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## SFA Gardens Newsletter, Feb 1991

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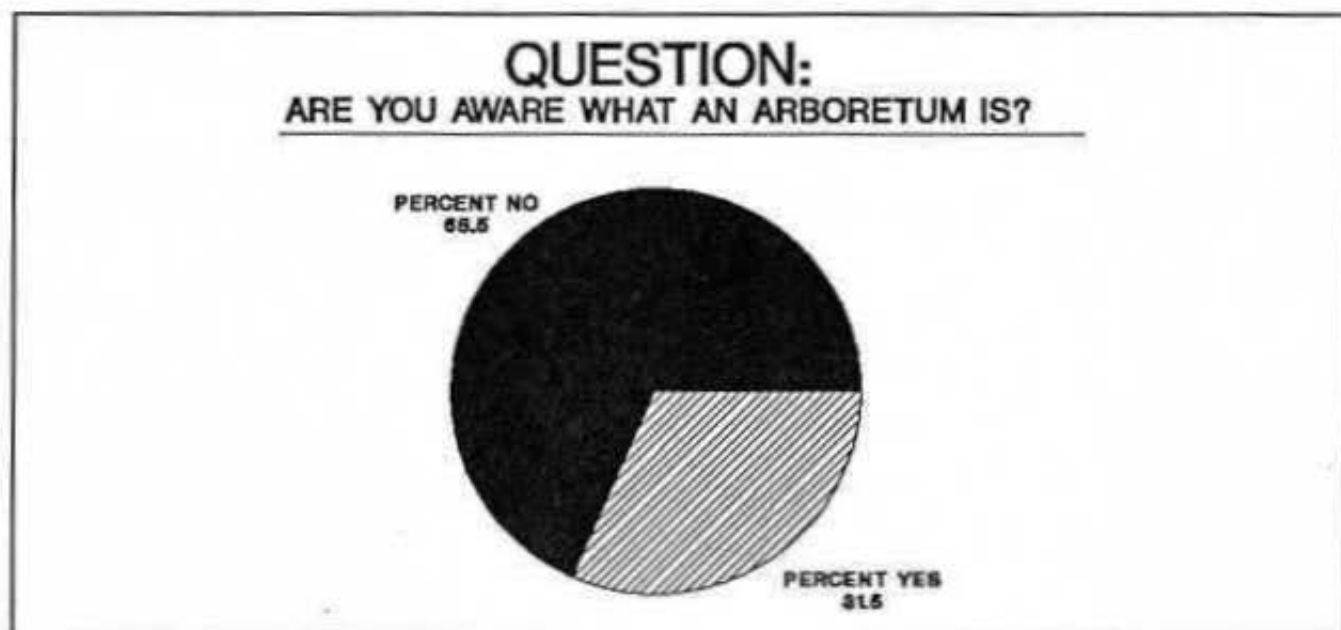
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NEWSLETTER NO. 10, FEBRUARY, 1991  
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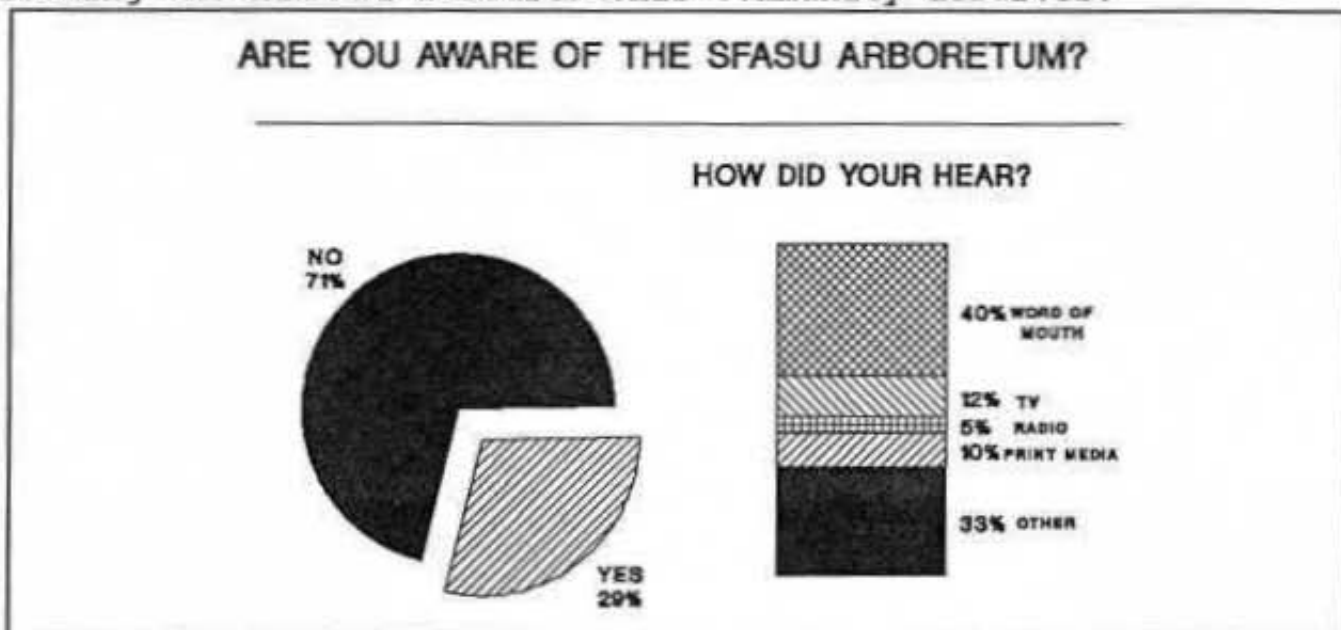
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**ARBORETUM MARKETING STUDY:** Four students in a fall marketing class of Dr. Curtis completed an interesting marketing study of the arboretum. Raquel Dominguez, Syma Johnson, Saron Stell, and Randy Whittemore conducted a survey for the arboretum. A random telephone sampling of 200 Nacogdoches residents revealed what we were afraid was true: Too few people know what an arboretum is or that one exists in Nacogdoches.



Of those who did know about us, it was interesting how they did. The results indicate that we still have a long way to go before becoming the kind of resource this community deserves.



**SIGNAGE AND INTERPRETATION:** We have initiated a project that will begin to deal with our worst characteristic: signage and interpretation. If there's one major complaint voiced by our many visitors it would have to be that the theme gardens are not interpreted or signed and that individual plant labelling is weak. Using treated two-by-twelves, we have begun a series of painted signs that define the garden. The first two signs on Wilson Drive read "SFASU Arboretum." That should end any problems for visitors just trying to find us and will boost arboretum recognition on campus. It's still surprising, even though the marketing study proved it, that so many students and faculty don't even know we exist. Signage will help. The gray-background, purple lettered signs (SFASU colors) will define our main garden sections: the herb garden, the daylily garden, the "Texas Heritage" garden, the east Texas Bog, the border, Asian "valley," the dry garden, the conifers, etc.

I am awaiting word on a grant that will move us closer to purchasing a computer-assisted plant labelling machine. Software now allows easy on-screen creation of text, fonts, and graphics to produce durable, white on black signs in a range of sizes. A new Agriculture computer laboratory is the logical home for such a machine. A reliable pool of work-study students assures that the machines could be manned to generate an excellent inventory of signs, a major key to arboretums and botanical gardens. Interpretive signs are essential to self-guided tours and can open up all kinds of avenues for educational outreach. Signing the LaNana creek trail would greatly enhance the value of this green belt project. The machine would have value to biology and forestry students and faculty in projects involving interpretation.

**THE TEXAS ASSOCIATION OF BOTANICAL GARDENS:** The TABG is only two years old and the annual conference was hosted by the Fort Worth Botanical Garden, November 1-3, 1990. The association is a gathering of arboretum and botanical garden faculties and staff and those interested in topics that deal with plant collections, research, and conservation projects. The Fort Worth Botanical Garden staff put on excellent sign-making and database management workshops, both of major interest to this professor. The Fort Worth Botanical Gardens are enjoying several major garden projects. The Japanese garden is excellent, complete with a money-making woodland pond of large Koi, multi-colored fish that resemble goldfish. Just about everyone who visits has to spend a quarter to feed the fish, particularly if kids are along. Just how much money? They made me promise not to say but it was surprising.

**THE NATIVE PLANT SOCIETY OF TEXAS CONFERENCE:** The Native Plant Society of Texas is ten years old and promotes conservation and greater use of native plants. The annual meeting was held October 20 and 21, 1990, in Houston, Texas, and featured speakers covering native plant topics and about ten plant vendors selling a wide range of Texas natives. I was surprised and honored to be voted in

as president-elect of this society and will spend this year getting ready to take the helm in 1992.

**CARPENTER SCHOOL PROJECT:** The Men's Garden Club, Nacogdoches, and the SFASU Arboretum are tackling a project to bring a native woodland to the Carpenter elementary school campus. We have selected a wide range of east Texas native tree species for this first year. The school kids will be brought into the planting effort with help from the "Students for Environmental Awareness," a club at SFASU, members of the Men's Garden Club of Nacogdoches, and the teachers at Carpenter Elementary. This is an interesting project that mimics efforts going on in Austin, Texas, in a project called the "Bryker Elementary Woodlands Project".

**CADD LAB AT SFASU:** A new ten-station computer laboratory has been secured for the horticultural program at SFASU. This new resource is a wonderful tool for teaching all sorts of design and mapping courses. The maps attached in this newsletter were generated via this lab.

## CAD gives SFA edge on technology

New microcomputer system offers students wave of the future capabilities

BY CHRIS JOHNSON  
Staff Writer, *The Pine Log*

Inside the Agriculture Building is a \$40,000 secret.

The building houses the latest in computer design technology and the fastest microcomputers on campus, but few students know about it. Dr. David Creech, professor of agriculture and horticulture wants more students to know his secret.

CAD (Computer Assisted Design) is rapidly replacing hand-drawings in the areas of architecture, interior design, geography and forestry. CAD is capable of producing photographic quality three-dimensional images or mapping transparent layers of a landscape or house.

"Thanks to CAD, drafting is becoming a dinosaur," said Dr. Creech. "It's the design wave of the future. By the mid 1990's, if you aren't doing CAD, you won't be able to compete (in the industry)."

Dr. Creech, who is teaching two classes on CAD, said because the horticulture department is also a design-oriented field, it is "just as good a home as any" for the new CAD computers.

