

JC Raulston Arboretum

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Notes from the Arboretum

Surprise, surprise, surprise! We've gone from the world record long time between issues of the newsletter to world record time for the fastest turnaround time between newsletters. (About the only thing on time in my life at present - but hey!). As I'm in the middle of 9 states, two courses with 80 students and our N.C. tradeshow in a 3 week period - I'm going to let the newsletter speak for itself this time without my generic introductory philosophical discussion. We must say however - that this has been the winter (or one could say "non-winter") for our Japanese Flowering Apricots, *Prunus mume* - fabulous! Visit the arboretum often, attend some of our many lecture programs we've prepared for you this spring (or catch me somewhere across the country) and we'll be back in early summer with more personal and detailed information.

(Please note our newly designed letterhead logo and stationary used for the first page here. Opinions?)

THE EVERGREEN OAKS

A brief review prepared for the NCAN Green & Growin' Show in Winston-Salem, NC, January 13-15, 1995 to accompany a display of the evergreen oaks from The NCSU Arboretum (now the JC Raulston Arboretum).

Oaks are well known, classic essential plants in the landscape with a general "image" of large, slow-growing, long-lived, trees. They have similarities in that all are members of the genus *Quercus* and produce fruiting structures called acorns - but beyond that it becomes an amazingly diverse group of plants. There are over 600 species - all found in the northern hemisphere - with great diversity even within individual species and innumerable intermediate hybrids. They range from slow-growing diminutive alpine plants to giants of tropical forests and include a full spectrum of types from fully deciduous to fully evergreen with various intermediates.

In this display we focus on the "evergreen" oaks - plants that are generally evergreen in the Raleigh, NC region in USDA Zone 7. Some of these plants will go further north, but become deciduous with more severe freezes - or even in Raleigh, some of these will become deciduous when the freeze point of leaves are reached - but they are stem and trunk hardy in this range. There are likely over a hundred species that are evergreen in their native habitats - but many are subtropical or tropical, or will not grow in this climate (the huge array of west coast oaks for example which go out from summer rains in our definite "non-Mediterranean" hot-wet climate) - so a complete listing of all evergreen oaks will not be presented.

Most oaks by necessity are acorn propagated and in general acorn viability diminishes rapidly and acorns should be sown as soon as mature. Insect damage on seed is high, particularly on seed which has been shed on the ground - and floatation tests can be made to sort out the hollowed out and likely dead "floaters." The source of available acorns is often the limitation to producing the less common species as stock trees are rarely available. A few species can be cutting propagated and more work is needed to completely define the possibilities of this technique in this genus.

Evergreen oak species now growing in The NCSU Arboretum (now the JC Raulston Arboretum):

- *Quercus acuta* - native to Japan and introduced to western culture in 1878. Extremely handsome foliage distinguished by the very long and narrow apex of the leaf from whence it takes its species name. The large coarse winter buds are particularly showy and add much to the ornamental nature of the plant. Very well adapted to the southeastern U.S. for USDA Zones 7-9 - but rarely available due to lack of seed sources.
- *Quercus glauca* - native to Japan, Taiwan, China, and the Himalayas - introduced in 1804. A fairly variable species in foliage characters - sometimes intergrading in the smaller foliage types to look much like *Q. myrsinifolia*. Distinguished from others here by the fairly coarse teeth on the outer margins of the leaves. Tends to be more shrubby and multi-trunked than some but can be grown single-stem. Perhaps the most commonly available of the Asian evergreen oaks in American trade at present. USDA Zone 7-9 - our old plant was damaged severely in the winter of 1984 when we went to -10F.
- *Quercus hypoleucoides* - native to the southwestern U.S. - mountains of Arizona and New Mexico. Better adapted to the southeast than many of the western tree species with no evidence of root rotting in summer rains. Noted for the silvery cast to the underside of the leaves which can make a beautiful show when the branches blow in breezes. Rather rare and not in commercial nursery trade even in the U.S.
- *Quercus myrsinifolia* - native to China and Japan and introduced by Robert Fortune in 1854. Generally smaller leaves than the other Asian evergreen oaks and probably the hardiest of all - good in USDA Zone 6 with excellent large old trees in the D. C. area. Getting considerable attention at present with much interest in production and utilization. (Disney World just bought every specimen plant on the east coast for their use - so lots of people taking note and wanting them). But seed trees are rare. They are reported to be relatively easy (in the oak universe) from cuttings - and we have had some success in our limited trials. Much deserving of more production and a very beautiful tree.
- *Quercus phillyreoides* - native to China and Japan and introduced by Richard Oldham in 1861. More twiggy and shrubby than most oak species - rarely making a true single-trunk "tree" - and slow growing. A 30+ year old tree in The NCSU Arboretum (now the JC Raulston Arboretum) is only 20-24' in height - but 45' wide. When limbed up, the multiple trunks on this old plant are attractive and it draws attention - but it would unlikely fit in most commercial production schemes that well. We have discovered this form roots well from cuttings (as ours has never produced a crop of acorns yet). In growing a population of seedlings from imported seed - we discovered a seedling variant that grows upright very rapidly with columnar growth - and we have named it 'Emerald Sentinel' for introduction as a useful evergreen tree. Unfortunately it is more difficult to root than the old seedling in the arboretum - but numbers are high enough to encourage further work (30-40% generally).
- *Quercus suber* - the "Cork Oak" - source of commercial cork which is made from the bark of this southeastern Europe species. In Europe (and California) it can be a magnificent tree with gnarled trunks and deeply fissured bark (or smooth and bright red when peeled for the cork harvest) - but it is unhappy in the southeast. In our trials it grows slowly or dies - possibly from both cold damage in winter and summer rains and roots rots in the heat. We have had our current plant for 4 years (a record) and it is 3' tall. Certainly not commercial - but very interesting for its history and use connections.
- *Quercus virginiana* - "Southern Live Oak". A very familiar native plant in the southeastern U.S.; and almost the symbol of the deep south when draped in spanish moss on an antebellum plantation. Used heavily in the landscape trade. In northern areas of its range - care should be taken on the provenance of the seed used for production. Northern seed sources will be more cold hardy than southern seed sources. The more cold hardy types are perfectly fine in USDA Zones 6. Readily available and an excellent plant.
- "The Mexican Oaks" - two-thirds of all the 200-230+ species of oaks that grow in North America are native to Mexico. They grow in enormously variable habitats from swamps in rain forests, to cloud forests, to baking, dry deserts. There is widespread hybridization where species overlap - and in general the group in a taxonomic nightmare that few would dare tackle (botanists are notably few and shy about plunging into this group). And beyond collection for scientific purposes - horticulturists have done even less and there exists enormous potential for cultivated uses of this group of over 140 species of trees and shrubs. Yucca Do Nursery is introducing many oaks from their explorations (409-826-6363 for catalog info) and some of these have been in trial at the NCSU Arboretum (now the JC Raulston Arboretum) for the last 5 years. We did not expect them to do well - likely to either freeze in winter - or root rot in our heavy clay flooded soils in summer - neither has happened. Samples of 4 of these oaks are on display here.
- *Quercus cambyi* - a spectacularly variable species - all these branches in one pot represent some of the variation - the same seed lot from the same parent tree yielded everything from a dwarf shrub to a tree that grows 6' per year. More semi-evergreen than most here -but the better ones do stay through winter.
- *Quercus polymorpha* - as the name would indicate - a very widely variable species - with generally rounded foliage of various sizes. An attractive species - and in commercial production and use in Texas at this point. About intermediate of the several types for us with about 3' of growth a year.
- *Quercus risophylla* - perhaps the most beautiful of these species (that are in trial) with cut/toothed foliage that is thick and leathery with a rugose surface. In spring, new growth flushes have heavy bronze/red tints and are quite spectacular. Very worthy of commercial utilization in eastern N.C.
- *Quercus sp.* - an unknown species - truly amazing foliage which one must touch to fully appreciate - feels like rigid plastic it is so thick. Very vigorous growth - at 5 years it is 20' tall with 6" caliper trunk. We would love to have a block of a thousand of these. It set acorns last year for the first time so we may have a seed source - if they come true from seed.

IMPOSTER "OAKS"

The family Fagaceae also contains another genera of trees closely related to *Quercus*, the *Lithocarpus* genera. All 100 species are evergreen and from Asia (except 1 west coast species from America which I've not been able to grow). Many have great potential here but have rarely been grown. They are supposedly spectacular in fruit (which I've never seen). Woodlanders Nursery in Aiken, SC (803-648-7522) and Camellia Forest Nursery in Chapel Hill, NC (919-967-5529) have the largest range of *Lithocarpus* for sale in the country - definitely worthy of trial. Three species are doing well in The NCSU Arboretum (now the JC Raulston Arboretum) at present.

- *Lithocarpus chinensis* - from central China; nothing about it in my literature sources. Well established now and growing over 2' per year - no injury last year in coldest winter in 9 years.
- *Lithocarpus glaber* - from China and Japan - described as reaching 20' but normally a shrub.
- *Lithocarpus henryi* - from central China and introduced by Wilson in 1901. The most common species in southeast U.S. cultivation and an excellent landscape tree with large, long and narrow leaves. Learned during the trade show there are large handsome trees of this in Raleigh, and that it propagates well from cuttings which would make it of good commercial potential.

CUPRESSUS EVALUATION IN THE NCSU Arboretum (now the JC Raulston Arboretum)

Tom Foley, Jr. and J. C. Raulston (original version in Proc. SNA Res. Workers Conf. 39:in press).

In general, conifers are a relatively small percentage of the total nursery and landscape ornamentals market in the southeastern U.S. Most commercial offerings come from a few prominent genera with *Chamaecyparis*, *Juniperus*, *Pinus*, *Platycladus*, and *Thuja* heavily dominating the conifer market at this time. During the past 20 years, The NCSU Arboretum (now the JC Raulston Arboretum) has actively collected and evaluated adaptability and ornamental potential of a wide array of conifers in almost all existing genera. The conifer genus *Cupressus* (Cupressaceae) is a diverse one with about 100-115 taxa currently listed (14) from 15-20 species native to the southeastern U.S. and Mexico, the Mediterranean region from southern Europe around the Middle East into Northern Africa, and in the Himalayas and southern China. The group is a difficult one taxonomically with many varied naming and classification schemes of the species. The American complex alone is considered to be anywhere from 6 to 15 species (5). Various taxonomic keys to the species are available (5,8,9,13).

Most species eventually form tall evergreen trees though some remain shrubs. With a few exceptions, the majority of species come from arid areas of subtropical to tropical regions which would seem to limit adaptability for use in the southeastern U.S. - with likely potential problems of summer root rots typical of most Mediterranean woody plant species brought to this region, or of inadequate winter hardiness in the upper reaches of the southeast.

With such "rare minor taxa" published information is often difficult to locate and the following general guides will offer the best potential for further search (1,5,7,9,11,13,14). Most species are easily propagated by cold-stratification of seed which is readily available from commercial sources (4). Many early cultivars were produced by grafting but the economics of this technique have lead to the development of cultivars in the last decade specifically selected for their ability to be cutting propagated. Development of numerous commercial cultivars of *C. glabra* and *macrocarpa* has been extremely active in Australia, England and New Zealand where these two species are well adapted for landscape use and grown in large quantities from seed allowing selection of distinct variants in this population. Various source guides report 18 *Cupressus* taxa currently being sold in Holland (12), 28 in the U. S. (8) and 53 in England (10).

