



DETECTIVE DENDRO THE DIAGNOSTIC SLEUTH

By Guy Meilleur and Michael Ormston-Holloway

The Case of the Alder Alternatives

Codit and I were taking in the Canadian experience at the ISA conference in Toronto—five days of fun with friends old and new. The topics seemed to focus on tree biomechanics, with examples from research and practice confirming the principle that careful reduction of branches and trees can increase trees' stability.

On the trade show floor, I was chatting up some folks at a booth when I noticed a chap down on his knees, excitedly pulling up the panels of their flooring and exulting about its shock-absorbent qualities and wood-grain design. Odd behavior for an arborist, I thought, so I leaned in to listen.

The chap looked up, his excitement elevated. "Detective Dendro?!" he exclaimed. "I'm Captain Kanata and I've been hoping to run into you here. We have some established white alder trees (*Alnus rhombifolia*) in a park nearby that have been shedding leaves since early summer and are now losing branches. We need to learn why it has happened so suddenly and how to manage the problem. Could you take a moment to have a look at them with me? We can ride bicycles up there and take in some tree scenery along the way."

"That sounds great," Codit chimed in. "After all this time inside, it'd be great to get outside, where the trees are."

Codit's point was well-taken and the chap's enthusiasm was infectious, so after the sessions were done for the day we got on our bikes and rode. On our first stop we saw an ironwood (*Ostrya virginiana*) in front of a fraternity building. "This tree's an example of a successful planting project by a nonprofit," Kanata explained. "It was rated in good condition, and a lasting asset to the community. It was a fine choice of species for the site and its foliage is so attractive." Micro inspection revealed: a dead central leader, the flare buried over 10 cm (4 inches), and roots circling the trunk. The red mulch had been colonized by grass, and the trunk was shredded by string trimmers.

Kanata showed us the informational pamphlet distributed by the nonprofit. It contained the familiar, but flawed, phrase: 'Plant the root ball at grade.' I did my best to be diplomatic. "I would urge the nonprofit to consult the ANSI A300 Standard on planting. They will see it is the

tree's flare, where the roots spread out, that should be at grade—as nature intended. Flares are often buried inside root balls from birth. The buyer and the installer both need to find the flare. The arborist can accomplish this objective, but more work means more cost."

As we rode to the next site, we passed row after row of young maple trees. "Our native sugar maples are on our country's flag, and quite familiar to residents," Kanata said as we waited at a red light, Codit picking maple leaves out of his riding goggles. "The approved species list was diversified to include silver maple (*Acer saccharinum*), red maple (*Acer rubrum*), and the hybrid Freeman's maple (*Acer x freemanii*). Lately, local landscape architects have embraced these species. They have become major players in Toronto's urban landscape."

"Red maples are common in other cities as well," Codit added. "Diversity is a valued quality, and the theme of this year's conference."

Our next stop was a planting of plane trees (*Platanus x acerifolia*) in a commercial district. I struggled to lock the bike to the odd-shaped structure that was installed for that purpose.

"Form did not follow function with that design, either," Kanata said, shaking his head and turning to the trees. "Many of these plane trees have been replaced already, and still many are declining. All the soil here is artificial, and the mix is being adjusted for drainage and nutrients. Plus, the merchants are regularly reminded that salt is harmful to the trees, yet they spread de-icing salt at every sign of snow. Fear of slip-and-fall lawsuits seems to trump concern over tree loss. Levels of other pollutants are high, from traffic and dog waste and littering, like these cigarette butts." I flicked a few from the funnel-shaped intersection of the panels of polished granite sidewalk.

"Plane trees in northern Europe do quite well in harsh urban conditions," Codit pointed out. "There must be something else wrong with these. I chiseled away some of this dirt they call soil. Take a look at this adventitious root; it's 3 cm (1.2 inches) below the surface."

We soaked up Codit's observation and pedaled onward to a third site, which featured a variety of trees planted along a highway.

“This research plot is testing many species for their tolerance of roadside conditions,” Kanata explained. “In the specifications, the compost is incorporated 60 cm (2 feet) deep, and tree spacing is two meters (6 feet) apart.”

“In the field, it’s something else again.” Codit was already going to work. He pulled a soil probe out of the ground and pointed to the core sample. “Pure compost on the surface means the weeds are taller than the trees. This poor oak tree is getting outcompeted right and left, and enveloped by this vigorous maple, one meter (3 feet) to the south. Researchers work diligently to deliver good data, but best-laid plans oft go astray unless they are connected to field operations.”

We mounted our vehicles and rode to our ultimate destination, The Village of Yorkville Park. “This landscape was built after an international design competition in 1991,” Kanata began. “The park is a celebration the history of the Village of Yorkville and reflects the diversity of the Canadian landscape: orchards for Canada’s fruit production, pine groves for the boreal forest, wildflowers for the prairie provinces, and alders for the northern plantations. The alders grew quite well for over ten years, but recently developed a problem.”

As he carried his lunch to a table under the alders, Codit’s feet crunched on dead leaves. I pulled the brow of my fedora down, to keep the sun out of my eyes. The sleeves of my trenchcoat stuck slightly to the stained-black table. “It’s kind of neat how they put that artificial snow on the branches, to simulate the conditions up north,” Codit remarked as he looked upward.

