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ARBORIST NEWS



Tree Nutrition and Fertilization Climbers' Corner: Adjustable Friction Savers

Restoring Trees

The Green We Need

ASK-a-BCMA

Tree Anchorage





Tree Nutrition and Fertilization

This month's CEU article is the first in a series on various approaches to fertilization as a tree management prescription. **Page 12**

Restoring Trees

This feature article observes the most effective means of restoring trees damaged by strength loss, storm conditions, or poor maintenance. **Page 20**

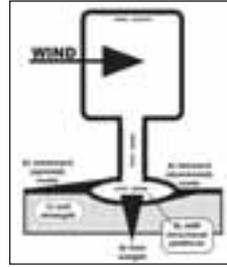


The Green We Need

Allyson Holbrook chronicles her extensive investigation into nature's nurturing effects. The benefits of greenspaces are numerous, and assist social development for many people in many different types of places. **Page 33**

ASK-a-BCMA

ISA is developing a new plan of action to help arborists and homeowners. The ASK-a-BCMA Knowledge Center will be a service to ISA members in need of a quick response from veteran tree care workers. **Page 47**

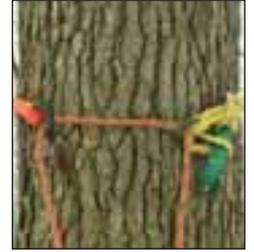


Tree Anchorage

Kim Coder takes a look at the strategies available for estimating tree root plate resistance to failure; there are multiple factors involved when analyzing tree anchorage, learn about them here. **Page 52**

Climbers' Corner: Adjustable Friction Savers

Learn about adjustable friction savers, how they are used, and the benefits they provide. **Page 60**



PR Update

Melanie Goetz of ISA-RMC discusses consumer awareness in everyday marketing. **Page 65**



Global Perspectives

In our interview with Koen Linskens, learn about the latest in arboriculture in Belgium. **Page 68**

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DETECTIVE DENDRO™ THE DIAGNOSTIC SLEUTH

By James A. Chatfield and Erik Draper

The Case of the Suspicious Specks

The emergence of spring leaves brought a resurgence of calls from potential clients, putting me in a particularly cheerful mood. The phone pealed again—music to my ears—and Codit popped his head into my office to tell me City Arborist Ashley Green was on the phone. I quickly picked up her call with a cordial, “Good

morning, Ashley. What’s new in the urban forest today?”

“Hello, Dendro. New trees are what’s new! We’re busy planting street trees and updating the city tree inventory. ISA’s *Best Management Practices: Tree Inventories* has helped me become systematic about keeping our records up-to-date.”

“A commendable feat, indeed!” I said with honest admiration.

“Sounds like I caught you at a good time,” Ashley Green continued. “I gave your cell phone number to my father’s cousin, Irma M. Green. She is completely distraught. Her prize crabapple (*Malus* sp.) at the Royal Horticultural Therapy Gardens are, shall we say, less than prize-worthy. Long shoots on ‘Silver Moon’ crabapple, blighted last season, appear to be dead to the world this year. To add insult to injury, the new spring leaves adjacent to the blighted shoots are full of small spots.”

Ashley explained that Irma M. Green faintly remembered reading about a disease of crabapples and pears last year, but she knew nothing about these leaf spots. Ashley had suggested to her that this could be a case for Detective Dendro and his trusty apprentice, Codit.

Ashley continued, “The problem is, Aunt Irma is not very organized when it comes to keeping track of things like phone numbers, so she has probably lost yours by now and is frantic. Could we meet with Irma at the Royal Horticultural Therapy Gardens, like... right away?”

“Not a problem, Ashley. Codit and I will meet you there in fifteen minutes,” I replied, eager to step outside on the beautiful, sunny day.

I would learn later that, just as Ashley and I were talking, Irma M. Green pulled a piece of paper out of her car’s glove compartment with a phone number on it, which she assumed was mine: 666-TREE.

I.M. Green dialed the number, and the call was answered with, “Dr. T, here. How can I help?”

“Oh, did you say ‘Dr. D’? Do I have the right number? I have a question about my trees. I am afraid they are going downhill. It’s

just been one thing after another!” Irma stopped to gasp for breath.

“Give me the address and I’ll be there in five minutes, Madame. I assure you, you have called the right place,” Dr. T cut in quickly.

In what seemed like seconds, a black van came screeching into the parking lot. On the side panel was a painting of an oak tree (*Quercus* spp.) in severe decline. The bold red lettering above it read, “Dr. Treevorkian—Helping Your Tree to RIP!”

