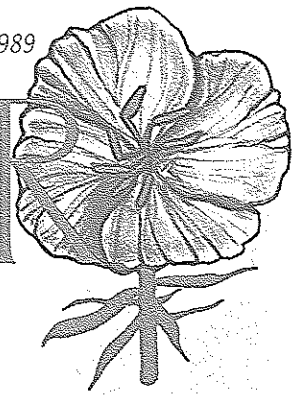


WILDFLOWER



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

Spring Climbs Rockies Slowly

By the calendar, spring comes earlier in the southern parts of North America than in the more northern regions. And in high-elevation areas like the Rocky Mountains, spring comes even later. Spring wildflowers appear in February in the southern deserts, in March and April throughout the South and Southeast, and in June and July in the western mountains of the United States.

The snowcapped mountains of the West are a favorite retreat for denizens of hot-summer areas. Many different wildflower species grow along the mountains' changing elevational gradient. For years, naturalists have recognized general vegetation patterns that correspond to elevation zones.

Life zones, as described by naturalist C. Hart Merriam in the late 1800s, are perhaps the most famous. Dr. Merriam described seven distinct zones in the San Francisco Mountains in northern Arizona, and they have been generalized into five zones for other western mountain regions: *grasslands* (4,000-6,000 feet), *foothills* (6,000-8,000 feet), *timbered mountain slopes* (8,000-10,000 feet), *timberline* (10,000-11,500 feet) and *alpine* (11,500 feet and above).

Each of those zones has its own set of wildflowers, although the same species may be found in more than one zone. Plants of the same species usually bloom later in higher zones. Exceptions to this are high-elevation riparian (streamside) areas, where running water provides some insulation from harsh temperatures.

The alpine zone is one of the most spectacular areas in the Rockies.

Although wildflowers bloom for only a few short weeks at this elevation, the area is popular with plant lovers from across the world. Some of the more common native species are: *Polemonium viscosum* (sky pilot), *Caltha leptosepala* (cowslip), *Draba* spp. (several mustards), and *Phlox caespitosa* (alpine phlox).

Flora of other western ranges follow the general pattern of life zones. For instance, some of the same genera are found at similar elevations in the Sierras. Life zones serve as habitat guides, for both botanical research and wildflower watching!

Katy Kramer McKinney,
Wildflower Center Research Botanist

Colorado Cooler

The cool, green, high alpine meadows of the Rocky Mountains are the destination of a National Wildflower Research Center summer fund-raising tour, from July 28 to August 2. The itinerary? Wildflower walks, trout fishing, and photography — all with experienced guides — are a few of the activities. Professional chefs will provide three hearty meals a day.

Terry and Charlotte Strange of California, and Milly and Charles Crites of Texas will cohost the retreat at the cabins of Mr. and Mrs. Howard H. Callaway in North Pole Basin, located above Crested Butte, Colorado. Mrs. Callaway is Vice President, Education, of the Wildflower Center's Board of Trustees, and Mrs. Strange is one of the Center's newest trustees. Space is still available for the trip. For information, call Mae Daniller, the Center's Development Director, (512) 929-3600.

Christina Allday-Bondy,
Wildflower Center Admin. Asst., Development

Phlox caespitosa (alpine phlox)

Conference Report:

On Friday, May 5, 1989, representatives of 30 organizations from across North America gathered at the National Wildflower Research Center to open a unique conference. A grant from the American Conservation Association made it possible for the Wildflower Center to host a **Conference of Wildflower and Native Plant Organizations**, providing three days of discussions on pre-identified topics of mutual concern.

Organizations invited to attend included conservation and restoration groups, botanic gardens and arboreta, garden clubs, wildflower and native plant preservation societies, and related groups concerned with protecting and reestablishing native flora. Although all entities that participated are nonprofit, most have active and productive relationships with the nursery and seed industries and with local, state, and federal land management agencies.