The shade was deeper in June, when the leaves began falling,” Kanata continued. “The Planning Partnership is actively trying to build its arboriculture department, so I want to do a particularly good job on this park. Not only do we need to learn the reason for this premature shedding, but also why it developed so recently and what we can do to improve the situation in this urban setting.”

I swallowed my first bite of a delicious onion sandwich and tapped my feet to the Dixieland music coming from



Something’s suspicious about the alder trees (*Alnus rhombifolia*).

a nearby café. “The cause is much easier to determine than the timing, but it saw that answer clearly on our tour today. As for mitigation options, you might consider a harvester.”

Which clues will solve this mystery, and what kind of harvester will work in the urban forest? Turn to page XX for the answers.



WHAT'S THE SOLUTION?

"I knew that is not artificial snow on the branches, but masses of woolly alder aphid (*Paraprociophilus tessellatus*)," Kanata began. "But alders have always been around, and these were growing well, so why did the aphid suddenly appear?"

"The recent rise in numbers is due to the introduction of its alternate hosts, the soft maples," I clarified. "The woolly alder aphid has two life cycles. "These aphids have a complex life cycle," Cedit went on. "The spring generation feeds on maples and reproduces by parthenogenesis. Females give birth to live females without a male involved. No time is wasted on mating since the young are essentially clones of their mother, so aphid populations can increase rapidly. In late spring and summer, winged adults fly to alder to feed and populations can explode. In the fall, there is a winged generation of both males and females that look like flying fuzzballs. These move to soft maples, their alternate host, where the females lay eggs that overwinter. Sweet sap strengthens the spring generation, which flies back to the alders in summer." As those species of maple got popular, the juvenile aphids had plenty of habitats, so the adults became a pest on the alders." I frowned at the sticky eyes of my trenchcoat. "Premature shedding put a strain on the trees' resources, which explains the dead branches."



The caterpillars of the harvester butterfly, camouflaged with white hairs, looks like an aphid.

"Chemical controls are a challenge to institute in our political climate, especially in an urban park," Kanata noted. "Other potential treatments include natural biological controls. Bats and birds can intercept aphids in flight, but there are way too few of these aerial allies in our city. Lacewings, lady beetles, and hover flies eat aphids, but they are difficult to keep in one place. The wildflowers provide some habitat for these beneficials, but it would be good to have more help."

"Absolutely. Hence my reference to a harvester—specifically, the harvester butterfly, *Feniseca tarquinius*," I winked at my youthful guide. "Caterpillars of the harvester butterfly are the only carnivorous butterfly caterpillars in North America, and they only eat aphids. The adult butterflies feed on aphid honeydew—an added benefit! Small in size, the adults spend most of their time near their aphid prey, have an erratic flight, and do not feed at flowers, so they are probably considered less common than they actually are. The female butterflies lay their eggs among the aphids. Camouflaged with white hairs, the caterpillars look like aphids. After hatching, the caterpillars consume the surrounding aphids. Harvesters can have extra generations per year due to this exceptionally nutritious food source."

Kanata took the cue. "As we look into relationships between species, whether predator and prey, host and parasite, or herbivore and plant, other species are connected to them in a complex web. John Muir described these connections long ago. Large black ants walk around and over the aphids to get honeydew. Wasps come in for an occasional sugary treat, too. Exotic ladybird beetles can devour aphids, but the ants keep the ladybird beetles away. Ants are actually aphid 'herders' and protect their flocks of aphids."

"An amazing relationship," I agreed. "However, the ants don't recognize the camouflaged caterpillars as a threat to their herd, so these caterpillars are really wolves in fuzzy, white sheep's clothing. The harvester butterfly has something in common with the ginkgo tree—it's the only species in its genus. This singular associate might be a key player in the control of the pest, and the preservation of the alders in these alders."



Caterpillars of the harvester butterfly are the only carnivorous butterfly caterpillars in North America. Could they be the key?

“I guess I was wrong about diversity—planting soft maples really created a major problem here,” Codit admitted. “Let’s recruit the local Audubon group to help set up some fake patches of aphids and feed the caterpillars **real honey**, to boost butterfly populations and fuel Mother Nature’s **hit squad**.”

Kanata stroked his wispy chin. “Well now, that’s a fine idea, good luck with that one there, eh?”

Additional Reading

Davidson, J.A., Michael J. Raupp. 2010. *Managing Insects and Mites on Woody Plants: An IPM Approach*. Tree Care Industry Association, Londonderry, New Hampshire, U.S. 195 pp.

Lloyd, J. 1997. *Plant Health Care for Woody Ornamentals: A Professional’s Guide to Preventing & Managing Environmental Stresses & Pests*. University of Illinois College of Agricultural, Consumer and Environmental Sciences, Champaign, Illinois, U.S. 223 pp.

Watson, G.W., and E.B. Himelick. 2013. *The Practical Science of Planting Trees*. International Society of Arboriculture, Champaign, Illinois, U.S. 250 pp.