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# THE AMERICAN GARDENER

A Publication of the American Horticultural Society

July/August 1998 \$3.95

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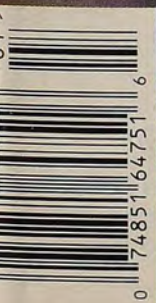
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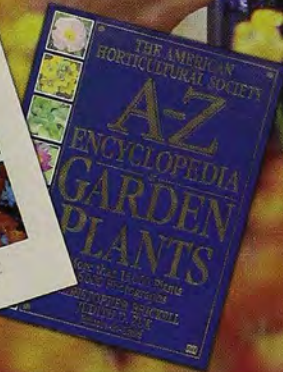
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# c o n t e n t s

Volume 77, Number 4

July/August 1998



## DEPARTMENTS

- Commentary** 4  
**Members' Forum** 5  
Ipomopsis, Galle tribute, more on mums and agaves.  
**News from AHS** 7  
Heat-Zone Map update, roses for the Midwest, plants in peril.  
**Focus** 9  
Demystifying mycorrhizae.  
**Offshoots** 14  
Cottage garden brings cheer to Bronx.  
**Mail-Order Explorer** 16  
Native perennials from the Northwest.  
**Planting the Future** 18  
Sowing seeds of history and geography.  
**Gardeners Information Service** 19  
Bloomless ginger, sprouting beans, houseplant hazards.  
**Conservationist's Notebook** 20  
Asian beetle threatens North American trees.  
**Urban Gardener** 22  
Creating focal points with garden features.  
**Book Reviews** 54  
Gardening with children, Lacy's latest, vegetable gardening.  
**Regional Happenings** 58  
Colorado wildflowers, New England garden tours, Master gardeners meet in the Southwest.  
**Hardiness and Heat Zones** 62  
**Pronunciations** 63

## FEATURES

- Magical Milkweeds** 24  
by C. Colston Burrell  
*Milkweeds are often relegated to naturalistic and wildlife gardens, but many of these little-known natives are wonderful choices in more formal garden settings.*  
**A Garden in the Redwoods** 31  
by Pamela Conley  
*Escaping the hustle and bustle of San Francisco, a gardening couple has created a peaceful retreat in the shade of California's coastal redwoods.*  
**Centaureas** 36  
by Rand B. Lee  
*This large and versatile genus of sun-loving annuals and perennials contains enough old favorites and new cultivars to grace almost any garden.*  
**Conservation by Committee** 41  
by Hugh and Carol Nourse  
*An innovative alliance of state and federal conservation groups in Georgia is allowing scarce resources and staff to be focused on the state's most pressing plant conservation projects.*  
**Sea Plants Inland** 46  
by Pamela D. Jacobsen  
*Plants that thrive in coastal habitats and beach homes are often well adapted to the sandy soils found in many inland areas of North America.*  
*On the cover: Bachelor's-button (Centaurea cyanus), has a long history of cultivation in the garden and is prized for its flowers, which are among the bluest in the plant world. Photograph by David Cavagnaro.*

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*The American Horticultural Society (AHS) educates and inspires people of all ages to become successful and environmentally responsible gardeners by advancing the art and science of horticulture.*

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# commentary

It's the time of year when many of us are taking vacations—spending quality time with family and friends. While traveling around our country, it is always exciting to visit gardens that contain unfamiliar plants or learn about innovative gardening and conservation programs. Most of my family now live in the Phoenix, Arizona, area and for this Virginia native, every visit brings new learning experiences. Wherever you go this summer, be sure to scan those saved issues of *The American Gardener* before you leave. More likely than not you'll find an article for any region you're visiting in North America.

If you need an escape from the hot summer sun, you will enjoy our article in this issue about a California gardener who has created an emerald oasis in the shade of America's majestic redwoods. Learn how shade-loving wildflowers and shrubs that grow naturally in coastal redwood forests have adapted to cultivation in this cool West Coast garden.

Anyone who goes to the beach regularly becomes familiar with the plants used to landscape beach homes or found naturally in coastal environments. But if you are nostalgic for the shore, there's no reason you can't grow many "beach" plants in your inland garden. Besides being beautiful, many are hardy, drought tolerant, and adaptable to a wide range of soil conditions. Pamela D. Jacobsen, founder of the North American Sea Plant Society, describes coastal plants she has integrated into her western Massachusetts garden.

In late summer, many of our gardens go into the doldrums. Milkweeds come into their own at this time of year, however, producing vivid colors and attracting butterflies to the garden right through to fall. Frequent contributor C. Colston Burrell extols the virtues of several virtually unknown members of this showy genus of mostly North American natives.

Another group of plants that offer mid- to late-summer flowers are cornflowers or knapweeds (*Centaurea* spp.). Garden writer Rand B. Lee tells us about the best cornflowers for borders and cutting gardens.

Plant conservation is in the news. A recent study revealed that nearly a third of American plants are at risk of extinction, and that the pace of global plant extinctions is far above historic levels (see related article on page 7). From Georgia, we bring you a story about an innovative alliance of plant conservation groups that is being heralded as a model for other states. By pooling financial and human resources, this coalition of state and federal agencies has found it can more effectively tackle critical conservation projects.

Of course, if your travels bring you to our nation's capital, don't miss the opportunity to visit the national headquarters of the American Horticultural Society at George Washington's River Farm—just a few miles north of historic Mount Vernon. I look forward to greeting you and telling you more about the Society's exciting plans for this historic property! Wherever your travels take you this season, we wish you a safe and enjoyable trip.



A handwritten signature in black ink that reads "Linda D. Hallman". The signature is written in a cursive, flowing style.

—Linda D. Hallman, AHS President/CEO

TONDA PHALEN



members'  
forum



*Seeds of several Ipomopsis species are available from Southwestern Native Seeds, P.O. Box 50503, Tucson, AZ 85703. Catalog \$2.*

### CENTURY PLANTS AND MUMS

Although I'm a longtime member, a couple of letters in the March/April "Members' Forum" have prompted me to write for the first time to share my own experiences.

The first concerns century plants. As a native North Carolinian, I was amazed by the flora of the Southwest when I moved to New Mexico in 1967. My neighbors were mostly transplants, but I met enough native southwesterners to become interested in the region's native plants. I received lots of cuttings, which were potted up and rooted according to directions. When I moved from New Mexico, the plants were transported to the humidity of Portsmouth, Virginia, for three years, then on to Cary, North Carolina, for an additional three before moving to a "permanent" home on the outskirts of Cary. (I believe the line between USDA Zone 7a and 7b runs through my living room.) All have thrived in my cactus garden, including the century plants, which have managed to put out blooms for both my children's weddings. For people here, that is a real treat and truly amazing. Such a testament to the "will" of plants to survive and flourish in climes totally out of their natural habitat! My cactus garden, now mixed with native succulents, is a great source of interest to all who see it.

My second response is to the letter about mums and growing them as permanent garden plants. I have a landscape maintenance business that deals mostly with commercial properties. While I have mums dating from 1975 in my own garden, I am sensitive to the needs of commercial properties to have a constant

### IPOMOPSIS

I was riding my bike through one of the older parts of town when I saw my first *Ipomopsis*. Struck by the beauty of its crimson spikes, and curious as to its identity, I had to stop and ask the owner, an elderly lady, a few questions. She called it scarlet rocket, and informed me that all the ferny little clumps amid the tall blooming stalks were the result of its annoying habit of re-seeding itself.

She was happy to give me as many of the ferny little clumps as I was able to carry. I took them home and transplanted them into the middle of my very informal flower garden. Only three survived the transplanting and our cold Iowa winter. However, those three bloomed, and their spikes were filled with hundreds of seeds. I scattered the seeds in the fall and again in the spring. My gardening friend was right: They germinated easily, and it didn't seem to matter when the seed was sown. I have since had them appear out of three-year-old compost.

I suspect my plant is *Ipomopsis aggregata*, also called towering cypress, a biennial that will thrive under varying soil and moisture conditions. I've even had its first-year growth do very well under my sunflowers.

If you want dramatic, four-foot-tall, red-orange spikes in mid-July, try my favorite plant, the *Ipomopsis*.

Fritz Fruh  
Davenport, Iowa

COURTESY OF FRITZ FRUH

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beautiful display. So I dig up pansies on May 1 for summer annuals, replace summer annuals on September 1 with mums, and remove the mums on October 15 to make way for pansies. My solution has been to offer mums to employees of those properties as I remove them, along with a little education. It is gratifying to hear stories about plants that have survived for many years—and to contribute to the employees' awakening interest in gardening. This is a real joy to me—and I feel less like a villain of the plant world!

Patricia Hudson  
Cary, North Carolina

## KUDOS FOR GALLE

What a wonderful article about Fred Galle in the November/December 1997 issue of *The American Gardener*! It captured the essence of Fred's life and work with azaleas and Callaway Gardens. Every time I was with Fred, I learned something practical about growing plants in the Piedmont of Georgia. The photographs by Michael Hayman were superb! For my wife, Carleen, and myself this issue is a real keeper.

Fred has been very special in our lives—first, with his help finding projects at Callaway for graduate students while I was with the University of Georgia—and, later, with his suggestion of focusing on hellebores and hostas for our nursery business at Piccadilly Farm.

By the way, hellebores are hot items! We cannot keep up with the demand. One wholesale customer even tried to bribe one of the staff to sell him 4,000 additional plants in four-inch pots that were going to another customer.

Samuel B. Jones Jr.  
Bishop, Georgia

## BUM RAP

I am a garden writer who works a great deal with landscape contractors, designers, and architects. Since landscape professionals as a whole are striving to get away from the fly-by-night image that clouded public perception of the industry in the past, most reputable companies are constantly seeking to improve the quality of their work. Unfortunately, the "Offshoots" column "In the Pink" by Ester Bentz, published in the March/April 1998 issue, seems to equate home gardening with professional landscape design and maintenance.

Far from hiring any old friend who is "bankrupt and brokenhearted" to perform landscape maintenance, design, or installation, reputable contractors want well-trained, experienced professionals to join their teams. Many state associations have introduced certification programs with extremely high standards to help homeowners

identify the companies with the knowledge and experience to handle their landscaping needs. Besides a knowledge of soil conditions, plant hardiness, and the difference between native plants and rampant exotics, a contractor should also be properly trained to handle pesticides and to be aware of organic gardening techniques and many other factors that could affect the end result of a landscaping job.

Instead of "lopping off limbs from the tops of towering trees," then taking the landscape waste and "stuffing it into trash barrels" prior to a trip to the dump, most responsible landscapers either create compost heaps or turn wood waste into reusable mulch. And far from using far corners of a customer's property as *al fresco* restroom facilities, many contractors provide industrial port-a-potties for their crews.

As for the comment, "the care and feeding of the rich is surely the fastest-growing business in America," such arrogance barely deserves an answer. If landscapers relied on rich customers, they would soon be out of business. There are many homeowners and condo-dwellers who are either elderly and unable to maintain their landscapes, or are occupied with business and want to devote their free time to their families instead of their lawns. Busy people, not rich people, keep landscapers in business.

I have nothing against home gardeners—I am one! But the landscaper with years of experience and training who keeps up with the latest research is a different species from the lawn-mowing cowboys of the past and present. Your article did these hardworking professionals a disservice.

Becke Davis  
Cincinnati, Ohio

*The intent of Ms. Bentz's tongue-in-cheek article was not to disparage legitimate landscaping professionals, but to offer a personal account of her brief foray into a job and a way of life that were unfamiliar to her. Our "Offshoots" department is designed to provide personal perspectives on a wide variety of garden-related subjects.*

## Just a Reminder...

...to start saving your flower and vegetable seeds for the American Horticultural Society's Annual Seed Exchange Program in January. Further details about the seed exchange and a form to submit with your seeds will be sent to you this fall.



# news from ahs

## AHS PLANT HEAT-ZONE MAP

It's been almost a year since the American Horticultural Society released the Plant Heat-Zone Map, but enthusiasm for this new gardening tool has not subsided. Since the August 21, 1997, release date, articles about the map have appeared in most major national newspapers and magazines, including the *New York Times*, *USA Today*, *Washington Post*, *Garden Design*, *Better Homes & Gardens*, and *House Beautiful*. The industry response to the map and the information it offers has also been enthusiastic. Trade publications have featured it and nurseries are eager to add heat codes to their offerings. Monrovia nursery in Azusa, California, published the first list of 100 heat-coded plants in this year's spring/summer wholesale catalog.

AHS President Emeritus H. Marc Cathey's book, *Heat-Zone Gardening*, published in February by Time-Life Books, describes how the map works and lists codes for 500 popular native and exotic ornamental plants. Cathey has been spreading the word about the Heat-Zone Map in an ongoing lecture tour that so far has included flower shows, botanical gardens, garden club groups, and plant conferences in 12 states and the District of Columbia. Upcoming speaking engagements include an International Waterlily Society meeting in Washing-

ton, D.C., on August 3 and a lecture at the Kansas Arboretum in Manhattan on October 3. For details about lectures in your area, check out the AHS Web site at [www.ahs.org](http://www.ahs.org) or call (800) 777-7931 ext. 10.

What's next? In the fall of 1999 Monrovia will add heat codes to tags on many more plants. Many gardening books published in 1999 will feature both the USDA Plant Hardiness Zone Map and the AHS Plant Heat-Zone Map. As we continue to assign heat codes to the more than 40,000 cultivated plants available in the floral and nursery trades, you will become familiar with the two sets of zone numbers that will guide you to more successful selection of plants for your garden.

## IN MEMORIAM

David G. Leach, a renowned rhododendron breeder, horticultural author, wildlife photographer, and past president of the American Horticultural Society, died April 22 at his home in North Madison, Ohio. He was 85 years old.

Leach is perhaps best known for his book *Rhododendrons of the World*, considered by many to be the definitive text on the subject. He also traveled the world in search of new rhododendron varieties, introducing more than 70 hybrids in a career that spanned over 50 years. One of the aims of his breeding

program was to produce rhododendrons that integrated the cold hardiness of North American species with the flower colors available in selections from milder climates. "David's breeding of hardy, uniquely tinted rhododendrons produced new cultivars of exceptional performance and beauty," says H. Marc Cathey, AHS president emeritus. Leach served as AHS president from 1971 to 1974 and was the recipient of the Society's Scientific Award in 1985.

Many of Leach's hybrids were bred at the David G. Leach Rhododendron Research Station, which he donated in 1986 to the Holden Arboretum in Kirtland, Ohio. He continued to direct the station's operations until just before his death.

Memorial contributions may be made to the David G. Leach Rhododendron Research Station of the Holden Arboretum, 9500 Sperry Road, Kirtland, OH 44094.

## GLOOMY GLOBAL PLANT STUDY

An international study of plant diversity has revealed that at least one out of every eight known vascular plant species on Earth is at risk of extinction. The study, a 20-year joint project sponsored by 16 organizations including the Smithsonian Institution in Washington, D.C., cites habitat destruction and introduction of non-native species as the prime reasons that 34,000 plant species—or 12.6 percent of the 270,000 species known worldwide—are close to extinction.

Because only a fraction of the world's species have been cataloged, scientists warn that the study's findings are actually overly optimistic. In the United States, where plants are studied more intensively than elsewhere in the world, nearly 30 percent of the flora are considered at risk. Yet data from remote sections of Asia, Africa, and South America—including large portions of the world's equatorial and tropical regions, where biodiversity is greatest—is sketchy.

The potential loss of plant diversity has major implications for medical science and agriculture, say scientists. More than half of all prescription drugs are based on naturally



**H. Marc Cathey, president emeritus of AHS and author of *Heat-Zone Gardening*, promotes the heat-zone concept at a press conference during the Society's recent annual meeting in Nashville. Public interest in the AHS Heat-Zone Map has been unabated since its release last summer.**

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food and ornamental crops can be bred.

The 862-page study, titled "1997  
IUCN Red List of Threatened Plants,"  
was released in April. In addition to the  
Smithsonian, sponsoring agencies includ-  
ed the World Conservation Union, the  
World Wildlife Fund, the Nature Conser-  
vancy, and the Royal Botanic Gardens at  
Kew and at Edinburgh.

### SHRUB ROSE EVALUATION

The Chicago Horticultural Society has pub-  
lished a detailed evaluation report on 52  
shrub roses for midwestern gardens. Be-  
cause these roses were developed in parts of  
the world where the growing conditions  
vary greatly from those of the Midwest, this  
report provides critical information on how  
the plants actually perform in the central  
United States.

The Chicago Botanic Garden began  
evaluating English roses—hybrids devel-  
oped by English plantsman David Austin—  
in 1990, and in 1992 began a second  
evaluation on Explorer and Parkland roses  
from Canada. Both studies, which conclud-  
ed in 1995, took account of the hardiness,  
disease resistance, and general performance  
and characteristics of each rose.



'Henry Kelsey' from the Explorer series.

The report gave its highest overall rating  
to the following varieties from the Explor-  
er series: 'Champlain', 'Henry Kelsey', 'Jens  
Munk', 'John Davis', and 'William Baffin'.  
The English roses that fared best in the eval-  
uations were 'Constance Spry' and 'The  
Reeve'; the only Parkland rose to rate five  
stars was 'Assiniboine'. The report also in-  
cludes a chart comparing each rose's resis-  
tance to insects, diseases, and winter injury.

For additional information on the study  
or to obtain a copy of "Plant Evaluation  
Notes: An Evaluation Report of Shrub  
Roses," write to the Plant Evaluation Pro-  
gram, Chicago Botanic Garden, 1000 Lake  
Cook Road, Glencoe, IL 60022.

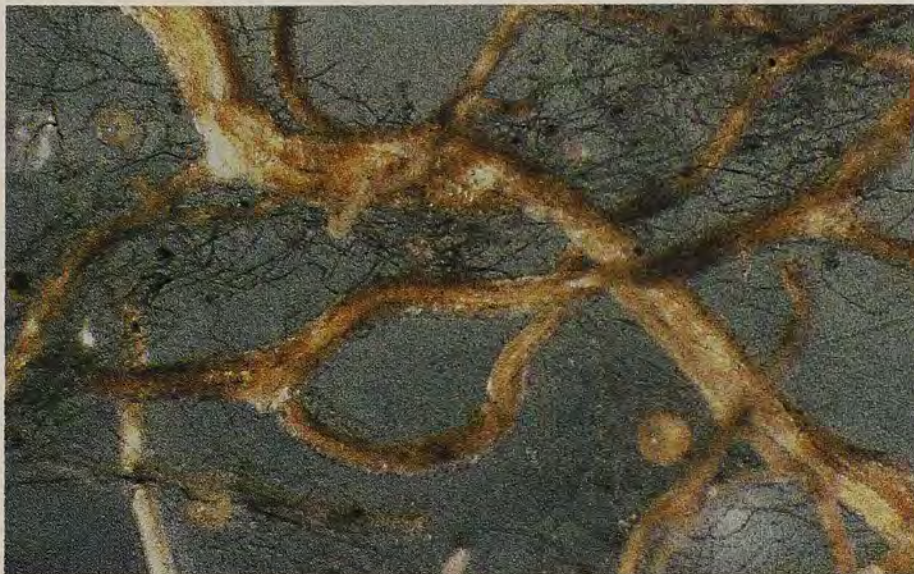
COURTESY OF CHICAGO BOTANIC GARDEN



# focus july/august

# soil's hidden heroes

by David J. Ellis



COURTESY OF R.M. MILLER

The fine, threadlike feeding structures—hyphae—of mycorrhizal fungi bring nutrients and water to the roots of a sorghum plant. Globular objects attached to hyphae are the spores of this common mycorrhizal fungus, *Gligaspora gigantea*.

**IN THE LAST FIVE YEARS,** *products containing mycorrhizal fungi—symbiotic fungi that help plants obtain water and nutrients in exchange for sugars produced by the plant—have become available to gardeners. Mycorrhizae have shown tremendous potential for improving yields of certain agricultural crops and rehabilitating soils damaged by intensive farming, strip mining, and toxic waste spills. They are also being used extensively by foresters and nursery owners to help establish trees.*

*Critics argue that the fungi commonly used in commercial mycorrhizal inoculants are too generalized to be useful in ornamental gardening, but producers of mycorrhizal products say the proof is in the pudding—both professional horticulturists and amateur gardeners are reporting positive results. We've put together an overview of the current understanding of this complex topic.*

## mutual benefits

Commercial production of mycorrhizal fungi for use in gardening is in its infancy, but research into these microscopic plants has been going on for more than 50 years. Soil scientists now understand that microscopic organisms such as fungi and bacteria are just as important to healthy soil as are its physical characteristics. Despite this research, scientists have only begun to understand the secrets of soil life. “We know a lot about what is going on above the ground, but we know very little about what is happening below ground,” says Michael Miller, senior soil ecologist at the U.S. Department of Energy’s Argonne National Laboratory in Argonne, Illinois. The diversity of life forms found in soil has been compared to the biological diversity of the world’s rain forests.

The word mycorrhizal literally means “fungus-root.” These specialized fungi are microorganisms that colonize, or “infect,” the fine roots of plants. Gradually they extend threadlike feeding structures called hyphae into the soil. These absorb nutrients, which are then shared with host plants. In return the fungi receive sugars synthesized by the plants. There is evidence that mycorrhizae help plants survive stresses such as drought, elevated soil temperature, and increased salinity and even protect them from certain soil pathogens.

Mycorrhizal fungi develop an immense network of hyphae that, in effect, serves as extensions of plant root systems. Miller says that the hyphae spread through the soil “seeking hot spots of microbial activity where nutrients are being turned over. They compete with the microbes to bring nutrients back to the host plant.”

Because the surface area of the hyphae of mycorrhizae may be several hundred

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Bill and Sylvia Varney are the owners and operators of a combined 12-acre herb farm, bed and breakfast, and restaurant which has been written up many times in national and regional publications, including *Texas Highways*, *Country Living*, and *Victoria* magazine. They also create and distribute over 1,500 herb products worldwide.

times the surface area of the roots, plants have access to a much larger volume of soil—and thus water and nutrients—than they would through their roots alone. “At any one time much of the nutrients in any ecosystem reside in the fungal mass, either in living fungi or in dying tissue that will be consumed by other fungi,” says Randy Molina, a research botanist with the U.S. Forest Service’s Pacific Northwest Research Station.

By sending threads far into the root zone, mycorrhizal fungi also improve soil structure by letting water percolate deeper into the soil and by improving porosity. As reported in the March/April issue of *The American Gardener* (see “News from AHS”), a researcher with the USDA’s Agricultural Research Service has found a protein—called glomalin—in mycorrhizal fungi that actually binds soil together. The protein coats soil particles and binds them into stable aggregates that resist erosion.

Mycorrhizae are believed to have struck up relationships with the first land plants as both struggled to survive in the primitive, mineralized soils that covered the earth millions of years ago. Mycorrhizae provided plants with nutrients, particularly phosphorus and nitrogen, and plants in return gave the fungi the carbohydrates produced through photosynthesis. Gradually, certain mycorrhizae became associated with particular plants or plant families in a process scientists call coevolution. “It’s a very old and stable relationship,” says Miller.

According to Miller, mycorrhizal relationships among plants are actually the rule rather than the exception. “What’s unusual are the nonmycorrhizal plants. Basically, 90 percent of the world’s vascular plants

belong to families that have symbiotic associations with mycorrhizal fungi,” he says. Miller believes that with refinements in genetic testing methods “what we are eventually going to find is that the fungi have plant genes in them and the plants have fungal genes in them.”

Scientists divide mycorrhizae into two major groups: ectomycorrhizae and endomycorrhizae.

Common to forests of the Pacific Northwest, ectomycorrhizae colonize the roots of conifers such as pines, spruces, and firs, and hardwoods such as oaks, beeches, and birches. These fungi normally produce fruiting bodies—mushrooms—aboveground, and their spores are spread by wind or animals.

Endomycorrhizae produce solitary or clumped spores in soil and are not wind-disseminated. The most common endomycorrhizae are vesicular-arbuscular mycorrhizae (VAM), which are associated with a wide variety of trees and shrubs, including junipers, arborvitae, maples, buckeyes, dogwoods, ashes, and elms. Most commercial inoculants are composed of a mixture of VAM strains. A specialized group of fungi called ericoid mycorrhizae colonize members of the heath family, which includes rhododendrons, blueberries, and mountain laurels.

## PRODUCING INOCULANTS

Inoculants are produced by growing mycorrhizae on a host plant—often Sudan grass (*Sorghum* spp.)—which is grown either hydroponically or in a relatively sterile medium such as fine sand. Mycorrhizal spores are harvested by grinding up the roots of the host plant and its medium or, in hydroponic systems, by flushing the



Ectomycorrhizal fungi are common to the forests of the Pacific Northwest, where they colonize the roots of conifers such as Sitka spruce, above.

MARK TURNER

roots with water at intervals. Many mycorrhizae require specific conditions for propagation, so individual species are cultured separately and then combined with others in a blended inoculant. Inoculant producers try to create a mixture of species that are adaptable to a wide range of host plants. "We try to pick species that will ensure that at least one will be right almost anywhere, from the tropics to northern climates," says Don Chapman, owner of Bio/Organics, a mycorrhizal product company in Camarillo, California.

Inoculants—often mixed with materials such as moisture-retaining gels, micronutrients, and a surfactant—are sold either as a powder to be mixed with water and used as a root-dip, as a liquid to be injected directly into the roots of established trees, or in granules that are added to the planting hole.

Not all the products that are on the market are equal. The key to successful production of mycorrhizal inoculants is avoiding contamination with fungal pathogens—such as *Phytophthora* spp., which cause root rot—says Elaine Ingham, who runs Soil Foodweb, Inc., in Corvallis, Oregon, a company that tests soil for the presence of microorganisms. Ingham suggests asking suppliers how they produce their inoculants. "If they are just going out and extracting spores from soils, they are likely to end up with pathogens," she warns. Chapman says reputable producers of mycorrhizal inoculants will list the fungal species used in the product and provide certification of the viable spore count.

### USE IN THE GARDEN

In laboratory tests, mycorrhizae have shown tremendous potential for stimulating establishment and growth of both vegetables and woody plants. Anecdotal evidence for the benefits of mycorrhizal inoculants in gardens also proliferates, but there are few field studies to back up claims of their efficacy. The main reason for this is it is almost impossible to run controlled field tests using mycorrhizae—there are just too many variables. "The problem is that results with mycorrhizal fungi are not very reproducible in general," says Amy Rossman, director of the USDA's systematic botany and mycology laboratory in Beltsville, Maryland.