The Wildflower Center is preparing a complete summary of conference discussions for the participating groups. However, *Wildflower* newsletter offers an opportunity to report on the main points covered in conference sessions:

- The best examples of local ecosystems must be identified, acquired, and preserved, using management techniques that emulate natural processes. Nothing substitutes for conserving what we still have.
- The burgeoning demand for wildflower seed and native plants for landscapes must be met through increased commercial production. Concepts and statements such as

(read on, back page)

Director's Report

Introducing: New Trustees, New Advisory Council Members

Any successful nonprofit organization depends heavily on its board for guidance, policy setting, hands-on work, financial support, and technical advice. The National Wildflower Research Center is no exception — our Board of Trustees is essential to our effectiveness and stability. Composed of representatives from across the nation, the Wildflower Center Board of Trustees is an excellent illustration of the old saying that governing boards provide "work, wisdom, and wealth" to enable an organization to thrive.

Trustees not only provide needed financial support each year, many also give generously of their time, serving on one or more of our standing committees. Whether they help establish policy or commit time to a project-oriented committee, trustees provide Wildflower Center staff members with assistance on a broad range of programs and activities.

Because the Wildflower Center is engaged in many technical activities, trustees and staff are also assisted by another invaluable group — our Advisory Council. Being able to turn to this source of experience-based wisdom saves us countless hours and dollars.

As each year passes, trustees complete their term of service and new board and council members are elected to continue the work begun by Lady Bird Johnson and members of the Center's Founding Board, many of whom have continued to serve by accepting a second term. With the continued support and participation of our trustees and members of the Advisory Council, we are confident that the Wildflower Center will grow and prosper. We would like to introduce our board officers and newest trustees and council members:

Board of Trustees

Mrs. Arnold Schwartz, New York, N.Y., a trustee since 1985, is now Board of Trustees Vice President, Development, joining our other board officers, who include Mr. Nash Castro, President; Mr. G. Michael Alder, Vice President, Research; Mrs. Howard H. Callaway, Vice President, Education; Mr. C.W.W. Cook, Vice President, Management; Mr. Robert Ench, Vice President, Operations; Mr. Donald S. Thomas, Senior Vice President; and Mr. John Barr, Secretary-Treasurer. Lady Bird Johnson and Helen Hayes continue actively as co-chairmen of the board.

Joining the board as new trustees are:

Mrs. Robert O. Anderson, Roswell, N.M.
Dr. Charles J. Arntzen, College Station, Tex.
Mrs. John Byram, Austin, Tex.
Mrs. Barton C. English, Stonewall, Tex.
Mrs. Wayne Gibbens, Arlington, Va.
Mr. Gilbert Grosvenor, Washington, D.C.
Mrs. Gail L. Jacobs, Bethesda, Md.
Mr. Patrick Noonan, Arlington, Va.
Mrs. Howard Phipps, Westbury, N.Y.
Mrs. Bob L. Schieffer, Washington, D.C.
Mrs. Charlotte Anders Strange, Tiburon, Calif.

Advisory Council

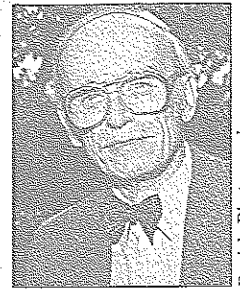
Four trustees have "changed hats" to work with us as members of the Wildflower Center Advisory Council. They are Mrs. Jacqueline Goettsche, Houston, Tex.; Mrs. Grace Jones, Salado, Tex.; Mr. John Thomas, Eagle Lake, Tex.; and Mrs. Roberta Warren, Comfort, Tex.

Joining the Advisory Council as new members are Mr. Joe McElroy, Chicago; and Mrs. Jack C. Payne, Wimberley, Tex.

David K. Northington, Ph.D.,
Wildflower Center Executive Director

Trustee Profile: Carlton B. Lees

He says he's a "descendant of Connecticut Yankees since 1630," and Wildflower Center Trustee Emeritus Carlton B. Lees reveals his heritage as a practical New Englander when he talks about helping Lady Bird Johnson found the Center in the early 1980s. "Basically," he says, "it was like putting up a steel-girded building: You start with the simplest framework and build on it, according to priority, opportunity and need."



