



# JC Raulston Arboretum

AT NC STATE UNIVERSITY

Planning and planting for a better world.

Friends of the JC Raulston Arboretum Newsletter

Vol. 5, No. 2

## director's letter Exciting Times

By Bob Lyons, Ph.D.  
Director

These are indeed exciting times for us. On the bricks and mortar front, my weekly meetings with the construction leaders, architects, and landscape architects for the McSwain Education Center are enlightening. Being a part of this process helped me better understand the project, especially as I watch the drawings come to life. The colorful renderings help in some regard, but not being part of the original planning and design process has left me to a sort of "connect the dots" exercise in my imagination.....I'm glad to see the real structure arise from the builders' hands. The most recent progress report from the general contractor puts us "on schedule," two words we like to hear. Slabs are in place, wall forms up, framing taking shape, and utilities roughed in. We all owe a great debt of gratitude to **Bradley Holland**, Superintendent of the Horticulture Field Lab (HFL) of the Department of Horticultural Science, the parent site of the JCRA. Without his knowledge, flexibility, and availability on site, the excavation and utilities installation processes would have been incredibly confusing and fraught with problems.....many thanks! I am glad he is in our weekly meetings...and thanks also to Bradley's assistant, **Christian Gibbs**, for his invaluable help.

Many visitors and "e-mailers" have made the obvious inquiry upon peering through the construction fence....what happened to all the plants displaced by the new building? Well, as **Mitzi Hole** mentioned in the last newsletter, over 100 were moved out, and many others were propagated. This was no small task for **Mitzi, Anne Calta**, and **Jason Burris**, and required an enormous degree of planning and organization on many people's part to insure their destiny by the time the construction fences went up. We will also be swapping back much of the land area currently taken by the new Education Center's footprint. Once the current staff office space is demolished and the existing parking lot renovated, we will regain these previously occupied sites to plant, an area approximate to that lost in the West. The parking lot will have 12" of its surface removed and replaced with topsoil before any installations occur....and it will need every inch!

When **Donna Walker** assumed responsibilities for managing our membership program, I knew that the changes I wanted to discuss would be handled well....and I was right. We engaged a subcommittee from our Board of Advisors, chaired by **Phyllis Brookshire**, and started to hash out our ideas. Your Board is multi-talented and "exploiting" their insights will be a key element of many decisions in the future. The last newsletter outlined the new details for our membership structure and the process for accruing equivalent "membership dollars" through volunteering. I want to emphasize how delighted



Above: The staff/volunteer building is on target for an early fall completion date.

Photograph by Bob Lyons

I am with the modifications and how important I view them, for several reasons. We didn't want to alter the "Individual" level, as it is our most popular membership level. However, we were looking to simplify the remainder of the structure and build higher giving levels based on greater generosity linked to our Connoisseur Plant Program. A major change, yes, but memberships are the "fuel" for our mission. Our dues enable us to fund part-time positions and provide the resources needed by all JCRA staff members to do their jobs as best they can. Our new levels of membership will enable us to continue to expand as an arboretum and allow the staff to do what they do best. I'm also very excited about the concurrent major change for our volunteers tied to our membership program. With a change

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The JCRA Volunteer Office is staffed by volunteers.

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towards accumulating hours over a lifetime, it becomes possible to achieve our highest membership level and all of its benefits strictly through volunteering. Impossible? Hardly, as I know of several volunteers who will likely be there in just a matter of time. What an exciting achievement that will be!

Your Board of Advisors has also worked hard during 2000 to produce a 5 year long range plan (5YP). We'll publish the essence of that plan in a future mailing, but the entire 5YP will also appear on our Web site <[www.ncsu.edu/jcraulstonarboretum](http://www.ncsu.edu/jcraulstonarboretum)>. This is our road map, our blueprint, our itinerary, for everything we do through 2006. Sure, we'll have some flexibility, but sticking to that plan will keep our mission steady and on track. The plan places plants at the core of what we do and, in many respects, we are pursuing elements of the 5YP already. There is an aggressive commitment to plant collection management and accessions. Our Assistant Director, **Todd Lasseigne**, has been on plant collecting/purchasing trips in the Pacific Northwest and numerous nursery visits throughout the Southeast.

If you haven't checked out our new Web site <[www.ncsu.edu/jcraulstonarboretum](http://www.ncsu.edu/jcraulstonarboretum)>, then put this on the new and exciting list for us, too. **Nancy Doubrava**, **Chris Glenn**, and **Todd Lasseigne** have created a super site which will be a major portal for JCRA information. You can already access our newsletter there earlier than waiting for mail delivery, and you can save us some cash by electing to receive your copy via the Web site exclusively. We'll let you know when it's ready for viewing, and we'll print fewer hard copies for mailing.....just e-mail Chris at <[chris\\_glenn@ncsu.edu](mailto:chris_glenn@ncsu.edu)> and let him know if you'd like this option.

By the time you read this, **Nancy Margaret Brodd** and her husband **Bob** will be parents! Nancy Margaret's skills and great nature have made the JCRA and the coordination of our volunteers a far better place. Now, if genetics say anything, their child will be juggling a ton of activities and getting back and forth via bicycle. Nancy Margaret will be taking some time off

through September.

On April 17, 2001, the JCRA hosted its first luncheon for members of the media. This was coordinated through the Board of Advisors Public Relations Subcommittee, with assistance from JCRA staff, and proved to be extremely successful! Attending were representatives of virtually all media forms, with each receiving a great package of resources about who we are, what we do, and how to stay in contact with us. This will no doubt enhance our recognition throughout the Triangle and beyond. A very exciting statistic compiled during 2000 revealed that the JCRA was noted in the print media in some way an average of 4.1 times per month, that's almost once per week!

As you can see, there is a definite air of excitement and anticipation around here. I want to thank you for rolling with many of the new changes and being a part of strengthening many of the traditions of the JC Raulston Arboretum. In closing, keep your calendars open for our 4<sup>th</sup> JC Raulston Arboretum Symposium - 2001: A Plant Odyssey - slated for September 28 and 29, 2001. It will indeed be an event to remember for anyone into plants!



