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# Propagate, Archive, Reforest

*Setting out to identify and save significant trees worldwide is a big job. But there's a small non-profit group that's up to the task, and their efforts can help the green industry as well as the environment.*



BY SALLY BENSON

## ARCHANGEL

### ANCIENT TREE ARCHIVE

**I**t was a natural evolution. Early in the 1990s, a Michigan plantsman with an abiding love of trees and the environment established the non-profit Michigan Champion Tree Project. Determined to save the state's unique and "champion" trees—the largest of their species—David Milarch and his sons set out to collect germplasm and to archive the genetics of long-lived specimens.

Meryl Marsh, Archangel's global field operations coordinator, rests at the base of the Amos Alonzo Stagg tree in California, which is claimed to be the fifth largest tree in the world. The giant sequoia was named for a pioneering football coach on his 99th birthday.

It was a big job. But it soon became bigger, when word got out and Milarch's passion took him across the country and around the world in search of champions. The Michigan organization morphed into the Champion Tree Project International, whose mission was familiar but whose scope was expanded. Milarch, along with his son, Jared, and a small crew continued to seek, identify and preserve the world's outstanding trees.

Today, the "next generation" of the non-profit is known as Archangel Ancient Tree Archive, co-founded by Leslie Lee and David Milarch. What began in Michigan evolved in 2008 into a global organization that preserves, propagates and restores arboreal treasures, and educates citizens around the

globe. Archangel's mission is clear:

- To propagate the world's most important old growth trees before they are gone.
- To reforest Earth with the offspring of these trees to benefit all life through the natural filtering process of the trees to increase oxygen, sequester carbon dioxide and provide beneficial aerosols and medicines.
- To archive the genetics of ancient trees in living libraries around the world for the future

Armed with solid research, state-of-the-art propagation facilities and the proper tree-climbing equipment, the organization is already making significant contributions to ecological restoration and green industry promotion.



## Which tree?

With the help of Archangel's Senior Science Advisor, Diana Beresford-Kroeger, the group has developed a list of 100 "important" species (see sidebar, "Ten iconic trees"). Archangel identifies and selects valuable, individual trees based on a number of criteria, but often it's word of mouth that assists them in locating these important trees. Local landowners and expert arborists alike may recommend trees, and once the group receives a reference and permission to enter the property, the tree is evaluated, measured and cuttings are obtained.

According to Beresford-Kroeger, the tree species selected by Archangel and intended for use in reforestation "have unaltered native, wild DNA. They bank carbon as they grow. ... Some are drought-resistant and help maintain fresh water aquifers. Many reflect infrared light back into space, curbing an increase of atmospheric temperature. ... Most help scrub the atmosphere clean of 2.5-micron particulate contamination. ... Finally, they all pump oxygen into the atmosphere to maintain all life on this planet."



Jake Milarch, director of collections and propagation—and son of Archangel founder David Milarch—climbs the "Waterfall Tree," a famed giant sequoia that measures 155 feet in circumference at its base.

## A new generation, a renewed mission

Archangel Ancient Tree Archive, a not-for-profit organization based in Traverse City, Mich., has a limited staff of 17 with an unlimited mission: to propagate, archive and reforest. Established in 2008 by Leslie Lee and David Milarch, Archangel is the natural evolution of the Milarchs' previous organization, the Champion Tree Project International (profiled in the Dec. 1, 1996, issue of *American Nurseryman*). The group now comprises co-founders Leslie Lee and David Milarch; science advisor Diana Beresford-Kroeger; executive director Ben Walraven; Jared Milarch, PR and development; Jake Milarch, collections and propagation; and Meryl Marsh, global operations. William J. Libby serves as Archangel's scientific and forestry consultant.

Those valuable trees selected for Archangel's mission, then, will be preserved through clonal propagation, and in turn will help to benefit the environment.

### Up in the air

A tree to be archived may be easily approached—say, in someone's back yard—or it may be deep in forested areas where access is limited and challenging. In either case, the practice of gathering material requires no small measure of athleticism.

