



DETECTIVE DENDRO THE DIAGNOSTIC SLEUTH

By Guy Meilleur

The Case of the Bumpy Blackness

I was circling the property with my new client, Ruby Rubrum, as I inventoried the landscape. We were making our way around the backyard, me describing management options as she described her goals. Thinning cuts on the big zelkova (*Zelkova* spp.) would allow a little more light into the bedroom windows, and onto the azaleas (*Rhododendron* spp.) beneath. Removal cuts would raise the crapemyrtles

(*Lagerstroemia* spp.) over the driveway above car height, while reduction cuts would contain the *Prunus* × *yedoensis*, 'Yoshino' cherry that sprawled into our path. Thinning, removal, and reduction cuts were all required to restore and rejuvenate the repeatedly sheared viburnum (*Viburnum* spp.), quince (*Chaenomeles* spp.) and spiraea (*Spiraea* spp.) that composed the bed on the back border that buffered the small city park beyond the orange signs. Ruby agreed that she would have arborists manage all her woody plants, instead of having the shrubs topped by the "shear madness" of the turfgrass crew.

She also voiced her concern about homeless people in the park trespassing in her garden, so we looked at guying options to train those shrubs into an impenetrable wall. Codit was videotaping segments of the management plan as it developed, so she could review the DVD later. Codit could burn a DVD on the laptop in a matter of minutes, while I took a look around the site as I waited for the check. Many clients were glad to buy a DVD for a reasonable upcharge, and I was glad to have both the video record for my files and of course the extra income. In the back of my mind I was buying myself a dynamic cone soil penetrometer while I leaned toward Ruby and guided her eye to follow my gleaming green laser beam. The sparkling spot neatly traced the lines where a saw could remove horizontal branches from her favorite tree, a red maple that hung over her second story veranda.

Codit slid through the shrub border for the obligatory inspection of the trunk flare, as I pointed above the maple to the gleaming white belly of the hawk gliding above, and the V of honking geese heading south for the winter. Ruby gasped the crisp air, long and full, and our eyes met in silent appreciation. The last of the maple's fall color matched the strawberry highlights in Ruby's hair. I smiled, I leaned in closer, but suddenly Codit cried, "Whoa! What's this?" That kid has impeccably horrible timing, I thought as I painfully pulled away and joined him at the trunk.

"Whatcha got there Codit, a fire-breathing skink?" I asked as I dropped to one knee to look. I could see right away that Codit's



Figure 1. The black and brown discoloration, the foul smell, and insect swarms in the past caused the client to form some uncharitable opinions about her homeless neighbors. Can our team bring her gladder tidings this holiday season?

confused cry was not unfounded. There was a blotch of bumpy blackness at the base, surrounded by a brown stain. I pulled out my magnifying lens to get a closer look.

"Careful, don't get too close to that," Ruby warned as she came up behind us. "Early this summer that area smelled like skunky beer, and there were insects all around. Those homeless people must be doing some nasty business there—I wish someone would do something about them."

Codit pulled back in disgust, while I crumbled the crusty, coal-colored crud with the tip of my trowel. "Ruby, despite its appearance I'm not sure this is scat, human or otherwise. I'd like to explore other possibilities." I handed my hesitant assistant said trowel as I reached into our bag of diagnostic tools for the field guide. "Keep your gloves and eye protection on and you'll be fine, Codit."

"I don't know what else could explain the vile stench of vomit, the insects, and the brown stain," Ruby replied. "If you can solve this mystery while I fill these bird feeders for my winter visitors, I would be ever so grateful."

Codit slowly started cleaning the site as my fingers flew through the pages, hoping to find the solution that would earn a most welcome reward.

*Will our team discover what is stinking up this beautiful yard?
See page 62 for the solution.*



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WHAT'S THE DIAGNOSIS?

"My goodness, what's all this?" Ruby asked as she brushed the birdseed off her hands.

"Our first clue was the absence of a trunk flare. We exposed the primary roots coming off the trunk, like the buttresses you can see on those trees in the park," I said. "As

we did our RCX—root crown examination—we found a large root squeezing the stem, right below the stained area on the trunk.

Stem tissues adjacent to girdling roots are often softened by decay, especially if they are buried over six inches (15 cm) like this one. This problem began when your lot was leveled for construction, and roots were forced to grow upward through the fill."

"I removed the dead bark on the left side of the wound," Codit added. "There is little callus—"scar"—tissue on the margin, indicating that the tree is succumbing to the decay. The black bumps resemble the

fungal fruiting bodies of the decay fungi *Inonotus* or *Kretzschmaria*, aka 'hypoxylon'. It's hard to tell them apart, but both of them are known to foresters

as "butt rotters," causing basal decay on the underside where we cannot see."¹

Codit continued: "Last year a tree with a lot of these black bumps at the base fell over just from the weight of my friend climbing it, and he got busted up pretty bad. On this tree, the high target rating and the low vitality evidenced by the absence of callus create a high risk that, lacking a tomograph or radar, we must invasively assess. I drilled into this trunk with our slim drill bit to see how soft it was. The decay was about 4

inch (10 cm) deep on this 22 inches (56 cm) diameter tree."