Above: The class' favorite photograph from the Horticultural Photography Workshop. *Magnolia × soulangiana* 'Coates' - 'Coates' saucer magnolia  
Photograph by Frankie Fanelli

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# Stokes' Aster: A Perennial Garden Favorite

By Lyn A. Gettys  
Former Graduate Research Assistant  
and

Dennis J. Werner, Ph.D.  
Professor, Department of Horticultural Science, NC  
State University

Stokes' aster [*Stokesia laevis* (J. Hill) Greene] is an underutilized herbaceous perennial that has greater potential use as a landscape ornamental and as an industrial oilseed crop. It has large, showy flowers and is available in several attractive cultivars. Stokes' aster is grown primarily for its attractive flowers and enjoys moderate popularity in the herbaceous perennials trade. Stokes' aster has potential for cultivation as an industrial oilseed crop because its seeds contain large amounts of vernolic (12,13-epoxy-*cis*-9-octadecenoic) acid, a fatty acid that is converted to epoxy oil products that can be used in the manufacture of plastics and adhesives.

Stokes' aster initially was described and classified as *Carthamus laevis* by J. Hill in 1769. The genus *Stokesia* was described by L'Héritier de Brutelle in 1788, who proposed that the type specimen used by J. Hill to describe *C. laevis* should be selected as the type specimen for the new genus *Stokesia*. L'Héritier de Brutelle also referred to *S. cyanea* but failed to describe the species; therefore, the name *S. cyanea* is illegitimate. The final authority regarding the nomenclature of Stokes' aster is Greene, who in 1893 stated that the proper binomial for both the specimen called *C. laevis* by J. Hill and *S. cyanea* by L'Héritier de Brutelle should be *Stokesia laevis*.

*Stokesia* is one of approximately 950 genera in the aster family (Asteraceae) and is monotypic, with *S. laevis* being the only species. *Stokesia* belongs to the subfamily Tubiliflorae within the tribe Vernonieae. Vernonieae has two other genera - *Elephantopus* and *Vernonia*. *Stokesia* is

the only member of the tribe Vernonieae that is restricted to the United States.

Stokes' aster is indigenous to the southeastern United States. It is classified as hardy in USDA hardiness zones 5-9 and American Horticultural Society heat zones 4-11. Native populations are found in South Carolina, southern Mississippi, Louisiana, southern Alabama, and Florida. Isolated colonies also are found in southern South Carolina, central Georgia, and the Florida Panhandle in areas that are damp to wet for at least part of the year. Flowers in native populations range in color from blue to bluish-purple or -violet, to white. Established colonies of Stokes' aster appear to tolerate a wide range of moisture levels. Stokes' aster is thought to be a shade-tolerant sun species; full sun is preferable, but some shade is tolerated. Seedlings of Stokes' aster typically produce only vegetative growth the first year from seed. Flowering is typically from late spring through summer.

The wild type, or species, of Stokes' aster bears flowers that are described as lavender-blue or bluish-violet. White-flowered specimens occasionally are seen in wild populations, and a yellow-flowered Stokes' aster has been found only once. Cultivars were described in the literature and popular press as early as the 1940s; however, information concerning the origin of many cultivars is lacking. Most commercially available cultivars have vegetative growth similar to that of the species and differ only in flower color. The growth habit of Stokes' aster is described as acaulescent. Acaulescent, which means stemless or nearly stemless, refers to a growth habit in which the leaves originate from a basal rosette, as typified by daylily. Leaves, elliptic to lanceolate in form, are thick, and range from 4-12 inches long and 0.3-2 inches wide. Flower stalks (peduncles) arise from the basal rosette of leaves in early to mid

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summer. Peduncle length varies among cultivars, but most cultivars have peduncles that bear flower heads in or slightly above the vegetative canopy of the plant.

The cultivar 'Alba' bears white flowers, as does 'Silver Moon'. Blue-flowered cultivars that are commercially available include 'Blue Danube', 'Blue Moon', 'Blue Star', 'Klaus Jelitto', and 'Wyoming'. The cultivar 'Träumerei', marketed by Jelitto Perennial Seeds, has flowers that range in color from white tipped with lilac to solid lilac. 'Träumerei' is one of the few cultivars that is seed propagated. Many cultivars of Stokes' aster are thought to be selections from wild or garden populations, but no formal documentation exists as to how these cultivars arose. Most cultivars have characters that are only slightly different from the species. Notable exceptions include 'Mary Gregory', 'Purple Parasols', 'Honeysong Purple', and 'Omega Skyrocket'.

'Mary Gregory' is the only yellow-flowered cultivar of Stokes' aster known to exist in the United States. It is readily available from commercial nurseries, but no formal publication of the cultivar name was found. It was discovered as a chance seedling in a garden population in Columbia, SC by Mike Creel of the South Carolina Department of Natural Resources. The patented cultivar 'Purple Parasols' was selected in Kentucky and registered by Warren of North American Lily and Floral in 1998 (U.S. Patent #PP010660). It is described as having flowers



Above: *Stokesia laevis* 'Peaches' - Stokes' aster  
Photograph by Dennis Werner

that are light blue initially, then changing to dark-blue, bluish-purple, reddish-purple, and dark hot-pink as the head ages. The parentage of both 'Mary Gregory' and 'Purple Parasols' is unknown.

'Honeysong Purple' was released in 2000 by Wayside Gardens of Hodges, SC. It is described as being ultra-floriferous and bearing deep-purple flowers. Flower color reportedly darkens as the head ages, which "... highlights the contrasting white stamens and red overtones." Wayside Gardens has applied for a plant patent to protect the cultivar, which was discovered by A. Summers and A. Summers of Wayside Gardens. 'Honeysong Purple' is a seedling selection from an open-pollinated population of Stokes' aster; therefore, its parentage is also unknown.

'Omega Skyrocket' exhibits a markedly different growth habit from the species and the aforementioned color cultivars. Unlike most cultivars of Stokes' aster which bear their flowers on short stalks at or slightly above the foliage canopy, 'Omega Skyrocket' is described as bearing lavender-blue flowers on stalks that may be up to 3.3 ft. (1 m) long. At this time, 'Omega Skyrocket' is available only with wild type (bluish-violet) flower color, but a white-flowered group has also been selected. 'Omega Skyrocket' was derived from a wild population of plants found growing in Colquitt County, GA near the town of Omega, by Ron Determann, Susan Determann, and Ozzie Johnson of the Atlanta Botanical Garden <[www.atlantabotanicalgarden.org](http://www.atlantabotanicalgarden.org)>. The original population consisted of a group of plants that were morphologically similar to one another, but possessed a growth habit different from the wild type Stokes' aster. The site where 'Omega Skyrocket' originally was found has since been developed into cultivated pastureland and the original population of plants has been destroyed. Fortunately, seeds were collected from many specimens within the population before habitat destruction; as a result, some level of germplasm preservation was established. 'Omega Skyrocket' is primarily propagated by seed, but some nurseries have selected and offered clonal selections. The long flower stalks make 'Omega Skyrocket' particularly appropriate for cut flower use.

