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THE PURDUE LANDSCAPE REPORT

In This Issue

When purple coneflowers are not purple: Aster Yellows and Eriophyid mites

(John Bonkowski, jbonkows@purdue.edu)

Purple coneflower, *Echinacea purpurea*, is an old native standby that can thrive even in some difficult landscapes. With beautiful purple flowers and the ability to reseed and fill an area, it has been used widely, especially in gardens comprised primarily of native plants; however, they are not without their problems. We sometimes see some fungal leaf spots, including Cercospora leaf spot, which can lead to premature defoliation under humid conditions, but this is more of a problem in nurseries and greenhouses where plants are overcrowded and air flow is restricted (Figure 1). There are two more common and noticeable problems that can affect the overall appearance of the plant and severely affect the flower color and structure: eriophyid mites and aster yellows.

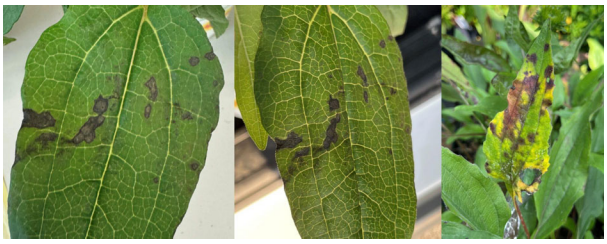

Figure 1: Echinacea leaves with necrotic angular leaf spots caused by the fungus Cercospora. Photo Credit: PPDL

Eriophyid mites do not look like your typical mite. Most mites have a round body with 4 pairs of legs. Eriophyid mites have elongate, maggot-like bodies with only 2 pairs of legs which are located at the front of their body (Figure 2). While the majority of mites found on plants are very small and often require a hand lens to see, eriophyid mites are smaller still and require a microscope with high magnification to view properly. Eriophyid mites infest and feed on coneflower floral parts, which can cause significant plant stunting and deformation of the flowers, which become small and very spikey (Figure 3). Minor damage may affect the flower scales and disk florets and cause them to be green in color instead of yellow/orange or red. The damage eriophyid mites cause may affect the amount and quality of seeds produced and may lead to reduced reseeding.

Figure 2: Three different mites. Left: Clover Mite, 4 pairs of legs; Center: European spider mite, 4 pairs of legs; Right: eriophyid mite with 2 pairs of legs and maggot like body. Photo Credit, PPDL and Cliff Sadof

Figure 3: Echinacea with severe flower stunting and gall-like flower formation due to eriophyid mite feeding. Photo Credit: PPDL

The other coneflower problem we see frequently in the landscape is aster yellows, which is a disease caused by a Phytoplasma spp. and spread by an insect vector, leafhoppers (Figure 4). A phytoplasma is a bacterium that lacks a cell wall and is located only in the phloem of the plant or in its phloem feeding vector, so we cannot find it anywhere else in the environment. Coneflowers infected by Phytoplasma may develop a few different kinds of symptoms: whole plant stunting, phyllody, and virescence. Phyllody is the name of a symptom when vegetative plant parts develop in place of floral parts. This might present as just individual leaves or leaf tissue being produced in the middle of the florets or it might develop into entire stems sprouting from the middle of the flower (Figure 5). Virescence is the name of a

symptom when plant parts that are naturally more colorful become green instead. Coloration might appear as a light green cast to the petals, but it might progress into a leaf green color (Figure 6). Damage from eriophyid mites might cause a similar color change, which can make it sometimes hard to distinguish between the two. Like mite damage, since this disease disrupts the normal floral development, it may reduce the potential for plants to reseed.

Figure 4: Aster Leaf hopper, the vector for aster yellows. Photo Credit: Whitney Cranshaw, Colorado State University, Bugwood.org

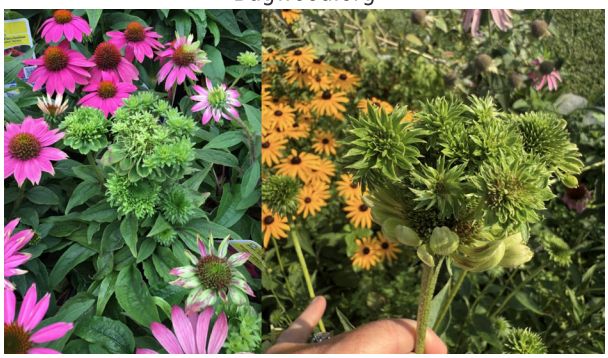
Figure 5: Echinacea infected with aster yellows: example of phyllody, where vegetative tissue develops within floral tissue. Photo Credit: PPDL


