

Horticultural News and Research Important to American Gardeners

FROST TOLERANCE IN A BOTTLE

As fall turns into winter, gardeners in colder regions begin the guessing game of when the first frost will occur. But what if there was a way to stave off that icy death blow and extend the season a few days or weeks longer? Now there just might be, thanks to a new spray-on formula called “Freeze-Pruf” developed by a group of researchers at Miami University in Ohio.

The water-based spray, a non-toxic mixture of five ingredients, enhances a



When exposed to temperatures between 26 and 27 degrees Fahrenheit, the treated banana plant on the left suffered minimal damage. The control plant on the right was killed after 30 minutes.

plant’s natural ability to survive cold temperatures. The researchers tested the product on a wide variety of plants such as palms, bananas, tropical foliage and flowering plants, tomatoes, and citrus. According to David Francko, one of the spray’s co-developers who is now a botany professor at the University of Alabama, they found a four to nine degree Fahrenheit improvement in “both the first temperature causing injury and the temperature causing mortality. Citrus was the only exception—there the benefits are only two to three degrees, but even that is significant for citrus growers at the margins of the range.”

Currently in the patent process, the product may be available by next winter for commercial and home garden use.

PLANTS CAN RECOGNIZE KIN

Scientists have recently discovered that some plants can recognize their siblings, a behavior that was previously believed to only occur in the animal kingdom. As reported last year in the United Kingdom’s journal *Biology Letters*, researchers at McMaster University in Hamilton, Ontario, noted that root growth of searocket (*Cakile edentula*), an unassuming, fleshy-leaved plant that grows in beach habitats in many of North America’s coastal regions, differed when siblings were present as opposed to non-related plants. If strangers—other searockets with a different mother plant but from the same population—were detected, the plants produced a greater amount of root mass to compete aggressively for nutrients. However, when grown with siblings, root growth was more restrained.

How plants are able to recognize kin is not yet well understood, but further studies have revealed similar interactions in native wild *Impatiens*, common lambsquarters (*Chenopodium album*), and *Arabidopsis*, according to Susan A. Dudley, an evolutionary plant ecologist who conducted the studies with graduate student Amanda L. File. “These are all species with very local dispersal, and often found in single species stands,” Dudley explains, “so they are likely to interact with relatives.”



Studies show lambsquarters can recognize kin.

NEW TECOMA CULTIVARS

Horticulturists with the USDA’s Agricultural Research Service in Florida have developed three new cultivars of *Tecoma guarume*, a semi-deciduous subtropical to tropical flowering shrub related to trumpet creeper. ‘Miami Sunrise,’ ‘Miami Sunset,’ and ‘Tangelo’ are reportedly hardy in USDA Zones 9 to 11, and possibly root hardy to Zone 8. These fast-growing plants, reaching about 10 feet in height, require full sun and well-drained soil.



Tecoma guarume ‘Tangelo’ is one of three new cultivars developed by USDA scientists.

‘Miami Sunrise’ features orange flowers that fade to yellow while ‘Miami Sunset’ has crimson-colored buds that open red to orange-red and fade to reddish-orange. ‘Tangelo’ produces orange flowers.

Currently produced in small numbers for evaluation purposes, these cultivars are expected to be released for retail sale in the next couple of years.

NEW PLANT COLLECTIONS ONLINE DATABASE

In June, the Chicago Botanic Garden, in conjunction with 29 partnering organizations, launched *PlantCollections.org*, an online database of living plant collections at international botanic gardens and arboreta. Free and accessible by anyone, the database can be searched by selecting fields such as scientific name, common

name, genus, and family, then inputting keywords to find plants of interest, complete with images.

“The data for the project,” says Boyce Tankersley, PlantCollection’s project director and director of living plant documentation at the Chicago Botanic Garden, “come from leading botanic garden and arboretum plant record databases, herbaria, seed repositories, DNA banks, and image repositories from around the world.”

