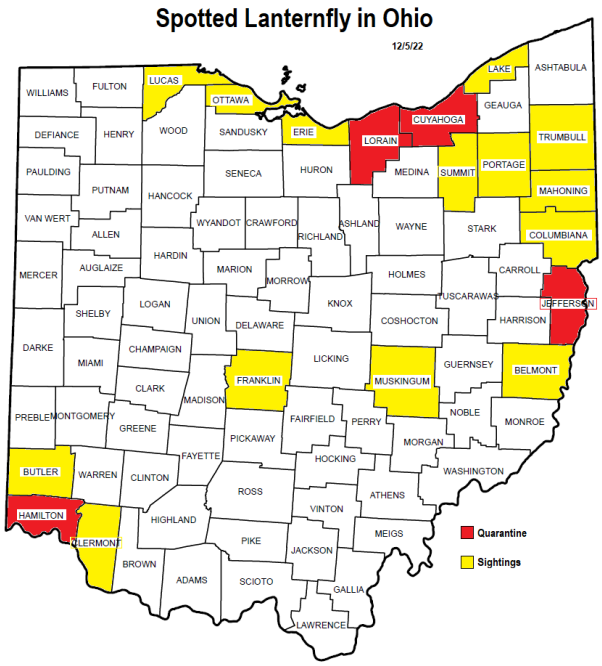

Figure 2. Counties in Ohio with reports of Spotted Lanternfly.

We know this insect is a hitchhiker, and that is important as we monitor and survey in the state of Ohio. Ohioans are urged to be on the look-out for this non-native invasive planthopper. Currently the insect is in the egg mass stage and will be there until the nymphs begin to hatch later this spring and into the summer. Adults will begin to appear in August and can be present until temperatures drop below freezing. At this point, the eggs that are laid will remain until the following spring. There is a single generation per year.

If you suspect that you have seen SLF, it is important to report the location and document the specimen with a photo, or the actual insect. Ultimately, ODA will be the one receiving the reports and will be the one to verify or confirm that it is SLF.

We need your help in Spotting the Spotted Lanternfly in Ohio. Please continue to stay updated on this insect, where is has been found, and the damage caused by this insect pest. For additional information on SLF, check-out check out OSU's SLF website at: https://u.osu.edu/spottedlanternfly/

Ways to Report SLF in Ohio

Ohio Department of Agriculture

•Call 614-728-6400 or
•Visit their website at: https://agri.ohio.gov/divisions/plant-health/invasive-pests/invasive-insects/slf
- Click on the tab "Report Suspect SLF or Tree of Heaven"
- Information needed includes: Observation Date; Name; Phone Number; Email Address; Address of Location Where SLF Was Found; County; and Photograph

Your Local OSU Extension Office

•Not familiar where your local county office is located? Check out this link and scroll to your county on this website: https://extension.osu.edu/lao#county
•A photograph or specimen is required for confirmation.

Use the Great Lakes Early Detection Network App

•This App is available on the Apple App Store, or on Google Play.
•Check out the website for more information: https://apps.bugwood.org/apps/gledn/
•Reports will be verified, and information shared with ODA.

Table 1. Diseases, insect pests, and abiotic disorders diagnosed on fruit, nut and hop samples in 2022. Diseases in bold text are new or emerging in Ohio.

Crop (N samples)	Diagnosis	County
Blackberry (2)	Cold damage, abiotic (glyphosate injury)	Wayne
Blueberry (6)	Neopestalotiopsis disease, insect pest damage, abotic (cold injury)	Brown, Fulton, Morrow
Raspberry (7)	Pythium root rot, Phytophthora root rot, abiotic (unknown spray injury, glyphosate injury)	Brown, Wayne
Strawberry (27)	Rhizoctonia crown rot, Pythium root rot, Fusarium wilt, Neopestalotiopsis disease, anthracnose, leaf scorch, leaf blight	Columbiana, Greene, Franklin, Hamilton, Highland, Huron, Morrow, Pike, Wayne
Apple (18)	Nectria canker, Botryosphaeria canker (black rot), bitter rot, Alternaria fruit rot, fire blight, stink bug injury, abiotic (bitter pit, soggy breakdown)	Columbiana, Erie, Licking, Sandusky, Wayne
Chestnut (3)	oak wilt	Carroll
Grape (11)	downy mildew, grape ripe rot, Botrytis bunch rot, anthracnose, black rot, abiotic (2-4 D injury)	Franklin, Licking, Warren, Wayne
Peach (3)	bacterial leaf spot, insect injury, abiotic (cold injury)	Columbiana, Summit, Wayne
Pear (4)	Cicada scarring, abiotic	Summit, Cuyahoga
Plum (2)	insect injury	Columbiana
Hops (4)	mites, Pythium root rot	Franklin, Sandusky, Tuscarawas

