

Arboretum News

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UNIVERSITY OF MINNESOTA



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Annual Gardens Go Tropical with Sultry Citrus



Look for 1999's dramatic color combinations in the main annual gardens on the slope just south of the visitors' parking lot, and in containers and hanging baskets around the Snyder Building and in the perennial gardens and Home Demonstration areas. Photo: Duane Otto

BY DUANE OTTO
Landscape Designer

The 1999 annuals display will transport you to the South Pacific. Dramatic, tropical foliage will be combined with masses of intense yellow, orange, and green flowers. Seventy selections of the newest and best varieties of annuals available will be displayed in the main garden.

Plants of special interest include:

- *Canna* 'Bengal Tiger' is a sought-after plant because of its spectacular sunny yellow-and-green-striped foliage and bright orange flowers.
- *Canna* 'Phaison' (trademarked Tropicanna) has shocking foliage—dark purple striped with rich coral-orange and green—and large bright orange flowers.
- *Zinnia* 'Envy' has unbelievably intense blooms with contrasting dark green foliage.
- *Colocasia esulenta* (Elephant Ears) has bold green foliage that grows up to 6 feet.
- *Impatiens* 'Tango' is a 1988 All-America Selection winner.
- New Guinea Impatiens, grown from seed, produces exceptionally large orange blooms.

- *Nicotiana langsdorffii*, a distinctive, old-fashioned, 3-4-foot species, has branching stems and drooping sprays of lime-green flowers.

- *Amaranthus* 'Green Tails' is a 3-foot Victorian favorite with green ropes of trailing chenille-like blooms.

Other annuals of interest to look for include *Moluccella laevis* (bells of Ireland), *Eucomis bicolor* (pineapple lily), *Ricinus communis* (castor bean), *Amaranthus* 'Golden Giant', *Pelargonium* 'Orange Appeal' (geranium), and *Kochia* 'Childsii' (Mexican firebush), and many interesting chartreuse and green coleus varieties.

1998's special 40/90-logo garden will be replaced with the official Arboretum logo, a hand holding a leaf, which symbolizes the nurturing relationship of humans to plants. The garden will be planted in an old-fashioned style known as "carpet bedding." Selections include *Alternanthera ficoidea* (Joseph's coat); *Alternanthera* 'Rosea Nana', with red foliage; *Alternanthera* 'Aurea Nana', with yellow foliage; *Alternanthera* 'Snowball', with white foliage; and *Petroselinum* 'Curlinum' (parsley).

Over 200 varieties totaling 20,000 annual plants will be planted in late May and should reach their glorious peak in late July and August. ✨

Director's Message

Celebrating a Friend's Birthday and His Vision

BY PETER J. OLIN
Director

This June we celebrate the 90th birthday of one of the Arboretum's most influential leaders, Elmer L. Andersen.

When Leon Snyder and others were developing the concept of an Arboretum for Minnesota it was clear that three components were essential. First, research to develop and test plants for hardiness in Minnesota's environment; second, a place to display plants; and third, a research library of plant information for scientists and the public. Enter Elmer and Eleanor Andersen, bibliophiles interested in horticulture and friends of Leon Snyder. The rest is legend. A library was started in 1970, the Snyder Building was completed in 1974 along with the Elmer L. and Eleanor J. Andersen Horticultural Library. Today it is known worldwide for the excellence of its collections and its publications.

Andersen Library has 10,000 volumes (many of the best references donated by the Andersens) and a 200,000-volume, historic seed and nursery catalogue collection. Its publications, especially the *Flowering Plant Index* (a book referencing the location of color pictures of flowering plants in journals) and the *Source List of Plants and Seeds* (4th edition), are known and used around the world. The new on-line plant information service, we expect, will appeal to an even wider audience. All this has flowed from a single vision.

Both lovers of books, especially old books and horticultural and botanical books, Elmer and Eleanor Andersen not only pushed for a world-class library, but they also backed their ideas with personal

It's spring! Longer summer hours are in effect. Turn to page 20 for complete details.



Elmer L. Andersen, former governor of Minnesota and trustee of the Minnesota Landscape Arboretum.
Photo courtesy Andersen Horticultural Library

funds and encouraged others to do so. After becoming director, one of my first visits with Arboretum leaders was with Elmer Andersen. In his charming way he presented the case to build an addition to the library. There was no place for rare research books, which needed a climate controlled room; the stacks were nearly filled, and some collections (seed and nursery catalogues) were beginning to stack up in the basement.

An advocate of libraries myself, I agreed to ask the Minnesota Landscape Arboretum Foundation Board of Trustees to put a library addition on our needs list. Their comments were, "Sure, but we have so many priorities and so little money, it won't be high on our list." Elmer and Eleanor's response: Let us help raise the funds. The Board agreed. The Andersens again led the fundraising effort and an addition was completed in 1988. You simply can't beat dynamic goals, enthusiastic energy, and sheer will!

Elmer is a man of all seasons for all people. He is counselor, volunteer, donor, and friend. Even at ninety, people flock to his door for advice, direction, encourage-

ment, and donations. He still gives generously in time, energy, and funds to his many causes. At the Arboretum, his interests are carried on by his son Tony, one of the Arboretum Foundation's newest trustees.

As we move forward with the implementation of our new Master Plan, Elmer remains a role model. He sets a dynamic direction, keeps the enthusiasm and energy level high, opens the Arboretum doors to more people, spreads its knowledge and advice widely, and contributes to what he believes in.

As we develop the Arboretum for the 21st Century, we cannot do better than to look for inspiration from one of our founders as he moves with dignity and elan into his 91st year. Elmer, we salute you!*

Arboretum News

VOLUME 18, NUMBER 3 • MAY - JUNE 1999

MINNESOTA LANDSCAPE ARBORETUM NEWS is published six times a year by the Minnesota Landscape Arboretum Foundation, 3675 Arboretum Drive, P.O. Box 59, Chanhassen, MN 55317-0039; (612) 443-2460. The newsletter is a benefit of membership in the Minnesota Landscape Arboretum. No portion may be reprinted without permission from the Arboretum. The information published in this newsletter is not necessarily endorsed by the University of Minnesota. The Arboretum welcomes your opinions, ideas, concerns.

MARIA KLEIN, Editor

The Arboretum is a unit of the Department of Horticultural Science, University of Minnesota. The University of Minnesota is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

PETER J. OLIN, Director
JAMES HORNIG, President—Board of Trustees
JOHN CARTER, Director—Research
PETER MOE, Director—Operations
FRANK J. MOLEK, Director—Development & Communications

To request a copy of this publication in alternate format, please call (612) 445-2478.

MAY EVENTS

Tour Season Begins May 1

Enhance your Arboretum experience by taking advantage of several tour options.

- **Personal Audio Tour**—Walkman available at Snyder Building reception desk.
- **Group Walking Tour**—Tuesday-Sunday. Private tours can be arranged for groups of 15 or more.
- **Bus Tour**—An Arboretum tour guide will provide narration on board your bus. By reservation only.
- **Trumpet Creeper Tram Tour**—Tuesday-Sunday, 11:30 a.m., 1:00 and 2:30 p.m. \$1.50/person.

For information and reservations, call (612) 443-2460, ext. 772, Monday-Friday.

2nd Annual "Bud Break"

Sunday, May 2

Registration, 8 a.m.

Race, 9 a.m. sharp

Storytelling, 10:30 a.m.

Tree buds, that is, as they break open this spring. Enjoy the sights and sounds as you run or walk around 3-Mile Drive in support of the Arboretum.

Entry fee: \$12 by mail pre-registration, \$15 on the day of the race. Includes admission to the Arboretum (up until 8:45 a.m.), race packet, 1999 Bud Break T-shirts, and refreshments. Prizes will be awarded to the top overall male and female finishers. Beginning at 10:30 a.m., storyteller Susan Warden will be on hand to entertain you with tree-related stories.

Only the first 300 registered participants will receive a race packet and Bud Break T-shirt. Race will be held rain or shine.

3-Mile Drive will be closed for the event until 10:30 a.m. No inline skates, skateboards, bikes, or dogs allowed during race.

31st Auxiliary Spring Plant Sale

Saturday, May 15, 9 a.m.-3 p.m. ☼ Sunday, May 16, 10 a.m.-2 p.m.

Margot Picnic Shelter

It's "Vine Time" at the Auxiliary's 1999 Spring Plant Sale. In addition to our usual fine selection of annuals, perennials, shrubs, and other landscape plants, this year we offer a variety of interesting vines, from a wonderful array of clematis to sweet pea vines in a riot of colors. The 1999 Hosta of the Year, 'Paul's Glory', will join the wide variety of hosta always available. We will also have plenty of *Rudbeckia* 'Goldsturm', the 1999 Perennial Plant of the Year [see page 6 for more information]. And don't forget those favorite herbs for your kitchen garden, with a hardy shrub rose or two for a little romance!

Our University of Minnesota introductions, new last year, will return with even more excellent selections from the Horticultural Research Center. The Hemerocallis Society and the Dahlia Society will again support the Arb with their bare-root selections. You can also look forward to the return of Paul Bondis and his beautiful stone vases—perfect for enhancing the flowers from your cutting garden.

Don't miss this incomparable opportunity to get a jump start on spring and support the Minnesota Landscape Arboretum. See you at the plant sale!!

