WHITE OAK

Oaks are synonymous with strength and longevity, but in California and the Pacific Northwest, several species are under threat from a funguslike pathogen that causes an affliction known as sudden oak death.

THE ROOT OF THE MATTER

How the American landscape has been indelibly altered by arboreal blight, and what we can do to protect and preserve our **BEAUTIFUL NATIVE TREES.**

OUR NATION'S SCENERY CHANGED a lot during the 20th century. But one of the most profound effects went largely unnoticed, perhaps because it was an absence, not an addition. The American chestnut tree, *Castanea dentata*, was once the giant of the American forest, towering over all other trees from Maine to Mississippi. But a fungal blight discovered in New York in 1904 killed nearly every single one. Its tall, straight trunk and delicious nuts had made the chestnut one of this country's most useful, distinctive native trees, as well as an important food source for wildlife. Yet with the passing of a few decades, it became a stranger to most Americans.

Sadly, the chestnut was not an isolated case. In the 1930s, Dutch elm disease, an invasive fungal condition spread by native bark beetles, began to affect American elms. The stately trees that graced

PHOTOGRAPHS BY *Tom Zetterstrom* | TEXT BY *Tom Christopher*

countless streets and parks across the eastern United States died by the millions within a few decades, their loss far more tangible to many Americans because of the trees' extensive residential use.

If anything positive can come from the devastating loss of these emblematic American trees, it's that we come to appreciate the value of our native specimens. This is especially important because our trees continue to be besieged by an array of new dangers. Although protecting our forests may seem like an insurmountable task or one best left to professionals, we can in fact play an important role in safeguarding the trees. Simply spreading the word to friends and family about local threats increases awareness and helps limit damage.

As with the chestnut blight and Dutch elm disease (imported from Asia and Europe, respectively) many of the new threats are accidental arrivals, introductions into North America against which native trees have no defense. Take the emerald ash borer, a beetle that most likely hitchhiked to the United States in wooden packing materials shipped from Asia. The insect, discovered in the United States in Canton, Michigan, in 2002, killed wild and cultivated ash trees with alarming speed and has since spread south, east, and throughout the Midwest, where the destruction looms large. Kris Bachtell, vice president of collections and facilities at the Morton Arboretum in Lisle, Illinois, estimates that one in five street trees in Chicago is an ash. To the west, in Nebraska and South Dakota, ash trees constitute a majority of all cultivated shade trees.

More lethal perhaps than the ash borer is the Asian long-horned beetle, a pest that arrived in Brooklyn, New York, in 1996, also in materials shipped from Asia. The larval stage of this very large insect causes severe damage to an array of valuable native trees, including maples, willows, elms, and birches. So far, treating infestations has involved chipping and burning not only the infected tree but also any neighboring trees of susceptible species. Dire as they are, such swift actions have contained infestations primarily to urban areas of New York, New Jersey, Illinois, and Massachusetts, but at considerable cost. A 2008 outbreak in Worcester, Massachusetts, required the destruction of more than 25,000 trees.

Insects are not the only threats. Oaks face a funguslike pathogen, *Phytophthora ramorum*, commonly known as a water mold. This microbe, discovered in Marin County, California, in the early 1990s, is behind sudden oak death, a disease that is rapidly spreading through many species of native and cultivated plants along the West Coast, including not only oaks but also rhododendrons and viburnums. When the mold takes hold, secondary threats such as fungi and boring insects exploit the tree's compromised health. In as few as one to two years, the tree can die, disrupting the local ecosystem by depriving animals of food and habitat and leaving fuel for increasingly common wildfires.

AMERICAN CHESTNUT

Once numerous along the East Coast, these trees were effectively made extinct by a fungal blight discovered in the early 1900s. This legacy of loss prompted faster responses to new pest invasions.

Our changing climate presents problems as well. The mountain pine beetle, endemic to mountainous regions from Mexico to British Columbia, had a population that was historically kept in check by cold spells. With increasingly warm winters, the beetle's numbers have exploded, turning it into a pest responsible for the destruction of 70,000 square miles of lodgepole, ponderosa, Scots, and limber pine forest. Compounding the problem is summer drought. The lack of water stresses the trees, making them more susceptible to invasion.

Researchers are exploring various controls. Thanks to new DNA technology, the American chestnut is poised for a comeback. Scientists have inserted protective genes from wheat into the tree, and in preliminary tests, the new stock appears to have blight-resistant properties.

The release of natural enemies can also be effective: The U.S. Department of Agriculture has been rearing a trio of wasps native to China that attack and kill emerald ash borer eggs and larvae, before they reach maturity.