Parish Photography

Mr. Lees, who resides in North Carolina, is a former editor-in-chief of *Horticulture* magazine, retired senior vice president of the New York Botanical Garden, the author of several books, and is now changing roles from senior vice president of the Wildflower Center's Board of Trustees to trustee *emeritus*. He met Mrs. Johnson, the Center's founder and co-chairman, in 1964 at her White House Conference on Beautification. As an editor, he had been trying to relate native plants to gardening.

"A lot of people thought I was barking up the wrong tree, but Mrs. Johnson's focus on beautification provided a great step forward," he says. "We all knew 'beautification' was not the word, but it did the job and made a lot of believers!"

When Mrs. Johnson decided to establish the Wildflower Center, she asked Mr. Lees to head the master plan committee. He did — Wildflower Center Board of Trustees President Nash Castro notes that "Carlton Lees was a bulwark in launching the Center and has made an indelible imprint on its future." He was adamant that the Center's departmental structure should include a Clearinghouse of wildflower information which, now in its fifth year, answers thousands of inquiries annually.

Wildflower

Founder: Lady Bird Johnson

Executive Director:
David K. Northington, Ph.D.

Editor:
Candace Kiene

Art Director:
Patty Alvey

Copy Editors:
Beth Anderson, Jim Hankins

Wildflower, v. 6, no. 4 (ISSN 0898-8803). Published bimonthly. A portion of \$25 membership dues pays for your annual subscription to *Wildflower*, National Wildflower Research Center, 2600 FM 973 North, Austin, Texas 78725-4201. Phone: (512) 929-3600. Material may be reprinted with the permission of the editor. Second class postage paid at Austin, Texas.

POSTMASTER: Send address changes to *Wildflower*, National Wildflower Research Center, 2600 FM 973 North, Austin, Texas 78725-4201.

Grasses Grasses Grasses

In a world dominated by visual images, it's the showy, colorful plants that capture the attention and admiration of the masses. The subtle beauty of native grasses is often overlooked or unappreciated.

Yet, "grasses inhabit the earth in greater abundance than any comparable group of plants," notes F.W. Gould in *Grass Systematics*, published by Texas A&M University Press. The world's major food crops — rice, corn, wheat, and sugar cane, to name a few — are members of the Poaceae or grass family. Grasses are also important in the production of meat and milk products; they provide fodder for beef and dairy cows. And, of course, the turf industry depends on grasses for millions of lawns and golf courses.

Many of the most beautiful grasses are the indigenous grasses of each region. Late summer or fall is when most warm-season grasses reach their showiest flowering stages, and this season is also the best time to take up the challenge of grass identification.

The thought of trying to learn grasses often makes even botanists throw up their hands with dismay. Grass taxonomy has its own unique terminology, and you'll soon find yourself

wading through terms such as *glume* (modified leaf, or bract), *lemma* (bract with seed), *rachilla* (part of the stem), and *ligule* (part of the leaf).

Taxonomic differences in species or genera are often determined by the structure and type of inflorescence (spikelet) that a grass has. A true grass expert never sets out in search of grasses without a hand lens and dissecting tools.

Yet all grasses have basic characteristics that even a novice *agrostologist* can recognize, such as shape, texture, and color. For instance, if a plant looks like a grass, it usually is one! In the words of Samuel Johnson, 18th-century English author, "A blade of grass is always a blade of grass, whether in one country or another."

Characteristics of grasses also include: a *culm* or stem that is usually hollow except at the node where the leaf is attached, paired leaves with parallel venation, and small inconspicuous flowers, reduced to stamens and pistils and enclosed in a series of bracts.