Mail-in entries will not be accepted if postmarked after April 23. For more information, call (612) 443-2460.

Annual Hosta Sale

Saturday, May 8, 12 noon

Co-sponsored by the Minnesota Hosta Society, this year's sale will take place on the Snyder Building's front terrace. First come, first served until all the plants are sold.

Mother's Day Brunch

Sunday, May 9, 11 a.m.-2 p.m.

Celebrate spring and honor all the moms in your family at the Tearoom's popular all-you-can-eat brunch. Includes assorted pastries, eggs, bacon, sausage, French toast, seasonal salads, cold cuts, potatoes, veggies, and an opulent dessert buffet. Cost: \$11.95 adults; \$5.95 children 6-12 (gate fee

applies for non-members). Seating is limited; reservations are required. Call (612) 443-2460, ext. 772 today to reserve a spot.

Spring Peeper Rendezvous

Thursday May 20, 7:00-8:30 p.m.

Experience the excitement and clamor of the annual spring rendezvous of frogs and toads. Every spring, these amorous amphibians unearth themselves and head to the nearest wetland to mate. Learn what triggers these rowdy encounters and explore the meadow as a rendezvous habitat. Event free with paid gate admission. Meet at Spring Peeper Meadow parking lot.

By reservation only, limited to 15 participants. To participate, call Julia Bohnen at (612) 443-2460, ext. 250. Please leave a phone number and spell your last name.

News continued on page 4

Plant Sale Plant Lists Available

To obtain a plant list by mail, please send your name and address plus \$1 for each list requested to:

PLANT LIST

1605 Fairway Lane
Minneapolis, MN 55426

Lists will be mailed in late April. You can also pick up a list at the end of April at the Snyder Building reception desk free of charge.

New Card Policy

IF YOU LOSE YOUR MEMBERSHIP CARD...

Lost and misplaced membership cards may be replaced by mailing \$2 per card to the membership office, or by dropping off your request at either the gatehouse or lobby desk.

Carrying your card allows you faster access to Arboretum services and helps us provide high-quality customer service to all visitors. Like other organizations, the processing fee helps the MLA manage overhead costs.

Questions? Call the membership office at (612) 443-2478.

Keep Those Books Coming!

The Library's '99 book sale is only a growing season away! Drop off your previously-read contributions during normal Library hours. Please notify a librarian that you have books.

News continued from page 5

Sojourn Benefit Plant Sale

Tuesday, May 25, 10:30 a.m.–3:00 p.m.
Presbyterian Homes

Purchase a variety of plants for your garden, and share a cookie and conversation with family and friends. This annual sale helps support therapeutic horticultural services administered by the Arboretum throughout the year to elders at the Sojourn Adult Day Care Program.

Presbyterian Homes is located at 4497 Shoreline Drive in Spring Park (one and a half miles west on County Road 15 from the intersection of County Roads 19 & 15).

For further information contact Sally Hebson at (612) 471-6080.

JUNE EVENTS

Backyard Composting

Saturdays, June 5 & June 12, 10 a.m.–12 noon

Compost is sometimes called black gold, and it can do wonderful things for your garden. Kathy Dyess will show you how to compost in your backyard. Find out what can be composted, what to do with compost, and what equipment you'll need.

The class is free to Carver County res-

idents, and there is a nominal charge for residents of other counties. Class limit: 30 per session. Meet in Classroom 2.

To register, call Carver County Environmental Services Monday–Friday, 8 a.m.–4:30 p.m., at (612) 361-1800.

Thursdays in the Garden

Thursday evenings, 6–9 p.m.

Join us on Thursday evenings for music, magic, and more. The tram runs on the half-hour until 6:30, and the “main stage” show starts at 7:00. Thursday evening events are free and open to the public. Rain stage: Snyder Building Auditorium.

June 3—The Big Show

Travel back to the late 1800s when traveling magic shows visited towns and entertained audiences with a mix of offerings that included magic, juggling, mind-reading, and more. Join us at the Ordway Shelter for a magical evening.

June 10—Homestead Night

Whether you're a novice musician or an old-time picker, if you've a fondness for fiddlin', or just like to enjoy a summer night with good music, Homestead Night at the Arb is the place for you. Join us as

string-instrument and vocal musicians gather for a pick-in on the Terrace.

June 17—No Program

June 24—Celtic Fling

Back for their second year, **Scoil da' na Tri Dancers** bring high-stepping music to the Ordway Shelter.

Green Link Station Returns

Sunday afternoons, 12 noon–3 p.m.

Once again the Green Link Station will travel through Arboretum gardens this summer. As each garden reaches peak bloom, the popular discovery station will provide interactive experiences for families and visitors of all ages. Vote for the most fragrant rose, sample herb teas and dips, print a vegetable creature, or zoom into a flower via a microscope.

June schedule:

- June 6 & 13—Slade Perennial Garden
- June 20 & 27—Wilson Rose Garden

ARBORETUM NEWS

New Marketing Manager

A warm welcome to Bonnie L. Ronning, who recently joined the Arboretum as

Annual Members Luncheon

THURSDAY, JUNE 3, 11:30 A.M.–1:30 P.M.

Lunch 11:30–12:30; Concert 12:30–1:30

Snyder Building Auditorium

JOIN OTHER ARBORETUM MEMBERS for a slice of Southern cooking and some toe-tap-pin' music at the Annual Members Luncheon (formerly held in the fall). Lunch will feature Southern cuisine, including Spicy Chicken & Sausage in Tasso Gravy, White Grits, Black-Eyed Peas, Sweet Potato Casserole, Cypress Creek Biscuits, and Buttermilk Pie. A concert will follow, featuring the music of **URBAN RENEWAL BLUEGRASS**, a trio whose

foot-stompin', hand-clappin' lyrics and acoustical music are sure crowd-pleasers. This event is a perfect summer kick-off for members. Guided walking tours and tram tours will be available.

Reservations needed for the luncheon and concert. No advanced reservations for tours.

Cost: \$15.00 per person

RSVP must be received by May 20.

LUNCHEON REGISTRATION

Name _____

Address _____

City/State/Zip _____

Daytime Phone _____

Member Number _____

Number attending _____

ENCLOSED PLEASE FIND: \$ _____

Mail form w/ check to MEMBER LUNCHEON, Membership Office, MLA, P.O. Box 39, Chanhassen, MN 55317. **RSVP must be received by May 20.**

Marketing and Public Relations Manager. Bonnie has already begun Arboretum-wide research and planning for a comprehensive marketing initiative.

Bonnie, a journalism graduate of the University of Minnesota, has been a member of the Arboretum and the Auxiliary for several years. She was formerly a director of marketing with a major telecommunications company, where she led the introduction of digital service to the Twin Cities market and was responsible for all aspects of advertising, promotion, and public relations. Prior to her position at Sprint PCS, Bonnie was an account supervisor with a Twin Cities-based advertising and public relations agency.

Volunteers Needed for Learning Center Programs

Program assistants are needed for the Children's Garden, Day Camps, and Summer Excursion Tours for kids. Opportunities will match your time, interests, and schedule. Be a role model as you assist with crafts and planting activities, manage garden tools and transplanting, or help weed the gardens.

If you'd like to volunteer, call (612) 443-2460, ext. 170 for more information.

ARBORETUM TRAVEL

Pacific Northwest—July 8-19

Enjoy summer at its finest in breathtakingly beautiful British Columbia and Washington State. Includes Vancouver, Victoria, and Seattle. Visit stunning Butchart Gardens, indulge in the delights of high tea, and partake in an alder-smoked salmon feast. Tour brochure now available. Tour price: \$2,575 per person, including airfare from the Twin Cities.

Southern California—November 3-9

A wonderful overview of the great gardens and dramatic natural areas of the California coast from San Diego to Santa Barbara. Includes Huntington Gardens



ORCHID LIGHTS 1999

THURSDAY, JUNE 17, 5:30-9:30 P.M.

Japanese music mingling with the sounds of a waterfall will greet our guests at Minnesota's favorite garden party, the 12th Annual Orchid Lights Benefit. This year we celebrate the serenity and beauty of our Japanese garden, Seisui-Tei, the "Garden of Pure Water." Designed by Dr. Koichi Kawana in 1985 as a wet garden with a 9-foot waterfall as its focal point, everything in the garden is symbolic. For many of us it is a place to find peace, repose, and a sense of closeness to nature.

Please join honorary hosts and long-time Arboretum supporters, John and Marge Ordway, on Thursday evening, June 17, for our main fund-raising event of the year. Funds raised at Orchid Lights help our programs, research, and gardens thrive. It's a delightful way to introduce your friends and associates to the Arboretum. Tickets are \$100 a person (\$60 is tax-deductible) and include cocktails, hors d'oeuvres, and a special Japanese-influenced dinner. Of course we'll have our famous silent and live auctions with tempting trips and garden-related items, including our own Horticultural Research Center introductions.

Our first-ever preview party for Orchid Lights will be held for Patrons, Benefactors, and Friends at a beautiful private residence on Lake Minnetonka on the evening of June 9. It promises to be an exciting kick-off to Orchid Lights 1999 and to a wonderful summer season.

Invitations will be mailed in early May. To ensure that you receive one, or for more information about the benefit or the private preview party, please call (612) 443-2460, ext. 181.

and the sensational new Getty Center. Tour brochure available in July—tour price to be announced.

