



Integrated Pest Management: IPM Concepts

Our CEU article is first in a two-part series based on ISA's latest Best Management Practices book, on integrated pest management. **Page 12**



What Do You Know About Approaches to Value?

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San Francisco's Friends of the Urban Forest help the city with its early tree care program.

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The Christmas Tree: From Origins to Present Day

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How to Communicate with Engineers

Arborists and engineers often have to work together during construction projects. Carol Kwan provides some tips to facilitate communication between these diverse professionals. **Page 63**

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On the cover:
Ladybird beetle feeding on a colony of scale insects.

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William M. Ciesla, Forest Health Management International, Bugwood.org

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DETECTIVE DENDRO THE DIAGNOSTIC SLEUTH

By Guy Meilleur

The Case of the Charismatic *Carya*

After we left the large pecan tree shading Carrie Ackurnel's farmstead home last spring (*The Case of the Ill Illinoensis*, April 2007), Arbor Cop and I reviewed the options for treating the tree, and the *Ganoderma* fungus that infected it. Codit also got into the discussion, and used the tree in his semester project for

the plant pathology course he was taking. One morning, he came into the office with a sly grin.

"Hey, Dendro, did you know that cattle eat tree trunks?" he asked. I had to think about that one. "Well, Codit, I have heard of cows doing that but, even with multiple stomachs, I don't know how they could digest solid wood."

"Ha! I finally stumped you!" he triumphantly exclaimed. "My classmate from Chile, Rodrigo Robledo, showed us pictures of *palo blanco*. This wood turns white when the reinforcing lignin is digested by a *Ganoderma* fungus, leaving the fibrous cellulose behind. Cellulose is carbohydrate, so the cows can handle that. Also, Rodrigo's project is on root invigoration, so he will do that work for our *Carya* client, the Ackurnels."

"Extraordinary!" I exclaimed, looking at the bundles of bright white wood in the picture. "Your Chilean friend has shared an extreme example of wood with 'white rot,' which retains flexibility while losing strength and solidity. 'Brown rot' fungi leave lignin, which tends to be brittle, behind. I would love to visit Chile to see *palo blanco* in person, and for the experience of snow skiing in July."

We received the results of the soil test and scheduled our winter visit to the Ackurnels' trees. As we approached, we saw that the large pecan tree had weathered the long, hot summer intact. Rodrigo was in the yard on one knee, studying cylinders of soil that he had extracted with his probe. Carrie met us at the driveway with her three children, all acting anxious and animated.

"Good morning, Detective; Codit," she welcomed us. "My children have been watching this tree closely and have saved some things to show you."

"I found a twig on the ground this spring that the squirrels chewed off," complained Candace, waving the evidence. It was cut cleanly on the outside, but torn fibers protruded from the pith. "We don't mind sharing the nuts, but how do we stop them from biting off the branches?"



Severed end of twig from pecan tree.

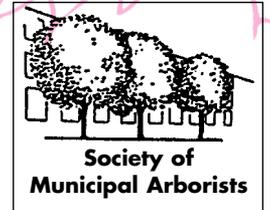
"I found this spiderweb this summer!" cried Knut, thrusting a ragged mess that he had clipped off the end of a branch. "Why do they get this coarse, black sand inside their webs? I don't like spiders. They're creepy. How can we stop the spiders from spinning these messy webs?"

"I see lines of holes in that big branch up there where bad bugs brutally bit it," exclaimed Carol. "Will the tree leak its sap and die? How can we stop those bad bugs? And if pecan trees have all these problems, should we plant a different kind of tree this fall to line our new driveway?"

"Carrie, your children are budding tree detectives, and we will answer their questions in good time," I said, "but I think you have a more immediate concern about this tree's stability. We can see that the top is less dense above the *Ganoderma* infection, and the branches on the other side are better balanced since Codit reduced the sprawling ends. So, at first glance, the aboveground portion of the tree appears more stable, and the increased growth in this callus tissue at the margin of the infection is a good thing. However, it is clear this tree is in poor condition, as I noted in April, and may need to be removed before long."