Two related grass-like families are the sedges and rushes. Sedges have solid stems and are usually triangular in shape. The flowers are extremely showy, while the leaves are in groups

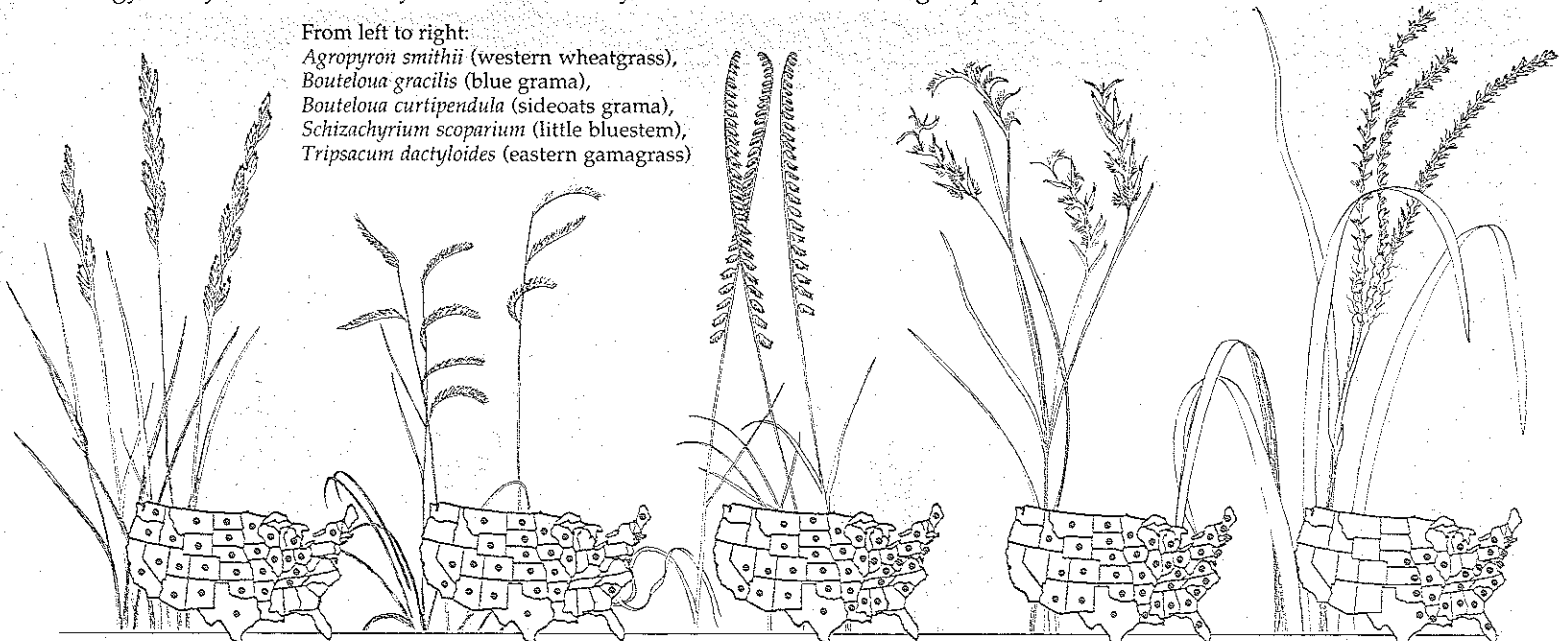
of three. Rushes have mostly round, solid stems, and flowers that produce many seeds in each capsule.

Like other herbaceous plants, grasses can be annuals or perennials. Perennial grasses can be categorized as bunch grasses or sod-forming grasses. Bunch grasses form into clumps with leaves that rise up from the base. Over a period of time the center dies out, leaving a ring of new green growth on the outside. Bunch grasses are adapted to dry soils in particular, and are an important source of forage in arid rangeland. Sod-forming grasses spread over large expanses with *stolons* (creeping runners) and *rhizomes* (underground stems).

Although the prairies of the Midwest constituted the largest area of grassland in North America, grasses also occurred in the Coastal Prairie of the Gulf Coast, the Palouse Prairie of the Northwest, the Pacific Prairie of California, and the Desert Plains Grassland of the Southwest. Agricultural practices and urban development have drastically depleted or altered the original areas and plant composition of those grasslands.

