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Spotted Lanternfly Found in Indiana

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Adapted from IDNR Press release by Cliff Sadof, Elizabeth Barnes, Purdue University and Amy Stone (The Ohio State University)

Spotted lanternfly (SLF) (*Lycorma delicatula*) a serious invasive plant pest has been reported to be in Indiana. This federally regulated invasive species harms plants by slowing their growth and reducing fruit production, especially in vineyards and orchards. Finding this pest this far west of its previously known distribution makes it possible for SLF to be anywhere in Indiana. Knowing where this pest is located can help us respond more effectively to this pest.

Right now, the Indiana DNR is asking for all citizens to keep an eye out for spotted lanternfly. The bright color of late stage immatures and adults are easily recognized at this time of the year. Anyone who spots signs of the spotted lanternfly should contact the Indiana Division of Entomology and Plant Pathology (DEPP) by calling 866-NO EXOTIC (866-663-9684) or send an email (with a photo of the insect if possible) to DEPP@dnr.IN.gov. For more information about this or other invasive pests see the following link <https://www.in.gov/dnr/entomology/pests-of-concern/spotted-lanternfly/>



Figure 1. Adult Spotted Lanternfly resting on the bark of a tree of heaven Vevay, Indiana. Photo taken by Ren Hall (DEPP).



Figure 2. Red immature stage of SLF (fourth instar) feeding on leaves of tree of heaven in Vevay, IN. Photo taken by Ren Hall (DEPP).



Figure 3. Egg mass of SLF on branch of tree of heaven in Vevay, IN. Photo Taken by Angela Rust (DEPP).



Figure 4. Sooty mold of SLF on branch of tree of heaven in Vevay, IN. Photo Taken by Angela Rust (DEPP).

Status of the known Indiana Infestation.

A homeowner in Vevay contacted DNR's Division of Entomology & Plant Pathology (DEPP) with a picture of a red immature stage near their home. DEPP staff surveyed the site and discovered an infestation in the woodlot adjacent to a few homes in the area. The site is within 2 miles of the Ohio River and the Markland Dam. DEPP and USDA are conducting an investigation to determine exactly how large the infestation is and where it could have come from, as well as how to limit the spread and eradicate the population.

What is Spotted Lanternfly?

Spotted lanternfly is a planthopper that originated in Asia. It was first discovered in the United States in Pennsylvania in 2014. The Pennsylvania Department of Agriculture was unable to limit the spread of this pest because it is an effective hitchhiker and is often spread unknowingly by humans.

Adult spotted lanternfly has two sets of wings, and the underwing has a very distinct red color with spots on the outer wings. The

fourth instar of the insect is bright red with black and white markings. The egg masses of this invasive insect look like mud and they can be spread by vehicle transport including recreational vehicles, cargo carriers (truck transport) and freight trains. They can also be spread through trade materials sold in infested areas that are shipped out of state including nursery stock, outdoor furniture, lumber, etc. Anyone receiving goods from the east coast should inspect for signs of the insect, especially if the commodity is to be kept outdoors.

Spotted lanternfly prefers to feed on tree of heaven (*Ailanthus altissima*), but it has been found on more than 103 species of plant including walnut, oak, maple, and various fruit trees. This insect is often found on grapevines in vineyards. Adult insects have piercing, sucking mouthparts and weaken the plants through feeding on them, which can make it difficult for the plant to survive the winter months. Congregating spotted lanternfly insects produce a sticky substance called "honeydew" in large quantities that over time becomes infested with sooty mold that attracts other pests in the area.

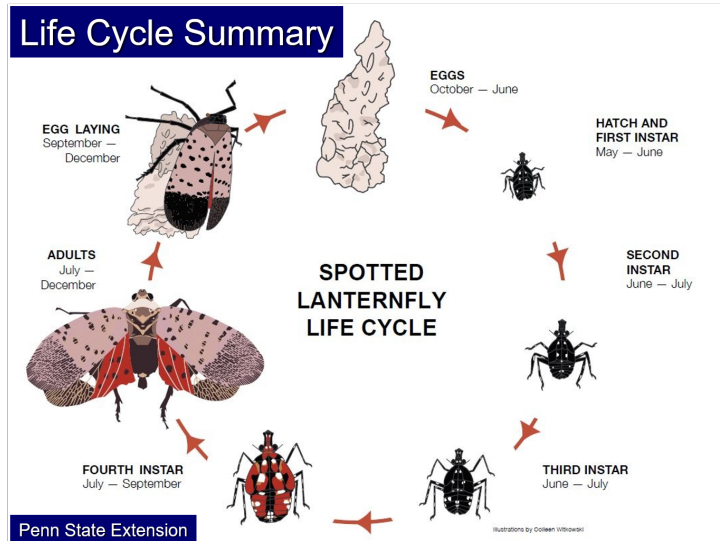


Figure 5. Life cycle of Spotted Lanternfly from Penn State Extension Source: Penn State Extension