Another interesting Stokes' aster, only rarely available in the trade, is a cultivar called 'Peaches'. 'Peaches' has been used effectively by Edith Eddleman in the perennial plantings at the JC Raulston Arboretum. It differs from the other cultivars of Stokes' aster in having lavender-blue flowers held above the foliage on distinctly upright flower stalks. Flower stalks are considerably shorter than those of 'Omega Skyrocket'. 'Peaches' also exhibits repeat flowering from mid June through frost, in contrast to other cultivars which tend to produce only one or two flushes of flowers in mid through late summer. According to Edith Eddleman, 'Peaches' was discovered as a chance seedling in Meridian, MS by Peachy Saxon.

Stokes' aster has few pest problems in the landscape. Powdery mildew occasionally can be problematic, but usually only under greenhouse conditions. Other greenhouse pests include aphids and whiteflies.

Information concerning the reproductive biology of Stokes' aster is limited. Anthers dehisce, and pollen is released prior to anthesis, but production of viable seeds without cross-pollination is rare. The species is classified as self-incompatible. Studies performed at NCSU showed that the cultivars 'Klaus Jelitto', 'Mary Gregory', 'Omega Skyrocket', and 'Silver Moon' are self-incompatible, while 'Alba' is highly self-fertile. Since most cultivars of Stokes' aster are propagated utilizing asexual methods, self-incompatibility does not hamper production of established cultivars.

Stokes' aster is typically commercially propagated by seed, division, or root cuttings. Many of the unique characteristics that differentiate specific cultivars from the species may be maintained only by vegetative propagation; however, the species and selected cultivars may be propagated by seed. Light does not appear to affect germination, and germination is variable in seed populations. Conflicting information is present in the literature and the popular press regarding optimum temperature conditions for germination of seeds. We have found that seeds germinate in 14-21 days at 59-68 °F and that cool stratification prior to sowing, recommended in some


references, is neither required nor beneficial.

Propagation of Stokes' aster by root cuttings or division is common. Plantlets produced by division will reach marketable size more quickly than those derived from root cuttings; however, a single stock plant may be used to produce far more plants from root cuttings than from division. As much as 30% of the root mass may be removed for use in propagation by root cutting without deleterious effects to the stock plant. Root cuttings may be taken at any time of year; however, cuttings taken in early spring appear to produce plantlets most reliably. Root cuttings taken in fall may be successful if bottom heat is utilized. Niche Gardens (Chapel Hill, NC) produces plants of Stokes' aster by this method, and head propagator **Robert Evinger** recommends the following protocol.

Thick roots are selected and cut into sections 3-4 inches in length. Flats that are 2-3 inches deep are filled with a standard potting medium to within 1 inch of the top of the flat. A trench is prepared in the medium and roots are placed in the trench at a 45° angle. Polarity is maintained so that the proximal end of the root cutting is closest to the surface of the medium. Between 20 and 40 cuttings can be placed in each trench and each flat may contain up to ten trenches, accommodating several hundred root cuttings. Potting medium is added to cover each trench and bring the surface of the medium level with the top of the flat. Flats are placed in a shade house and hand-watered 2-3 times per week, as excessive moisture seems to cause bacterial and fungal growth on the surface of the medium. Plantlets of Stokes' aster produced in this manner are ready to be teased apart and transplanted to 1-qt pots approximately 3 months after the root cuttings are placed in the flats. The resulting plants of Stokes' aster are large enough to offer for sale 3-6 months after transplant to 1-qt pots (Robert Evinger, Niche Gardens, personal communication).

Our initial breeding objectives in Stokes' aster have focused on incorporating the novel upright scape architecture found in 'Omega Skyrocket' into a broader range of flower colors. Accord-

ingly, we have hybridized 'Omega Skyrocket' with cultivars 'Alba', 'Mary Gregory', 'Peaches', and 'Purple Parasols', demonstrating white, yellow, violet, and deep violet flower color, respectively. Preliminary hybridization experiments suggested that Stokes' aster is sexually self-incompatible, simplifying the hybridization process and eliminating the need for emasculation (removal of male sexual flower parts on the intended female parent). First generation hybrid plants ( $F_1$  progeny) in all crosses demonstrate both violet-blue flower color and upright growth architecture characteristic of 'Omega Skyrocket', suggesting genetic dominance of these characters. Progeny within each of these three  $F_1$  families have been intercrossed by planting in isolated field locations, or by establishing potted plants in screened cages, and introducing bumblebees and honeybees as pollinators. Large amounts of  $F_2$  seed have been obtained and have been germinated.  $F_2$  populations, which will show genetic segregation for the various traits of interest, will be field planted in the summer of 2001. Individuals showing the desired combinations of traits will be selected and further tested in comparative performance trials. To date, we have recovered various interesting progeny that have potential as commercial cultivars.


Stokes' aster has great potential for increased use as a landscape ornamental. The large, showy flowers are appealing and numerous cultivars are available, providing a range of colors for growers and consumers. Its cultural requirements are not demanding, and it tolerates a wide range of soil conditions. Nursery production requirements are not exacting, as cultivars of Stokes' aster are easily propagated by root cuttings and require no special equipment, treatments, or handling. These factors make Stokes' aster a prime candidate for increased attention from growers and propagators, and an attractive perennial flowering plant for inclusion in the landscape. Stokes' aster also has potential for use as an industrial oilseed crop with great implications for the plastics and adhesives industries. Give this underutilized native a try, and let it grace your summer garden. 

## in the arboretum What is That?

By Valerie Tyson  
Plant Recorder

"What is that?" is the question we mappers and labelers have always worked at answering for our visitors. But these days I'm asking that question myself more and more. New plants are coming into the Arboretum every day, and I can't tell you how much that means to me. I used to say "I know more plant names than I do plants." Now I'm feeling like I don't even know so many plant names. **Todd Lasseigne** has been on several plant purchasing trips and has ordered plants from all over the world. And, **Edith Eddleman** and **Doug Ruhren** brought in a lot of new wonders for their new perennial border last year. In the last couple of years, more than 1,700 new plant names have been added to our database. Many of those have genus names that were new to me. *Ostryopsis*, *Swertia*, and of course our new  $\times$ *Sinocalycalycanthus*. It's so exciting to see so many new plants flowing in. Or, at least to see their names go by as they are entered into the computer. The plants are back!