Nearly 50 accessions of *Cupressus* have been received by The NCSU Arboretum (now the JC Raulston Arboretum) over the years, and about 22 taxa are presently growing in the collections. Performance of some *Cupressus* taxa which have been evaluated in The NCSU Arboretum (now the JC Raulston Arboretum) is presented below with brief information on origin, general plant character, propagation, hardiness, and present status in the nursery industry. Bold type indicates plants which have been in the collection at some point with those presently growing indicated by asterisks (*).

To our surprise, summer root rotting in our heavy clay soils has been less of a problem than expected with most species apparently having decent tolerance. The genus is noted for rootbinding problems when grown in container production with subsequent anchorage and topple problems in the garden. Field grown and transplanted plants probably make better long-term landscape plants. Foliar diseases have also been less prevalent than expected and all mentioned are more useful in this regard than some other existing commercial conifers such as the *Juniperus scopulorum* cultivars.

Winter hardiness is variable with species - but most listed below are dependable in USDA Zone 7 to the 5F range; with the hardiest species coming from the mountains of Oregon (*C. bakerii*) and Arizona (*C. glabra*) and hardy to USDA Zone 6. All species except these two were either severely damaged or killed in the record low winter of 1985 when temperatures reached -7F and most were replanted for further evaluation at that time. An unusual adaptation issue noted in our trials has been snow breakage tolerance. Most species come from arid, snow and ice-free regions and all of these have shown marked susceptibility to limb flux and breakage with even moderate snow loads. The two species which come from heavy snowfall regions, *C. bakeri* and *glabra*, are structurally sound through generations of genetic selection in native habitats and have shown no damage in our trials.

Perhaps the most unfortunate generalization from observations of this genera is that while very beautiful plants with widely variable ornamental features are available - few seem to age well and remain with attractive form and character beyond 10-20 years of age. Most open up to loose habit and unsymmetrical character with age limiting long-term usage.

- *C. arizonica* - native to Arizona, California, New Mexico, Texas and Mexico. One of the most complex "groups" taxonomically with up to 7 botanical varieties/species within this "species" by various authors. Horticultural cultivars are bounced back and forth between this designation, *C. arizonica* var. *glabra* (10), and *C. glabra* (14) (which this paper will use).
- **C. bakeri* - native to southern Oregon and coastal northern California; blue-grey foliage; very hardy and snow tolerant; attractive; seed propagated - we have never rooted cuttings successfully from our plants.
- *C. cashmeriana* - not known in the wild and its true origin and identity is debated, reputedly from Kashmir and Tibet; blue-grey color and pendulous growth habit; unquestionably the most beautiful *Cupressus* and one of the most magnificent ornamental plants in the world; no frost tolerance and grown strictly as an interior foliage plant; cutting propagated.
- **C. chengiana* - native to western China and only discovered and named in 1964.
- **C. duclouxiana* - native to China (Yunnan, Szechwan, Kansu).
- **C. funebris* - native to China; at times classified as a *Chamaecyparis* species.
- **C. glabra* - as discussed above, often considered a form of *C. arizonica*. Nearly 30 cultivars have been introduced with most coming from Australia and New Zealand. The group of cultivars from this species likely makes up 90%+ of the *Cupressus* production and use in the southeastern U.S. at present.
- **C. glabra* 'Arctic' - 1984 introduction by Duncan & Davies Nursery, NZ; green foliage with bluish (whitish) tips (apparently only in cool climates; not seen at NCSU); open habit; cutting propagated.
- **C. glabra* 'Blue Ice' - introduced by Kemp's Nursery, Aldgate, Australia 1957 and recently imported into U.S. in quantities by Duncan & Davies Nursery, NZ; excellent frosty grey-blue foliage with upright symmetrical habit; cutting propagated.
- **C. glabra* 'Carolina Sapphire' - 1987 introduction by Forestry Department, Clemson University, SC; dark steel-blue foliage; loose habit; extremely fast with up to 6' per year possible on young plants; cutting propagated; in rapid buildup and promotion in the N.C. market at present.
- **C. glabra* 'Clemson Greenspire' - 1980 introduction by Forestry Department, Clemson University, SC; bright green foliage; fast growth; cutting propagated.
- **C. glabra* 'Gareei' - 1958 selection by M. Garee, Nobles Nursery, OK; 1973 introduction by Monrovia Nursery, CA ; good blue color and form; not easy from cuttings and normally grafted - accounting for its slow decline in market share as newer and easier propagating clones have entered the market.
- **C. glabra* 'Golden Pyramid' - originated by R. Levy of Brisbane, NZ and a 1972 introduction by Duncan & Davies Nursery, NZ; very showy golden color in sun.
- **C. glabra* 'Silver Smoke' - 1984 introduction by Duncan & Davies Nursery, NZ; silvery-grey foliage; compact growth; cutting propagated.
- *C. goveniana* - native to central coastal California.
- *C. guadelupensis* - native to Guadalupe Island in southwest California and Baja California.
- **C. lusitanica* - native to Guatemala, Honduras, and Mexico; in European cultivation since 1682.
- **C. macnabiana* - native of southern Oregon and northern California; reported to be the most frost and drought tolerant of all *Cupressus* species (13).
- **C. macrocarpa* - smallest native range of any *Cupressus* species with only 2 groves at Monterey Bay on the central California coast. Widely grown in Australia and New Zealand forestry production - probably accounting for the large relative proportion of the over 45 cultivars which have been named coming from these countries in observation of the seedling populations for variations.
- **C. macrocarpa* 'Coneybearii Aurea' - found in 1920's and introduced 1933 by Hazelwood Bros. Nursery, Australia; now sold commercially in U.S. by Duncan & Davies, NZ as 'Saligna Aurea'; very attractive plant with pendulous golden thread foliage; grafted.
- **C. macrocarpa* 'Goldcrest' - 1948 introduction from Treseder Nursery, England. Grown by the millions in recent years in the European greenhouse industry for interior foliage plant use; cutting propagation.
- **C. macrocarpa* 'Golden Pillar' - 1979 introduction from Jackman Nursery, England; golden foliage; columnar; cutting propagation.
- **C. macrocarpa* 'Horizontalis Aurea' - 1898 introduction from Brunning's Nursery, Australia; golden foliage; the name and actual growth form are confusing ("for some reason . . . nurserymen have seen fit to give [this name] to an upright grower . . . It took me some time to appreciate the fact, though I will never appreciate the logic" - Adrian Bloom (2)).
- *C. sargentii* - native to north and central coastal/foothill California.
- **C. sempervirens* - native to Asia Minor and the eastern Mediterranean as far east as north Iran - distributed through widely variable climatic regions for considerable ecotypic variation potential. Cultivated since antiquity and normally seen in American cultivation in the tightly columnar forms (widely used in the southwest - Texas through California) but in the wild it varies greatly in form. The NCSU Arboretum (now the JC Raulston Arboretum) recently received plants supposedly from the coldest portion of the native range in Turkey mountains and will be evaluating these for potentially greater cold hardiness.
- **C. sempervirens* 'Glauca' - 1989 introduction by Monrovia Nursery, CA; blue-grey foliage; columnar.
- **C. sempervirens* 'Swane's Golden' - selected in 1944 by Swane Bros. Nursery, Australia; introduced 1956; gold foliage; columnar; has been less successful at NCSU than the species requiring lathhouse culture in well-drained bark beds to perform well.
- *C. torulosa* - native from western Himalayas to China (Szechwan).

A large variety of *Cupressus* taxa can be grown successfully in the southeastern U. S. but most would fit more in speciality hobbyist markets without widespread commercial landscape potential due to long-term survivability and age aesthetics problems. The most commercial at the moment is *C. glabra* 'Carolina Sapphire' with its bluish-grey color, cutting propagation ability and exceptionally fast growth of up to 6' per year for maximum profitability to growers, and relative low resulting price for the purchaser. The New Zealand Duncan & Davies Ltd. cultivars *C. glabra* 'Blue Ice', 'Golden Pyramid', and 'Silver Smoke' also produce well and have very attractive landscape appeal. The speciality markets of interiorscaping and annual patio plants using more tender taxa such as *C. macrocarpa* cultivars and *C. cashmeriana* should be pursued in the southeast in light of the enormous success with these plants in the European market over the last decade.

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***PRUNUS LAUROCERASUS* EVALUATIONS IN THE NCSU Arboretum (now the JC Raulston Arboretum)**

Tom Foley, Jr. and J. C. Raulston (original version in Proc. SNA Res. Workers Conf. 39:(in press).

Broadleaf evergreen shrubs are perhaps the most important woody ornamental plant group in the landscape industry of the southeastern United States with heavy use for specimens, medium height groundcovers, foundation plantings and screening. Among the many widely diverse taxa of broadleaved evergreen shrubs, the Cherry Laurel or Laurel Cherry, *Prunus laurocerasus*, is one of the most widely used and successful of such plants for effective landscape use. This large shrub/small tree species is native to southeastern Europe and Asia Minor around the Black Sea in the Caucasus and Transcaucasia mountains of Anatolia, Bulgaria, and Serbia - reaching 20-25' in height as old specimens (1).

It has likely been cultivated since antiquity in its native region, and was recorded as an introduced exotic species in western Europe by 1576. It is a widely variable species in growth rate, ultimate size, form, foliage characteristics, bloom time and ornamental quality. As a very easily propagated species (stem cuttings at most any time of year (3)), many selections have been made for various ornamental qualities and at least 45 cultivars have been named (5,6,11). Taxonomic keys to sorting out the main cultivars by foliage characteristics are available (5,10). The vast majority of the cultivars have been made in Europe and the ones now in most common use in the U. S. are old European cultivars (1889 and 1898) which were likely imported before contemporary U.S. plant quarantine bans on all *Prunus*

introduction. In general, most of the large-leaved forms originate from Caucasus Mountains germplasm, and the small-leaved forms from the Balkan Mountains (5). Also, in general the small-leaved forms tend to have greater cold resistance than do large-leaved forms. Most cultivars perform well in USDA Zones 7-8, with hardier ones extending into Zone 6 and possibly 5.

No serious biological problems commonly exist in landscape use. Leaf shot-hole, a *Pseudomonas* bacteria problem, can be serious under the high water, frequent overhead irrigation schemes normally used in modern container nursery production (7). It can be controlled by chlorination/bromination of irrigation water or by using media-applied drip irrigation during production to keep foliage dry. Root decline in the landscape occurs with poor drainage and excess water during high temperature months. In hot southern environments, planting beds should be engineered for good aeration and drainage. *Prunus laurocerasus* taxa have been under evaluation in The NCSU Arboretum (now the JC Raulston Arboretum) for cultural and ornamental characteristics in USDA Zone 7 for over a decade.