Figure 6: Echinacea infected with aster yellows: example of virescence, where tissue that is normally another color is becoming green. Photo Credit: PPDL

Once a plant is infected with aster yellows, it cannot be cured. Sanitation of affected plants will help remove reservoirs of the pathogen from the area and reduce the potential for leafhoppers to spread it to other healthy plants. The problem is that the Phytoplasma that causes aster yellows can cause disease in over 300 plant species and a large number of different plant families, including vegetable crops (garlic, carrot, celery, etc.). It is possible for the leafhopper vector to come into a new location and spread the pathogen after acquiring it somewhere else. That being said, weeding out perennial weeds may also help reduce possible reservoirs in the landscape. Phytoplasmas will only survive inside the plant tissue, so once the plant tissue is dead and dry or entirely removed, then it cannot be spread by the vector. Managing for the leafhopper is not generally recommended as it does not provide reliable control of the disease.

To determine what pest or pathogen may be present, please consider submitting a sample to the PPDL for diagnosis. While we can look for mites on flower heads, it is important to note that they can be transient and may not be present later, even though the symptoms will remain. Phytoplasmas are obligate pathogens and will only be found in either the host plant or the vector. We are unable to culture it and cannot observe it microscopically, so we must use DNA testing in order to detect it in symptomatic tissue, which typically leads to a higher cost for Phytoplasma testing. We prefer whole plants, where possible, so we can examine everything and collect the appropriate tissue, but the pathogen is primarily located in the phloem, so plant stems and flower stalks are some of the better tissues to submit for testing.

Please contact us at PPDL-samples@purdue.edu, or visit our website https://ag.purdue.edu/department/btny/ppdl/ to reach us.

For additional information:

https://hort.extension.wisc.edu/articles/aster-yellows/

https://www.purdueplantdoctor.com/factsheet/flower-5

This aphid is a double threat to the landscape

(Andrew Johnston, john3796@purdue.edu)

Aphids are some of the most common insect pests of herbaceous plants and broadleaf trees and shrubs. I have to admit, I do not always enjoy identifying aphids – but I find their shapes, colors, and biology fascinating. One species of aphid, which I first met myself this year, threatens plants in our landscapes on two fronts: the Spiny Witch Hazel Gall Aphid (*Hamamelistes spinosus*).


Figure 1. Spiny Witch Hazel Gall formed by an aphid. Photo by Judy Gallagher on iNaturalist. https://www.inaturalist.org/observations/194152616

As the name implies, the first plant this aphid attacks witch hazel.

When the aphid feeds on flower buds it induces irregular growth into a spiny gall within which the aphids reproduce safely (Fig. 1). The aphids survive on witch hazel during the spring before eventually producing winged adults which leave the witch hazel behind to lay eggs on their secondary host – the river birch (or black birch). This species is also sometimes called the river birch aphid for its second host. The aphid causes a distinctively deformed leaf with long furrows which lead to overall puckering (Fig. 2). Underneath the leaf surface you can find aphids inhabiting the crevices of the deformed leaves (Fig. 3). The immatures are red in color and adults are mostly black, but they secrete a white filamentous wax that covers their bodies and fills up the leaf crevice. The wax is believed to protect them from pathogens and from becoming coated in the sugary honeydew that they excrete. The aphids live and reproduce inside this shelter for the spring and summer before producing winged adults which go off to lay eggs on witch hazel. Eggs and nymphs of these aphids will overwinter on each of the respective plant hosts, awaiting spring to start this dual host cycle again in the spring.

Figure 2. Wrinkled river birch leaf deformed by aphid.

Figure 3. Underside of river birch leaf showing spiny witch hazel gall aphids living inside the crevice they induced.

The spiny witch hazel gall aphid can co-occur on plants with other species of aphids – even on the same leaf. The handsome streaked river birch aphid (*Calaphis betulella*) is green with black stripes and this individual (Fig. 4) was feeding several millimeters away from a large colony of spiny witch hazel gall aphids.

Figure 4. Streaked river birch aphid adult.