Roger Koide, professor of horticultural ecology at Penn State University, has experimented with mycorrhizae on annual bedding plants. "We've used both our own strains of mycorrhizae and commercial strains," says Koide, "but we just don't see that many benefits yet."

In agricultural crops, however, mycorrhizae have shown great promise. According to Koide, increased yields of fruits and vegetables seem to be linked to early accumulation of phosphates in seedlings—a function mycorrhizae are ideally adapted to do. "We've demonstrated significant yield increases in field corn," says Koide. Mycorrhizae are also being successfully used with crops such as strawberries, citrus fruits, and avocados. Strawberry growers use inoculants to restore microorganisms to soils fumigated with the fungicide methyl bromide.

Some gardeners claim huge success with inoculants—amazing yields of vegetables

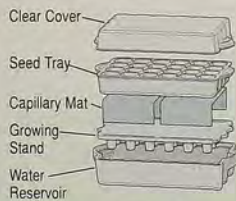
or rapid establishment of ornamental plants. Doreen Howard of Angleton, Texas, who inoculated her heirloom tomatoes with a commercial mycorrhizae mixture, says, "I have picked 1,297 tomatoes and stopped counting from a dozen seven-foot plants."

Inoculant producers such as Chapman of Bio/Organics say they are getting generally favorable reviews both from gardeners and from owners of small organic farms. "We have several thousand customers in every state for our home garden products," says Chapman. "Most of the more dramatic results have come out of



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## Restoring Natural Ecosystems

One area in which mycorrhizae are showing tremendous potential is in restoration of damaged or altered ecosystems. Robert Betz, a prairie ecologist who has been studying a 1,000-acre tallgrass prairie restoration on the grounds of the Fermi National Accelerator Laboratory in Batavia, Illinois, says that many areas that were once prairie have been farmed for so long that native mycorrhizae have been depleted or exterminated. "After 150 years or more of agriculture, it appears



Finding mycorrhizae specific to bottle gentian, above, has proven tricky.

that some of the specific mycorrhizae associated with prairie species are not present in the amounts that were in virgin prairie soils," he says. He and other scientists there are trying to determine if new mycorrhizal strains found in undisturbed prairie remnants can be used to help restore former prairie sites.

James Beaver, an ecologist at Argonne National Laboratory in Argonne, Illinois, says that—based on preliminary experiments—use of mycorrhizal fungi may also aid in the recovery of some endangered or rare prairie plants. Prairie shooting star (*Dodecatheon meadii*) and Mead's milkweed (*Asclepias meadii*) have responded well to inoculation with

mycorrhizae in soil derived from prairie remnants, although bottle gentian (*Gentiana andrewsii*) is still proving difficult to re-establish. "We're at the hopeful stage," says Beaver.

In California, restoration of native plant communities is almost impossible without an understanding of mycorrhizal associations. "Mycorrhizal associations are the foundations of plant communities," says Bert Wilson of Las Pilitas Nursery in Santa Margarita, who has developed a proprietary system for using mycorrhizae in ecological restorations. "We basically bet the entire nursery on mycorrhizae about seven years ago," says Wilson. "When you get the combination right, it's incredible—you lose almost no plants at the site."

Another success story for mycorrhizae has been rehabilitating soil at strip mines, where topsoil has been stripped away and buried, leaving sterile subsoil at the surface.

—D.E.

sandy soils in Florida and in the desert Southwest, where the mycorrhizae have a clumping effect and hold moisture and nutrients in the root zone."

The bottom line, say mycorrhizal researchers, is that if you already have healthy soil that contains a lot of beneficial microorganisms, you probably won't derive much benefit from mycorrhizal inoculants. If you have just moved to a new development where the topsoil was replaced with fill dirt and construction debris, mycorrhizae may be beneficial if used in a program of organic soil amendments and if use of pesticides and quick-release synthetic fertilizers is kept to a minimum. (For information on getting your soil tested for microorganisms, see "Resources," page 13.)

Opinions differ, however, on just how many home gardens contain suitable amounts of natural mycorrhizae. Miller of Argonne National Laboratory says,

"Under most gardening conditions, you have mycorrhizal fungi already present in the soil. You have to have the appropriate fungi to get the optimum response from different host plants. Unfortunately, with most commercial inoculants, you don't know if it's going to work."

But Ingham says that common gardening practices such as use of synthetic fertilizers and pesticides reduce native mycorrhizae populations. "So much of what we do in our gardens destroys the mycorrhizae. You want to see 40 to 80 percent of plant root systems colonized by mycorrhizal fungi, but I see a lot of situations in landscapes where colonization is only five to 12 percent. That's not enough for a plant to benefit from mycorrhizae."

Bert Wilson, owner of Las Pilitas Nursery in Santa Margarita, California, and a specialist in using mycorrhizae in restorations of California native plants, concurs.

“Mycorrhizae will almost always appear naturally when conditions are right,” he says, “but most people treat their yards in such a way that there are few appropriate mycorrhizae there.”

Wilson says most ornamental plants, especially natives, have relationships with a limited number of specific mycorrhizal fungi; thus, commercial inoculants are too generic to be of use in ornamental gardening. When certain plants, such as gentians, prove difficult to germinate or establish in a garden setting, it is often because they have very specific—obligate—associations with mycorrhizal fungi. “In a backyard, with 50 different plant species all looking for different types of mycorrhizae, you’re bound to fail,” he says.

When selecting an inoculant, Ingham says it is important to know what type of plants you will be using it on. “For instance, we know corn is very nonspecific. Any of the commercial inoculants available would be fine for corn.” She says the same is true of common annuals such as marigolds and pansies. But native plants are trickier because many have obligate relationships with specific mycorrhizae. “The closer a plant is to native stock, the more likely it will benefit from mycorrhizae,” says Miller. “However, it’s also more likely to have greater specificity requirements.”

## GREAT POTENTIAL

According to Miller, one of the greatest potential applications for mycorrhizae is to lower the reliance of farmers in developing nations on fertilizers. The availability of inexpensive synthetic fertilizers after World War II led breeders to select crops that grow well in a high-fertilizer regime. Because a plant’s responsiveness to mycorrhizal fungi is a genetic trait, says Miller,

## Lending a Hand

Good soil-management practices are the best way to foster mycorrhizal colonization. Here are some ways to encourage the natural establishment and growth of mycorrhizae in your garden soil.

- Fertilize using compost or limited amounts of organic or gradual-release fertilizers—overfertilization or use of quick-release fertilizers causes plant roots to reject colonization by mycorrhizae.
- Avoid frequent deep disturbances of soil such as annual tilling.
- Avoid use of synthetic pesticides, especially fungicides.
- Avoid soil compaction.
- Mulch with partly decomposed leaves and other organic matter.
- Avoid use of leaf blowers, which remove decaying organic matter.
- Encourage birds and other beneficial wildlife to visit your garden.
- When planting native trees and shrubs, add a handful of rich organic duff from a woodland near your home to the planting hole—this likely contains spores of locally occurring mycorrhizae.
- If you decide to use mycorrhizal inoculants, look for a company that produces the inoculant in your geographic region. Ingham says that in some cases it appears mycorrhizae produced by western companies do best in western gardens; presumably the opposite also holds true.

“if we select under high nutrient conditions, we may have unconsciously selected against mycorrhizae.”

By focusing breeding efforts on plants that can get their nutrients through mycorrhizal associations rather than being dependent on synthetic fertilizers, more sustainable farming practices can be fostered. The same is likely to be true for ornamental plants. “As we cut back on use of fertilizers, mycorrhizae are going to be more important,” adds Miller.

Continuing research on mycorrhizal relationships with ornamental plants is likely to benefit gardeners. Eventually, says Miller, host- or region-specific mycorrhizae may become available. “Just as we have different fertilizer regimes for different plants, we may have different isolates of mycorrhizal

fungi that can be added at nurseries or even by the home gardener,” he predicts.

“As we learn more and more about mycorrhizae, the strategic use of them will get better and better. There’s been 50 years of laboratory work on them, but as far as having commercial amounts of inoculant that we can go out into farm fields and gardens around the world, we’ve only recently had that ability,” says Chapman of Bio/Organics. If you have tried mycorrhizal inoculants in your garden, we’d like to hear about your experience. We will continue to provide updates on this exciting area of research.

*David J. Ellis is editor of The American Gardener. Adele Kleime, a free-lance writer from Winnetka, Illinois, contributed to this article.*

## Sources

The following companies sell mycorrhizal inoculants.

**BIO/ORGANICS SUPPLY CENTER**,  
3200 Corte Malpaso, #107, Camarillo,  
CA 93012, (800) 604-0444,  
e-mail:don@bio-organics.com,  
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## Resources

You can have your soil tested to find out if it has a healthy dose of microorganisms, including mycorrhizae. For details, visit the Web site of Soil Foodweb, Inc., at [www.soilfoodweb.com](http://www.soilfoodweb.com) or write the company at 980 NW Circle Boulevard, Corvallis, OR 97330.



# offshoots

## COTTAGE GARDENING: BRONX STYLE

by Ruth Bird

Late in the 20th century we have evolved a very romantic association with cottages—sweet little vine-covered abodes with bluebirds on the sill of mullioned windows and cats curled up on the front porch. This idyllic image is a long way from the reality of cottage life in England in the 17th, 18th, and 19th centuries. Cottages were small, dark, damp, and cold, often with dirt floors. The farm animals were often housed in the same structure, providing warmth for the huddled humans. Early in the 19th century, life on these tenant farms was so abysmal that the English Parliament was moved to set standards for the construction of cottages.

Originally, the tiny gardens that surrounded these cottages were filled with vegetables and herbs the tenants used to supplement their diets and income. Every square foot of usable land was planted.

While I have never had a Guernsey for a roommate or swept a dirt floor, I can relate to gardening in a limited space. Four feet by three feet to be exact, located six stories up on New York City's Upper West Side. I moved there in 1987, leaving behind my beautiful Los Angeles garden. I didn't think of it as cottage gardening at the time, but it had all the requisites of a cottage garden: a gated surround enclosing a limited space, trellised vines and herbs, all mixed in with vegetables and flowers. It might have been a little short in the wild profusion department, but it was true to the origin of cottage gardening—making do with what little space is available.

A neighbor in the building across the street started me thinking about New York-style gardening. It was too far removed from my midwestern upbringing—huge backyard gardens and front yards full of hydrangeas, lilacs, and iris—for me to even imagine gardening in my cement-bound apartment. This neighbor—to whom I had never spoken—had a few plastic pots filled with the skeletal remains of Easter lilies and poinsettias on her fire escape. I probably never would have noticed them if she hadn't gone barking mad one

day, raving from her window and tossing the pots down on the startled Saturday morning shoppers.

In New York, much like everywhere else on this earth, good can often be salvaged from the most tragic of circumstances; this woman's temporary misfortune drew my attention to my own naked fire escape.

Why not? I lived on the top floor. No one used it but me. It had great exposure, and the street was broad and not shaded by the building across from me—a rare advantage in Manhattan.

I might as well have asked, "Why not build a pyramid?" New York is a city that offers all things to all people at all hours, but not very many of its millions are gardeners.

I didn't have a clue where to find a nursery, soil, planters, seeds, and starts. There was an entire district full of house plants and cut flowers but I had never seen a nursery. And how was I going to get my garden essentials home—if I ever found them—without a car? I was reasonably self-sufficient, but that didn't extend to lugging two-cubic-foot bags of potting soil on the A-train.

I was determined not to be defeated before I even started. I ordered seed catalogs and spent the better part of a dismal March planning my garden. Looking back at those catalogs now, I circled so many choices it looks as if I intended to plant the Tuileries.

Somehow, when it was all over, I ended up with an order of seeds amounting to more than \$40. Before mailing the check, I took another look at my tiny fire escape. A frigid rain dripping from the bars onto the thin slats of snow-covered metal made it look even smaller and less likely, but with resolution I put the envelope in the outgoing mail.

It was during this time that I met a friend of a friend, a veteran gardener who lived on Long Island. She invited me out to see her garden and took me on a tour of Long Island's abundant nurseries. When the weekend was over, she taxied me back to the city with a precious cargo of pots and soil. I'd made a new friend, and I was in the cottage gardening business.

Obviously what I was really doing was container gardening. It turned



out to have many advantages over what I still considered the real thing. No need to double dig, fence, stake, or varmint proof. No weeding, no knee pads needed. There was, however, one very large unforeseen problem unique to my little fire-escape cottage garden.

I started my plants the official East Coast way in seed trays. When the time came, I transplanted the seedlings and hardened them off by putting them out on the fire escape, moving everything back and forth through the window in my bedroom. By the third week of April, I planted them out in hanging baskets, pots, and window boxes, specially designed to fit over railings. For vegetables I had zucchini squash, scarlet runner beans, 'Early Girl' tomatoes, sweet peas, and Japanese eggplant. In the herb category I planted basil, French tarragon, Italian parsley, golden thyme, and pineapple sage. For flowers I had gloriosa lily (*Gloriosa superba* 'Rothschildiana'), *Eustoma* 'Double Eagle', *Scabiosa caucasica* 'Alba', and forget-me-nots (*Myosotis* spp.) sharing a pot with lamb's-ears, and *Viola odorata* sharing digs with chamomile and tansy.

The pot-sharing idea was a new one to me, and I stumbled over it mostly by accident in my stubborn desire to get the most out of my \$40-worth of seeds. It really is cottage gardening in miniature—I got better and better at understanding just how much and of what I could crowd into one six- or 10-inch pot. The effect is much more interesting than one plant per pot, and it is an enjoyable design challenge to pick plants that complement each other and grow well together.

At this stage my garden looked like nothing so much as an obstacle course of wood and clay on the fire escape. Certainly that is what the fire marshal must have thought. The New York City fire department was the unforeseen problem I referred to earlier. One morning I answered a very insistent knock on my front door and found three fully geared firefighters and one fire chief eager to engage me in conversation about my gardening techniques.

They politely refused my invitation to coffee and marched me back to the window that opened onto my fire escape. It seems that by obstructing my fire escape I was breaking a law that everyone else was aware of. Guess I should have thought about it beforehand. For them the solution was pretty cut and dry: remove the pots. The chief said they would be back to make sure I complied.

After they left and I calmed down a little, I decided it was just a problem of perception. The city saw my fire escape as, well, a fire escape. I saw it as an opportunity to garden. I decided to try a compromise. I moved the herbs to a kitchen window to make more room and scooted pots around a bit to create access to the stairs—a garden path as it were.

Then I just forgot about it and concentrated on keeping my plants happy and growing. At least I could enjoy my garden until they came back to haul me away. Civil disobedience and gardening. Thoreau and Walden. Romeo and Juliet. Tristan and Isolde.

The fire department apparently had a lot more to worry about than me and my misused fire escape, so it was more than three months before I had a second visit from the fire chief. By this time the garden was in full force. My neighbors were enjoying it nearly as much as I was. It even charmed the officious fire chief, who agreed to let me off the hook as long as I left a small access to the stairs. I sent him off with a bag full of beans, tomatoes, and basil, assuring him that in no way could it be construed as a bribe.

I continued to garden on that fire escape for the five years I lived in New York. Much of what I learned I was able to apply when I returned to Los Angeles, especially that space—or, more precisely, lack of space—should be no impediment to the joy of gardening.

*Ruth Bird is a free-lance writer and editor who now gardens with luxuriant amounts of space in Los Angeles, California.*

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# mail-order explorer

## RUSSELL GRAHAM: NORTHWESTERN NATIVES

by David J. Ellis

For gardeners who are used to the hefty catalogs issued by popular northwestern mail-order nurseries such as Forestfarm and Heronswood, the Russell Graham catalog may appear somewhat disappointing. The modestly sized catalog contains no illustrations and only bare-bones descriptions of the hardy native and exotic perennials carried by the Salem, Oregon, nursery.

But on closer inspection, two things quickly become obvious: Most of the plants in the catalog fall into the highly-sought-after category, and the prices are very reasonable compared with other nurseries. My first run through the catalog left it awash in yellow sticky notes. Among the more uncommon natives listed are ginseng (*Panax quinquefolius*), Matilija poppy (*Romneya coulteri*), Oconee bells (*Shortia galacifolia*), and twinleaf (*Jeffersonia diphylla*).

Leon Sirota, who lives in West Barnstable, Massachusetts, on Cape Cod, has been buying from the nursery for 10 to 12 years. "I'm interested in ferns and in northwestern plants that may make it in the Northeast," says Sirota. "This year I'm going to see whether Oregon wood sorrel [*Oxalis oregana*] is hardy on Cape Cod."

Sirota says he appreciates the way the nursery "almost always fills the orders. I very frequently find other nurseries, particularly in the Northwest, are out of stock by the time they can send plants here." Sirota adds that he tends to buy unusual or hard-to-grow plants, such as bottle gentian (*Gentiana andrewsii*), from Russell Graham rather than from other nurseries. "When I see that kind of plant in his catalog, I buy from him because I know it will arrive in good condition and I know it will be moderately priced," he says.

Russell Graham: Purveyor of Plants is the formal name of the nursery, and I half expected to hear an English accent when I called. But Graham, who is sole proprietor, is a native northwesterner. He and his wife, Yvonne, moved to Oregon's Willamette Valley from Vancouver, British Columbia, in 1972, with an eye to both raising their four children in a pleasant environment and eventually starting a nursery. They took over the inventory of Edgar Kline, an Oregon nurs-

eryman who had specialized in bulbs and native woodland plants. The site the Grahams chose for their home is ideal for growing out nursery stock. "Native woodland plants fit in well here because the previous owners had grown Christmas trees, and many overgrown ones were left behind," says Graham. Graham has more than half an acre of natural fir shade available for his woodland plants. In addition to northwestern plants, Graham also offers woodland natives from other parts of North America and select species from around the world. His current catalog includes nearly 80 ferns, close to two pages of hardy geraniums, a large selection of primroses, and dozens of native and exotic violets.

Graham's career, first in library science and then in management with the state government, slowed development of the nursery; the first shipping season wasn't until 1981. Last fall Graham finally retired from his "other" full-time job to devote all his energy to running the nursery. Yvonne handles much of the shipping and record-keeping aspects of the operation, and two employees work about 10 months a year.

The personal service the Grahams provide is part of the nursery's appeal to many customers. "I love that funny little nursery," raves Mary Jo Wallace, who lives in Carmel, Indiana. "In one of the orders I received, each plant was individually wrapped in moss. It just touched my heart."

Sandra Rossire of Tumwater, Washington, says she was most impressed by the absence of glitz and gloss in the catalog. "What



Russell Graham is one of the few nurseries that sell foxtail lilies, left, by individual color rather than as mixes. Graham also offers several new selections of Peruvian lily, above, a staple in the florist industry.

COURTESY OF RUSSELL GRAHAM



For a catalog, send \$2 to Russell Graham: Purveyor of Plants, 4030 Eagle Crest Road, NW, Salem, OR 97304. Visits to the nursery are by appointment only except during open garden weekends held several times a year. The date for the next open weekend will be listed in the fall catalog.

you get is always good," says Rossire. "They obviously care for their plants and what they are doing." Five years ago Rossire moved into a home surrounded by what was largely a woodland garden. "There wasn't much there when I bought it," says Rossire. "Just a few trees and some overgrown rhododendrons." Among the Russell Graham plants she has used to flesh out her new garden are several hardy ferns, spring beauties (*Claytonia* spp.), hardy cyclamen, variegated Solomon's-seal (*Polygonatum odoratum* 'Variegatum'), violets, sessile merry bells (*Uvularia sessilifolia*), and Oconee bells.

Garden writer and photographer Ken Druse has been buying plants from Graham for about 10 years now and has

been impressed with the prices and the selection. "I bought *Digitalis parviflora* from him—I don't know anyone else who sells it," says Druse. He bought foxtail lilies (*Eremurus* spp.) from Graham because—unlike most nurseries—Graham sells them by individual color rather than as mixes. "That's important because it means to me that he's seen them in bloom," notes Druse. Other plants he has purchased include shooting stars (*Dodecatheon* spp.), three different selections of bugbane (*Cimicifuga* spp.), and ostrich fern (*Matteuccia struthiopteris*).

A number of the plants Graham offers—ginseng and hardy cyclamen, for example—are time-consuming or difficult to propagate. Often nurseries that offer such plants obtain them from wild-collected sources, but Graham says he does about 85 percent of his propagation—including those plants—on site. Tony Avent, owner of Plant Delights Nursery in North Carolina sometimes buys plants from Graham to propagate and sell at his own nursery. He visited Graham's nursery a couple of years ago and was pleased to see he was propagating his own plants. "I try to check out the sources we use to make sure they are propagating the plants and not collecting them in the wild," says Avent. Graham has supplied Avent with plants such as false Solomon's-seal (*Smilacina* spp.), redwood ivy (*Vancouveria* spp.), and Peruvian lilies (*Alstroemeria* spp.).

George Sanko, director of the Dekalb College Botanical Garden in Decatur, Georgia, has been buying Graham's ferns for use in the Dekalb garden and for the garden's annual plant sale. "I got a catalog from them about three years ago and saw a lot of ferns I didn't have," says Sanko. "I am always looking for things from the Pacific coast that will do well in the Atlanta region."

Although he has dabbled with breeding primroses, hardy *Agapanthus*, and hellebores, Graham has not formally introduced any plants. "We're working on our double English primroses—doing some crosses and propagating some new plants out of Canada using tissue culture," he says. Other plants of which he is particularly enamored are hardy geraniums, which he thinks are under-used, and Peruvian lilies. His offerings of these arranger favorites include new selections bred by Coast Alpine Nursery that are hardy to USDA Zone 6 or 7, fragrant, and ideal for containers or cutting gardens.

Now that Graham is able to concentrate on the nursery full-time, he expects to expand the range of his offerings. This can only make the nursery's understated catalog even more appealing to gardeners seeking unusual plants at reasonable prices.

David J. Ellis is editor of The American Gardener.

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# planting the future

## SAVING THE PAST FOR THE FUTURE

*Story and photograph by Carol Howe*

In the early 1970s, when Ray Flagg set up the first courses for a two-year horticulture program at Medomak Valley High School in Waldoboro, Maine, little did he know how far it would progress in the next 25 years. Many high schools across the country had horticulture programs, of course, but the Medomak (pronounced med-OMM-ak) greenhouse—built with federal funds—was a first for Maine. Flagg, a farmer from nearby Jefferson, taught classes at the school until he retired in 1991.

His replacements, Neil Lash of Waldoboro and Jon Thurston of Searsmont, were already well-known for their home gardens—Lash for his flowers, Thurston for his vegetables. But they faced a new challenge: teaching horticulture to a mixture of kids who were in the program because they thought it would be an easy course, others who could not or would not learn in conventional sit-still-and-be-quiet classrooms, and those who really wanted to find out where this hands-on program would lead.

Always looking for fresh ways to inspire students, Lash was captivated by a story he saw on public television's "Victory Garden" program about Seed Savers Exchange, a nonprofit organization based in Decorah, Iowa, dedicated to preserving and sharing heirloom seeds. "Medomak is definitely in what has traditionally been an agricultural part of Maine, but farms are being sold off and people are giving up the agricultural component," says Lash. "We really needed to find a way to connect our kids with their agricultural past."

Lash and Thurston were also concerned by the worldwide loss of biodiversity. They decided that training their students to grow heirloom crops would both establish a link to the region's agricultural history and contribute to preservation of biodiversity. "When you add this historical flavor," says Lash, "it makes things come more alive for students than just growing beans."

From this brainstorming emerged the Medomak Valley High School Heirloom Seed Project. One of the first targets for preservation was the Waldoboro Greenneck rutabaga.

### RUTABAGA RESCUE

In the 18th and 19th centuries, vegetables and seeds from wrecked ships would sometimes wash up on Maine shores. Thrifty residents would salvage them, saving seeds of varieties they favored. One of the vegetables was a rutabaga reputedly derived from seeds

saved from the vessel *Cambridge*, wrecked in 1886 en route to Bangor. Known as the Cambridge or Waldoboro Greenneck rutabaga, it has been grown in the area for generations, but was in danger of disappearing before being adopted by the heirloom seed project.

Other heirloom varieties have come in from a variety of sources. Students have brought in seeds saved by family members. Local gardeners offered seeds of plants from tomatoes and peas to watermelons, garlic, and sunflowers.

### HELPFUL EXCHANGE

Since 1991 students have offered some of their seeds through the annual catalog issued by the Seed Savers Exchange. In return they have ordered new varieties listed by other members of the exchange. "Last year we got Lafayette beans, Choctaw sweet potato, and a Mandan squash," notes Lash. "We try to make sure there is some history to the seeds."

In 1994 Lash and Thurston decided to share the school's seed collection with a wider audience. Immediately, letters began to flow in. "Last year we sent seeds out to 37 states and six countries," says Lash. Many people have also contributed their own heirloom treasures to the school's effort. The list has grown to a catalog that included 300 varieties this year.

The program's influence has extended into the community and beyond. Some Waldoboro residents are now helping to grow out the heirloom varieties. Thurston and Lash, who were voted agriculture teachers of the year last year for the state of Maine, have been asked to speak at fairs, flower shows, garden clubs, and—last November—at the Northeast Biodiversity and Saving Our Seeds Conference at Pennsylvania State University.

Because students are involved in every step of the seed-saving venture, they have learned much more than horticulture—they have also learned geography and history and are now keeping track of their collection using a computer database. Lash and Thurston have built a vibrant program that is giving students an early boost to budding horticultural careers.



Teacher Jon Thurston examines a pea plant in the school greenhouse.

*Carol Howe is a free-lance writer living in Rockland, Maine.*



# gardeners information service

***I have a cultivated ginger plant that is about three years old and seems to be thriving, but it has never bloomed. It sits in a chilly room in the winter, probably 50 degrees, and in the summer it goes outside where it is sunny. It is about five feet tall and looks healthy. I live in New England. How do I get it to bloom?***

—C.R., via e-mail

Most likely you have common ginger (*Zingiber officinale*), a native of tropical Asia. The aromatic, edible rhizomes of ginger are extremely versatile and widely used in Asian cuisine and medicine. This perennial herbaceous plant has thin stems and scattered, pointed leaves; it can grow up to five feet tall. Unfortunately, blooms are rarely produced on this species. According to Liz Bodin at Stokes Tropicals in Louisiana, "The flowers of *Zingiber officinale* are small and rare. Gingers love long periods of summer and grow best in Zone 8 or higher. North of USDA Zone 8 they do not really have a long enough growing season to produce flowers." She suggests applying a diluted fertilizer regularly during the growing season to try to promote flower growth.