Beth Anderson,
Wildflower Center Resource Botanist

From left to right:
Agropyron smithii (western wheatgrass),
Bouteloua gracilis (blue grama),
Bouteloua curtipendula (sideoats grama),
Schizachyrium scoparium (little bluestem),
Tripsacum dactyloides (eastern gamagrass)



MOWING MOWING MOWING MOWING

We've been battling weeds along roadsides as long as we've been building highways. We mow them, plow them, and spray them, but we have more weeds now than ever. It's time to change management practices — from killing weeds to establishing a vigorous native grass cover to prevent their growth.

Developing mowing practices that preserve and support native species (both grasses and wildflowers) can be a key step in winning the weed battle. A native grass cover can help choke out weeds by preventing weed seeds from germinating, or by simply out-competing weeds. Two practices critical to keeping native vegetation vigorous and competitive are:

- mowing at the proper height
- following a timely mowing cycle

Mowing too short, a common practice, weakens native grasses. Many depend on their leaves to nourish the root systems, and shearing off too much leaf area reduces competitive vigor. Native bunch grasses such as *Bouteloua curtipendula*

(sideoats grama), *Schizachyrium scoparium* (little bluestem), and *Agropyron smithii* (western wheatgrass) should be at least seven inches high. The recommended minimum height for turf-forming native grasses (including *Buchloe dactyloides* or buffalo grass) is four to six inches.

Timely mowing cycles are crucial. In late summer and early fall, native grasses are growing actively and should not be cut too low. It is better to delay mowing until seed heads mature and grasses are dormant — in late fall in most areas, and as late as early winter in southern areas.

In many states, highway departments mow frequently, putting stress on native grasses. Many weeds and undesirable grasses such as *Sorghum halepense* (Johnsongrass) can sustain frequent mowing and, as a result, become dominant. A delay in mowing can give native grasses a chance to compete.

Annie Paulson Gillespie,
Wildflower Center Resource Botanist

From the Field

"Native Heritage in Washington State" July through Oct. 1, Burke Museum, University of Washington, Seattle, Wash.
This exhibit includes a display of native plants used by native tribes of Washington. Contact: (206) 543-5590.

Crested Butte Wildflower Festival July 2-Aug. 13, Crested Butte, Colo. Continuing from June, this annual festival is dedicated to sharing a universal appreciation of wildflowers and assisting in their propagation and preservation. Most events are scheduled for the weekends. Highlights include landscape and garden tours, natural history talks, identification walks, and horseback rides. Contact: (303) 349-6438.

Texas Fourth Annual Xeriscape Conference Oct. 5-6, Arlington Hilton, Arlington, Tex.
Conference on water-efficient landscaping. Contact: Cari Hyden, (817) 870-8208.

Natural Areas Conference Oct. 17-20, Knoxville, Tenn. This is the sixteenth annual conference. Contact: J. Ralph Jordan, Natural Resources Building, Tennessee Valley Authority, Norris, Tenn. 37828, (615) 494-9800.

Coming Up!

Watch *Wildflower* newsletter and other publications for details about the following events: Mid-South Native Plant Conference in Memphis, Tenn., Oct. 27-29... American Society of Landscape Architects Annual Meeting in Orlando, Fla., Nov. 18-21.

Q Questions, questions, questions! The Clearinghouse at the National Wildflower Research Center answers thousands of questions a year on wildflowers and native plants and how to grow them. Here we feature some of those questions and the answers.

Q. I would like to plant some lady's slipper orchids. However, I cannot find a nursery that carries them. How can I purchase some? — R. H., Newcomerstown, Ohio

A. Like other members of the orchid family, *Cypripedium* spp. (lady's slippers) are endangered in many areas. Since they are difficult to propagate, lady's slipper plants sold in nurseries may have been collected from the wild, and may not survive transplanting. Horticulturists are experimenting with new methods of propagation, such as tissue culture, so there is hope for greater commercial availability in the future. Until then, enjoy lady's slippers in their native habitats.

Q. I would like to begin an effort to preserve wildflowers that grow along roadsides. Are there state laws prohibiting the mowing of roadsides in wildflower seasons? — M.Y., Point Washington, Florida

A. Each state sets its own mowing policies. Although many defer mowing during bloom seasons, such decisions are up to each highway department or district.

