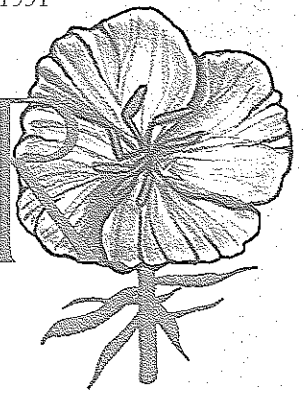


WILDFLOWER



A nonprofit organization dedicated to researching and promoting wildflowers to further their economic, environmental, and aesthetic use.

New board president named for Center

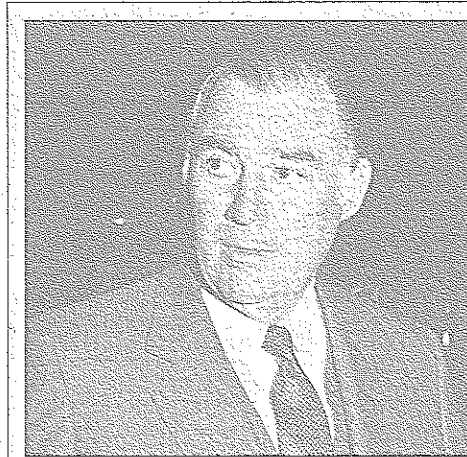
National Wildflower Research Center trustee Dana Leavitt has been selected to serve as the new president of the Wildflower Center Board of Trustees.

Mr. Leavitt succeeds Nash Castro, who has presided over the Board of Trustees since the creation of the Wildflower Center in 1982.

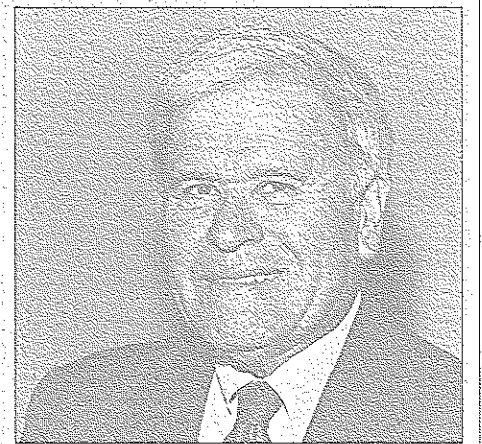
"Nash Castro's dedication and energy have been instrumental in the rapid progress the Wildflower Center has experienced in its first eight years. He has led us to a position of national prominence," says David Northington, executive director of the Wildflower Center.

Mr. Leavitt was elected president at the Board of Trustees' October meeting in San Antonio, Texas. He officially assumes the duties of president January 1, 1991.

Mr. Leavitt, who lives in California, has served on the Wildflower Center board since 1988. He is president of Leavitt Management Co. of San Francisco and serves on the boards of several corporations and organizations such as Chicago Title and Trust Co.



Dana Leavitt



Nash Castro

and Queen of the Valley Hospital in Napa, Calif.

"We look forward to the management experience Dana Leavitt brings to the Wildflower Center. We have a bright future full of opportunities, and we feel his leadership will keep us moving forward at the same rapid pace," Dr. Northington says.

As a token of its appreciation, the Wildflower Center and the Board presented Mr. Castro with a special Connoisseur porcelain wildflower

figurine, "Woodland Wonders," at the October meeting.

Mr. Castro, who recently retired as executive director of the Palisades Interstate Park Commission, will continue serving on the board's Executive Committee.

"The NWRC is fortunate to have an active and involved board and we are pleased that both our past, and future leadership bring unique talents and strengths to the broad spectrum of projects in which the Center is involved," Dr. Northington says.



Here's one way *you* can help promote wildflowers and native plants: Ask local and state governments and companies that have tree give-away programs to give native trees.

New Year's resolution: stop pests naturally

Biological pest control — controlling pests by using their natural enemies — is the oldest pest control method in the world.

The Chinese were the first to use biological pest control, or integrated pest management. As early as the third century, Chinese citrus growers used predatory ants to forage for insects. The ants were sold in marketplaces and used to prevent "wormy" oranges.

In 1889, the United States Department of Agriculture introduced planned biological pest control to the

United States. Because cottony cushion scale was destroying the California citrus groves, the USDA imported a beetle to curb the citrus pest. Beetles still protect the groves today.

Although biological pest control was effective, new toxic chemical pesticides were developed and widely used after World War II; biological controls were nearly forgotten.