"I have been very pleased with the academic support at SFA," he said.

The 10 386 SX microcomputers were installed in the agriculture building in August as a "recruiting tool" for horticulture. They could as easily have been given to the art or forestry departments.

Each of the two classes Dr. Creech instructs has 18 students, and he said the only prerequisite for the course is to have interest. One class is for interior design students, and the other is for landscape architecture students. In AutoCAD, the basic design language, students learn how to use the computer as a database for variables in landscapes and buildings, calculating square feet and square inches with the touch of a button.

"When students finish the course, they won't be experts, but they will feel comfortable with CAD," he said. By 1995, he hopes to be teaching not only AutoCAD classes, but also LandCAD, a more advanced version. He suggested students start as freshmen to be able to master the language when they graduate.

One year ago, Dr. Creech would have thought the idea of using computers for artistic purposes was dehumanizing, but he doesn't believe that now.

"Critics poo-poo it (computer generated art) because they think it takes away from creativity, but actually it increases creative time by decreasing time spent drawing or painting," he said.

When Dr. Creech attended college in the '60s and '70s, he still had to carry a slide rule and wasn't allowed to use a calculator in his horticulture classes. He admits things have changed since he attained his bachelor of arts and doctorate at Texas A&M University and his master's of science

at Colorado State. He describes working with CAD as a "mid-life emotional breakthrough".

Since he arrived at SFA in 1978, he has done nutritional research on blueberry farms, studied the transplanting of Asian vegetables in the United States and helped to preserve endangered plant species in this area. During his tenure, he has worked diligently on the SFA arboretum. It is projected to be the largest and most diversely furnished arboretum in the state of Texas in the next couple of years.

He mentioned that Bob Rogers, grounds maintenance manager, is trying to talk the board of regents into switching to AutoCAD for the campus grounds upkeep. The system would allow better precision and speed in solving electrical and plumbing problems.

Many colleges are considering adding CAD to their curriculum. Dr. Creech is scheduled to present an oral paper entitled, "Integrating CAD Into Horticulture Curriculum: Headache Or Opportunity?" at the annual Southern Region American Society of Horticulture Science meeting in Fort Worth next February.

Despite its horticultural applications, Dr. Creech said CAD is equally useful in other careers. Another thing he wants to tell students is that it is fun.

"When students think of electives we would certainly like them to give us a look."

## Notes from the Herb Garden

by Kurt Whiting

Since the last issue, we have added several new and interesting herbs to our collection. In mid-summer, under close supervision and beneath a hot summer sun, I added Brazilian Buttonflower, *Centratherum camporum*, a beautiful pineapple scented annual with blue composite-shaped flowers which reseed prolifically. The plant dies completely at the first fall frost but comes back from seed abundantly the next spring. Usefulness of *C. camporum* is confined to aesthetic landscape value and scent as well as limited arts and crafts.

Pineapple sage, *Salvia elegans* was donated in early summer by Lennie Murphy of Murphy's Cottage in Shreveport, Louisiana. This sage is a tender perennial that also has pineapple scented leaves. Showy bright red flowers attract hummingbirds and butterflies to terminal flower spikes throughout most of the summer. The plant reaches a height and spread over four feet. *S. elegans* dies to the ground after the first frost but usually comes back from the root the next spring. *S. elegans* is used as a landscape plant, as a garnish for cool summer drinks, and as a cut flower in herbal arrangements.

Last October, I met Mary Lou Hamilton on a visit to her herb farm (The Herbarium and Stuff) in Jacksonville, Texas. She graciously donated more pineapple sage plants and Southernwood, *Artemisia abrotanum*, a fine addition to our gray/green garden with its dark-green, soft, fine feathery leaves. The scent is hard to describe. Some like it; others don't. A great landscape plant with one drawback: its very susceptible to winter kill from freezing weather. Rue, *Ruta graveolens*, was another plant gift from Mary Lou. This dark blue-green, extremely hardy perennial is a blessing in the winter and a beauty in the summer. Preferring a drier sandy soil, *R. graveolens* will withstand the coldest of Texas winters and produces a profusion of bright yellow flowers in summer. Oils produced on its club shaped leaves often cause contact dermatitis. Once a medicinal herb in folklore medicine, it is now used sparingly as a culinary herb but remains a great landscape plant. Mary Lou also shared Gopher purge, *Euphorbia lathyris*, with us. This spindly looking three foot plus hardy biennial herb is reported to repel gophers. The blue-green leaves of *E. lathyris*, protrude into the air perpendicular to the upright stem with the oddity of a Norfolk Island pine. An interesting and unusual landscape plant and a welcomed addition to our herb garden.

The summer and early fall of 1990 was typical Texas: long and hot! I watered the herb garden with a pulse type overhead sprinkler twice a week for 4 to 8 hours periods after dusk to insure deep watering and to avoid sun scald and wilting. Shallow watering encourages plant roots to grow near the surface only to become more susceptible to drought and heat from direct sun. So, always water deeply. Herbs produce healthier foliage, better

plant shape, size and color when grown in well drained soils that are properly fertilized and allowed to dry out between irrigations. Our raised beds are built from railroad ties donated by Mr. Curtis Pruett of the Texas State Railroad in Rusk, Texas. We cut and rebar the ties in place, then back fill with sand and composted pine bark mulch. As fertilizer, we use chicken litter in the herb garden. Not because we are trying to make a statement, but because it works so well and we have an abundant supply in east Texas. Our litter comes from friend and poultry producer and truck farmer, Mr. George Millard, II. George operates a poultry operation, a truck farm and vegetable stand on Woden Road in Nacogdoches, just off the loop. George sells composted chicken liter by the pick-up or trailer load at a very reasonable price. He will even load your truck or trailer free. If and when you use chicken liter as a fertilizer, use care not to come in contact with plant parts including roots. Spread the liter in concentric circles around and to the outside of the drip line of your plants and then water it in well. The smell can't be avoided while transporting and applying the litter, but a light mulch over the liter will reduce most if not all the odor and help create a buffer zone. Mulch helps to keep plant roots cooler in the summer and warmer in the winter plus help reduce weeds. Mulches are also aesthetically pleasing in the landscape and can cover up garden glitches and irregularities.

During the fall, I worked with foreman Bill Ross and sign painter and artist Ronnie E. Morrow from the SFSAU print (paint) shop. Ronnie hand lettered several signs for the arboretum and Susan Elking (SFASU Art graduate student) and I chiseled them out. There are many more signs to prepare for the gardens and we will finish them as time permits. We appreciate everyone's effort getting us this far along with signage.

Thursday, November 29, 1990, brought the first killing frost last fall. The first to die were the annuals: basil, *Ocimum basilicum* and Brazilian Buttonflower, *Centratherum camporum*. This frost also nipped the scented geraniums, *Pelargonium spp.*, lemon balm, *Melissa officinalis*, lemon verbena, *Aloysia triphylla* and killed the flower buds on the French lavender, *Lavendula dentata*.

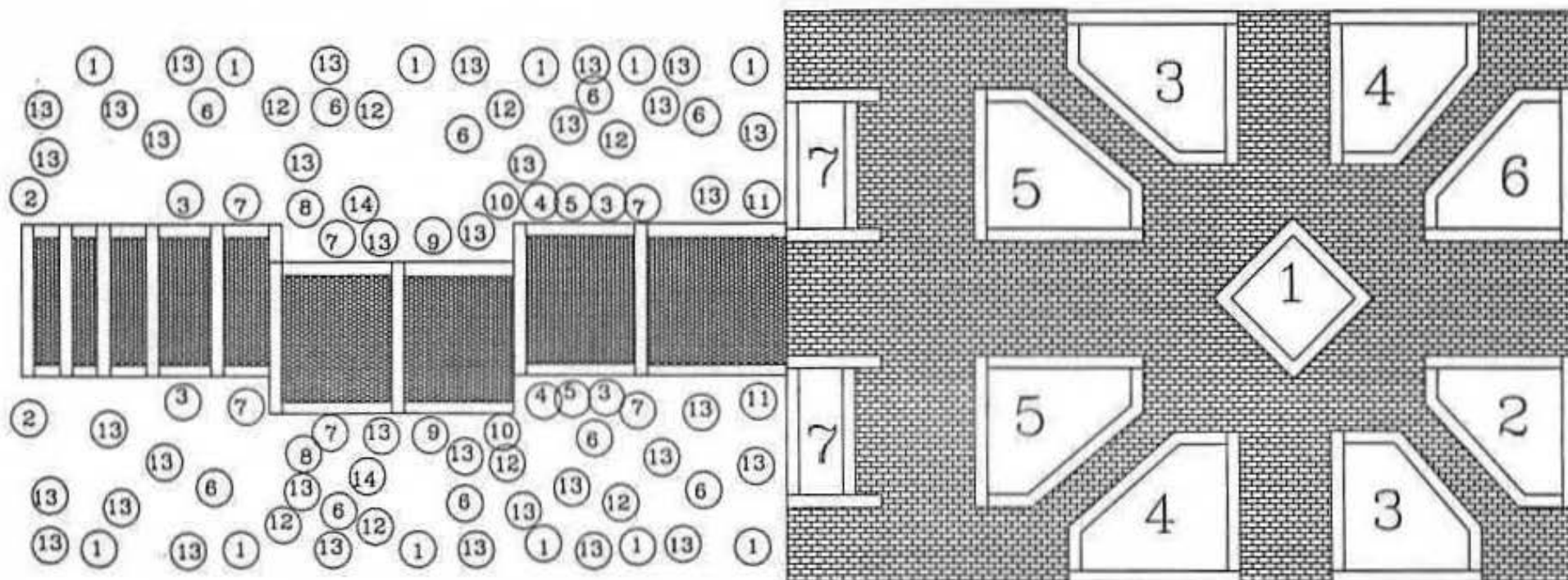
This was the time of year that I decided to dig and lift out the lemongrass, *Cymbopogon citratus*. Once dug, *C. citratus* should be cut back at the root and leaf blade proportionately to about 6 inches, then divided into clumps of 8 to 10 rhizome like bulbs. These can be planted or healed in and overwintered in a greenhouse. Replant outside when the soil temperature has risen enough to prevent it from rotting in the cold, wet Texas soils. After a few more freezes during the week of christmas and new year, damage had been done to the rosemary, sage and thyme. Arp rosemary, *Rosmarinus officinalis* 'Arp' a less attractive rosemary, remained unscathed. Rescued by Madalene Hill and or Gwen Barclay in Arp, Texas in 1972, R. o. 'Arp' is one of the most hardy rosemaries we can grow.

