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ARBORIST NEWS

ISA

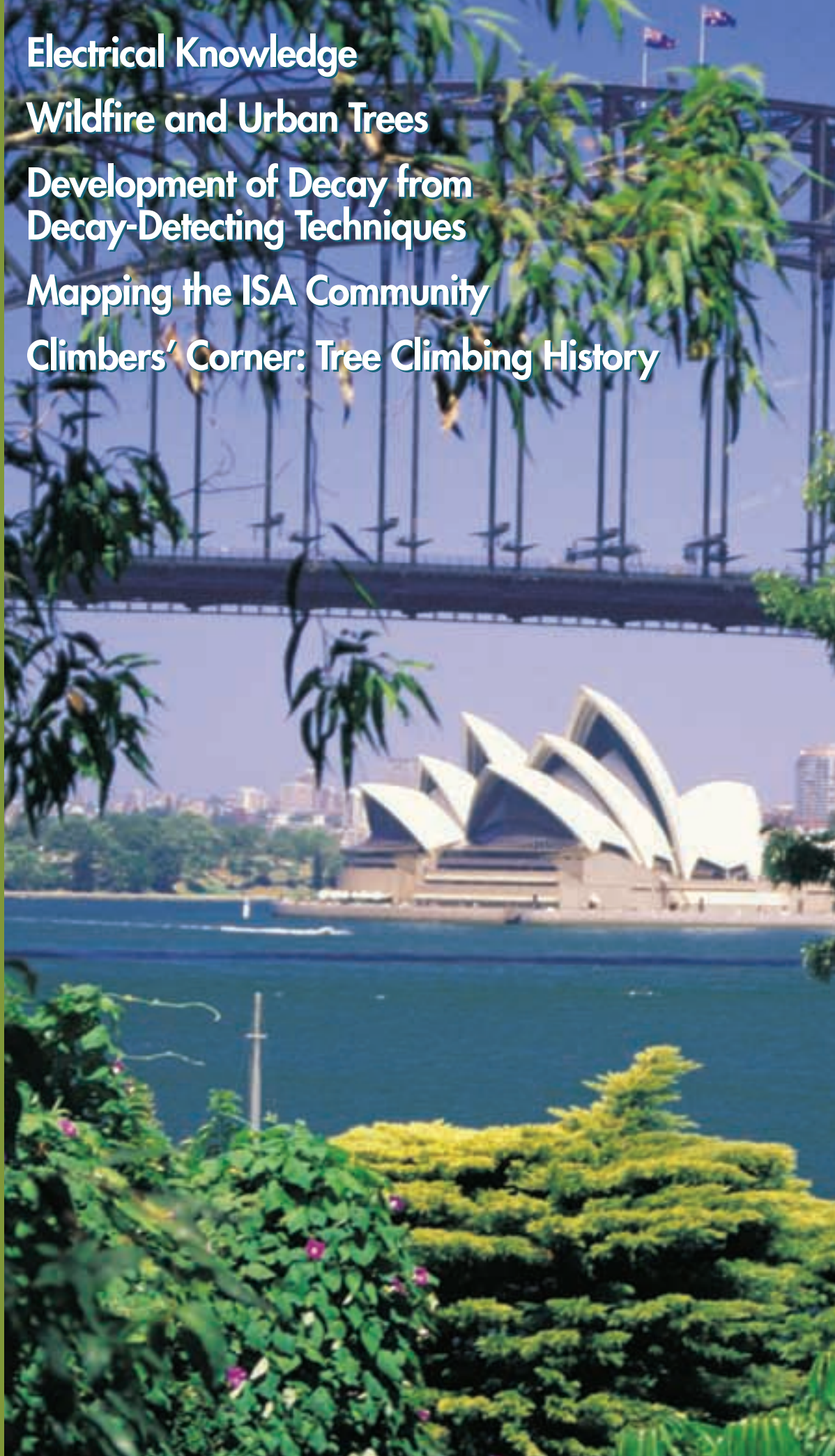
Electrical Knowledge

Wildfire and Urban Trees

Development of Decay from
Decay-Detecting Techniques

Mapping the ISA Community

Climbers' Corner: Tree Climbing History



Electrical Knowledge

The December 2010 issue's CEU article addresses the importance of electrical safety standards. Readers will also learn the basics in relation to utility arboriculture.