OSU Upcoming Events-2023

New Pesticide Applicator Training Webinar – February 8 link here
Agricultural and Horticultural Field Crop Recertification – February 14 link here
Ohio Grape and Wine Conference – February 20-21
Ohio Commercial Pesticide Applicator Recertification Conference – Columbus February 21
Agricultural and Horticultural Field Crop Recertification Webinar – February 28 link here

*Contact your county Extension office to register for events by phone.
For a list of CFAES events and schedule changes go to the CFAE Events Page

QuinStar 4L (quinclorac) for the Control of Perennial Weeds in Apples and Raspberries

By Allison Robinson, Research Associate, Department of Horticulture and Crop Science; Douglas Doohan, Professor, Department of Horticulture and Crop Science

Apple QuinStar is an auxinic growth regulator herbicide that controls field- and hedge-bindweed and suppresses Canada thistle. The herbicide has soil activity thus future rotational crops need to be considered when using QuinStar, and drift can be an issue with certain crops such as tomato. QuinStar should always include crop oil concentrate (COC) in the mixture. Currently it is registered for use in blueberry, brambles and cranberry.

The IR-4 program (https://www.ir4project.org) has moved forward with residue trials for QuinStar 4L on apples, that should in time lead to registration. There is potential to add QuinStar to a mix with other labeled herbicides such as Karmex + Matrix + Roundup (K+M+RU) to enhance perennial weed control. With funding provided by the Ohio Vegetable and Small Fruit Research and Development Program (OVSFRDP) and the Ohio Apple Improvement Association (OAMP) we conducted experiments at Rittman Orchards in Doylestown in 2022. The purpose was to evaluate QuinStar alone and in combination with other tank-mixes.

QuinStar (Q) by itself did not provide good weed control. Adding QuinStar to a tank mix of K+M+RU improved control over the 3-way mix of K+M+RU. Canada thistle control at 1 WAT after a late-May application of Q+K+M+RU was 50%. While this level of control is inadequate, it was significantly better than with other tank-mixes tested. A second application of the Q+M+K+RU tank mix in late-June to those same plots increased Canada thistle to 99%. The second application had been preceded by mowing the existing plants to about 8 inches tall. We believe that mowing Canada thistle prior to application may have been crucial in achieving control.

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Figure 1. Comparison of QuinStar and Stinger in the standard tank mix of K+M+RU and an untreated control.

Additional results collected in a set of non-replicated plots established in another row of apples infested with field bindweed indicated the addition of QuinStar and Stinger to the standard tank mix of K+M+RU increased the control of field bindweed and Canada thistle (Figure 1). At 2 weeks after the treatments were sprayed 95% control of field bindweed and 90% control of Canada thistle was observed.

Raspberry Perennial weeds are a big problem in bramble production (Figure 2). Mike Pullins at Champaign Berry Farm (Urbana, OH) observed some suppression of honeyvine milkweed seed production after QuinStar 4L use. Research supported by OVSFRDP in 2020 - 2021 led to early findings showing an increase in honeyvine milkweed control when using QuinStar 4L tank-mixed with other herbicides labeled for raspberries.

Crop safety is always a consideration with a new herbicide. In 2021, QuinStar 4L was safe when applied to raspberry as a directed soil application in late fall and early spring at Champaign Berry Farm. However, honeyvine milkweed control was incomplete. Further research was established in 2022 to evaluate the efficacy and safety of QuinStar 4L when sprayed directly to the foliage, tank-mixed with other commonly used herbicides. QuinStar 4L by itself did not provide good suppression of honeyvine milkweed. Karmex + QuinStar controlled 30% of honeyvine milkweed at 4 weeks after application but caused significant injury to the crop. We believe injury may have been due primarily to Karmex in a tank mix containing crop oil concentrate, enhancing foliar uptake of that herbicide. Control of honeyvine milkweed was increased when QuinStar was added to all the tank-mixes tested. The crop injury observed in some of the plots did not exceed 10% when QuinStar 4L was tank-mixed with Matrix or Princep.

Figure 2.Perennial weeds such as honeyvine are a common challenge in raspberry fields.

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Primocane chlorosis and stunting were observed at Mauers' Farm (Wooster) after a mid-spring application to emerged primocanes. We believe this injury was caused mainly by Matrix in the mix with QuinStar and was because the timing was late, after primocane growth had initiated. The tank mixes of QuinStar 4L with Chateau and Matrix, provided 50 - 80% control of Canada thistle and 70% control of goldenrod and persisted through harvest.

At this point our findings support use of QuinStar in brambles as a dormant season application in either spring or fall but not during active growth. Similarly, we caution growers to avoid applying Matrix either alone or in combination with other herbicides during active cane elongation in the spring and early summer.

This research was supported by the 2022 Ohio Vegetable and Small Fruit Research and Development Program and the Ohio Apple Improvement Association.