One of Archangel's ongoing programs is the preservation of old-growth redwoods. *Sequoia sempervirens*, coast redwood, was selected as a premier candidate for archiving. This giant can reach more than 375 feet tall with a diameter at breast height of 20 feet or more, so to say it requires skill to scale is an understatement. They are the world's tallest living organisms. Archangel has a team of experienced climbers, trained by Rip Tompkins of Arbormaster, who tackle the project of collecting material. Under extremely challenging physical circumstances, the climbers must be adept at handling ropes and other technical climbing equipment—not to mention having no fear of heights—as well as be able to select and gather the most promising cuttings for propagation. Once they've collected these samples and returned safely to Earth, the material is packed in coolers and sent to one of Archangel's propagation facilities.

### Making more

At the flagship location in Copenish, Mich., the production activity focuses on propagation from old growth, native tree species collected in the wild. The process involves asexual propagation, or cloning, using traditional nursery techniques to create mother plants as the source for broad scale production. Led by Bruce Hammersmith, a 25-year horticulture industry veteran, the production team is divided into

two units: inside and outside growing. While the inside team concentrates on rooting clones of collected trees, the outside team cares for the trees in the outdoor archive as well as participates in collections and grafting. The Michigan production team also works closely with California-based propagator for Archangel, Bill Werner, in developing propagation programs.

Executive director Ben Walraven outlines the program: "Archangel's propagation program is directed toward production research," he states. "Trees that first meet Archangel's collection criteria are then selected for product development.

"Step one in the process is to add the newly collected tree to the Archangel archive of trees derived from old growth trees. The collected material may be directly rooted into growing media, grafted onto rootstock or introduced into micropropagation (tissue culture).

"After viable clones of the collected material are safely established in the archive, they are evaluated for the targeted markets Archangel serves. Marketing approaches are concurrently developed in conjunction with customer's needs. Since Archangel is a production research and technology licensing company, its products must be suitable for production in nurseries all around the world."

Archangel intends to partially support its environmental cause through the sale of trees made from their collection. So who will purchase the trees?

Customers may include governments, businesses and people who desire trees derived from old growth genetics. Archangel's trees are targeted for urban and traditional reforestation, environmental restoration, commercial and residential landscapes.

Walraven explains, "Our production research facility in Michigan has

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Traditional nursery techniques are employed to create parent plants as the source for broad scale production of significant trees.

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the ability to test our trees for successful propagation. This means trees selected to fill a marketing need can be multiplied in great numbers and stay true to type. Archangel also provides technological support through our production research function. This allows licensees to successfully produce and supply old growth genetics to the markets served."

## The WaterWay™ brand

Branding and marketing in the green industry long have been challenges, especially for those who wish to promote their products and services as environmentally responsible. Consumers are savvier than ever before, and they demand solid science to support the claims. But Archangel Ancient Tree Archive may have an answer.

The organization's WaterWay™ Trees program is targeted at improving watersheds through the use of the proper trees for the proper location in a watershed. So far, two species have

been introduced: Prima-Nygra™ Willows (*Salix nigra* or black willow) and Prima-Cornus™ Dogwoods (*Cornus sericea* or red osier dogwood).

According to Archangel, both species are known to have shallow and extensive root systems that are ideal for holding soil in place on river and stream edges and other areas prone to soil erosion from runoff. Prima-Nygra Willows are ideal streamside trees, and when coupled with Prima-Cornus Dogwoods provide not only outstanding soil erosion abatement, but high-quality habitats for beneficial insects, animals and fish. Both species are strong on improving the quality of the soil through phytoremediation.

Because these plants have been cloned from "ancient" parent trees found in their native stands, restoration contractors, environmental landscape operations, even garden centers may be confident in promoting them as eco-friendly.

More species are anticipated to join the brand program, but each must prove its value in providing a specific environmental contribution to improving a watershed. And each must prove it can be successfully—and economically—propagated in sufficient numbers to serve the market.

Addressing environmental chal-

Clonal propagation of old-growth trees in Archangel's facilities results in the preservation of ancient trees that may provide a sound future for waterways.