If you are interested in a flowering ginger plant, you might want to try growing *Zingiber mioga*—an edible ginger grown for its flowers and colorful new shoots—*Z. rubens*, or *Z. spectabile*. These and other varieties can be ordered through Stokes Tropicals, P.O. Box 9868, New Iberia, LA 70562-9868. You can also call (800) 624-9706, or check out their Web site at [www.stokestropicals.com](http://www.stokestropicals.com).

***I am interested in growing bean sprouts at home, but I don't know how to go about it. I am particularly interested in the Chinese red bean. Have you heard of it and do you know where I can get some?***

—P.H., Lake Worth, Florida

A welcome addition to salads, sandwiches, and soups, bean sprouts are a tasty and nutritious fresh vegetable that anyone can grow in the kitchen. Half a cup of sprouts contains only about 16 calories yet is a good source of protein, vitamins, and minerals. The Chinese red bean, a variety of the adzuki or adzuki bean

(*Vigna angularis*), is a small, dark red, oval bean about a quarter-inch in diameter. Adzuki beans are known for their distinctive nutty taste and red color, which gives visual appeal to dishes.

Beans for sprouting can be purchased from many health food stores and some mail-order seed companies. If you buy from the latter, however, ask if the seeds have been treated with a fungicide. Do not sprout or eat treated seeds; a pink, blue, or green dust on seeds is usually an indication they have been treated.

Beans can be sprouted in a variety of wide-mouthed containers such as mason jars, crocks, or plastic pans. First, wash about a half cup of beans and soak them overnight in a container in lukewarm water. The next day, rinse the beans again, drain the water off, and place them in a container covered with cheese cloth. Continue to keep the seeds moist but not wet by rinsing and draining them several times each day. For best results, keep the jar in a warm, dark place (between 70 and 80 degrees). It will take three to seven days for sprouts to mature; do not let the sprouts get more than 4 inches long or they will become bitter. When they are ready, rinse them again and remove the seed coats and fibrous roots. Sprouts are best eaten immediately but can be stored for several days in the refrigerator.

One source of organically grown adzuki beans is On-Line Health Products, 387 Yellowstone Avenue, Pocatello, ID 83201, (800) 789-1577; Internet address: [www.dhi.com](http://www.dhi.com). For more information on sprouting seeds, see the Brooklyn Botanic Garden's quarterly handbook #144, *Salad Gardens: Garden Greens and Beyond*, published in autumn 1995.

***I have a Dieffenbachia at home and have found that it is causing a skin rash when I touch it. Is it possible that I am having an allergic reaction to my plant?***

—R.M., Ferguson, Maryland

Commonly grown as house plants, *Dieffenbachia* species are actually tropical evergreen perennials in the arum family. They are distinguished by thick, clustered stems that become woody with age, draped with large, fleshy, spotted leaves. Many people are not aware that the base of the leaf stalks and stems contain a milky or yellowish sap that can cause contact dermatitis in susceptible individuals. To relieve skin irritation, wash the affected area thoroughly with soap and water; if the irritation persists, wear gloves when handling your *Dieffenbachia*. The plant also contains microscopic, needlelike crystals of calcium oxalate that if ingested by humans or pets can cause burning and swelling of the mouth and throat. People who experience severe reactions are sometimes unable to talk—hence one of the plant's common names, dumb cane. Before bringing any plant into a home that includes small children or pets, be sure to find out if it is potentially toxic.

—Melanie Bonacorsa, Information Specialist

For answers to your gardening questions, call Gardeners Information Service at (800) 777-7931 ext. 31 between 10 a.m. and 4 p.m. Eastern Time, or e-mail us anytime at [gis@ahs.org](mailto:gis@ahs.org). PLEASE MAKE A NOTE OF THIS NEW E-MAIL ADDRESS.



# conservationist's notebook

## ASIAN BEETLES BORE TREES TO DEATH

by David J. Ellis

In its native China it is called the starry sky beetle because of the distinctive white markings that adorn its black body and antennae. But North American forestry officials harbor no romantic illusions about the Asian long-horned beetle (*Anoplophora glabripennis*), which was discovered in August 1996 infesting street trees in Brooklyn, New York.

"It certainly has the potential to be as serious a pest as the gypsy moth," says E. Rick Hoebeke, senior Extension associate at Cornell University in Ithaca, New York. "It may not spread as far, but if it spreads wide enough and encompasses a number of its major hosts, it could have a major impact on forest trees, ornamental trees, and the timber and maple syrup industries."

Unlike many wood-boring beetles, which tend to feed on dead or dying trees, the larvae of Asian long-horned beetles bore holes in living trees, disrupting their vascular systems and weakening and eventually killing them. Hoebeke, who visited the initial infestation site in Brooklyn and was the first entomologist to identify the beetle, says that he knew immediately that he had something unusual on his hands. "In the 20 years I've been doing this work, I've never quite seen anything like it," he says. "The damage was quite hard to believe, actually. It really looked like the trees had been attacked by vandals."

Following the discovery of the beetle in Brooklyn, a second infestation was found a month later in Amityville, a community east of Brooklyn on Long Island. Since that time federal and state regulatory agencies have been scrambling to contain the infestation.

The USDA Animal and Plant Health Inspection Service (APHIS) put together a multi-agency team to track the beetle's possible spread. The beetle seems to favor maples, but it has also been found on birches, poplars, willows, horsechestnuts, and elms.

A quarantine restricting the movement of potential beetle host material, including firewood, was imposed on the two infested areas in late 1996. Local and federal government inspectors conducted street-by-street searches for additional infes-

tations. On the advice of a science advisory panel, all infested trees were cut down, chipped, and burned. As of this spring, around 2,000 infested trees—80 percent of which were maples—had been destroyed. Because the beetles are inactive during the winter and spring, inspection teams are waiting to find out this summer how their control efforts have fared. "Last year the first adults weren't seen until the middle of July, but with the mild winter they could emerge as early as June this year," says Hoebeke.

### TRADE DEFICIT

Apparently the beetle arrived in the United States in larval form, as a stowaway in wooden crating material coming from Asia. Based on the beetle's life cycle and the extent of the infestation, Hoebeke says it is likely the beetle has been established in New York for at least a decade. "Trade with Asia has picked up over the last 20 years or so," he points out.

According to Steven W. Lingafelter, a systematic entomologist with the USDA's Agricultural Research Service and an expert on the family to which the long-horned beetle belongs, APHIS has stepped up its monitoring activities to help prevent new infestations. "APHIS is intensifying its inspections at ports and thoroughly investigating packing crates, especially on ships originating from China," he says. In the last year and a half, closer scrutiny at North American entry ports of such packaging and of other timber products has resulted in the interception of beetles at several locations, including California, South Carolina, and Canada.

### PROFILE OF A PEST

The Asian long-horned beetle is native to China and neighboring regions of Japan and North Korea. Its range is of particular concern to North American scientists because the equivalent latitudes in North America span the region between the Great Lakes and southern Mexico. "Almost the entire North American continent could be colonized by this particular insect," says Hoebeke.

In its native range its primary host trees include maples, poplars, and willows, but it also has been known to infest chinaberry (*Melia* spp.), mulberry (*Morus* spp.), plums, pears, black locust (*Robinia pseudoacacia*), and elms.

Adult beetles have shiny black bodies dotted with



An adult Asian long-horned beetle on a section of damaged wood.

CHARLES HARRINGTON/CORNELL UNIVERSITY PHOTOGRAPHY

A fact sheet on the Asian long-horned beetle is being distributed by the Forest Service. For a copy, send a request to Long-horned Beetle Fact Sheet, USDA Forest Service, 271 Mast Road, Durham, NH 03824, or visit the Web site at [willow.ncfes.umn.edu/pa\\_ceram/ceramb.htm](http://willow.ncfes.umn.edu/pa_ceram/ceramb.htm).

white or yellowish spots. They are an inch to an inch-and-a-quarter long, and two prominent black-and-white-banded antennae stretch out in front in a V-shaped pattern. Adults can travel more than a thousand feet during brief flights in search of new host trees. Once a host tree is selected, females chew through the bark and lay their eggs in the vascular tissue beneath. Eggs hatch in one to two weeks, and the emerging larvae tunnel deeper into the tree. The grublike larvae, which can reach two inches in length, live for one to two years in these tunnels before metamorphosing through

the pupal stage and into adulthood. Adults chew their way out and emerge to mate and begin the cycle anew.

### RECOGNIZING THE THREAT

The nationwide control program for the long-horned beetle appears to have benefited from the current attention being focused on problems caused by invasive non-native animals and plants. According to Lingafelter, Congress has set aside a half-million dollars this year toward control efforts. "Treating this situation seriously and aggressively at this stage will probably save a lot of money in the long run," he notes.

Lingafelter and Hoebeke are preparing a handbook that will help municipal arborists, cooperative Extension agents, and other pest control officials identify the Asian beetle and 40-odd other species—most of which are also tree pests—in the same genus. The handbook will also help to distinguish the Asian beetles from thousands of native beetle species that are not economically important pests of trees. According to Lingafelter, most native beetles "consume dead wood, making them important primary decomposers in our forest ecosystems."

Destroying infested trees is currently the only feasible control method for the beetle, but scientists hope that eventually biological controls can be developed from among the beetle's natural enemies in Asia. Toward that end, ARS scientists are working with their counterparts at the Chinese Ministry of Agriculture and at the Sino-American Biological Control Laboratory in Beijing.

Although it is most likely that additional infestations will be discovered in the greater New York City area, Hoebeke warns that the beetle has the ability to establish itself just about anywhere. "These things are coming in [on ships] all the time, so it's just a matter of time before we get another infestation," he says.

Homeowners are a valuable ally in the effort to contain this pest. Hoebeke says telling signs of long-horned beetle damage include large circular holes in the trunk or main branches, copious accumulations of coarse sawdust in branch crotches and at the base of trees, and heavy sap flow from holes in tree bark. "All of those characteristics should make you suspicious, especially if the tree's a maple, willow, or poplar," notes Hoebeke. If you live in the greater New York City area and suspect you have seen the beetle or have tree damage similar to that described above, call the New York Department of Agriculture and Markets at (800) 554-4501 ext. 2087. Outside New York, potential sightings of the long-horned beetle should be reported to your state agriculture department.

*David J. Ellis is editor of The American Gardener.*

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# urban gardener

## GARDEN FEATURES

*Story and photographs by Walter M. Pickard*

Mark Twain once said, “Everybody talks about the weather, but nobody does anything about it.” Similarly, landscape architects, garden designers, and garden writers talk on and on about garden features, but nobody that I can find defines exactly what that means. Not that this is all bad; since most gardeners fancy themselves landscape/garden designers by more or less divine right, we can decide for ourselves what the term encompasses.

To illustrate: Some years ago, a speaker at the Williamsburg Garden Symposium was describing her garden in New England, where the ground often has as much stone in it as soil. The speaker and her husband had designed and were in the process of building a new patio that was to be paved with irregularly shaped flagstones (being British, they called that “crazy paving”). As they were leveling the ground—removing roots, small rocks, and other debris—they ran into an outcropping of stone that turned out to be like an iceberg: only its tip was showing. They dug around it, pried at it, tried to lift it out—with no success. After all this wrenching effort—and after the husband’s

“corrective surgery”—they concluded, barring dynamite, there was no way to shift that huge thing. So they built the patio around the outcropping and called attention to it as an attractive garden feature. We gardeners soon learn to go with the flow.

## NATURAL AND CONSTRUCTED

Following the example of the gardener with the immovable rock, it is clear that almost anything can be designated a feature. In thinking further about what makes garden features, however, it is obvious that they can be broken down into two very broad categories: natural and constructed. Natural features include streams or other bodies of water, bogs or wetlands, specimen trees, and rock outcrops—in other words, natural assets that can be framed or featured to enhance a landscape garden.

Many of us aren’t lucky enough to have outstanding natural features, so we have to rely on constructed objects. Among the most common of these are gazebos and other garden houses; paved patios and garden paths; arbors, trellises, and pergolas; manmade ponds and bogs; brick and stone walls; fences of all shapes and sizes; statuary; and minor features such as birdbaths, garden benches, and gazing balls. There are also a variety of whimsical or unorthodox features such as pink flamingos, plaster gnomes, and planters made from truck tires. These items



A gazebo, above, is a prominent design feature in the author’s garden, as well as a place for resting and socializing. The author used paint to give the concrete birdbath, right, the look of terra-cotta. In addition to attracting birds to the garden, the birdbath provides a focal point at the end of a perennial bed. Brick walkways, opposite, tie all the garden elements together.



certainly don't appeal to everyone, but beauty is in the eye of the beholder.

### PONDS, PERGOLAS, AND PAVING

In the 20 years that we have been developing our current garden in Alexandria, Virginia, we've added a number of features to the landscape. A prominent one is the gazebo, which sits in the dappled shade of a magnificent old pin oak and is fronted by a brick patio and flanked by flower beds, lawns, and brick paths. The gazebo is a cool and pleasant place from which to view the landscape, especially the lily pond and bog garden.

The eight-foot-by-10-foot pond is home to four or five hardy water lilies, cattails (*Typha laxmannii*), and a clump of sweet flag

## Although often overlooked by the casual viewer, paving can add much to the ambience of a pleasure garden.

(*Acorus calamus* 'Variegatus'). The adjacent, small manmade bog supports a variety of plants that like wet feet, including Siberian iris, arrowhead (*Sagittaria latifolia*), and pickerel weed (*Pontederia cordata*).

Another always eye-pleasing garden feature is an arbor or pergola. We placed our very small arbor between a corner mixed bed and a Bradford pear tree. A shelter for a teak bench, it is covered with sweet autumn clematis and hung with flowerpots. It is partly hidden from the rest of the garden by a small bed that contains a robust *Caryopteris xclandonensis* 'Heavenly Blue', *Centranthus ruber* 'Roseus', and *Hylotelephium* (formerly *Sedum*) 'Autumn Joy'. The vines over the arbor and the plants in front make it a cool place to sit in the summer and watch the bees feeding on the nectar of the plants.



Although often overlooked by the casual viewer, paving can add much to the ambience of a pleasure garden. The brick paths and patio in our garden are made from old-fashioned molded brick pavers, which add soft background color and texture to complement the green of the lawn and shrubs and the colorful flowers in the beds. The bricks are set in sand, which allows water to drain quickly after a rain and offers the gardener more opportunities for dry-shod viewing.

### WALLS AND FENCES

Well-designed brick or stone walls probably add more character to a garden than any other structure. In addition to looking good, they can block out unsightly views, make a fine background for plantings, and provide a vertical element for growing vines and hanging plant containers. Our 50-foot-long brick wall effectively blocks out cars and people passing on a side street by our house. Yet at five-and-a-half feet high, it is low enough for neighbors walking by to peek over the wall at our garden, which we encourage.

Although it might not be as charming as a well-sited wall, a solid board fence serves much the same purpose. We have a six-foot-tall red cedar fence across the back of the garden that provides privacy as well as support for a great many vines. The vines create a soothing green backdrop for foreground plantings in the herbaceous and mixed beds and, in season, add the color of their blooms. A real winner in this department is sweet autumn clematis (*Clematis terniflora*). It has lush green leaves and is covered with tiny white blossoms from late summer to first frost and beyond. In the spring and early summer, the perennial sweet pea (*Lathyrus latifolius*) adds its pastel flowers to the scene. Another contributor to the green backdrop is climbing hydrangea (*H. petiolaris*). And finally, another late-summer bloomer on the fence—and on the garage—is silver lace vine (*Polygonum aubertii*). As the old adage goes, "Good fences make good neighbors."

These, then, are some of the garden features that add warmth and interest to our garden. They did not all come about at once but were added over the years as the garden developed. I regard these features somewhat like adjectives that are carefully woven into a sentence to emphasize a point and add color and interest. Like adjectives, when overused they can detract rather than enhance. It is the gardener's job to find the right blend of natural and constructed features for each individual landscape.

*Formerly a colonel in the U.S. Air Force, Walter M. Pickard gardens in Alexandria, Virginia.*

## Resources

Two recently published books on garden features and ornaments are available through the AHS Horticultural Book Service.

**GARDEN DETAILS: ACCENTS, ORNAMENTS, AND FINISHING TOUCHES FOR THE GARDEN**, by Warren Schultz and Carol Spier, Friedman/Fairfax Publishers, New York. Publisher's price, hardcover: \$27.50. AHS member price: \$24.50. Book code: FFP 001.

**SMITH AND HAWKEN GARDEN ORNAMENT**, by Linda Joan Smith, Workman Publishing Company, New York. Publisher's price, hardcover: \$22.95. AHS member price: \$19.75. Book code: WOR 016.

## Sources

**GARDENER'S SUPPLY COMPANY**, 128 Intervale Road, Burlington, VT 05401. (800) 863-1700.

**KINSMAN COMPANY, INC.**, River Road, Point Pleasant, PA 18950-0357. (800) 733-4146.

**SMITH & HAWKEN**, Two Arbor Lane, Box 6900, Florence, KY 41022. (800) 776-3336.

BILL JOHNSON



# Mad about

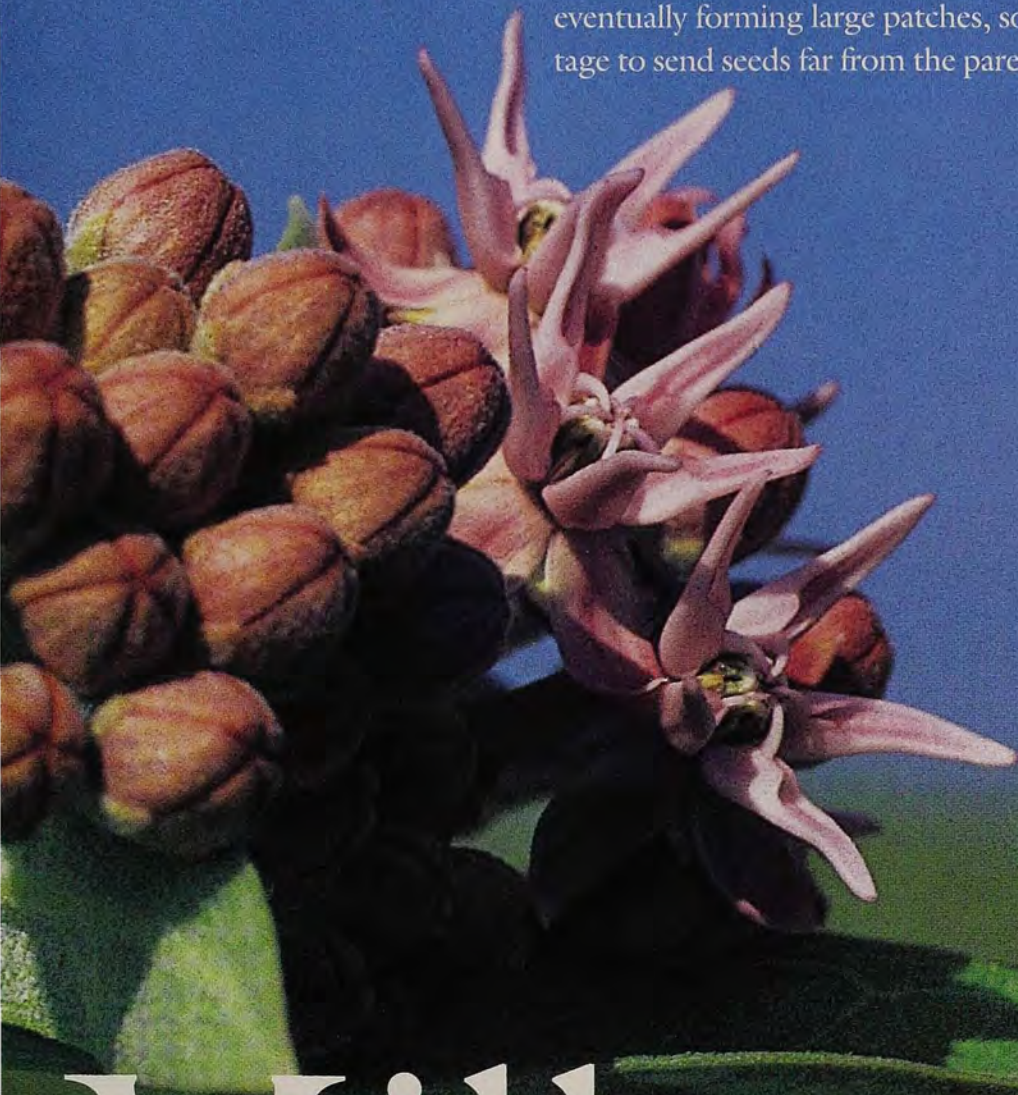


by C. Colston Burrell

**Though frequently maligned and often misunderstood, these plants deserve a chance in every garden.**

**An exploding milkweed pod** sends hundreds of seeds on an untethered journey. Parachutelike silken sails called comae, attached directly to the seeds, carry them aloft on an odyssey of dispersal and survival.

Why has nature gone to such elaborate lengths in this case? The aim of any good seed dispersal strategy is to carry the seed to a spot where it has the best chance of germinating and growing into a new plant. Most milkweeds are colonizing plants that homestead bare ground, eventually forming large patches, so it is to their evolutionary advantage to send seeds far from the parent plant.



Showy milkweed (*Asclepias speciosa*) lives up to its name. Native to the prairies and meadows of the Midwest, it bears clusters of pink, one-inch flowers with a delicious fragrance.

# Milkweeds



Though called purple milkweed, the flowers of *Asclepias purpurascens*, top, can also be a deep crimson red. The flowers of poke milkweed (*A. exaltata*), above, remind the author of a shower of fireworks. Opposite: Seed pods of butterfly weed (*A. tuberosa*) split open, releasing their ethereal cache to the whim of the wind.

The milkweed family, Asclepiadaceae, counts among its members such diverse plants as the sultry *Stephanotis*, a fragrant vine that reigns supreme in bridal circles; the *Hoya*, or wax plant, often trained indoors around windows; and the curious starfish cactus, *Stapelia*. Family traits include milky sap and rather bizarre flowers with parts in fives. The family is closely allied with Apocynaceae, the dogbane family, which flaunts the showy bluestars (*Amsonia*), the fragrant tropical frangipani (*Plumeria*), and the fibrous dogbanes (*Apocynum*).

The genus *Asclepias* contains about 150 species worldwide, with the majority found in North America and Africa. Many are subtropical to tropical, though temperate North America has a bounty of species waiting for gardeners to discover their charms. The flowers are clustered in flat or rounded cymes, but a close look at an individual re-

veals a reflexed—downward curved—ring of five green sepals and five variously colored petals. The center of the flower contains an elaborate, up-facing structure called a corona that flaunts a five-lobed hood and, often, five narrow, erect horns.

The corona is a little shop of horrors for insects. Lured by seductive scent and color, they come in droves to sip nectar, incidentally pollinating the flowers in return. While sipping petalside, an unwary insect may slip on the waxy corona and become hopelessly ensnared. Many a hapless bee or butterfly has escaped from the vise grip by leaving behind a leg or two. Others never escape and are sometimes found dangling from the flower. It seems “gentle” Mother Nature sometimes has a sick sense of humor!

### *A Useful “Weed”*

Because some milkweed plants had a long tradition of use for various medicinal purposes, the genus was named after Asclepios, the Greek god of medicine. The doctrine of signatures—an ancient theory that a plant’s appearance indicated the ailments it would treat—dictated using the sap of the warty seed pods, called follicles, to remove warts. The milky sap was also used as a contraceptive, as an antispasmodic, and to induce vomiting. A syrup was made by collecting dew-flushed flowers, pressing them to remove the liquid, and boiling it. The roots, especially those of *Asclepias tuberosa*, were used to make a tonic to treat lung ailments such as pleurisy—hence the common name pleurisy root. It is important to note, however, that many milkweeds contain cardiac glycosides and other toxic compounds, so experimentation is discouraged.

Milkweeds were indispensable to Native Americans and early settlers. The silken filaments of milkweed seeds were collected to stuff pillows and mattresses and to be woven into string for candle wicks. The fibrous bark of some species was used to make fishing lines, sewing thread, and lariats. The spring shoots were boiled like asparagus and used as potherbs. During World War II, Boy Scouts and other civic groups collected milkweed floss—which is more buoyant than cork and warmer than wool—for use in life jackets and aviator’s flying suits.

### *Well-Known Species*

Despite this long relationship between humans and milkweeds, they are usually shunned in the garden except by butterfly fanciers and native-plant enthusiasts. This



*Asclepias sullivantii*, below left, is sometimes mistaken for common milkweed (*A. syriaca*), below right, but unlike its prolific cousin, Sullivant's milkweed is a rare plant in several mid-western states. Bottom: A clump of *Asclepias asperula* grows amid a drift of *Gaillardia*. Opposite, left: The flowers of green milkweed (*A. viridiflora*), with its strongly reflexed petals, are unusual in both color and form. Swamp milkweed (*A. incarnata*), opposite right, is a more familiar-looking species that is coveted by butterfly gardeners.

is a pity since they have so much to offer, including beauty, fragrance, and easy care. Milkweed foliage provides an excellent display all season long, with fall colors varying from clear yellow to burnt orange and occasionally flushes of rich red tones. The lack of enthusiasm among gardeners also means that despite the plethora of milkweed species, only a handful are commercially available as either plants or seeds. Butterfly weed (*A. tuberosa*) and swamp milkweed (*A. incarnata*) have graduated to real perennial status in the mainstream nursery trade, but most others are only sold through specialty native-plant nurseries.

Common milkweed (*A. syriaca*) is able to leap farm fields in a single bound, and as wild a gardener as I am, I advocate relegat-

ing it to meadow gardens where there is sufficient competition to keep it in check. Its merits include showy pink flowers that are deliciously fragrant and warty seed heads that are coveted by floral arrangers. If you take the time to look, you will notice dozens of different insects, including butterflies, bees, beetles, wasps, spiders, and others using the plant for food and shelter. For those who have the room, I heartily endorse this maligned renegade as an essential wildlife plant.