Figure 3. Crop injury at two weeks after QuinStar broadcast applications.
Note: The use of QuinStar 4L as a foliar directed spray is not included in the herbicide's label and it was done only for research purposes.

Alternatives to Gramoxone for the Control of Perennial Weeds

By Allison Robinson, Research Associate, Department of Horticulture and Crop Science; Douglas Doohan, Professor, Department of Horticulture and Crop Science

Shortages of Gramoxone in 2021 combined with changes to label instructions created a need for OPGMA and the Ohio Apple Improvement Association funded research to look for alternatives. AIM, Venue and Sharpen were tested alone and in tank mix with Karmex + Matrix. The performance of these tank mix combinations was compared to Gramoxone. Treatments were sprayed in mid-July when Canada thistle, poison ivy and Virginia creeper were actively growing.

Aim by itself achieved a 50% control of Canada thistle and 85% in the tank mix by 1 week after application. Four weeks after application Aim in a tank mix had 90% control of Canada thistle compared to 10% control when Aim was applied by itself. At the 4 weeks evaluation, Venue control of Canada thistle, by itself, reached 50% and 95% when it was tank mixed.

Sharpen by itself and in tank mix performed very similar to Venue in tank mix. Sharpen by itself and in tank mix provided 85% and 90% control of Canada thistle respectively by the 4 week evaluation. None of the treatments tested except Gramoxone provided control of grasses.

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Figure 1. Perennial weed control by Gramoxone (left images) and Sharpen tank mixed with Karmex and Matrix (right images).

None of the alternative mixes were able to completely control poison ivy. Poison ivy has waxy leaves that reduces herbicide penetration. The plant also has deep roots and vining growth habits that enable it to recover after herbicides are used. Aim by itself and in tank mix provide only slight (10%) control of poison ivy. Sharpen was the only treatment that provided approximately 60% control of poison ivy by 2 weeks after application, but regrowth occurred and by 4 weeks control was only 20%. In contrast poison ivy control with Gramoxone persisted for the period of observation.

Virginia creeper was more sensitive to the treatments. By the 4 week evaluation Venue in tank mix with Karmex + Matrix provided 80% control of Virginia creeper.

Sharpen worked good on Virginia creeper when sprayed alone and in tank mix, with both treatments reaching 100% control by the 4 weeks evaluation.

Read the full article on QuinStar and Alternatives to Gramoxone for Perennial Weed Control in Berries and Apples using this link or request a copy of the article by contacting Allison Robinson.

This research was supported by the 2022 Ohio Vegetable and Small Fruit Research and Development Program and the Ohio Apple Improvement Association.

NEW Drones for Spraying Pesticides Factsheet!

Small, remotely piloted aircraft are being used to apply pesticides around the world. However, in the United States, drone spraying is in its infancy, but interest in this technology from pesticide applicators is steadily increasing. **Erdal Ozkan, Professor and Extension State Specialist—Pesticide Application Technology** has published a new factsheet on this exciting new technology. Drones for Spraying Pesticides—Opportunities and Challenges is available on Ohioline https://ohioline.osu.edu/factsheet/fabe-540 or by contacting Dr. Ozkan (614-292-3006; ozkan.2@osu.edu).

Spray drone with a boom. *Photo by Erdal Ozkan, The Ohio State University.*

Peach canker

Gummosis (amber colored sap oozing from tree) on fruit trees has many causes including winter injury, mechanical injury, wounding by insect pests, and diseases. In this case, the gummosis is due to the fungal pathogen *Cytospora,* the cause of **peach canker**. The fungus survives the winter in cankers or dead wood. In the spring, when it is cool and wet, spores are produced and spread to other trees by wind and rain splash. Fungicides are generally ineffective for controlling this disease. Removing cankers and dead wood during the dormant season and maintaining a good control program for other diseases and insect pests, especially borers is recommended.

VIEW THE GUIDE

The 2023-2024 Midwest Fruit Pest Management Guide is available. This guide provides conventional pest management recommendations for commercial tree fruit, small fruit, and grape producers throughout the Midwest and surrounding states. These recommendations have been formulated to provide up-to-date information on pesticides and their application.

The guide is $15 and only available through Purdue University.
https://mdc.itap.purdue.edu/item.asp?Item_Number=ID-465 or 765-494-6794

Grower Resources:

- OSU Fruit Pathology website (u.osu.edu/fruitpathology)
- OSU Fruit and Vegetable Safety website (https://producesafety.osu.edu)
- OSU Fruit and Vegetable Pest Management website (entomology.osu.edu)
- OSU Fruit and Vegetable Diagnostic Laboratory (u.osu.edu/vegetablediseasefacts/)
- OSU Bramble: Production Management and Marketing Guide (Bulletin 782) (extensionpubs.osu.edu)

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