As of early February, yarrow, *Achillea millefolium* was beginning to develop new dainty green fern shaped leaves, the sweet vernal grass, *Anthoxanthum odoratum* had small spikes of fresh green grass and the lemon mint, *Monarda citridora* had spread profusely from last years boundary. Soon we will divide the vetiver, *Vetiveria zizanioides* in the garden and replant the lemongrass, *C. citratus* and the scented geraniums, *Pelargonium* spp. that we have been growing in the greenhouse. This spring I hope to expand the herb garden to include: a culinary herb garden, an herb tea and dye garden, and a medicinal herb garden. If you would like to donate herb plants, labor or other materials and embellishments, it would be gratefully accepted and appreciated.

Jeff Oakley has helped us once again, by taking last year's design and brick project one step further. Jeff used his time and effort in a CAD (computer-aided design) class to develop a map of the herb garden (attached).



# SFASU HERB GARDEN



## LEGEND

1. *Vetiveria zizanioides*
2. *Anthoxanthum odoratum*
3. *Tegetes lucida*
4. *Monarda citriflora*
5. *Salvia grahamii*
6. *Cynopogon citratus*
7. *Aloysia triphylla*
8. *Chrysanthemum balsamita*
9. *Melissa officinalis*
10. *Centrathium camphorum*
11. *Mentha pulegium*
12. *Artemisia annua*
13. *Achillea* spp.
14. *Anethum graveolens*

1. THYME  
*Thymus vulgaris*  
*T. x citriodorus*  
*T. x c. Argenteus*  
*T. glabrescens*  
*T. pseudolanuginosus*  
*T. praecox Aureus*  
*T. praecox Articus*

2. SAGE  
*Salvia officinalis*  
*S. o. Aureum*  
*S. o. Tricolor*  
*S. farinacea*

3. ROSEMARY  
*Rosmarinus officinalis*  
*R. o. Albus*  
*R. o. Lockwood de forest*  
*R. o. Tuscan Blue*  
*R. o. Collingwood Ingram*

4. LAVENDER  
*Lavendula angustifolia*  
*L. a. Hidcote*  
*L. a. Munstead*  
*L. latifolia*  
*L. dentata*

5. MIXED  
*Poterium sanguisorba*  
*Stachys byzantina*  
*Helichrysum angustifolium*  
*Ruta graveolens*  
*Lynchnis cardonaria*  
*Santolina virens*  
*S. chamaecyparissus*  
*Teucrium chamaedrys*  
*T. lucidum*

6. ARTEMESIA  
*Artemisia absinthium*  
*A. vulgaris*  
*A. ludoviciana*  
*A. schmidtiana nana*  
*A. stellerana*

7. GERANIUMS  
*Pelargonium* spp.



## NOTES FROM THE BOG

by Peter Loos

Much has happened since the last newsletter. The Bog Garden has received a large quantity of new plant species. Dr. Creech has been elected president-elect of the Native Plant Society of Texas and I have been accepted as a graduate teaching assistant in the SFASU horticulture program. That means that I can play a role in seeing to it that the arboretum becomes a great place for anyone who enjoys plant diversity. The Bog also received a much deserved weeding and pruning.

After graduating from SFASU in 1989, I accepted a job as a grower/landscaper for Fleming Nursery and Landscaping in Tomball, Texas. The nursery and Will's incredible landscaping tastes underlines the word diversity. It was a great experience and I'm looking forward to making plant contributions to the arboretum and Texas landscape thinking. In July of 1990 I had an opportunity to travel through the Southeast along and south of I-10 from Houston through the Florida panhandle before heading on to Atlanta, Georgia on a landscape job. Along the way I trekked to as many native bogs in Alabama and Florida as our time allowed and while visiting area Nurseries that sold native plants (container-grown?), I managed to pick up a few specimens and seed for our *Sarracenia* collection in the SFASU Bog Garden. The plants are now content in their new home and seedlings from the seed are will come later. We have two species of pitcher plant, *Sarracenia leucophylla*, Red Top Pitcher Plant and *Sarracenia psittacina*, Parrot Pitcher Plant. Other new plants in the garden include a pink Phlox, similar to *P. pilosa*), a bog moss, giant colic root, *Aletris sp.*, pipewort, meadow beauty (*Rhexia sp.*), *Sabatia sp.*

Will Fleming Landscaping also donated some plant material for the bog. Included in donation Bushy Bluestem, *Andropogon gigantea*; Indian Grass, *Sorghastrum sp.*; Blue-eyed Grass, *Sisyrinchium sp.*; Yellow Bush Pea, *Baptisia shaernocarpa*; *Itea japonica* 'bebu'; Swamp Black Gum, *Nyssa sylvatica var. bicolor*; Palmetto, *Sabal minor*; Meadow Rue, *Thalictrum dasycarpum*; Downy American Snowbell, *Styrax americanum var. pulverulentum*; Yellow Sunny Bells, *Schoenolirion croceum*; a Neches River Dwarf Sedge, *Cupressus sp.*; Golden Alexander, *Zizia aurea*; Joe-pye Weed, *Eupatorium fistulosum*; Manfreda, *Manfreda virginica*; Button Bush, *Cephalanthus occidentalis*; Little Leaf Cyrilla, *Cyrilla microphylla*; also a flat of twenty 4" pots of Piney Woods Rose Gentian, *Sabatia gentianoides*; and near one of the catwalk ends I planted Walters Violet, *Viola walterii*.

All the new plants were planted over the homecoming weekend after I spent one day weeding. Unfortunately the weeds were so bad I had to spend another day (Thanksgiving weekend) to finish but I'm pleased to say that once polished a bit the garden now looks

fantastic. The only noticeable death was a reduced number of *Aletris aurea* that I could find only here and there. The *Physostegia puchella* is doing so well that it is going to need to be reduced (dug up) some. We can quickly propagate a good number which can be used in any manner seen fit (Plant Sales, use in other places, Plant Trades, Give-A-Ways, and so on.)

This issue I would like to highlight a plant that is found in East Texas but not in Bogs, the American Fringe Tree, *Chionanthus virginicus*, an understory tree that is part of the Piney Woods association. They are found in conjunction with moist sandy soils along creek banks and streams. Fringe Trees are commonly found in the wild as multitrunked shrubs reaching a height of 35 feet. *Chionanthus virginicus* is a member of the Olive family. The genus name *Chionanthus* is a combination of two greek words meaning "snow flower," and the species name *virginicus* refers to the state of Virginia. There are numerous other common names for Fringe tree, such as, Grancy Grey Beard, Grandfather Greybeard, Old Man's Beard, and Snow Flower tree. From a distance, the blooms do resemble the white of an old man's beard. There is a subspecies (variety) of *Chionanthus virginicus* found in Florida known as *Chionanthus virginicus* var. *pygmaea*, or Pygmy Fringe Tree. There is only one other species of *Chionanthus* in the world and it is found in China. Chinese Fringe tree is scientifically called *Chionanthus retusus*. Chinese Fringe tree grows well in our part of Texas and differs from American Fringe Tree in that the leaves and flower clusters are smaller. Both trees are extremely showy in flower. Although many people debate which is prettier I personally feel neither is superior to the other.

The flowers of Fringe tree appear in midspring (around the middle of April), usually right after the Dogwoods and Parsley Hawthorns. The flowers emerge as racemose clusters of 3 to 7, drooping gracefully anywhere from 5 to 10 inches long. The blooms develop at the leaf axils of the preceeding year's growth and develop before or with the young leaves. The color is white to greenish-white to yellowish-white. The male and female flowers are usually on seperate plants but not always.

The leaves are simple, opposite, deciduous, and dark green above and lighter underneath, with new growth almost white due to the presences of minute hairs. The leaves feel thick to the touch. They are usually 4 to 8 inches long and about 2 to 4 inches wide. The fall color is a striking bright yellow and can be seen at its best around the middle to late October.

The fruit of Fringe tree is discribed as a drupe borne in loose clusters (off the females only), dark-blue to purple or blue-black and fleshy. The fruit is oval shaped (ovoid to globose-oblong), and approximately 1/2 to 3/4 inches long. The seed is oval shaped and 1/3 inch long, and there can be up to three seed in a fruit. The fruit normally ripens in late summer and plants are usually 5-8 years old before they start to produce seed.

Fringe tree makes a wonderful ornamental small flowering tree

for the landscape. They seem to do well in a variety of acidic soils. They thrive even in well-drained Houston gumbo. Although quite attractive Fringe trees are not commonly found in East Texas yards and gardens, they should be. The fruits are relished by birds, and according to Paul Cox and Patty Leslie in their book, Texas Trees, A Friendly Guide, "fringe tree bark has many reputed medicinal qualities and is used as a decoction, tincture, or external poultice for wounds and skin irritations. Its main uses are as a laxative, diuretic." If you're looking for an interesting, white-blooming understory tree for your yard or garden, give some thought to using a Fringe Tree! Until the next issue, happy gardening!

## NOTES FROM THE ARBORETUM

This issue of the Arboretum newsletter marks five and one-half years of steady progress and remarkable change. There isn't any doubt that our gardens are now uniquely poised to make a real contribution to the university, community and region. As the first arboretum at a university in Texas, one blessed with an outstanding horticultural facility at its center, there's no reason to underestimate the potential. A surprising diversity of native and exotic plant material has found a happy home in the arboretum and the gardens are proving to be a wonderful testing ground for alternative landscape plants, the new, the unusual, and the underutilized. For those not familiar with our mission, I have attached a copy of a recent Nacogdoches *Sampler* article that overviews our current attributes, activities, and hopes for the future.

**DAYLILY GARDEN:** A new three thousand square foot daylily garden was constructed in the fall, 1990, just to the west of the herb garden, and will soon display an outstanding collection of this popular plant. The Nacogdoches chapter of the American Hemerocallis Society awarded a \$2000 grant to develop this garden. Jean Barnhart, Delores Jones, and so many others deserve a hearty thank you. This new garden rests in a high visibility, full-sun spot and should be a real eye-opener on the edge of a ten-foot slope facing the intramural field. Jason Singhurst and Mark LaRue are due much of the credit for designing and laying out the railroad tie garden. George Millard provided a bobcat that allowed the garden a little more size and a quick way to backfill raised beds with compost, sandy loam, and bark mulch. The first collection to find a new home in the Daylily garden has been waiting patiently for two years in a rather unattractive edging of the northeastern face of the Agriculture building: the Stout Medal Series. These are the best of the best, selected every year since 1950 by the American Hemerocallis Society. While we don't quite have the complete collection, we will soon. The garden is the planned home for two pieces, a bench donated from the Four Seasons Garden Club and the Arboretum's first fountain, a steel sculpture to be designed and constructed by Ms. Renea Locke, Art student.