Results and Discussion: The following list summarizes 45 taxa listed in the literature and their general ornamental attributes when known or given. Invalid synonyms are presented in parentheses. The 10 cultivars currently in The NCSU Arboretum (now the JC Raulston Arboretum) collection are indicated by bold type.

- 'Angustifolia' (4,5,11) - tall, narrow leaves, 1802 by A. Leroy of Angers, France.
- 'Barmstedt' (11) - no description available.
- 'Bernardii' (5) - large leaved form, 1920 by G. Benard & Cie of Orleans, France, likely no longer in existence.
- 'Bruantii' (5) - vigorous, ascending & open, less hardy, 1913 France.
- 'Camelliifolia' (4,5,6,8) - vigorous growth, dramatic curled & curved leaves, originated 1901, widely grown in England today and in some production in western U. S.
- 'Castlewellan' ('Marbled White') (4,6,11) - narrow, dense, upright, densely speckled white foliage resembling "marbelized wood" of 19th century decor, originated at the Castlewellan Estate in Northern Ireland in 1811; given Award of Merit by Royal Horticultural Society in 1986. The foliage variegation is showiest in cool climates of the U.S. Pacific Northwest and England - but as our plants have aged they become consistently more attractive. Very fast growing and taller than other cultivars. Worthy of greater production for specimens and hedging, and potential use for florist industry cut greens.
- 'Caucasica' (4,5,6,8,11) - vigorous, upright, hardiest large-leaved cultivar, light green, glossy.
- 'Caucasica Nana' (2) - small, compact, thick, rich green leaves.
- 'Cherry Brandy' (6,11) - new English cultivar; name only, no published description available
- 'Colchica' (5) - broad, thin dull lvs., heavy flowering, 1853 England.
- 'Dart's Good News' (11) - new English cultivar; name only, no published description available.
- 'Dart's Low Green' (6) - new English cultivar; name only, no published description available.
- 'Erect' (5) - vigorous, 1960 by P. Lombarts of Zundert, Holland.
- 'Forest Green' - chance seedling from Dr. Floyd Smith, Bear Garden Nurseries, Silver Spring, MD with broader and darker green foliage than 'Schipkaensis' and reported by him to not foliage burn at -15F. Grows to 4-6' height. Received by U.S. National Arboretum in 1977 (Accession #41215), and distributed by The NCSU Arboretum (now the JC Raulston Arboretum) to N. C. growers in 1984.
- 'Goldglanz' ('Golden Lustre') (11,12) - leaves yellowish, broad upright habit, new Holland selection.
- 'Golden Splash' (6) - name only, no published description available.
- 'Green Carpet' ('Grunerteppich') (6) - name only, no published description available.
- 'Green Mantle' (4,11) - wide-spreading and open habit with dark glossy green leaves, Hillier Nursery 1965.
- 'Green Marble' (6) - new English cultivar; name only, no published description available.
- 'Greenpeace' (11) - new English cultivar; name only, no published description available.
- 'Herbergii' (4,5,6,8,11) - dense pyramidal shape to 6', for hedging, oblanceolate polished green leaves, very hardy, 1930 by Herberg of Germany.
- 'Holstein' (11) - name only, no published description available.
- 'Latifolia' ('Magnolifolia', 'Macrophylla') (2,4,5,6,8) - largest leaved cultivar (12") with dark green leaves, 1869 in Versailles, France; rated a "superb plant" Dirr (2) who reports a 25' specimen in KY.
- 'Mari' (9) - wide shrub with upright branches, leathery, dark glossy green leaves, very hardy - taking -15F without injury. Bred by Dr. M. Jozsa of Szombathely, Hungary.
- 'Microphylla' (5) - narrow leaves, 1873 France. Probably no longer in cultivation.
- 'Mischeana' (4,5,6,8,11) - dense, flat & wide, dark green glossy foliage, flowers spring & fall, 1898 by Spath of Berlin, Germany from Balkans Mountains collection, highly valued form in Europe, "the most ornamental clone (4)", needs import and introduction into U.S. culture.
- 'Mount Vernon' (2,6,11) - described as small and compact - a 1-2' groundcover spreader - but plants brought from the Pacific Northwest to The NCSU Arboretum (now the JC Raulston Arboretum) change form and grow more vigorously upright and have now reached 6' in height. Introduced by Wells Nursery of Mount Vernon, WA.
- 'Otinii' (5) - compact, strongly upright, darkest green of large leaved cultivars, lustrous, 1873 by Otin of St. Etienne, France.
- 'Otto Luyken' (2,4,5,6,8,11) - broad habit, 3-4' high by 6-8' wide, dense & compact, vertically oriented leaves, very free flowering, selected 1940 by Herm. A. Hesse Nursery of Weener, West Germany - introduced to trade in 1953, Royal Horticultural Society Award of Merit 1968, Award of Garden Merit 1984. One of most widely grown cultivars in the south and an excellent landscape plant.

- 'Parkway' - recent introduction by Woodlander's Nursery, Aiken, SC from turn-of-century plant in Aiken. Parent plant is globe-shape, 15' X 15', dense and compact; has large glossy foliage and dense symmetrical growth without shearing on young plants.
- 'Piri' (9) - compact semi-globe reaching 2-3', obovate dark green leaves, better winter hardiness than 'Otto Luyken' taking -15F without damage, new selection bred by Dr. M. Jozsa of Szombathely, Hungary.
- 'Pyramidalis' (5) - pyramidal, 1920 Renault Nurseries of Orleans, France, doubtful if still in cultivation.
- 'Renlo' ('Renault Ace' TM) (12) - upright habit excellent for hedges, glossy green leaves.
- 'Reynvaanii' (4,5,6,8,11) - small, slow-growing, dense upright to 6', 1913 by A. J. Reynvaan of Velp, Holland.
- 'Rotundifolia' (4,5,6,11) - broad erect habit, light non-glossy leaves, 1865 by L. C. B. Billard & Barre of Fontenay-aux-Roses, France - widely grown in Europe.
- 'Rudolf Billeter' (5,6,11) - low, broadly ascending (unattractive?), 1930 Stafra, Switzerland.
- 'Rufescens' (4) - slow, small, flat-topped, small neat oval to obovate leaves, Hillier Nursery.
- 'Schipkaensis' (2,4,5,6,8,11) - broad to vase-shaped to 6', heavy flowering, selected in 1889 from Schipka Pass at 4,000' near Kasanlik, Bulgaria by Spath of Berlin, very winter hardy to USDA Zone 5, Royal Horticultural Society Award of Merit 1959. Widely grown in southeastern U.S.
- 'Schipkaensis Compacta'(5) - broad to 3' in height, 1914 by W. Klenert Nursery in Graz, Austria.
- 'Schipkaensis Holland' (4,5,11) - probably a seedling of 'Schipkaensis' named by Dutch nurseries in 1970; differs primarily by smaller more distinctly toothed leaves, flowers profusely.
- 'Schipkaensis Macrophylla' (5,11) - differs by open, broadly upright habit to 6', abundant flowers, fruits well, 1940 by G. D. Bohlje, Westerstede, Germany, one of most popular cultivars in Europe.
- 'Schipkaensis West Coast' - a mystery plant in true identity and origin - appearing originally in southeast nurseries from liners purchased in from the Pacific Northwest as 'Schipkaensis', but growth is more rapid and more upright than normal 'Schipkaensis' and makes a larger plant. Proving popular and being propagated, grown and normally sold as 'West Coast Schipkaensis'.
- 'Serbica' (4,5,11) - broad & dense, twiggy, obovate rugose leaves, geographical form from Yugoslavia to Germany in 1877.
- 'Taff's Golden Gleam' ('Aureovariegata') (6,8) - shrub to 12', striped yellow foliage.
- 'Van Nes' (5,6,11) - wide & dense, very hardy mountain form from Caucasus Mountains, 1935 by P. van Nes AZ in Boskoop, Holland, highly valued form in Europe.
- 'Variegata' (2,4,5,6) - narrowly upright, dense, white striping in leaves - unstable variegation and quite variable, 1811 from France, likely more of hobbyist/collector interest than for commercial landscape use.
- 'Zabeliana' (2,4,5,6,8,11) - low spreading habit, 3-5' high by 12-25' wide, long narrow willow-like leaves, very free flowering, very winter hardy, 1898 by L. Spath of Berlin from Bulgaria collection, Royal Horticultural Society Award of Garden Merit 1984, very widely grown and used in U.S..

Prunus laurocerasus cultivars 'Otto Luyken', 'Schipkaensis', 'West Coast Schipkaensis', and 'Zabeliana' are currently common in the southeast U. S. nursery trade and make excellent problem-free landscape plants for hedges, specimens, foundation plantings, and mid-height groundcovers. Observations at The NCSU Arboretum (now the JC Raulston Arboretum) indicate that 'Castlewellan', 'Forest Green', and 'Latifolia' offer good potential for future market development for the southeastern U. S. market. There are many other cultivars in widespread use in Europe which offer much potential for trial and production. Potential industry long-term value of these cultivars would probably justify attempts to import the best forms through the long and difficult USDA quarantine isolation procedure.

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PLANTS DISTRIBUTED TO NURSERYMEN - 1993 NCAN SUMMER SHORT COURSE

NCAN Short Course and Trade Fair - Asheville, NC - August 28-29, 1993.

(Most members who comprise the Friends of The NCSU Arboretum (now the JC Raulston Arboretum) are not in the professional nursery/landscape trade, but are serious gardeners or people who want to support the continuation of the arboretum as a state resource. Beyond the arboretum use as a university teaching resource and display garden for the public, there is also the very important outreach to the commercial industry. Each year plants are taken to the North Carolina Association of Nurserymen's meeting for display, and thousands of plants are also propagated for free distribution as an incentive to try to encourage nurserymen to grow some new crops. To allow our "Friends" to have a feel for this outreach, I am again as for many years, including here the information on plants distributed at the 1993 meeting as these may be plants which will appear in garden centers for the public in the future - and of course many of the extras from this distribution end up in the autumn members plant giveaway so many of these are now in your gardens under trial.)

Each year a selection of plants from The NCSU Arboretum (now the JC Raulston Arboretum) is made for propagation and distribution to N. C. nurserymen at the summer short course as a means of spreading new or uncommon plants through the state for further observation and perhaps commercial production. This program has been underway since 1980 and ca. 58,000 plants of 285 different species and cultivars have been given to growers since its inception. Selection of plants is based on plant ability to be propagated when the Department of Horticultural Science propagation benches are empty, size of stock plants in the arboretum adequate to allow taking of 200-300 cuttings, and absence in the existing commercial industry. Plants will vary in commercial potential with some having great potential - others merely curiosities for adaptation study or hobbyist collector-type items. The 38 plants distributed in 1993 were by far the largest number of plants ever provided in our packs.

The plants provided for growers represent just a sample of the 5,000 species and cultivars presently growing in The NCSU Arboretum (now the JC Raulston Arboretum). Commercial growers are most welcome at any time to come to the arboretum to collect propagation material to provide stock plants for their operations. We do request for nurserymen collecting plants from the arboretum for the first time, an appointment be made (call 919-515-1192 for J. C. Raulston, 515-5361 for Tom Foley, or 515-1632 for Newell Hancock) to coordinate which materials may be collected and our general guidelines for collection procedures. Dozens of growers now gather many hundreds of thousands of cuttings annually in this manner.