Irma hurried outside to meet him, and he rushed toward her saying, “Please allow me to introduce myself. Dr. T. is the name, helping trees die is the nature of my game. Can I interest you in my Ten Step Program for Assisted Herbicide? Pruning at ground level? Let me help you pick those scabs. Dr. Treevorkian, ‘tis I!”

“No, no!” I.M. Green cried, “I’m not looking for Dr. T. There’s been a misunderstanding. I want to see Detective D! And scab is certainly not the problem. There are no olive green to brown scab-by spots on the leaves and fruits. What I have here are tannish spots with purple borders—very different from scab.”



Fireblight, a bacterial disease, causes the collapse of the branch and twig on crabapple.

“Quite astute of you, madam! But it sounds like there is something seriously wrong with your trees, and there is no reason to prolong their agony. I have many humane methods for assisting them toward their eternal sleep,” Dr. Treevorkian assured her in an ingratiating manner.

“Good heavens, no!” exclaimed I.M. Green. “I want to improve the health of my trees, not kill them! You are *not* the person I meant to call.”

Just then, Codit and I pulled into the parking lot, with Ashley Green close behind. When Dr. T saw us step out of our vehicles, he began sidling toward his van, intent on a quick getaway.

“Not so fast, Treevorkian,” commanded the city arborist. “We need to have a word.”

Ashley took hold of his arm and steered him toward his van, talking sternly the entire way, using words like “violation” and “citation.” Dr. T left tire marks on the pavement in his urgent departure.

“I’m so pleased that the renowned Detective Dendro is now at hand,” Irma said as Codit and I introduced ourselves. I could see her hopes for proper diagnostics soar.

“So, Ms. Green, please tell me more—from the beginning,” I said in my best curbside manner.

“I suppose ‘in the beginning’ is appropriate for my beloved crabapples. After all, the crabs’ big brothers are apples, you know. The Garden of Eden, the apple tree, and all that...”

“Not likely. They were probably pomegranates, as far as my research goes,” I mumbled under my breath.

“Anyway, Detective D,” sniffed Irma, “please don’t interrupt if you really want my story.”

I raised my eyebrows as she continued, “Now, as the Earl of Pomeroy once said, crabapples, with their fabulous features of flower, foliage, fruit, and form, are ‘the crowne jewelle of the rose family royale.’ So you can imagine my horror last June when the leaves on my ‘Silver Moon’ shoots began to wilt, blacken, and curl at the tip. It seems like some sort of blight, don’t you think?”

“Yes, I do, but let’s not get too far ahead of ourselves. I suspect there is something more going on here,” I replied, patiently.

“Well,” continued I.M. Green, “as we moved into late summer and fall, I constantly had words with my husband, Ivan R. Brown... I had no intention of taking his most unhorticultural name upon marrying... Pruning out those blighted shoots seemed like the best arboricultural practice to me, but Ivan argued that we should let nature take its course. As a plant pathologist, he wanted to see what would happen if we did not prune! Can you imagine such a silly profession?”

I felt my face turn a pathological purple and the image of a smirking Dr. Treevorkian came to mind as I muttered, “Silly is as silly does. Go on, Ms. Green.”

“As often happens,” she said, “our arguments raged well into the winter. Sitting by the fire one day in February, I realized he had won by default—we had done nothing. At any rate, it’s now the next spring, those blighted branches are dead, and we have this new leaf problem. It seems to be associated with the leaves surrounding the dead branches. I know it is not scab. I have seen scab before, although never so bad on my crabapples and not much on ‘Silver Moon.’ I’ve never seen so many spots all in one area of the plant. What is going on? Could this leaf problem, or disease, be so bad because of an especially wet spring?”

I scratched my chin thoughtfully and replied, “Well, first of all, Irma, I congratulate you on your suspicion that this leaf problem is



An old fireblight strike on crabapple infected by the fungal pathogen *Botrytisphaeria obtusa*, which colonizes dead or dying plant tissue.

a disease; indeed, it is a common infectious fungal disease of crabapple. I also salute you for recognizing that the weather is a factor for tree disease problems. Codit, can you explain?”

Codit, nearly inebriated by the fragrance of spring flowers, suddenly awakened from his musings. “Oh, oh yes, Dendro. It’s all about threes—The Holy Trinity of Plant Pathology, so to speak. The disease triangle concept tells us that there are three things necessary for infectious plant disease to occur: a susceptible host plant, a virulent plant pathogen, and an environment conducive to disease. In this case, the wet environment resulted in enough moisture for germination, penetration, and infection by the pathogen.”