But concern about the effects of chemical pesticides have pushed today's

(read on, page 4)

Diversity an essential element of native landscapes

We frequently hear landscape designers and others suggest that exotic plants are used to increase diversity. Why, it is asked, should we deny ourselves the use of these many plants? The argument may seem reasonable, at least in terms of artistic expression, but the results hardly suggest that variety actually is a goal.

Estimates are that some 85 percent of our landscaping is done with a selection of only 20 exotic species. Not only are the plants the same, the landscape designs are similarly monotonous. Moreover, many of the plants are static, changing little from January to July. Consequently, such plantings provide neither a sense of place nor a sense of time.

The monotony becomes even more extreme because of our tendency to select plants for particular traits such as dwarf growth form, large flowers, or variegated leaves. Uniformity, in fact, has become a measure of nursery stock quality. Uniformity is maintained through asexual or vegetative propagation so that genetic variability is lacking.

Asexual propagation is accomplished by such means as stem or leaf cuttings, bulbs, and separations. In each case, the propagated plant is a genetic duplicate, or clone of the parent.

Sexual reproduction is the source of variability. It generally is a genetic exchange between different individuals but even in cases of self-fertilization, there is a random assortment and recombination of genes in the reproductive process.

Thus, there is a homogenization of our habitat in three ways: limited landscape designs, limited numbers of species, and limited variability within the species used. The results, and attendant problems, are similar to those long noted in agricultural monocultures.

The problems are not abated simply by using native plants. There might be a little more regional variation, but if, by and large, we use the same basic plants in the same basic design and they are selected for uniformity of particular traits, we have the same consequences. We need to have more species available to us and to reject the strong tendency to use the same selections.

For some time, a part of the research program at the Wildflower Center has been directed toward the propagation and establishment of native plants. Similar efforts exist with a variety of groups and individuals across the country. While much remains to be done, much has been learned.

Certainly, we have the basic elements to have attractive landscapes that not only reflect time and place but that are ecologically sound, sustainable systems. We simply need to incorporate these ideas into our landscape designs. More importantly, our landscapes can help maintain some of the biodiversity around us rather than reduce it.



John Averett is Research Director of the National Wildflower Research Center.

Wildflower

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WILDFLOWER CENTER NEWS

Alison Hill, Wildflower Center community ecologist, will present a paper titled "Spatial Variability in the Pinyon-Juniper Woodlands of Southern New Mexico," at the Society of Range Management annual meeting in Washington, D.C., in January.

Connoisseur Porcelain of Worcester, England, is donating part of the proceeds from the sale of its fine handcrafted wildflower porcelains to the Center. The 12-piece American Wildflower Collection, whose botanical accuracy is the result of a two-year effort with the Center's staff, features wildflowers indigenous to several regions of the United States. The porcelains are available through the Wildflower Center's gift shop or Connoisseur's agents across the country. The collection includes five limited-edition pieces of 100 copies each and one

limited-edition piece of 50 copies. For a brochure on this exquisite collection, please write to "Porcelains," at the address on the back page.

Because of an agreement between the Wildflower Center and the American Association of Botanical Gardens and Arboreta, Wildflower Center members can receive a combination of one or more benefits — free admission, free parking, or gift shop discounts — at arboreta and botanical gardens across the country. Contact the Wildflower Center's Public Information Office for a list of the 81 botanical gardens and arboreta participating in this program.

More copies of the Center's educational poster for children will be printed and distributed thanks to a donation from Southwestern Bell.

Healthy soil: The key to healthy plants

You've selected plants native to your location, given them water and "food," but *why* aren't they doing well now?

Healthy soil is an important, but often overlooked, component in establishing and maintaining landscapes. Anchored in the soil, plants feed on nutrients available in the upper layers of the Earth's crust. Understanding your soil's composition and its processes is the key to building an environment where your plants will flourish.

Half of a healthy soil's volume is composed of air and water in fluctuating proportions. Minerals account for another 45 percent and organic matter, found in the soil's upper horizons, for only about 5 percent. Soils are characterized by a predominance of sand (light soil), clay (heavy soil), or loam, which is a combination of the two. While sandy soil has good drainage, the active clays hold moisture and prevent

nutrients from leaching. These clays and the organics contribute to the chemical activity that makes nutrients available to plants.

At least 17 elements are essential to the growth of higher plants. Oxygen, hydrogen, and carbon are derived from air and water through photosynthesis. Macronutrients including nitrogen, phosphorus, potassium, and calcium, and trace elements such as iron, copper, and zinc are provided through interactions with mineral and organic components of soil.