In addition to the gall formation described above, aphids are fluid-feeders and use their tube-like mouthparts to drink from their plant hosts. Aphids are rarely a major threat to trees and shrubs. If a tree is already stressed, then the increased water loss or sooty mold growing from the excreted honeydew could contribute to plant decline. Leaves and flowers that are galled will often brown and drop from branches early. Heavy infestations are likely to be seen after its too late to effectively manage them. Treating trees with imidacloprid or other systemic insecticides labeled for aphid control during the early spring will help reduce populations and damage throughout the growing season.

Take a look at your witch hazel and river birch plants to see if you are hosting this interesting aphid. The more we look closely at trees and shrubs, the more likely we are to see aphids feeding underneath leaves or galls forming on the tops of them. If you ever want to know more about these or other insects on your ornamentals, please submit samples to the Purdue Plant & Pest Diagnostic Lab.

New Ag Climate Dashboard makes climate resources more accessible for Midwest farmers

(Beth Hall, hall556@purdue.edu)

The Midwestern Regional Climate Center (MRCC), with support from the United Soybean Board, has launched the Ag Climate Dashboard — a centralized digital hub offering streamlined access to integrated climate and agricultural data and decision-support tools for producers, advisors and researchers in the Midwest.

Designed to support on-farm decision-making, the Ag Climate Dashboard offers up-to-date weather data, National Weather Service forecasts, Climate Prediction Center outlooks, historical records and interactive tools for monitoring crop growth, pest threats, climate anomalies and extreme weather events.

Figure 1. The Ag Climate Dashboard offers tools to help monitor extreme weather events in addition to crop growth, pest threats and climate anomalies. (Agricultural Communications)

The dashboard also connects users to regional ag climate products and a variety of state-specific resources. State-specific pages, such as Indiana's, link to tools and resources like the Purdue Mesonet and the Indiana State Climate Office.

"We want to provide as much clear, well-organized information to producers and advisors as possible so they can make confident management decisions, whether that's on their own farms or helping clients," said Austin Pearson, climatologist at the MRCC and Indiana State Climate Office.

By placing these tools in a single, easy-to-navigate platform, the dashboard allows users to make better-informed decisions and support profitability and yield.

The idea for the dashboard stemmed directly from farmers. "In 2023, we hosted workshops with farmers and one of the biggest takeaways was that while many ag climate tools exist, they aren't found in one location," Pearson said.

The dashboard hosts tools both developed by Purdue University and trusted external sources. For example, MRCC's Corn Growing Degree Day tool helps track crop progress and predict maturity, while the Pest Forecasting Map from the Iowa Environmental Mesonet alerts farmers to threats like alfalfa weevil. Within the dashboard, users also have access to the Climate Prediction Center outlooks for temperature and precipitation, interactive maps, crop and disease forecasting, fieldwork planning tools, and localized climate summaries — all designed to support timely, informed decision-making throughout the year.

"The forecasting tools help farmers understand what pests — whether weeds, insects or diseases — could be an issue and when management is crucial," Pearson said. "I encourage users to get into the dashboard and explore, as new tools are frequently added."

Users can also consult climatologies through the platform to gain insights into historical weather patterns that may influence marketing and management strategies.

Beth Hall, director of the MRCC and Indiana State Climate Office, emphasized the broader vision of the project. "We're discovering that individual states provide tools that are limited geographically. While searching for information, we found that there are missing tools — those that cover the full soybean production region. This inspires us to keep growing the dashboard to create a dynamic system that's helpful for both a small geographic area and the whole region."

Future enhancements will be guided by feedback from farmers and advisors. One requested addition is an irrigation planning tool, as several farmers are seeking region-specific guidance on how much water to apply to minimize waste. While isolated tools like this exist, they often lack the geographic specificity needed for practical field use.

Looking ahead, the MRCC plans to incorporate more interactive, user-friendly features, such as location-based maps that respond to ZIP code input, providing a customized experience for each user.

"This is just round one of the dashboard," Hall said. "We really wanted to provide people a taste and hopefully get them excited about the future. I envision more and more of our tools offering a greater user experience."

Additional information about the Ag Climate Dashboard can found on the Midwestern Regional Climate Center's website.

*This press release was written by Devyn Raver on August 4, 2025. Link to the original press release can be found here.

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Editor: Kyle Daniel | Department of Horticulture and Landscape Architecture, 625 Agriculture Mall Dr., West Lafayette, IN 47907