A significant 1993 improvement in our pack was the first use of pre-printed permanent labels to help recipients keep the plants identified better when potted back at the nursery - our sincere thanks to Horticultural Printers, Inc. of Dallas, TX for providing excellent and stunningly fast service in preparing these labels with notice at the last possible moment. We very much appreciate the long, diligent efforts of a whole team of Friends of The NCSU Arboretum (now the JC Raulston Arboretum) Volunteers who spent a full week individually labeling, wrapping, and bagging the 8,000 plants in this year's distribution. Many, many thanks to all who have helped in this process, and especially to Rosanna Adams, Sue Aldworth, Mary Edith Alexander, Wayne Brooke, Tom Bumgarner, Anne Clapp, Jody Council, Alice Figgins, Vivian Finklestein, Larry Garver, Linda T. Jones, Betsy Lindemuth, Ray Noggle, Danny Piner, Charlotte Presley, Sherri Sattewhite, Letizia Thrift, and Bee Weddington for your incredible help.

- 9301 *Aster carolinianus* Walter - "Autumn-Flowered Climbing-Aster" (Compositae). An unusual woody composite "vine" ("robust, sprawling perennial" - p. 1080 in Manual of the Vascular Flora of the Carolinas - Radford, Ahles and Bell) native to Bladen Co. in N. C. (rare there) and along the South Carolina coast to Florida in marshes and woodland borders. First brought to my attention by the display plant at the Montrose Nursery gardens in Hillsborough, NC, and the many testimonials from customers who bought plants from their mail-order nursery catalog. Used very effectively by Edith Eddleman in the early-late border at The NCSU Arboretum (now the JC Raulston Arboretum) where it is allowed to climb through the branches of American beautyberry for a spectacular display of the masses of 1" diameter purple flowers against the beautyberry fruit in October. The best plant I know is located on the outside wall of the N.C. Governor's Mansion in downtown Raleigh on the southeast corner of the square. Greatly deserving of more widespread use through the commercial nursery industry with the current interest in a wider range of native plants, for autumn interest plants, and of more vines for use in the landscape. Listed in the above book as reaching 6' in height in nature, but already seen at 12-15' in cultivated landscapes. Propagated very easily by softwood cuttings in summer under mist. Useful in USDA Zones 7-9; worthy of trial in 6?, 5?. Since it blooms photoperiodically (short days in autumn) - it could be bedded out in spring as an annual in colder climates; and may have possibilities for an distinctly unusual hanging basket for autumn seasonal color.
- 9302 *Aster oblongifolius* Nuttall. - "Oblong-Leafed Aster" (Compositae). An autumn-flowering aster (p. 1077 in Manual of the Vascular Flora of the Carolinas) native to Madison Co. in N. C. (rare there and found on basic soils on wooded cliffs) and further west and north in other states. A perennial spreading by creeping rhizomes and reaching 2-3' in height with purple-violet flowers in autumn. Propagated by divisions of the clumps or by softwood cuttings under mist in summer. Useful in USDA Zones 5-9. (Note - a beautiful example of the problems of discussing plant hardiness in varying climates is presented by the observation that the new

"definitive" Royal Horticultural Society Dictionary of Gardening lists this plant as hardy only in Zone 9 - when it is native in Zone 5 in the U. S.!).

- 9303 *Aucuba japonica* Thunb. f. *longifolia* - "Lance-Leafed Aucuba" (Cornaceae). A narrow-leafed form of the widely grown broad-leafed evergreen Aucuba which presents a different texture in the landscape and is reputedly hardier than the species in more marginal northern areas. Can reach 5' in height and is best in light shade. This distribution from plants tracing back originally to those in the University of California Berkeley Botanic Garden. Very easily propagated by stem cuttings at most any time of year (we used single-node cuttings to maximize our limited wood available for this distribution). Useful in USDA Zones 6-9. (Located in the lath house).
- 9304 *Callicarpa shikokiana* Makino - "Shikokiana Beautyberry" (called "Tosa-Murasaki" in Japan) (Verbenaceae). A rarely-grown species of beautyberry native to the milder districts of Japan (Shikoku and Kyushu) which we obtained as Index Seminum seed distributed from the Strasborg Botanic Garden in France. Like most beautyberries it is a deciduous shrub - probably to 4-6' in height; and produces purple fruit in autumn. From its native source, it is likely less hardy than most of the species currently being grown in commercial culture in the US. Being distributed as a novelty for observation and to learn more about potential hardiness. Very easy and fast from softwood cuttings; or as seed is available later - from stratified seed. Possibly useful in USDA Zones 7-9 (8-9?). Postscript note to this original description. One of the plants went to horticulturist Jenks Farmer of Riverbanks Zoological Park & Botanical Garden in Columbia, SC and he recently described it in an article (Farmer, Jenkins. 1995. Beautyberry. American Nurseryman Magazine - February 1, 1995:30-35) as "the tallest, fastest growing beautyberry . . . and is also the most floriferous . . . with a pleasant, lila-like fragrance . . . reaching its color peak in November." Well worth trying.
- 9305 *Camellia X williamsii* 'Mary Christian' - "Mary Christian Camellia" (Theaceae). One of the numerous hybrids in the group created by crosses of *C. japonica* X *C. saluenensis*. As stated in the Hillier Manual (England): "one of the most valuable hybrid shrubs ever produced . . . The cultivars originating from this cross are invaluable shrubs, exquisitely beautiful, and exceedingly free-flowering over a long period. . . . In foliage they tend towards the *C. japonica* parent and in flowers towards *C. saluenensis*. First raised by J. C. Williams at Caerhays Castle, Cornwall about 1925." 'Mary Christian' was one of the early releases with small, single, clear pink flowers and it received an Award of Merit from the Royal Horticultural Society in 1942. The NCSU Arboretum (now the JC Raulston Arboretum) plant has grown rapidly to 9' with abundant flowers in early spring. Probably best used in USDA Zones 7-9. Propagation is by semi-hardwood to hardwood cuttings at most any time of year under mist. (Located north of the lath house in the small pass through corridor).
- 9306 *Cercidiphyllum japonicum* Sieb. & Zucc. - "Katsura Tree" (Cercidiphyllaceae). A plant presently in commercial trade around the world - and certainly not a rarity or unfamiliar to the nursery industry. We had large quantities of seedlings left over from plants grown for distribution to children at The NCSU Arboretum (now the JC Raulston Arboretum)'s 1993 Arborfest celebration in the spring (seed graciously provided by The Morris Arboretum, Philadelphia, PA) - and we decided to pass them on here as a way of getting them in nursery gardens where they might not be familiar to proselytize new converts to a wonderful plant. A great favorite of Dr. Michael Dirr with rave comments in his manual ("if I could have only one tree, this would be [it]") p. 197-198). In the southeastern US - as one goes into hotter and drier climates it is more demanding in requirements than in more northern areas - needing partial shade with both good moisture and drainage for best performance in our heat.

A deciduous shade tree to 40-60' in cultivation; fast in growth; with attractive yellow to apricot autumn foliage color. Very easy from seed with no pretreatment and 4-5' growth can be obtained in a year in container culture. Useful in USDA Zones 4-8. Several *Cercidiphyllum* cultivars exist which are produced by grafting on seedling understock.

- 9307 *Chamaecyparis thyoides* (L.) B. S. P. 'Ericoides' - "No Common Name; Ericoides White Cedar?; Juvenile White Cedar?" (Cupressaceae). A very attractive, conical to fastigate, juvenile foliage form of the native "White Cedar" of eastern NC which was developed by the Bergeot Nursery in Le Mans, France in 1840. It was once commonly grown in the NC nursery industry and sculptural old plants which have reached 20' in height can be seen around farm homes throughout the eastern part of the state. The foliage is soft and fluffy in texture and turns an attractive plum-purple color in winter. This is a plant which, because of its juvenile, non-fruiting state, has been a taxonomic nightmare with much confusion. It has probably been listed in at least 3 different genera, and as many different cultivars. Very easy to propagate by semi-hardwood to hardwood cuttings in mid-to late summer and through the winter. Useful in USDA Zones 7-9.
- 9308 *Clethra barbinervis* Sieb. & Zucc. - "Japanese Clethra" (Clethraceae). Cultivars of the American Summersweet, *C. alnifolia* have recently become very popular in the southeastern US, but the many other species with potential use (over 30 in eastern Asia and the US into central America) are much less known. This species native to China and Japan fits a different "use category" as a small flowering tree to 20' with showy summer pendant panicles of white flowers. *C. argentea* - native to north and central coastal/foothill California. *C. sempervirens* - native to Asia Minor and the eastern Mediterranean as far east as north Iran - distributed through widely variable climatic regions for considerable ecotypic variation potential. Cultivated since antiquity and *normally seen in* clones have entered the market. *C. glabra* - "Golden Pyramid" - originated brecent efforts of Yucca Do Nursery in Texas (this plant to be featured in an upcoming American Nurseryman article by them; \$3 sales catalog from: FM 359, P. O. Box 655, Waller, TX 77484) - and who kindly provided the seed for the plants being distributed here. It is a deciduous tree to 25' in the mountains of Mexico with beautiful red flaking bark and cascading panicles of white flowers in summer. New growth is reddish-bronze tinted on many seedlings and quite attractive in spring. Potential hardiness is unknown at this point with its recent introduction, but it seems likely to be useful in Zones 7-9, possibly 6? We are distributing it for evaluation trial - probably best in light shade with good moisture and drainage (will likely root rot in hot, wet clay soils). Easily grown from seed without any treatment, or from softwood cuttings under mist in summer - and rapid growing with good culture.

- 9310 *Cornus kousa* (Buerger ex Miq.) Hance. 'Little Beauty' - "Little Beauty Kousa Dogwood" (Cornaceae). This species from China, Korea, and Japan is one of the showiest of flowering dogwood trees with pointed bract "flowers" appearing on layered branches after the US native *C. florida* bloom. They are also noted for their attractive red fruit in autumn and for the beautiful bark on trunks in winter. There is huge commercial interest in this species at present with feelings of it possibly having greater resistance to dogwood anthracnose and innumerable new cultivars are being selected and named for production. Dr. Tom Ranney and Mr. Dick Bir have assembled one of the largest *C. kousa* cultivar collections in the US at the Mountain Horticultural Crops Research & Education Center in Fletcher, NC and evaluation of their merit and characteristics is now ongoing there.