Old-fashioned plant breeding and selection techniques have introduced tough new American elms and even new approximations of the American chestnut.

Our vigilance and informed choices play a key role as well. When we plant carefully chosen trees, we do much more than add a bit of beauty and a slice of shade to our corner of the planet. We also plant seeds of change.

WHAT YOU CAN DO

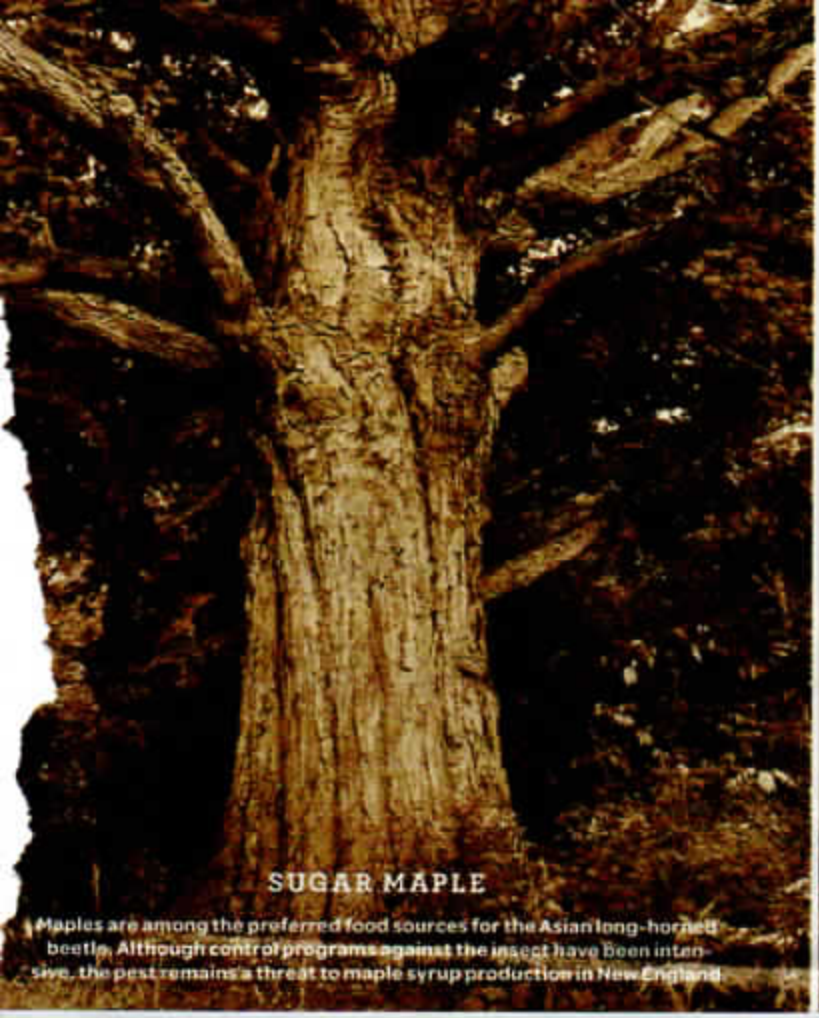
1. ***Know your trees—and their threats.*** Your local cooperative extension service can help identify your garden trees. Check online educational resources, such as Cornell's Urban Horticulture Institute (*www.hort.cornell.edu/uhi*), to learn about threats those species face and how to recognize their presence in trees.

2. ***Plant wisely.*** Your best bets are native, nontarget trees. But if you have your heart set on a susceptible species, choose a resistant variety (the 'Princeton' elm, for example, has a built-in tolerance for Dutch elm disease). Avoid large-scale plantings of a single species, which will cause a larger loss if a problem hits. For more tips, visit *plantsmart.org*.

3. ***Never transport firewood.*** When you take wood out of its local area—to campsites, say, or vacation homes—you may inadvertently transfer pests to unspoiled areas. For tips on wood disposal, visit *dontmovefirewood.org*.