Still under development, the database will eventually provide access to the plant records of more than 50,000 taxa. In addition to being useful to gardeners, students, and educators, this new resource is designed to provide a tool for scientists to better understand the global genetic diversity of plants and to assist with plant conservation efforts.

Future developments will allow users to download data to a spreadsheet, locate experts on particular plant groups or techniques, create maps showing botanic gardens and arboreta that grow various species and cultivars, and locate commercial sources for plants.

INDOOR GARDENS AT DUKE FARMS CLOSE

After being open to the public for nearly 50 years, the elaborate indoor gardens encased in one of America’s largest glass houses and created by the late tobacco



The recently closed indoor gardens at Duke Farms are contained in one of America’s largest glass houses, above.

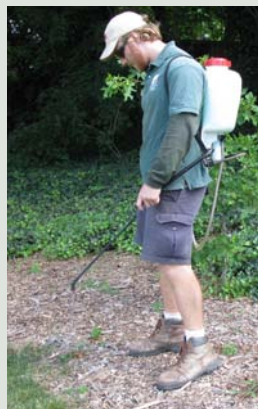
heiress Doris Duke closed in June. Located on the 2,740-acre estate in Somerset County, New Jersey, known as Duke Farms, the gardens comprise 11 unique “rooms” that represent garden styles from England, France, Italy, China, Japan, and the Indo-Persia region.

The board of the Doris Duke Charitable Trust, which now manages the estate,

Herbicide Overuse Poses Risk of Resistant Weeds

Growing crops, managing roadsides, and even creating backyard gardens have all been made easier with the use of synthetic herbicides. However, the overuse of one particular chemical is causing the development of resistant weeds, cautions the Weed Science Society of America (WSSA). In a recent report, the organization stated that glyphosate’s “widespread, repeated, and often sole use for weed management has selected weeds that have become glyphosate resistant and are thus not controlled by this herbicide.”

Glyphosate is the active ingredient in broad-spectrum herbicides such as Roundup® and Touchdown®. Since its introduction in 1974 by Monsanto, it “is used on more area of field crops and horticultural crops than any other active ingredient and has been very important in agricultural production,” says Stefan Seiter, an agricultural ecologist with the Linn-Benton Community College in Albany, Oregon. According to the Environmental Protection Agency, in recent years, between 13 and 20 million acres in the United States have been treated with 18.7 million pounds of glyphosate annually.



Overuse of glyphosate-based herbicides can result in resistant weeds.

Indeed, weeds like Palmer amaranth (*Amaranthus palmeri*) and giant ragweed (*Ambrosia trifida*) have developed glyphosate resistance, according to Chris Boerboom, a University of Wisconsin Extension weed scientist and WSSA member. “Over the past several years, we have seen the list of glyphosate-resistant weeds grow to nine species, which are scattered across at least 20 states,” Boerner says.

While the presence of glyphosate-resistant weeds may not yet be a major issue for home gardeners, it is becoming a concern at botanic gardens. Scott Starr, operations director of the Botanical Garden of the Ozarks in Fayetteville, Arkansas, says that although glyphosate use is minimal at the garden, it has become necessary to apply increasingly stronger doses of the herbicide to control certain weeds.

To slow the prevalence of resistant weeds, the WSSA advises rotating between herbicides with different active ingredients and using non-chemical controls such as tilling and mowing. However, these alternatives may create other issues. “Many times, a number of changes are needed in how plants are grown if a grower switches from chemical to non-chemical control,” Seiter notes. If growers switch to herbicides with different active ingredients, “often these active ingredients are more damaging for the environment,” he says.

“Kochia and Russian thistle are resistant to many other herbicides as well,” says Paul Walvatne, roadside vegetation management unit supervisor for the Minnesota Department of Transportation. Economic factors can also affect weed management practices. “Our spraying acreage has gone up over the years due to less mowing because of energy costs and wildlife concerns,” says Walvatne. “But one spraying typically lasts much longer than one mowing because the perennial weeds and brush sprout back from mowing with a vengeance.”

