

GARDENER'S NOTEBOOK

Horticultural News and Research Important to American Gardeners

North America's Ash Trees Under Threat

Not since the Dutch elm disease early in the last century has there been a threat as potentially deadly to North America's trees as the emerald ash borer (EAB). The metallic green beetle is only a half-inch long, but it ravages ash trees (*Fraxinus* spp.) and is now spreading rapidly in the eastern half of North America.

In Michigan alone, where the EAB was first identified a year and a half ago, it has caused the death of some seven million ash trees. And "there are probably two million more infested," says Howard Russell, an entomologist at Michigan State University's Extension Service. "The beetle is real aggressive," adds Russell. "It doesn't care whether a tree is healthy or stressed, old, sapling, forest grown, or a landscape specimen."

EAB larvae tunnel under bark and starve a tree by choking off its supply of water and nutrients. This results in die-back of the upper third of the tree, vertical splits in the bark, D-shaped holes where adult EABs emerge, and, when the bark is removed, serpentine tunnels revealed in the cambium. Most affected trees do not survive.

At first, infestation was confined to five Detroit-area counties, but by August 2003, seven more Michigan counties reported the occurrence of the borers. The Michigan Department of Agriculture placed a one-year quarantine on all 13 affected

counties, prohibiting the sale and movement of ash nursery stock from, into, and within Michigan's lower peninsula. It also suspended the movement of any ash materials—including logs, branches, and other items unless chipped to one inch or less, and firewood of any tree species—from within the core EAB-infested zone to anywhere else in the quarantined area or state.

Michigan isn't the only place affected. EABs have infested ash trees in the city of Windsor and the towns of Amherstburg, Essex, LaSalle, and Tecumseh in Ontario, Canada, as well as in Ohio's Lucas and De Finance Counties.

Previously unknown in North America, the insect is indigenous to eastern Russia, Japan, Korea, and northern China. Scientists speculate that the borer arrived as long as a decade ago in wood packaging from Asia. It poses a grave threat to the landscape and forestry industries. According to the American Nursery and Landscape Association, "ash is estimated to be the single most important

shade and landscape tree in the northern United States. It is also an economically important forestry species and a valued component of ecosystems across most of the United States."

For more information about EABs and how to report a sighting, visit the U.S. Forest Service Web site at www.na.fs.fed.us/spfo/eab.



Above: An ash borer larvae tunnels into the trunk of an ash tree. **Right:** The adult is smaller than a penny but has caused millions in damage.



CARING FOR LIVE CHRISTMAS TREES

With the winter holidays approaching, the International Society of Arboriculture (ISA) is encouraging gardeners to purchase and plant live holiday trees rather than buying cut ones. A live Christmas tree can beautify a home landscape for years and provide habitat for wildlife.

But, ISA cautions, homeowners considering planting live conifers should re-

member that trees, like puppies, eventually grow up. Most species used for Christmas trees (pine, spruce, and fir) grow to be more than 50 feet tall and 20 feet wide at maturity, so select a site that will accommodate a fully-grown tree. Be sure also that the tree you select is suited to your USDA hardiness and AHS heat zones.

Here are some pointers ISA offers for success with a live Christmas tree.

- When purchasing a live tree, be sure it appears vigorous and healthy and that its root ball has not dried out.
- After you get the tree home, water it well and store it for a week in a cool/cold place such as an unheated garage that is out of the wind and direct sun.
- Prepare a planting hole in a sunny, well-drained location. Dig the hole twice as wide as the root ball and as deep. Mix the

soil from the hole with organic matter such as composted manure or peat and pine bark, and sand for drainage. Fill the hole one-third of the way with this mixture. Store the rest on a tarp to use later for backfilling around the planted tree.

- Soak the root ball in water, wrap it in heavy plastic, and bring it inside to stand in a barrel or tub. Check the root ball daily. It should be moist, but not sitting in water.
- Trees should stay inside no longer than three to five days. A longer stay in warm temperatures can cause the tree to break dormancy and be damaged by cold when it goes back outside. To help the tree adjust to conditions outside again, store it for a week in a cool place such as an unheated garage.
- Plant the tree with one-third of the root ball above soil grade. Make sure to loosen the burlap wrapping and cut off any rope around the ball. Cut or bury any burlap above the soil line so it cannot wick moisture. Fill the hole, mulch the tree, and water it well. Continue to water once a week when the ground isn't frozen.