Call (612) 443-2460, ext. 0 to request travel brochures, add your name to our mailing list for future brochures, or obtain for further information.

Cape Town, South Africa—October 1-10

Director Peter Olin will host an Arboretum Tour to South Africa's jewel city. Our

tour will feature the highlights of the region plus some of South Africa's finest gardens. Scheduled activities include a full day peninsula tour; Kirstenbosch National Botanical Gardens; Winelands region; Harold Porter National Botanical Gardens; and Fernkloof Nature Reserve in Hermanus. Extension trips to Victoria Falls, or to Kruger Park, and Johannesburg are also available.

For information, please call Dayton's Group Holidays at (612) 375-2881.*

1999 Plants of the Year

BY SHIRLEY MAH KOOYMAN
Adult Education Manager



Rudbeckia fulgida var. *sullivantii* 'Goldsturm'.
Photo courtesy Andersen Horticultural Library

Perennial Plant of the Year

Each year the Perennial Plant Association selects an exceptional perennial. This year's selection is *Rudbeckia fulgida* var. *sullivantii* 'Goldsturm', chosen for its adaptability, long period of ornamental impact, and ease of production. For the past 50 years it has been one of the most popular perennials sold.

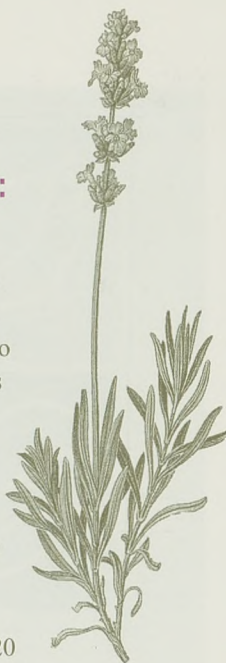
In 1937 Heinrich Hagemann, employed by Karl Foerster in Potsdam, Germany, noticed a group of *Rudbeckia fulgida* var. *sullivantii* at Gebrueder Schuetz's nursery in the Czech Republic that was superior to the common *Rudbeckia* species. It was only after WWII that the plant was available on the market.

Rudbeckia fulgida var. *sullivantii* 'Goldsturm' (translates to gold storm) is a low-maintenance, long-lived perennial that grows in full sun to partial shade. The orange coneflowers bloom from July to October on plants 18-30 inches tall and 24 inches wide. It grows best in well-drained, consistently moist soil, but will tolerate clay soils and mild droughts. The plant is easily propagated by seed, division, or stem cuttings (taken as the stem tissue begins to harden).

Herb of the Year: Lavender

The genus *Lavandula* comes from the Latin *lavare*, which means to wash. The reference is from the ancient use of lavender flowers and leaves by the Romans in bath perfumery. *Lavandula* belongs to the mint family (Lamiaceae/Labiatae) with about 20 species of perennials and shrubs from the Canary Islands to India, with the Mediterranean region as the center of their natural occurrence. Oils obtained from some of the species are used in the production of perfumes, soaps, and related products. The dried flowers are used in sachets, potpourris, and cooking.

Lavenders thrive in full sun with good air circulation and not-too-fertile, well-drained soil with a pH of 7. A few dwarf forms of English lavender such as *L. angustifolia* and *L. latifolia* are considered more hardy than others, but reliably hardy only to Zone 6. In Minnesota *L. angustifolia* 'Hidcote' and 'Munstead' can survive some mild winters with a good layer of mulch. There is also the annual lavender, 'Lady', which can be grown from seed. The non-hardy lavenders are best grown indoors in pots and moved outdoors for summer display.*



Lavender seed (above, enlarged) and dried lavender flowers.



MAY-JUNE GARDENING TIPS

May

- * Harden off seedlings before planting them in the garden. Expose seedlings to outdoor temperatures each day for at least a week to help them acclimate to the outdoors.
- * Patiently wait to plant warm-season plants (annuals, tomatoes, peppers, cucumbers, etc.) after threat of last frost. A deep freeze or a snowstorm can still occur at the end of May, and these plants usually do better if the soil and evening air have warmed up.
- * Use a cardboard collar around the base of seedlings to prevent cutworms from feeding on tender stems.
- * Allow the leaves of spring-blooming bulbs to turn yellow before removing them. This will allow the bulbs to manufacture food for next year's flowers.
- * Prune pines by the 'candle' method with fingers. Pinch off 1/2 to 3/4 of the new growth. Don't use pruning shears because they will leave brown blunt ends.

June

- * Plant flowering annuals among the tulips and daffodils. The annuals will help hide the dying yellow leaves and fill bare spaces in the flower bed.
- * Don't harvest asparagus or rhubarb after the end of June. This will enable the plants to store reserves for next year's production.
- * Put mulch around annuals and vegetables only after the soil warms up.
- * Prune lilacs and other spring-blooming trees and shrubs within several weeks of last bloom. Pruning much later will run the risk of removing next year's flower buds.
- * Prevent cabbageworms from damaging cole crops (broccoli, cauliflower, cabbage) by using a dusting or spray solution of *Bacillus thuringiensis* (Bt). It's an organic alternative to a chemical spray treatment.

— Shirley Mah Kooyman

Design Basics on a Small Scale Yield Big Results

BY DUANE OTTO
Landscape Designer

Start with a plan. Decide first where you want to place your containers. Their shape, size, and number should be proportionate to the site. Be sure to place the containers in close-knit groupings. Set them at different levels for added interest.

Choose plants with care. When you plant containers, think of it as designing a landscape in miniature. For appealing groupings include plants of different heights, colors, textures, and shapes.

SUN. Once you determine the number and the placement of your containers, you can choose what to grow. It's very important to know how much sun your containers receive and to select plants appropriate to the amount of available light. Regardless of sun or shade, plan out each container or grouping of containers, making notes or sketches of what will go where.

COLOR. Color is very much a matter



Every year, Arboretum container and hanging basket designs feature at least six different plants. Photos: Duane Otto

of personal taste, but when planning designs for containers, be aware that color creates a mood. Red, orange, and yellow combinations give a feeling of warmth and tend to stand out. Blue and green create a cool effect and tend to recede into the background. Also, when selecting a color scheme, consider what colors will enhance your existing architectural structures. Once you've decided upon a color theme, plant selection becomes easier because you've limited your options.

TEXTURE. Establish textural balance by combining bold flower and leaf shapes with smaller flowers and foliage. Also, use equal proportions of different flower forms. Linear forms like *Salvia splendens* or snapdragons are tall and spiky and create an uplifting effect. Mass forms (rounded), such as daisies, petunias, or *Melampodium*, have many flow-

ers and tend to give a restful feeling.

SHAPE. Arrange plants according to their directional form and habit of growth. Plants that grow upwards are called "uprights" and should be placed at the center. Shorter plants that spread sideways are called "fillers" and should go next to the center plants. The plants that grow downward, "trailers," belong on the container edge. The chart at left suggests some combinations of uprights, fillers, and trailers. Keep in mind that plants taller than one and one-half times the height of the container, or more than half again as wide as the container width, may look unbalanced.

Educate your imagination. For more ideas and information about container gardening, Andersen Horticultural Library offers numerous non-circulating books and newsletters, and the Giftshop sells many books on container gardening and garden planning. Two classes will be offered at the Arboretum this spring by Arb staff members, one on summer-flower hanging baskets and another on container gardening (class listings are on pp. 9-12).

Have fun. Be daring and creative to your heart's content—let your imagination run free to bring you a masterpiece to enjoy all summer! Keep records and photograph your containers for future reference.*

PLANT COMBINATIONS FOR CONTAINERS

Shade and Partial Shade

UPRIGHTS	FILLERS	TRAILERS
Coleus	Impatiens	Browalia
Tuberous begonia	Fibrous begonia	Asparagus fern
Impatiens	Polka dot plant	Yellow archangel
Flowering maple	Upright fuchsia	German ivy
Calla lily	Spider plant	Swedish ivy
Plumosa fern	Dwarf Boston fern	Tradescantia
	Lobelia	Fuschia
	Swan River daisy	Avalanche begonia

Sun and Light Shade

UPRIGHTS	FILLERS	TRAILERS
Geranium	Petunia	Lantana
Coleus	Dusty miller	Potato vine
Mealy-cup sage	French marigold	Scaevola
Lantana	Verbena	Trailing verbena
Canna	Melampodium	Alyssum
Nicotiana	Evolvulus	Helichrysum petiolore
	Zinnia augustifolia	Bidens
	Nirembergia	Vinca major
		Nasturtium
		Ivy geranium
		Bacopa
		Sweet potato

WHAT'S BLOOMING

In May & June

EARLY-MID-MAY

Daffodils
Forsythia
Iris
Magnolias
Serviceberry
Tulips
Wildflowers

MID-MAY-MID-JUNE

Azaleas
Crabapples
Hawthorns
Herbaceous Perennials
Honeysuckle
Iris
Lilacs
Magnolias
Mountain Ash
Potentilla
Serviceberry
Shrub Roses
Spirea
Viburnum
Wildflowers

MID-LATE JUNE

Annual Gardens
Daylilies
Garden Roses
Herbaceous Perennials
Herbs
Mock-orange
Peonies
Potentilla
Shrub Roses
Viburnum

Bloom periods are estimates only, as actual bloom periods vary from year to year, depending on the weather. Detailed weekly bloom lists are posted at the Snyder Building reception desk.