**HERB GARDEN:** Not only did the herb garden survive its first summer and fall, it prospered. This is one of the most popular stops for school children on tours. Encouraging kids to pinch, squish, and tear leaves for their smell always brings a smile and lots of questions. Kurt's "notes from the herb garden", later in this newsletter, chronicles the plantings and work of this Herb Society of Deep Texas project. Funding for the herb garden is primarily through the annual SFASU Arboretum/Herb Society of Deep East Texas/Texas Department of Agriculture Herbal and Native plants garden symposium, to be held this year on February 16, 1991, at the Fredonia Inn Convention Center in Nacogdoches. We have a strong speaker list, including Mr. Benny Simpson of the Texas Agricultural Experiment Station, one of the native plant pioneers of Texas.

## INCREASING THE USE OF NATIVE PLANTS - THE CHALLENGES AHEAD

There are many reasons why native plants have enjoyed increased prominence and popularity in Texas landscapes. The hard mid-winter freezes of 1983 and 1989 devastated landscapes, broke the hearts of thousands of homeowners, cost millions of dollars and forced nurseries and landscapers to scramble for alternatives. A whole new plant palate opened up. Natives, better able to deal with the harsh Texas climate, were suddenly much more attractive. Boosting the trend, a Texas-wide campaign for xerophytic landscapes, plantings that save water and dollars, found many natives ready to fit the bill. Water conservation, based on worsening shortages, is a strong factor encouraging the use of adapted native plants, particularly in the central and western regions of the state. A pesticide-fearful public bolstered the natives cause by demanding disease and insect-resistant plants. Increased environment and plant conservation awareness has affected the way we want our world to look. The public is being educated at every turn about the tragic loss of genetic diversity, that ecosystems are being shattered, and that endangered plants are on the rise. Conservation work in Texas is more visible than ever before. The National Wildflower Research Center, the Native Plant Society of Texas, the Texas Organization for Endangered Species, the Texas Nature Conservancy, the Texas Association of Botanical Gardens and Arboreta and many others now find themselves on center stage. Each group is working hard to make some kind of positive impact on the environment. Native plant enthusiasts are conservationists; the two go hand-in-hand. Any way you look at it, all trends point to increased use of native plants in Texas landscapes.

Whether native plant proponents will be able to take advantage of the situation is another question. Native plant enthusiasts have found themselves in recent years with a bigger and more receptive audience. However, one can easily argue that current landscape thought in Texas has changed very little over the last few years. A close look at most newly established, urban commercial and residential landscape jobs will reveal about the same plant "mix" as just a few years ago. Sure, some things have changed but changing landscape philosophy is a very big job. Native plant meetings are often an example of the convinced preaching to the converted. Many of the key players for real change are just not there. If city, community, business, and residential plantings are really going to evolve, the native plants movement must take an active role in seeing that it happens. While the availability of native plants in sizes and volumes needed is often cited as a constraint, a general lack of knowledge is a major obstacle to increasing use. Three primary groups need educating: 1) horticulture students, the force driving the nursery and landscape industry in the years ahead, 2) landscape architects and

horticulturists, now setting the pattern, and 3) the general public, looking for answers.

**SECONDARY AND HIGHER EDUCATION:** Just about every collegiate horticulture program has a landscape plant materials course. Typically, the course expects students to gain a familiarity with the common landscape plant material in use in their area at that time. This means the student learns to recognize from 125 to 200 plants in a semester and the plant's family, genus, species, care and culture, and landscape value. With so many plants, it's easy to understand how difficult it is to add more to the student's learning goals. Even "woody ornamental" judging contests at the high school and collegiate level focus predominantly on the mostly-exotic plants that commonly grace Texas landscapes. After students work their way through junipers, hollies, pittosporums, viburnums, Ligustrum, Indian hawthornes and other exotics, there's so little time left for alternatives. Educators are partly responsible for this dilemma. Instructors, more likely than not, are a product of one or two courses emphasizing only the common. Understandably, many are hesitant to alter the palate of their course, fearful that a student might not "know" a variegated privet or a pyracantha or some other common landscape plant. In academia, it's very easy not to make a significant teaching change. That leads to graduates very familiar with the common and, more often than not, too little else. As these students enter the work force they are naturally hesitant to depart from what they know to what they are unsure of. Certainly, students need to know all the common landscape plants in use. Everyone recognizes that fact. Yet, education must come up with ways to incorporate alternative landscape plants into the student's foundation of knowledge.

**THE NURSERY AND LANDSCAPE INDUSTRY:** A major obstacle to increasing the use of native plants in Texas rests in the present composition of the nursery and landscape industry. A kind of chicken and egg phenomenon exists; that is, nurseries are likely to grow what landscapers demand and landscapers are likely to use what they have always used and what nurseries have available at low cost. The same comparison can be made between the buying public and the nursery/landscape industry. Just who influences who the most is up for debate. Nurseries like to choose plant materials that are easy to propagate and easy to finish into an attractive container plant in a quick period of time. Thus, evergreen, round "balls" often dominate the trade. The nurseryman or landscaper is more likely than not to have had just a course or two on landscape plant materials and has a natural tendency to stay with the familiar. The landscaper, eager to have a project "look good" right from the start, is reticent about adding plants that take time to flesh out in a landscape. Increasing plant diversity in landscape jobs increases job complexity, another reason to avoid adding a "new" plant to projects. In bidding landscape jobs, landscapers often avoid many native plants because of their higher cost. Many native

landscape plants are difficult to propagate, grow off slowly and need time to fill out. Educating the nursery/landscape trade about the value of native plants requires a concerted effort if dramatic changes are to take place.

**THE PUBLIC:** The public, of course, wants a beautiful, interesting, low-cost, low-maintenance landscape and bases plant selection on what they've experienced around them and what the professional is telling them.

A great deal of education about native plants is already taking place. Native plants have been given a special forum in many educational programs organized by garden clubs, the Texas A & M University Agricultural Research and Extension Service, the Texas Department of Agriculture and by professional horticulturists all around the state. Trade publications, like the *Texas Horticulturist*, *Gardens and More*, and *Texas Gardener* are running more "native plant" articles. Garden columnists are paying increased attention to the topic and wholesale and retail nurseries are adding "new" natives to their inventory. Texas landscapes are using more natives than ever before and the trend will continue.

**THE SOLUTION:** Any effort to promote greater use of native plants must target horticulture students, nurseries, horticulturists, landscapers, and the general public, as well. Every audience has a role in affecting change. To dramatically impact Texas landscapes with native plants requires increasing awareness. The first steps are being taken and there are exciting indications that natives will soon be a dominant force in the way we cloak our homes with greenery.



## FIVE SOUTHERN NATIVES THAT DESERVE GREATER RECOGNITION

The South is blessed with so many woodland plant treasures that choosing the best is not an easy chore. It's a little like choosing clothes or cars; it depends on what you like. If you like evergreen, strikingly-variegated, broad-leaved shrubs pruned to horrid, round balls, then, you may be out of luck. However, if you like plant diversity, don't mind deciduous shrubs a bit, and get a kick out of working with southern natives, then, the list is a happy one. There is a plethora of southern flowering shrubs and small trees that bring distinction and charm to any garden. I have chosen five uncommon, deciduous beauties. These are underutilized plants that never fail to attract a lot of attention during their moment of glory.

At the top of any list would have to be *Itea virginica*, the Virginia sweetspire. One of perhaps fifteen, mostly-Asian species of evergreen or deciduous trees or shrubs, this plant has a lot going for it. It was recently heralded by the *Horticulturist* magazine as a sterling native shrub deserving far greater respect and attention. Dramatic, May-blooming, six-inch inflorescences can blanket a four to six foot plant for weeks, bright white at first, then paling over the next few weeks to a cream-yellow. If exposure and vigor are right, the plant finishes the season with a surprising burst of red/orange leaves that persist well into the worst of winters. In Texas, sweetspires are native to moist, sandy knolls along streams and creeks, often perched on bank edges under the heavy shade of woodland patriarchs. Given plenty of sun, bark mulch, and moisture, the plant suckers enthusiastically, is denser, more floriferous, and a stunning landscape specimen. Sweetspires "Swarthmore" and "Henry's Garnet" are desirable varieties, not always easy to find, but certainly worth seeking.

East Texas is blessed with three members of the *Styraceae* family that deserve much more use: *Styrax americanus*, American snowbell, *Halesia diptera*, the snowdrop tree, and *Halesia carolina*, Carolina silver bells. All three are refined, small, multi-stem trees sporting delicate clusters of white, yellow-stamened, bell-shaped, half-inch flowers in May and June. Best viewed from below the canopy, they will never take the place of bright-blooming crepe myrtles, the noisy red, pink, purple, and white lollipops that dominate our lives. However, they do offer a natural grace and quiet elegance in a small, multi-stemmed tree. The American snowbell is the diminutive one, rarely exceeding ten to twelve feet, with a natural branching pattern that is aesthetic and easy to maintain. Given time, snowdrop trees and Carolina silverbells make stately small trees, casting light shade. They add character to gardens as accent specimens or when mixed into woodland edges.

*Euonymus americanus*, the strawberry bush or "Hearts-a-Burstin", is a special, little native that always commands attention during the October-November fruiting display. The plant bares little resemblance to the green or impetuously variegated Asian varieties that are splashed across thousands of Texas landscapes. *Euonymus americanus* is a suckering, erect, or straggling shrub to eight feet and has a range from New York, south to Florida and Texas. Normally a sparse shrub under forest giants, this moisture-loving plant prospers in the dappled shade of pine trees. The inch-wide fruit is the main feature. The scarlet, warty capsules widen, split, and then umbrella outward to display a hanging garden of bright orange seeds. The fruit and seeds persist for several months, framed by a thin canopy of leaves that pale to a cream-yellow before falling. It's easy to understand why the plant is not used more. Like the sweetspire, the strawberry bush is not impressive in the nursery container, often a tangle of a few erect and straggly stems. In the landscape, both are likely to go unnoticed for years, taking their time to fill in, spread, and thicken. For those willing to wait, the plant rewards by settling into years of reliable, colorful displays without pampering and is sure to bring a smile to any garden visitor.