Spotted Lanternfly and Its Look-A-Likes

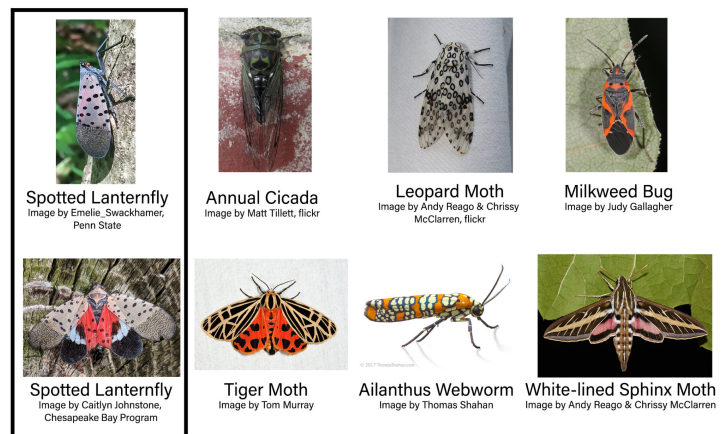


Figure 6. Be aware of insects that resemble SLF when reporting spotted lanternfly.

Coleus Downy Mildew

(Tom Creswell, creswell@purdue.edu)

First identified on coleus in the US in 2005, downy mildew has become an annual threat to production of this popular annual. The disease may be caused by the pathogens *Peronospora lamii* (also infects basil, as well as several species of *Salvia* and *Lamium*) or *P. belbaharii* (also infects basil). The symptoms may range from barely noticeable spots (Fig 1), to large blotches (Fig 2), to leaf distortion or defoliation of the entire plant (Fig 3). Cultivars show extensive variation in how they react to the fungus and symptoms may mimic Impatiens necrotic spot virus (INSV) (Fig 4 A and B), *Botrytis* blight, drought stress or spray burn. Spread is primarily by air-borne spores and cool conditions with high humidity favor spore production and infection. Spores are produced on the undersides of leaves (Figs. 5 and 6) and can resemble *Botrytis* sporulation unless viewed with a hand lens or microscope.



Fig 1. Early stage of downy mildew leaf spot symptoms on coleus



Fig 2. As downy mildew develops large areas of leaves may become necrotic.



Fig 3. In high humidity conditions downy mildew may cause extensive defoliation



Fig 4A. Downy mildew lesions showing concentric rings, a symptom often associated with virus disease



Fig 4B. Coleus leaf with Impatiens necrotic spot virus showing concentric rings.

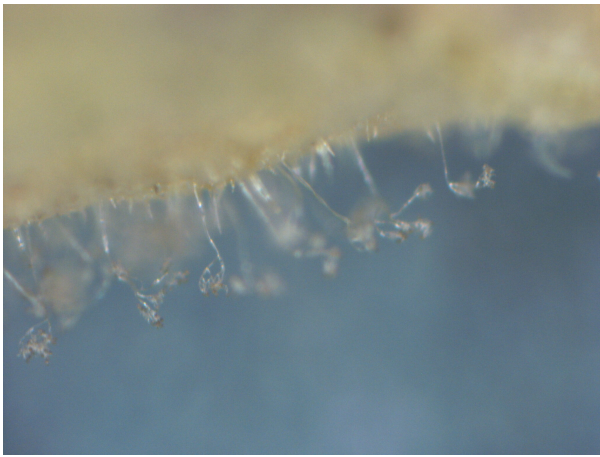


Fig 5. Downy mildew spores are produced on the undersides of leaves, giving the leaf surface a fuzzy gray appearance.