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Explore Australia with ISA

Next year's ISA Annual Conference & Trade Show is in Australia. Read up on what you do once you're there. **Page 36**



Mapping the ISA Community

The International Society of Arboriculture has re-launched its website. Learn more about the new features we are offering our members and credential holders. **Page 21**



Trees of Galveston, TX

In the aftermath of Hurricane Ike (2008), one Texas town found a creative way to memorialize the trees devastated by the natural disaster: tree carvings. **Page 26**

Wildfire and Urban Trees

Wildfires are terribly common in Australia, but fire as recent as early 2009 has proved one of the most devastating yet. Do wildfires always destroy the forest ecology, or are there some species capable of adapting to the environment? **Page 32**



Development of Decay from Decay-Detecting Techniques

Francis Schwarze probes into research surrounding the use of invasive decay-detecting devices and whether they cause harm by penetrating reaction zones. **Page 46**



Climbers' Corner: Tree Climbing History

Mark Bridge takes a look at the development of various tree climbing techniques in the U.S. and Europe through the years. **Page 50**



ForestryImages.org

Looking for some good tree pictures? Need online exposure for your own photography? Joe LaForest has the answer: Forestry Images. **Page 58**

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DETECTIVE DENDRO™ THE DIAGNOSTIC SLEUTH

By Guy Meilleur



The Case of the Wondrous Washboard

“Yes, it’s amazing!” the TV infomercial proclaimed. “Just put our belt on, plug it in and it will exercise your abdominal muscles while you relax. In just two weeks you’ll have washboard abs, rippling six-pack abs. You’ll be the hottest hottie on the beach, or your money back!” Codit put down his fork, popped open another can of root beer, and

reached for the phone. I grabbed the remote and hit the mute button.

“You’re not ordering another one of those get-strong-quick gizmos, are you?” I asked. Codit’s ears turned red as he set down his soda. “Your exercise machine is full of spiderwebs, and that case of protein powder is buried behind the seat of your truck. What makes you think this scheme will work?”

“But it’s guaranteed!” my assistant protested. “This machine’s harmonic oscillations electronically stimulate the abdominal muscles to harden like steel. All you have to do is plug it in and...”

“...Make three easy payments, yes we’ve heard that before.” I shook my head. “If it works, they would have proven it with independent research. What data did they show in that commercial?”

Codit’s retort was cut short by the telephone. “Detective Dendro, solving trees’ mysteries,” I answered.

“Oh Detective, I’m so glad you are there,” her voice sighed gratefully. “My beech (*Fagus grandifolia*) tree has had fill dirt on the trunk for nineteen years. We removed what we could, but now these growths on the other side of the trunk look bigger. I found nothing on the internet, and the university foresters surveying my hemlocks for adelgids didn’t know what to make of them. My Australian landscaper, Chamomile Dundee, gave me your number.”

“Dundee’s back around? That’s great—I haven’t seen him since we swung around in that Tasmanian eucalyptus!” I exclaimed. “If my assignment is to assess your trees’ condition and review management options with you, I gladly accept,” I said. “We can pick Cam up on the way.” She accepted our terms, gave us her address, and we were off. As we drove up the steep driveway, I could see the bright green crown of the beech overspreading the roof like a huge living umbrella. Codit and Chamomile grabbed the diagnostic gear as I approached the door.

“Thank you so much for coming so quickly,” the lady said. “I’m Wanda Waverly. I’ll get my shoes on and meet you out back.”

We wove our way through the landscape to the cooling shade of the straight-stemmed beech tree. A column of bulges ran up the back side of the trunk, away from the house, but the front side was fairly smooth. “Must be sapsuckers, *Sphyrapicus varius*,” Codit said. “They were feeding on the back side because they are shy. Those horizontal bulges are made by the tree in response to the bird’s barrier-breaking beak tapping sapwood and eating cambium. Over time, the holes are smoothed over by layers of new tree tissue.”

“I haven’t seen a lot of bird activity,” Wanda said, twirling her finger skyward. “The former owners used radios for long-range communication. Maybe they attached antennae to this tree with semicircular clamps. Or could it be a genetic mutation that is only expressed on one side of the trunk... or burls made by wasps laying eggs?”



A column of bulges runs up the back side of the beech, facing away from the home and toward the forest.

“There are two feet of fill dirt on the house side; we cleared some away last fall,” Dundee pointed to the excavation with his boot. “Could decay under the clay be causing the bulges, Detective?”

“I like your down-to earth approach, Cam,” I smiled. “Wanda, I see some green onions in your vegetable patch. Mind if I sample some while I consider all these possibilities?”

Which theory will prove true? Turn to page 66

CERTIFICATION INFORMATION

Professional credentials: How do I choose which one?

By Derek Vannice, ISA Director of Certification

There has been a trend in recent years in a variety of professions for more and more credentialing programs. These may be in the form of certifications, accreditations, or training certificates. The consumer is becoming more educated, and they are demanding a way to make better choices when looking for professional services like tree care. Naturally, as these programs become successful, more and more organizations will want to become involved in the credentialing process. So as a professional, how do you choose which credential will give you the most credibility? Just like when we talk to customers about how to choose an arborist, there are some questions that you can ask to determine the quality of a prospective credential.