A soil's productive capacity is limited not only by the presence of these elements but also by their availability in forms that plants can use. This is why chemical analysis alone cannot give a total picture of your soil's health. A lively population of soil organisms (worms, bacteria, fungi, actinomycetes, etc.) in conjunction with that tiny 5 percent of organic matter increases the soil's

capacity to promote plant growth by regulating nutrient supplies.

Most below-ground microbial species share a mutually beneficial relationship with most plant species. If a healthy native community has long been gone from your site, you can reintroduce, or encourage remnant microbes, by adding compost.

Chemical applications, whether fertilizers, pesticides, fungicides, or herbicides, tend to damage this community of beneficial soil organisms. Pests and pathogens that attack plants are only symptoms of a system's ill health, not the cause.

Once you've selected species compatible with your native soil, stop accumulating poisons in the soil, aerate compacted soils, and imitate nature's processes by continually providing organic litter that feeds the natural processes that build better soil.

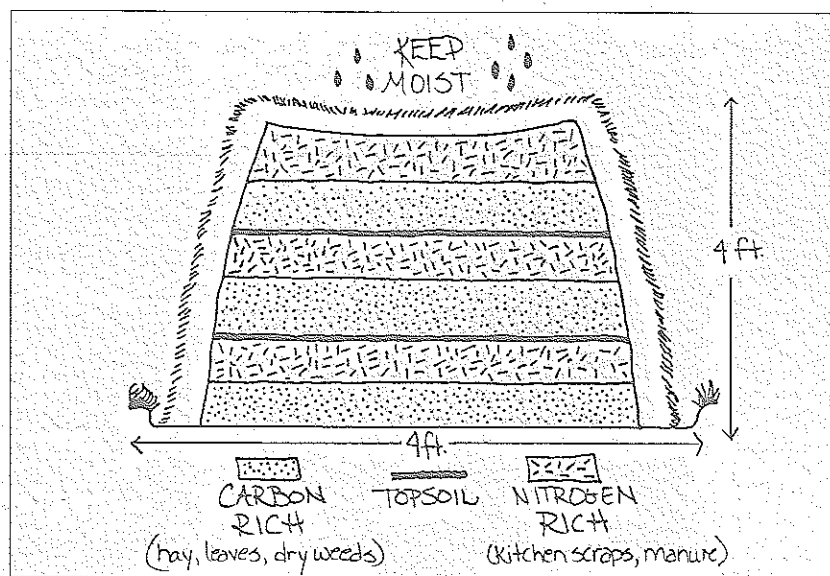
Bonnie Crozier

Wildflower Center Resource Botanist

Composting recycles organic materials

In our "civilized" life, we often harvest organic material and later throw this valuable resource into landfills, where it takes up space and cannot decompose for years, if ever. The wisest way to dispose of organic material is composting it and returning it to the soil.

A multitude of microorganisms including bacteria and fungi decompose plant and animal materials (sometimes called "organic" material) to create compost. In a healthy plant community, composting occurs continuously as plants die and then decompose into nutrients that living plants can use. Animals, including earthworms, deposit feces that decompose and then nourish living plants.



You will probably need a source of animal manure to provide enough nitrogen. Keep the pile moist (not wet) and turn once a week.

Adding compost will add nutrients and beneficial microorganisms and make the soil looser and better able to hold moisture.

You can work compost into the soil when preparing a bed, place it around existing plants, or use

it when planting seeds. Instead of disturbing the soil to plant seeds, place the seeds on top of the soil, then cover them with compost. This deters erosion and is an imitation of the way seeds are planted in nature.

A quick but labor-intensive method of composting is the hot composting method. (See box above).

Marcia Hermann

Wildflower Center Research Assistant

Research Department unlocks the secrets of native plants

The Wildflower Center is answering important questions about wildflowers and native plants posed by horticulturists, garden industry leaders, members of the academic community, and others.

The answers uncovered by Center researchers have helped recreate sustainable wildflower and native plant landscapes in residential yards, commercial landscapes, and along roadsides.

"The techniques we've developed are the ones used most in the current literature (such as seed catalogs and highway department publications), but it's hard to take full credit for all of that," says Dr. John Averett, Wildflower Center research director.

John hopes the Center will continue to influence the horticulture, garden, and seed industries, so wildflowers and native plants will be used in more American landscapes.