In addition to entering all the new plants into our database, we've been keeping track of the activity in the Arboretum which is no small task. I'm about ready to handcuff **Mitzi Hole**. In preparation for the construction of the McSwain Education Center, she transplanted over 130 plants out of the West Arboretum into other parts of the Arboretum. She and the curators have put over 500 other kinds of plants in the ground since last summer, and some 545 "babies" have come out of our nursery for distribution or planting. All of these have been entered and/or mapped in the computer. And when the bulldozers came in, some 800 plants were reported as removed. Whew!

Because there is so much activity, we review our records on a bed by bed basis. If you're interested in helping with these reviews, please see the volunteer section of this newsletter. 

## Out with the Old...Part II

By Todd Lasseigne  
Assistant Director

As the West Arboretum is no longer with us, felled to make way for the McSwain Education Center, rejoin me to reflect and learn of the plants once located there. In Part 1, we ended talking about small-statured, deciduous flowering trees.

Resuming this theme, we come to *Malus yunnanensis*, the Yunnan crabapple. For me, the crabs have always represented a group of flowering trees that seemed neither at home, nor well-adapted, based on my Deep South nativity. It is only with my recent transplant to a more northerly locale (North Carolina) that have I begun to discover these trees. Even considering this personal bias, however, I was immediately attracted to the Yunnan crabapple. Why, you ask? Well, in a genus with 25-35 species, *Malus yunnanensis* represents the species with perhaps the most southerly-located geographic distribution of all crabs. [Yunnan Province comprises the southwesternmost part of China and contains climates ranging from alpine to tropical.] Furthermore, this species has contributed little, if any, to the development through extensive hybridization of the legions of modern crabapple cultivars – an unfortunate anecdote, I feel. I would wonder at the dual possibilities of latent heat tolerance and a low chilling requirement within the genome of Yunnan crabapple. And, do these characteristics sound familiar to southern gardeners wishing to grow plants that have been bred mostly for northern climates? A rhetorical question, indeed! Speculation aside, though, what most impressed me with our specimen of *M. yunnanensis*, standing 25' tall, was its amazing profusion of bloom and dense, rounded canopy. Other authors point to the ascending branches as a key feature in identifying this species, but alas, I do not recall observing the branch architecture of our former tree. Through generous collaboration with our friends at Highland Creek Nursery (wholesale only; Fletcher,

NC), we have preserved germplasm of this rarely cultivated and valuable species.

Growing near the Yunnan crabapple, practically right in the center of the West Arboretum, were two medium- to large-sized deciduous shrubs – the bladdernuts or *Staphyleas*. As this genus is poorly known among horticulturists, I, expecting little from these plants, was amazed by their overly showy, spring floral display and attractive, glossy, rich green foliage. The first plant, labeled as *Staphylea trifolia* (NOT “trifoliata,” as is often seen), or American bladdernut, is native to much of eastern North America, where it occurs in streambank settings or bottomland forests (never in long-flooded microsites, though). It is sometimes unjustly confused with *Ptelea trifoliata*, or wafer-ash. [These two natives, however, are readily distinguished by 1) their markedly differing fruits – swollen, bladder-like (hence the common name) capsules in *Staphylea*, and flattened samaras (not unlike those of the maple relative *Dipteronia*) in *Ptelea*; and 2) the leaf arrangement – opposite in *Staphylea*, and alternate in *Ptelea*.] In mid-spring (April in Raleigh, NC), our specimen of *S. trifolia* produced dangling clusters of off-white flowers (occurring with the emerging leaves) in abundance, bespeckling the plant nearly as good as any flowering cherry. Especially considering that our plant grew in a not-so-moist site, in contrast to that of its preferred nativity, our specimen prospered, maintaining good summer foliage color and strong vigor as a landscape shrub. Clearly, this USDA Zone 4-hardy, spring flowering shrub deserves notice by horticulturists, nurseries, breeders, and plantsmen.

Near to the American bladdernut grew a second plant, an equally-sized (12' tall × 8' wide) specimen of *Staphylea holocarpa* 'Rosea', the pink Chinese bladdernut. As with the American species, *S. holocarpa* 'Rosea' produced flowers with the emerging foliage; but unlike our native, the pink Chinese bladdernut displayed flowers

medium-pink in bud, opening to reveal a clear-pink color. The display was equally as showy, and clearly this was one plant that caused me to pose the oh-so-common plantsman's mental conundrum, “Why isn't this plant seen more commonly in cultivation?” Even the great Krüssmann agrees, reminding us all that, “...*S. holocarpa* and its f. *rosea* are particularly attractive but utilized too little.” The typical form, *Staphylea holocarpa*, was not present in the West Arboretum collection, but is said to produce flowers, tinged pink in bud, that open white.

However, one item continued to nag me – being that one of the bladdernuts was exceedingly fragrant, perfuming the entire area around it with a lovely sweet aroma when I first observed these plants in 1999. Upon reading various standard books, I realized that of all the *Staphyleas*, only *S. colchica*, the Caucasian bladdernut, is mentioned as producing scented flowers. Since the flowers of *S. colchica* are white, could it be possible that our specimen was misidentified as “*S. trifolia*?” Quite so! Krüssmann specifically highlights that in *S. colchica* leaves consist of five leaflets except on flowering shoots, wherein only 3-leaflet-ed leaves occur. *Staphylea trifolia*, as its name implies, only produces leaves with three leaflets. How I now wish that our original specimens still stood, so that I could answer this question. Alas, we will all have to await new replacement plants to be replanted back into the Arboretum, the West Arboretum of the future, after the new Education Center is constructed.

