

DETECTIVE DENDRO THE DIAGNOSTIC SLEUTH

By Cláudia Coleoni

The Case of the Mysterious Sugar Maple

Following a successful week at the ISA Annual Conference & Trade Show in Washington, D.C., Codit and I drove all the way to good ol' Philly. Codit couldn't stop commenting on the conference's Educational Sessions, and immediately hatched a plan to present at next summer's conference, in Columbus, Ohio. Of course I was very proud to hear Codit's plan, but at this point, I could only think of having a Philly cheesesteak to start off the day. . .

"Hey, Dendro!" Codit called me out while I was savoring my tasty cheesesteak. "Do you really think Ashley

Green wanted us to come here because of her recent analysis on Philly's urban forest?"

"Well, Codit," I replied, between one bite and then another, "to be quite honest, I have a feeling Ashley has a special case reserved for us, as she always does. So don't expect us to be getting a day off any time soon!"

"Wow, how exciting! I really hope so." Codit was clearly looking forward to solving a new case.

Ashley Green, the city arborist, took a seat at our table. She had initially invited me and Codit for a walk around town so that we could take a closer look at the most common tree species in the local urban forest—spicebush, black cherry, ash, tree-of-heaven, and boxelder. I was surprised that the invasive tree-of-heaven (*Ailanthus altissima*) was so common in Philly, which could pose a risk to other tree species in the

long-run. But today, Ashley was concerned with something else.

"Dendro," she began, "I recently received a call from Ms. Jones, an arborist in Berks County, which is just about an hour and a half-drive northwest of here. She has reported that a sugar maple (*Acer saccharum*) on her property has some sooty mold deposits, something that hasn't happened before. I told her you would be in Pennsylvania and could take a look at it. Is that okay?"

Codit jumped in his seat. "Oh, yes! Absolutely! We're off to Berks County, right Dendro?" My assistant tended to forsake professional decorum when he got a little excited.

I pondered for a second. If two arborists were unsure about the case at hand, then it's an invitation I simply couldn't pass up.

"Right-o, Codit!" I exclaimed, also curious and excited to get to a place I had never been. "Let's get in the car and solve this mysterious case in Berks County!"

Later, as Codit and I arrived at Ms. Jones's property in Berks County, she handed each one of us a cup of coffee. Perfect. Coffee would definitely help us remain alert before this challenging task.

"Detective Dendro and Codit," Ms. Jones said after introducing herself. "Now I finally know the world's most famous arbor duo! Thanks for coming by."

"Our pleasure, Ma'am," I said, sipping the coffee. "So this is the sugar maple Ashley told us about, eh?"

"Exactly, and these are the signs I wanted you to look at." Ms. Jones pointed to the sugar maple's bark. "I suppose this dark liquid here is tree sap oozing from these wounds, right?"

"Indeed!" Codit exclaimed. "But hey, Dendro, I just noticed this sooty mold growing at the base of the sugar maple! Not to mention these patches of blackened soil around the base and some honeydew, too."

I bent over for a closer look. "This is definitely interesting, I'll give you that. This can sometimes lead to the growth of saprophytic fungi, if large amounts of bleeding



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Egg masses lying on the tree's bark, covered by waxy deposits.

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Mold growing at the base of the tree.

sap accumulate on the sugar maple's base . . . although that's not necessarily a bad sign."

Ms. Jones tapped her chin, deep in thought. "If only other trees nearby showed this pattern, I'd have a better clue of what this actually is. But it's only with this maple!"

Then something caught my eye, or my arm, as it were. Resting against the maple's smooth bark, my arm had unintentionally brushed against something. "Ms. Jones, I think I have a clue right here: brownish egg masses."

"Whoa, now that's something," Codit said, examining the egg mass. "It should be an insect then, right? Oh, I know! It's gypsy moth egg masses, isn't it?"

"Hmm." I gave it a thought. "It does appear to be, but--"

"The covering for gypsy moth is more fibrous and tanner in color," Ms. Jones corrected.

"You're right," I added. "Plus, gypsy moth eggs are more spherical than these ones. I also thought it could be mantis egg cases, but those are generally larger and sometimes lie on thin stems. The eggs on your maple were laid pretty much in vertical rows. That's really curious."

Codit squealed. "Hey, everyone, come over here!" My assistant called us to observe a bench nearby the sugar maple. "I know it sounds weird, but I've found egg masses here, too! What kind of insect is this?"

"The kind of insect that chooses inanimate smooth surfaces for egg laying—surfaces like stones, fence posts, and pretty much any kind of outdoor equipment!" Ms. Jones said, thinking out loud.

Ms. Jones was right, whatever insect we were dealing with, it clearly had a preference for smooth surfaces, regardless of whether it was a tree.