Research has evolved from basic field trials and greenhouse studies to more detailed examinations of interactions between plant species at different levels, including relationships between plants and soil microflora such as mycorrhizae and rhizobium, and between plants and other host plants.

"Although the projects are diverse," John says, "they all fit that theme of plant interactions."

Pests (continued from page 1)

gardeners to look for the least-toxic methods of controlling pests. As a result, biological controls are enjoying a renaissance of popularity.

Organisms used to control pests biologically include viruses, bacteria, fungi, nematodes, protozoa, and predatory insects. For example, many gardeners are buying lady bugs, beetles, and praying mantises to control aphids and other soft-bodied pests, and they are buying predatory mites to prey upon spider mite eggs.

Routine applications of toxic chemicals often create problems further down the road — killing not only the pest but its natural enemies, too. This practice leads to an



The Wildflower Center researchers pose in the Pollination Garden. Back row, left to right: Dr. John Averett, Dr. Alison Hill, and Annie Paulson Gillespie. Front row, left to right: Elinor Crank, Beth Anderson, and Marcia Hermann. Not pictured: Bonnie Crozier and Dr. David Northington.

Everything is related in one way or another."

"Endangered species are indicators of damaged habitats."

Currently, Center researchers are studying how mycorrhizal fungi affect plant growth, and how best to reestablish endangered species in their native habitats.

In the mycorrhizae study, staff

unhealthy garden environment and dependency on chemical pesticides.

But biological control begins with a healthy garden environment — healthy plants are less susceptible to insects and disease. Soil is the key to healthy plants.

Avoid adding chemical fertilizers to the soil. Although all natural or chemical fertilizers break down into the same chemical elements before plants absorb them, only the natural ones add valuable organic matter to the soil.

(For more on healthy soil, please see page 3.)

Annie Paulson Gillespie
Wildflower Center Resource Botanist

horticulturist Elinor Crank is investigating whether the inoculant could significantly aid in reestablishing plants, whether they are rare, endangered, or common garden plants.

The endangered plant study has concentrated on two Texas plants, the rare *Salvia penstemonoides* and the endangered *Thymophylla tephroleuca*, or ashy dogweed.

"Endangered species are indicators of damaged habitats," says David Northington, executive director of the Wildflower Center. "To successfully reestablish an endangered species, its habitat must first be repaired. Our research can help others better understand the techniques to successful habitat reestablishment."

Staff ecologist Alison Hill is studying prairies as part of the Center's grasslands restoration project. The data that Alison gathers will help in reestablishing native grasses in damaged areas.

John is proud that Center researchers could "develop a common thread to all the research and involve everyone in it — not only the Research Department, but others at the Center, through the Clearinghouse and other departments. We're all speaking together, with one voice."

Curl up with a best-seller

For anyone interested in wildflower gardening, Harry Phillips' comprehensive book *Growing and Propagating Wild Flowers* is an invaluable reference. Based on 10 years' research on native species at the North Carolina Botanical Garden, the book possesses a wealth of plant information.

Beginning with brief overviews on design, soil preparation, and maintenance, Phillips progresses to discussions on seeds and propagation methods. Much of the book features detailed accounts of individual species found throughout the eastern United States and parts of the western United States.

This paperback book, with 331 pages and 260 illustrations, costs \$14.95 and is one of the most popular offered by the Wildflower Center.

Other best-sellers:

Wildflower Handbook. National Wildflower Research Center. Includes a 50-state directory of native plant sources. 337 p. Paperback. \$9.95.

Wildflowers Across America. Lady Bird Johnson and Carlton B. Lees. Deftly captures the beauty and importance of wildflowers. 288 p. 300 color photos and illustrations. Hardback. \$39.95.

Growing California Native Plants. Marjorie G. Schmidt. Growing and propagating more than 350 species. 366 p. Paperback. \$9.95.

Gardening with Native Plants of the Pacific Northwest. Arthur R. Kruckeberg. Well-organized guidebook of Northwest native plants. 264 p. Paperback. \$22.50.

Southwest Landscaping with Native Plants. Judith Phillips. Tips on designing for arid gardens. 142 p. Paperback. \$17.95.

The Wildflower Meadow Book. Second Edition. Laura C. Martin. Comprehensive guide to meadow gardening. 320 p. Paperback. \$16.95.

Wildflowers of the Southeastern United States. Wilbur H. Duncan and Leonard E. Foote. Wonderful field guide. 304 p. 477 color photos. Hardback. \$17.95.