One of the great vistas in the former West Arboretum was the gently, downhill-sloping run that ran from the entrance down toward the Southwestern Garden. In mid- to late-summer, this view was punctuated by a stunning pair of summer-flowering trees, the golden raintrees, specifically *Koelreuteria paniculata* and the cultivar ‘September’. Well, although *K. paniculata*, in its typical form, needs no further mention here for its garden merits, as its virtues have been extolled many times over by other authors, I find it puzzling that the latter plant, *K. paniculata* ‘September’ has not received as much notice. For us, the typical form flowered consistently in June (in Raleigh, NC); whereas ‘September’ was

in full bloom in late August. The capsules for both plants also ripened at different dates, accordingly – July and September, respectively. Michael Dirr, Ph.D. and others point out that ‘September’ is not as cold hardy as the typical form, possibly due to initiation of the hardening-off process occurring too late in ‘September’. However, this relative lack of cold hardiness is of no concern in most, if not all (?), of North Carolina. I find that ‘September’ is an excellent plant that is well worthy of much wider cultivation, especially since it acts to extend the landscape performance of an already-proven flowering tree. There are no good reasons as to why this plant should not be grown and planted throughout the southeastern U.S.

Recently, questions have been raised as to the identity of several plants labeled as, or resembling, ‘September’. The original plant known as ‘September’ (also listed as September Gold™ in Jacobson, but nowhere else as far as I can tell) was selected by the late J.C. McDaniel on the University of Indiana, Bloomington campus in the late 1950s and was introduced into the horticultural trade by Scanlon Nursery. [Speculation has also arisen that ‘September’ may represent a hybrid between *K. paniculata* and *K. bipinnata*, but I find no intermediateness in the foliar morphology between the former species and ‘September’. This hypothesis would be worthy of confirmation or refutation using modern taxonomic techniques.] On the other hand, a tree located at the Arnold Arboretum (Boston, MA) <[www.arboretum.harvard.edu](http://www.arboretum.harvard.edu)>, sometimes confused with ‘September’, was recently named ‘Rose Lantern’ [see *Arnoldia* 56(2):32-37]. Unlike ‘September’, ‘Rose Lantern’ displays capsular fruits that emerge yellowish-green and age to a rich pink color (vs. brown in ‘September’ and all other plants of *K. paniculata*). In this regard, ‘Rose Lantern’ mimics the behavior of the less-hardy *K. bipinnata*. As we have only recently acquired *K. paniculata* ‘Rose Lantern’, I am eager to grow it side-by-side with ‘September’ and see what comparative data are yielded. Clearly, though, ‘Rose Lantern’ also holds much promise as a landscape tree.

In concluding this discussion on the small-statured flowering trees that once graced the West

Arboretum, no discussion would be complete without a mention of the Styracaceae. The Styracaceae, or *Styrax* or storax family, comprises one of our core focus groups of woody plants in our collections at the JC Raulston Arboretum. In this family, we have grown many species of *Styrax*, *Halesia*, *Sinojackia*, *Rehderodendron*, *Pterostyrax*, *Alniphyllum*, and *Meliiodendron*. I look forward to the day when we can add *Parastyrax* and *Huodendron*, as well as many species of the above-listed genera that we have not yet acquired and tested, to this list.

Of the Styracaceae, the *Halesias*, or silverbells or snowdrop trees, comprise a group (as presently recognized) of three species native to North America, with a fourth species (*H. macgregorii*) native to China. However, *Halesia* taxonomy is now quite messy, thanks to a nomenclatural study dating back to 1976. I agree fully with Jacobson’s view that this study “...has left many people shaking their heads,” and suffice it to say, an explanation of that study would require an entire article in this newsletter. Fortunately, though, the species with which I am concerned was spared the nomenclatural axe (or perhaps nomenclatural blender would be more appropriate). Unfortunately, though, our specimens were not spared the actual axe, and they no longer grace the Arboretum grounds. Specifically, two plants grew in the former West Arboretum, prospering near the site where the ‘Fantasy’ Japanese crepe myrtle (*Lagerstroemia fauriei* ‘Fantasy’) still stands – *H. diptera* var. *diptera* (two-wing silverbell) and *H. diptera* var. *magniflora* (large-flowered two-wing silverbell).

Of the silverbells that are known and grown, the widely geographically distributed *Halesia tetraptera* (formerly known as *H. carolina*; commonly known as Carolina silverbell) has received the most attention. Particularly, mountain silverbell (*H. tetraptera* var. *monticola*), which can attain great sizes (with national champions measuring over 100’ tall!), attracts amazement and admiration, especially since we consider the silverbells as relatively small-statured trees. However, two-wing silverbell, *H. diptera* (including both varieties), represents a more southerly distributed species that has received

much less attention from all but a few select horticulturists. *H. diptera* var. *diptera* is native across the southern tier of the southeastern U.S. from southeastern South Carolina, south to the western panhandle of Florida and then westward to eastern Texas. As such, it represents a Coastal Plain species that does not intrude into the Piedmont region of any of the southern states. Despite this native range, this species is rated as hardy to USDA Zone 5 (possibly 4), according to Dirr, and it also flowers 2-3 weeks later (yes, later) than Carolina silverbell, with Dirr reporting flowering in (early?) May. Our plant of two-wing silverbell stood 11’ tall, displaying a nice, dense canopy and annually put forth a profusion of white flowers in spring, these bell-shaped flowers dangling amid the emerging foliage and being borne in such density as to make the tree appear white from a distance. Clearly, with such outstanding garden and landscape attributes and a broad geographic range across the Deep South, ample room for selection of more superior or different clones exists for *H. diptera*. Furthermore, although some literature (e.g., Krüssmann) lists *H. diptera* var. *diptera* as being a sparse-flowering tree, I did not find this to be true with our lone specimen, and undoubtedly with proper selection, other good, heavily-flowering genotypes can be found, introduced, and grown.

Some degree of selection for ornamental attributes within this species has occurred – that being the discovery and subsequent introduction into cultivation of *H. diptera* var. *magniflora* (sometimes incorrectly listed as “magnifica”), a naturally occurring variety of two-wing silverbell. Endemic to a small area centered around the Apalachicola River and adjacent ravine and bluff systems of southwestern Georgia, southeastern Alabama, and the central panhandle of Florida, *H. diptera* var. *magniflora* was described as new to science in 1958 by the late Robert Godfrey, Florida botanist and dendrologist. [The Apalachicola region in Florida is a haven for many Pleistocene relict plants, a veritable plant hunter’s paradise in the southern U.S.] However, Jacobson states this plant was cultivated since the 1920s (preceding in cultivation its recognition as a naturally-occurring variety by three decades); yet, it was not until the 1990s, much through the


efforts of J.C. Raulston, that this plant became better known and distributed outside of its native range. At the JC Raulston Arboretum, *H. diptera* var. *magniflora* performed splendidly, displaying the largest flowers of any of the silverbells. Also, unlike reports of later-flowering behavior in *H. diptera* var. *diptera*, *H. diptera* var. *magniflora* has been observed at peak bloom as early as April 5<sup>th</sup> (in Raleigh, NC) – a date certainly not 2-3 weeks later than that of *H. tetraptera*. Godfrey states the two varieties “appear to be distinguishable morphologically only in respect to flower size,” this appearing in his treatise on north Florida dendrology – Trees, Shrubs, and Woody Vines of Northern Florida and Adjacent Georgia and Alabama (1988. Univ. of Georgia Press, Athens, GA). Taxonomically speaking, some authors choose not to recognize this “var. *magniflora*,” reducing it to cultivar status (‘Magniflora’), but I disagree and would at least accord it status as a botanical forma (f. *magniflora*), although still preferring the varietal name I have used here, since plants occur naturally in the wild.