*Hydrangea quercifolia*, the oakleaf Hydrangea is a show-stopper native to Georgia, Alabama, west to Mississippi. The plant can still be found in old, abandoned landscapes of east Texas and Louisiana and is well-adapted to anywhere pine trees grow. This stoutly branched, coarse shrub to six feet features eye-catching, early mid-summer inflorescences: ten-inch pyramidal clusters that are white at first, later turning pinkish. Not often easy to place in residential landscapes, the oakleaf hydrangea prospers in mulched, shady spots blessed with natural moisture runs nearby. "Roanoke", "Harmony", "Snowflake", and "Snow Queen" are improved varieties featuring larger inflorescences and more dependable bloom. Heavy rains can dramatically bend bloom-heavy branches to near the ground but they quickly bounce back after drying. Fall coloring can be dramatically red, orange, yellow, or disappointing, depending on plant and site conditions. For best performance, the plant demands protection from overhead and mid-day sun, exposed conditions, hot western faces and dry conditions. Bright early morning and late afternoon sun appears to bring out the best flowering and fall leaf color.

*Calycanthus floridus*, commonly called sweet shrub, Carolina allspice, or strawberry bush, is a delightful southeastern native that finds an easy home in east Texas. The plant reaches ten feet and displays curious, unusual blooms. A profusion of two-inch, dark reddish-brown flowers, borne singly from the leaf axil, appear in May and often fill the air with a sharp, strawberry-pineapple fragrance. After the main show, this lustrous-looking shrub will continue to bloom lightly and sporadically through the summer and fall. There are superior selections available, sporting variations

in bloom color and, especially, fragrance. Unfortunately, they are hard to find, best sought through specialty and mail-order nurseries. Always welcome in the shrub border, this dark-green leafed shrub prefers partial shade and loamy soils.

The philosophy that a small plant palette is a monotonous plant palette is taking hold, albeit way too slowly. While many might argue that the "round, green glob theory of landscaping" still plagues us, there is a definite move to variety. Once popular in early Texas gardens, deciduous woodland shrubs have taken a back seat to exotic, broad-leaved evergreens for way too long. Changing landscape philosophy doesn't happen overnight but it is happening. All trends point to the increased use of natives, a move to diversity, the return of deciduous shrubs, and a public looking for something just a little bit different.

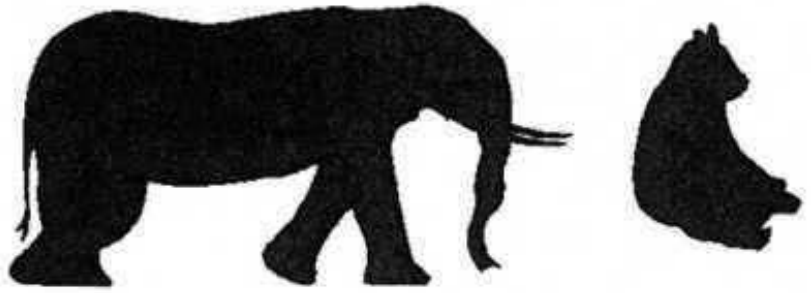
## THE ARBORETUM AS A FOUNDATION FOR PRESERVING PLANT BIODIVERSITY

Arboretums and botanical gardens around the globe are suddenly having to face global issues involving the biology of our planet. The earth's plant population is suffering through five extinctions per day, a rate predicted to exceed ten per day by the year 2000. While there have been many fluctuations in global extinction rates over the millenia, the coming wave is unprecedented in sixty million years, especially in abruptness

and probably in total numbers of species that will have been lost. As a response, biologists and horticulturists are scrambling to preserve plant biodiversity in arboretum collections and in outreach habitat conservation projects.

There is plenty of documentation on man's direct hand in extinguishing vertebrates. Campaigns to save the megacharismatics, the big vertebrates like the whale, panda, elephant, rhino, and tiger are given center stage. Efforts to rescue a rare salamander or a small herbaceous plant command less media attention and generate a lot more controversy. Suddenly, the cost of saving a species, particularly one that happens to be in our own backyard, is measured against benefits.

Some writers now refer to ecology in terms of the depth of commitment, as a kind of social/political/economic phenomenon. That is, a "deep" ecologist is one who believes that man has no right and should play no part in any plant or animal extinction, no matter what. Life is to be protected, no excuses allowed. A central American, or African, or Asian on the brink of survival, scrambling almost every day for food and firewood, is not likely to be impressed. Deep ecologists are more likely to be well-to-do, modern-world, urban residents, blessed with amenities and plenty of time and money to pursue their philosophy. A "moderate" ecologist, on the other hand, is a little different, leaning to rescuing



It's the megacharismatics  
that command all the attention



Not the small rare rose



species, yet insisting on evaluating all the costs and benefits. Scientists, trying to arrest the species plunge, have found themselves "defending" a species, assigning one kind of human value or another to the organism. In the face of development, there is a tendency to undervalue species. There is often a cynical attitude about stopping progress because a plant might fight cancer, cure heart disease, be pretty to look at or have medicinal or food value. In a developed nation like the U.S., all of the resources are present to "save" a species, but the willingness to conserve significant and natural habitats is less evident. In less-developed countries, the loss of species is bound to be much more dramatic and habitat-saving efforts more complicated and less likely to succeed. The final category of ecologists is that of the "shallow" ecologist, one whose philosophy can best be summed up as, "species be damned, full speed ahead." While few publicly embrace this tenet, many sociologists assert that the collective reason of a nation, a state or province, a local government and the pressure of maintaining a viable economy has led to our current dilemma.

What is the scope of the problem? A global perspective is sobering and assessment of the palontological literature somewhat discouraging. In affluent nations, with well-developed scientific communities, with vocal environmental movements, and with legal frameworks to save species, the problem of decreasing biological diversity remains tragic. In the developing nations, deforestation is increasing at an alarming rate, with entire habitats destroyed in days or months. There is no time to save much but the best-known and most magnificent species. What are the dimensions of the problem?

1. While there are 1.5 million identified and documented species in the world, the total is often put at between 5 million and 30 million. Why the big spread? Simply because most species have not been identified and recent research in tropical rain forests indicates that the breadth of species diversity is far greater than once thought. There are approximately 250,000 plant species in the world. Twelve species make up most of the caloric intake of the human population. Estimates project that twenty to twenty-five percent of existing plant and animal species face extinction in the next quarter of a century.
2. The tropical world is headed for the steepest loss. Tropical forests cover only 7% of the earth's land surface, yet they contain over 50% of all species.
3. There are 35,000 plant species in Mexico alone. There are 30,000 species in North America and ten percent are considered endangered.

Prior to the 1950s, most arboretums in the U.S. satisfied themselves by displaying collections in pleasing settings, keeping a modicum of records alive, and trying to survive low budgets. During this period, the forests of Asia, Africa, South America, and many other parts of the world began to decline. The decline in percent land covered by forest was brought about by humans and their agriculture. Many regions of the tropical world were "invaded" and the scale of shrinking habitat moved up a notch. The release of modern wheat, rice, maize, and potato varieties in the 1960's and 70's upped the ante. Yields could be doubled, more people could be fed, and fertilizer was cheap. Most people do not think about the impact on forests by the simple act of curing malaria. Curing malaria and many other human diseases allowed populations to migrate, prosper, multiply, and live longer. Scientists no longer see the prospect of world starvation as a global issue, more as a social and political one. After all, let's face it: starving Africa is a warring Africa. Subsistence farming families with a history of migration during lean times now have nowhere to go, except, perhaps, to dismal refugee camps, known throughout the world for their misery and horror. The problem is not agriculture. After all, some scientists have predicted that current agricultural technology could feed a world population of 25 billion, now just a bit over five billion and on its way to ten by the year 2000. No one really wants to think what that optimistic prediction might really mean.

In too many countries, particularly those least able to afford it, three and four percent population increases per year are the norm. Population control efforts have not abated the surge. Agricultural development philosophy continues to focus on increasing yields, irrigated acreage, and technology. For donor agencies to third world countries, this mandate is founded on two precepts: 1) there is a "moral" imperative that we do everything we can to prevent starving millions, all the time hoping that population growth will decline, and 2) that encouraging technology and agriculture will result in a higher standard of living, more urban residents, less strife, and a population smart enough to get their house in order. The human population crisis is founded in communities and villages, full of very smart people that know little of social security, medicare, and retirement plans. Large families are not only a source of pride, they are an old age pension plan. In simpler terms, overpopulated areas are rarely short on fecundity.

Plant extinction is not limited to the tropics. Many temperate ecosystems have been degraded for thousands of years. U.S. forests are at 24% of the land surface, a relatively mild decrease from the 26% estimate for our "natural" condition. However, there has been a striking change in woodland composition and diversity, and many plants now have reduced ranges. In the U.S., only remnant populations of old-growth western forests

remain, occupying a paltry 4% of their normal range. Ultimately, loss of provenances may be as big an issue as loss of species, and for good reason. A plant's natural range enhances species ability to adapt to ecological changes. Plant communities that evolve in drier, wetter, colder, or hotter regimes provide the bulk of genetic diversity essential to plant adaptation and successful evolution. Restricting habitats means restricting genetic diversity. The concept of "minimum viable population" predicts the decline of species diversity as ranges diminish and adaptation ability diminishes. That "minimum number" is still a matter of great debate among population biologists. The loss of rare, threatened and endangered plants may forecast the loss of now well-entrenched species, later. For example, in the sub-humid, temperate southern U.S., east Texas is blessed with many plant communities on the fringes of their normal range. That is, many plant stands in east Texas can claim to be the "western-most" or "eastern-most" colony. They are worth saving. Loss of plant colonies that are rare in east Texas reduces the range of that species and threatens long-term population viability.