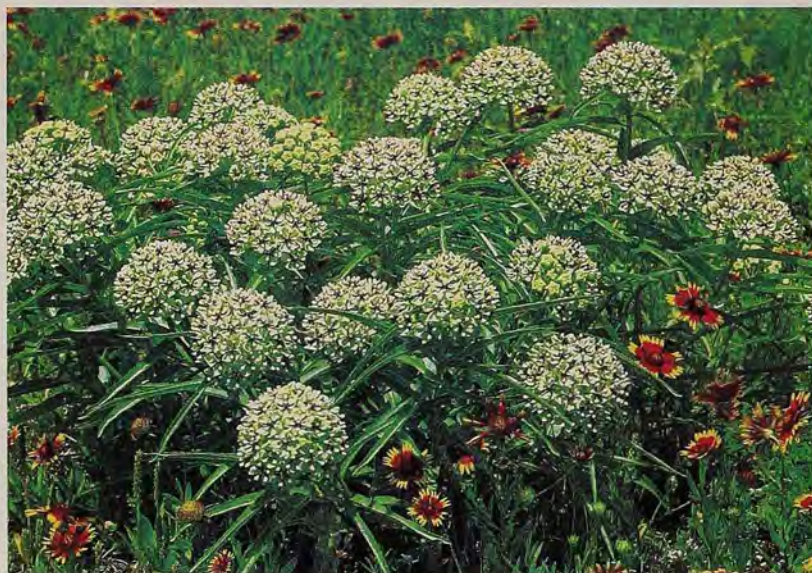
Everyone knows butterfly weed (*A. tuberosa*), with its leafy stems and flat clusters of screaming orange flowers. The plant grows in clumps one to three feet tall from a thick, fleshy taproot. Flowering begins in June and recurs in midsummer as side shoots mature. The cigarlike seed capsules are blushed with sienna and are decorative fresh or dried. Throughout the East and Midwest, butterfly weed thrives in sandy meadows, in dry prairies, and along roadsides.

In the garden it's more versatile than most species—as appropriate in formal borders as on dry clay banks—and is hardy in USDA Zone 4 to 9. The discrete clumps obligingly hold their position in the border. I like to contrast the flattish form with the yellow-striped swords of variegated yuccas and the crepe-paper flowers of prickly pear cactus, unifying them with a carpet of verbenas and trailing veronica. If orange makes you queasy, try 'Hello Yellow', which has clear, bright yellow flowers. 'Gay Butterflies' is a seed strain with yellow, dark orange, or red flowers.

Butterfly gardeners have recently discovered the charms of the swamp milkweed (*A. incarnata*), which sports multiple flattened trusses of rose to crimson flowers on two- to four-foot stalks. The richly colored petals coupled with paler horns give its flowers a two-toned appearance. They give way to narrow seed pods, which stand upright like candles on a holiday altar. Handsome, lance-shaped leaves clothe the stems rather densely for a milkweed and turn burgundy, orange, or yellow in autumn. Native east of the Rockies and hardy in Zone 3 to 7, swamp milkweed grows naturally in wet meadows, in marshes, and on pond margins but is equally at home in moist garden soil or containerized in a water garden. A selection called 'Cinderella' is rosy pink, while 'Ice Ballet' features large creamy white flowers.

### Deserving of Attention

Gardeners in our country's arid midsection



## Sources

**FLOWERY BRANCH SEED COMPANY**, P.O. Box 1330, Flowery Branch, GA 30542. (770) 536-8380. Catalog \$4.

**FORESTFARM**, 990 N. Tetherow Road, Williams, OR 97544-9599. (541) 846-7269. Catalog \$4.

**NATIVE GARDENS**, 5737 Fisher Lane, Greenback, TN 37742. (423) 856-0220. E-mail: rcopallina@aol.com. Price list free.

**NICHE GARDENS**, 1111 Dawson Road, Chapel Hill, NC 27516. (919) 967-0078. www.nichegdn.com. Catalog \$3.

**PRAIRIE MOON NURSERY**, Route 3, Box 163, Winona, MN 55987. (507) 452-1362. E-mail: pmnrsy@hbc.com. Catalog free.

**PRAIRIE NURSERY**, P.O. Box 306, Westfield, WI 53964. (608) 296-3679 or (800) 476-9453. Fax: (608) 296-2741. E-mail: pnursery@maqs.net. Catalog free.

**SUNLIGHT GARDENS**, 174 Golden Lane, Andersonville, TN 37705. (423) 494-8237 or (800) 272-7396. Fax: (423) 494-7086. E-mail: sungardens@aol.com. Catalog \$3.

**WE-DU NURSERIES**, Route 5, Box 724, Marion, NC 28752-9338. (704) 738-8300. Fax: (704) 738-8131. www.wedu@wnclink.com. Catalog \$2, refundable.

**WOODLANDERS**, 1128 Colleton Avenue, Aiken, SC 29801. (803) 648-7522. Catalog \$2. (October 1–March 31 shipping only.)

are sure to appreciate the elegant species called antelope horns (*A. asperula*). In spring, each stem bears rounded, six-inch clusters of starry, pale green flowers with wide, flat petals and broad, spreading horns. Slightly tapered, linear leaves fold upwards in the middle to form a narrow pouch. The leafy one- to two-foot clumps grow from a thick taproot, so the plants are extremely drought tolerant. Native to rocky prairies and high plains, they can easily be killed with kindness in the garden. Hardy in Zone 6 to 9, they want lean soil and little supplemental watering.

Bloodflower (*A. curassavica*) is a jazzy but tender annual species from South America. The three-foot scapes, loosely clothed with lance-shaped leaves, possess a gawky



but charming demeanor. The flowers add the fire, opening in flattened clusters of bi-colored orange and red throughout the warmer months. Bloodflower does best in a warm, sunny position in average to rich, moist soil; it will self-sow readily south of Zone 9, however, and is considered weedy in tropical regions of the world.

I'm partial to the eccentric poke milkweed (*A. exaltata*), whose pink-and-green spherical flower clusters look like a fireworks display on Chinese New Year. The stately clumps, accented with large egg-shaped leaves, rise to three feet in early summer, with three to five flower clusters gathered on the upper third of each stem. Count on poke milkweed to be well behaved in the garden. Its rhizomes creep slowly outward to form open clumps of up to a dozen stems, but I don't consider them invasive. Its native range is from Maine to Georgia and west to the upper Midwest; it can be found growing in rich loamy or humusy soils along lightly shaded roadsides, on riverbanks, and in clearings. In a garden it thrives where there is either sun or part shade and soil enriched with organic matter.

Anyone who has seen common milkweed take over an old field at the speed of light will find it hard to believe that there could be an endangered milkweed. In fact, there are two highly ornamental species that are regionally listed as rare species. Native to dry prairies of the Midwest, the delicate green milkweed (*A. hirtella*) grows two to three feet tall with pairs of pencil-thin leaves. In bloom it is crowned with up to three rounded clusters of sea green flowers. Five slightly reflexed petals are often white-edged or spotted with purple. The delicate charm of this plant should endear



it to rock gardeners and border builders alike. At the front of a bed it can serve as an accent, springing from a carpet of veronica, verbena, or winecups.

Several Midwest states list Sullivan's milkweed (*A. sullivantii*) as rare. This native of wet prairies and low meadows—often mistaken for common milkweed—puts up two-foot stalks topped by crimson-purple dome-shaped inflorescences. Individually stalked florets are up to an inch long and a half-inch in diameter, with deeply reflexed petals and protuberant horns. Smooth, egg-to spearhead-shaped leaves clothe the stem. Plants are well behaved so hostile takeovers are unlikely. They will settle comfortably in a bed with blazing stars (*Liatris* spp.), rattlesnake-master (*Eryngium yuccifolium*), and ornamental grasses.

More curious than beautiful are the tight green heads of another species called green milkweed (*A. viridiflora*), native to dry prairies, meadows, and roadsides from the East Coast to central Canada and the Southwest. The individual flowers have strongly reflexed petals and narrow, jutting horns that resemble a spent bullet shell. Up to three flower clusters crown the one- to three-foot stems, which sport thick, leathery oval leaves. *A. viridiflora* var. *lanceolata*, a botanical variety found in the upper Midwest, has narrow, lance-shaped leaves and is often mistaken for *A. hirtella*. The latter has spreading rather than totally reflexed petals, however.

Lance-leaf milkweed (*A. lanceolata*) grows in low woods, pine savannas, and barrens, where it is often overlooked when not in flower. The somewhat wiry stems, which can reach three feet, are very sparsely covered with narrow, lance-shaped leaves. Peo-

## Milkweeds in the Garden

As you can see from some of my examples, I use milkweeds in both formal and informal settings. They show to great advantage against a stone or brick wall or accenting a garden gate. At the front or center of beds and borders they mix wonderfully with fine-textured perennials such as gaura (*Gaura lindheimeri*), bowman's-root (*Gillenia trifoliata*), meadow rue (*Thalictrum* spp.), verbena, sea lavender (*Limonium* spp.), and *Boltonia*.

You can keep the running species in check, at least in the short term, by planting them in bottomless containers with sides at least a foot deep. The truly rampant growers are best relegated to wild gardens and habitat plantings, where they can romp freely without eliciting the gardener's scorn. Combine them with grasses, flowering spurge (*Euphorbia* spp.), blazing stars (*Liatris* spp.), coneflowers, penstemons, prairie clovers (*Dalea* spp.), goldenrods, and asters. With the species that desire wet feet, mix in some turtleheads (*Chelone glabra*), blue flag irises, ironweeds (*Vernonia* spp.), sneezeweeds (*Helenium* spp.), and showy sedges such as *Carex pendula*. Shade-tolerant species are lovely when planted with golden alexanders (*Zizia aurea*), wild geraniums, goatsbeards (*Aruncus dioicus*), bluestars (*Amsonia* spp.), phlox, wild sennas, and asters.



Milkweeds lend themselves to informal garden settings. Here butterfly weed and Sullivant's milkweed are planted with *Echinacea tennesseensis*.

Milkweeds are easy to grow from fresh seed sown in winter or stratified for four weeks in the refrigerator. The seedlings develop quickly and some may even bloom the first summer if they are started early enough. The runners are easily divided in spring or fall, and root cuttings will produce new plants if taken in late summer or autumn. Stem cuttings will root from most species if taken in late spring or early summer.

Plants are mostly pest-free, though aphids may gather to feast on the fresh succulent foliage, flower buds, or young seed pods. No need to call out the exterminator—just wash aphids off with a steady stream of water. You want to avoid using pesticides on milkweeds because of their special, exclusive relationship with monarch butterflies, which lay their eggs singly on the underside of milkweed leaves. They prefer common milkweed and the other succulent species, but they will use any species that is available, even the hairy-leaved butterfly weed. The caterpillars feed voraciously on the plant, but there are so many stems and leaves in each clump that the damage is hardly noticeable in most cases. For the small cost of a few leaves, you may be rewarded with a glimpse of the chrysalis, which looks as though it is banded in gold, and you will win the loyalty of the beautiful adult butterflies for helping to perpetuate their species.

—C.C.B.

ple and butterflies take notice, though, when the small heads of red, orange, or yellow flowers open. Like the swamp milkweed, it can be used where soils are soggy or in a container sunk in a water garden.

While it suffers from a bit of an identity crisis, purple milkweed (*A. purpurascens*) can be distinguished from common milkweed at a second glance. It is native to dry shrubby prairies and woodland edges from Ontario south to Virginia and west to eastern Kansas. The somewhat lax stems sport sparse, egg-shaped leaves and two to three clusters of deep red or purple flowers. The seed pods are softly hairy and lack the warts

of common milkweed. This is a less invasive plant that is ideal for meadow and prairie gardens. Red milkweed (*A. rubra*) is similar, but the leaf tips taper to a sharp point. In the wild it is seen only in eastern coastal areas, but red milkweed does well in a variety of garden situations. Both it and purple milkweed are hardy to Zone 4.

Four-leaved milkweed (*A. quadrifolia*) is a small treasure for a semi-shaded border or rock garden. The one-foot stems of this eastern native produce whorls of four broadly lance-shaped leaves and up to three open clusters of soft pink, sweet-scented flowers in late spring. I love this enchant-

ing little plant and use it with showy skull-cap (*Scutellaria incana*), green-and-gold (*Chrysogonum virginianum*), and fire pink (*Silene virginica*) in lightly shaded borders and along woodland trails. It will also grow in full sun with verbenas, Indian pink (*Spigelia marilandica*), and smooth phlox (*Phlox glaberrima*). This milkweed forms open, multi-stemmed clumps and is quite drought tolerant.

The showy milkweed (*A. speciosa*) is aptly named. Its spherical heads of one-inch, starry, pink flowers are gorgeous and deliciously fragrant. At first glance it resembles common milkweed, but it is far more delicate and far less rambunctious. The sturdy one- to two-foot stems sport pairs of oval, sea green leaves and three or four terminal flower clusters. The plants put out runners but form sparse open clumps that are seldom invasive. Planted in the front or middle of the border, the stems pop up just obligingly enough where space is available. Hardy in Zone 2 to 8, it is native to rich prairies and low meadows of our West.

Many are the "oohs" and "aahs" uttered by visitors when my drifts of whorled or horsetail milkweed (*A. verticillata*) are in full bloom. This petite enchanter has one-to-two-foot stems densely hung with long, needlelike leaves, so they look something like a cartoon cat's tail after an electric shock. The sweet-scented white flowers open in midsummer, and side branches keep them coming for several weeks. In autumn the leaves turn yellow to orange, and the pencil-thin seed capsules are very decorative once they split open. Clumps increase rapidly by runners, but it's easy to keep unwanted stems pulled or dug up. Prairies, meadows, and open woods of the eastern and central United States are its wild haunts.

I hope I've succeeded in convincing you that you needn't be a sadist or an anarchist to introduce milkweeds into your landscape. There are plenty of well-behaved species that won't demand weekly attention from a front-end loader to stay in check. You will be rewarded with intriguing, seductively scented flowers and a front-row seat for the spectacle of nature's unceasing drama. Quite a gift from a humble group of weeds.

C. Colston Burrell is a landscape designer and garden writer who lives in Minneapolis, Minnesota. His most recent book, *A Gardener's Encyclopedia of Wildflowers*, received one of this year's AHS Book Awards.

JERRY PAVIA

# Garden in the Redwoods

**In northern California two gardeners have created an emerald oasis.**

by Pamela Conley

**When most people think of a redwood forest,** they picture towering ancient trees and deep shade, with little at ground level except moss-covered stumps. Yet a redwood forest offers the opportunity to create a garden that is naturally beautiful, in an environment that is naturally healthy. The shade moderates temperatures, keeping the forest floor moist and cool in summer. The forest canopy protects plants below from the forces of wind and rain. Newly fallen foliage provides a nurturing mulch that, as it breaks down, contributes to a humus-rich soil. Because this is a mature ecosystem in terms of natural succession, there are few of the colonizing “weed” plants that plague a typical new development. Where else could a gardener find a more inspiring canvas on which to paint a soul-soothing green retreat?

Cazadero, California, is a former logging town of about 2,500 residents with a general store, a post office, and a lumber mill, hidden in the redwood hills of Sonoma County 90 miles north of San Francisco. For a brief period ending in the 1920s, Cazadero was a resort town, but today it is famous primarily for receiving the second most rainfall in the state next to Humboldt County, about 150 miles north of Sonoma County. Just five miles from the Pacific Coast, Cazadero’s residents live on both sides of Austin Creek, which runs all year.

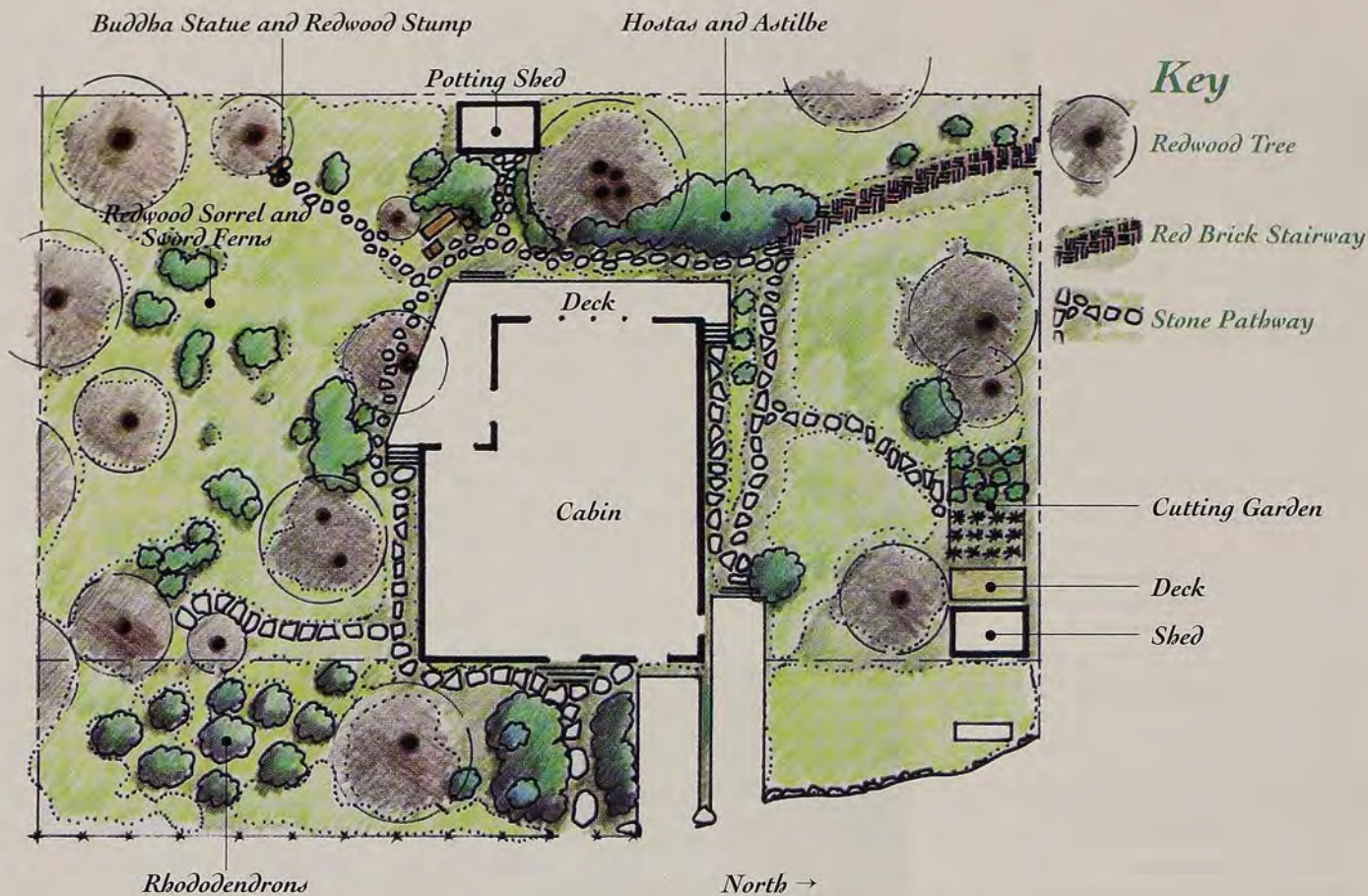
The 90 to 100 inches of rain we receive between November and late April chases off a lot of people, and the area has a high



percentage of part-time residents. But the temperature seldom gets below freezing—the coldest I remember is 33—or higher than 80, and those of us who live here year-round are treated to a lush and tranquil setting eight months of the year.

My husband, Dennis Beall, and I tested the waters of Cazadero by buying a small weekend cottage that we enjoyed for 12 years. But it became harder and harder every Sunday to make the drive south, back to the fast pace of San Francisco. Then, about the same time that Dennis decided to retire early from teaching art at San Francisco State University, the two-story house at the end of our road came up for sale.

**Adirondack chairs and a swinging bench lie along a stone path amid the primordial atmosphere of the author’s forested garden. The light filtering down from the towering redwoods casts a green glow that is reflected by ferns, mosses, and other shade-loving understory plants.**



Coast trillium, above, is one of the many native wild flowers the author and her husband found growing naturally in the understory of their redwood garden. A plan of the garden, top, shows how it is designed to make the most of the clearings between giant trees.

Little had been done to the backyard of the two-thirds-acre plot, but we immediately saw its possibilities. The main focus was four redwood trees that grew in a circle about 35 feet from the house. The property was surrounded with other native trees and shrubs—fir, California bayberry (*Myrica californica*), madrone (*Arbutus menziesii*), tanbark oak (*Lithocarpus densiflorus*)—offering complete privacy. The ground was carpeted with the cloverlike foliage of redwood sorrel (*Oxalis oregana*), sprinkled from spring to autumn with its pink flowers and contrasting with sky blue forget-me-nots (*Myosotis sylvatica*). We weren't unconcerned about the lack of sun, but set ourselves the challenge of naturalizing with native flora.

### Shedding a Little Light

The first task was to hire an arborist to limb up several of the 35 redwoods on the property to increase our quota of filtered sunlight. Most of them are relatively young—100 to 150 years old—and moderately sized at 150 to 175 feet high and two to three feet in diameter. On the south side of the house, the increased sunlight encouraged the redwood sorrel to begin spreading down the hill, creating an emerald green carpet where shadow and

leaf mold had been before. Admiring that new growth from the deck the following spring, I exclaimed to my husband, "The Emerald Garden!" and we've called it that ever since.

The circle of big redwoods had already created a focal point, and we didn't fight it. The sound of Austin Creek rushing by 75 feet below inspired us to create a "riverside" atmosphere to underscore it, and to do that, we wanted to pave the dirt path running through the garden with river rock stepping stones. That summer, it seemed that Dennis made endless trips to the garden supply store before we had the two-and-a-half tons we needed to finish the project. On a "puddle" of smaller pebbles to the left of the redwood circle, Dennis put up the redwood swing from the front porch of our old cabin. They've been joined by two matching Adirondack chairs.

The following summer, Dennis built me a potting shed from recycled redwood. He put windows in its swinging doors and a shutter in the front, then added windows along the back and one side. Since one of our bird-feeding stations is next to the shed, I can enjoy the antics of the birds and squirrels while potting up bulbs and annuals.



### Discovering Natives

One of the joys of leaving our garden natural is being surprised by natives that volunteer eagerly and prolifically. In the early spring, our pathway on the south side of the house is lined with the yellow flowers of redwood violet (*Viola sempervirens*). Two other violet species reside on the house's north side. The northern bog violet (*V. nephrophylla*)—it's sometimes called kidney-leaf violet but the shape looks more like a heart to me—has deep purple flowers with white basal hairs, and the more appropriately named wedge-leaved violet (*V. cuneata*) has white flowers with purple eye spots on the two side petals. These violets began to appear after we brought in more light, and they become more plentiful each year.

A native plant we introduced to our garden is the western bleeding heart (*Dicentra formosa*). Its lacy foliage shows up in early spring, but unlike the imported *D. spectabilis*, which disappears in midsummer, it continues to produce sprays of pink heart-shaped flowers throughout the summer. We introduced a few in front of a rhododendron next to the swing area, and they have begun spreading on their own. In spring, the white bracts of a western dogwood (*Cornus nuttallii*) on a slope behind the swing shine like beacons in the shade.

One of the most dramatic features on the property is the moss-covered stump of a redwood we estimate to have been logged about a century ago, 12 feet high and eight feet across, with a “keyhole” running almost its full height. Next to it on a much smaller stump we placed the statue of a white meditating Buddha, which stands out starkly in the shadows. In front of it, my husband built a meditation bench carved with the words “The Emerald Garden.”

Redwood steps and railings lead down to this spot, to the left of the seating area. In winter, we search here for mushrooms and other fungi—we admire them rather than eat them, since they're nearly all poisonous—and in spring, for subtle native flowers. The calypso orchid (*Calypso bulbosa*) rises out of our highly acidic soil on a tall stem with one oval leaf. The size of a fingernail, its slipper-shaped flower is bright pink with a tongue mottled in yellow, orange, and white. Several other redwood flowers we have are wild ginger (*Asarum caudatum*), the aptly named fetid adder's-tongue (*Scoliopus bigelovii*), woodland star (*Lithophragma affine*), false Solomon's-seal (*Smilacina stellata*), grand hound's-tongue (*Cynoglossum grande*), coast



trillium (*Trillium ovatum*), and the lovely purple *Iris douglasiana*, which gradually fades to white. Native sword fern (*Polystichum munitum*), bracken (*Pteridium aquilinum* var. *pubescens*), and lady fern (*Athyrium filix-femina*) have freely naturalized in our garden.

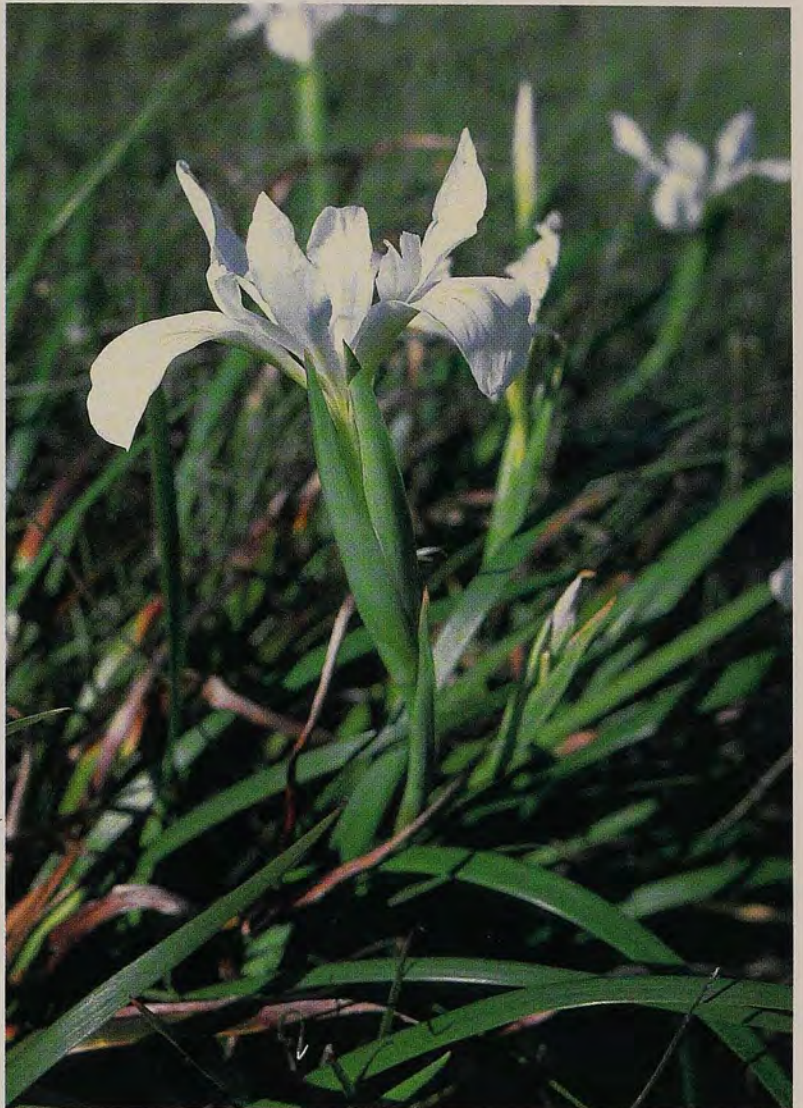
Heading away from the house and deck, Dennis added a red brick stairway that leads down to a gate and an ivy-covered arbor, both made of recycled redwood. Next to the steps, we planted a bed of hostas, backed by the feathery foliage and flowers of astilbes. Sword ferns, along with more bleeding hearts, surround one of our birdbaths.