Near to the silverbells were planted three cultivars of Japanese snowbell, *Styrax japonicus* – ‘Crystal’, ‘Kusan’, and ‘Camellia Forest Dwarf’. Of these, only ‘Crystal’ is widely grown in the nursery industry. Named and released through the JC Raulston Arboretum, ‘Crystal’ was derived from seed collected in South Korea on the 1985 U.S. National Arboretum Korean expedition. Our plant measured nearly 12’ tall and displayed a dense canopy with rich, dark green foliage. One of my favorite Arboretum views was that of the upright, single-trunked specimen of ‘Crystal’ in flower and foliage next to the adjacent shrubby, more horizontal than vertical, specimen of *S. americanus*, with light green foliage. Unlike other selections of Japanese snowbell, ‘Crystal’ not only displays rich, lustrous dark green foliage, but also bears its flowers (and later fruits) on dark purple peduncles. This purple coloration, which is also expressed in the calyx, contrasts effectively with the pearly white petals, such that the flowers stand out more than in green-peduncle/green-calyx genotypes. I have seen fine specimens of ‘Crystal’ in various landscapes in North Carolina, and I have never been disappointed with the landscape performance of this cultivar.

Of the other cultivars that grew in the West Arboretum, less information has been written about them. Although all three cultivars were planted at the same time (1994), ‘Kusan’ measured only 6.5’ tall, and ‘Camellia Forest Dwarf’ measured 8’ tall (compared to the 12’ of ‘Crystal’). ‘Kusan’ is a selection from Robert Ticknor of Oregon State University, selected for its precocious bloom, globose crown, short stature, and slow growth rate. Our specimen seemed to bear out his selection criteria, although sadly, little mention was ever made of it before now. Jacobson reports that ‘Kusan’ was introduced into the nursery trade through Roslyn Nursery (Dix Hills, NY), and perhaps they still stock plants. The last cultivar, ‘Camellia Forest Dwarf’, remains an enigma to me. Our plant growing in the West Arboretum did not seem to be exhibiting to any great degree a dwarf habit (although it did grow to only 66% the size of ‘Crystal’ in an equivalent time period). Stay tuned for more on this plant, as I am intrigued enough to do some follow-up with my friends at Camellia Forest Nursery (Chapel Hill, NC), who have introduced so many fine plants that I cannot simply dismiss this one casually as an aberration.

In one last note on the cultivars of *Styrax japonicus*, I must add that some friends in the nursery industry, whose opinions I value, have seen significant problems with infestation and destruction of plants due to the Asian ambrosia beetle. However, since I do not know of any large-scale declines of Japanese snowbell in landscape settings, I would wonder if this is a problem in production (where plants are predisposed to insect attack due to high fertility/high growth rate regimes) than in the landscape. One thing is clear – further intense study of this pest is needed. To date at the JC Raulston Arboretum, we have never lost a single, entire plant of any *Styrax* due to ambrosia beetle; and any serious dieback instances that we have had (e.g., one case of crown dieback of an 8’+ specimen of ‘Carillon’ ca. 1996) may have been due to either cold injury (due to premature deacclimation during a warm spell) or to a beetle attack – although no data to support either hypothesis were taken.

Lastly, in our collection of West Arboretum Styracaceae were two specimens of *Styrax americanus*, the American snowbell. In actuality, one of these specimens (standing at 15’ tall) was labeled (ever since its acquisition back in the 1980s) as “*Styrax grandifolius*,” but this was based on an incorrect identification. *Styrax grandifolius*, or bigleaf snowbell, can readily be distinguished from American snowbell by – you guessed it – leaf size. An honest mistake, and one now gone along with the very plants from the former West Arboretum. Of more importance than a simple error was the fact that the other plant (reaching 10’ tall × 15-20’ wide) was labeled under the name *Styrax americanus* var. *pulverulentus*, a name no longer recognized by modern botanists who instead prefer to lump the “var. *pulverulentus*” with the species. Historically, this variety represented populations (or individual plants?) of American snowbell that displayed leaves covered with stellate (stalked and star-shaped) hairs on both the upper and lower leaf surfaces, giving a whitish or grayed appearance from a distance. Some plants that I have run across, still labeled with the varietal name, are indeed different in appearance, displaying nearly gray foliage! Our specimen, however, while somewhat different than “normal” glabrous (=smooth or hairless), green-leaved plants, never came close to matching these other specimens that I have since observed at other gardens. Thus, for some plants, the epithet “*pulverulentus*” (meaning covered in a powdery or fine bloom) would seem appropriate. Again, as in the *Halesia*, it might seem to some preferable to treat this plant as a botanical forma, as *Styrax americanus* f. *pulverulentus* – although we are splitting taxonomic hairs in doing so. In any regard, our plant (of “*pulverulentus*”) basically represented a sprawling, shrubbier version of this highly variable species. This, of course, points to the need for selections to be made from this native species, one occurring throughout the entire southeastern quadrant of the U.S.

With this discussion of several of our former specimens of the Styracaceae, I conclude this second chapter of the West Arboretum Florilegium. Stay tuned, there is more to come in the next issue. 



# Paving the Path to the McSwain Education Center


By Donna Walker  
Development Associate

Most of you know about many of the methods we've used to raise funds for the McSwain Education Center. One of the most intriguing ways has been the sale of personal message bricks. These bricks will be placed in the pedestrian walkway and plaza outside the Education Center. More than 850 bricks have been sold. The range of messages has been phenomenal - including memorials to a family loved one or pet, the commemoration of a special date, noting pride in grandchildren, and just giving one's initials. Families, businesses, newly married couples - the list goes on - have purchased a brick to show allegiance to the JCRA and support to the McSwain Education Center. The bricks make great presents - Christmas, birthday, wedding, graduation, etc.