No one denies that human activity is leading to degraded ecosystems, reduced biodiversity, and shattered habitats. How to deal with the problem is going to remain a very hot topic. Arboretums make logical and natural stewards of regional plant heritage. Arboretums and botanical gardens considered as leaders in conservation work are dedicated examples of scientific research and education: Research to rescue on-the-edge species and education to enlighten people about the problem and what they can do to help. Arboretums and botanical gardens provide sensible umbrellas for projects that conserve and protect special ecosystems. Studies to rescue, multiply, and reintroduce endangered and threatened species are measured in decades. While some might argue that efforts like this are just a "finger-in-the-dike" kind of cure, they offer us the only opportunity available to save a diminishing plant heritage. While not an easy chore, it's our only real choice.

**DAUGHTERS OF THE TEXAS REPUBLIC - A HERITAGE GARDEN:** On October 20, 1990, the Daughters of the Texas Republic presented the arboretum with a check for \$2000. This generous gift, earmarked for education and promoting Texas heritage, will develop a "plant heritage" garden between the new daylily garden and the phase 1 and 2 area. Plants featured will be those that represent east Texas cottage gardens at the time of our independence in 1836. Gardens back then often included dooryard fruit trees, old roses, hollyhocks, cosmos, nasturtium, black-eyed Susan, and native woodland flowering shrubs and small trees that caught the settlers eye. A ground-breaking will occur in early May of 1991. By then we will have a design and a split-rail fence defining the theme garden.

**A FRAGRANT GARDEN:** A collection of fragrant plants will be planted in railroad tie framed beds surrounding the intramural field restroom building, certainly not a bad choice for such a garden. A collection of gardenia, sweetshrub, fragrant honeysuckle, fragrant wintersweet, and colonies of herbs will soon be doing their thing. Jason Singhurst, Jason Powers and Mark LaRue, arboretum student volunteers, are tackling this fun project.

**ENTRANCE GATES, BRIDGES, AND THE LANANA CREEK TRAIL:** Finally, after several years of talking about it, we have erected three accent gates. The twelve by twelve-inch beams were carved by Art student, Ms. Susan Elking, off and on for over a year. They now grace the south, southwestern, and western bottomland sections of the arboretum. Moving them into place tested a front-end loader and the sense of humor of about six husky volunteers. Jockeying the beams into place so they were plumb seemed to take forever. Because the gates lay directly in the floodplain it was essential to "tie" the beams down. We accomplished this with angle iron, rebar and about three hundred dollars worth of concrete footings. The experience convinced me to do it a different way next time.

Four metal footpath bridges and a limestone gravel trail now link the SFASU Arboretum with the LaNana Creek trail. Long time coming, this cooperative project has been afforded by a mix of city and SFASU participants. The trail's spearhead is Dr. Abernethy, a persistent English professor, who has worked tirelessly for years to develop this community resource. Before this latest expansion, the trail began at the Main street bridge in downtown Nacogdoches and meandered north along the west side of LaNana creek. The Starr street bridge was a major obstacle: too wide and busy for a crossing and too rough for an under-bridge passage. A proposal accepted by the city in March, 1989, resulted in the construction of a below-bridge path and cleared the way for the trail to move through the intramural field, to the SFASU Arboretum and points north. The footpath bridges have been placed over the worst tributaries feeding LaNana creek and, now, over a mile of trail walk has been added to the system. The university assisted in obtaining limestone gravel for the trail project and four metal footpath bridges, a super gesture for a worthwhile project and a harbinger of future cooperation in related projects.



## GROWING COOL-SEASON ASIAN VEGETABLES IN EAST TEXAS

Interest in Asian vegetables is primarily related to the incredible demographics of the Asian population, the fastest growing ethnic group in the U.S. With over 300,000 Asians in Houston alone, a Texas market is already in place. Making the situation even more interesting is that Asians enjoy a higher per capita income average (about \$26,000), most are college-educated (about two-thirds), and many harbor a recent memory and fondness for vegetables from their home-land. Oriental restaurants have been increasing at 10% per year for over a decade, partly due to U.S. trends in "eating healthy." All of this growth is coupled with the recent addition and movement of Asian vegetables through the produce counters of mainstream grocery stores. There is optimism in east Texas about creating an "Asian vegetable market niche." Success will depend on growers that choose the right varieties, select the right cultural tricks, and know how to compete in production costs and marketing strategies.

After two years of field trials, it's apparent that there's a wealth of cool and warm-season Asian vegetables that can be successfully grown in east Texas. That shouldn't be much of a surprise. After all, most are close kin to the common commercial crops already in production in this region. They share many of the same insect and disease problems, the same risk for weather disasters, and, most importantly, all of the difficulties in picking, packing, and shipping. To top it all off, marketing cool and warm-season Asian vegetables may be a bit more of a challenge than our very own standards. The marketplace is smaller, spread out, not that well defined and not all that easy to access.

For the past two years, SFASU field trials and grower acreages have tested many different cool and warm-season Asian vegetables. This project was supported primarily by the "Agricultural Diversification" program in the Texas Department of Agriculture, by TU Electric and by a cadre of cooperating farmers and SFASU Horticulture majors in "Vegetable Production" classes. The focus of this article is on three Brassicas: Chinese Cabbage, Pak Choi, and Daikon radish. All three move in sizeable market volumes and the Texas marketplace is dominated by California sellers.

In east Texas, Chinese cabbage, Pak Choi and Daikon can be produced as a spring crop harvested in late April and May or as a fall crop harvested in October, November, and, maybe, most of December. With modern F<sub>1</sub> hybrids, the crop matures quickly. Because of transplant costs, our studies have been based on direct seeding. It may be possible, however, to produce transplants directly in the field in heavily seeded beds and then move plants to nearby rows. We have one season of experience with this

approach and it looks promising. At any rate, commercial vegetable growers in east Texas should attempt to get at least a small block of transplants set; a small early yield can help open market doors before peak harvests begin. Our approach has been to seed heavy and then thin to the desired spacing once the stand is obvious. For a fall crop, direct seedings in August require frequent, light sprinkler irrigations during the first few weeks; this keeps the shallow-planted seed in sufficient moisture for good germination and subsequent root growth and the humidity up for plant turgor during the blistering heat of a Texas August. It is important to avoid stress during the first month. After the crop has a well established root system, it is remarkably thrifty. Direct seedings in mid-February to Mid-March produce marketable heads by late April or early May in the Nacogdoches area.

Selecting the correct variety is important. We have had poor luck with open-pollinated varieties. The problem is bolting, a tendency of the plant to prematurely flower, thus ruining the marketability of the crop. Seed is readily available from the major seed companies and new varieties are rapidly being introduced. Of thirty-one Chinese cabbage varieties tested, China Pride, China Express, China Flash, Napa 50, Napa 60, and Tango have performed well. Jade Pagoda and Monument have been good "Michihili" types, vase-shaped rather than football-shaped like the "Napa" types. Joi Choi is an excellent Pak Choi, the first F<sub>1</sub> hybrid, white-petioled pak choi ever offered. Mei Qing Choi is a lime-green petioled, diminutive 8" hybrid Pak Choi that has produced high quality product in our trials. Of Daikon varieties tested, April Cross and Summer Cross produced good fall and spring crops with straight, high quality roots. Tae-Baek, H.N Cross, and White Rat are superior Daikon varieties of the "short-statured" type.

The crops require high fertility, raised beds, and, in the acid, sandy loams soils of east Texas, pH adjusted to 6.5 or a little higher. Our conventional approach to fertilization has been to band 50-60 lbs of NPK per acre before planting and then side dress with a high N and K fertilizer when plants are three to four weeks of age. On sandier soils, boron deficiency may be a problem, best handled by incorporating foliar feed into the spray program or going with a generous pre-plant application of manure to the field. The crops appreciate high organic matter but can be grown successfully without it. George Millard Farms, one of our cooperating growers, relies almost exclusively on chicken litter as a source of nutrients for his irrigated 5-acre vegetable market garden on the southeast side of Nacogdoches. His Asian cool-season crops have performed well. On the other hand, Norman Farms, Douglass, Texas, has taken an "out-of-the-sack" approach to fertilization and encountered few nutritional problems.

Insects and diseases are a very real problem. Much of the spring, 1990, crop was lost to bacterial soft rot and Anthracnose

after several weeks of excessive rainfall. Cabbage maggots attack germinating seed and emerging seedlings but can be controlled with sprays or granular application of Diazinon at planting and shortly thereafter. Cabbage loopers and cutworms have been a recurrent problem on Chinese Cabbage and Pak Choi, spring and fall, and required repeat spray applications for good control. With Chinese cabbage, timing is critical early in the growing season; an infestation after the interior leaves have begun to fill the head is difficult to cure. Vegetable weevils have been a problem at two farms, attacking emerging seedlings and small plants at the crown. Daikon has been easiest to grow and most resistant to insect and disease problems. Misshapen Daikon roots can be the result of too close a spacing, tight soils, late thinning, or early attacks by soil insects. Slugs have been a nuisance at some locations, particularly with Chinese cabbage. Rainy periods increase disease opportunity. If growing space is not at a premium, the plants should be well-spaced to allow the plants to "dry out" between rains or irrigations (18-24" apart for Chinese Cabbage, 12" for Pak Choi, and 6" for Daikon). In a good season, yields of each crop exceed 250 seventy-two pound WGA wire-bound wood crates per acre; some buyers prefer produce in waxed cartons and lower weights and most demand a precooled product. Like many perishable vegetables, prices are highly volatile and depend greatly on what is going on in California at the time of harvest. However, over two years, the price has varied during the east Texas season of supply from \$10 to \$21 per crate, depending on the buyer, product quality and volumes involved.

Future work will focus on trials to extend the market window by testing new varieties, by modifying the planting dates and by use of floating row covers early in the spring or late in the fall. In one 1990 trial, Chinese Cabbage "Napa 50" seeded on February 15, March 1, and March 15 all matured about the same time in early May. If east Texans are to make an impact on the 12 month flow of these crops in market channels, it's essential to widen the marketing time frame from just a few weeks to several months, spring and fall.

Commercial and home gardeners are encouraged to begin trials of their own. If current trends continue, Asian vegetables will carve a little bigger piece of the market pie each year. With a little luck and concentration, east Texas growers can be part of that picture.

## BOOK REVIEWS

A Handbook of Mexican Roadside Flora, Charles T. Mason, Jr. and Patricia B. Mason, University of Arizona Press, Tuscon, Arizona, 1987, includes a good overview of Mexico's geography and vegetation, a review of plant taxonomy, a host of detailed line draws, and is an excellent field guide to plants of Mexico. This paperback is well-written and includes an identification key.