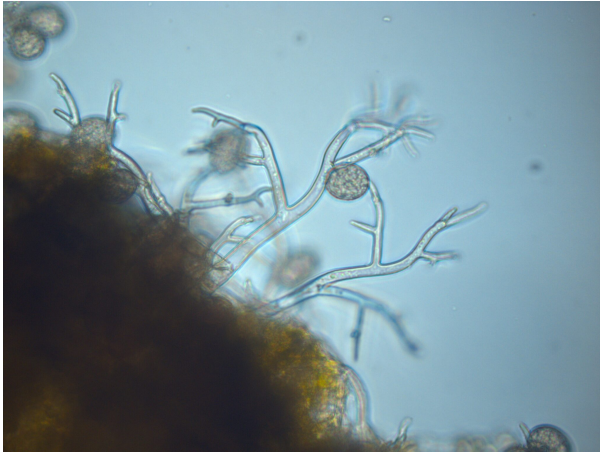


Fig 6. Microscope view of coleus downy mildew spores

Recommendations for greenhouse growers:

- Check incoming coleus and other host plants carefully for any signs of disease before placing them in the greenhouse.
- Reduce greenhouse humidity where possible to reduce spore production.
- Do not work with plants while they are wet or damp
- Confirm suspected downy mildew by [sending samples for diagnosis to the Purdue Plant and Pest Diagnostic Lab](#)
- Cover diseased plants in a plastic bag before removing them from the greenhouse to reduce spread of spores.
- Spray with an appropriate fungicide to protect uninfected plants before the problem appears.

For landscapers and gardeners:

- The disease is less likely to be a problem in the landscape than the greenhouse.
- Look for healthy transplants without leaf spots or distortion of the leaves.
- Water by trickle irrigation on the soil surface instead of using a sprinkler.
- Do not work with plants while they are wet or damp
- Bag and remove badly infected plants from the garden.
- Most fungicides used against this fungus are available only to professional applicators. For more information a list of

fungicides labeled for use, see Janna Beckerman's publication "Downy Mildew of Landscape Plants" at: <http://www.extension.purdue.edu/extmedia/BP/BP-68-W.pdf>

The Economic Contribution of the Indiana Green Industry, 2020 Report

(Ariana Torres Bravo, torres2@purdue.edu)

Along with many other industries, the green industry experienced changes in the last few years. Since the 2008-2009 recession, the industry has shown signs of recovery, especially for some sectors. More recently, mitigation measures due to COVID-19 and mandatory business shutdowns are expected to contract revenues from landscaping services slightly until 2021; yet revenues are expected to rise in 2022. In addition, nurseries and garden stores reported increased revenue in 2020, despite the pandemic effect. The industry benefits from customers (residential and commercial) looking to make aesthetic upgrades to homes, yards, and spaces. Put simply, when homeowners and companies have more income, they will purchase more plants, services, and equipment from the green industry. These trends present important economic opportunities for the environmental horticulture, or green, industry.

Using data from the latest green industry survey, this publication characterizes the economic contributions of Indiana's green industry in 2018. The findings in this report can help industry stakeholders, policymakers, and researchers and Extension personnel understand the structural and performance issues faced by businesses in the green industry. Findings can also help policymakers inform incentives and policies to have a more efficient allocation of resources. This publication categorizes the green industry in six sectors based on main revenue activity: greenhouse and nursery production; lawn and garden equipment manufacturing; farm, garden equipment, nursery, and florist wholesalers; lawn and garden equipment and supplies stores; florists; and landscape architecture and services. For more information, access the full report at purdue.ag/hortbusiness.

Main Findings

Indiana placed 20th in output contributions (\$6.9 billion), 19th in job contribution (45,701 jobs), and 19th in value-added (\$3.8 billion) in the U.S. Figure 1 illustrates the total and direct job contributions by sector. Landscape architecture and services generated most of the total (27,510) and direct (15,393) jobs in 2018, followed by stores (7,544 total and 4,052 direct jobs), wholesalers (5,030 total and 3,905 direct jobs), florists (2,272 total and 1,469 direct jobs), producers (1,947 total and 1,388 direct jobs), and manufacturers (1,398 total and 323 direct jobs). When comparing job contributions between wholesale and retail sectors, estimates show retail generated more total and direct employment at 9,816 and 5,521 jobs, respectively.