That big sigh of relief you all heard late on a Friday afternoon early this year wasn't the usual TGIF! After many weeks, days, and hours of intensive work, every single message had been gone over many times, confirmation phone calls made, forms perused, and changes made to create some kind of conformity. (A huge thanks goes out to Pam Byington and Chris Cammarene-Wessel from the CALS Development Office). The messages were finally ready! They were downloaded to a disc and off they went to the engravers. But you haven't missed out! This was just the first wave and we hope you'll jump on the bandwagon. We've got plenty of space in the courtyard, but don't wait until the last minute.

It's easy to have a brick for your very own! Simply fill out the form on the right and mail it to us. Additional forms are available on our Web site at <www.ncsu.edu/jcraulstonarboretum> or by requesting one by calling our office at (919) 515-3132. You may also write out your message and send it to us with a check (made

out to the NC Ag. Foundation with JCRA in the memo line) for \$100.00 to our address which is given on the back of this newsletter. You may use three lines, seventeen spaces per line for your message. Remember that spaces between words count, and please don't use commas or periods. After receiving your request, a certificate will be sent to you or to your honoree - whichever you've requested - to acknowledge your contribution. The bricks will be placed in the walkways as one of the final phases of construction.

Don't be left out when you visit the Arboretum and others have a brick to proudly point out to their friends. Remember - bricks - they're a good thing! 



Above: Bob Lyons pushed up his sleeves to help build the McSwain Education Center along with several other volunteers and staff members.

Photograph by Christopher Todd Glenn

## Pledge for Partnership

Yes! I want to join the effort to create the McSwain Education Center.

Enclosed is my check for \_\_\_ brick(s) at \$100.00 per brick, made out to the NC Ag. Foundation, in the amount of \$\_\_\_\_\_.

Message to be engraved on brick: (a single space counts as a letter)

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I want to make an unrestricted gift/pledge to the McSwain Education Center Building Campaign of \$\_\_\_\_\_ payable over \_\_\_\_ (1-3 years).

I am interested in more information about other naming opportunities within the McSwain Education Center.

I am interested in information about how I can support the Arboretum's future through my estate plan.

\_\_\_\_\_  
Name

\_\_\_\_\_  
Organization or Company

\_\_\_\_\_  
Address

\_\_\_\_\_  
City State Zip

\_\_\_\_\_  
Phone (daytime) (evening)

Notification of gift and certificate to be sent to:

Name: \_\_\_\_\_

Address: \_\_\_\_\_

Amount enclosed: \$ \_\_\_\_\_

And includes: \$ \_\_\_\_\_ for engraved bricks  
\$ \_\_\_\_\_ unrestricted gift

Mail to: The JC Raulston Arboretum  
Department of Horticultural Science  
Box 7609  
Raleigh, NC 27695-7609

For additional information, please contact the Arboretum Development Office at (919) 513-3826.

# people Volunteering News

By Nancy Margaret Brodd  
Volunteer Coordinator

## Volunteer Holiday Party December 16, 2000

Everyone enjoyed themselves at the home of JCRA Director, **Bob Lyons**, for the Volunteer Holiday Party. The food was abundant, fattening, and delicious! We have some great cooks and bakers among our volunteers. Along with the spread of provided staples, Bob made four pots of various soups which warmed all of our tummies. Aren't we all still waiting for recipes?

Among the festive decor were poinsettias galore throughout the home, thanks to **Joe Stoffregen** of Homewood Nursery. Under Bob's magnificent tree were found lots of raffle gifts, which were given out every hour to the winning ticket number. One of the nicest gifts was one of Bob's framed photographs chosen off the wall, any wall, of his home by the winning ticket holder. **Doris Huneycutt**, Winter Garden Co-curator, was the lucky winner. She chose a photograph of a soft, solitary Jack-in-the-pulpit, which reminded Doris of her mother's garden from many years ago. But the greatest gift of all was having so

many wonderful volunteers and friends enjoying some holiday spirit together. ❁

## Welcome to the New Year of Many Changes: Ms. Frankie Fanelli as Interim Volunteer Coordinator

As most of you know, my husband **Bob Brodd** and I are expecting our first child. With the due date of June 30 fast approaching, **Bob Lyons** and I have decided it best that I enjoy this precious time and take maternity leave. He has graciously offered us until the end of September for us to see how this wonderful gift effects our lives, both personally and professionally.

As I take my maternity leave, I am excited to announce **Frankie Fanelli** as the Interim Volunteer Coordinator, effective immediately until the end of September. Many of you already know Frankie as the Paradise Garden Curator since the spring of 1998. She is also the JCRA Wedding Co-coordinator.

Frankie has been much more than this to the JCRA. She has stepped up to volunteer for many

of our needs without even being asked. I am most thankful to Frankie for her unselfish volunteering efforts during the fall of 1999, when I was new to this position and found myself all alone in Kilgore due to the many staff changes. Frankie stepped into the office one day and saw my dilemma and offered to come in daily to cover the main office

number. She handled this task with her normal grace and ease, especially since she is a retired manager of AT&T. Once again, thank you Frankie!

Frankie is also involved the Department of Horticultural Science at NCSU. She graduated magna cum laude with a B.S. in Horticultural Science, with a minor in Botany, in May 2000. She studied closely with the renowned **Gus DeHertogh**, Ph.D., learning much about flowering bulb physiology. This fall, she hopes to continue her horticultural studies in the NCSU Graduate School.

By just being herself, along with her dedication to and studies of horticulture and history of managing people, I know I leave all the JCRA volunteers in capable and nurturing hands. Good gardening and happy volunteering to you all!

Frankie's office hours are 10:00 AM-3:00 PM Monday through Wednesday and her e-mail address is <frankie\_fanelli@ncsu.edu>. ❁

## Apparel News

At the spring Pi Alpha Xi plant sale in April, we sold over \$1,000 worth of apparel, thanks to the following booth volunteers: **Jeanne Andrus**, **Mark and Jeanine Armagost**, **Jack and Pat Benson**, **Anna Berry**, **Mary and Claude Caldwell**, and **Nancy Simonsen**. This was a huge success and a much needed one. Our funds are low and supplies are high. Please help us move the old apparel to make room for the new by volunteering to sell these to the public as booth volunteers and/or by purchasing these items for yourself and/or as gifts!