Arboretum Tree of the Year

Kentucky Coffeetree

BY MIKE ZINS

Extension Horticulturist

NOTE: For many years, we've presented to you the Herb and Perennial Plant of the Year, the AARS rose selections, and the AAS selections of the year. So we decided it was high time to include a tree of the year, and who better to choose one than the Arboretum?—Ed.

Our first featured Arboretum Tree of the Year is the KENTUCKY COFFEETREE. This native American tree can be found from New York to Oklahoma, including southern Minnesota, where its preferred habitat is rich soil along river bottom lands. The scientific name, *Gymnocladus dioica*, is derived from the Greek word *gymnos* (naked) and *klados* (branch), a reference to its dormant-season bare branches. The species, *dioica*, refers to its being dioecious, or having separate male and female flowers borne on separate trees.

Kentucky coffeetree is not exactly a household word in the plant industry or in our landscapes. Scattered plants may be



Bi-pinnate leaves and seed pod of Kentucky coffeetree. Photos this page: Mike Zins

found here and there in our communities, but we rarely see them growing as a street tree. Not that they couldn't do well in boulevard situations! In fact, a recent cultivar introduction, 'Espresso', was selected from a street planting in Davis, California.

Kentucky coffeetrees tolerate alkaline soils, dry conditions, salt spray, and other elements of urban environments. Even better, the trees seem to have few pest problems. However, they will not tolerate shade and, if transplanted, may be slow to get re-established in the landscape. This has been a complaint of landowners with recently transplanted specimens.

In spring, when other plants are anxious to start growing, Kentucky coffeetree is rather cautious and remains dormant, perhaps to make sure danger of frost is truly over. When the tiny buds do break dormancy, they produce huge leaves that are bi-pinnately compound, i.e., they have a main leaf stalk (*rachis*) attached to leaf stalks (*pinnae*), which support the many individual leaflets. With such a large investment in energy to produce these leaves, no wonder the plant is conservative at spring leaf-out!

The dioecious nature of the tree gives us male and female trees. Female trees tend to have a broader branch spread and produce pods containing the seeds. The hard, round seeds were supposedly roasted and used as a coffee substitute by early settlers, hence the plant's common name. The male trees are more upright in branch pattern and lack the pods, which some people may object to as they



Female specimen of Kentucky coffeetree, behind the Snyder Building, shows tree's spreading form and plentiful seed pods.

can be messy in the fall.

The Arboretum has selected a male cultivar called 'Stately Manor', which has been introduced to the nursery industry. At the Arboretum you can see Stately Manor near the yuccas on the path between Morgan Terrace/ MacMillan Garden and Slade Perennial Garden. Another interesting specimen we have growing at the Arboretum is a dwarf form, which is only about 6 feet tall after 20 years. Look for it near the wooden bridge over the waterfall in the dwarf conifer area. Other seedless male cultivars are available commercially. Female trees aren't generally selected for propagation, but often appear in landscapes because most of these plants are seed-propagated.

With today's emphasis on sustainable landscaping, trees with few problems and high stress-tolerance are highly desirable. Environmentally-conscious designers are also interested in using more native plants in their designs. In light of these considerations, more of the beautiful Kentucky coffeetrees should be planted in our own landscapes.*

JUNE

C A L E N D A R

<i>Sunday</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>	<i>Saturday</i>
				M-Annual Members Luncheon 11:30 am-1:30 pm P-Propagation Techniques 11 am-12 noon P-Thursday in the Garden- The Big Show 6-9 pm	C-Propagating Prairie Plants 10 am-3 pm	C-Backyard Composting 10 am-12 noon
		<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>
P-Green Link Station Slade Perennial Garden 12 noon-3 pm	C-Iris for Minnesota Gardens 10 am-12 noon			P-Thursday in the Garden- Homestead Night 6-9 pm C-Garden Insect Identification and Control 6:30-8:30 pm		C-Backyard Composting 10 am-12 noon C-Basic Elements of Japanese Gardening 1-3 pm
<i>6</i>	<i>7</i>	<i>8</i>	<i>9</i>	<i>10</i>	<i>11</i>	<i>12</i>
P-Green Link Station Slade Perennial Garden 12 noon-3 pm		C-Gardening w/ Perennials 10 am-12 noon		M-Orchid Lights 5:30-9:30 pm (3-Mile Drive will close early. There is no evening program and public parking will be limited.)		C-Container Gardening (Compleat Scholar course) 9:30 am-12:30 pm
<i>13</i>	<i>14</i>	<i>15</i>	<i>16</i>	<i>17</i>	<i>18</i>	<i>19</i>
P-Green Link Station Wilson Rose Garden 12 noon-3 pm				P-Thursday in the Garden- Celtic Fling 6-9 pm		
<i>20</i>	<i>21</i>	<i>22</i>	<i>23</i>	<i>24</i>	<i>25</i>	<i>26</i>
P-Green Link Station Wilson Rose Garden 12 noon-3 pm						Calendar Legend C=Class or Workshop L=Lecture M=Member Event P=Public Event S=Symposium
<i>27</i>	<i>28</i>	<i>29</i>	<i>30</i>			

C L A S S E S

PROPAGATING PRAIRIE PLANTS*

Friday, June 4, 10 a.m. – 3 p.m.

CHASE CORNELIUS

Learn hands-on how to work with easy and difficult-to-grow species, how to deal with weed problems with and without chemicals, how to start from seeds without a greenhouse, how to propagate species such as gentian, and how to divide to get more plants. Take home prairie plants that you've worked on in class.

Chase Cornelius has been an integral part of the Arboretum's prairie program for many years. He has grown over 100 species of prairie plants for research, restoration, and garden use.

Class fee: \$35 members, \$45 non-members. Fee includes all workshop materials. Lunch on your own. Class limit 20. Meet in Classroom 2. Dress for planting.

IRISES FOR MINNESOTA GARDENS*

Monday, June 7, 10 a.m. – 12 noon

TRACY JENNINGS

Learn about the many different types of irises suited for northern gardens. Class covers care, plant division, disease and pest problems. Weather permitting, class includes a visit to the Arboretum's iris garden.

Tracy Jennings is a past president of the Iris Society of Minnesota and an accredited judge for the American Iris Society. She owns Riverdale Iris Gardens in Buffalo, Minnesota.

Class fee: \$15 members, \$25 non-members. Class limit 30. Meet in Classroom 2.

ABOUT CLASS REGISTRATION

ADVANCE REGISTRATION. By mail or in person only. If registering by mail, use the form on page 12 and send with check to CLASSES at the Arboretum.

REFUNDS. Registration fees will be refunded if requested at least one week prior to the first class session. If the Arboretum must cancel a course, we will contact you and refund the fee. No refunds otherwise.

CONFIRMATION. Your canceled check is your *ONLY* confirmation.

GARDEN INSECT IDENTIFICATION AND CONTROL*

Thursday, June 10, 6:30 – 8:30 p.m.

JODY FETZER

Learn to identify both beneficial and damaging insects found in the garden. Recognize what the damages are and keep insects from destroying your plants by knowing what control methods to use. Designed for beginning and intermediate gardeners.

Jody Fetzer is the integrated pest management specialist at the Arboretum.

Class fee: \$15 members, \$25 non-members. Class limit 20. Meet in Classroom 2.

BASIC ELEMENTS OF JAPANESE GARDENING*

Saturday, June 12, 1 – 3 p.m.

DOUGLAS ROTH

Gain insight, design principles, inspiration, and concepts for designing, building, and maintaining Japanese Gardens. Class will cover rocks, stones, water, gates, fences, and architecture.

Douglas Roth did a traditional 5-year gardening apprenticeship in Kamakura, Japan. He became the first foreigner ever licensed to practice gardening in Japan. His company, Roth Tei-en, located in Orefield, Pennsylvania, publishes *The Journal of Japanese Gardening*.

Class fee: \$25 members, \$35 non-members. Class limit 30. Meet in Classroom 2.

GARDENING WITH PERENNIALS*

Tuesday, June 15, 10 a.m. – 12 noon

DUANE OTTO

Perennials give shape, texture, color, structure, scent, and sound to your garden year round. Learn all there is to know about old-time favorites and new introductions and how to establish and care for them in your home landscape.

Duane Otto is a landscape gardener at the Arboretum. The Slade Perennial Garden is one of the many gardens he maintains.

Class fee: \$15 members, \$25 non-members. Class limit 30. Meet in the Auditorium.

Other Learning Opportunities

PROPAGATION TECHNIQUES CLINIC

Thursday, June 3, 11 a.m. – 12 noon

Learn how to propagate plants from seeds and cuttings. Meet at the Keating Greenhouse in the Home Demonstration Gardens, located across the road from the Wilson Rose Garden. No reservations are needed; clinic is free with paid admission.

Compleat & Practical Scholar

CONTAINER GARDENING FOR EVERYONE

Saturday, June 19, 9:30 a.m. – 12:30 p.m.

SHIRLEY MAH KOOYMAN

Gardening in containers is ideal for apartment dwellers and for anyone who wants to add colorful accents to their flower beds or landscape. Learn the what-how-where-when-and-why of growing plants in containers.

Shirley Mah Kooyman, Adult Education Manager at the Arboretum, is a botanist and a Master Gardener.