In front of the house, we took advantage of our acidic soil by planting a dozen different rhododendrons. From our kitchen window, I can enjoy their floral display—pale pink, bright pink, red, and pur-

Grand hound's-tongue, top left, is another common redwood forest native that grows naturally in the author's garden. An elegant potting shed made of recycled redwood provides a backdrop for a mix of ground covers, including hostas, astilbe, and ferns, top right. Near a deck on the sunnier north side of the house, Conley has planted roses, irises, and foxgloves, above.



Western bleeding heart, above left, a West Coast native Conley introduced to the garden, offers colorful pink flowers and lacy foliage throughout the summer. The flowers of *Iris douglasiana*, above right, start out violet then gradually fade to white as they mature.



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**FORESTFARM**, 990 Tetherow Road, Williams, OR 97544-9599. (541) 846-7269. Catalog \$4.

**FRESHWATER FARMS**, 5851 Myrtle Avenue, Eureka, CA 95503-9510. (800) 200-8969. [www.freshwaterfarms.com](http://www.freshwaterfarms.com). Catalog free.

**GREER GARDENS**, 1280 Goodpasture Island Road, Eugene, OR 97401-1794. (541) 686-8266. Catalog \$3.

**LAS PILITAS NURSERY**, 3232 Las Pilitas Road, Santa Margarita, CA 93453. (805) 438-5992. [www.laspilitas.com](http://www.laspilitas.com). Catalog \$8.

**RUSSELL GRAHAM: PURVEYOR OF PLANTS**, 4030 Eagle Crest Road, NW, Salem, OR 97304. (503) 362-1135. Catalog \$2.

**SOUTHWESTERN NATIVE SEEDS**, P.O. Box 50503, Tucson, AZ 85703. Catalog \$2.

ple—from mid-spring through early summer. The rest of the year I'm entertained by the birds and squirrels that come to another feeding station here.

### *Adding a Little Color*

In the redwoods, most of the native flowers possess an understated beauty you can't fully appreciate unless you get down on your knees. To add color we can enjoy from farther away, a few years ago I introduced poor man's-orchids (*Schizanthus pinnatus*) into my garden. These natives of Chile freely spread seeds and now come up in great numbers every July and last into fall. They stand about one-and-a-half feet tall above the redwood sorrel and forget-me-nots and produce an abundance of small but showy orchidlike flowers. With their fernlike foliage, they complement the native ferns and bleeding hearts.

It's impossible to beat impatiens for long-lasting splashy color in shade. Next to the swing area, we sunk cylindrical clay pots of various sizes, and by midsummer the



spring-planted annuals are continuing our riverside theme by flowing together in a stream of bright hues.

For spring color on the decks, I've potted several different azaleas. While they're blooming I pot up begonias that will provide color later in the season. Not content to rely on plants alone for contrast with our green background, we've draped Mexican serapes over our lounge chairs.

On the north side of the house, Dennis built a small deck and two sheds to store wood. Ironically, it's here on the north where we get the most sun, and I'm experimenting with a bed of perennials and roses for cut flowers. Heucheras, daylilies, and Chinese foxgloves (*Rehmannia elata*) tolerate this mottled shade, as do Japanese anemones, marguerites (*Argyranthemum frutescens*), foxgloves, Shasta daisies, and heliopsis. I've even discovered that I can grow dahlias and this year expanded my collection from two to 25. I wish I could grow more roses, but I do get a few blooms every summer. My most successful have


been 'Cécile Brunner', a pale pink, spice-scented polyantha, and 'Margo Koster'.

I must confess to a love-hate relationship with our biggest redwood, not because of its size but because it stands only 10 feet from the house, dropping pitch and seed in summer and providing ammunition for squirrels that drop cones on our head and in our food when we sit on the deck.

Still, it was the natural redwood forest—with its deep shade, subtle flowers, moss carpet, and lush ferns—that was our inspiration, and we've tried to alter the scene as little as possible. Plucking an occasional Sequoia cone from our salads and not having bushels of roses to arrange seems a small price to pay. We like to think of our Emerald Garden as a gentle and successful partnership with nature.

*Pamela Conley was a senior flight attendant for an international air company for seven years. Now a free-lance writer, she still travels when she can tear herself away from her garden.*

**A shade-loving mixture of ferns and rhododendrons welcomes visitors to the front of the house, top. Among the understated native plants found on the property is miner's lettuce, above left. Near the moss-covered stump of a once-mighty redwood, above right, Conley and Beall have added a white statue of a meditating Buddha to enhance this natural focal point.**

A circular inset photograph showing two vibrant purple flowers with spiky, daisy-like heads. The flowers are set against a dark green background, and the entire inset is framed by several thin, light blue lines radiating outwards from its center.

**There are some 500 species in the genus *Centaurea*,** most of them native to Europe, and as you might expect with such a diverse clan, some of them are very bad eggs indeed—among the worst weeds known to humanity and almost ineradicable once established. Warned English gardener and herbalist John Parkinson in his 1629 *Garden of Pleasant Flowers*, “There are a great many sorts of Knapweedes, yet none of them all fit for this our Garden,” except for something he calls the “Spanish Sea Knapweede,” which may be our bright rosy purple *Centaurea jacea*.

Parkinson made a clear distinction between the black-sheep knapweeds and the respectable “Corne flower” or “blew Bottles.” Yet even the seemingly innocent annual cornflower or bachelor’s-button (*Centaurea cyanus*) has had a reputation to live down. Parkinson’s less romantic countrymen called its wild single-flowered form—a common weed of wheat fields—“hurt-sickle” because its durable and elastic stems blunted harvesting tools.

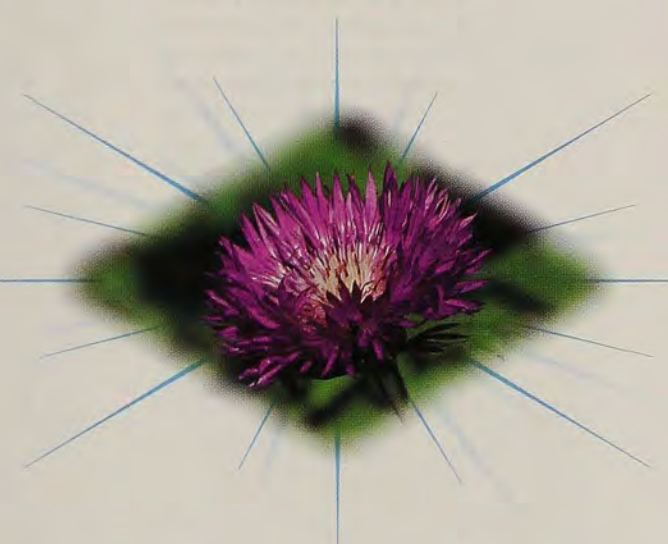
Parkinson had no hesitation declaring it a candidate for ornamental gardens, however, waxing at length on every detail of its appearance: the leaves “long, and of a whitish green

# Scintillating





Left to right: *Centaurea scabiosa*, *C. macrocephala*, *C. americana*, and *C. hypoleuca* 'John Coutts'.



# Centaureas

b y R a n d B . L e e

color, deeply cut in on the edges in some places,” somewhat like “the leaves of a Scabious,” and the stalks “two foot high or better, beset with such like leaves but smaller, and little or nothing slit on the edges.” The tops are “branched, bearing many small green scaly heads, out of which rise flowers, consisting of five or six or more long and hollow leaves [petals], small at the bottom, and opening wider and greater at the brims, notched or cut in on the edges, and standing round about many small threads in the middle.”

Parkinson called the cornflowers’ central boss of fertile florets “thrums” because he thought they resembled the sheared-off short threads from a loom. The diverse colors he described presaged those we’re planting some 360 years later: some “wholly blue, or white, or blush [pink],” as in our modern *C. cyanus* Florence series; “of a light or dead red,” like our ‘Red Boy’; “of an overworn purple color,” similar to ‘Black Ball’; “or else mixed of these colors ... the edges white, and the rest blue or purple,” as in today’s ‘Frosted Queen’ hybrids.

“After the flowers are past,” observed Parkinson, “there come small, hard, white and shining seed in those heads, wrapped or set among a deal of flockie [woolly or hairy] matter, as is most usual in all plants that bear scaly heads.” The stony substance of these seed pods inspired one of the genus’s common names, hardhead.

**Hurt-sickles,  
Hardheads,  
Knapweeds,  
and Bachelor’s-  
Buttons**

LEFT TO RIGHT: JESSIE M. HARRIS; BILL JOHNSON; LYNNE HARRISON (2).

Native to the mountains of central and southeastern Europe, *Centaurea uniflora* is among the less commonly available species for growing in gardens. It is a naturally dwarf perennial that grows only about eight inches tall. Wispy blossoms give the plant a tousle-headed charm in summer.

In British gardens, *C. cyanus* predates Parkinson. It was recorded there in the 16th century and has been on this side of the Atlantic since at least the Colonial period. In her 1905 *Another Hardy Garden Book*, Helena Rutherford Ely called them indispensable filler plants for beds of perennials. Today the most commonly grown are the double blues. 'Jubilee Gem' has been known since 1937 and, at one or two feet tall, fits into any garden. But *C. cyanus* can get four feet tall, particularly the long-blooming Victorian 'Emperor William' strain, the last of the old, tall single-flowered bachelor's-buttons. There are also miniatures of a foot or less, such as *Centaurea* 'Dwarf Midget'.

Reference books will tell you bachelor's-buttons must be sown where they are to grow because they don't transplant well from nursery starts; this is poppycock. If you move them before they are four inches tall they transplant perfectly well, as long as you keep them watered and partly shaded until they have acclimated to garden conditions. Like all centaureas I have encountered, *C. cyanus* needs a neutral to alkaline soil with reasonably good drainage.

### Native Knapweeds

For years I thought *C. cyanus* was the only annual centaurea; then in a catalog I discovered *C. americana*, the American basket flower, also known as *cardo-del-valle* (thistle of the valley) and—I am sorry to say—jolly joker. With *C. americana*, it does seem best to sow it where you want it because seedlings of this southeastern and south central native grow very quickly into what—if they had any prickles—you would call giant thistles. Six feet tall



and three feet wide, they are topped with huge, softly scented, five-inch-wide rosy lilac shaving brushes with paler centers. If kept deadheaded, they will produce flowers till frost, and you are permitted to gasp with astonishment, as I did, when you notice that the great blossoms close at night, sometimes trapping drunken bees within their filaments. They open right up again the next morning with the bees apparently none the worse for wear. I do not know of any other *Centaurea* that does this. A white form is available as well, but I have never grown it.

Another native American centaurea that is just now hitting some of the better seed catalogs is the annual to biennial *C. rothrockii*. Native to the southwestern and south central United States, this species is very like *C. americana*. Its seeds require

one to two months of cold treatment or fall sowing for best germination, but when the plants emerge they grow quickly into three- to five-foot-tall, drought-tolerant pseudothistles bearing enchanting bicolor to tricolor blossoms, one on each of its many stems. The flowers are up to five inches in diameter with centers that are cream to yellow, and outer florets of purple to pink, turning pinkish blue at their tips.

### Perennials

Once I discovered *C. americana*, it occurred to me that the genus might have other pleasures in store, so I began casting about in catalogs and local nursery stalls. I first bought *C. montana*, the perennial mountain bluet. It hails from the mountains of Europe. Like the cornflower, it has been grown in gardens since at least the

16th century. It is also very hardy—reportedly reliable in USDA Zone 3 through 8—but the flowers are more blue-violet than a true cornflower blue. They are very pretty, nonetheless, opening in June here on the border of Zone 5 and 6 with a spatter of blossoms off and on till fall. The white selection, ‘Alba’, is supposed to be particularly appealing. All forms of *C. montana* loll on their stems, though, and since they can be extremely variable in height they are not plants for the formal border.

The next centaurea to hit my garden was the perennial great-headed knapweed, *C. macrocephala*. This species is native to the Caucasus Mountains and northeast Turkey, and is hardy in Zone 3 through 7. The one-gallon start I got from the garden center was a simple clump of rather coarse basal foliage, tagged to grow three feet tall, and I planted it near a path. What grew from this clump the first year was a single starved-looking, four-foot spike topped with one large, bulbous, shining brown bud. In summer, the bud opened into a bright golden yellow thistlehead about two inches across.

The next spring I noticed that quite a big circle of green was coming up where the knapweed had been. Where the year before there had been only one bloom spike, this year there were seven, and they were six feet tall, not four. I had planted Godzilla. Eventually I had to move the whole

clump, and it signaled strong resentment: It died. Perhaps it is just as well. The flowers make a very brief show considering the room the plants take up, although some people admire the bronzy brown bracts that linger long after the flowers.

My current favorite centaurea is the perennial Spanish buttons (*C. nigra*). Plants grow easily from seed, quickly forming strong, gray-green, basal rosettes; in August, they heave up—or rather, fling about, since they tend to flop—two-foot stalks of single maroon flowers. The flowers look great in bouquets, and the plants are said to be hardy to Zone 3. I would like to try interplanting them with the pink, two-foot-tall *C. hypoleuca* ‘John Coutts’ or the rosy Persian cornflower, *C. dealbata* ‘Steenbergii’, which can grow from two to four feet tall. These last two are hardy at

least to Zone 4. Although *C. nigra* behaves in my garden, it has naturalized in some East Coast areas.

If you are running out of room in your garden but still wish to include one perennial cornflower, try *C. simplicicaulis*. Only 16 inches tall, it makes a silvery green mat from which spikes of striking, cool rose flowers rise in late spring to summer. Hailing from the Transcaucasus, it is very easy to grow, extremely hardy—Zone 3 through 8—and quite drought tolerant once established. Another hardy 16-inch Transcaucasian is *C. pulcherrima*, which bears rosy purple blossoms somewhat later than *C. simplicicaulis*.

There are many species worth exploring that I have not yet grown. *C. uniflora*, a natural dwarf perennial to around eight

**Bachelor's-buttons and red poppies make good garden companions, as shown by the dramatic display below. This species of centaurea, also known as cornflower, has had a long history of cultivation in Europe. In North America, it has been grown in gardens at least since Colonial times.**



inches tall, blooms violet or white and in the subspecies *nervosa*, deep purple. *C. de-beauxii* is a slightly tender three-footer bearing orange flowers with a pink tinge. University of Georgia horticulturist Allan Armitage praises pink knapweed (*C. pulchra*, also labeled *C. depressa*), which he describes as similar in habit to *C. macrocephala* but with rose-pink flowers. This plant is popular in Europe but little grown in North America. According to Armitage, the cultivar ‘Major’ is “larger and more vigorous than the type and is a better garden plant.” Because it has not been widely grown, hardiness limits in North America are not well defined, but it is safe in Zone 5 through 7.

#### **Bad Seeds**

If these descriptions have afflicted you with *Centaurea* zeal, hark back to those

old warnings from John Parkinson. Five *Centaurea* species you definitely want to avoid are *C. diffusa* (diffuse knapweed), *C. dubia* (short-fringed knapweed), *C. maculosa* (spotted knapweed), *C. repens* (Russian knapweed), and *C. solstitialis* (yellow starthistle). Diffuse knapweed, spotted knapweed, and Russian knapweed are among some 200 plants banned from sale or import into the United States under the Federal Noxious Weed Act of 1974. Their tough roots infest crop and grazing lands in North America and elsewhere, and their resilient stems and rock-hard flower buds foul machinery. Furthermore, many of them possess bracts with sharp, rigid spines.

*C. diffusa*, for example, doesn't seem particularly threatening at first glance. It grows only about two feet tall, bearing

The blue-violet flowers of *Centaurea montana* provide soothing notes to the cool green backdrop of this garden in the Pacific Northwest.

## Sources and Resources

**AIMERS SEEDS**, Rural Route #3, Ilderton, ON, N0M 2A0, Canada. (519) 461-0011. Catalog \$2.

**AMBERGATE GARDENS**, 837C County Road 43, Chaska, MN 55318-9358. Catalog \$2.

**BLUESTONE PERENNIALS**, 7211 Middle Ridge Road, Madison, OH 44057. (800) 852-5243. Catalog free.

**CANYON CREEK NURSERY**, 3527 Dry Creek Road, Oroville, CA 95965. (530) 533-2166. Catalog \$2.

**FLOWERY BRANCH SEED COMPANY**, P.O. Box 1330, Flowery Branch, GA 30542. (770) 536-8380. Catalog \$4.

**GARDENS NORTH**, 5984 Third Line Road North, North Gower, ON, KOA T20, Canada. (613) 489-0065. Catalog \$4.

**SELECT SEEDS-ANTIQUE FLOWERS**, 180 Stickney Road, Union, CT 06076. (860) 684-9310. Catalog \$1.

If you live in the western states and have a problem with noxious knapweeds, contact The Division of Plant Industry, Colorado Department of Agriculture, 700 Kipling Street, Suite 4000, Lakewood, CO 80215, (303) 239-4140.



gray-green leaves and numerous white to purplish thistlelike flower heads. But it is widespread throughout our mountain Southwest, forming dense taprooted stands that crowd out native plants. Too many of these stands can render rangeland useless, and to make matters worse, *C. diffusa* is toxic to horses.

Yellow starthistle is a rangeland weed that now occupies millions of acres from Washington east to Montana and south to New Mexico. It is considered a priority noxious weed in Oregon and is on California's list of the most widespread and invasive wildland pest plants.

Much research is being done to develop biological controls for these species. Scientists have identified beetles, weevils, moths, and flies that all delight at one stage or the other of their life cycles in the

roots, foliage, or seed heads of knapweeds. Sheep and goats are being used to control them in some areas, and one beleaguered Western community has even started a campaign called "Whack the Knap Attack!" Volunteers patrol the county for knapweed stands that are accessible to hiking and biking trails. They then post a sign near the stand, explaining the problem and asking users of the area to pull a few weeds to reduce the use of herbicides.

Don't let these warnings put you off the genus, which is far from being a group of environmental bad guys. It is not widely known that many *Centaurea* species support the life cycles of certain butterflies, but there is even a butterfly species commonly named for these plants. The European *C. scabiosa*, which bears blossoms of purple-

crimson from June to September on three- to five-foot plants, provides forage for the caterpillars of the knapweed fritillary, as well as for those of marbled white butterflies. Its flowers provide nectar for peacock butterflies. In addition, when the plants go to seed, they are visited by snacking goldfinches, bullfinches, and greenfinches.

For this service to wildlife alone, centaureas would be worth planting. With their varied stature and color, and their striking bracts and petals, these hardheads will make even the most stubborn gardener smile.

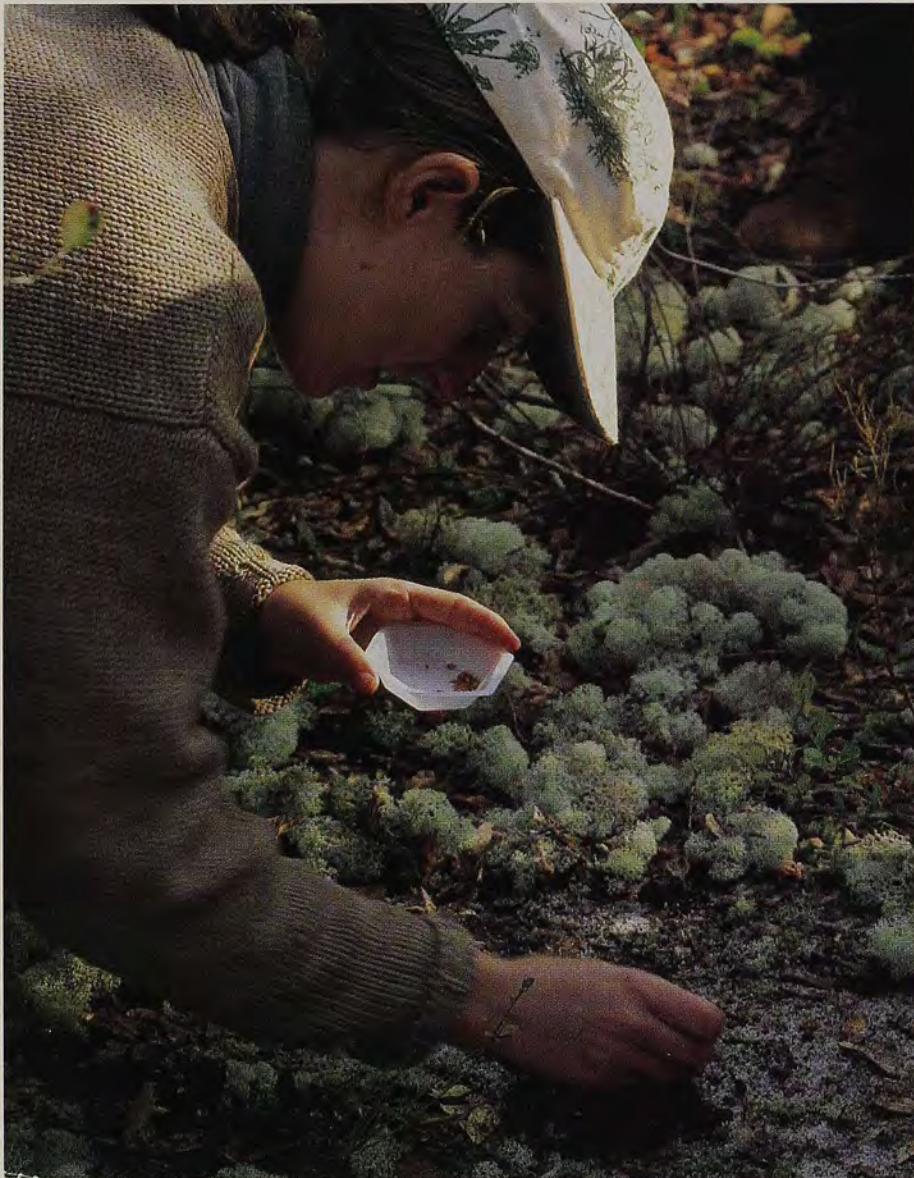
*A contributor to the AHS A-Z Encyclopedia of Garden Plants, Rand B. Lee is co-editor of the American Cottage Gardener and founder and co-president of the American Dianthus Society.*



# Peach of a Partnership

**Georgia's innovative Plant Conservation Alliance focuses limited resources on selected conservation projects.**

by Hugh and Carol Nourse



Jennifer Ceska, who helped set up the alliance of Georgia plant conservation groups, plants a seed of hairy rattleweed.

## **Hairy rattleweed is an ugly name**

for a beautiful plant. *Baptisia arachnifera*—the spider indigo—is not exactly hairy but certainly fuzzy, so its leaves look gray from a distance. That distinguishes it from a smooth-shaven relation, *B. tinctoria*, also sometimes called rattleweed because its pealike seed pods clatter in the wind. Both have yellow flowers, grow about three feet tall, and are native to the East Coast. But hairy rattleweed exists only in a 10-mile strip in Wayne and Brantley counties, near the coast in southeastern Georgia.

In 1992, a University of Georgia at Athens (UGA) horticulture graduate student, Jennifer Ceska, was smitten by “Hairy,” as she calls the plant. A natural denizen of longleaf pine savannas, it stood out like a gray exclamation point on the open terrain where it resides today—a commercial pine plantation. More important for a potential thesis subject, it appeared to have been little studied.

To support her research, she applied for and won a fellowship awarded by the Garden Club of America and the Center for Plant Conservation. Ceska’s study did shed some light on the reproductive quirks of the hairy rattleweed. But, more important, it planted the seed of a statewide rare plant alliance, which is not only a shot in the arm for professional botanists and horticulturists, but also a call to arms for amateur naturalists and schoolchildren.

“The fellowship,” relates Ceska, “enabled me to visit six public gardens, working my way north.” She learned that one of the first she visited, Callaway Gardens in



Restricted in the wild to a 10-mile strip along Georgia's southeastern coast, hairy rattleweed, above, was the subject of alliance organizer Jennifer Ceska's graduate thesis. Georgia plume, right, has the potential to become a popular garden plant, but only 50 populations are known, all in Georgia.



Pine Mountain, Georgia, had done good research on the hairy rattleweed in the 1970s. "But it hadn't been widely circulated, and I could easily have wasted time duplicating it." At the last garden, she learned about the New England Plant Conservation Program, a regional network of conservation groups.

She noticed that the New England program and similar networks were organized around habitat types. "But it seemed to me that a rare plant alliance could be just with in one state, because that's where you go to get permits" for working with rare plants. "It would be more manageable and doable." Her advisor, Jim Affolter, director of research at the State Botanical Garden of Georgia in Athens, encouraged her to add a conservation network plan to her thesis.

When she graduated in 1994, Ceska signed on as plant conservation coordinator for the state botanical garden, but it was a tenuous occupation for more than two

years. Even to keep Ceska on board part-time, the garden relied on "soft money"—grants and private donations.

Ceska had to prove herself and her idea of a statewide plant alliance. In July 1995, she and Affolter invited representatives of six other Georgia conservation organizations to a meeting. Not only did everyone come, but individuals paid their own expenses. "That said to me," recalls Ceska, "that they thought this was worthwhile." Charter members in addition to the state garden and Callaway were the Atlanta Botanical Garden, the Natural Heritage Program of the state's Department of Natural Resources (DNR), the Nature Conservancy, the University of Georgia, and the U.S. Forest Service.

Tom Patrick, botanist with the Natural Heritage Program, proposed 20 key projects for the new Georgia Plant Conservation Alliance. Limited resources led them to concentrate on four that could benefit from their pooled skills.

## Plume Project

The recovery of the Georgia plume (*Elliotia racemosa*) is a good example of the way the alliance focuses on both short- and long-term studies, and on preservation not only of individual species but also of habitat.