A Field Guide to Rocky Mountain Wildflowers. Edited by Roger Tory Peterson. 200 color photos. Glossary. Paperback. \$12.95.

A Field Guide to Wildflowers (Northeastern/North-Central North America). Edited by Roger Tory Peterson. Excellent field guide featuring more than 1,293 species. Paperback. \$14.95.

Wildflower Folklore. Laura C. Martin. Fascinating, entertaining book filled with little-known facts and legends about wildflowers. 256 p. Hardback. \$23.95.

To order any of these selections, please use the form below.

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Use this form to order any of the books on this page. Make your check payable to NWRC and mail with form to: NWRC Book Orders, 2600 FM 973 North, Austin, TX 78725-4201. Or call (512) 929-3600, from 9 a.m. to 4 p.m. Central Time weekdays, for credit card orders only.

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FROM THE FIELD

Fifth Annual Texas Xeriscape Conference, Jan. 10-11, San Marcos, Texas. Conference on water conservation using native plants. Includes public forum on Jan. 10. **Contact:** Vicki Greene, Texas A&M University, University Center — 2nd Floor, Rudder Tower, College Station, Texas 77844-1232, (409) 845-8904.

Society for Range Management Annual Meeting, Jan. 12-17, Washington, D.C. Meeting topic is "Rangeland Resources: Influencing Change in a Global Setting." **Contact:** SRM, 1839 York St., Denver, Colo. 80206, (303) 255-7070.

Native Plants in the Landscape: Maintaining Natural Grasslands and Meadows, Feb. 11, New Brunswick, N.J. **Contact:** Cook College Office of Continuing Professional Education, P.O. Box 231, New Brunswick, N.J. 08903, (908) 932-9271.

International Erosion Control Association Conference, Feb. 20-23, Orlando, Florida. **Contact:** Ben Northcutt, IECA, P.O. Box 4904, 1485 S. Lincoln, Steamboat Springs, Colo. 80477, (303) 879-3010.

Wildflower Photography Lecture and Workshop, March 7, Northern Arizona University, Flagstaff, Ariz. Program sponsored by the National Wildflower Research Center. **Contact:** Northern Arizona University, (602) 523-6168.

Southwest Regional Conference on Landscaping and Water Conservation with Native Plants, March 14-16, Desert Botanical Garden, Phoenix. **Contact:** Sondra Mesnik, Desert Botanical Garden, 1201 N. Galvin Parkway, Phoenix, Ariz. 85008, (602) 941-1225.

Needed: landscape architects and designers, ecologists, and restorationists

The Wildflower Center is updating the 1989 *Wildflower Handbook*.

The next edition will list professionals who incorporate native plants into planned landscapes, including landscape architects and designers, ecological restorationists, and consultants involved in assessment, inventory, planning, and monitoring native plants.

To be included, request an Ecological Landscape survey from the Wildflower Center. Write to the attention of the Ecological Survey, using the address listed below, or call (512) 929-3600.

Experience beautiful Guatemala

The Wildflower Center and SelecTours have planned a lush tropical adventure in the rain forests of Guatemala, January 19 through 27. Visitors on the

tour will see the ancient Mayan ruins of Tikal, the Turkey Hill Biological Reserve, and many other Guatemalan treasures. Other tours this year include:



Baja California

Whale Search and Exploration

March 2-9

Costa Rica

March 17-23

Austin, Texas

April 19-28

England

May

Sea to Sea

June 28-July 5

For more information — or reservations — contact SelecTours at 1-800-759-7727.

Celebrate a new year: Join the National Wildflower Research Center!

Members of the National Wildflower Research Center support wildflower and other native plant work across the nation. Benefits include *Wildflower*, the newsletter and *Wildflower*, the journal; 10% discount on unique Center products such as wildflower books, calendars, and T-shirts; advance notice on tours and discounts to Center seminars; free wildflower information from the Center's Clearinghouse; a membership card; and other benefits.

- \$25 Supporting Member. All benefits listed above.
- \$50 Sustaining Member. All the above plus a set of specially commissioned wildflower note cards.
- \$100 Key Member. All the above plus wildflower garden apron and invitations to special events.
- \$250 Center Sponsor. All the above plus wildflower poster.
- \$500 Trust Member and \$1,000 Benefactor. All the above plus special privileges.

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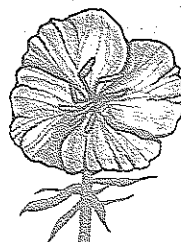
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