Class fee: \$31.50, age 62 and Arboretum members; \$35 non-members. No credit. Class limit: 25. Arboretum gate fee waived with course receipt. Meet in Classroom 2.

To register for a Compleat/Practical Scholar course, call (612) 624-8880.

Coming This Summer

15TH ANNUAL HERB SYMPOSIUM

Thursday, August 5 and Friday, August 6

"The World of Herbs" featuring the wonders of Lavender, the 1999 herb of the year.

MINNESOTA PRAIRIE DAY

Saturday, August 14, 8:30 a.m. – 3:30 p.m.

Sixth annual full-day event sponsored by the Arboretum and The Nature Conservancy.

For more information and a brochure about these events, call the Adult Education Department at (612) 443-2460, ext. 180.

C L A S S E S

TREES FOR SHADE AND BEAUTY*

Monday, May 17, 10 a.m. – 12 noon

MIKE ZINS

There are specimen trees and there are weedy trees. Find out which trees, deciduous and coniferous, are most desirable for the home landscape based on their size, shape, form, bark, flowers, and texture. Class includes a short hike into the gardens.

Mike Zins is a Minnesota Extension horticulturist with a forestry background.

Class fee: \$15 members, \$25 non-members. Class limit 30. Meet in Classroom 2.

SUMMER-FLOWER HANGING BASKET*

Tuesday, May 18

9:30 a.m.–12 noon (Session 1) OR

1 – 3:30 p.m. (Session 2)

DUANE AND RENEE OTTO

Design your own moss-lined basket and watch your creation grow throughout the summer. Workshop covers soils, specialty plants, fertilizing, and watering techniques.

Duane Otto designs the hanging baskets seen throughout the Arboretum's gardens. Renee Otto is a floral designer. They own Otto's Floradora in Watertown, Minnesota.

Class fee: \$35 members, \$45 non-members. Fee includes all materials. Class limit 20. Meet in the Headhouse located in the maintenance area near the Pine Collection along 3-Mile Drive. Dress for planting.

WOVEN MELON BASKET FOR HARVESTING*

Tuesday, May 25, 9 a.m. – 12 noon

SHIRLEY MAH KOOYMAN

Weave your own small melon basket to use in the garden. This traditional American rib basket takes just a few hours to weave. The weaving material will be reed, the inner core of the rattan palm, a tropical vine from Southeast Asia. The finished product will measure 7 inches long, 6.5 inches wide, and 7 inches high.

Shirley Mah Kooyman, a botanist and the Arboretum's Adult Education Manager, has been weaving baskets for 15 years.

Class fee: \$25 members, \$35 non-members. Fee includes all materials. Class limit 15. Meet in Classroom 2. Bring sharp scissors, ruler, water bucket, towel, and spring-type clothespins.

GARDEN PATHWAYS*

Thursday, May 27, 6:30 – 8:30 p.m.

DIANE KLAUSNER

Pathways help set the tone and mood of a garden. Design principles and techniques, practical aspects of installation, and plant materials will be discussed.

Diane Klausner is a registered landscape architect with McCaren Designs, Inc. in St. Paul, Minnesota. She specializes in residential landscape and garden design.

Class fee: \$15 members, \$25 non-members. Class limit 30. Meet in Classroom 1.

Other Learning Opportunities

PROPAGATION TECHNIQUES CLINIC

Thursday, May 6, 11 a.m. – 12 noon

Keating Greenhouse

Learn how to propagate plants from seeds and cuttings. Meet at the Keating Greenhouse in the Home Demonstration Gardens, located across the road from the Wilson Rose Garden. No reservations are needed, clinic is free with paid admission.

BREEDING FOR FRUIT & LANDSCAPE USE:

CURRANTS & GOOSEBERRIES*

Sunday, May 23, 1:30 – 3 p.m.

REX BRENNAN

Join us for a special lecture and reception to learn about the breeding work being done with currants and gooseberries for use as edible fruit and landscaping material. These fruits are now among the most popular in Europe.

Rex Brennan, Ph.D. is a fruit breeder from the Scottish Crop Research Institute in Dundee, Scotland, and the visiting scientist of the Endowed Visiting Chair for Plant Breeding Research. He is conducting his research at the Arboretum's Horticultural Research Center and at the University of Minnesota's St. Paul campus.

Class fee: \$15 Arboretum members, \$25 non-members (includes gate fee). Meet in the Auditorium. Refreshments and light hors d'oeuvres will be served following the lecture.

For more information, contact the Adult Education Department at (612) 443-2460, ext. 180, shirley@arboretum.umn.edu.

CLASS REGISTRATION FORM

One form per person, please. Photocopy as needed.

Sorry, no phone reservations.

<input type="checkbox"/>	Trees for Shade and Beauty*	\$ _____
<input type="checkbox"/>	Summer-Flower Hanging Baskets*	\$ _____
	Session 1 _____ Session 2 _____	
<input type="checkbox"/>	Woven Melon Basket for Harvesting*	\$ _____
<input type="checkbox"/>	Garden Pathways*	\$ _____
<input type="checkbox"/>	Propagating Prairie Plants*	\$ _____
<input type="checkbox"/>	Irises for Minnesota Gardens*	\$ _____
<input type="checkbox"/>	Garden Insect Identification and Control*	\$ _____
<input type="checkbox"/>	Basic Elements of Japanese Gardening*	\$ _____
<input type="checkbox"/>	Gardening with Perennials*	\$ _____
<input type="checkbox"/>	Breeding for Fruit & Landscape Use*	\$ _____
	TOTAL ENCLOSED \$	\$ _____
	(Cash or check only please)	

* Volunteer vouchers accepted § Gate fee waived with paid tuition

Name _____

Address _____

City _____ State _____ ZIP _____

Telephone _____ Day _____ Evening _____

I am an Arboretum member. _____
Member Number

\$35 Single \$55 Dual
 \$45 Single + One \$70 Dual Plus

I have enclosed \$ _____ for a _____
level membership with my tuition payment.

Make checks payable to Minnesota Landscape Arboretum. Mail with this form to **CLASSES**, Minnesota Landscape Arboretum, 3675 Arboretum Drive, P.O. Box 39, Chanhassen, MN 55317.

Plant Breeding Is a Lifelong Commitment

BY JEFFREY L. JOHNSON
Arboretum Horticulturist

As with any good story, plant breeding begins with an idea or a dream. With respect to improving available nursery stock, the story begins with some promising individuals or populations of plants. From there the idea is to manipulate evolution to improve those few individuals—a human intervention that began before recorded history. The ultimate dream is to develop and release a cultivar that is superior to any currently available.

Prior to writing, an author typically gathers information, sketches out interesting, dynamic characters, and develops an outline or a plan. A plant-breeding project typically begins with a breeder or curator collecting plants. The collection is evaluated and categorized for various traits. Only then do scientific plant breeders develop designs for plant crosses. Much random chance is involved in almost any breeding, but evaluation of parental material and a carefully developed breeding design can advance the process and reduce the amount of undesirable progeny.

Occasionally, a plant breeder has an opportunity to explore germ plasm that has not yet been tapped. Just like authors who read and travel, plant developers explore new plants; they value introducing new germ plasm for hybrid vigor and superior traits. Until recently many regions of the world have been closed to foreign travel. Recent exploratory trips to the Far East by the Arboretum/ HRC's Dr. Harold Pellett, Dr. James Luby, and Kathy Zuzek have brought valuable new plant material for breeding work on roses, apples, maples, and small trees.

The process of controlled plant breeding in horticultural crop cultivar development begins with collecting mature pollen from a selected plant, which is designated the male parent of the offspring seed. Then the plant that will serve as the female parent is selected, labeled, and



A scientist applies pollen to a rose from which the anthers and petals have been removed. Photo: Kathy Zuzek

observed for flower development. Just prior to its buds opening, a flower or flower cluster is prepared for controlled crossing. Petals and anthers are removed as necessary and the flower is covered completely with a bag, which is sealed. This elaborate procedure will prevent unwanted pollen fertilizing the female gamete. At the appropriate time, the bag is removed, pollen is placed on the receptive stigma with a clean, dry paintbrush, and the bag is replaced. A label is placed on the flowering branch indicating the cross number, which cites what parents were used in that cross. The fruit and seeds are allowed to naturally ripen inside the bag.

One thing must be noted at this time. With complex heterogeneous plants such as fruit-producing plants, there is but one near certainty that will occur from a breeding cross: We will never produce a plant identical to either of the parents from sexually formed seed, even if a plant is allowed to self-fertilize. Also, just like animals, limiting offspring to two parents does not assure identical siblings. To the contrary, the chance of two individual offspring being identical is very, very low.

The exception (there is almost always an exception) is apomictic seed, which will be identical to the female parent.

What are we doing, then? We are producing a chance for each seed to be an outstanding individual above and beyond its parents and siblings. It is a controlled-chance environment. Like rolling dice, when one adds more and more dice (i.e., genes), the chance of any one roll coming up all sixes gets smaller and smaller. But the more often a person rolls, the better the chance that at least once we will roll sixes. You can see why it takes so many years and so many seedlings to yield unique, outstanding offspring.