"I'd like to continue giving it a chance," Carrie insisted. "What do you have, Rodrigo?"

PROFESSIONAL AFFILIATION BRIEFS



Los Angeles Chief Forester Is SMA President-Elect

The City of Los Angeles' lead arborist, George Gonzalez, was recently elected president of the Society of Municipal Arborists, a nationwide organization of urban foresters and municipal tree experts.

Gonzalez, chief forester for the City of Los Angeles, runs the Urban Forestry Division of the Department of Public Works, Bureau of Street Services, and is one of the project leaders of the city's Million Trees LA initiative.



He is a 29-year veteran of the tree care profession. Before joining the City of Los Angeles, he ran his own tree care and landscaping company. His municipal career began in 1985 when he was first hired as a tree surgeon. He made his way up as crew foreman, inspector, claims supervisor, training coordinator, and eventually street tree superintendent. Today, he manages the maintenance of 700,000 street trees and more than 300 acres of land-

scaped median islands that make up the largest, most diverse urban forest in the United States.

Gonzalez is an ISA Certified Arborist and a certified urban forester (California Urban Forest Council). He is also past president of the Street Tree Seminar, Inc., and former member of ISA's Western Chapter (WCISA) Certification Committee. He currently serves on the American Public Works Association's Facilities and Grounds Committee.

Committed to promoting and developing the tree care profession, Gonzalez has written urban forestry articles in various trade publications including *City Trees*, *Western Arborist*, *APWA Reporter* and *Southwest Trees and Turf*. He is also a founding member of the Municipal Forester Institute (MFI), where he served on the steering committee that developed the MFI curriculum, and is a member of the institute's teaching cadre. Gonzalez has spoken at many urban forest conferences and seminars, including the annual conferences of WCISA and SMA and the APWA congress, where he discussed sidewalk repair programs, green waste recycling, and how public works managers can enhance their urban forest management programs. **AN**



Rows of holes in long branch of pecan tree.

"Here's the soil analysis from the state lab, and our prescription for soil treatments this fall," noted Rodrigo, pointing to his sheet. "Injecting air, water, composted organic matter, and these inoculants will provide a biological basis for root growth. The infection does not seem to have affected five of the seven support roots, and the beneficial organisms may outcompete the pathogen in the soil. You have already done a great job of mulching the tree, 4 inches deep, off the trunk flare, and out toward the drip line."

"Well, Rodrigo, I was following some very fine direction." Carrie turned her aster-blue eyes on me. "But this trunk does not look good—a third *Ganoderma* conk has popped out, next to the ones you identified before, Detective. Does that mean my tree will fall down, or is there something we can do to stabilize it?"

"Let's review your management options," Carrie, I said. We cannot solve the stability problem by pruning alone, because losing too much leaf surface can starve the tree. Rodrigo's work may increase stability over time. By increasing fine root density, the support roots will get more of the nourishment they need. Cabling will support individual branches but can do nothing to prevent toppling. Guying to a ground anchor would not fit this historic landscape, and the forks are strong, so installing brace rods will not help."

Codit ruffled through his copy of the ANSI A300 (Part 3) support standards. "Gosh, Dendro, only cabling, bracing, and guying are mentioned here."

"Same here," added Rodrigo, as he looked through Codit's copy of ISA's Best Management Practices book on support systems.

"You fellows are behind the times," I told them, looking over their shoulders. "Perhaps if we listen to rap music on the radio while we eat lunch, we will hear the synonym for 'support' that this senescent tree may someday require. Meanwhile, let's look through our reference books for the answers to this tree's pest problems as we enjoy the sweet onion salad I saw advertised at the corner café. We'll be back in an hour, Carrie."

*What three pests are attacking this *Carya*, and what type of support might Dendro prescribe in the future? Turn to page 62 for the answers.*



WHAT'S THE DIAGNOSIS?