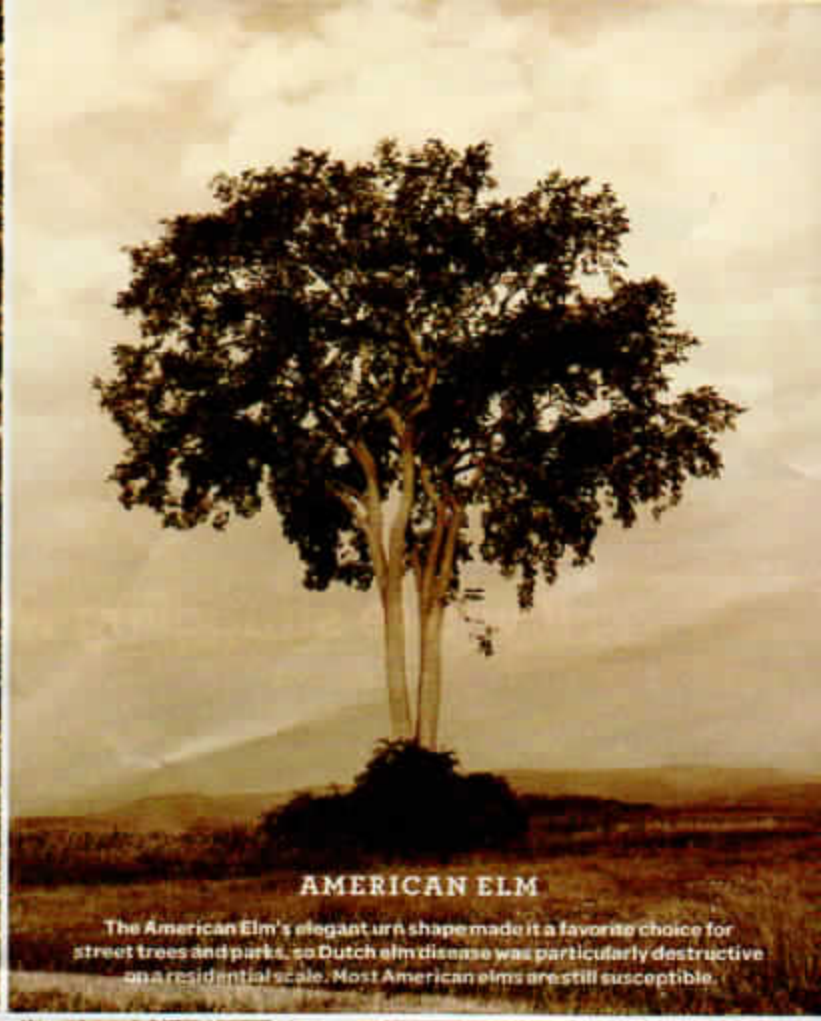
4. ***Report suspected pests or disease.*** The USDA lists contacts by state: *www.aphis.usda.gov/services/report_pest_disease/report_pest_disease.shtml*.