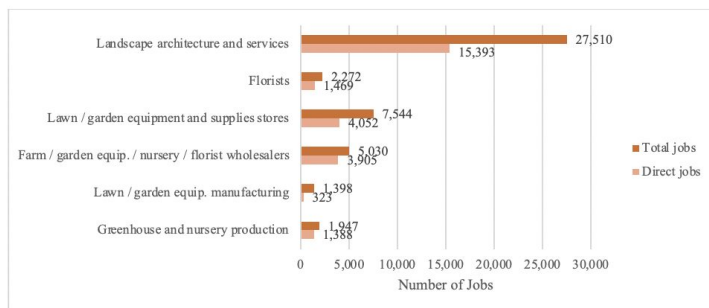


Figure 1. Indiana green industry employment contributions, 2018.

Figure 2 illustrates the labor income contributions of the Indiana green industry by group of business. Labor income represents employee wages and benefits and business owner income. Landscape architecture and services generated 63% of labor income contributions, estimated at \$1.5 billion, followed by stores (\$344 million, 14%), wholesalers (\$274 million, 11%), producers (\$96 million, 4%), florists (\$91 million, 4%), and manufacturers (\$86 million, 4%).

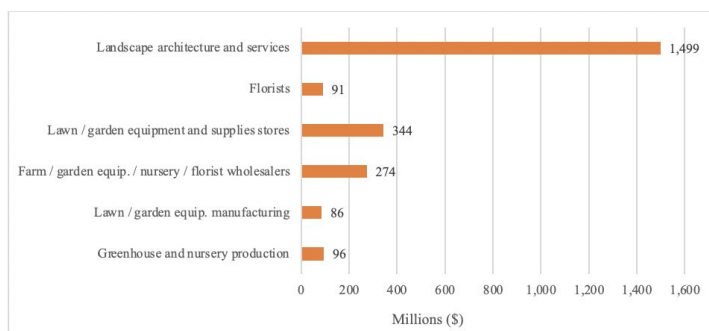


Figure 2. Indiana green industry labor income contributions, 2018.

Figure 3 shows the total and direct output contributions, as well as value-added contributions of the Indiana green industry in 2018. Output is equivalent to business sales revenue, and value-added is equivalent to Gross Domestic Product (GDP), including labor income, other property income (interest, rents, royalties, and corporate benefits) and business taxes. Similar to other contributions, the landscape architecture and services group generated the highest contribution in terms of output and value-added. To illustrate, the landscape architecture and services generated 61% and 65% of the total and direct sales estimated for the Indiana green industry in 2018. The other groups: stores (16% total and 13% of direct sales), wholesalers (9% total and 6% of direct sales), manufacturers (7% total and 6% of direct sales), producers (4% total and 9% of direct sales), and florists (3% total and 2% of direct sales). Similarly, landscape architecture and services generated the most value-added contributions at \$2.2 billion, which represents 59% of all industry contributions in Indiana in 2018.

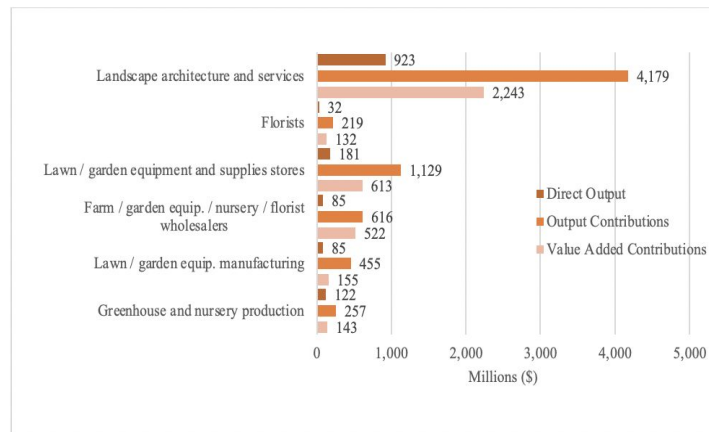


Figure 3. Indiana green industry output and value-added contributions, 2018.

Spotlight on Weeds: Common Bermudagrass

(Aaron Patton) & (Kyle Daniel, daniel38@purdue.edu)

Biology: Common bermudagrass (*Cynodon dactylon*) is the most commonly used turfgrass in the southern United States, but it is also a difficult-to-control weed in northern turf. Bermudagrass is a drought tolerant, warm-season, perennial grass species that tolerates low mowing and actively spreads vegetatively by both rhizomes and stolons but also has the ability to spread by seed.