The National Arboretum Book of Outstanding Garden Plants, Jacqueline Heriteau and March Cathey, Simon and Shuster Press, New York, 1990, is hailed on its cover as the authoritative guide to selection and growing the most beautiful, durable, and care-free garden plants in North America. With a unique directory of over 1,700 flowers, herbs, shrubs, trees, aquatics, ground covers, vines, and ornamental grasses described and 450 four-color photographs, the reference is a great guide. Plants are placed in handy selection guides, an approach that does lead to some redundancy. That is, the description of many plants is repeated in several sections. With the new USDA Hardiness Zone map and an accounting of the National's mission, collections, and activities, the book is worth setting on any garden book shelf.

Successful Flower Gardening, Ortho Books, Chevron Chemical Company, Consumer Products Division, San Ramon, California, 1990, is an exceptional book that takes readers on a tour of nine widely diverse and beautiful gardens. Most of the 352 page book is an "encyclopedia" describing over five hundred species of flowering plants and includes over 450 color photographs.

The Preservation of Species - The Value of Biological Diversity, edited by Bryan G. Norton, Princeton University Press, Princeton, New Jersey, 1986, is a compilation of essays dealing with the preservation of biological diversity on earth. This is an excellent book describing the thoughts of scientists, philosophers, social scientists, attorneys, and resource managers. Not overburdened with the mathematical or technical aspects of population genetics and theoretical ecology, this book is divided into three sections: the problem, values and objectives, and management considerations. For anyone looking for an overview of a very complicated problem, this reference may be just the ticket.

Biodiversity, edited by E.O. Wilson, National Academy Press, Washington, D.C, 1988, is a compilation of scholarly articles that cover the details of the biological diversity crisis. Challenges to preserving biodiversity and human dependence on that diversity is detailed. Concepts of ecological reforestation, minimum viable population, species interdependence, and biomass drain are well elucidated. Case studies in South America are fascinating reading; tropical rain forests are evidently much more diverse than once thought. Great book to start studying biodiversity issues.

**THE DRY GARDEN:** The harsh, west face of the metal-sided Art building made a likely candidate for a dry garden. Complete with a noisy, wind-stirring, air-conditioning station, the area is a very unlikely place to find a garden of any kind. We were surprised how easily so many of the herbaceous and woody plants, common to more western regions of the state and Mexico, took to the spot. With only a few irrigations needed in the first establishment summer, we are hoping to go cold turkey next year. Standout plants include lantanas, salvias, penstemons, verbena, Mexico coreopsis, desert willow, Texas mountain laurel and several Acacias. Yucca and Dasylyrion species are sprinkled liberally throughout this busy border.

An extension of the dry garden, a new rock garden on the southeast corner of the Art building displays a steel sculpture representing a roadrunner. While some complain that they can't see the "roadrunner" in the statuesque piece, I can, and I like it. Surrounded by a collection of dry-loving plants, some from Mexico, the art work is soon to be home to a *Tecoma stans* vine, a special-yellow-flowered selection from Paul Cox of the San Antonio Botanical Garden. There are a number of plants in the older sections of the dry garden that impress me. A real surprise from the San Madre Oriental mountain range of Mexico is *Mahonia gracilis*, now a robust four-foot shrub that is prospering in full sun, right on the very dry edge of the Agriculture/Art parking lot. While our specimen has failed to bloom, we are still keeping our fingers crossed. Small colonies of this yellow-flowering, lustrous-leaved evergreen occur sporadically most often in protected canyons and rainfall pockets of the San Madre. With no supplemental water after the establishment year (1988), our plant has never been pampered. Yet, it has withstood a mid-winter low near zero, two late spring freezes, and long dry stretches during the summers of 1989 and 1990. *Myrospermum sousanum* is another stellar performer, a fine example of a small Mexico tree rescued from the brink of extinction. Our two seven-foot specimens have been hardy, weathering much more cold than I would have expected considering its native home near Bustamente. All of the Mexico oaks carry plenty of character and this year they showed another twist; they were unaffected by a September attack of cutworms that took every leaf off all of the red and white oaks on campus. While webworms are yearly plagues on hickories, walnuts, and pecans in east Texas, oaks are rarely victims to premature defoliation. This year was different. Except for *Quercus grisea*, all the Mexico oaks were immune. Too much chili pepper, perhaps?

**THE PERENNIAL BORDER:** A mixed border is really anything that the designer wants it to be. Normally ten to twelve feet wide, long borders are meant to display tight colonies of plants, larger plants in the back, smaller plants in the front. The goal is to create season long waves of color, form, and texture using a wide variety of plants. A border doesn't have to exhibit only herbaceous perennials; annuals and woody shrubs can be pocketed here and there for effect. Normally, an evergreen backdrop provides the planting "line", forming a portrait for the planting. It's really amazing how many plants even a small border can

swallow. Our backdrop is *Viburnum nitidum*, a native, "evergreen" selection by Dodd Nurseries in Alabama. The arboretum's perennial border lies on the eastern side of the Agriculture/Art parking lot and is about one hundred feet long and twelve feet wide. Featuring primarily herbaceous perennials, the border is going to be an ongoing experiment in the mixing of plants. One of the best performers this first year was *Hamelia patens*, a Mexico native, commonly referred to as firebush and for good reason; all parts of the plant carry a pinkish or red hue. Seemingly pest-free and dry-loving, our plants grew quickly to four feet and yielded a year-long bounty of blazing scarlet tubular flowers, just under an inch long. The plant is a real eye-catcher. I doubt if the plant is winter hardy but we are testing it under a heavy bark mulch. We have over one-hundred vigorous one-gallon container plants prospering in the greenhouse and they will be tested in several spots across the campus this spring. As in past years, *Caryopteris clandonensis* "Heavenly Blue Mist" was pleasing, producing trim, uniform three-foot globes that sported season long waves of blue flowers. *Caryopteris* NA56588, a National Arboretum selection received from North Carolina State University, was equally vigorous with larger blooms, but exhibited a sparser, more spreading form. Other winners included lantana, coreopsis, Mexican Ruellia, Stokes aster, monks-cap, purple fountain grass, and variegated Miscanthus.

The border and two nearby beds were planted in mid-late December to a collection of daffodils, a cooperative project with Bob Rogers to find varieties that return reliably year after year. Bulbs were held in cold storage for one month. An original collection of 50 varieties set in 1986 in the Phase 1 area will be heavily evaluated this spring with data collected on size of clump, time of bloom, season of bloom, and the number of flowers open per week.

**CHUCK MARTINDALE DEPARTS:** Chuck's thesis project drew to an end in August, 1990, and we lost a tireless arboretum worker. He will be sorely missed. Two years of research culminated in an excellent site analysis of a nearby and special ecosystem: 121 acres of springs, seeps, and streams just six miles west of Nacogdoches, Texas. The site is part of an 8,600-acre tract of land owned by S.B. Hayter Trust and is a strong candidate for a conservation effort. The chief attributes of the site lie in the wide diversity of plant-growing conditions in such a small area, including everything from vast wetland seeps to expanses of east Texas "desert" (excessively dry upland sands). In addition to topographic, vegetative, soil, and moisture gradient mapping, Chuck's final document included an excellent summary of Nacogdoches climate. I've attached a few two of Chuck's tables that will be of interest to Nacogdoches gardeners. Because the weather station, directed by Dr. Hershel Reeves, Forestry, is just down the street from the arboretum, it represents an accurate picture of temperatures and rainfall for the garden (tables 1 and 2). One thing emphasized is how the last few years have been witness to so many record-breakers; let's hope that the climate settles back to some kind of Texas "norm."

Table 1. Temperature Data for the period of 1967-1989 for Nacogdoches, Texas.

Year	High	Low	Last Spring Min. of			First Fall Min of			GD
			24°F or below	28°F or below	32°F or below	32°F or below	28°F or below	24°F or below	
1967	100°F	17°F	03/07 (21)	03/07 (21)	03/08 (30)	11/02 (32)	11/04 (26)	12/04 (22)	211
1968	94	19	03/13 (24)	03/13 (24)	03/13 (24)	11/12 (22)	11/12 (22)	11/12 (22)	213
1969	105	21	03/09 (24)	03/26 (27)	03/27 (32)	11/03 (30)	11/15 (20)	11/15 (20)	234
1970	102	11	02/04 (20)	03/27 (27)	04/06 (31)	11/03 (32)	11/04 (28)	11/16 (19)	222
1971	101	19	03/08 (21)	04/07 (27)	04/08 (31)	11/11 (31)	11/25 (28)	--	211
1972	99	13	02/09 (23)	03/03 (28)	03/31 (32)	11/16 (29)	12/06 (27)	12/17 (13)	258
1973	97	14	02/11 (15)	04/11 (27)	04/11 (27)	10/29 (31)	12/07 (27)	12/08 (23)	240
1974	101	20	02/26 (21)	02/26 (21)	03/22 (30)	12/03 (22)	12/03 (22)	12/03 (22)	280
1975	102	13	01/13 (13)	03/15 (28)	03/15 (28)	11/14 (26)	11/14 (26)	11/23 (20)	228
1976	96	12	01/28 (22)	03/17 (29)	03/17 (29)	10/20 (31)	11/05 (27)	11/29 (16)	223
1977	99	3	02/17 (24)	03/23 (27)	03/23 (27)	11/10 (25)	11/10 (25)	12/07 (21)	232
1978	104	14	03/11 (24)	03/17 (28)	03/28 (32)	11/08 (32)	12/09 (24)	12/09 (24)	267
1979	98	13	02/11 (18)	03/05 (28)	03/06 (32)	11/12 (32)	11/14 (26)	11/30 (19)	254
1980	104	12	03/04 (22)	03/18 (28)	04/15 (32)	10/25 (31)	10/31 (25)	11/19 (23)	227
1981	98	12	02/12 (21)	02/15 (28)	03/24 (32)	11/21 (25)	11/21 (25)	12/19 (18)	279
1982	97	5	02/09 (19)	03/09 (29)	03/25 (32)	10/25 (32)	12/12 (26)	12/13 (21)	280
1983	98	8	01/04 (22)	03/12 (26)	04/03 (32)	11/11 (31)	11/25 (28)	12/22 (12)	258
1984	102	9	03/01 (22)	03/08 (26)	03/08 (26)	11/12 (30)	11/22 (23)	11/22 (23)	259
1985	104	8	02/14 (23)	02/17 (28)	02/17 (28)	12/02 (22)	12/02 (22)	12/02 (22)	288
1986	99	21	03/02 (21)	03/02 (21)	03/21 (31)	11/15 (29)	12/25 (28)	--	298
1987	102	19	04/03 (24)	04/03 (24)	04/22 (32)	11/11 (27)	11/11 (27)	11/12 (24)	221
1988	103	15	02/24 (23)	03/15 (25)	03/20 (32)	11/23 (28)	11/11 (28)	12/17 (23)	253
1989	101	19	03/06 (24)	03/09 (28)	04/12 (32)	10/20 (27)	10/20 (27)	12/04 (21)	225

GD - Growing Days Between Last and First Killing Frost (28°F).