This deciduous shrub or small tree is the only species in a genus of the heath family (Ericaceae), which includes rhododendrons, mountain laurels, and blueberries. In summer it produces pedicels of delicate white fragrant flowers. "It has the potential to be a great horticultural species," says Jonathan Streich, director of stewardship at the Nature Conservancy's Georgia field office. "It's a very attractive plant, both in flower and in the fall," when the foliage turns burnt orange.

All 50 populations are in Georgia, which made for an especially appealing cause célèbre for the new alliance. The plant had never been very widespread, but scientists were puzzled because, although

## Growing Pitcher Plants

mature plants produce seeds, no seedlings had been confirmed in the wild for about 50 years. The only documented new plants were suckers of existing plants. That meant they were clones with no genetic diversity.

Two of the Nature Conservancy's holdings in Georgia include populations of Georgia plume: the R.G. Daniell Conservation Easement and the Charles Harrold Preserve; the latter was donated to the conservancy solely because of the shrub.

Elon Flack, a nurseryman in Metter, Georgia, heard about the alliance's interest in the Georgia plume and offered to watch for seeds to set. "One day he called and said, 'The seeds are ripe! They're blowing in the wind,'" recounts Ceska.

Working with seeds from that and two other populations, the state and Atlanta botanical gardens tried treating seeds several different ways. They germinated relatively well—about 15 out of 25—even with simple cold conditioning. "But at the time we still didn't know why they weren't germinating in the wild," says Ceska.

### Field Tests

It was time to broaden the investigation. Last fall, George Rogers, a retired history professor in Statesboro, Georgia, and a graduate student, Martha Joiner, helped collect more seeds to test them for viability. Ceska and Jay Averett of the state garden joined Ron Determann and Madeleine Groves of the Atlanta garden and Malcolm Hodges of the conservancy to plant the seeds at the Daniell easement.

While one group was planting the seeds outdoors, another was subjecting them to more sophisticated lab work. A Nature Conservancy-funded pilot study had shown that genetic analysis might be helpful, so in 1997 the state DNR gave University of Georgia botanists Jim Hamrick and Mary Jo Godt the financial backing for a closer look at the genes of 10 *Elliottia* populations.

Is the plant really in trouble reproductively? Hamrick, like all good scientists, is skeptical. "The evidence that the plant is in trouble is anecdotal," he says. Noting that the alliance studies show the species producing viable seed, he outlines several possibilities: "Not many seeds are produced, conditions for germination are not present, conditions for growth are not present, or the plant may only produce new seedlings every 20 years or so when conditions are right. This would make the plant very sensitive to environmental problems. Unfavorable situations may cause the plant to

**Y**ou don't need to live in Georgia or build an elaborate bog garden in order to grow pitcher plants. Larry Mellichamp, director of the University of North Carolina-Charlotte Botanical Garden, recommends grouping several in a square-foot dishpan or half whiskey barrel in a mix of half peat moss and half sand.



**This pitcher plant cultivar, 'Ladies in Waiting', is being made available to gardeners through tissue culture propagation.**

"You have to keep them wet, and they need a lot of sun, so they don't make good houseplants," he says. "You don't want to treat them like a typical perennial, because they need wet, acid, nutrient-poor soil."

Along with Rob Gardner, curator of the North Carolina Botanical Garden, Mellichamp developed the first two named, tissue-cultured pitcher plant hybrids. Nursery-propagated pitcher plant species are also commercially available, he says, "but we thought that manmade hybrids that do especially well in cultivation might offer more enticement to grow them, and ease some of the pressure to collect them."

It took 13 years to develop 'Ladies in Waiting', a hybrid of three species that is 14 to 16 inches tall and deep maroon with white spots. The upright hood has scalloped edges and a pale green interior featuring white specks and maroon marbling.

'Dixie Lace', which took nine years to develop from crosses among four species, is eight to 10 inches tall. Its maroon pitchers have dark red veins on a creamy yellow background. The hood has wavy margins and hangs over the pitcher.

Growing several pitchers in one container helps moderate conditions, Mellichamp says, so that the soil doesn't dry out as quickly or get as hot. "They should be hardy to zero or below, as long as they are down in the ground where their roots aren't exposed." Therefore, it's a good idea to sink your container in the ground over winter.

Until fall, Niche Gardens is the exclusive source for these hybrids. Their catalog is \$3. Write them at 1111 Dawson Road, Chapel Hill, NC 27516, or call (919) 967-0078.

Beginning this fall, they will also be available from Plant Delights Nursery, which offers a number of other pitcher plant species. Their catalog can be obtained for 10 first-class stamps or a box of chocolates. Write them at 9241 Sauls Road, Raleigh, NC 27603, or call (919) 772-4794.

miss growth opportunities when the fruit sets. Or it may be self-incompatible. A single common gene may determine whether or not individuals can mate, so if you have just a few closely related individuals, they may share that gene."

If the genetic studies confirm that most or all of the Georgia plumes in a population are clones, what then? "If the habitat seems fairly stable and protected, we may do nothing," says Ceska. "Otherwise it may be possible to get some pollen from another site and try to cross them, or to introduce seedlings [from other sites] to bolster the genetics of a population."

In late March of this year, Ceska heard from Rogers and Joiner, who had been monitoring the Daniell plot every week to 10 days: They had discovered two tiny seedlings. "They're so small at this point that a chickadee could wipe them out," Ceska notes. Patrick points out that this is exactly why field studies must serve as an

adjunct to lab work. "Field observations are often useful in solving mysteries. Deer love to browse *Elliottia*, and perhaps browsing impacts seedling establishment."

### Pitcher-Perfect Plots

Another initial alliance project, aimed at restoring pitcher plant bogs, also combines propagation, monitoring wild sites, and genetic studies. But in addition, it is touching several hundred Georgia schoolchildren through the Georgia Endangered Plant Stewardship Network, established by the alliance's education committee.

Pitcher plants are especially good for inclusion in education programs, says Determann, superintendent of the Atlanta Botanical Garden's Fuqua Conservatory, because "People get excited about carnivorous plants." Determann developed instructions for students to build pitcher plant bogs on school sites, where they can establish plants they've propagated from



seeds collected by the alliance. Before getting the seeds, schools must obtain an official state permit for growing endangered species. Students then record any pollinators they see, bloom times, and seed counts, and forward the information to alliance scientists. At least 26 schools have constructed pitcher plant bogs. Best of all, the students are telling their parents and friends about Georgia's endangered plants.

Anne Shenk, education coordinator with the state botanic garden, leads environmental education programs for teachers, where they not only learn about pitcher plants but about other endangered natives. "By teaching teachers, we reach more students, and the parents get drawn in, too," she says. "Kids hear a lot about endangered animals such as sea turtles and whales, but they never get a chance to see one. Here they can hold a real live endangered plant in their hands and realize that, without their help, it may not be around in 10 or 15 years."

### **Search for Lost Species**

The public will play a major role in yet another alliance initiative—a search for historic species. Jennifer Cruse, a graduate student in the UGA botany department, is working with the Natural Heritage Program and the UGA Herbarium to compile a field guide

*"Here [kids] can hold a real live endangered plant in their hands, and realize that without their help, it may not be around in 10 or 15 years."*

for 25 species that once grew in the north Georgia mountains but haven't been seen in the wild since 1975. "These aren't all obscure species," says Ceska. "Our native bleeding heart—*Dicentra eximia*—isn't found in the wild any more. We need to decide if we should invest time in recovery of

these plants or, if they're really gone, say a blessing and go on." These pocket guides will help amateur naturalists both identify "lost" species and report sightings of them.

The fourth of the alliance's initial projects is a scientific mystery involving a tree nicknamed "stinking cedar" because its foliage gives off an unpleasant odor when crushed. *Torreya taxifolia* is a member of the yew family that has been traced in the fossil record back to the time of dinosaurs. It occurs naturally in the Florida panhandle, at one site in Georgia, and in ravines along the Apalachicola River basin. In the 1800s trees grew 60 feet tall. As recently as the 1930s, there were reports of specimens with two-foot diameters. Today, an unidentified fungal disease kills most of them before they get much more than knee high. Others sucker, become distorted, and never reach reproductive age.

For some years, the Atlanta Botanical Garden has been carefully safeguarding a few specimens, and the collection had grown enough that they needed some safe outdoor sites for the trees. In March 1997, trees cloned from Georgia's single population were planted in the Smithgall Woods Conservation Area in the mountains of northern Georgia. This area is north of the tree's natural range and therefore may be

HUGH AND CAROL NOURSE



Opposite page, clockwise from upper left: Malcolm Hodges of the Nature Conservancy, center, points out planting sites for Georgia plume. Wire cages were used to protect the plants at experimental plots. Students at a Georgia elementary school prepare a bog garden for rare pitcher plants. At another Georgia school, students monitor their pitcher plants. Left: Another alliance project is re-establishing stinking cedar in the wild.

free of the fungus. Populations of *Torreya* from Florida will be safeguarded at various alliance locations.

#### *Early Accolades*

So does the alliance make a difference? "Overall," says UGA's Hamrick, "for a group less than three years old, the alliance has accomplished a lot. We know much more about these species than we did before." He and colleague Godt praise Ceska for coordinating field trips and cutting red tape. "In my study of *Elliottia*, I would have had to spend half my time trying to get permits and find private landowners," says Godt.

Hank Bruno of Callaway notes that the umbrella group provides continuity when individuals leave member organizations. Even though many members cooperated before, he believes a new synergy has developed out of the alliance. "The camaraderie of first-class plantsmen, the exchange of information, and the seminars all provide intellectual stimulation."

One measure of the alliance's success has been grants they've received from outside foundations: \$20,000 from the Turner Foundation, Inc., for bog restoration and expansion of the teacher training workshops, and \$7,650 from the National Fish

*"For a group less than three years old, the alliance has accomplished a lot. We know much more about these species than we did before."*

and Wildlife Foundation for bog restoration, creation of a mountain bog safeguarding site, and production of the field guide to historic mountain species.

With grants, however, come paperwork. Ceska hopes that by taking most of that burden she frees the others for crucial hands-on

work. "Every group needs someone to be the gadfly, to push projects and remind them that deadlines are coming up."

As for Ceska's own future, the alliance's track record apparently impressed the state enough that last July her position was made part of the Georgia State Botanical Garden's permanent budget.

The hairy rattleweed is looking more secure as well. Another graduate student, David Handaly, is propagating the plant, and there are about 200 specimens in the state botanical garden greenhouse. Some will be used for future reproductive studies, and the rest will be displayed in the garden's "Threatened and Endangered Plants of the South" educational beds.

Subsequent genetic studies, published last October, revealed that even though the natural populations are dwindling and their range is limited, there's a lot of diversity in the gene pool. "This speaks well for the species' potential for survival if its habitat can be protected," says Ceska. Rayoiner, Inc., the paper company that owns most of the land where "Hairy" is found, is now working to protect the plants on its land.

*Hugh and Carol Nourse are free-lance photographers and writers living in Athens, Georgia.*

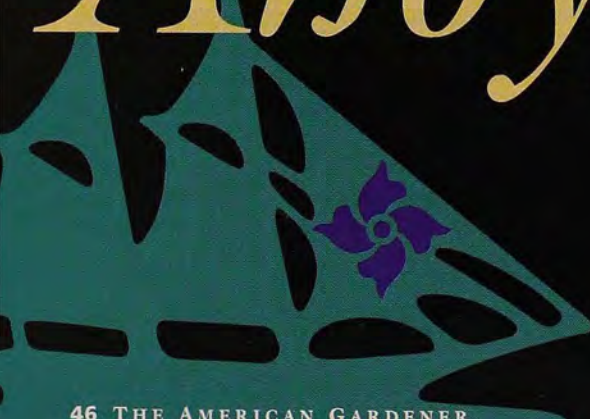



ROB SIMPSON

# Ahoy, Inland

**You don't have to live at the beach to grow seashore plants.**

by Pamela D. Jacobsen





While most gardeners think of cactus as a desert plant, prickly pear cactus (*Opuntia compressa*) can be found growing naturally along the sea-sprayed dunes of Cape Cod, Massachusetts.

# Gardeners!

**Imagine that a genie granted you one wish:** To live—and garden—anywhere in North America. What type of spot would you choose? If you're like me, you would want an open space that receives ample, but not over-

abundant, rainfall. You would require a warm, temperate climate with a long growing season. And of course, you would also need a pristine piece of land where the soil is rich and loamy. Unfortunately, no one I

know has ever rubbed up a genie, and very few of us can pack up and move to our version of gardening heaven.

For the past 15 years I've slaved on dry, extremely porous soil in western Massachusetts—various soil tests have pronounced it loamy sand or sandy loam. After investing hundreds of dollars on “top-grade loam” and countless hours hauling compost, all I had to show for it was slightly darker sand. What I've got, I finally realized, is an inland beachfront. So I started investing in what my landscape really needed—seashore plants.

And why not? Coastal flora have a lot going for them. For starters, they are incredibly tough. Most can tolerate salt, drought, and high winds. But best of all, many are simply beautiful to behold.

My area isn't the only inland site suited to coastal flora. U.S. Department of Agriculture figures show that in at least 20 states, 10 percent or more of the land consists of soil types that are either sandy, loamy sand, or sandy loam. For instance, 20 percent of Wisconsin, 41 percent of Michigan, 55 percent of Delaware, and 57 percent of Georgia fall into one of those categories. Therefore we have to conclude there are a lot of landlocked gardeners who would find growing seashore species...well, a breeze.

In our northern states, there's another reason to experiment with beach plants. In winter our roadways—and greenery anywhere near them—take a beating from salt-laden sand. Coastal ground covers, shrubs, and trees readily bounce back from this harsh treatment, which is why states such as Michigan and Illinois have incorporated salt-tolerant plantings along their highway tree belts.

### Selecting Seashore Plants

According to the 1997 *World Almanac and Book of Facts*, there are more than 88,000 statute miles of American shoreline, running from USDA Zone 2 through 11. This vast range pretty much guarantees that no matter where inland gardeners live, they can find shore-



**What's great about choosing seashore plants for a sandy garden is that you don't have to spend a lot of time or money preparing a cushy site for them.**



In the wild, seashore mallow (*Kosteletzkya virginica*), top, grows in brackish marshes, so it needs a garden location that is consistently damp. Above: The pond in the author's Massachusetts garden.

line plants that will survive their winters.

Of course, cold hardiness is only a starting point—habitat compatibility is an equally important consideration. For example, seashore mallow (*Kosteletzkya virginica*) is found in the wild near tidal marshes and won't appreciate a spot in a dry rock garden. You can make it feel at home, though, if you have a low-lying area that is consistently damp, perhaps due to large amounts of clay in the soil. *Opuntia compressa*, a yellow-flowering cactus commonly found along the dunes of Cape Cod, Massachusetts, appreciates sunny locations where the soil drains quickly. It will struggle in medium to heavy shade, especially if drainage is poor as well.

There's also a nomenclatural trick you can use to identify coastal species. Taxonomists sometimes indicate a plant is “of the sea” or a “seashore” variety by using species names such as *littoralis*, *littorale*, *maritima*, *maritimus*, or *maritimum*. Occasionally you may need to do some additional detective work. Take for example the scientific name of rosemary, *Rosmarinus officinalis*, in which *ros* stands for “dew” and *marinus* means “maritime.” Thus the herb's botanic name lets you know it is ideal for coastal settings. I've spent many a cold winter night searching *Hortus Third* for plants with one of these words in their names.

Gardeners with soil that contains between 40 and 90 percent sand will find their site a natural for dune plants. In general, the site should also get full sun, although a number of seashore species can tolerate a small amount of shade each day. If tree cover creates dappled shade throughout the day, the gardener should look for plants found in maritime forests.

Consistently moist spots are candidates for seashore plants whose natural habitat is along marshes or tidal ponds. Sweetfern (*Comptonia peregrina*), serviceberry or shadblow (*Amelanchier canadensis*), and seashore mallow are just a few good choices.

### Halophytes

You may be wondering: If highway departments and others choose seaside



plants because of their salt-tolerance, can those plants adapt in a garden where there is no salty air? The answer is, for the most part, yes. Scientists use the word “halophyte” for a land plant that can tolerate at least half a percent sodium chloride (salt) in the water it absorbs through its leaves or roots. It’s a large category with several distinctions, but to keep things simple, the group can be divided into salt-tolerating plants or salt-desiring plants. A very few—such as *Salicornia*, commonly called glasswort or saltwort—need high concentrations to survive. Others need high salt levels for optimum growth. A few of our agricultural crops—including vegetables such as asparagus, beets, spinach, and kale—have been found to grow better in salty soils. But among ornamentals—once you exclude a few aster species—these preferential halophytes aren’t species that even the most ardent natural gardener would seek out, and duplicating their growing conditions would be difficult. The plants to invest in are the salt-resisting species, which tolerate or adapt well to excess salt but don’t require it to flourish.

### **Simplified Planting and Maintenance**

What’s great about choosing seashore plants for a sandy garden is that you don’t have to spend a lot of time or money preparing a cushy site for them. You can skip digging in soil amendments like peat moss and bone meal and go right to the planting stage. The same is generally true for moisture-loving coastal species placed in consistently damp soils.

About all you need to do for a dune dweller is give it a little extra attention to make sure it develops roots to stay well fed and anchored. After you’ve dug a hole to the proper depth, completely fill it with water (this is unnecessary, of course, when you’re working with a wet area). Deep watering reduces the stress that commonly occurs when a plant is moved from one location to another. Adding a teaspoon of sea kelp extract per gallon of this water will provide valuable micronutrients and plant



**Seaside goldenrod (*Solidago sempervirens*), top, may look like its inland relatives, but its leaves are more succulent. Above: A variety of plants flank a flagstone path in the author’s backyard.**

hormones to give roots an extra boost. Continue this deep watering once a week until signs of new growth appear. Then you can stop the supplemental watering unless you see signs of stress. Drought-tolerant species need to remain tough, so don’t baby them by providing extra moisture once they’re established. They will send their root systems in search of the water they need.

When my landscape contained mostly fussy inland plants, life was a never-ending cycle of watering, feeding, pruning, and mulching. Most seashore plants, however, maintain themselves on what appears to be a starvation diet. Maritime soil tends to be low in fertility, and species that thrive best usually don’t require much nitrogen. Some coastal dwellers such as bayberry (*Myrica* spp.) and sea buckthorn (*Hippophaë rhamnoides*) even help manufacture their own food through nitrogen-fixation. Others, such as beach rose (*Rosa rugosa*), beach plum (*Prunus maritima*), seaside goldenrod (*Solidago sempervirens*), and many native grasses, actually produce less spectacular displays when they are overfed.

More inland gardeners are choosing organic fertilizers, and they are even more appropriate for environmentally sensitive coastlines. They release nutrients—and salts—more slowly and in lower concentrations. Chemical fertilizers leave additional salts in your soil, and even when you’ve chosen plants for their salt tolerance, soil that’s too salty can set up a situation in which osmotic pressure actually sucks water

out of plant roots. As an additional safeguard, do your fertilizing when rain is more prevalent—in most areas, in spring—so that salts won’t build up in the soil around plant roots. My fertilizer regimen consists of spring and early summer applications of commercially prepared liquid fish emulsion mixed with sea kelp extract; look for fertilizers with nitrogen, phosphorus, and potassium levels at 5 percent or less.

Mulch, which I used to apply heavily to retain moisture, is something I no longer buy. Once I realized that the natural environment of coastal plants provides little in the way of



organic cover (except for leaf debris in maritime forests and seaweed in tidal zones), I discontinued most of that activity—with no detrimental effect.

The only time I mulch now is in autumn, when I use my lawn mower to grind up an over-abundance of fallen leaves. Then I apply an inch or so of this fine material around my plants for winter protection and soil improvement.

I only prune once a year, too. Outside of an early spring trim-up to keep beach rose, beach plum, and bayberry compact and bushy, my seashore plants are left on their own. And you won't need unsightly stakes for even those herbaceous plants that can grow medium to tall in height, such as seaside goldenrod, sea holly (*Eryngium* spp.), and sea oats (*Uniola paniculata*). Coastal species generally remain compact because their low-nitrogen diet prevents the excessive green growth that can cause garden plants to splay and flop.

Insect pests and diseases are less likely to attack seashore plants. Near the coast, salt spray acts as a natural fungicide, and bugs don't seem to care much for salty plants. Inland, the plants' inherent resilience works in their favor most of the time. But to compensate for my lack of salt-permeated winds, I guard against fungal problems by spacing plants far apart to ensure good ventilation. If fungal problems arise from excessive or prolonged summer humidity, I will occasionally mist the leaves with a one- to two-percent salt solution (carefully applied on salt-tolerant species only).

Seashore plants are known to survive hurricanes, severe drought, and tidal inundation, so I'm willing to bet they will have little trouble in most gardens. Here are a few worthy specimens for you to try. All are natives unless otherwise noted.

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**Opposite:** Sea kale's main attraction is its glaucous blue-green leaves. The appeal of sweet pepperbush (*Clethra alnifolia*), above, lies in the fragrance of its midsummer flowers.

#### Plants for Sandy, Sunny Spots

**BEACH PEA** (*Lathyrus japonicus* subsp. *maritimus*). This sweet pea relative, an Asian native that has naturalized on beaches around the world, is another nitrogen-fixer, literally producing its own fertilizer. Full sun stimulates generous production of its pink flowers. Common along dunes, it spreads nicely and helps prevent soil erosion. It's hardy to Zone 3 and also makes an interesting planting under trees.

**BEACH PLUM** (*Prunus maritima*). This eight-foot shrub is ideal for hedges in Zone 3 to 7. Foamy white flowers in early spring give way to dense green foliage. In September the shrub produces grapelike clusters of deep purple or red fruits from which the famous Cape Cod jelly is made. High winds and salt spray rarely bother it, but in inland gardens watch for signs of brown-rot fungus.

**BEARBERRY** (*Arcostaphylos uva-ursi*). This ground cover for Zone 3 through 5 stays under a foot tall but spreads into a mat up to 10 feet in diameter. In autumn, the tiny, dark, evergreen leaves turn bronzy red and are joined by tiny red berries that remain well into winter. It requires slightly acidic soil and perfect drainage, but its exceptional salt tolerance makes it a good ground cover under trees if these other conditions are met.

**NORTHERN BAYBERRY** (*Myrica pensylvanica*). This eight- to 10-foot shrub has wonderfully fragrant leaves and masses of tiny, waxy, gray berries that appear in late summer. It is semi-evergreen in the southern part of its range. Extremely drought-tolerant, it has nitrogen-fixing abilities that also let it tolerate infertile soils. It spreads easily by adventitious roots and is useful for pre-

venting soil erosion. Hardy in Zone 3 to 6; it does best in Zone 4 and 5. South of Zone 6, *M. cerifera* (see page 53) is a better choice.

**SEA BUCKTHORN** (*Hippophaë rhamnoides*). This nitrogen-fixing, spiny shrub is native to Asia but is unrelated to the *Rhamnus* species from Europe and Asia—also

called buckthorn—that are becoming environmental pests. The leaves are silvery, and if you have both male and female plants, the tiny yellow flowers will be followed by edible orange fruits. Hardy to Zone 3, it can make an attractive hedge but does best with both regular pruning and elbow room, since it can grow 30 feet tall and suckers readily.

**SEA KALE** (*Crambe maritima*). This two- to three-foot-tall perennial from the Black Sea region of Europe produces bold, bluish gray, leathery leaves up to 18 inches across. White flowers in racemes up to a foot across appear in late spring or early summer. Hardy to Zone 5—but not tolerant of heat in the South—sea kale will quickly become a conversation piece in the garden. This species grows equally well along rocky coastlines

and in average inland soils.

**WILD OATS and SEA OATS** (*Chasmanthium latifolium* for Zone 4 to 6; *Uniola paniculata* for Zone 8 to 9). The sound of wind sifting through beach grasses is a song more gardeners should hear, and nothing produces that romantic sound as effectively as the small, flattened, drooping seed heads of sea oats. Generous bundles of them form on three- to five-foot-tall stalks; several clumps grown together create a carefree garden setting. Sea oats is endangered in its native Southeast and should only be obtained from legally propagated sources.

**SEASIDE GOLDENROD** (*Solidago*

*sempervirens*). A spectacular yellow-flowering species hardy to Zone 4, it blooms from mid-September into October. Compared to other goldenrods, the seaside variety has leaves that are longer, lighter green, and somewhat succulent. A patch of four-foot-tall goldenrods looks spectacular next to purple asters.

**SEASIDE WORMWOOD** (*Artemisia stelleriana*). Growing less than 16 inches tall, this wormwood's silvery white, fuzzy leaves form a brocade ground cover. It truly dislikes watering and does best in the driest of spots. A front border of seaside wormwood surrounding hardy lavender is a dynamite combination. Salt-spray tolerant, this species also does well under trees and is hardy to Zone 5.

#### Plants for Moist or Shady Spots

**CUMBERLAND ROSEMARY** (*Conradina verticillata*). This shrubby perennial, native to Tennessee, thrives in moist (not wet), sandy woods. It is on the federal endangered species list, but is worth seeking out from a locally propagated source. The shape and scent of the evergreen leaves are similar to the Mediterranean herb from which it gets its common name. It bears lavender-pink flowers in spring and is hardy in Zone 5 to 9. Gray conradina (*C. canescens*), a coastal dune native with gray foliage, is hardy to Zone 7 but requires more sun.

**HOLLY** (*Ilex* spp.). Several evergreen holly species are native to East Coast maritime forests and can tolerate considerable shade, and both wet and dry soil. They include the American holly (*I. opaca*), a tree that usually grows to 20 or 30 feet; inkberry (*I. glabra*), an eight-foot shrub with blue-black berries; and yaupon holly (*I. vomitoria*), a multi-trunked small tree that develops red berries.

**OREGON GRAPE** (*Mahonia aquifolium*). This Northwest native is an evergreen shrub that produces bright yellow flowers in summer and silvery blue berries in fall. Growing six to eight feet tall, it needs protection from winter sun and, as long as it has some shade, can grow in very dry soil as far north as Zone 6.

**RED FESCUE** (*Festuca rubra*). This rhizomatous or mat-forming European grass thrives in moist, sandy soils in Zone 3 to 6. It grows one to four feet tall and features



Several seaside plants offer a bonus of ornamental fruits. Beach plum (*Prunus maritima*), top, produces an abundance of purplish fruit in late summer. The yellow summer flowers of *Mahonia aquifolium*, above, give way to attractive blue berries in the fall.