A clarification: Don't be confused by this when you go to the garden center this spring and buy a pack of petunia seeds and they all come out identically red, 5 inches tall, and disease resistant. The basic process is similar, but further requires purifying parental populations through inbreeding to create homogeneous genetic populations. Then, crossing of homogeneous parents is controlled through geographic or mechanical isolation and selective flower

Plant breeding continued on page 14

removal to produce "F-1" hybrids. Of these only the first generation will be pure. Each subsequent generation will be less and less similar to the original homogeneous parent combination. That is why when *you* collect seeds from those red, 5-inch petunias, they come up a mixture of colors, sizes, and resistance. All of this means that an enormous amount of resources went into developing the seeds we take for granted. The next time you buy seeds, appreciate the value in that little packet.

Back to our story. Now we want to grow the seeds we produced and collected from our controlled crosses. Prior to sowing, seeds often require special treatments to improve germination rates. But that is a story for another article. After we have successful seed germination, the individuals are carefully transplanted and each population is labeled with an accession number for record-keeping purposes. Plants are grown in containers to a sufficiently large size, sometimes over several seasons, and planted into a field evaluation nursery at the MLA or at a cooperative organization affiliated with the Landscape Plant Development Center.

Evaluation of populations can commence at any time after seeds germinate and after plants express important characteristics. Scientists typically screen for hardiness, growth habit, flowering, fruiting, resistance to diseases and insects, size, vigor, and/or seasonal displays of color or fruit persistence. More advanced, intensive screening efforts involve intentional stress by inducing soil compaction, high pH or low oxygen levels in the soil, or by inoculating with specific diseases.

Plants that do not 'make the cut' are *rogued*. More than 90% of all seedlings produced are rogued before ever being repropagated. A plant that looks good to the evaluator is selected and numbered. Famous examples: AE-90 (Haralson Apple), AE-1711 (Honeycrisp apple), AZ-104 (Northern Hi-lites azalea). A

selection is then vegetatively propagated.

The evaluation process can continue for decades, producing controlled-cross seedlings, evaluating the progeny, and reintroducing the progeny into the breeding work as parents. Using our writing analogy, a work is rarely finished in the first try. Authors write, rewrite, submit for editing, and acquire feedback from selected readers before the manuscript goes to print. The ultimate goal of a plant-breeding program is a named cultivar or series of named cultivars well received by the nursery trade. Cultivars are introduced from Arboretum's Horticultural Research Center (HRC) via the University of Minnesota Experiment Station. Related industries such as garden centers, landscapers, orchardists, viticulturists, enologists, and floriculturists help develop and establish a market for new cultivars.

Some of the better known introductions from the HRC are 'Haralson', 'Honeygold', and 'Honeycrisp™' apples, 'Swenson Red' grape, 'Orchid Lites' azalea, 'Autumn Spire' red maple, and 'Autumn Splendor' buckeye. More recently 'Mesabi' strawberry, 'Northern Hi-lites' azalea, 'Zesta!™' apple, 'His Majesty' corktree, and 'Mr. Coffee' Kentucky coffeetree have been introduced. The list of releases from the HRC is a "who's who" of cultivars available to northern gardeners.

As you can see, plant breeding requires a long-term commitment of resources and land. The work is both exciting and mundane, and it can be difficult and painful too. For example, tasting fruit is the only way to evaluate fruit seedlings. Some of the fruit can be so tart and acidic that it almost burns your tongue. Imagine tasting acres of rows of seedling apples or grapes! It is exciting to discover a really good apple or strawberry, but a lot of bad fruit passes one's palate first. Now, that's commitment!*

COMING SOON: VEGETATIVE PROPAGATION

Plant Breeding Glossary

Anther	Pollen-bearing organ forming the upper portion of flower stamen.
Apomixis	The rare development of a seed from a non-egg female cell, without fertilization (seed not formed from a sexual process). A naturally occurring form of vegetative propagation.
Asexual reproduction	Propagation of new plants by vegetative means.
Chromosome	A rod like structure in cell nuclei that contain the genes or units of heredity.
Cultivar	An organism of a kind originating and persisting under cultivation. A cultivated variety usually asexually propagated.
Gene	The unit of heredity contained in a chromosome.
Germ plasm	The hereditary material of a cell. The extractable hereditary assets of a population.
Hardiness	The capability of withstanding adverse conditions.
Hybrid	A cross-breed of two species.
Hybrid vigor	Heterosis; a marked vigor or capacity for growth often shown by cross bred plants.
Juvenility	The stage of a seedling plant in which floral initiation is not possible; often distinguished morphological differences from mature plants within a species.
Pistil	Seed-bearing organ of flower, includes stigma and ovary.
Ploidy	The degree or repetition of the basic number of chromosomes.
Population	Plant breeding: A group of individuals originating from the same two parents.
Sexual reproduction	The union of sex cells (gametes) and their nuclei after nuclear division (meiosis), with concomitant association of their chromosomes to form a zygote (seed).
Stamen	Pollen-producing organ of flower, consists of anther and filament.
Stigma	The upper portion of flower pistil where pollen is deposited.
Vegetative propagation	A means of replication of a plant through asexual reproduction; a process of cloning plants via grafting, rooting cuttings, layering, micropropagation, or other cloning means.

In Second Season, Spring Peeper Meadow Flourishes

BY JULIA BOHNEN
Wetland Restorationist

Research at Spring Peeper Meadow (SPM) began in earnest last spring. Scientists from project director Dr. Susan Galatowitsch's lab conducted amphibian-chorusing and breeding-bird surveys. They collected samples of soils and water for analysis and conducted the first full-scale vegetation survey. Over 190 plant species were recorded for SPM. Of course, many of these were weeds, but of 115 native species planted or seeded at SPM, over 70 were recorded during the vegetation survey. This means that, relative to other wetland restorations, SPM is already very diverse.

As the vegetation structure continued to improve and more closely resembled that of an undisturbed wetland, more wildlife—from water mites to whitetail deer—discovered a comfortable home at SPM. Wood frogs joined the complement of amphibians found at SPM. Lesser yellowlegs and common yellowthroat, both

bird species that inhabit wetlands, appeared for the first time in the meadow. Redwing blackbirds and mallards fledged their young in the wetland. Larger mammals began to pass through or hunt in the wetland; deer established trails along the dense vegetation. Large piles of scat, probably from a coyote, were found on a well-established trail within the tall wetland plants. And of course, raccoons and muskrats left their telltale signs, including a lodge constructed near the second pod of the boardwalk.

If you haven't yet visited SPM, you will want to visit soon. The interpretive signs along the pathway and boardwalks explore many aspects of wetland and sedge meadow restoration. The newly constructed Gallistel Overlook affords a panoramic view of the wetland. On warm days you can almost always find a breeze flowing through the open structure. Waves of bloom envelop the meadow beginning with golden alexanders in May and followed by water plantain, blue vervain and ox-eyes in June, and false white aster, sunflowers, and goldenrod in late July. The more subtle qualities of blue flag iris, prairie phlox, and monkeyflower can be seen if you observe closely. And now you can hike from the Arboretum into SPM via a mown pathway connecting the North Star trail to the wood-chip path near the north boardwalk. (The Arboretum's maps indicate this new trail.)

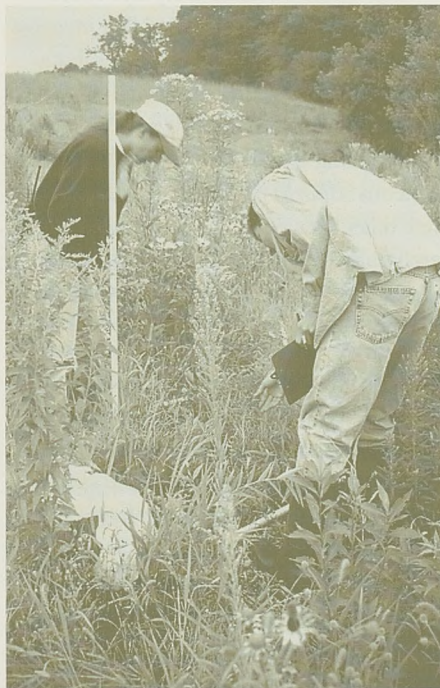
The 1999 season promises to be a very exciting time at Spring Peeper Meadow. New plant and animal species will be observed; more prairie will be planted. Management of invasive species in the wetland and its surrounding prairies and uplands will continue—there are many more buckthorn seedlings to pull. But perhaps the greatest visual change will be the transformation of the hillside



Sunflowers and boltonia bloom below Gallistel Overlook (upper right).

along Highway 41 from agricultural field into forest. Nearly 6,000 bare-root trees and shrubs will be planted in April and May—perhaps you've already noticed the large mounds of mulch awaiting trees.

If you would like to make an Earth Day or Arbor Day contribution to the Arboretum, the SPM crew could use some extra help with the tremendous effort of this spring planting. If you can volunteer this spring at SPM, contact Julia Bohnen at 612-443-2460, ext. 250.*



Technicians conducting a vegetation survey stop at one of the many data collection points in SPM.



Youthful visitors to SPM make full use of interpretive displays. Photos this page: Julia Bohnen

New Predator Invades—Help Keep It from Spreading

BY TED PEW
Landscape Gardener

In my travels through neighborhoods close to the Arboretum, especially around Minnetonka, I have noticed a predator on the ground layer, and it's not a four- or even a two-legged critter. It's a plant, and it's gobbling up huge chunks of the forest litter area where wildflowers and other shade-tolerant plant normally grow. It seems to be spreading westward, so be on the lookout for this recent invader, garlic mustard.