This cultivar was selected by The NCSU Arboretum (now the JC Raulston Arboretum) for introduction from a population of plants grown from seed collected in Korea during the 1985 expedition. It has a slower growth rate than the species with a height of less than 4' at 7 years of age when companion seedlings were 7-12' high; and dense twiggy growth. It is scorch and blemish free growing in full sun on our worst nursery site with heavy clay and no irrigation in the driest June in history. There do not appear to be any other named "dwarf" cultivars in the trade and it was felt that a smaller tree could be of market value for apartment or townhouse gardens, or as a tubbed patio tree. Summer semi-hardwood cuttings have rooted readily under mist (though the ones being distributed will not show this as they were collected later than intended and have not have an fully adequate rooting time. For those that can - potting them and holding under mist to allow continued rooting would be recommended). Probably use in USDA Zone 5-9. Postscript - the original tree remains slow-growing and dense and has now flowered with smaller than normal flowers. We have noted that cuttings grow off much more rapidly than the parent plant and seem to lose the dense compact growth. We'll have to watch this with time to see if indeed it stays smaller than the species. (Parent in the field nursery but will be moved to the Certified Plant Professional Garden later this spring for display).

- 9311 *Deutzia gracilis* Sieb. & Zucc. 'Variegata' - "Variegated Deutzia" (Hydrangeaceae). Another of the variegated deciduous flowering shrubs for specialized tastes and hobbyists willing to handle the plant appropriately to maintain it. This plant has heavily white variegated leaves often approaching a "marbled" pattern with white flowers in spring on a 5-7' plant. The variegation is not stable and plants must be rogued to keep the desired pattern, removing green shoots and other variegation forms - with probably repropagation and re-establishment of the plant every 5-8 years. Very easy from softwood cuttings. Tolerant of a wide variety of soils and most heavy flowering in full sun though the variegation may benefit from light shade. Potential use in USDA Zones 4-9. (Located in the "White Garden" next to the holly hedge).
- 9312 *Euonymus japonicus* Thunb. 'Bekomasaki' - "Bekomasaki Euonymus" (Celastraceae). *E. japonicus* is a broadleaved evergreen shrub native to China, Japan and Korea and is widely grown in the US nursery trade with many (mostly variegated) cultivars being grown. With easy propagation, fast growth and market appeal in smaller containers - they are very profitable items. This cultivar was selected in Japan and introduced to the US by Brookside Gardens, Wheaton, MD. It has smaller solid green foliage very formally arranged around the stem on almost fastigate growth of a dense and refined character. The NCSU Arboretum (now the JC Raulston Arboretum) plant reached 7' in height with a width of less than 2' before it was cut for propagation. It seems less susceptible to scale attack than the normal forms though there has been no formal evaluation of this observation. Easily propagated by cuttings of almost any type at almost any time of year. Potential use in USDA Zones 6-9 in sun or shade. (Located in the lath house).
- 9313 *Euscaphis japonica* (Thunb.) Kanitz. - "Euscaphis" (Staphyleaceae). A small monotypic deciduous tree to 25' from Korea, Japan, and China. It was collected on the 1985 Korean expedition with plants from that collection at The NCSU Arboretum (now the JC Raulston Arboretum) now of a size (7-12') to see their beauty and to produce seed crops to allow commercial production trials in NC. It is a very highly ornamental plant through the entire year with glossy and leathery compound foliage in summer, spectacular red-pulped fruit showing shiny black seeds from August to October, followed by winter "snake-bark" with white stripes on deep purple bark. It is very stress tolerant - able to grow well in tight clays through flooding or extreme drought in full sun and transplants well. Propagation to this point is only by seed - which need acid scarification and cold stratification; cuttings have not been successful in our trials (postscript - subsequently, Dick Bir, Frank Blazich and graduate student Hunter Stubbs have now show good rooting from cuttings when handled properly). It should grow well throughout NC (there are some beautiful specimens from our early 1988 distribution now growing at the New Hanover County Arboretum in Wilmington) with potential use in USDA Zones 6-9 (5?). This is a NCAN promotion plant with initial seed crops going to growers commissioned by NCAN to grow them on for distribution to other growers for production. A single seedling is being distributed here to allow growers a "preview" of the plant and to test it under their conditions. When the time comes that seed is readily available from abundant stock plants - this has the potential to become an important nursery crop in the southeastern US. (In the east arboretum in the Cypress and Witch Hazel collections).
- 9314 *Ilex crenata* Thunb. 'Skypencil' - "Skypencil Japanese Holly" (Aquifoliaceae). There are probably more plants sold of this broadleaved evergreen shrub species than any other nursery crop in the southeastern US - and innumerable cultivars of all colors and shapes and sizes exist. This new, very tightly fastigate cultivar has recently become very popular in commercial markets in Japan and was introduced to the US by the U. S. National Arboretum with renaming (from the Japanese name) and distribution in 1992. We chopped our first plant to shreds (two node cuttings!) immediately upon arrival and with repropagation have managed to get enough plants for distribution in less than a year. It roots from cuttings easily, and appears it can grow perhaps 1-2' per year in good container culture with ultimate height of 6-7'(?). Potentially useful in USDA Zones 5-8 in sun or light shade. (Now located on either side of the entrance to the visitor center arbor at the arboretum).
- 9315 *Ilex crenata* Thunb. 'Variegata' - "Variegated Japanese Holly" (Aquifoliaceae). Yet another cultivar of the plant species described in #9314 above - this time a Japanese cultivar introduced by Brookside Gardens, Wheaton, MD. The color variegation of this plant occurs in irregular patterns of golden splotches and patches of golden leaves scattered rather evenly throughout the

entire plant in a uniform enough pattern to not look "sick." It is a normal growth rate and form cultivar forming roughly a rounded plant with time (ours is 6' in height and width after 7 years growth). Very easy from cuttings. Potentially useful in USDA Zones 5-8 in sun or light shade. (Located north of the Witch Hazel collection in the colored foliage holly collection to the right just after one leaves the White Garden).

- 9316 *Ilex* X 'Ginny Brunner' - "Ginny Brunner Holly" (Aquifoliaceae). Broadleaved evergreen hollies are the workhorses of the southern landscape industry with literally thousands of cultivars from dozens of species and hybrids (which Mr. Fred Galle is documenting in his monumental Hollies book currently in preparation). This relatively new cultivar (of the last decade) is an attractive female selection which fruits well as a young plant (note the berries on our rooted cuttings) and grows rapidly with medium coarse foliage. It is a hybrid of *I. cornuta* X *I. latifolia* and grows to a fine broad, dense conical form - eventually probably exceeding 20' in height. It has potential as a specimen, for hedging, or as a limbed up small tree. Very easy from cuttings at most any time of year. Probably useful in USDA Zones 6-9. (Located in the west arboretum in the hollies/anise bed just east of the education building "footprint").
- 9317 *Illicium anisatum* L. 'Pink Stars' - "Pink Stars Anise" (Illiciaceae). A broadleaved evergreen shrub to 10' with yellowish-white flowers native to Japan and Taiwan which has long been grown in the lower south where it is dependably hardy in USDA Zones 8-9. It is often confused in the nursery trade and sold as the native *I. floridanum*, or even as *I. parviflorum*. This selection, which was named by The NCSU Arboretum (now the JC Raulston Arboretum), has distinctly pink flower buds which open pink and fade to white depending on heat at time of bloom; and new shoot growth has a reddish glow to the foliage which fades as growth hardens and summer temperatures rise. The characteristics of the plant were first brought to our attention by Dr. Michael Dirr on a visit to the arboretum - and to the best of our knowledge the plant in question was originally purchased from Woodlanders Nursery, Aiken, SC. Although the parent plant is growing well in Zone 7 in Raleigh - the years of its presence have been milder than many and it would probably best be considered for permanent commercial use in Zones 8-9, and for specialist hobbyists in Zone 7 who understand and tolerate occasional damage or losses to have uncommon plants. Very easy from semi-hardwood cuttings through the year. Will grow in sun or shade with heavier flowering in brighter sun. (Located in the west arboretum in the hollies/anise bed just east of the education building "footprint").
- 9318 *Ilysanthes floribunda* - "No Common Name". A mystery plant in terms of recorded botanical information. A beautiful low-growing herbaceous perennial groundcover to 2-3" in height with blue flowers produced non-stop as long as temperatures are warm enough for growth. Originally obtained in the garden of Yucca Do Nursery (see #9309) in USDA Zone 8 where it is a wonderful garden landscape feature. We know little about potential adaptation (except that our arboretum rabbits love it as a salad appetizer prior to dining on larger and more expensive woody plants) and we are distributing it for trial across the state to see how hardy it may be. Very easily propagated by division of clumps, or in days by stem cuttings under mist. Will grow in sun or shade and probably looks best in partial shade. Has good potential to be used for hanging baskets with its rapid growth and cascading nature.
- 9319 *Iris cristata* Sol. 'Vein Mountain' - "Vein Mountain Crested Iris" (Iridaceae). The eastern US native crested iris is well known in gardener's native plant and perennials circles as a low-growing (3-5"), colony forming, early spring-flowering plant of great beauty and adaptability. It is one of the few iris to grow and flower well in woodland situations. Several cultivar selections have been made for different flower colors and sizes. This selection was made by We-Du Nursery, Rt. 5, Box 724, Marion, NC 28752 (704-738-8300) from wild populations near their nursery. Propagation is by division of clumps into single fan pieces with the roots attached.
- 9319A *Juniperus horizontalis* Moench. 'Variegata' - "Variegated Creeping Juniper" (Cupressaceae). An excellent groundcover conifer species and one of the most important nursery crops in the world with millions of plants produced for use in the US from coast to coast and from Florida to North Dakota. Native to northern North America from Washington to Maine and throughout Canada. Many selections have been made for form, color, texture, height, etc. and The NCSU Arboretum (now the JC Raulston Arboretum) currently has the world reference collection of ca. 55 cultivars which was assembled by graduate student Larry Hatch for a taxonomic study under the direction of Dr. Paul Fantz. This cultivar has white variegated patches of growth thrown out in a relatively stable and consistent manner (i.e., seems to not do all white, or all green chimeral sections in a planting) - which provides a variation from the normal appearance of this plant in the landscape. Certainly not a "commercial plant" for widespread landscaping - but of interest again to a variegated plant enthusiast or conifer specialist. Easily rooted under mist from hardwood cuttings at any time of year on mature growth. Potential for use in sunny locations in USDA Zones 3-9. (Located in the west arboretum in the *Juniperus horizontalis* collection).
- 9319B *Lindera strychnifolia* (Sieb. & Zucc.) Vilm. - "No Common Name; Evergreen Spicebush?" (Lauraceae). An outstanding broadleaved evergreen shrub which has impressed us at The NCSU Arboretum (now the JC Raulston Arboretum) for many years now. An extremely rare plant in US cultivation native to China, Taiwan, Philippines and SE Asia. Typical of the genus - it produces showy yellow flowers in early spring which glow against the glossy, dark green foliage of this species (most are deciduous). Annual growth is moderate with perhaps 1' per year and our plant is now 9' tall and 5' wide with dense growth. It would make a very handsome specimen or has potential for an unsheared hedging plant - for either sun or light shade. Complete adaptation is unknown - but certainly useful in USDA Zones 7-9 and probably 6 as well. In general, Linderas are propagated only by seed which is difficult to find on obscure species - but it has been a surprise to find that this species propagates readily from semi-hardwood cuttings (we've done it in January and June with success both times) which offers the greater possibility for its commercial success. (Postscript - the plant was subsequently damaged by a late freeze after growth came out - but has recovered and continues to look good) (Located in the west arboretum near the education building "footprint").
- 9320 *Lonicera alseuosmoides* Graebn. - "No Common Name; Evergreen Chinese Honeysuckle?" (Caprifoliaceae). A rare evergreen honeysuckle vine introduced from western China (Sichuan) by Ernest Wilson in 1904. It produces purple and yellow flowers in summer (or so the literature states - haven't seen them) followed by round black fruit in fall. This plant was discovered growing on

the side of the Center for Urban Horticulture building, University of Washington, Seattle, Washington in November of 1992. The 3 cuttings collected there have been pushed and chopped nonstop here to (barely and hopefully) make this distribution - so we've never seen it here longer than a 10" shoot. Reportedly hardy to USDA Zone 6 - but this is in English literature and needs testing here. Sounds like a potentially very useful and showy vine for southern gardens - I envision it as a good combination to mix with *Gelsemium rankanii* for year-round green foliage; yellow flowers in fall and spring - and the purple and yellow flowers through the summer.