I glanced around the property and saw only rough-barked trees in the area, until I set my eyes across the street. That's when I noticed a row of trees—all of them tree-of-heaven individuals. That's gotta be it!

"Thank you, Codit, and Ms. Jones, for your careful and precise observations," I said with a smile. "But the final clue seems to be right across the street."

Turn to page 60 to find the solution.

Soft Scales

Soft scale females are small, circular to oval insects that appear as immobile, raised areas or bumps on bark, leaves, or fruit of many trees and shrubs. Most plants tolerate low to moderate numbers of scales. Additional notes:

- Soft scales are larger and more rounded than armored scales.
- They excrete sticky honeydew that can develop a growth of black sooty mold. Ants feed on scale honeydew and can protect scales from natural enemies.
- Soft scales can cause leaf yellowing or the premature drop of foliage.

What Do I Do?

- Maintain healthy plants by providing proper fertilizer applications and adequate but not excessive water.
- Protect natural enemies. Predators such as lady beetles and parasitic wasps can be important in keeping scale numbers below damaging levels.
- Use sticky barriers to keep scale-tending ants out of trees; use baits to reduce ant populations.
- Prune out heavily infested twigs and branches if infestations are not widespread throughout the plant.
- Apply horticultural oils when trees are dormant or when immature scales (crawlers) hatch in the spring; crawlers are highly susceptible to oils.
- Consider replacing plants that have a chronic problem. Most scales are specific to particular plants.



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WHAT'S THE SOLUTION?

Continued from page 23



As we approached the row of tree-of-heaven individuals, I couldn't help noticing some similar signs—honeydew and sooty mold on the base of the tree, and oozing wounds on the trunk. Also, I spotted the same type of egg masses we encountered in the maple tree. Some of the egg masses seemed to be unfinished, covered by waxy deposits. I could even see some ants and wasps on the tree, most likely attracted by honeydew and tree sap.

"Oh, you guys gotta see this!" Codit shouted in awe. "I think I counted over a hundred egg masses in this single tree!"

"Great job, Codit!" I said, praising the efforts of my young assistant. "And now, here they are: adult insects of the *Lycorma delicatula*, a planthopper native to China, more commonly known as spotted lanternfly!"

"No way." Codit seemed very surprised, just as all of us were. "I remember reading a scientific article about infestations in South Korea, which are quite recent and are quickly spreading throughout many regions of the country!"

"So this means we have a new invasive pest in the U.S., which also feeds on an invasive tree?" Ms. Jones asked, intrigued.

"Well, that seems about right, Ms. Jones," I said. "As far as scientific literature goes, spotted lanternfly prefers tree-of-heaven individuals because of their high concentrations of cytotoxic alkaloids, for as you know, *A. altissima* is an allelopathic tree species."

"And there's more," Codit continued. "Recent research points out that spotted lanternfly individuals definitely prefer hosts that contain toxic secondary metabolites, which is why tree-of-heaven is always a solid option."

"Thanks for mentioning that, Codit. Spotted lanternfly chooses plants with toxic metabolites for egg-laying, most likely as a mechanism of defense to protect from feeding by natural

enemies. For the record, even birds have been observed vomiting after consumption of this insect!"

"But these insects clearly prefer *A. altissima*," Ms. Jones began, "as we see here right in front of us, why would spotted lanternflies feed on my sugar maple?"

"Great point," I answered. "It turns out that spotted lanternfly also appreciates the sugar content of the host plant, which would make the sugar maple another ideal host."

Codit elbowed me excitedly. "We should tell this to Ashley Green right away, Dendro! As we saw from the urban forest composition in Philly, *A. altissima* is invasive and widely established, which the spotted lanternfly could also take to its advantage."

"Or we could take that to our advantage as well," I replied. "You see, as *A. altissima* is the preferred tree for egg-laying adults, it can also be used as a 'sentinel plant' to monitor spotted lanternfly. It's also equally important to understand the life cycle of this insect, which has one generation per year. Spotted lanternfly has four nymphal instars, and male and female individuals can be distinguished by their size and reddish color."

Ms. Jones puzzled out the scenario. "So, as a potential solution, we could try to eradicate this pest first by setting up quarantine areas across Berks County and beyond, potentially also removing tree-of-heaven."

"Although tree-of-heaven removal could be an option, it might not be so appropriate," I said. "Once you cut it down, you must take care of the root system as well, because hundreds, if not thousands of new trees may pop up from the roots underground."

Codit dusted off his hands and crossed his arms—his traditional pose for being deep in thought. "Besides the quarantine, promoting banding efforts could be helpful, at least in the short-term. Because by putting sticky bands around the trunks of potential host trees, you'll have these adults trapped, and you could mechanically remove them later."