"Boom-shiddi-boom." Our truck vibrated with the beat as we approached the farm after lunch. "Turn that rap racket down, Codit!" I implored. "If I hear 'Props for the Homeboys' again, I believe I'll lose what's left of my mind."

Codit grudgingly obliged, and we parked outside the drip line.

Carol Ackernel ran up to us and started jumping up and down so hard an earbud from her iPod popped out.

"I know! I know!" She hooked her iPod to the car stereo and pumped up the volume. "Givin' props to my homeboys, no more stops on my own toys . . ."

Our truck windows were vibrating so hard I was afraid they would break.

"Thank you, Carol. We get it now, so turn it down, okay?" Carrie pleaded.

"Yes, props under these large lower branches may be worth considering," I said, enjoying the quiet. "They can prevent both branch breakage and root failure, and are

made from metal or wood. Now, let's go over to the picnic table, where Codit and Rodrigo have spread out the publications I always take to the

field. First, we can see that props are covered in my 2006 versions of the standards and BMPs, but not in Codit's 2001 version. By revising them every five years, the committees ensure that our specifications are up to date."

"Youngest first," Codit started, meeting Candace's wide-eyed gaze with his hand lens. "The end of your twig has been gnawed almost straight across with a faint rounding and is slightly roughened by the chewing. The adult twig girdler, *Oncideres cingulata*, cuts this circular incision into the wood. In the section of the twig above the girdle, a small hole is gnawed and the egg is placed inside. So, if you gather and destroy these fallen twigs, there will be less damage next year."

"You're next, Knut," Rodrigo said. "The webs you found were not made by spiders at all, but by the fall webworm, *Hyphantria cunea*. This pest has traveled from its North American origins to become a major pest in Europe and Asia. Here, it can stress trees when the larvae eat the leaves, but only with years of defoliation will it strain them. The

best control may be to keep a long pole handy and strip off the webs whenever they are woven. *Trichogramma* spp. wasps are natural parasites, laying their own eggs into the eggs of the moth."

Meanwhile, I had attached a climbing line and helped Carol get up to the limb with the lines of holes in it. She straightened her goggles inside her helmet and took deep breaths as I ascended and gave her my magnifying glass. "Do you see dust, little crumbs of mushy wood, or rough bits of wood, Carol?"

"Just rough bits," she answered. "I see no visible dust or crumbs, or 'frass,' as Codit called it. Does that mean our pest may not be a wood-boring insect?"

"Correct," I replied, marveling at such great powers of deduction in such a small person. "The pest is the yellow-bellied sapsucker, *Sphyrapicus varius*. Unfortunately, sapsucker holes allow fungi and other pests to inflict damage. Sapsuckers drill these holes to get at the sap. In the summer, sapsuckers feed on the 'phloem' sap—the sticky fluid that carries the nutrients produced in the leaves. Imagine the work this tree is trying to do, closing around each and every wound that bird made."

"There are hundreds of holes." Carol ran her eyes up and down the limb. "So many wounds to close! Can we cover it to prevent any more?"

"Exactly, Carol!" I proclaimed. "There isn't much we can do, but we can wrap burlap long enough to train the bird to look for something else to peck. And, if you hang suet feeders in a sheltered location where they can comfortably feed, their feeding may be entertaining, not destructive." We rappelled back to earth.

"Thank you so much, Detective," Carrie said, clapping my shoulder as she walked me to my truck. "My children and I will look forward to your midsummer inspection, when you can check our progress with our pecan's pests. You won't forget us, will you?"

"No ma'am." I smiled, as her hand slid slowly from my shoulder. "Regular checkups are what the doctor ordered."

Guy Meilleur is an ISA Board-Certified Master Arborist. He is formerly staff arborist at the University of North Carolina and instructor at Duke, Virginia Tech, and North Carolina State universities. Guy's research includes endocormic growth from dormant buds, compartmentalization of decay, and tree climbing as an antidote to aging.

Photos courtesy of the author.