The Apparel Committee (volunteers **Mary Edith Alexander** and **Cheryl Doyle**, headed by JCRA Assistant Director, **Todd Lasseigne**) are currently working on the 2001 design. If you are interested in becoming a part of this committee, please let us know. ❁



Above: After a wonderful dinner, the volunteers eagerly waited for their numbers to be called during the holiday giveaway.  
Photograph by Bob Lyons

## Updated Volunteer Database

Thanks to telephone volunteers Frankie Fanelli, Elaine Pace, Nancy Simonsen, Anne Stellings, Kathleen Thompson, and the brainstorming of the Volunteer Program Planning Committee (see Fall 2000 & Winter 2001 Newsletter), we have updated the active/inactive status of all volunteer records in our database. As a result, the active volunteer list has dropped from 458 to 264 records. In addition to saving time when searching for active volunteers, it has also proven itself as a money saver in mailing costs too! Most importantly, however, this means that more time and attention can be given to our "active" volunteers.

Also, thanks to volunteer **Anna Absher** for inputting all these updates into our database. ❁

## Special Thanks

**Catherine Gaertner**, Iris Collection Curator, is no longer volunteering with us. She and her family have moved to Tennessee. I know all of you who knew Catherine join me in wishing her family all the best. The iris curator position will not be renewed.

**Doug Ruhren**, Perennial Borders Co-curator, is now living in Belmont, NC, working at Daniel Stowe Botanical Gardens <[www.dsbg.org](http://www.dsbg.org)>. Regretfully, the commute is too long for him to continue volunteering with us on a regular basis. Doug has been involved with the JCRA since 1984. What a huge loss this is for us, personally and professionally. We wish Doug all the best. ❁

## Tour Guides 2001

Tour Guide Training 2001 was a success! Many new faces were seen among the seasoned tour guides. Special thanks to **Bryce Lane**, **Todd Lasseigne**, and **Bob Lyons** for leading such informative and enjoyable tours. Bob's and Todd's tours were taped and may be checked out at the Volunteer Office. ❁

## Welcome to the New JCRA Volunteers



Anna Absher



Jayme Bednarczyk



Korena David



Shelley Griffin



Kathy Hafer



Susan Hyte



Barbara Kennedy



Beth Parks



Catherine Poff



Jane Triplett



Kalai Teves

Photographs by Nancy Margaret Brodd

## JC Raulston Arboretum Volunteer Coordinators & Curators

**Anna Absher**  
Tour Guide Coordinator

**Chris Allen**  
Butterfly Garden Curator

**Susan Andrews**  
Winter Garden Co-curator

**Pam Baggett**  
Entry Garden Curator

**Alicia Berry**  
Water Garden Curator

**Harvey Bumgardner**  
Finley Rose Garden Co-curator

**Tom Bumgarner**  
Labeling Curator

**Mary and Claude Caldwell**  
JC Raulston Archives Co-curators

**Anne Calta**  
Aquatic Gardens Co-curator

**Susan Cheatham**  
Klein-Pringle White Garden Curator

**Anne Clapp**  
Finley Rose Garden Co-curator

**CJ Dykes**  
Wisteria Garden and Vines Curator

**Edith Eddleman**  
Perennial Borders Curator

**Frankie Fanelli**  
Paradise Garden Curator

**Doris Huneycutt**  
Winter Garden Co-curator

**Amelia Lane**  
Mixed Borders Curator

**Pat McCracken**  
Magnolia Collection Curator

**Patrick Pitzer**  
Aquatic Gardens Co-curator

**Bob Roth**  
Lath House Curator

**Bill Satterwhite**  
Bluebird Houses Curator

**Dick and Judith Tyler**  
Winter Garden Co-curators

**Curator Needed**  
Japanese Garden Curator

## Volunteer Opportunities

The following are volunteer positions that need to be filled as soon as possible. Volunteer Interest Forms are available in room 162, Kilgore Hall, NCSU; at the JCRA Volunteer Office; and by mail. If you are interested or have any questions, please contact the Volunteer Coordinator at (919) 515-3132 or e-mail <frankie\_fanelli@ncsu.edu>.

**Mapping/Labeling** - We have three different needs in this area: **Map Review**, which assures accuracy between the map and the actual area; **Size Measurement**, which is measuring the height, caliper (using fine reading instruments), and spread of woody plants; and **Label Review**, which is checking each plant at the Arboretum for labels. Interested volunteers will need training during the week, preferably Tuesday, and then could work independently any time. Some plant knowledge would be helpful and neat handwriting is a plus.

**Plant Recorders** - Volunteers are needed to help curators with mapping their gardens. Two volunteers are needed on Wednesday, one to help **Amelia Lane** in the Mixed Shrub Border and one to help **Susan Cheatham** in the Klein-Pringle White Garden. We also need two volunteers for the weekends, one to help **Frankie Fanelli** with mapping in the Paradise Garden and one to help **Chris Allen** in the Butterfly Garden. These volunteers must have attention for detail and neat handwriting. Some plant knowledge would be helpful. 

### 2001: A Plant Odyssey

September 28 & 29, 2001 (Friday and Saturday)

Keep your calendars open for the 4<sup>th</sup> JC Raulston Arboretum Symposium. A brochure will be mailed soon and details will be posted on the Arboretum's Web site <[www.ncsu.edu/jcraulstonarboretum](http://www.ncsu.edu/jcraulstonarboretum)> as they are finalized.

## Membership Application

- |  |   |
|--|---|
| <input type="checkbox"/> Student/Senior \$10.00    | <input type="checkbox"/> Patron \$500.00-\$2,499.00       |
| <input type="checkbox"/> Individual \$30.00        | <input type="checkbox"/> Benefactor \$2,500.00-4,999.00   |
| <input type="checkbox"/> Family/Dual \$50.00       | <input type="checkbox"/> Philanthropist \$5,000.00 and up |
| <input type="checkbox"/> Sponsor \$250.00-\$499.00 | <input type="checkbox"/> My company matches gifts.        |

I have enclosed a matching gift form.

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Mail to:  
The JC Raulston Arboretum at NC State University  
Department of Horticultural Science, Box 7609, Raleigh, NC 27695-7609

The JC Raulston Arboretum is a 501(C)3 organization. All membership contributions over \$30.00 are tax deductible.

  
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