Q. Indian paintbrush blankets the meadows and fence rows along the country road where I walk daily. One day I spotted a lone white paintbrush amongst the red ones. Have I stumbled upon a rare mutant? — F. H., Scroggins, Texas

A. Albino plants are indeed the result of genetic crosses and can be rather rare. Sometimes unusual coloration is more concentrated in small populations.

If you have a question about native plants, write to the Clearinghouse at the Wildflower Center (address on page 2). Free wildflower information is a benefit of membership in the Center. Nonmembers need to enclose \$1 and a self-addressed label or 3-by-5-inch card.

How Natives Take the Heat

The air is hot and dry. Heat waves radiate off the road, creating the illusion of movement. Looking out from cars, buildings, and other air-conditioned habitats makes you wonder how plants survive the hot, dry days of summer. Basically, they do it by avoiding the heat and conserving water, precautions often taken by natives of hot climates.

Unfortunately, many plants we use in traditional landscapes survive only with regular supplemental watering because they are not adapted to survive on natural rainfall. Watering plants in landscapes uses vast amounts of water across the United States — an estimated 50 percent of all water used in urban areas. That is why a new method of landscaping — Xeriscaping — is practiced in many areas. Xeriscaping means creating water-conserving landscapes with drought-tolerant plants, mulches, and efficient irrigation systems.

Plants native to a given area are the most adapted to the natural amount of rainfall because they have developed a variety of mechanisms to survive periods of low moisture. Three of those mechanisms that are often observed in plants, are *evasion*, *avoidance*, and *conservation*.

Through evasion, plants escape dealing with the problem of drought altogether. Many annual wildflowers and desert plants live out their entire lives — from seed to flower — during the rainy season, never having to cope with the lack of water. Some of those plants live only a few days, germinating when the rains begin, then growing rapidly, flowering, and setting seed. The seeds remain dormant until the next rainy season. Other plants, such as spring-blooming annual wildflowers, live their lives from fall to spring, going to seed by summer. The seed remains dormant until the fall rains come. Individual plants of species dependent upon evasion may not survive a prolonged drought, since they have no physical means to cope.

Perennial plants that experience all kinds of weather have developed the avoidance method to survive drought. What they are avoiding is not drought in the environment, but drought in their internal tissues. These plants are able to maintain high water content in their cells despite the scarceness of water.

Cacti, succulents, and plants with tuberous roots store water for use during dry times. Other plants have

the ability to increase water uptake by extending root growth when soil moisture decreases.

Conserving water is probably the most common way plants tolerate drought. The physical properties of leaves, primarily, are what enable plants to do this. Hairy and waxy leaves help plants conserve water by preventing excessive water loss through transpiration, the natural evaporation of water into the atmosphere through the leaves. Hair on leaf surfaces conserves water by shading the surfaces and increasing humidity around them. Waxy substances protect leaves from drying out. And many desert plants have decreased transpiration rates by drastically decreasing leaf size — or eliminating leaves altogether!

Elinor Crank,
Wildflower Center Research Horticulturist

Wildflower Outlook

We're in the middle of the "Year of the Wildflower," says the National Garden Bureau. The Illinois-based, nonprofit organization has designated 1989 as such, and is offering a wildflower fact sheet to encourage the appreciation and use of wildflowers. For a copy, send a self-addressed business envelope and 25 cents in postage to: National Garden Bureau, Inc., 1311 Butterfield Road, Suite 310, Downers Grove, Ill. 60515.

and along roadsides. The abundant, one-and-a-half- to two-inch-wide flowers range in color from dark purple to pink. Plants may grow to over six feet tall. New England asters prosper in full or partial sun with moderate moisture, and reseed easily. Among companies that have developed production methods to supply seed commercially is Applewood Seed Co. of Arvada, Colorado.

~~~~~  
It's about time for *Aster novae-angliae* (New England aster) to bloom. A stand of flowering New England asters — which usually bloom from July or August until October — is a stunning sight. The perennial wildflower's natural range extends from Vermont to Alabama, and west to North Dakota, Colorado, and New Mexico. New England asters are generally found in meadows, old fields,

~~~~~  
New on the native scene is *Native Notes*, an informative, 10-20 page quarterly newsletter focusing on landscaping with native plants of the eastern United States. Contents: articles, reviews, abstracts, a calendar, and other information. Subscriptions are \$10 a year. Make a check payable to Bluebird Nursery and mail with your request for subscription to *Native Notes*, Route 2, Box 550, Heiskell, Tenn. 37828.