What type of credential? Licensure is a mandatory governmental requirement necessary to practice in a particular profession. Accreditation is a process where an individual or organization meets a specified set of criteria usually set by a non-governmental agency. A certificate program is one which an individual has gone through some form of organized training curriculum. Certification is a voluntary process instituted by a non-governmental agency in which individuals are recognized for advanced knowledge and skill through some form of formal valid and reliable assessment.

Is the method used to measure knowledge and skill valid and reliable? A strong certification program will have an accepted process adopted from the *Standards for Educational and Psychological Testing* and be legally defensible. The keys to legal defensibility are validity and reliability. An assessment of validity tells whether we are measuring what we are intending to measure; reliability provides the indication of the accuracy of that measurement. If the exam is valid, we can statistically prove the exam measures an appropriate body of industry knowledge. If the exam is reliable, we can statistically prove the exam is able to accurately predict those who have the knowledge from those who do not. One of those key processes in validity is the job analysis.

Why is the job analysis important?

As ISA develops new certification credentials, we are often asked questions about how and why certain aspects of each credential were determined. The key step in the development process is the job analysis. When a decision is made to develop a credential, the first step is to convene a panel of experts.

The panel of experts is chosen by the ISA Certification Board and is made up of experts in a given area based on their knowledge

and region of the countries they represent. Once a panel is chosen, their first task is to develop a job or task analysis survey.

According to the Institute for Credentialing Excellence (ICE), the survey is one of the most important documents created in the process. All aspects of the credential are based on the results obtained from the survey. The job analysis is an exhaustive list of task statements specific to the area of knowledge we are going to certify. Other survey questions are asked to help the panel determine other important aspects of the credential such as experience requirement, other prerequisites, and the title for the credential.

The real strength of this process is in the numbers. Once the survey is developed, it is sent to a random sample of the proposed test population. For example the municipal specialist job analysis was sent to more than 2,000 municipal arborists. The ISA Board-Certified Master Arborist survey was sent to a random sample of more than 4,000 ISA Certified Arborists.

By utilizing the job analysis along with a panel of experts, the credential being developed is truly representative of the overall desires of the industry. Every three to five years, the job analysis is reviewed, modified and sent again. Each time, the survey is sent to a random sample of those who already have the credential and those who are eligible to obtain the credential.

On October 22, 2010, the job task analysis for the ISA Certified Arborist/Municipal Specialist was sent out for surveying. The job task analyses for the ISA Certified Arborist, ISA Certified Arborist/Utility Specialist, and ISA Certified Tree Worker (both Climber and Aerial Lift Specialist) are scheduled to be sent out early next year.

We hope this helps you to understand that each credential was developed, not only with the hard work of numerous volunteers, but also with the collective knowledge of thousands of arborists around the world.

Is the Exam valid and reliable?

Once the exam is developed through the use of the job analysis, it must be continually reviewed to make sure it is meeting the acceptable validity and reliability requirements. There are various accepted statistics that can be utilized to review exam performance. The statistics need to be reviewed on an ongoing basis to make sure the exam is a good instrument to separate those who know from those who do not.

The ISA Certification program has a test committee comprised of international experts in all aspects of arboriculture who meet



WHAT'S THE SOLUTION?

"Very tasty," I said as I chewed the juicy greens and studied the tree. "The bulges appear too smooth and blemish-free to be related to decay, and the wood sounds solid when I strike it with the mallet. The bulges seem too wide and irregular to be from birds or fasteners, and too big to be from wasps. The mutation theory was close—there was probably a change on the cellular level, but it was due to mechanical, not genetic, factors.

"Here's my theory: under wind loading, the tree bent forward, into the opening created by clearing for construction. This bending stretched the fibers on the back—tension—side of the trunk, stimulating the tree to add more "reaction wood" tissue. Strong gusts of wind pulled the crown downward, stretching tissues and triggering this terrific reaction."

I pulled out my laser pointer and fired a green dot at a high union. "Codit, how about setting a line on that limb, and giving this tree a crude pull test?"

Codit's first shot was perfect, the bag pulling the 1/4" (63 mm), 7,400 lb. test rope through cleanly. He pulled hard, then harder, then took a running start and jumped off the slope, tugging the tip of the limb downward. The trunk bent slightly near the top of the column of bulges.

"Check out the washboard pattern, like the muscles on a well-exercised abdomen," Chamomile said, thumping his belly. "Reaction



The root collar excavation, RCX, exposes an adventitious root turning inward to feed on decaying (white) patches of bark. The tree was demonstrating the ultimate in recycling as it harvested its own resources, but even this natural invasiveness is not a good thing.

wood grows in different patterns, according to external loads and internal genetics. As patterns of loading change, the tree adds to its natural system of support by forming reaction wood.