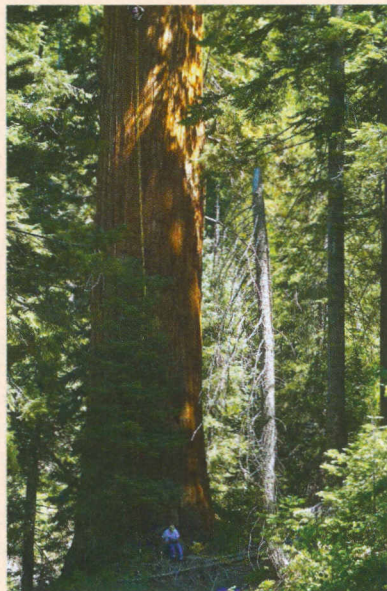




## Ten iconic trees

Thorough research helped Archangel identify and prioritize a list of 100 worldwide species that, according to the group, "would be the most important for archiving in living libraries, and for reforestation to help restore planetary health through carbon sequestration and oxygenation." From that list of 100, 10 were selected as "iconic." These include:

- *Sequoia sempervirens*, coast redwood
- *Andansonia grandidieri*, baobab
- *Quercus macrocarpa*, bur oak
- *Cedrus libani*, cedar of Lebanon
- *Metasequoia glyptostroboides*, dawn redwood
- *Cryptomeria japonica*, sugi or Japanese cedar
- *Nothofagus dombeyi*, southern beech
- *Agathis australis*, kauri
- *Ficus benghalensis*, banyan tree
- *Eucalyptus regnans*, mountain ash



One of Archangel Ancient Tree Archive's current programs is the preservation and restoration of old-growth redwoods and giant sequoias.

Challenges is a big task. And Archangel Ancient Tree Archive is willing to take it on, one tree at a time.

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For more information on Archangel Ancient Tree Archive, visit [www.ancienttreearchive.org](http://www.ancienttreearchive.org).

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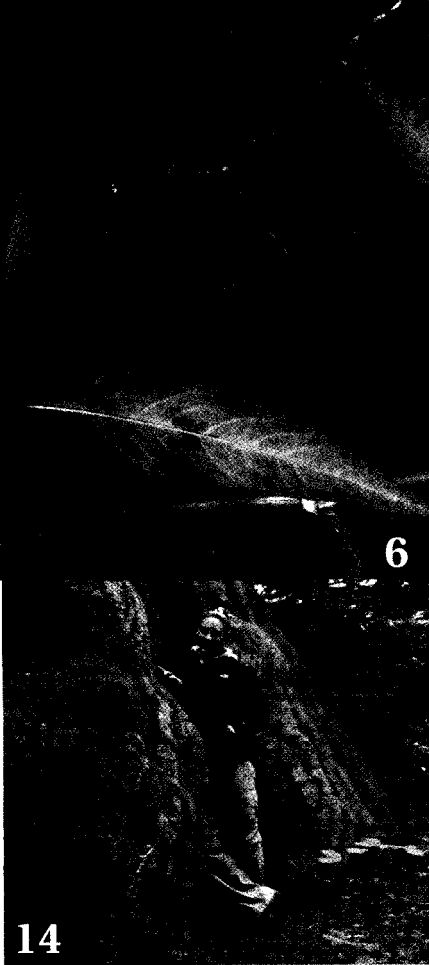
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### Controlling Summer Annual Weeds

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You have to know your enemy in order to vanquish it. A basic understanding of dormancy and germination can help you plan your attack on weeds in the field nursery.

by James Altland

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Create excitement for clients and customers with brilliant, easy-to-assemble and easy-to-sell container gardens.

By Patti Nagai, Ph.D.

### Greenhouse Goods

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The challenge of growing robust, saleable plants can be eased when you've got the right greenhouse.

#### On the cover:

One of the most common enemies found in field production, annual lambsquarters germinates prolifically in early summer.

PHOTO COURTESY OF JAMES ALTLAND.

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