Table 2. Monthly Precipitation Data for the Period of 1967-1989 for Nacogdoches, Texas.

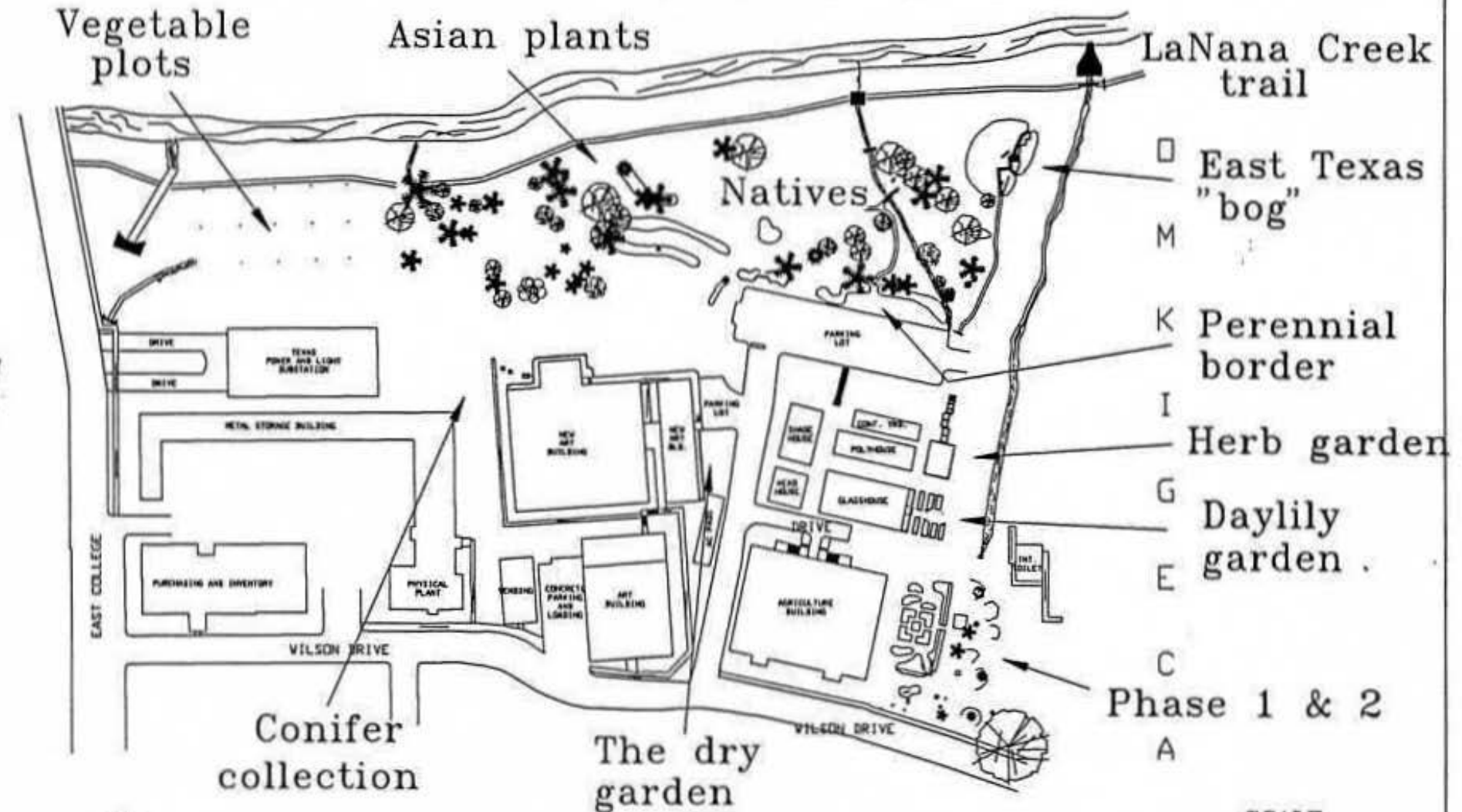
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	X
1967	0.72	3.52	2.06	2.94	4.92	3.64	3.90	4.67	0.68	2.46	0.62	5.46	35.59
1968	8.41	3.53	2.67	10.38	8.21	8.62	4.03	1.17	7.70	1.48	5.90	6.09	68.19
1969	<u>1.76</u>	<u>6.77</u>	<u>7.79</u>	<u>8.23</u>	<u>6.66</u>	<u>0.67</u>	<u>2.37</u>	<u>1.11</u>	<u>2.37</u>	<u>3.34</u>	<u>2.07</u>	<u>4.49</u>	<u>47.33</u>
X	3.63	4.61	4.17	7.18	6.59	4.31	3.43	2.32	3.48	2.43	2.86	5.35	50.37
1970	1.78	4.39	4.00	2.68	3.20	1.15	0.79	3.41	2.48	6.47	2.16	1.81	34.32
1971	0.50	2.40	0.78	0.69	5.67	2.10	3.69	2.28	4.10	3.45	4.21	5.50	35.37
1972	5.50	0.97	2.98	1.65	1.98	4.60	9.86	2.26	2.35	8.19	3.51	3.63	47.48
1973	7.03	1.76	7.26	6.87	3.06	7.17	2.35	4.51	7.39	5.91	4.65	5.18	63.14
1974	9.12	2.16	1.58	-	5.35	2.06	3.09	3.74	7.75	3.68	-	3.76	42.29
1975	3.96	2.95	4.20	3.60	1.17	3.66	2.30	4.08	2.31	1.85	2.76	2.97	35.54
1976	1.15	2.13	3.99	2.91	6.13	5.03	3.81	0.68	3.32	3.24	2.68	5.99	41.06
1977	3.69	2.95	4.20	3.60	1.17	3.66	2.30	4.08	2.31	1.85	2.76	2.97	35.54
1978	5.84	2.61	3.04	3.78	6.80	1.90	1.39	2.07	2.38	0.95	5.72	3.26	39.74
1979	<u>8.14</u>	<u>6.16</u>	<u>6.63</u>	<u>5.10</u>	<u>4.66</u>	<u>3.49</u>	<u>6.86</u>	<u>3.46</u>	<u>0.27</u>	<u>0.60</u>	<u>7.68</u>	<u>4.25</u>	<u>57.20</u>
X	4.67	3.85	3.89	3.11	4.59	3.92	3.61	2.87	3.48	3.81	3.74	3.84	45.38
1980	3.96	1.98	4.07	5.45	6.38	1.60	1.45	2.64	4.07	2.06	3.90	0.82	38.38
1981	1.04	3.54	3.50	1.15	5.56	3.47	7.03	1.19	0.67	7.06	3.47	0.83	38.51
1982	3.60	1.68	4.09	9.36	3.25	7.32	2.46	0.19	2.39	6.40	-	9.21	49.95
1983	1.44	5.57	4.90	0.91	9.57	5.86	0.94	2.46	1.92	1.19	4.46	6.14	45.36
1984	1.69	5.44	3.84	1.70	2.15	2.12	4.12	1.43	3.18	11.98	2.84	2.86	43.35
1985	3.03	4.78	4.35	7.07	4.54	1.27	2.73	3.64	3.39	10.35	7.99	2.76	55.90
1986	0.43	2.08	0.48	4.73	9.27	12.12	4.41	2.83	3.32	6.01	7.41	5.30	58.39
1987	2.06	6.33	1.86	0.05	2.07	5.02	4.18	1.27	3.46	1.69	7.14	5.39	40.52
1988	1.13	1.62	3.85	1.73	0.50	0.51	3.55	4.96	1.70	2.78	3.03	5.01	30.37
1989	<u>10.69</u>	<u>1.25</u>	<u>6.96</u>	<u>9.30</u>	<u>5.98</u>	<u>11.21</u>	<u>4.91</u>	<u>1.04</u>	<u>4.06</u>	<u>2.08</u>	<u>2.03</u>	<u>1.68</u>	<u>61.19</u>
X	2.91	3.43	3.79	4.15	4.93	5.05	3.58	2.17	2.82	5.16	4.23	4.00	46.19



**MAPPING THE SFASU ARBORETUM:** Rick Rankin, graduate research assistant, has finished the base CAD (computer-assisted design) map of the SFASU Arboretum. The mapping project included a perimeter and topographic survey of the arboretum, the creation of a 50' X 50' grid, and significant site characteristics. The Autocad software package allows arboretums and botanical gardens a powerful mapping tool to keep up with plant collections. The software allowed us to layer the map. Layers act as computer transparencies. It's easy to turn off layers to get different views. The Arboretum CAD map now includes layers for buildings, major beds, text, electrical, irrigation, significant points, etc. Of course, Autocad allows an almost unlimited zoom-in ability, invaluable when mapping the location of small plants in busy beds (i.e., the perennial border). While we have a long way to go before we get to that point, we have made the important first step: getting a base map. At the corner of each 50' X 50' square, Rick set a one-foot concrete footing with a label describing the grid coordinates (x,y,z). Except for major identifier plants, Rick did not map individual plant locations; that will come later. That effort will be a major one, involving standing on the grid marker, measuring the distance and angle to specific plants, writing the results down, and then entering the data into the computer. Rick has provided the workable base map from which all future work will come. I have attached the overview map of the arboretum. A zoomed-in blowup of the SFASU Herb garden is included in Kurt Whiting's "notes from the herb garden." Our objective is to turn the CAD map into a hard-copy book based on the 50' X 50' grids, allowing visitors and scientists to easily locate particular collections or individual plants.

# STEPHEN F. AUSTIN STATE UNIVERSITY ARBORETUM

21 19 17 15 13 11 9 7 5 3 1



DRAWN BY:  
RICK RANKIN 1991

## Garden collections