- 9321 *Loropetalum chinensis* (R. Br.) Oliv. 'Blush' - "Blush Loropetalum" (Hamamelidaceae). The white-flowered species of this broadleaved evergreen shrub/tree from China, Japan and India has long been grown in southern gardens (I've seen 25' trees in Atlanta). Recently much interest has centered on new introductions with spectacular rosy magenta ("hot pink") flowers from both China - where they occur in wild populations (which some have called *L. chinensis* var. *rubrum*), and from Japan where the plant has entered commercial production. The NCSU Arboretum (now the JC Raulston Arboretum) received our first plant from noted plantsman, Dr. James Waddick of Kansas City, who collected his plant in China. We have propagated and distributed this plant as rapidly as possible, and in 1992 NCAN selected it as a special plant for their promotions and they have been distributing it to growers for trial. The U. S. National Arboretum also brought plants in, and subsequently a number of other individuals and institutions - all of whom are racing to get it into commercial production with obvious great market potential - and with a bewildering (and frightening) variety of cultivar names looming on the horizon. A paper from the US National Arboretum will appear in the near future in American Nurseryman magazine attempting to straighten out the current origin and naming situation.

There seem to be two basic forms (groups of identical or nearly identical clones) of the plant - both have nearly identical "hot pink" flowers (one dynamite cultivar name coming from the west coast is 'Sizzling Pink'). One of the two forms has purple foliage which retains its color through the year and provides a superb background to contrast with the flower color. This is the form originally received by The NCSU Arboretum (now the JC Raulston Arboretum) which is now being promoted by NCAN and which has constituted all our distributions to date. Recently it was given the cultivar name 'Burgundy' by the US National Arboretum.

The second form (which we received through the generosity of the Atlanta Botanical Garden and is being distributed here by us for the first time) has the same color flowers, but the foliage is less purple even in the early flush and quickly fades to green. The green foliage provides a different background for the flower which makes it appear "redder" to the eye although the two flower colors are almost identical when pulled off the plants and compared side by side. This form was given the cultivar name 'Blush' by the US National Arboretum. (Sigh!). Unlike the white flowered species - both of these forms tend to sporadically bloom all summer after the peak bloom in spring.

Both plants have great market potential - easy to propagate all year long, fast growing, and the eye-catching flower color stuns observers when plants are in full bloom. It will be in mass markets at the mall in gallon cans in 5 years and a lot of money will be made with this (these) crop(s). Hardiness on the new forms has not yet been tested but I suspect them to be useful in USDA Zones 7-9. I think they have great potential for development as greenhouse flowering pot plants; and a potential market exists for them grown as staked standards (or top-grafted on limbed up specimens of the older existing white species for speed in production) for patio plants, hotel display, etc. One caution - we find them a bit salt sensitive - at least when newly rooted and potted - so don't try to push them too fast with too much fertilizer too soon. Also - cutting grown plants are plagiotropic and they frustratingly produce mostly horizontal growth at first which will be a shaping problem in container production. When they are planted out in soil to develop a larger and more normal root system, they will begin to develop the normal upright shrub/tree growth (which is why grafting on field stock may speed height growth for sales). (Postscript - the market profit potential for this group and extreme interest has resulted a bewildering proliferation of named selections and renaming of existing plants for marketing purposes and we'll have a nightmare for years to come).

- 9322 *Muhlenbergia dumosa* - "Bamboo Muhly" (Graminae). A stunning ornamental grass I first saw in the gardens at Yucca Do Nursery (see #9309) in the fall of 1992 while on a Texas lecture tour. The texture and form were unique and exquisitely beautiful - and I babbled and babbled on and on (and on) about how magnificent the plant was until the owners finally gave me a shovel and allowed me to chop their plant to bits to get a piece to bring back. I felt it was the most beautiful new ornamental I saw in 1992 and certainly deserving of trial to see its potential in NC. It is a clumping-forming (no aggressive runners) grass with coarse bamboo-like stems which emerge from the ground to a height of 5' and arch out 5-7' wide like a graceful fountain of finely divided, almost gossamer-like pale green foliage. Native to Arizona and grown in California by "the grassman" John Greenlee (who grows every grass known) - but does not seem to be in eastern US culture yet. It is reputed to be a USDA Zone 8 plant - but trials are needed and mulching in winter may spread its potential use area. I've talked about it at great length in the past 8 months at various meetings and at least 3 NC nurserymen I know are getting it in production and it will be sold here in 1994. It can be propagated by division of the clumps - but more easily by seed which are available from Wild Seed, Inc., P. O. Box 27751, Tempe, AZ 85285 (602-345-0669) at \$12/1,000 seed. The large 7 gallon specimen on display at the arboretum booth at the NCAN Asheville show was produced in just 3 months from 3 single bib divisions in the container. We had intended to provide a packet of seed in this distribution but unfortunately our particular source fell through at the last minute. Luckily it can be ordered from the source above. (Postscript - has now entered the N. C. nursery trade and can be found for sale. Hardiness is better known with plants at various locations coming through the 9 year lows encountered in spring '94 - and certainly people are much better acquainted with it after watching the "hedge" of it at the front of the arboretum this spring. My enthusiasm continues - a magnificent plant!).

- 9323 *Osmanthus heterophyllus* (G. Don) P. Green 'Kembu' - "Kembu False Holly; Kembu Sweet Olive" (Oleaceae). This is a widely grown broadleaved evergreen shrub native to Japan and Taiwan with numerous cultivars in the US trade. This irregular white-variegated foliage cultivar is a Japanese selection which was introduced to the US by Brookside Gardens, Wheaton, MD. It is slow growing (even by this species standards) and will likely be a speciality hobbyist plant for those who like to collect variegated plants, for container or patio plantings, or for the southern rock garden. It roots in high percentages but does take considerably more time than most growers are used to for most broadleaved evergreen crops (allow 4-7 months). Will grow in sun or shade and is stress tolerant once established. Probably useful in USDA Zones 7-9.
- 9324 *Poncirus trifoliata* (L.) Raf. 'Flying Dragon' - "Flying Dragon Trifoliolate Orange; Contorted Hardy Orange" (Rutaceae). A monotypic genera of a deciduous shrub/tree (to 20') native to central and north China and introduced in 1850. The plant has year-round ornamental merit with bright green twigs and large spines in winter, white fragrant flowers in spring, dark shiny foliage in summer, and attractive yellow-orange fruit in autumn and winter. It is extremely stress tolerant and will grow in wet or dry, heavy or light soil in sun or light shade. This Japanese cultivar was selected for its twisting and curving branches (much like the widely grown "Harry Lauder's Walkingstick Bush") and curved spines which have great picturesque value in winter when the plant is defoliated. Relatively easy from semi-hardwood cuttings under mist in mid-summer (and it will come true from seed; a characteristic of most citrus with unusual apomictic seed production in the genus). Useful in USDA Zones 5-9. (Plants located in the contorted plant collection in the west arboretum; and in the east arboretum in the winter garden).
- 9325 *Prunus mume* Sieb. & Zucc. 'Kobai' - "Kobai Flowering Apricot" (Rosaceae). Oh no! - here comes Raulston with yet another of these promotions of the Japanese Flowering Apricot! Well, yes - it is my duty after all. But realistically it came about more by accident - we had to severely prune our parent tree of this showy, deep red-flowered cultivar - and rather than waste the wood we stuck cuttings - not expecting them to root in time, or in numbers enough for the distribution. And admittedly the cuttings are going to be marginal and need good care by recipients - they are weakly rooted and would probably benefit from potting and holding under mist to continue the rooting process. At any rate - a deciduous flowering tree to 20' from Japan with a distinctive characteristic of flowering in mid-winter with intensely fragrant flowers. This is our darkest colored cultivar. Can be propagated by softwood cuttings, or by budding on purple-leaf plum understock - very rapid growth when young. Useful in USDA Zones 6-9. Super plant!
- 9326 *Prunus serrulata* Lindl. 'Ukon' - "Ukon Japanese Flowering Cherry" (Rosaceae). One of the innumerable selections of showy flowering cherries (Sato-Zakura Group) which have been made by the Japanese of this species which was introduced there from its native habitats in China. 'Ukon' was introduced in 1905 and is distinguished by its unique color of conspicuously yellowish to greenish yellow double flowers. The Royal Horticulture Society gave it their Award of Merit in 1923 and the Award of Garden Merit in 1984. It roots very easily and quickly from softwood cuttings (we nearly had to B&B them out of the propagation bench for our packs!), and grows rapidly to a funnel-shape 20' tall by 30' wide. Probably of more speciality interest than for the mass commercial market ('Kwanzan' will probably forever unfortunately capture that audience) - but certainly a distinctive and unusual flowering tree for the landscape. Flower it in your own garden and see what you think. Useful in USDA Zones 5-9. (Located in the east arboretum just to the west of the row of loblolly pines and north of the *Cryptomeria* collection).
- 9327 *Poliiothyrsis sinensis* Oliv. - "Poliiothyrsis" (really no common name) (Flacourtiaceae). A rare (and very rarely seen even in arboreta collections) monotypic tree species from China. Reported to grow to 45' and distinguished ornamentally most by fragrant creamy-white flowers produced in late summer. Commercial potential unknown, but probably limited due to lack of propagation material (seed only - and produced only in colonies of plants where both male and female individuals exist - few fruiting individuals in the US at present), and even if produced it is so unknown and unrepresented in reference books it would be difficult to market. We received a rare shipment of seed from China and are distributing it for adaptation information and plan to try to establish a seed-producing block at The NCSU Arboretum (now the JC Raulston Arboretum) for future access should it prove to be as beautiful as the literature indicates it is. Potential use in USDA Zones 5-8? (Postscript - I like it more and more with bronzed new growth and wonderful yellow fall color seen last year at the Arnold Arboretum - where Stephen Spongberg recently published one of the first articles ever to appear on it - in the Fall issue of *Arnoldia*:32-34). Located in the west arboretum just below the zen garden.
- 9328 *Pseudolarix amabilis* (J. Nels.) Redh. - "Golden Larch" (Pinaceae). Like the above, a rare monotypic tree species from China - but in this case of more proven nature, and of more commercial potential. Experience at The NCSU Arboretum (now the JC Raulston Arboretum) has shown we cannot grow the true larches (*Larix* sp.) in the south due to root rot problems on hot, wet soils. However, the "Golden Larch" is a deciduous conifer with much the same look and character, and it has proven to grow rapidly (2-4' per year) and well in our trials. The foliage is exceptionally beautiful with lacy texture in summer, turning to brilliant yellow-gold in autumn. On fruiting age plants - the bluish-green, artichoke-shaped cones are quite ornamental. Again, it can only be propagated by seed (cold stratification required) produced from trees in colonies where cross-pollination can occur - so availability of viable seed is the limiting factor. Several tree seed distributors list *Pseudolarix* in their catalogs, and the Arnold Arboretum in Boston has large fruiting trees which produce cones with viable seed which they can collect and provide for a fee. Very beautiful and definitely deserving of more wide-spread use. (3 plants located in the deciduous conifer collection at the far southwest corner of the west arboretum; and in the conifer area in the northeast section of the east arboretum).
- 9329 *Rhodophiala bifida* (Herb.) Traub. - "Autumn Amaryllis" (Amaryllidaceae). A very rare bulb in US culture - one of about 30 species in the genera centered in southern South America (Chile, Argentina, Bolivia, and Uruguay). It was apparently introduced to the US by German immigrants coming to Texas for settlement from Argentina in the mid-late 1800's and today can often be found in magnificent old clumps on farms in the German settlement areas of Texas near San Antonio. Scott Ogden, noted plantsman of that area, introduced me to the plant some years ago and it has been a stunning performer in The NCSU Arboretum (now the JC Raulston Arboretum) since.