SURVEY OF AMERICAN GARDENERS

This past May, the Garden Writers Association (GWA) sponsored a survey of 1,000 American gardeners to find out who and where they are and what they do. Here's what the survey disclosed about our gardening habits:

- The majority of Americans (81%) have a yard or garden and planned garden-related activities last summer.
- The most popular use of a yard or garden, especially for wealthy Americans (71 percent of those with incomes over \$75K) and Midwesterners (61%) was for relaxation.
- The next most popular use was to grow flowers, plants, or shrubs (51%).
- Almost three-quarters of respondents (73%) were planning to do maintenance in their yards or gardens.
- Weeds are most likely to be removed by hand (56%). This percentage can be bro-

ken down to Westerners (71%), the wealthiest Americans (62 percent of those earning \$75K+), urban dwellers and females (61%), and those between 25 and 44 (60%).

- Of those who raised fruit, vegetables, and herbs, the majority (85%) did so in order to eat them fresh and to share with friends (70%). Over two-thirds (69%) did so for satisfaction, 58 percent for better flavor, and 34 percent to have pesticide-free produce.
- The percentage of those willing to donate their produce to the needy decreased with increasing income (27 percent with incomes under \$30K versus 10 percent with incomes of \$75K+).
- Gardeners get most of their information about gardening from friends (29%), the Internet (26%), magazines (25%), and books (23%).



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THE WOLLEMI PINE

How would you like to have a prehistoric plant growing in your garden? You will get a chance in 2005 or 2006 if all goes according to the plans of Wollemi Pine International, an Australian company that is now preparing to market its namesake plant worldwide.

The Wollemi pine (*Wollemia nobilis*), a conifer known from fossils dating back

90 million years, was considered extinct until 1994, when David Noble, a New South Wales Nation-

The Wollemi pine can be grown successfully in a container indoors or outdoors.

al Parks and Wildlife Service officer came upon this unusual tree while bushwalking in Wollemi National Park, located

some 90 miles northwest of Sydney, Australia. The trees, over 100 feet tall with multiple trunks and bark that resembles bubbling chocolate, were growing in a sheltered rainforest canyon.

After studying the ferny foliage samples Noble had collected from the trees, botanists at the National Parks and Wildlife Service (NPWS) and the Royal Botanic Gardens (RBG) in Sydney concluded that the tree was a previously unknown genus and species. It belongs to Araucariaceae, an ancient family that includes the Norfolk Island pine (*Araucaria heterophylla*) and monkey puzzle tree (*A. araucana*).

RBG horticultural scientist and conservationist Cathy Offord calls the Wollemi pine “a link to Australia’s prehistoric past.” Offord has been conducting research on the tree since its discovery and has encouraged investigation of its commercial potential.

“The Wollemi pine is a fantastic indoor plant,” says Sally McGeoch, marketing manager for Wollemi Pine International. “It responds very well to low light and stands up really well to air conditioning.” The plant is reportedly able to survive temperatures ranging from 23 to 133 degrees

Fahrenheit. Trials for the Wollemi pine in the United States, says McGeoch, “should be underway by the end of the year.”

Royalties from the sale of Wollemi pines will go to the NPWS and RBG for conservation of the tree and other threatened plants in the wild.

For more information about the Wollemi pine, visit www.wollemipine.com.

VITAMIN C FOR STRESSED-OUT PLANTS

Just as with humans, plants can suffer from exposure to tropospheric or ground-level ozone—atmospheric molecules that form when air pollutants react with oxygen and sunlight. When ground-level ozone enters plants, it forms unstable molecules called reactive oxygen intermediates (ROIs), which can injure plants if they are not neutralized by antioxidants. And as it does with people, vitamin C (ascorbic acid) is an antioxidant that protects plants.

Ozone-related damage in plants manifests itself differently from one species to another, but in many plants the upper surface of older leaves may become stippled with reddish, purplish, or brownish

spots. Compromised foliage can lead to reduced plant vigor and fruit yield.

Research by Kent Burkey, a plant physiologist at the Air Quality-Plant Growth and Development Research Unit of the U.S. Department of Agriculture’s Agricultural Research Service in Raleigh, North Carolina, suggests that plants with elevated levels of vitamin C in the protective liquid layer surrounding the outer leaf cells—called the apoplast—are more tolerant of ozone. While many plants manufacture ascorbic acid inside their cells, only those capable of transporting it to their apoplasts enjoy protection from ozone injury.

Vitamin C, however, is only one component of ozone tolerance. Future investigations will focus on plants that do not have high levels of ascorbic acid in the leaf apoplast. “We know that ascorbic acid is not the only compound in the apoplast that has antioxidant properties,” says Burkey. “We are trying to identify which plants have other useful compounds.” Once they are identified, he adds, scientists “could potentially develop plants with greater ozone tolerance.”



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