RESOURCES BY Stacey Hirvela



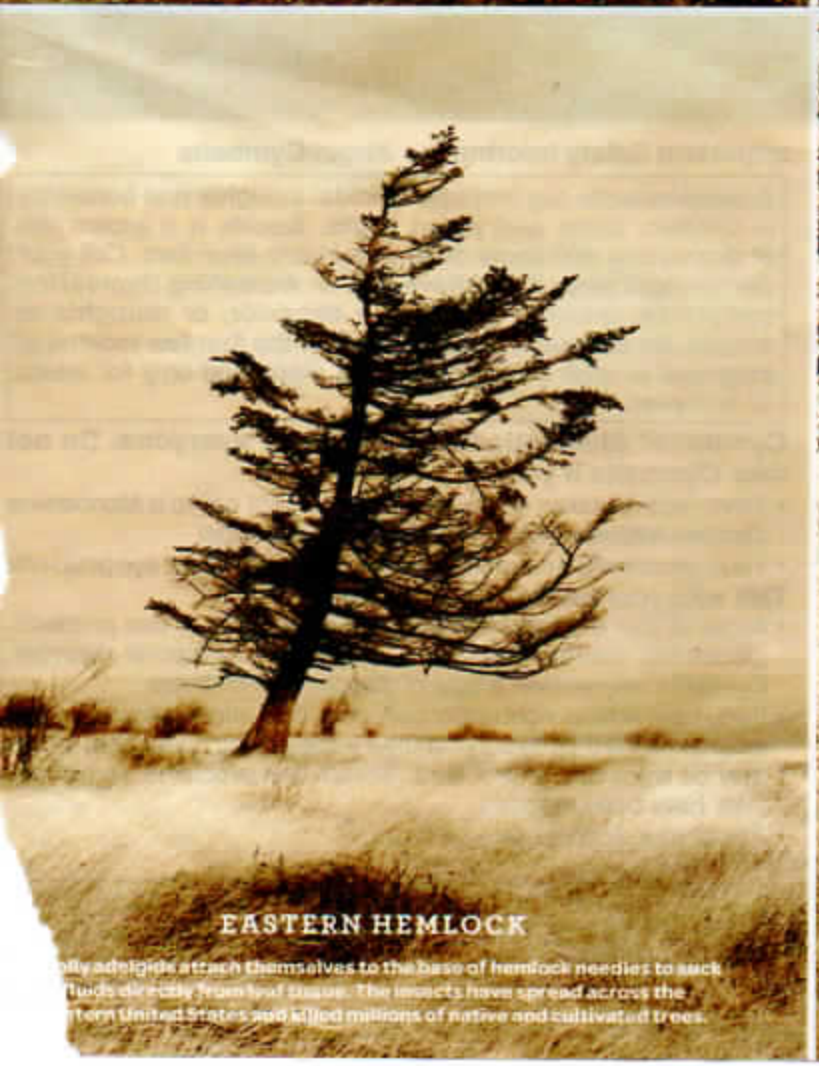
SUGAR MAPLE

Maples are among the preferred food sources for the Asian long-horned beetle. Although control programs against the insect have been intensive, the pest remains a threat to maple syrup production in New England.



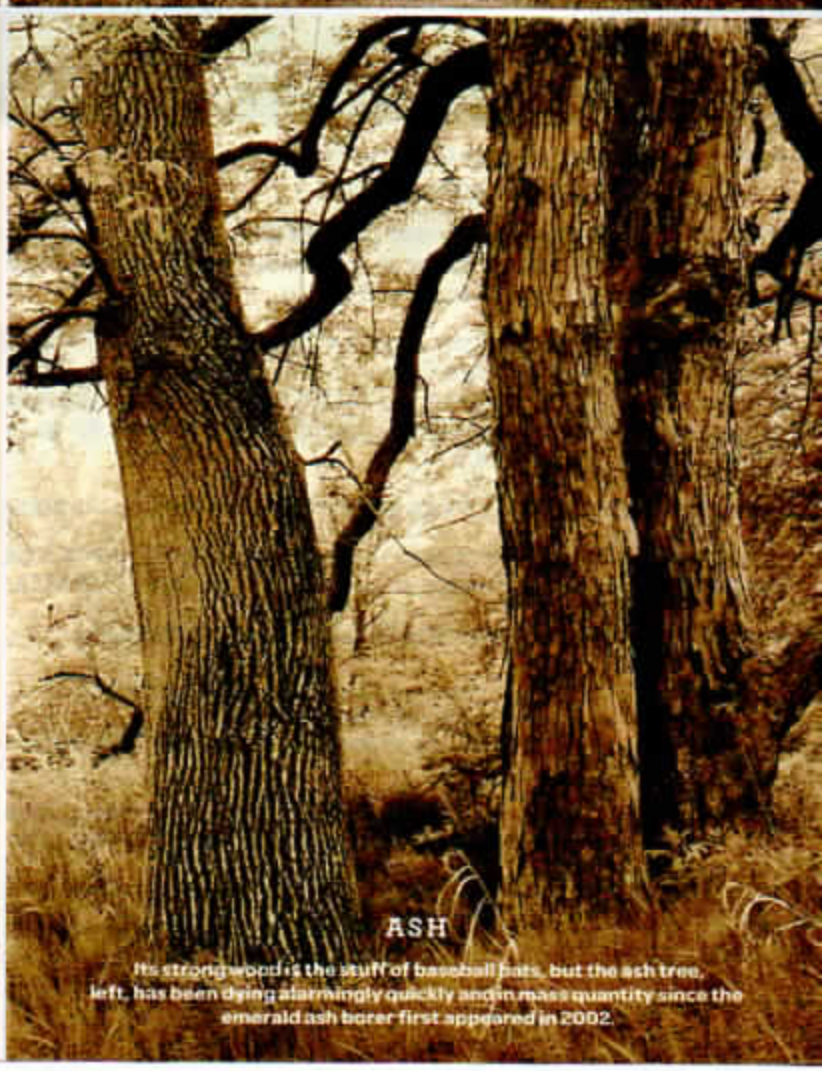
AMERICAN ELM

The American Elm's elegant urn shape made it a favorite choice for street trees and parks, so Dutch elm disease was particularly destructive on a residential scale. Most American elms are still susceptible.



EASTERN HEMLOCK

...lly adelgids attach themselves to the base of hemlock needles to suck ...fluids directly from leaf tissue. The insects have spread across the ...tern United States and killed millions of native and cultivated trees.



ASH

Its strongwood is the stuff of baseball bats, but the ash tree, left, has been dying alarmingly quickly and in mass quantity since the emerald ash borer first appeared in 2002.