It produces a winter crop of foliage which disappears in late spring and the bulb remains dormant and invisible until October when 1' flowering stalks much like miniature amaryllis appear bearing the bright red flowers. Plants in Texas seem to not produce seed and they are propagated by division of the offsets on clumps - and to the best of my knowledge had never been offered for sale commercially in the US except for a few plants "collected" from Texas gardens. In the summer of 1992 - I noted bulbs at the Huntington Botanical Gardens in San Marino, CA had heavy seed production and the curator of the garden generously shared that crop with us. The seed germinate readily without treatment - and we are distributing small, first year bulblets from that seed crop for adaptation trial across the state. Bulbs will probably not bloom until 3-5 years old from seed and our distribution should probably be container grown for at least another year or two before planting in the garden. In a strange coincidence - the day before preparing this information handout I discovered that The Daffodil Mart (Rt. 3, Box 794, Gloucester, VA 23061; 1-800-ALL BULB) has this plant in their catalog for sale for the first time (\$25/10). Useful in USDA Zones 6-10.

- 9330 *Sophora affinis* Torr. & Gray - "Eve's Necklace" (Leguminosae). A small, deciduous tree normally 10-15' in height (to 25' in old native specimens). Native to Louisiana, Oklahoma and Texas with slightly fragrant pendant white to pink flowers in early summer, followed by 4" fruit with constrictions between the seeds which give the showy pod a "stringed beads" appearance - and the common name. It has not been commercially grown even in Texas where it should have good potential with its great stress tolerance (a few native plant specialists there have offered it occasionally, but basically not available without effort). We are distributing it for adaptation evaluation trial with the thought it could potentially be a very useful urban tree for planting under power lines on stressed sites - sort of a smaller version of the commonly grown *S. japonica*. A very beautiful, multiple tree planting has recently been installed at the parking lot of the Dallas Arboretum and Botanical Society for public observation. It naturally occurs on limestone soils, so long term landscape tolerance to our eastern low pH soils is unknown.

Propagation is by seed which germinate readily without treatment once they are freed from the seed pods - no small task (we are indebted to our community service workers who struggled at this job for some time to process the large of pile of pods we received). Potentially useful in USDA Zones 7-9 (6?). (We have been amused to recently distribute excess seedlings to a large Texas corporate nursery for their trials - when they are located where the plant is native!).

- 9331 *Styrax japonicum* Sieb. & Zucc. 'Crystal' - "Crystal Styrax" (Styracaceae). The Japanese styrax is relatively well known in the nursery industry and has consistently been one of the finest of small flowering trees in our trials at The NCSU Arboretum (now the JC Raulston Arboretum). It is native to China, Japan and Korea and several cultivars have recently popularized the plant in the US industry ('Carillon' - a weeping growth form; 'Pink Chimes' - the only pink-flowered member of the genus; and 'Emerald Pagoda' - a large foliage and flower form from The NCSU Arboretum (now the JC Raulston Arboretum); and others - see: Raulston, J. C. 1992. *Styrax* - A comprehensive review of a fascinating genus. *Amer. Nurserymen* 176(9):23-32, 34. Nov. 1, 1992).

'Crystal' is a seedling selection made by The NCSU Arboretum (now the JC Raulston Arboretum) from seed collected on the 1985 Korean expedition sponsored in part by NCAN, NCALCA, and NCASLA funding. It differs from other cultivars in its very dark, black-green foliage and purple pedicels which highlight the abundant crisp, small pure white flowers. The flower petal number varies from two to nine within an inflorescence. The tree has a rather upright, fastigate growth habit. Among the most important "commercial" characteristics of this plant is that it is the easiest of all the cultivars to root from softwood and semi-hardwood cuttings (very fast, easy and in high nineties percentages), and it overwinters easily without the post-rooting death problems associated with most of the other cultivars. It blooms readily as a small plant (to the point of sometimes flowering in the propagation bed) - and may also have use as a speciality flowering pot plant which could be planted out following use as a gift plant. Probable use in USDA Zones 5-9. Excellent commercial potential. (Note - also distributed in 1992 as #23 - but we felt the quality of our cuttings in that distribution was marginal; and with much better rooting this year we wanted to put it out one more time).

- 9332 *Taxus chinensis* (Pilger) Rehd. - "Chinese Yew" (Taxaceae). In northern areas, yews (*Taxus cuspidata* and *T. X media*) are among the most common of landscape plants - where they are often over-planted and misused as foundation plants. They do not perform well in most southern areas due to the sensitivity of roots to hot, poorly drained soils causing quick and severe root rot problems. In our trials, this rare Chinese species* seems well adapted to hotter areas (we have trial plants growing well in Zone 8 with 60" annual rain) and we feel it is worthy of further testing to determine its potential commercial role in the south. (*We'll not try to sort out the varied *T. celebica*, *T. mairei*, *T. speciosa*, and *T. chinensis* taxonomic questions - except to just mention here that they exist. *T. chinensis* is used by the new RHS Dictionary of Gardening reference).

This species has been easier and faster to root from cuttings than those grown in northern areas, and much faster production with up to 2-3' annual growth possible in good container culture. As with most conifers, cuttings are best from mature wood - either taken in winter, or after the spring flush of growth has hardened in mid-summer. Cuttings of this species seem to produce plants with terminal central leaders with less problems than the plagiotropic *T. X media* types - and the plants have a loose open conical shape. It is reported to reach 45' in China, and has grown well in both sun and partial shade for us. With the rapid growth, we feel it also has potential for commercial Christmas tree use with shearing to increase branching and density of growth. Probably useful in USDA Zones 6-8; with potential for testing in 5 and 9? (Located in front of the lath house just north of the entrance).

- 9333 *Tetrapanax papyrifer* (Hook.) K. Koch. - "Chinese Rice-Paper Plant" (Araliaceae). A deciduous woody plant long and widely grown throughout Asia (where it has been moved from its native site on Taiwan) for ornamental use and for manufacture of fine rice paper made from the white stem pith. It is normally seen as colonies of suckering shrubs in the 5-10' range but it can make a tree to 25' with significant trunks in sub-tropic areas. The large (1-2' diameter) foliage is dramatic and imparts a tropical feel in gardens where it is used. Commercial use has been confined mostly to Florida and California and the southern Gulf coast in USDA

Zones 8-10; with the reference book assumption that it is too tender to use in colder areas.

We have grown a colony with great ornamental beauty at The NCSU Arboretum (now the JC Raulston Arboretum) for over a decade with survival through all the record cold winters (in the winter garden area). In cold winters they do indeed freeze to the ground, but quickly regrow in summer from the roots. We feel it a dependable enough plant to recommend for commercial use in USDA Zone 7, and for experimental trial (possibly with winter mulching) in 6. Propagation is by root division in winter (or autumn seed if available). It has also proven to be an excellent cut foliage in arrangements and would have very good potential for the florist trade market. (A beautiful variegated clone reportedly exists which I have long hunted for - but it seems to not exist in Europe or the US - one of those numerous plants I deeply lust after and for which I would probably do abominable things to acquire). (Note - the new name *T. papyrifera* is that used in the new Royal Horticultural Society Dictionary of Gardening - traditionally it has been *T. papyrifera*).

- 9334 *Trochodendron aralioides* Sieb. & Zucc. - "Wheel Tree" (Trochodendraceae). A beautiful broad-leaved evergreen tree reaching 60' and native to Japan, Korea and Taiwan. The common name comes from the flower stamens which spread like the spokes of a wheel. Although well adapted to use in USDA Zones 6-9 and long in cultivation, it has never really moved into commercial culture and remains a collector/novelty plant at present. The clone being distributed here is of somewhat different shape than the normal tree-form species - with a broad spreading form. Our plant (located in the display lath house at the back) is only 8' tall and spreads to 12' in width after 12 years of growth. It will grow in both sun or shade. Propagation is by seed when available, or more likely, by semi-hardwood cuttings under mist. Growth of this selected form will probably be less than a foot a year.
- 9335 *Wisteria floribunda* (Willd.) DC. 'Mon Nishiki' ('Brocade Cloth') - "Variegated Wisteria" (Leguminosae). A novelty variegated foliage cultivar of the common wisteria which was collected in Japan and introduced by Brookside Gardens, Wheaton, MD. It emerges most showy in the cooler spring temperatures with whitish-yellowish variegation which can be quite strong and dramatic at times. In the heat of the south the variegation fades back to solid green by mid-summer; but could perhaps retain its color in cooler areas such as the Pacific northwest, England, or northern US areas. The flower color is the normal violet-blue seen on most wisteria. Probably of interest only to variegated plant crazies with little commercial use - and distributed mainly for conservation purposes to get it scattered around the country. Propagation is easy with softwood cuttings under mist in summer - and the typical widely rampant growth once established. Potential use in USDA Zones 5-9. (2 plants located in the wisteria collection on poles between the Lawrence border and the rose garden).
- 9336 *Wisteria sinensis* (Sims) Sweet. 'Caroline' - "Caroline Wisteria" (Leguminosae). Another wisteria cultivar which does have excellent commercial potential. It was selected - and introduced by Duncan & Davies Nursery in New Zealand and is being imported into the US in significant numbers at present. There does not seem to be much production of this cultivar in this country yet - and NC growers should move into production of it over the often-mislabeled and poor quality wisteria forms which dominate the commercial market at present. The D&D catalog states: "A very good Duncan & Davies selection - a superior floral form of *sinensis* with very fragrant, larger than normal deep blue-purple flowers. Very free flowering over an extended period." It has been an outstanding performer in The NCSU Arboretum (now the JC Raulston Arboretum) - with heavy flowering as a young plant. Again, propagation is easy with softwood cuttings under mist in summer. Potential use in USDA Zones 5-9.