“But of what disease do you speak, oh saviors of my landscape?” Irma asked sardonically.

“Well,” said Codit, “It’s not scab with its olive-green lesions, nor cedar apple rust with its orange to red lesions on upper leaf surfaces. It’s not any of the common insect problems on crabapple foliage, such as skeletonized leaves due to Japanese beetle feeding, or speckled leaves due to chlorophyll-eating spider mites. There is no evidence of abiotic disorders, such as chemical injury from herbicides or nutrient deficiency.”

“Yes, yes, yes, I hear all of your no, no, nos. Is that the extent of your disease triangle?” snapped Irma.

“I apologize for my Dr. Watson-esque assistant, Ms. Green. Please, let me be more elementary,” I said soothingly. “For a plant diagnostician, as for any diagnostician, ascertaining what is *not* happening is an important part of the diagnostic process. Sir Arthur Conan Doyle put it best: *Once you eliminate the impossible, whatever remains, however improbable, must be the truth.* Sooo... no scab, no Japanese beetles, no herbicide injury. In the end we come down to our diagnosis. This is a most curious case of ‘The Fire and the Frog.’”

I.M. Green’s face held an incredulous expression as her pink cheeks deepened to red.

Turn to page 63 to find out what is compromising I.M. Green’s crabapples.

levels) of the pendulum-mounted blade on the rope. Increases in impact force and rope tension increased the ease of cutting both ropes tested, but impact force was the dominant effect. At the greatest impact force, which was similar to the impact force a climber could exert using two hands on a handsaw, all but one rope was completely severed. The results are discussed in the context of climber safety.

Gall Aphids, and Leaf Miners, with Notes on Life History of *Orchestes alni* and *Agromyza aristata* in Kentucky

Jennie M. Condra, Cristina M. Brady, and Daniel A. Potter

Twenty genotypes of landscape-suitable Dutch elm disease-resistant elms (*Ulmus* spp.) were evaluated in a replicated field study for resistance to multiple insect pests in Lexington, Kentucky, U.S. The European elm flea weevil (EEFW), *Orchestes alni*, a recently-introduced pest that disfigures elms by leaf-mining and adult feeding, was found as a new state record so its feeding preferences and life history were monitored. *U. parvifolia* and *U. propinqua*, originally from Japan, were relatively resistant to Japanese beetles, and *U. americana* was generally less susceptible than most hybrids. *Agromyza aristata*, a serpentine leaf-mining fly, favored American elms, whereas *Kaliogenesis ulmi* a blotch-mining sawfly, and aphid (*Tetraneura nigri-abdominalis*) pouch galls were uncommon on American and Asian elms but abundant on certain hybrids. EEFW infested all elms but at highest densities, (>20 mines per 30 cm shoot and >85 adult feeding holes per leaf), on certain hybrids. American elms, especially 'Jefferson', were somewhat less susceptible. EEFW laid eggs in expanding leaves; mines were initiated in late April and completed by mid- to late-May. Newly-emerged adults extensively damaged leaves in late May and June but nearly disappeared from tree canopies by mid-July. Implications for re-introduction of elms into urban landscapes are discussed. **AN**



WHAT'S THE SOLUTION?

"The fire and the frog?" Irma asked skeptically, her exasperation growing.

Just then, Irma's aforementioned husband, Ivan R. Brown, cleared his throat. During our entire discussion, he had been sitting on a nearby bench, head buried in a newspaper.

"Now just a moment, Detective Dendro," he said. "I appreciated your earlier parry of my lovely wife's claim that plant pathology is a silly science. I confess, she bruised me badly. I am, indeed, a phytopathologist, an expert on plant diseases. And as such, I think I see where you are going with this, although I can't imagine why. Are you actually claiming that bacterial fireblight (*Erwinia amylovora*) and frog-eye (*Botryosphaeria obtusa*) leafspot are in some way related to each other in this case?"

"I do say they are related to each other, and in a most curious and telling way," I replied calmly.

"I can believe that they both occurred on these crabapples—the symptoms support this—but are you seriously suggesting they are in some way related? If so, I might counter that while pathology is *not* a silly science, you, sir, are a silly scientist!" Brown exclaimed.

"With all due respect to both you and your profession, I can assure you there is nothing silly about my diagnostic methodology, and I would like to explain," I said with as much decorum as I could muster.

"Well then, go ahead and prove it... you, you, you, pusillanimous pussyfoot of parasitism!" sputtered I.R. Brown.