Figure 1. Bermudagrass is an aggressive weed in northern climates. Photo by Kyle Daniel.

Identification: Bermudagrass has a blue-green leaf and forms large patches in lawns as it spreads radially from rhizomes and stolons once it becomes established. The stolons can be easily spotted spreading into landscapes sidewalks and drives.



Figure 2. Bermudagrass rhizomes are thick and can be found in the soil. Photo by Aaron Patton.



Figure 3. Green bermudagrass is apparent in this drought stressed cool-season turf. Photo by Aaron Patton.

The patches are easily noticed in the summer months when cool-season turf is stressed by heat or drought. Patches are also noticeable in the early morning as bermudagrass holds a heavy dew on its leaves in the early am. In the winter months, bermudagrass is apparent as brown, dormant areas of turf.

Leaves can be very hairy or sparsely hairy depending on the biotype but the ligule will always have hairs.



Figure 4. The finger-shaped spikelets on the bermudagrass seedhead are similar to a crabgrass. Photo by Aaron Patton.



Figure 5. The finger-shaped spikelets on the bermudagrass seedhead are similar to a crabgrass. Photo by Aaron Patton.

The finger-shaped spikelets on the bermudagrass seedhead are similar to a crabgrass. Bermudagrass will produce seedheads from mid-summer until fall. Spikelets typically have 3-6 spikes in number.

Cultural control: In Turf: Enhance cool-season turf density through overseeding and fall fertilization. **In Landscape:** Install edging that prevents infestations above and below the soil line.

Biological control: None known.

Chemical control: Bermudagrass is the most difficult to control turf weed. Keep this in mind when trying to control it! These “control” methods should be regarded as ways to “suppress” bermudagrass. It is extremely difficult to “eradicate” bermudagrass. Different situations require different approaches. The areas below describe bermudagrass control in different situations for different users:

Control before seeding or sodding an area during renovation

The most effective way to control bermudagrass is with a preplant soil fumigant. For most, fumigation is not an option because it is so costly and because of specialized application equipment needed. A good alternative is to make three applications of glyphosate over the growing season (May, July, and September). Wait three to four weeks for regrowth before making the follow-up applications. Research shows that a tank-mix of 3 qts/A glyphosate plus fluazifop will improve bermudagrass control over glyphosate alone. When using fluazifop, be aware that it will have some residual soil activity. Wait at least 30 days before seeding turfgrass after applying fluazifop to bare ground or 14 days after an application to turf.

- Professional products that contain fluazifop only that can be used during renovation include Fusilade II and Ornamec.
- Homeowner products that contain fluazifop only that can

be used during renovation include ORTHO GRASS B GON
GARDEN GRASS KILLER

Control for homeowners

There are few “over-the-counter” products available for bermudagrass control. One such product is Bayer Advanced Bermudagrass Control for Lawns. Multiple (3 or more) applications will be needed to suppress bermudagrass. I suggest that homeowners make applications at the start of the end of the summer when the bermudagrass is not actively growing. Summer applications are generally less effective on bermudagrass and could injure their lawn when applied to drought stressed turf or heat stressed turf as temperatures approach 90 degrees. I suggest using this product twice in the month of May, twice in September, and once in early October. Treating during the cooler periods of the year while the weed is green will help to control the weed while reducing the risk of injuring your desirable lawn grasses. Having said all of this, remember that this is the toughest turf weed to control and few options are effective. At best, the homeowner will be able to suppress/reduce this weed but likely ever completely eradicate it.

Control for turf professionals

There are many situations on golf courses or lawns where bermudagrass invades. There are also many cool and warm-season grasses that bermudagrass invades. Each situation in each different turf species requires a different approach. Consult [Turfgrass Weed Control for Professionals Publication \(AY-336\)](#) for more information on professional options for control in these situations.

Control for landscape professionals

Prevention of spread into the landscape is most effective. Post control can be achieved with a high rate of glyphosate for heavily infested areas. Multiple applications may be required .

For more information of control in turf, visit the Weed of the Month from Turfgrass Science at Purdue University at <https://turf.purdue.edu/common-bermudagrass/?cat=106>.

For more turf information, visit the site at <https://turf.purdue.edu/>

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