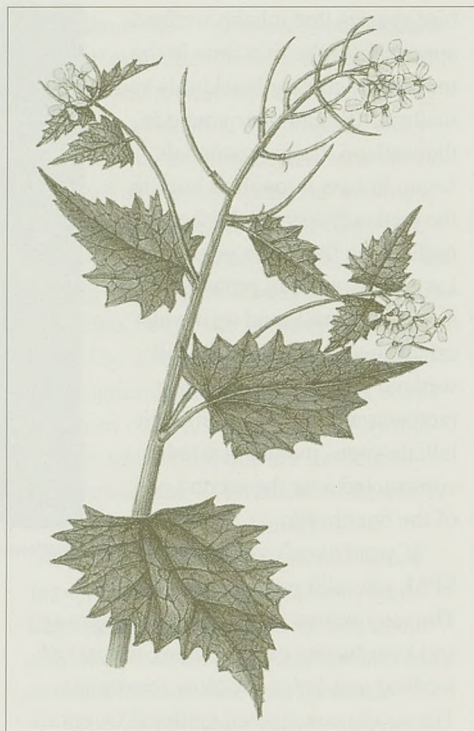
About Garlic Mustard

Garlic mustard, *Alliaria petiolata*, also called Jack-by-the-hedge, is a biennial herb. Native to Europe and common in North Africa, Sri Lanka, and India, garlic mustard grows most frequently in upland and flood-plain forests, savannas, and along roadsides. It invades shaded areas, especially disturbed sites and open woodland. It grows in dense shade and occasionally appears in full sun. It has aggressively invaded natural forested areas from Quebec to Kansas, and threatens other areas because of its tendency to crowd out other herbaceous species.

Alliaria seeds germinate in early spring and young plants winter over as basal rosettes. Plants grow 8–48 inches tall and have sharply-toothed, triangular, alternate, petioled* leaves, which differ somewhat from the basal rosettes' dark green, kidney-shaped leaves. Mature plants bloom from May to June, bearing numerous small white flowers, 1/4-inch across, on the tip of the stem and on some of the leaf axils.* Each flower has four petals, narrowing abruptly at the base. Plants usually produce one flowering stem, but can produce up to ten stems from a single root. Its most distinctive feature is the odor of garlic emanating from all parts of the plant.

* Petiole: Leafstalk

Axil: Angle created where a leafstalk joins flower stem



19th-century illustration of *Alliaria petiolata*, garlic mustard. Courtesy Andersen Horticultural Library

Garlic mustard produces numerous black seeds in 1–4-inch-long, narrow capsules called *siliques*. After forming seed-laden *siliques*, which burst at maturity in August, the plants die. Seeds have a 20-month dormancy period and do not germinate until the second spring after ripening. Garlic mustard reproduces readily from just one disbursement of seed. Thus it may take 4–5 years to be sure that a population is eradicated.

Before you undertake any control measures, identify the plant correctly. Garlic mustard usually grows in colonies of many plants. In May and June, you can easily distinguish garlic mustard from other woodland mustard plants not only by its garlicky odor but also by its tall flower stalks covered with a profusion of white flowers. However, the odor gradually dissipates by autumn and the basal rosettes may then be mistaken for violets (*Viola spp.*) or immature white avens (*Geum canadense*).

To make an accurate diagnosis, exam-

ine the roots. *Alliaria* has a slender white taproot with a crook or S-shape at the top of the root just below the base of the stem. (See below for resources that will help you identify garlic mustard.)

Control Measures

1. Removal by hand. Individual plants should be pulled out or cut by hand as soon as they produce flowers. Research indicates that cutting the flowering stems at ground level results in a 99% mortality rate. Cutting four inches above the ground produces only a 71% mortality rate, but reduces total seed production by 98%. Further, plants cut near the ground when in full flower usually don't resprout. But beware: Cut stems may still produce viable seeds, so remove all cut stems and flowers promptly and completely from the site. Be aware also that even though you have cut blooming plants in the spring, they may bloom again later in the season and require a second cutting. (This is a prolific, vigorous, noxious plant!)

The Nature Conservancy has successfully controlled or eliminated this invasive species from several sites by a combination of spring burning, hand-pulling, and cutting the flowering stems with a scythe.

Scything is effective in nearly homogeneous *Alliaria* populations that contain few other species. Large areas can be covered quickly without disturbing the soil. (Note: Burning is *not* recommended for homeowners.)

2. Herbicides. Judicious spot-treatment with an herbicide like Round-up may be appropriate in areas of heavy infestation. Garlic mustard turns green in the spring before most other woodland plants, and remains green later in the fall. Round-up is safe to use at these times. Fall application is recommended and *only* in populations where mechanical controls are not feasible or have not proven effective.

Mustard continued on next page

GARLIC MUSTARD AT A GLANCE

Scientific Name: *Alliaria petiolata*

Habitat: Dense shade to full sun, forests to open meadows and roadsides. Likes disturbed soil. Tends to grow in colonies.

Description: Plants grow 8–48 inches tall with sharply-toothed, triangular, alternate, petioled leaves. From fall to spring, plants have dark green, kidney-shaped basal rosettes.

Flowers: Mature plants bear numerous small white flowers. Each flower is composed of four petals that narrow at base. Slender seed pods curve up from base of flowers.

Bloom period: May–June. May bloom again later.

Distinguishing features: An odor of garlic emanates from all parts of the plant during growing season. Also, it has a slender white taproot with a crook or S-shape at the top of the root just below the stem(s).

Mustard continued

3. Repeat control efforts. Because it's so tenacious and because its seeds have such a long dormancy period, garlic mustard will require repeated control efforts over several years.

Resources

Andersen Horticultural Library has several books and magazines with photos and illustrations that will give you a better idea of what garlic mustard looks like. (You may notice that some publications suggest that garlic mustard is delectable in a salad, but we can't recommend saving *Alliaria* from the "axe" on that basis.)

We recommend two books: *The Complete Book of Herbs* (1988) by Lesley Bremness (pp. 133–134), and *Wildblühende Blumen* (1990) by Max Luber (p. 54). For further information, consult the *Flowering Plant Index* or ask a librarian for help.

The Minnesota Department of Agriculture is developing a Garlic Mustard Pest Alert Fact Sheet. For an update or further information call Wendy McDougall at (651) 296-3343.*

Memories of Seasons Past Protect This Year's Garden

BY JODY FETZER
IPM Specialist

Remember the mildews, spots, rusts, and wilts that have haunted your garden in seasons gone by? Such symptoms are caused by fungi or bacteria. These disease organisms lurk in decaying debris or in soil, or hide in buds and twigs until warmed by the sun and watered by spring rains. Then they spring to life! The spots and blights will occur again this season if the "magic triangle" comes together at all three points: the disease organism + a susceptible plant + a disease-conducive environment (wet).

How do you prevent disease? That's the question, because once disease begins, it's nearly impossible to stop. Prevention is the key. Here's how you can stop the magic triangle from forming.

- Clean up decaying plant debris and, if spots appear, remove those leaves.
- Select disease-resistant cultivars whenever available.
- Keep leaves dry. Use drip irrigation



Powdery mildew spreads on an Arboretum rosebush. Photos this page: Jody Fetzer

or water only at the base of the plant.

If POWDERY MILDEW has marred the beauty of your phlox, roses or monarda in seasons past, fear no more because this fungus is easy to control. Prevention is again the key. Divide dense clumps of phlox or monarda to increase air circulation. Spray the leaves with horticultural oil to create a thin film, a barrier that mildew does not penetrate. Horticultural oil will also suffocate early mildew-infection sites on the leaves. Repeat the oil spray (at 10- to 14-day intervals) to protect new growth. Use the low rate of oil. Do *not* apply any spray on sunny days.

BLACK SPOT fungal disease on roses may need chemical fungicide treatments. Watch very carefully for the first clue of disease, then spray the leaves with the appropriate fungicide. (Better yet, keep calendar records so you can anticipate the timing from past years' experience and apply a fungicide slightly before disease symptoms appear.) Thorough coverage is very important. Be sure to select a fungicide labeled for your plant and disease problem, read and follow label directions. Repeated treatments at 10–14-day intervals are necessary to protect new growth. At the Arboretum we obtain near-perfect control of black spot using the 10–14-day spray interval.*



Unsuspected black spot on rose 'Garden Party'.

A Stitch in Time Generates Funds and Friends

Celebrations Of Life

The Arboretum TRIBUTE FUND offers ways to recognize family and friends at special times—birthdays, weddings, anniversaries, and notable achievements—or as an expression of sympathy and remembrance.

Generally, tribute gifts help keep the Arboretum beautiful by supporting the maintenance of its gardens and collections, as well as supporting its educational and research programs.

To make a gift, simply send a short note with your gift, announcing the individual being honored or remembered, the occasion (if applicable), and the names and addresses of those you would like us to notify of your thoughtfulness. All tribute gifts are promptly acknowledged with a note to the family for a memorial or a note to the person being honored.

If you would like more information or wish to discuss the possibility of unique tribute and memorial opportunities, please call Terri Gustavson, (612) 443-2460, ext. 487.