"Gladly," I responded, trying to hide a wry smile. "Last spring we had a number of quite warm days, well above 65 degrees Fahrenheit, during the blooming period of I.M. Green's 'Silver Moon' crabapple."

"Well, obviously, a key to sudden plant disease outbreaks, or epiphytotics, of fireblight is warm, wet conditions during bloom," Brown interjected.

"Yes, and though infections can occur later, bad fireblight years typically begin with massive blossom infections," I continued. "Get those temperatures above the mid-60s for extended periods during bloom, add wet weather, and the perfect storm is possible."

"And what, pray tell, is the 'perfect storm' with regard to fireblight?" queried Irma.

I replied, "As Codit explained, it's the plant disease triangle: environment, host plant, and virulent pathogen. Last year, the environment for fireblight blossom infections was perfect. Crabapples are a host for this bacterial pathogen since they are in the rose family (Rosaceae), the only plant family afflicted by fireblight. 'Silver Moon' is one of the more susceptible crabapple cultivars to the disease."

I.R. Brown added quickly, "And, of course, the pathogen must be present. In this case, the bacterium may have been transmitted by rain, wind, and pollinating bees or other insects from overwintering cankers on other rosaceous hosts in the vicinity of Irma's gardens."

"So, we confirmed that fireblight occurred on Irma's trees last year," I persisted. "Leaves and shoots were blighted, the suggestive shepherd's crook symptoms were observed, and those dead shoots overwintered since ▶



Botryosphaeria obtusa colonizes the old fireblight strike and releases fungal spores, which intensively infect the new crabapple leaves in a localized area. These leaf infections are called frog-eye leaf spot.

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What's the Solution (continued)



Frogeye leaf spot lesions on a crabapple leaf caused by the fungal pathogen *Botryosphaeria obtusa*.

the fireblighted shoots were not properly pruned out.”

“Fine, fine, fine,” sputtered I.R. Brown, “but what does this have to do with frog-eye leaf spot disease?”

“Ah, therein lies the beauty of this beastly situation,” I said. “Tell me, Brown, what parts of the crabapple plant are affected by the frog-eye pathogen?”

“Well, the leaves of course,” said Brown petulantly.

“And...” I probed.

“And, er, the fruits,” mumbled I.R. Brown.

“And...” I continued.

First a bright light, then a dark cloud descended over Brown's visage. “And, the stems are affected,” muttered Brown, almost inaudibly.

“Expound, please,” I offered with a playful grin.

“Alright, I see where you are going,” said Brown dispiritedly. “*Botryosphaeria obtusa*, in addition to causing frog-eye leaf spot and fruit rots, also causes what is termed “black rot” on crabapple stems, typically attacking declining and dying stems. You might even say it is an opportunistic pathogen, helping that stem to die.”

Everyone was silent for a moment, reminded of the treacherous Dr. Treevorkian.

“So, can you provide a synopsis of what we've learned from this, Brown?” I queried.

The phytopathologist replied briskly, “I think what you are implying is that the relationship between fireblight and frog-eye goes something like this: First, severe fireblight in the spring and summer of Year One resulted

in numerous dead and dying shoots on I. M. Green's ‘Silver Moon’ crabapple shoots.”

Brown's mood brightened as he continued, “Next, the declining, damaged, and dead shoots and associated plant stem tissues were colonized by spores from the frog-eye fungus, *Botryosphaeria obtusa*, causing black rot on these stems. Since these shoots were not pruned out in the summer, autumn, and winter, especially high levels of overwintering *Botryosphaeria* were present on affected trees in the spring of Year Two.”

A professorial tone returned to his voice as he concluded, “Finally, the spores produced in these black rot cankers resulted in unusually high levels of infections and subsequent symptoms of frog-eye leaf spot this spring. The highest incidence was on leaves right next to the black rot cankers on the stems with unpruned fireblight strikes from the previous year.”

“The case of the fire and the frog—that is precisely what happened,” I confirmed. “As for Dr. Treevorkian, Irma, do not fear that reaper. The prognosis for your crabapple relative to frog-eye and black rot is good as long as proper pruning is pursued. Fireblight is more serious, but pruning will be sufficient in most cases for those years when environmental conditions are most conducive. But do not wait until the next season; procrastination contributes to the froggy fungus and also allows for overwintering bacterial inoculum buildup. This is just one of the multiple purposes of pruning. Follow it and good things happen, pure poetry of plant pathology in practice.”

Coda by Codit: As Sir William Bragg once said: “The important thing in science is not so much to obtain new facts as to discover new ways of thinking about them.”

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