## Sources and Resources

**BARBER NURSERY**, 14282 Rogers Road, Willis, TX 77378. (409) 856-8074. Price list free.

**COASTAL GARDENS AND NURSERY**, 4611 Socastee Boulevard, Myrtle Beach, SC 29575. (803) 293-2000. Catalog \$2.

**ENVIRONMENTAL CONCERN, INC.**, P.O. Box P, 210 West Chew Avenue, St. Michaels, MD 21663. (410) 745-9620. Catalog free.

**HORTICULTURAL SYSTEMS, INC.**, Golf Course Road, P.O. Box 70, Parrish, FL 34219. Brochure free.

**ROCK SPRAY NURSERY**, P.O. Box 693, Depot Road, Truro, MA 02666-0693. (508) 349-6769. Catalog \$2.

**NORTH AMERICAN SEA PLANT SOCIETY**. Members share information about growing sea plants, receive the quarterly *Maritima* magazine, and participate in a seed swap. Annual dues are \$12. Write NASPS, P.O. Box 262, Feeding Hills, MA 01030-0262. Fax (413) 789-2076; or e-mail NASPS@aol.com.

**SERVICEBERRY** (*Amelanchier* spp.). The delicate white flowers of these understory trees are one of the first signs of spring each year. In summer they lure birds with their small blue berries, and many develop good fall color as well. They tolerate a range of soil conditions; downy serviceberry (*A. arborea*)—reliable to Zone 4—is probably the hardiest member of the genus.

**SWEET PEPPER-BUSH** (*Clethra alnifolia*). This deciduous shrub grows wild in swampy areas but will tolerate drier conditions and cold to Zone 4. The drooping bottlebrush, pinkish white flowers are renowned for their fragrance. The species can grow nine feet tall and will sucker to form a clump. It can tolerate fairly dense shade. Many excellent cultivars are now available.

**SWEETBAY MAGNOLIA** (*Magnolia virginiana*). This elegant native tree with fragrant, creamy white flowers grows to only 10 to 20 feet tall in the northern section of its hardiness range (Zones 5 to 9), but in its native southern maritime forests it can reach 60 feet tall and up to 20 feet in diameter. An evergreen variety (*M. virginiana* var. *australis*), hardy into the southern extension of Zone 7, is also available. Sweetbay magnolia will grow in deep shade, but needs at least part sun to flower. Does best in moist, acidic soils.

**WAX MYRTLE** (*Myrica cerifera*). This is a more southerly, evergreen counterpart to *M. pennsylvanica*, appearing in swampy, infertile soil and saline conditions in Zone 7 to 9. It can grow considerably taller than northern bayberry—up to 20 feet—but can be pruned into a nice evergreen hedge.

*Founder of the North American Sea Plant Society, Pamela D. Jacobsen is a free-lance writer living in Feeding Hills, Massachusetts.*



Clouds of white flowers on serviceberry (*Amelanchier* sp.) signal the arrival of spring. This small tree, commonly found in the woodlands of North America, also goes by another common name—shadbush—because its flowering coincides with the annual return of shad to eastern rivers.

lax panicles of spiky green to plum-red flowers from June to August.

**SALAL** (*Gaultheria shallon*). This ground cover in the heath family is native to moist forests of the West Coast. It bears pinkish white bell flowers in spring, followed by blue-black fruit. If it likes its setting too much, it can gallop over less aggressive neighbors.

**SAND MYRTLE** (*Leiophyllum buxifolium*). This bushy shrub gets only one or two feet tall but will spread by suckers to four or five feet. The glossy leaves are dark green, turning somewhat bronze over winter. In late spring, pink buds appear, opening to white flowers in tufts, or corymbs. In spite of its common name, it likes moist soil and will tolerate even deep shade. It is native from New Jersey to Florida; in the northern limit of its range (Zone 6) it may need some protection from winter wind.

**SEASHORE MALLOW** (*Kosteletzkyia virginica*). This somewhat open, bushy perennial grows in sunny, brackish marshes in Zone 4 to 7. Over a long season beginning in late summer, it is covered with pale pink flowers up to three inches wide.



## book reviews

🌱 *child's garden*

🌱 *vegetables*

🌱 *Lacy's latest*

### A CHILD'S GARDEN: ENCHANTING OUTDOOR SPACES FOR CHILDREN AND PARENTS

Molly Dannenmaier. Simon & Schuster, New York, 1998. 192 pages. 8¼ × 10¼". Publisher's price, hardcover: \$35. AHS member price: \$31.50. **SIM 008**

Adults usually get it all wrong when it comes to children and gardens. They want to buy Jennifer a little sunbonnet and Jason a little hoe and drag them out to the vegetable plot to plant carrot seeds. This mentality has steered many of that generation of kids toward those dreadful mega-houses surrounded by a micro-perimeter of lawn.

No, gardens are not about forced labor. Children and gardens are about mud and worms, places to climb and hide, pungent smells, fuzzy leaves, soft breezes, and big skies. They're about swinging on vines, digging toward China, and sipping honey-suckle nectar.

Most of us remember growing up with all these things. Most children growing up today will not. There are no longer open places where children can pick wildflowers, build forts, throw stones into a creek. Every piece of ground is staked with a "Do Not Trespass" sign. If you want to build a tree house, you need a zoning permit. Children who live within walking distance of a public park don't dare go there without an adult, even in the daytime.

Dannenmaier, formerly children's editor of *Garden Design* magazine, begins her

book by citing research showing that humans have an inherent need for a relationship with plants and outdoor spaces. Even gazing at trees through a window can reduce stress, lower blood pressure, and help us heal faster. She cites the neurobiological studies of Marion Diamond, who found that complex environments actually increase connections among brain cells.

As children grow, they use the natural environment as a "science lab cum theater" to learn about the world and their own bodies, Dannenmaier says. Yet even school yards—the last communal space available to many—are often stripped of biological complexity, then asphalted and furnished with unimaginative equipment.

"If it is true that to care deeply about nature as adults, people must have intimate experiences with nature as children, then the world community faces a huge problem," she writes. "Human-kind's next great challenge will be to devise new ways to preserve and reconstruct the earth's natural systems, although the natural experiences that previously informed every aspect of childhood have been allowed to become nearly extinct."

The message isn't new. Gary Paul Nabhan and Stephen Trimble raised the alarm in 1994 with *The Geography of Childhood*, and Dannenmaier cites their work extensively. But this book may reach a wider audience because it is also a beautiful book that deserves to be on your coffee table. Its end papers use one of my favorite Ken Druse photographs—a fingernail-sized frog perched on a leaf. Other favorite photographers, Dency Kane and Roger Foley, contributed many wonderful portraits—several of which were taken at the American Horticultural Society's River Farm headquarters.

Here's a little boy lying on his back on a lawn. Here's a firefighter's pole for exiting a deck. Here are brawny trees to climb, leafy nooks to crawl into, and cool ponds to splash in. There are vegetable gardens, too, but the kids aren't weeding them—they're harvesting the fruit, poking in the dirt, nibbling the lettuce, sitting on pumpkins.

Dannenmaier addresses legitimate concerns about safety—suggesting, for instance, many low-risk designs for water features. She notes that play areas don't have to be ugly. Sand doesn't have to be in a box, swings don't have to be made of clanking chains, and basketball courts don't have to be concrete. There are also sections on garden creatures, treasure hunts, peepholes, paths, "pickable posies," and plants that "perform," such as the sensitive mimosa.

If the book does have a flaw, it may be that many of the garden furnishings—double-decker playhouses and gazebos, redwood rabbit hutches, teak benches, dance chimes built into a patio—look like they are straight out of the catalogs that cater to affluent baby boomers and undoubtedly

priced beyond anything I would buy for myself, let alone for children who will outgrow them along with their sneakers.

It would be a shame if those high-end options obscured the real message: We all can create small pockets for sensual delight, exploration, action, and imagination in our own backyards. If we want the next generation to care as much about nature as they do about computer games

and sitcoms, we have to.

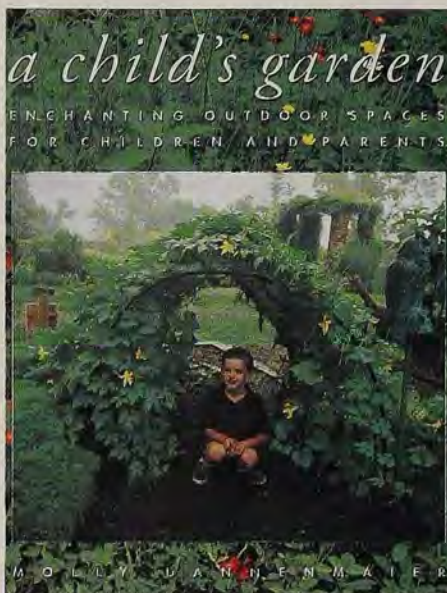
—Kathleen Fisher

Formerly editor of *The American Gardener*, Kathleen Fisher is a free-lance writer who lives in Alexandria, Virginia.

### THE COMPLETE VEGETABLE AND HERB GARDENER: A GUIDE TO GROWING YOUR GARDEN ORGANICALLY

Karan Davis Cutler. Macmillan, New York, 1997. 438 pages. 8¾ × 11¼". Publisher's price: hardcover \$29.95. AHS member price: \$26.95. **MAC 039**

Far more complete than most works on the same topic, *The Complete Vegetable and Herb Gardener* is both an intellectual treat—rich with allusions to Hawthorne, Sackville-West, Carlyle, and Thoreau—and a unique feast for the eyes thanks to David Cavagnaro's typically rich and inviting photography. Cutler has craft-

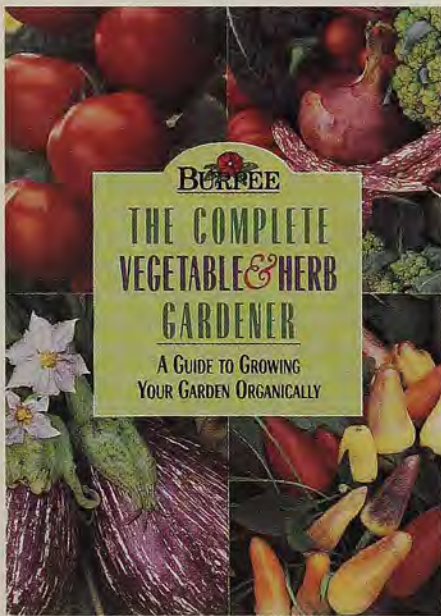


ed a work that is a welcome departure from many of the books that promise an organic direction but seldom provide much in the way of horticultural inspiration.

Essentially, *The Complete Vegetable and Herb Gardener* provides two integrated elements: a thorough, yet thoughtful introduction to gardening organically and—occupying half the book—a gallery of “Plant Portraits.” This offers an invaluable balance of old favorites and easily established reliables along with a wealth of entertaining and important information on less familiar heirloom varieties.

The first half of the book serves as either a primer or a refresher course. And while her chapters on “Getting Started” and “Improving the Soil” may seem predictable, Cutler imbues them with vital insights and challenges to prompt even the most seasoned of us to really start thinking about our gardening goals.

Among the book’s virtues is a series of humorous and pragmatic sidebars. These are helpful for beginning gardeners anxious to get started with easy or quick-maturing vegetables and herbs, and they provide useful tips on plant purchasing, watering, soil improvement, and much more. “Laying Out the Garden” is an imaginative guide to developing theme gardens—everything from Tex-Mex to tea gardens to gardening with and for children—even using vegetables and culinary herbs as part of an edible landscape.



Other chapters cover topics such as choosing equipment, planting the garden, selecting and starting seeds, transplanting, implementing long-term organic care, and using OPM (Organic Pest Management) to handle garden problems. There is also a well-illustrated section on common pests.

The “Plant Portraits” half of the book is an aptly named encyclopedic work in which each plant is treated uniquely—no two “portraits” are quite the same. Cutler reveals fascinating historical information on each species, provides cultivar options and preferences, and helps with potential problems, special cultural needs, and tips on harvesting. Like all good plant studies, the portraits are good reading in and of themselves. Along with the dazzling photography, they inspire us to experiment a bit and introduce a few new species into our gardens—and a few new tastes to our table.

—Joseph M. Keyser

*Education specialist for the Montgomery County, Maryland, Department of Environmental Protection, Joseph M. Keyser gardens on a rooftop in Arlington, Virginia.*

### THE INVITING GARDEN: GARDENING FOR THE SENSES, MIND, AND SPIRIT

*Allen Lacy. Photographs by Cynthia Woodyard. Henry Holt and Company, New York, 1998. 240 pages. 7<sup>3</sup>/<sub>4</sub> × 9<sup>7</sup>/<sub>16</sub>". Publisher's price: hardcover, \$37.50. AHS member price: \$33.50.*

HOL 017

**B**rowse the gardening section of your local bookstore and you will find an overabundance of how-to books, full of technical advice and slathered with eye-popping, color-saturated photographs. These are the kind of books that most gardeners page through wistfully before deciding that they really don't need another reference book and would rather spend the \$39.95 on chicken manure anyway.

When Allan Lacy's new book, *The Inviting Garden: Gardening for the Senses, Mind, and Spirit*, landed on my doorstep, I knew I'd found more than eye candy and rehashed horticultural advice. The book fell open to a critique of the American suburban landscape. Lacy laments the vast expanses of overfertilized lawns that carpet suburban neighborhoods, and he urges everyone to “immediately kill the grass in their front yards.” By doing that, he suggests, suburbanites would be forced to think about what they really want to plant in their gardens.

One of America's finest “thinking gardeners,” Lacy has charmed readers for years with his *New York Times* gardening column and books such as *Home Ground: A Gardener's Miscellany* and *Farther Afield: A Gardener's Excursions*. With its wide-ranging exploration of gardening as a sensuous delight, an intellectual challenge, and an intensely personal and spiritual experience, his new book will surely take its place among the

best tomes of gardening philosophy.

The book is organized into three sections: “Gardening and the Senses,” “Gardening and the Mind,” and “Gardening and the Spirit.” Each consists of three to five essays in which Lacy invites all gardeners to consider the rich personal gifts that a lifelong engagement with gardening offers. He advocates a lush, overgrown sanctuary where the words “look but don't touch” are never uttered. There should be herbs and fruit to nibble, soft lamb's-ears to stroke, and the sweet scent of honeysuckle or jasmine.

In the essay “Education of the Eye,” Lacy takes to task one of the world's most renowned public gardens, the Butchart Gardens in Victoria, British Columbia. This famous tourist attraction sports lavish displays



of annuals, planted in washes of color for mass effect then ripped out and replaced as soon as they begin to flag. “People come to Butchart,” Lacy laments, “to see ‘flowers,’ almost in a generic sense, the way some people go to the Grand Canyon to see ‘scenery.’” A garden, he argues, should offer depth and variety and engage the mind and spirit along with the senses.

This book offers something for everyone: historical and literary references, personal anecdotes, horticultural advice, and even a few botany lessons. Complete with color photographs and Lacy's personal list of favorite mail-order nurseries, *The Inviting Garden* offers a rich and varied exploration of gardening as a sensuous, spiritual, and intellectual journey. As Lacy says, “It isn't the knowledge about plants and gardening that's of first importance. It's the passion.”

—Amy Stewart

*Amy Stewart is a free-lance writer who tends a seaside garden in Santa Cruz, California.*

# gardeners' books

Books are chosen for the AHS Horticultural Book Service based on perceived reader interest, unusual subject matter, or substantive content. The following descriptions are not intended to be critical reviews, but are written to give an overview of the books' contents. For further information about these or other gardening books—or to order books—please call (800) 777-7931 ext. 36.

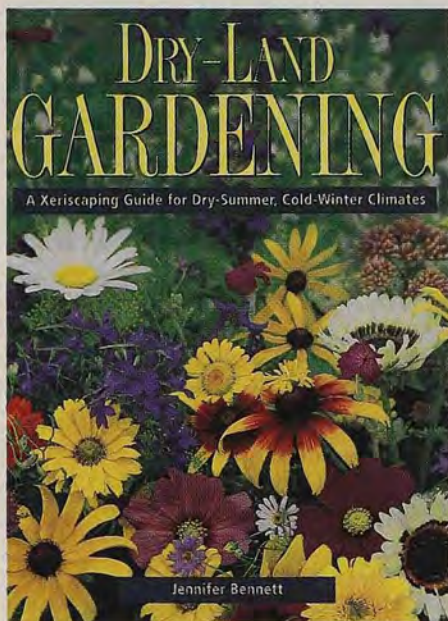
## SUMMER INTEREST

### COLOR IN GARDEN DESIGN

Sandra Austin. Taunton Press, Newtown, Connecticut, 1998. 165 pages. Publisher's price: hardcover, \$34.95. AHS member price: \$31.50.

TAU 007

With an artist's understanding and appreciation of color, Austin relates the concepts of hue, value, and saturation in the garden. She teaches gardeners to look at how the changing light, progression of seasons, and background all affect the colors of our gardens. This book takes a serious look at the use of the color wheel to select plants and plant combinations and helps us take another view of our landscapes. Includes 200 color photographs and 40 drawings.



### DRY-LAND GARDENING: A XERISCAPING GUIDE FOR DRY-SUMMER, COLD-WINTER CLIMATES

Jennifer Bennett. Firefly Books, Westport, Connecticut, 1998. 176 pages. Publisher's

price: softcover, \$24.95. AHS member price: \$22.50.

FIR 005

You don't have to live in the desert to face dry garden conditions in the summer. The secret to success is adopting methods of gardening that conserve not only water but also time and energy. Bennett explains that a xeriscaped design can be as beautiful as a lush perennial garden. Her bright, open designs include more silvery foliage and grasses than conventional plants. The book contains advice on lawns, vegetables, bulbs, roses, and even heatproofing the gardener. Includes more than 100 color photographs.



### Christopher Lloyd GARDENER COOK

Photographs by Howard Sooley



### GARDENER COOK

Christopher Lloyd. Willow Creek Press, Minocqua, Wisconsin, 1997. 255 pages. Publisher's price: hardcover, \$29.50. AHS member price: \$26.50.

WCP 001

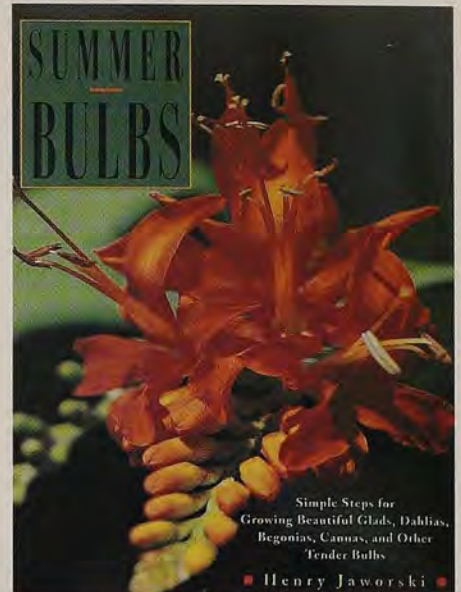
Lloyd's garden writing has been irresistible to many for years, and now it is revealed that his success spills over into the kitchen. His newest book is a careful look at his English kitchen garden and a course in his English country cuisine, where tradition meets absolute freshness. Includes more than 100 exquisite color photographs.

### SUMMER BULBS: SIMPLE STEPS FOR GROWING BEAUTIFUL GLADS, DAHLIAS, BEGONIAS, CANNAS, AND OTHER TENDER BULBS

Henry Jaworski. Houghton Mifflin, Boston, 1998. 124 pages. Publisher's price: hardcover, \$20. AHS member price: \$18.

HOU 033

Don't stop at daffodils and tulips—tender bulbs are perfect for the gardener looking for something new to grow. The author covers



propagation of bulbs and cultivation in both containers and beds and an encyclopedia of more than 100 bulbs with photographs and specific growing instructions.

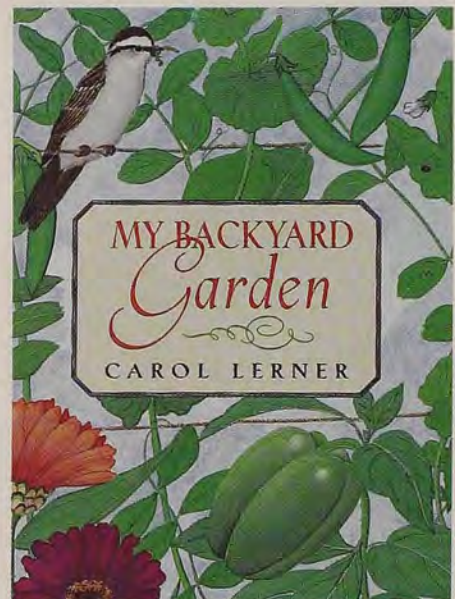
## CHILDREN'S BOOKS

### MY BACKYARD GARDEN

Carol Lerner. Morrow Junior Books, New York, 1998. 48 pages. Publisher's price: hardcover, \$16. AHS member price: \$14.

MOR 004

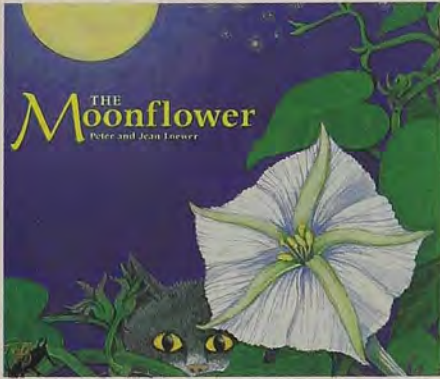
With clear and colorful illustrations throughout, this charming large-format book guides a child and an adult companion through choosing a site and designing, planting, and maintaining a garden. Sections on weeds and beneficial insects are particularly good. A great summer project book.





**THE MOONFLOWER**

*Peter and Jean Loewer. Peachtree Publisher, Atlanta, 1998. Publisher's price: hardcover, \$15.95. AHS member price: \$14. PTP 001*  
The wonderful story of nature at night is told by renowned garden writer Peter Loewer, but the brilliant, whimsical illustrations of Jean Loewer will steal your attention. Among many lessons, learn how bats see, how bees sleep, and how to grow a moonflower vine of your very own. A beautiful book for the young child in your life.



**CUT FLOWERS**

**THE COMPLETE BOOK OF CUT FLOWER CARE**

*Mary Jane Vaughan. Timber Press, Portland, Oregon, 1998. Publisher's price: hardcover, \$19.95. AHS member price: \$17.95.*

**TIM 143**

Once your garden is in full bloom, it's time to create wonderful bouquets for your home and for gifts. This book is your guide

*The Complete Book of*  
**CUT FLOWER CARE**

MARY JANE VAUGHAN



to cutting, conditioning, and preserving more than 200 kinds of flowers, foliage, and berries. Includes a section on principles of flower arranging, plenty of illustrations, and appendices on topics such as water quality and use of flower preservatives.

**WORLD GARDENS**

**THE GARDEN LOVER'S GUIDE TO BRITAIN**

*Patrick Taylor* **PAP 003**

**THE GARDEN LOVER'S GUIDE TO FRANCE**

*Patrick Taylor* **PAP 004**

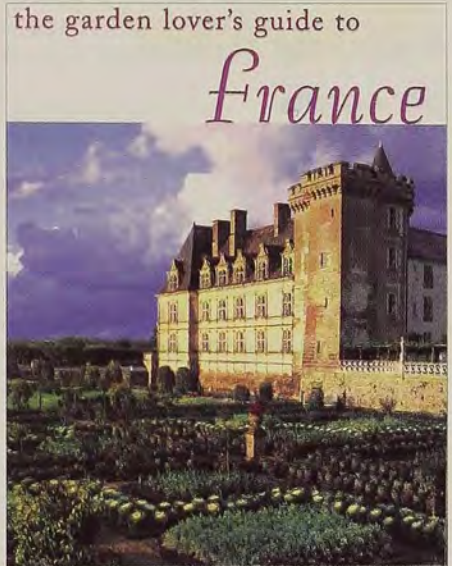
**THE GARDEN LOVER'S GUIDE TO GERMANY**

*Charles Quest-Ritson* **PAP 001**

**THE GARDEN LOVER'S GUIDE TO ITALY**

*Penelope Hobhouse* **PAP 002**  
*Princeton Architectural Press, New York, 1998. 144 pages. Publisher's price: softcover, \$19.95. AHS member price: \$17.95.*

This new series of guidebooks for garden enthusiasts and travelers is both authoritative and well designed. Each book includes more than 100 gardens, from world-renowned sites such as Versailles to little-known hidden treasures. Written by garden experts, each book begins with an overview of climate and the region's garden history and goes on to provide all the details you need for a spectacular tour. Includes three-dimensional garden plans, highlights of nearby cultural sites, and maps.



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## regional happenings

*a look at what's happening around the nation*

### MID-ATLANTIC

**JULY 23 ■ Tree Identification Walk For Children.** U.S. National Arboretum, Washington, D.C. (202) 245-4521.

**JULY 25 ■ Summer Perennials Workshop.** Monticello, Charlottesville, Virginia. (804) 984-9822.

**JULY 30–AUG. 1 ■ 6th Annual Youth Garden Symposium.** American Horticultural Society, Washington, D.C. area. (800) 777-7931 ext. 10.

**AUG. 1 & 2 ■ Butterfly Identification and Gardening.** Workshop. Wintergreen Nature Foundation, Wintergreen, Virginia. (804) 325-8169.

**AUG. 29 ■ 7th Annual Native Plant Seminar and Sale.** Irvine Natural Science Center, Stevenson, Maryland. (410) 484-2413.

### NORTH CENTRAL

**JULY 16 ■ All Commodity Field Day.** Educational field studies of horticultural issues. University of Kentucky, Princeton, Kentucky. (502) 365-7541 ext. 221.

**JULY 16–19 ■ HERBS '98.** International Herb Association. Workshops with industry experts. Holiday Inn–Lexington North, Lexington, Kentucky. (847) 949-HERB.

**JULY 17 ■ Shorewood Hills Home Gardens Tour.** Olbrich Botanical Gardens, Madison, Wisconsin. (608) 246-4550.

**JULY 18–19 ■ Cook Energy Information Center's Flower Show and Sale.** St. Joseph, Michigan. (800) 548-2555.

**JULY 25–AUG. 2 ■ The Henry Shaw Cactus Society Show and Sale.** Missouri Botanical Garden, St. Louis, Missouri. (314) 577-9400.

**AUG. 8 & 9 ■ Gardeners of the North Shore Show and Sale.** Amateur gardening contest and sale. Chicago Botanic Garden, Glencoe, Illinois. (847) 251-1774.