BY JANELL STEVENS
Membership Manager

Around a frame housed deep in the Snyder Building, a handful of women gather weekly to stitch and share stories. Retired from nursing, teaching, public relations, and full-time motherhood, the women, known simply as the Arboretum Quilters, are in their seventh season of creating works of art that raise funds for the Arboretum.

Quilt collectors and historians will tell you that history is stitched into the bits of fabric and thread of these American folk crafts. This premise certainly holds true for Arboretum quilts.

In 1992, Susan Kaakani, then-president of the Auxiliary, suggested that a quilt might commemorate the Arboretum's anniversary. Pat Carlson, with the aid of Karol Plocher, owner of Chanhassen's Sampler Quilt Shop, and Kathleen LoSapio, on staff at the Arboretum Gift Shop, selected fabric and patterns and prepared individual quilt-



The first Auxiliary quilt, completed in 1993.



The Arboretum Quilters. Left-right: Mary Luedtke, Adelaide Prillaman, Irene Johnson, Dodie Chalupsky, Opal Oleson, Claire Vogel, Liz Patterson, and Anne Vogel. Photos this page courtesy Arboretum Auxiliary

ing kits. Maxine Jacks rounded up a small band of volunteers who stitched throughout the winter of '92 and spring of '93.

The first Arboretum masterpiece went on display at the 1993 Spring Plant Sale. Since then, the Bees and Butterflies Quilt in '94, the Bountiful Harvest Quilt in '95, Field of Flowers in '96, Garden Window designed by quilter Anne Vogel in '97, and last year's Herbs in Bloom have generated more than \$50,000 for the Arboretum.

Each quilt begins in a "burnstorming" session where the quilters share ideas on designs and names. It takes the group two years to complete a quilt. One year is spent planning and piecing the design together, the second is spent actually stitching. While each quilter knows which sections are her own handiwork, the quality of the workmanship is uniform and high. "You can't tell which work belongs to any one quilter once we're done," says Claire Vogel, who joined the group in 1995.

Small things are remembered

about each of the quilts. A particularly challenging design required more than 2,000 hours of work; another earned honors in a Kentucky quilt show. One year it took twenty Auxiliary members to complete the quilt.

As each quilt stretches toward completion each spring, fewer people gather in the Craft Room. "There isn't as much room for us," explains Ann Vogel, "so we take turns and come in twos and threes."

"Nine members make up the group at present," says Dodie Chalupsky, a retired home economics teacher. But, each quilter quickly adds, there's always room for more.

Over the years, something else has been crafted from the fabric and thread wrapped across the quilt frame. "It's more than the quilting, it's the friendships," says Mary Luedtke. "We laugh and we visit." The quilters enjoy annual outings together. They take in a play or visit the Science Museum and have dinner. Recently they helped the "anchor and final decision maker" of their group, Dodie Chalupsky, and husband Howard celebrate their 50th wedding anniversary at an Arboretum tea.

Like its predecessors, this year's Arboretum Auxiliary quilt (untitled at press time) goes on display in the Snyder Building during the Spring Plant Sale, May 15 and 16. The quilt will be exhibited and raffle tickets sold until Fall Festival 1999. Each ticket guarantees that the prize-holder will take away not only a unique work of art, but also a chapter of Arboretum history.*

Practical Steps Lead to Eco-Friendly Neighborhoods

BY JEFFREY L. JOHNSON
Arboretum Horticulturist

In several New Frontier articles, I have pointed out how important our perceptions, attitudes, and philosophies are in addressing collective challenges. I have also attempted to demonstrate the role of environmental horticulture in economics, environment, energy, crime, and education. This time, I have a few practical suggestions for making your home and neighborhood more eco-friendly

☛ **Convert areas of lawn to trees and shrubs.**

Gerould Wilhelm of Conservation Design Forum, Inc. of Naperville, Illinois, calls sod areas “drug-dependent, living rugs.” Write to the National Arbor Day Foundation and request the publication *How to Landscape to Save Water* for ideas on reducing lawns (Arbor Day, July/August 1998).

☛ **Convert “dead zones” in your neighborhood to wildlife areas.**

In *Noah’s Garden*, Sara Stein describes the opportunity to cooperatively plant areas between yards and in the corners of intersecting properties and create micro-wilderness zones. An excellent guide for plant selection in Minnesota is *Landscape for Wildlife* by Carroll Henderson.

☛ **Fight the invasion of weeds that choke out native vegetation.**

Secretary of the Interior Bruce Babbitt warns that 5,000 acres a day are being lost to “invasive, alien species.” (Arbor Day July/August). In Minnesota, buckthorn (*Rhamnus sp.*), leafy spurge (*Euphorbia esula*), purple loosestrife (*Lythrum salicaria*), honeysuckle (*Lonicera tatarica*), Canada thistle (*Cirsium arvense*), reed canary grass (*Phalaris arundinacea*) are of particular concern. Contact your county extension office for a list of invasive weeds for your area and best practices for control.



“After” shot shows smaller lawn and mature plantings, which reduce maintenance, create pathways and interesting spaces, and enhance liveability and curb appeal.

☛ **Plan for an energy-efficient home.**

Shade east and west windows, and avoid planting trees south of windows. Create evergreen windbreaks northwest of your home. This allows radiant energy from the sun to reach your home and block northwest winds in the winter while giving effective shade for passive cooling in the summer. Order a copy of *Energy-Saving Landscapes: The Minnesota Homeowner’s Guide* from the Minnesota Department of Public Service, Energy Information Center (651-296-5175 or 800-657-3710 or www.dpsv.state.mn.us).

☛ **Get involved in organizations that influence the larger society.**

The Nature Conservancy (800-628-6860; www.tnc.org), Sierra Club (www.sierraclub.org), and The National Audubon Society (www.audubon.org) all have active memberships involved in shaping public policy, perceptions, and practices. A resourceful local organization is Minnesotans for an Energy Efficient Economy (www.me3.org).

☛ **Express your concerns to your elected representatives**

about sustainable issues such as education, transportation,

agriculture policy, population and urban sprawl. If you don’t like the answer you get from your representative, join a campaign to elect someone who better supports your position.

☛ **Continue to become educated, educate others, and discuss issues related to sustainability.**

Attend a seminar on environmental issues. Search the World Wide Web. Write or visit the Minnesota Office of Environmental Assistance,

Sustainable Communities Team (651-296-3471; www.moea.state.mn.us/sc/). Local libraries often have public-access computers for web browsing or have periodical sections where newsletters of environmental organizations are available.

Each of us can do some concrete things to create a more hospitable environment. We don’t have to do it all by ourselves; collectively, we can affect the larger world. It starts with each individual doing his or her part. There is no time like the present to begin a brighter future.*



“Before” shot shows...well, you get the picture! Photos this page: Jeffrey Johnson

DIRECTORY

GENERAL NUMBER
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Plant Info	2
Tours	3
Classes	4
Events	5

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www.arboretum.umn.edu



MEMBERSHIP
PRIVILEGE NUMBER
(612) 624-4776

HOURS
May-September
9 a.m.-3 p.m.
Weekdays

Present name and member number. Always dial the above-listed number for the direct Arboretum member line. This benefit of membership is a call-in service only and is non-transferable.



HOURS—MAY THROUGH OCTOBER

	MONDAY-FRIDAY	THURSDAY	SATURDAY	SUNDAY
GROUNDS	8 AM-SUNSET	8 AM-SUNSET	8 AM-SUNSET	8 AM-SUNSET
SNYDER BUILDING	8 AM-5:30 PM	8 AM-8 PM	8 AM-5:30 PM	11 AM-5:30 PM
LIBRARY	8 AM-4:30 PM	8 AM-4:30 PM	11 AM-4:30 PM	11 AM-4:30 PM
GIFTSHOP	10 AM-5:30 PM	10 AM-7 PM JUNE, JULY, AUGUST	10 AM-5:30 PM	11 AM-5:30 PM
TEAROOM—LUNCH	11 AM-2:30 PM	11 AM-7 PM JUNE, JULY, AUGUST	11 AM-3:30 PM	11 AM-3:30 PM
TEAROOM—SNACKS	10 AM-3:30 PM	11 AM-7 PM JUNE, JULY, AUGUST	10 AM-4:30 PM	11 AM-4:30 PM

GENERAL ADMISSION is \$5 for adults, free for members and for children 18 and under. The gate fee is waived after 4:30 p.m. on Thursdays year-round.

THE TEAROOM offers beverages and snacks weekdays 10-11 a.m. and is open for light evening meals on Thursday evening during June, July & August.

PLEASE NOTE: Pets are not permitted on Arboretum grounds, with the exception of dogs working to assist persons with disabilities.

NORTHERN LIGHTS

Gardening Show

Saturdays, 8:05 a.m.

KLBB Radio, 1400 AM

CALL-IN TELEPHONE NUMBER:
(651) 603-1400

Gardening talk with hosts **Ralph Bashioum**, Arboretum Trustee, and **Jody Fetzer**, Arboretum IPM Specialist, and their guests.

WCCO'S

CHANHASSEN DAYS

Saturday, May 22—11 a.m.-3 p.m.

Come watch and listen as
WCCO'S WENDY WILDE

broadcasts live from the Arboretum! Then visit downtown Chanhassen, where all the merchants will be holding their 3rd annual all-day garage/sidewalk sale.



MINNESOTA LANDSCAPE ARBORETUM FOUNDATION
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