Look, Don't Touch: Naturalist Lois Kelley works *Monotropa uniflora* (Indian pipe) into a terrarium representing a deep-woods habitat with native plants that shouldn't be picked. The terrarium and other exhibits created for The Connecticut State Museum of Natural History's June Wildflower Festival will be on display at the museum through fall.

Conference Report (continued from page 1)

"conservation through propagation" and "Digging plants from the wild is a net loss" were part of discussions.

• The general public needs to know more about native plants, specifically that North American species planted outside their natural ranges are *exotic* or *introduced* plants, not wildflowers, and can be ecologically disruptive.

• We can no longer leave it to nature to repair ecological damage because, in most cases, the damage is too great. Planting a single native shrub or tree, restoring a native plant community, calling or writing to praise those who work to protect our environment, and, especially, questioning activities that put needless stress on native flora are *all* important.

• In spite of the visibility and impact of the clearing of tropical rain forests, habitat destruction and species extinction are *not* Third World problems; they are occurring right here.

David K. Northington, Ph.D.,
Wildflower Center Executive Director



Costa Rica Tour

The Wildflower Center is sponsoring a tour to Costa Rica, from September 12-18. Jean Andrews, Ph.D., noted wildflower artist and author, will accompany the group along with experts on the area's flora, birds, and national preserves. September promises a vivid show of blooming orchids. For information, call Selec Tours: 1-800-444-2405.

More Wildflower News

A priority task force/advisory board of Texas Rare Plant Conservation has been assembled to encourage collaborative efforts to conserve Texas plant taxa most at risk of extinction. John E. Averett, Ph.D., the Wildflower Center's research director, is on the board. Texas, California, Florida, Hawaii, and Puerto Rico are thought to have significant numbers of plants likely to become extinct in the 1990s.

The Wildflower Center has received a \$20,000 grant from the Rockwell Fund, Inc. The grant supports several Center publications, including a new general brochure, spring tour and tribute brochures, a guide to the Center's grounds, and a membership order form.

Summer Project: Join the National Wildflower Research Center

Members of the National Wildflower Research Center support wildflower 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; special advance notice of and discounts to Center seminars; free wildflower information from the Center's Clearinghouse; a membership card signed by Lady Bird Johnson; 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 annual limited edition wildflower poster.
- \$500 Trust Member and \$1000 Benefactor. All the above plus special privileges.

• Thank you! Your contribution is tax deductible to the extent permitted by applicable law.

Please enter a membership in the category checked at left:

Name: _____

Address: _____

City/St./ZIP: _____

Phone: _____

Gift Membership: If you are giving this membership as a gift, please enter your name and address below.

Donor Name: _____

Address: _____

City/St./ZIP: _____

Phone: _____

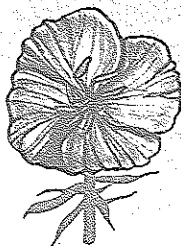
- Make your check payable to: NWRC
- Mail to: Membership, National Wildflower Research Center, 2600 FM 973 NORTH, AUSTIN, TX 78725-4201 6/4

National Wildflower Research Center
2600 FM 973 NORTH, AUSTIN, TEXAS 78725-4201

Second Class
Postage Paid at
Austin, Texas

Wildflowers Work!

Volume 6, Number 4, July/August 1989
Recycled Paper



NATIONAL WILDFLOWER RESEARCH CENTER
4801 LaCrosse Blvd.
Austin, Texas 78739
(512) 292-4200