**AUG. 15 ■ Herb Fest.** Demonstrations, lec-

tures, and food. Matthaei Botanical Gardens, Ann Arbor, Michigan. (313) 998-7061.

**AUG. 29 & 30 ■ Garden Clubs of Illinois State Flower Show.** Chicago Botanic Garden, Glencoe, Illinois. (847) 835-5440.

### NORTHEAST

**JULY 5 ■ Country Inns in the White Mountains Garden Tour.** North Conway, New Hampshire. (603) 356-9460.

**JULY 11 & 12 ■ Lily Show.** New England Lily Society. Tower Hill Botanic Garden, Boylston, Massachusetts. (508) 869-6111 ext. 10.

**JULY 11 & 12 ■ Newport Flower**

## Take a Walk on the Wild Side in Colorado

Whether you are looking for peaceful garden tours, arduous wildflower hikes, instructive workshops on garden-related topics, or nature programs for children, the 1998 Crested Butte Wildflower Festival—scheduled for July 6 to 12—offers something for everyone. The Victorian-style village of Crested Butte—designated the wildflower capital of Colorado—hosts this popular annual festival, which is dedicated to the conservation and appreciation of the region's wildflowers. In addition to taking full- and half-day guided hikes through plant habitats that range from alpine tundra to sagebrush steppe, festival-goers can tour many local gardens, including the Mount Crested Butte High Altitude Botanical Garden. At nearly 9,000 feet, this is one of the highest public gardens in the country.

From dawn to long after dusk each day, dozens of diverse activities are offered. Workshops, classes, and lectures focus on topics such as ecology, landscape design, nature photography, floral design, botanical illustration, and medicinal plants. This year's highlights include a five-day photography workshop, a course in identification of grasses and sedges, a Majolica tile-painting workshop, and a hands-on gardening workshop.

For children, there are butterfly hunts, plant identification workshops, and wildflower walks. Evening events include concerts, art exhibits, slide shows, and dinners featuring local edible plants. Individual fees are charged to attend most events.

Call (970) 349-2571 for a free festival brochure and schedule of events.

—Mark C. Mollan,  
Communications Assistant



Sunflowers and lupines are among the wildflowers that bloom at Crested Butte.

COURTESY OF NATHAN BILOW

## Massachusetts Garden Tours

From July 10 to 20, the Garden Club of Massachusetts is sponsoring whirlwind garden tours featuring more than 50 private and public gardens in 10 communities across the state. Each community will take turns opening several private estates, historical sites, and university display gardens for a period of two days, allowing visitors to view a variety of garden designs in settings stretching from the Berkshire Mountains to the whaling towns of the Boston suburbs. New to this year's tour are the Fletcher Steele Colonial Gardens in Stockbridge and the gardens of the Durfee Conservatory at the University of Massachusetts. Some offbeat stops on the tour include a restored medieval herb garden and the flower gardens attached to the House of Seven Gables of 17th-century Salem witch-hunt fame. Tickets for the entire tour can be purchased for \$28; single-day tickets are \$14. For more information, call (888) 982-TOUR.

## Blue Hill

The community of Blue Hill, Maine, is opening nine of its garden treasures for a one-day rain-or-shine garden tour on Saturday, July 18. The breathtaking gardens and views include the Scrivelsby estate entry garden, designed by renowned early 20th-century landscape architect Beatrix Ferrand, and Rockwood, on 29



Loon's Landing looking toward Blue Hill Bay.

acres of waterfront property with wooded paths through a white-pine forest and vistas of wildflowers and pink lady's-slippers. Tours are sponsored by the Blue Hill Garden Club. Tickets are available for the entire tour (\$15) or individual gardens (\$3 each). Maps for the tour and box lunches are also available at the centrally located Blue Hill Baptist Church. Proceeds benefit Blue Hill community beautification projects. For more information, call (207) 374-2714.

COURTESY OF C.W. GUILLES

**Show.** The Historic Mansion-Rosecliff, Newport, Rhode Island. (401) 847-1000 ext. 140.

**JULY 16-AUG. 2 ■ Rockefeller Center Flower and Garden Show.** New York, New York. (212) 843-8046.

**JULY 17 & AUG. 14 ■ Fireworks and Fountains.** Longwood Gardens, Kennett Square, Pennsylvania. (610) 388-1000.

**JULY 18 ■ Kennebunk Private Garden Walking Tour.** Benefits York County Child Abuse and Neglect Council. Biddeford, Maine. (207) 284-1337.

**AUG. 7-9 ■ Northeast Organic Farming Association Summer Conference.** Hampshire College,

Amherst, Massachusetts. (978) 355-2853.

**AUG. 9 ■ Caribbean Festival.** New York Botanical Garden, New York, New York. (718) 817-8700.

## NORTHWEST

**JULY 12 & 13 ■ Herb Fest '98.** Washington County Fair Complex, Hillsboro, Oregon. (503) 359-1705.

**JULY 15-18 ■ Western Regional Master Gardeners Conference.** Parkway Plaza Hotel and Convention Center, Casper, Wyoming. (307) 472-6936.

**JULY 25 ■ Symposium: Great Gardens Gardeners.** Northwest Horticultural Society and Heronswood, Museum of History and Industry, Seattle, Washington. (206) 527-1794.

**JULY 27 ■ Antique and Garden Show.** Idaho Botanical Gardens, Boise, Idaho. (208) 343-8649.

## SOUTH CENTRAL

**JULY 12 ■ American Hibiscus Society Show.** Louisiana State University 4-H Mini-Farm, Baton Rouge, Louisiana. (504) 627-9346.

**JULY 25 ■ Christmas in July Herbal Workshop.** Ozark Folk Center, Mountain View, Arkansas. (870) 269-3851.

**AUG. 16 ■ American Hibiscus Society Show.** Belle Aire Community Center, Houston, Texas. (713) 723-5858.

**AUG. 25 ■ Kids Detective Day.** Search the gardens for butterflies and insects. Botanica, The Wichita Gardens, Wichita, Kansas. (316) 264-0448.

## SOUTHEAST

**JULY 11 ■ Gardening with Heirloom Vegetables.** Slide show and walking tour of the Palace kitchen garden. Tryon Palace Auditorium, New Bern, North Carolina. (800) 767-1560.

**July 11, 12, & 25 ■ 6th Annual International Mango Festival.** Fruit tastings, cooking demos, horticultural displays, and workshops. Fairchild Tropical Gardens, Miami, Florida. (305) 667-1651.

**July 25 & 26 ■ Cactus Show and Sale.** Memphis Botanic Garden, Memphis, Tennessee. (901) 685-1566.

**AUG. 8 ■ American Hibiscus Society Show and Plant Sale.** Sarasota Municipal Auditorium, Sarasota, Florida. (941) 351-1596.

**AUG. 8 ■ Gardens of the Delaware Valley.** Lecture and slide show. Tryon Palace Auditorium, New Bern, North Carolina. (800) 767-1560.

**AUG. 22 & 23 ■ Tropical Fruit Symposium.** Marie Selby Botanical Gardens, Sarasota, Florida. (941) 366-5731 ext. 10.

## SOUTHWEST

**JULY 10-12 ■ Rocky Mountain District's Annual Rose Show and Convention.** Pikes Peak Community

College, Colorado Springs, Colorado.  
(719) 520-1555.

**JULY 11 ■ Arboretum Open House.**  
Arboretum at Flagstaff, Flagstaff,  
Arizona. (520) 774-1442.

**AUG. 2-4 ■ Cultivating the Earth  
Spirit in the New Millennium.**  
American Horticultural Therapy  
Association 26th Annual Conference.  
Albuquerque Biological Park, Albu-  
querque, New Mexico. (505) 848-7148.

## WEST COAST

**JULY 9 ■ Tour and Taste Thursdays.**  
First of four biweekly events featuring  
tours of the Arboretum of Los Angeles,  
Arcadia, California. (626) 447-8207.

**JULY 18 & 25, AUG. 1 & 8 ■ Intro-  
duction to the Garden.** Tour and lec-  
ture series. University of California  
Botanical Garden, Berkeley, California.  
(510) 643-2755.

**AUG. 8 ■ Venus Flytrap Terrarium  
Kids Workshop.** Huntington Botanical  
Gardens, San Marino, California. (626)  
405-2272.

**AUG. 20 ■ Cultivating Sacred Space.**  
Lecture by Elizabeth Murray. Friends of  
Filoli. Filoli, Woodside, California. (650)  
364-8300 ext. 508.

## CANADA

**JULY 9 ■ Fern Identification and  
Propagation Workshop.** The  
Arboretum of the University of Guelph,  
Guelph, Ontario. (519) 824-4120  
ext. 4110.

**JULY 19 ■ Kingsbrae Horticultural  
Garden Grand Opening.** Live music  
and children's activities. St. Andrew, New  
Brunswick. (506) 529-3335.

**AUG. 2 ■ Ikenobo Ikebana Japanese  
Flower Show.** Royal Botanical Gardens,  
Burlington, Ontario. (905) 527-1158.

## Reminder

To list an event, please send informa-  
tion at least four months in advance  
to Regional Happenings, *The Ameri-  
can Gardener*, 7931 East Boulevard  
Drive, Alexandria, VA 22308.

## Desert Gardening Conference in Arizona

The University of Arizona Maricopa County Extension Service is presenting the 1998 Southwestern Low Desert Gardening and Landscaping Conference, August 7 to 9, to help desert gardeners overcome the challenges of gardening in the arid American southwest. Living up to the conference theme "Growing Through



A workshop instructor demonstrates the uses of culinary herbs.

Knowledge," more than 25 educational workshops will be offered highlighting native vegetable and ornamental gardening in the Sonoran Desert. Examples of workshop topics include selecting the best varieties of citrus for the low desert and designing a garden with cacti and succulents. Of special interest this year is the Teacher Track series, designed to educate, train, and inform teachers about the instructional benefits of establishing school gardens.

Carolyn Polson O'Malley, executive director of the Desert Botanical Garden in Phoenix, will be the keynote speaker on Friday, August 7. Other speakers include Cass Turnbull, executive director and founder of PlantAmnesty in Washington State; Mary Irish, director of public horticulture at the Desert Botanical Garden; and Christy Ten Eyck, a noted Phoenix landscape architect.

For registration information, contact the University of Arizona Maricopa County Extension Service at (602) 470-8086 ext. 824, or check the Web site at <http://ag.arizona.edu/maricopa/garden/html/calendar/lowdsrt7.htm>.

## Rock Island, Illinois, Goes Tropical

Where is the last place you would expect a tropical rain forest garden to sprout? If you said Rock Island, Illinois, you had better guess again. Blooming from the rubble of the old Rock Island Millworks building, the Quad City Botanical Center (QCBC) has opened a 6,444-square-foot conservatory called the Sun Garden, with hidden waterfalls, *trompe l'oeil* tropical garden scenery, hundreds of tropical plants, and a fog simulation system to complete the atmosphere. The state-of-the-art trumpet-shaped conservatory is designed to maximize natural daylight for plant growth and for heating and cooling efficiency. Additionally, the 300-plus varieties of tropical plants are not planted in soil but in a new planting medium composed of organic material, perlite, vermiculite, and sand.

In addition to a beautiful refuge of tropicana, the QCBC is making its educational mission a reality by inviting area schoolchildren aged five through 15 to experience a variety of hands-on exhibits, starting with tropical plants that yield chocolate, vanilla, bananas, ginger, and chicle (the last is the main ingredient in all the world's chewing gum). "It is important for children to realize that things we use every day come from the plant world," explains Becky Buckrop, marketing manager for the gardens. "It is equally important to illustrate how we rely on tropical forests in our lives, whether it is for food, medicines, or fresh air." Other educational programs are planned. Nearing completion is a horticultural reference center featuring computer and CD-ROM facilities, as well as printed materials.

The Sun Garden lies in the center of the 14,670-square-foot facility on the banks of the Mississippi River, which will be developed in phases. The grounds will eventually hold horticultural and educational facilities including an amphitheater, lookout tower, and interactive children's garden.

Newly opened as of June 20, the QCBC is a participant in the AHS Reciprocal Admissions program, so AHS members are admitted free. Regular admission is \$3.50 for adults, \$1 for youths aged eight to 17, and free for children seven and under. For additional information, visit the Web site at [www.qcbotanicalgardens.org](http://www.qcbotanicalgardens.org), or call (309) 794-0991.

—Mark C. Mollan, Communications Assistant

# classifieds

## a look at current offerings from the marketplace

**CLASSIFIED AD RATES:** All classified advertising must be prepaid. \$2 per word; minimum \$50 per insertion. Copy and prepayment must be received on the 20th of the month three months prior to publication date. Send orders to: AHS Advertising Office, 4350 DiPaolo Center, Suite B, Glenview, IL 60025, or call (847) 699-1707.

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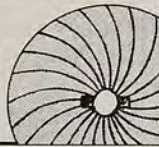
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# hardiness and heat zones

## a guide to USDA and AHS zones for plants found in this issue

For your convenience, the cultivated plants featured in each edition of the magazine are listed here with their USDA Plant Hardiness Zones and AHS Heat Zones. If 0 is listed in place of USDA hardiness zones, it means that plant is a true annual—it completes its life cycle and dies in a year or less. Tropical plants that require minimum temperatures warmer than 40 degrees Fahrenheit—the minimum average temperature in USDA Zone 11—will be listed by minimum average temperature rather than by zone numbers.

### A-C

- Arbutus menziesii* USDA 7-9, AHS 9-7
- Arctostaphylos uva-ursi* 8-11, 12-8
- Argyranthemum frutescens* 10-11, 10-1
- Asarum caudatum* 6-9, 9-4
- Asclepias asperula* 3-9, 9-1
- A. curassavica* 45°, 12-8
- A. exaltata* 3-9, 9-1
- A. birtella* 4-8, 8-1
- A. incarnata* 4-9, 9-1
- A. lanceolata* 3-9, 12-1
- A. purpurascens* 4-8, 11-1
- A. quadrifolia* 4-9, 12-1
- A. rubra* 5-9, 9-4
- A. speciosa* 3-9, 9-1
- A. sullivantii* 3-7, 7-2
- A. syriaca* 4-9, 9-1
- A. tuberosa* 4-9, 9-1
- A. verticillata* 3-9, 9-1
- A. viridiflora* 5-8, 8-3
- Athyrium filix-femina* 4-9, 9-1
- Baptisia tinctoria* 4-10, 10-1
- Blechnum spicant* 5-8, 8-3
- Carex pendula* 5-9, 9-4
- Centaurea americana* 0, 12-1
- C. cyanus* 0, 9-1
- C. dealbata* 'Steenbergii' 4-8, 8-1
- C. debeauxii* 7-9, 9-5
- C. depressa* (*C. pulchra* 'Major') 0, 9-1
- C. hypoleuca* 'John Coutts' 4-8, 8-1
- C. jacea* 3-8, 8-1
- C. macrocephala* 3-7, 7-1
- C. montana* 'Alba' 3-8, 8-1
- C. nigra* 3-9, 9-1
- C. pulcherrima* 4-8, 8-1
- C. rothrockii* 6-11, 12-6
- C. scabiosa* 3-9, 9-1

- C. simplicicaulis* 3-8, 8-1
- C. uniflora* subsp. *nervosa* 3-8, 8-1
- Centranthus ruber* 'Roseus' 5-8, 8-2
- Chasmanthium latifolium* 5-9, 9-3
- Chelone glabra* 4-9, 9-3
- Clematis terniflora* 4-9, 9-2
- Conradina verticillata* 8-11, 12-7
- C. canescens* 8-11, 12-7
- Cornus nuttallii* 7-8, 8-6
- Crambe maritima* 6-9, 9-6
- Cynoglossum grande* 7-8, 8-6

### D-I

- Dicentra eximia* 4-8, 8-2
- D. formosa* 4-8, 8-1
- D. spectabilis* 4-8, 8-1
- Digitalis parviflora* 4-9, 9-1
- Eryngium yuccifolium* 4-8, 8-2
- Festuca rubra* 4-8, 8-1
- Gaura lindheimeri* 6-9, 9-3
- Gaultheria shallon* 6-8, 8-3
- Gentiana andrewsii* 4-9, 9-1
- Gillenia trifoliata* 5-9, 9-3
- Gloriosa superba* 'Rothschildiana' 50°, 12-8
- Hippophaë rhamnoides* 3-8, 8-1
- Hylotelephium* (formerly *Sedum*) 'Autumn Joy' 4-9, 9-1
- Ilex glabra* 3-8, 9-2
- I. opaca* 5-9, 9-1
- I. vomitoria* 4-9, 8-2
- Ipomopsis aggregata* 8-9, 9-1
- Iris douglasiana* 7-9, 9-6

### J-O

- Jeffersonia diphylla* 5-7, 7-4
- Kosteletzkya virginica* 6-11, 12-6
- Lathyrus japonicus* subsp. *maritimus* 4-9, 9-1
- Leiophyllum buxifolium* 6-8, 8-4
- Lithocarpus densiflorus* 8-10, 10-7
- Lithophragma affine* 4-6, 6-1
- Myrica californica* 5-8, 8-4

- M. cerifera* 6-9, 9-5
- M. pensylvanica* 3-6, 6-1
- Opuntia compressa* 6-8, 8-4
- Oxalis oregana* 7-9, 9-0

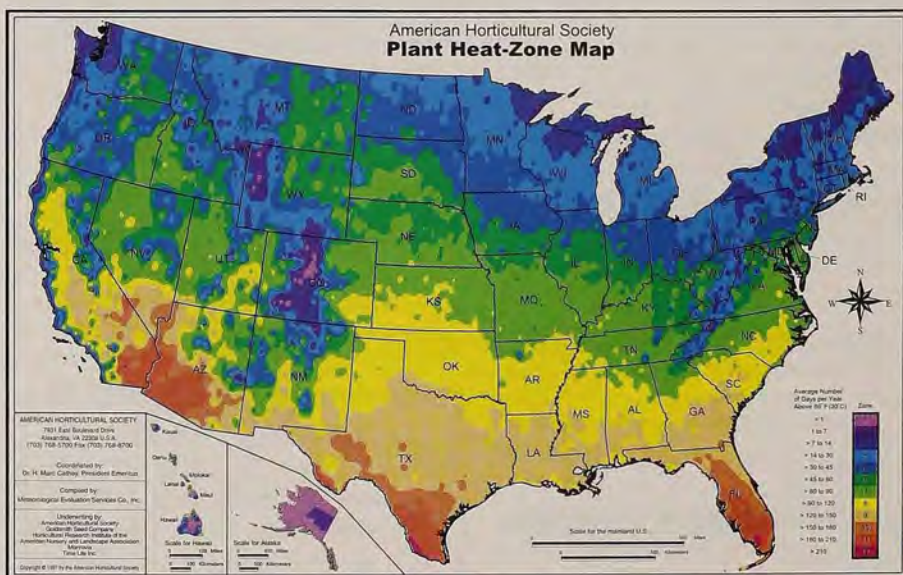
### P-S

- Phlox glaberrima* 3-9, 9-1
- Polygonum aubertii* 5-8, 8-3
- Polypodium vulgare* 6-8, 8-3
- Polystichum munitum* 3-8, 8-1
- Prunus maritima* 3-6, 6-1
- Rehmannia elata* 9-11, 12-9
- Romneya coulteri* 7-8, 8-6
- Sagittaria latifolia* 5-11, 12-2
- Scabiosa caucasica* 'Alba' 4-9, 9-2
- Schizanthus pinnatus* 0, 6-1
- Scoliopus bigelovii* 6-8, 8-5
- Scutellaria incana* 6-8, 8-5
- Shortia galacifolia* 6-9, 9-2
- Smilacina stellata* 3-7, 7-1
- Solidago sempervirens* 5-9, 9-4
- Spigelia marilandica* 7-9, 9-7

### T-Z

- Trillium ovatum* 5-8, 8-4
- Typha laxmannii* 3-11, 12-1
- Uniola paniculata* 7-11, 12-7
- Viola cuneata* 6-8, 8-3
- V. nephrophylla* 5-9, 9-3
- V. odorata* 8-9, 9-7
- V. sempervirens* 6-8, 8-4
- Zingiber* spp. 0, 12-7
- Zizia aurea* 3-9, 9-1

The codes above are based on a number of commonly available references and are likely to be conservative. Factors such as microclimates, plant provenance, and use of mulch may affect individual gardeners' experiences. To purchase a durable two-by-three-foot poster of the AHS Heat-Zone Map, call (800) 777-7931 ext. 45.





## pronunciations

### a simple speaking guide to plants found in this issue

#### *Acorus calamus*

AK-or-us KAL-uh-mus

#### *Arbutus menziesii*

ar-BYEW-tus men-ZEES-ee-eye

#### *Arctostaphylos uva-ursi*

ark-toh-STAFF-ih-loss yew-vuh-UR-sigh

#### *Argyranthemum frutescens*

ar-jih-RAN-theh-mum froo-TEES-senz

#### *Artemisia stelleriana*

ar-teh-MEEZ-yuh steh-leh-rec-AN-uh

#### *Aruncus dioicus*

uh-RUN-kus die-o-EE-kus

#### *Asarum caudatum*

uh-SAR-um kaw-DAY-tum

#### *Asclepias asperula*

as-KLEE-pee-us ass-peh-ROO-luh

#### *A. curassavica*

A. kur-uh-SAV-ih-kuh

#### *A. lanceolata*

A. lan-see-o-LAY-tuh

#### *A. purpurascens*

A. per-per-ASS-senz

#### *A. sullivanii*

A. sub-lih-VAN-tee-eye

#### *A. verticillata*

A. vur-tih-sih-LAY-tuh

#### *Athyrium filix-femina*

uh-THIH-ree-um FIL-iks-FEM-ih-nuh

#### *Baptisia arachnifera*

bap-TIZ-yuh ah-rak-NIF-ur-uh

#### *Blechnum spicant*

BLEK-num SPEE-kant

#### *Calypso bulbosa*

kah-LIP-so bul-BO-suh

#### *Centaurea babylonica*

SEN-taw-ree-uh bab-ih-LON-ih-kuh

#### *C. dealbata*

C. dee-al-BAY-tuh

#### *C. debeauxii*

C. dee-BO-ee-eye

#### *C. pulcherrima*

C. pul-KER-rih-muh

#### *C. rotbrockii*

C. roth-ROCK-ee-eye

#### *C. scabiosa*

C. skay-bee-O-suh

#### *C. simplicicaulis*

C. sim-plih-sih-KAW-liss

#### *C. solstitialis*

C. sol-stih-she-AL-iss

#### *Centranthus ruber*

sen-TRAN-thus ROO-bur

#### *Chelone glabra*

kee-LO-nee GLAB-ruh

#### *Chrysogonum virginianum*

krih-SOG-on-um vur-jin-ee-AN-um

#### *Conradina verticillata*

kon-ruh-DEEN-uh vur-tih-sih-LAY-tuh

#### *Crambe maritima*

KRAM-bee muh-WRIT-ih-muh

#### *Cynoglossum grande*

sin-o-GLOS-sum GRAN-dee

#### *Elliottia racemosa*

el-lee-OT-ee-uh ras-eh-MO-suh

#### *Eryngium yuccifolium*

ee-RIN-jee-um yuk-ih-FO-lee-um

#### *Gaultheria shallon*

gawl-THEER-ee-uh SHAL-lon

#### *Gentiana andrewsii*

jen-she-AN-uh an-DREW-zee-eye

#### *Gillenia trifoliata*

jih-LEN-ee-uh try-fo-lee-AY-tuh

#### *Hippophaë rhamnoides*

hip-po-FAY-ee ram-NOY-deez

#### *Houstonia caerulea*

hyew-STOH-nee-uh see-ROO-lee-uh

#### *Ipomopsis aggregata*

ip-o-MOP-sis ag-reh-GAY-tuh

#### *Kosteletzkya virginica*

kos-teh-LETZ-kee-yuh vur-JIN-ih-kuh

#### *Lathyrus japonicus* subsp. *maritimus*

LATH-ih-rus jah-PON-ih-kus subsp. muh-WRIT-ih-muss

#### *Leiophyllum buxifolium*

lay-o-FIL-lum buk-sih-FO-lee-um

#### *Lithophragma affine*

lih-tho-FRAG-muh uh-FEE-nay

#### *Matteuccia struthiopteris*

muh-TEW-key-uh struh-thee-OP-tur-iss

#### *Panax quinquefolius*

PAN-aks KWIN-kwe-FO-lee-us

#### *Polygonum aubertii*

pah-LIG-o-num aw-BERT-ee-eye

#### *Polypodium vulgare*

pawl-ee-PO-dee-um vul-GAR-ay

#### *Polystichum munitum*

pah-LISS-tih-kum mew-NY-tum

#### *Pteridium aquilinum* var. *pubescens*

teh-RID-ee-um ah-kwi-LY-num var. pyew-BES-senz

#### *Rehmannia elata*

ray-MAN-ee-uh ee-LAY-tuh

#### *Romneya coulteri*

rom-NEE-yuh KOOL-tur-eye

#### *Sagittaria latifolia*

sah-jih-TAIR-ee-uh lat-ih-FO-lee-uh

#### *Schizanthus pinnatus*

skih-ZAN-thus pih-NAY-tus

#### *Scoliopus bigelovii*

sko-lee-O-puss bih-guh-LO-vee-eye

#### *Scutellaria incana*

skoo-tuh-LAIR-ee-uh in-KAN-uh

#### *Smilacina stellata*

smy-LASS-ih-nuh stel-LAY-tuh

#### *Typha laxmannii*

TY-fuh laks-MAN-ee-eye

#### *Viola nephrophylla*

VY-o-luh nef-ro-FIL-luh

#### *Zingiber mioga*

ZIN-jih-bur ME-o-guh

#### *Zizia aurea*

ZIZ-ee-uh AW-ree-uh

## What's in a Name: *Scoliopus bigelovii*

This small genus of woodland perennials—distinguished by short underground stems and umbels of malodorous, orchidlike flowers on curved stalks—contains only two species, both native to the Western United States. *Scoliopus* is a member of the lily family (Liliaceae), although some taxonomists include it with the trillium family (Trilliaceae).

The unpleasant smell of its flowers—and the fancied resemblance of its three prominent, slender tepals to the forked tongue of a snake—led to its common name, fetid adder's-tongue. The genus name is derived from the Greek word *skolios*, which means curved or bent—an allusion to the curving flower stalks. The specific epithet, sometimes rendered *bigelovii*, honors John M. Bigelow (1787–1879), a Boston physician who accompanied renowned botanist Georg Engelmann during his plant explorations along the U.S.–Mexico border.

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