"My assistant is learning the books well, along with the other tools of the trade," I nodded to Ruby. "*Inonotus* conks are typically larger, so I am agreeing with the hypoxylon theory. That pest starts out as a soft rotter, degrading both cellulose and lignin. It oozes enzymes that cause the cellular walls to come tumbling down. A tree with high vitality can resist its spread, but this one's been suffocated for a decade, and it's tired of holding its breath."

"Oh, my poor red maple!" Ruby cried. "But Detective, how does this explain that foul smell, and the insects?" Ruby wondered.

"While I was cleaning dead bark off the trunk I noticed some was slimy," Codit wrinkled his nose as he held up his hand. Ruby leaned in cautiously to smell the glove, and quickly pulled back.

"That is indeed frothy flux," I explained. "aka 'alcoholic' or 'white' flux, caused by a cocktail of soil organisms. It often infects older oaks, entering the included bark between buttresses, but suffocation and strangulation weakened this middle-aged maple's defenses enough for those organisms to enter without wounds. The pressure of multiplying microorganisms and that stinky ethanol gas they produce pushes the bark away from the wood, killing the vital cambium tissues. Frothy flux can be treated by cleaning and soil replacement, so the infections dry up and the wounds close. But frothy flux appears to be the least of this tree's problems."

"You got that right, Dendro!" Codit called



Figure 2. The fill dirt is removed, and the girdling root cut. The "porpoise" root next to the orange chisel handle grows upward. There is no callus on the exposed left margin of the wound, and the decay on the right side is four inches (10 cm) deep.

from the other side of the tree. “Look at these ‘shrooms back here!”

I pulled back the shrubs, to see the tree was under attack on several fronts. “That should teach us to do a 360-degree inspection with the mallet on trees first, eh, Cudit?”² I groaned as I bent to inspect the smooth white base of a *Ganoderma lucidum* conk in a crevice, and then watched as Cudit’s drill went in over four inches (10 cm) behind it before meeting resistance and twisting out tissue that was bright, fibrous, and alive.

“Two decay fungi across from each other—that’s a pincer move, not good,” I confessed to Ruby. “These bright gold mushrooms (conks with stems) grew out of the tree at the soil line, but the bark beneath them is alive. It has no black ‘shoestrings’ that indicate the decay fungus *Armillaria* and neither does the nearby soil. We have packed up a few mushrooms, and will try to dry them out to see if white *Armillaria* spores are released.”³ Still, with two other decay fungi identified and so few defenses active in the tree, its prognosis is poor no matter what treatments are done for it.”

“I would hate to lose my favorite tree. How can I replace its beautiful color?” she pleaded.

“In many ways,” I replied, coming to the rescue. “See that Virginia creeper (*Parthenocissus quinquefolia*) climbing those trees in the park—those few red leaves that remain? That species of vine usually doesn’t hurt its supporting tree, because its single stem does not conceal its base from inspection, and its top stays inside the tree’s crown. The red color of your dogwoods (*Cornus* spp.) nearby will be brighter with the maple gone, because more anthocyanins will be made.”⁴ Improved soil management, such as a layer of mulch up to four inches (10 cm) thick and extending beyond the drip line, will help them not just survive, but to thrive.”

“That mistletoe on the dogwood branch detracts from the tree’s fall color display, as well as its health, so it should be removed and used in your holiday decorations. You can also enjoy the rich color of the inner wood every day if you have that part of the log I’m circling with my laser carved into a statue of a hawk. Perching as proudly as the Maltese Falcon, it may give you fond memories.”

“A most excellent suggestion,” Ruby answered, her eyes knowingly locking onto mine. “I also feel a much brighter holiday spirit knowing it was not homeless people but uncontrolled and uncorrected construction



Figure 3: The *Ganoderma* conk at the base has a smooth white underside. The mushrooms on the right resemble *Armillaria*, but so do many other fungi. The process of diagnosis is still underway, so the identification has yet to be made.

activity that fouled up my garden. Please see that all the work you describe is carried out, and have the bills sent to my office.”

Back home a few weeks later, I finished wrapping the new penetrometer, and put it under the tree. The wood carver called to say the hawk was finished. I put my feet up by the fireplace and started viewing the Rubrum Consultation on my laptop. I want to be well prepared when I deliver the mistletoe and the hawk, and wish Ruby a Happy New Year!

References

- ¹Sinclair, Wayne A., Howard H. Lyon and Warren T. Johnson. 2005. *Diseases of Trees and Shrubs*. 2nd Ed. International Society of Arboriculture. Champaign, IL. 676 pp.
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- ³Luley, Christopher J. 2005. *Wood Decay Fungi: Common to Urban Living Trees in the Northwest and Central United States*. International Society of Arboriculture. Champaign, IL. 58 pp.
- ⁴Dawson, Jeffrey O. Why Tree Leaves Turn Color in Autumn. *Arborist News*. Aug. 2008: 12-16.

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