"According to traditional teachings, angiosperms like beech tend to form compression wood that 'pushes back' under the lean, and gymnosperms form tension wood behind the lean that 'pulls back' against the lean. These may be general tendencies, which must not be rigidified. Rules are too absolute for Mother Nature, as Dr. Shigo used to say. Trees are not limited by the limitations of our thinking! Angiosperms can form reaction wood against tension. Cutting a wedge out of a bulge with a saw, or removing a cylinder with an increment corer, might help support this theory by exposing annual rings to that growth. Wanda can consider whether the need to know is worth the wounding. Some eucalypts in Australia make braided patterns, adding all kinds of reaction wood—look at these pictures on my phone."

"Fascinating!" Codit said, scrolling through the images. "There

must be magic in Myrtaceae, the eucalyptus family. I'll be looking for those amazing growths and more when we go down under next year."

"We'd love to show you our arboreal wonders," Dundee grinned. "But for now, the fill dirt on the stem hinders our inspection, so we must remove the rest of it, and find the flare. Excavation is also necessary to inspect the condition of the buttress roots." Codit grumbled as he pulled out the shovel. "No worries, mate—I'll take the other side," the Aussie arborist volunteered. He used the pick end of the mattock first, probing carefully for big roots to avoid damage beyond the scope of work. They excavated enough to get 6" (15 cm) of air movement around the stem, down to the flare. As they dug, I pruned small circling roots, and a few that were actually girdling the stem.

"Your tree seems strengthened by that "washboard" growth, and only slightly weakened by pressure and decay from the clay fill," I observed, showing Wanda our work. "We can see the roots in this surrounding clay proliferating where there is more air and organic material, near the trunk. The clay smells sour like anaerobic bacteria, so it is low in oxygen. We will examine the insect activity at these holes, and the apparent



For 19 years, clay has pressed against this beech tree's thin bark. Is the uncharacteristically rough bark caused by mechanical damage, or the fill? What will our team's excavation expose?

infections at these lesions. That rough-textured bark is facing the construction, so the likely cause is not kids carving their initials, as kids too often do to beech trees.

"I recommend the following treatments:

- 1. Using a tool like a steel bar or this pick, aerate the remaining clay fill. Crack the soil well beyond the hole.**
- 2. Inoculate with mycorrhizae..."**

"But Dendro, I heard that stuff was snake oil," Codit challenged. "Like you always say, prescription without diagnosis is malpractice. And those products may contain fungi that form mycorrhizae in association with tree roots, but they are not 'mycorrhizae'. Anyway, how do we know it will help the tree?"

"We don't, of course—too many variables out here in the field," Chamomile pointed out as he stepped between my glare and my apprentice. "Calm down, Detective. Blokes down under also wonder, but '...adding good old compost remains the simplest and most effective way to improve soil biology', and 'Unrestrained movement of air and water is vital to maintain a healthy plant and the soil food web itself.' Soil aeration and inoculation with compost can only improve that subsoil, or at least do no harm."

"Thanks, mate! All true, and more," I agreed. "By transferring beech leaf compost and soil with fresh mycorrhizae from the undisturbed downhill side to the holes in the fill, we can extend the soil food web. Research done in Italy and shown at the ISA conference this year showed positive results from this procedure, which I first learned in Tiananmen Square from the legendary Chinese arborist Ru Trundiep. Codit's skepticism about treatments is good, but we are armed with science and research, and will carry on with that third tenet of ISA, preservation:

3. Further amend the soil based on the results of tests on the soil that Codit is putting in that box. Keep the flare area clear, and have the crown structure assessed after the leaves fall. Annual examinations, and treatments per need, should keep the stem healthy. This tree demonstrates great resilience; its prognosis is very good."

"Oh, that is wonderful! I'm so relieved that our beautiful tree will last, with a little care. I'll be glad to have you back for annual inspections," Wanda smiled as she sighed. Codit filed our copy of the contract, I accepted payment for our hard work, and we climbed back into the truck.

"Hey Chamomile," Codit queried as he cranked down the window to cool off. "Maybe electrical impulses can stimulate reaction wood to form, just like stomach muscles!"

"Crikey—that's a corker of a theory!" Dundee replied. "Electricity that results from pressure is known as piezoelectricity, 'piezo' meaning to press or squeeze. This phenomenon may help explain the formation of reaction wood. **We know the symplast can regulate the activities of the vascular cambium, as electric or chemical signals advance in response to strain.** It works in reverse, too."

Codit perked up. "So... an electrical field applied from an exercise belt can put pressure on muscles, and make them tougher? Told ya, Dendro! I want to study harmonic oscillations in trees, too. We could set up some intercontinental observations on oaks and eucs. The potential of electronics and biomechanics might attract interest from scientists, and The TREE Fund!"

"I'm still not sure about that belt, but you never know what we can learn from international cooperation," I agreed, steering into Dundee's driveway. "Meanwhile, we'll get our washboard abs the old-fashioned way—good honest arboriculture, one shovelful at a time."

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