"That's right, Codit, bands are definitely an option," I said. "In order for our response to be an effective one, the public should be involved. Let's not forget that spotted lanternflies can also lay their eggs on smooth, manmade surfaces, which requires us to take an extra care. Oh, and by the way: a single egg mass could hold 30 to 50 eggs"

"Whoa, that's a lot!" Codit commented. "So scraping eggs could also be a solution! People could be mobilized to scrape them off of trees or smooth surfaces, put them in a bag and place the eggs in alcohol or hand sanitizer to kill them."

"What about natural enemies, Dendro?" Ms. Jones asked. "Are there any you're aware of?"

"Hmm, there are some . . . but the problem is that spotted lanternfly's brilliant colors—red, black, and white—are actually warning colors that keep their potential predators away," I said, recalling a text I had read not too long ago. "So it's not safe to say that we have a biological control agent."

"That's absolutely great advice, Dendro!" Ms. Jones said. "Thank you so much for your time and attention, you too, Codit! I'll help launch a campaign for the elimination



Aggregation of *Lycorma delicatula* on *A. altissima*.



The four nymphal instars of *Lycorma delicatula*.



View of an adult female of *Lycorma delicatula*.

of the spotted lanternfly here in Pennsylvania and I will surely be in touch with Ashley Green again.”

After an overwhelmingly busy day, Codit and I drove back to Philly, where I would once again savor my favorite cheesesteak with some soft pretzels. I was thrilled to have accepted this new challenge in Berks County. All in all, one thing was for sure: pests don't respect invisible borders; they cross state lines and inevitably find their way across the country if no further eradication action is taken.

Additional Reading

Barringer, L.E., L.R. Donovall, S. Spichiger, D. Lynch, and D. Henry. 2015. The First New World Record of *Lycorma delicatula* (Insecta: Hemiptera: Fulgoridae). *Entomological News* 125(1):20–23.

Dara, S.K., L. Barringer, and S.P. Arthurs. 2015. *Lycorma delicatula* (Hemiptera: Fulgoridae): A New Invasive Pest in the United States. *Journal of Integrated Pest Management* 6(1):20.

Nowak, D.J., R.E. Hoehn, III, D.E. Crane, J.C. Stevens, and J.T. Walton. 2007. Assessing urban forest effects and values, Philadelphia's urban forest. Resource Bulletin.

NRS-7. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 22 pp.

Pennsylvania Department of Agriculture. 2017. Spotted lanternfly. <www.agriculture.pa.gov/protect/plantindustry/spotted_lanternfly/Pages/default.aspx>

Cláudia Coleoni joined ISA headquarters as the 2013 educational goods & services department's intern. Cláudia graduated from the University of São Paulo, Brazil, earning a bachelor's degree in Environmental Management, having spent one year at Indiana University–Bloomington. In October, Cláudia will begin her MSc in Water Science, Policy, and Management at the University of Oxford.

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Plant I.D.



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Did you correctly identify this plant from page 43?

Crataegus viridis

Generally known as green hawthorn, this species is a rounded, sharply thorny, spreading, dense tree primarily occurring in the midwestern, southern, and southeastern United States. Suitable for most sites and soils; will grow best in sunny location. It's native habitat includes open woodlands, prairie, plains, meadows, pastures, and savannahs; however, as a thicket-forming tree, the green hawthorn is considerably adaptable. Prefers well-drained soils, but can grow in poor and compacted soil, as well as in heat and drought conditions. Tolerant of urban pollution.

Content sources: Missouri Botanical Garden, Penn State Extension, The Morton Arboretum, and *Dirr's Encyclopedia of Trees and Shrubs*.

- Botanical name: *Crataegus viridis*
Common names: green hawthorn
Mature size: 20–30 feet high and wide
Foliage: Alternate, simple, oblong-ovate to elliptic, 1.5–3.5 inches long, 0.75–2.5 inches wide. Foliage is a lustrous medium green in summer and can change to purple and scarlet in autumn. Flowers are white, fragrant, and showy. When present, thorns grow to 1.5 inches long.
Fruit: Bright red, one-fourth to one-third inch diameter, color in September–October and persisting. Edible, but not recommended for human consumption.
Growth rate: Moderate
Autumn color: Purplish-red
Geographic range: The southeastern U.S., from Virginia to Florida on west to Texas and up the Mississippi River valley to Illinois. In Missouri, the tree primarily occurs in low wet grounds and along streams in the southeastern and southwestern parts of the state.

USDA Hardiness

Zone: 4–8

Pests and diseases: Some susceptibility to cedar hawthorn rust and fire blight. Fungal leaf spots, powdery mildew, cankers and apple scab are occasional problems. Insect pests include borers, caterpillars, lacebugs, leafminers, and scale.