Another concern is that “nothing will be done until the problems develop more widely,” says Micheal Owen, professor of Agronomy at Iowa State University in Ames. He cautions that, because weed seeds can remain dormant for long periods of time, a weed’s resistance may not be immediately recognized. While Owen acknowledges there may be no easy solution to the problem of herbicide-resistant weeds, he says, “anything that diversifies the system [of management practices]” will help.

For more information, visit www.wssa.net.

—Kirsten Winters, Editorial Intern

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PEOPLE and PLACES in the NEWS

Brooklyn Botanic Garden's Elizabeth Scholtz Honored for Lifetime Achievements

Elizabeth Scholtz, director emeritus of Brooklyn Botanic Garden (BBG) in New York, received an Honorary Life Member Award from the American Public Gardens Association (APGA) in June. Awarded to only 15 recipients in the 68-year history



Elizabeth Scholtz, shown here with APGA Executive Director Dan Stark, center, and BBG President Scot Medbury, left, was honored in June for her lifetime commitment to public horticulture.

of the APGA, this honor recognizes those who have given long term meritorious service to the organization and have demonstrated exceptional dedication to the field of public horticulture.

"During a botanic garden career that has spanned nearly 50 years, Elizabeth Scholtz has been a peerless ambassador and advocate for gardens and garden education throughout the world," says Scot Medbury, president of BBG. "The world of public gardens has benefitted greatly from her role as mentor to several generations of North American public garden professionals."

Joining the BBG staff in 1960, Scholtz served as the garden's director from 1972 to 1980. She sat on the APGA board in the late 1970s and also has served on the committees for several botanic gardens.

Other accolades she has earned include the Scott Medal from the Scott Arboretum at Swarthmore in 1981 and the Liberty Hyde Bailey Award from the American Horticultural Society in 1984.

made the decision to close the indoor gardens as part of "a bold new vision" for Duke Farms to "become an environmental showcase and learning center." This move has not been popular with some of the gardens' longtime visitors and supporters, who argue that these gardens should be able to co-exist with the new plans. Supporters have presented petitions with thousands of names and encouraged letter-writing campaigns and other actions through the website www.savedukegardens.org, but this has not swayed the course chosen by the trust's board.

Plans include the renovation of a smaller conservatory on the property to achieve "gold" level certification from the Leadership in Energy and Environmental Design Green Building Rating System. This building will be used for a new indoor garden, which will incorporate some of the plants from the gardens Duke designed. The rest of the collection will be donated to other conservatories and gardens. The original conservatory and its five attached greenhouses, constructed in the early 1900s, will be converted into a production fa-

cility for native plants for the grounds.

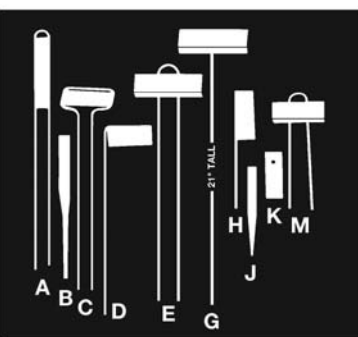
For more information, visit www.dukefarms.org or call (908) 722-3700.

SEQUENCING THE CACAO GENOME

Chocolate lovers can rest easy now that the U.S. Department of Agriculture (USDA) has begun a five-year project to sequence the genome of the cacao tree (*Theobroma cacao*), the source of cocoa. The resulting genetic data will allow scientists to target the plant's genes that provide better disease-resistance, yield, flavor, and other desirable traits.

Though almost no cacao is grown in the United States, the USDA has an interest in this research because many domestically produced crops such as nuts and raisins are used in chocolate products. Mars, Inc., the world's largest producer of chocolate-based candy, will fund the project with more than \$10 million, and IBM is contributing a supercomputer to analyze the more than 400 million parts of the genome.

Written by Associate Editor Viveka Neveln and Editorial Intern Kirsten Winters.



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