CANDIDATES ATTEMPTED AND FAILED FOR THE 1993 DISTRIBUTION WINDOW

Least growers think all is rosy in our propagation efforts and we have none of the problems that each of you face daily - we've decided to include our failure list for plants we tried to produce for this distribution. If one figures it up - we've had only about a 60% success rate this year!

- *Buddleja davidii* 'White Harlequin' - softwood cuttings - too slow, unstable variegation which mutates, very weak plant.
- *Cedrus deodara* 'Compacta' - too few rooted (probably kept too wet) - 250 stuck; 20 plants.
- *Cornus mas* 'Spring Glow' - June softwood cuttings - rooting but too slow to make August. (75 one gallons growing).
- *Cryptomeria japonica* 'Gracilis' - winter hardwood cuttings - in bed but not rooting (cuttings taken too small).
- *Fokienia hodginsii* - winter hardwood cuttings - first flush rooted well - 125 plants not enough for NCAN; finish off for next year.
- *Gardenia* 'Klein's Hardy' - winter hardwood cuttings - well rooted - pulled for NCAN program distribution use.
- *Ilex cornuta* 'D'Or' - partially rooted & potted '92; supplement with winter cuttings - for some reason very poor rooting this time.
- *Ilex crenata* 'Rocky Creek' - winter hardwood cuttings started but not repropagated - too few for 93 - finish in 94.
- *Ilex opaca* 'Clarendon Spreading' - winter hardwood cuttings - only 30 of 250 rooted. Used for patrons.
- *Ilex opaca* 'Silver Crown' - winter hardwood cuttings - about 30 of 250 rooted. Used for patrons.
- *Indigofera gerardiana* - summer softwood cuttings - top looks good but not rooting; potted about 40 of 250 cuttings.
- *Juniperus virginiana* 'Woodlander's Weeping' - hardwood cuttings - in bed slow rooting - only about 25 of 250 rooted.
- *Lagerstroemia indica* 'Casa Flora' - 5 stock plants growing to harvest - stopped work on it.
- *Magnolia denudata* 'Forrest's Pink' - summer softwood cuttings - none rooted.
- *Magnolia stellata* 'Chrysanthemumiflora' - summer softwood cuttings - stuck, most dying - will get maybe 5 of 250 cuttings.
- *Manglietia yunnanensis* - winter hardwood cuttings - 250 taken but none rooted.
- *Osmanthus fragrans* f. *aurantiacus* - winter hardwood cuttings - in bed - too few rooted for NCAN. Used for patrons.
- *Prunus subhirtella* 'Autumnalis' - tree removed for "Chairs with a View" sculpture before cuttings taken; too few stuck to use.
- *Rhus chinensis* 'September Beauty' - only about 20 of 250 root cuttings grew. Use for patrons. (4th time we've tried this one).

- *Solanum jasminoides* 'Variegata' - softwood cuttings - 5 stock plants growing, one flush stuck; too little time; try for 94.
- *Stachyurus salicifolia* and *S. yunnanensis* - seedlings - potted but too many died of root rots to use; repropagate for 94.
- *Ulmus alata* 'Lace Parasol' - summer softwood cuttings - incorrect wood probably used; only 30 of 250 useable; try for 94.

PLANT SOURCES NEWS

We shorted this section in the last newsletter with the lengthy amount of book news. With spring planting lust and frenzy coming up - time to do a better job here. There continues an explosion of new nurseries across the country - additions here will generally be very briefly described - some seen from catalogs received, some recommended by other people or publications. The "hottest of the hottest" continue to be Heronswood, Plant Delights, and Yucca Do - truly madmen!

Bob & Brigitta Stewart, Arrowhead Alpines, P. O. Box 857, Fowlerville, MI 48836 (517-223-3581; FAX 517-223-8750). Huge list of alpines and herbaceous materials, section on ornamental grasses, and woodies.

Fairweather Gardens, P. O. Box 330, Greenwich, NJ 08323 (\$3 catalog) - phone & FAX 609-451-6261. A remarkable listing of woodies which grows daily it seems. Happy to recommend it as they visit The NCSU Arboretum (now the JC Raulston Arboretum) often to get cuttings for new introductions and have been very helpful in getting some of our new introductions out to the market first. The beautiful 1995 catalog cover features one of my favorite and most often recommended plants, *Magnolia ashei*.

Limerock Ornamental Grasses, R. D. 1, Box 111-C, Port Matilda, PA 16870 (814-692-2272) has a large listing of grasses, sedges and rushes.

In a publication from the Scott Arboretum at Swarthmore College, 3 catalogs new to me were highly recommended:

Windrose, 1093 Ackermanville Rd., PenArgyle, PA 18072-9670 (\$2 catalog)

Amber Gate, 8015 Krey Avenue, Waconia, MN 55387 (\$2 catalog)

Canyon Creek, 3527 Dry Creek Rd., Oroville, CA 95965 (\$2 catalog)

Old friends of mine who have expanded from wholesale to mail order of conifers, alpines, sedums, perennials are at Porterhowse Farms, 41370 SE Thomas Rd., Sandy, OR 97055 (\$4 catalog).

Three new bamboo firms to add to my listings include:

New England Bamboo Co., P. O. Box 358, Rockport, MA 01966 (\$2 catalog - 28 New England hardy species).

Raintree Nursery, 393B Butts Rd., Morton, WA 98356 (206-496-6400) (free catalog).

Burt Associates, P. O. Box 719, Westford, MA 01886 (508-692-3240) (\$2 catalog).

Assorted interesting looking old and new firms:

Bay View Gardens, 1201 Bay St., Santa Cruz, CA 95060 (\$2).

Carleson's Gardens, Box 305, South Salem, NY 10590 (\$3)

Eco-Gardens, P. O. Box 1227, Decatur, GA 30031 (\$2) - many Asian introductions.

Twilley Seed Co., P. O. Box 65, Trevoise, PA 19053 (free)

Select Seeds, 180 Stickney Hill Rd., Union, CT 06076 (\$3)

Thompson & Morgan, P. O. Box 1308, Jackson, NJ 08527 (free)

Klehm Nursery, 4210 N. Duncan Rd., Champaign, IL 61821-9559 (\$4)

If you are insatiable try: Garden Catalog Directory (850 mail order sources!), GSG, P. O. Box 206A, Gowanda, NY 14070-0206 (\$5.95). Also - for list of nurseries offering nursery-propagated only native plants - send SASE to Virginia Native Plant Society, P. O. Box 844, Annandale, VA 22003.

People have long asked where they can get the excellent heat tolerant lilac (*Syringa oblata* var. *dilatata*) growing in the arboretum - now available from lilac specialists, Wedge Nursery, R#2, Box 114, Albert Lea, MN 56007 (507-373-5225) (free).

Great listing of unusual fruits and nuts: Northwoods, 27635 S. Oglesby Rd., Canby, OR 97013 (503-266-5432). For a comprehensive listing of other such sources order: Fruit, Berry & Nut Inventory, Seed Saver Publications, 3076 North Winn Rd., Decorah, Iowa 52101 - astonishing list of species, cultivars and nurseries all over the U.S.!

"We offer . . . a wide selection of uncommon and appealing trees, shrubs, dwarf conifers and other plants." Mike Stansberry, Beaver Creek Nursery, 7526 Pelleaux Rd., Knoxville, TN 37938 ((615-922-3961) (free).

Owen Farms, 2951 Curve-Nankipoo Rd., Rt. #3, Box #158A, Ripley, TN 38063 (901-635-1588) (free) - 20 crepe myrtles, lots of hollies, viburnums, hydrangeas, etc.

Collector's Nursery, 16804 N.E. 102 nd. Ave., Battle Ground, WA 98604 (206-574-3832) (\$2) - (rave review in American Horticulturist).

Dilworth Nursery, 1200 Election Rd., Oxford, PA 19363 - remarkable listing of grafted conifers & other woodies.

Dominic & Octavia Carpin, Bon Air Farms, 4412 Forest Hill Ave., Richmond, VA 23225-3242 (804-233-5642) - perennials, trees, shrubs, grasses.

List of nursery sources for Abies and Chamaecyparis cvs. - Mason, P. O. Box 1771, Conway, AR 72023 (\$4.95).

BOOK AND WRITING NEWS

Good friend, Gerald Straley at the University of British Columbia Botanical Garden in Vancouver, BC, Canada, recently sent a delightful book *Crazy about Gardening: Reflections on the Sweet Seductions of a Garden* by Des Kennedy which provided several evenings of pleasure in clever word useage and the foibles of gardeners (or as Ann Lovejoy stated more eloquently in her review of the book "a horticultural Robin Williams, Des Kennedy keeps us chuckling over a series of zinging one-liners"). In a chapter on weather and a discussion of hardiness zones and climatic factors he states: "Whatever the warnings about hardiness, growers seem perversely determined to ignore them, and instead develop an exaggerated estimation of their own expertise in the matter of local microclimates. Even more dangerous is the gardener's recklessness in what is known as "pushing the hardiness zones." This manifests itself as an irrational desire to cultivate plants that cannot possibly survive local growing conditions. I think of it as a form of horticultural bungee-jumping." In my own area of woody plants I loved his chapter on trees and an introductory statement: "One of the most magnificent components of gardening, trees also offer the amateur grower the grandest opportunities for blundering on a colossal scale. Choosing the wrong species, locating it improperly, planting it incorrectly, pruning it inappropriately - a good-sized tree can easily become a monument to incompetence visible for blocks. Not to mention becoming a menace; a problem tree can blight your garden, enrage the neighbors, flatten your house, antagonize authorities, and , ultimately, skewer you on the horns of ethical dilemma." What? My innocent and beloved trees can do all that?? 282 p., ISBN 1-55110-137-8, 1994, Whitecap Books, 1086 West Third Street, North Vancouver, BC V7P 3J6 Canada.

Remarkable *Agaves and Cacti* by Park S. Nobel was offered in the December catalog from Oxford Press (1-800-230-3242); 508415-2; 180 p. \$19.95. "For at least 9000 years, agaves and cacti have been cultivated and consumed. Whether they have been used to make alcoholic beverages, eaten as fruits, turned into hallucinogens for religious rites, raised for their leaf fibers, or fed to cattle, these succulent plants have proven invaluable to many cultures." (Hey guy - you left out their ornamental landscape use!).

Hand to Earth: Andy Goldsworth Sculpture 1976-1990. Andy Goldsworthy - A Collaboration with Nature. Harry N. Abrams, Inc., Publisher. 1990;1993, 196 p. Born at Cheshire, England in 1956. There are now three books out on this astonishing artist - have never encountered a person who could flip through any of these books without being completely entranced and captivated. He does ephemeral creations from nature materials and photographs them for a permanent record - imagination that cannot be believed. Check the magic in a bookstore - WOW!

The International Camellia Register - for the hardcore specialist, definitely. How about 2,200 pages describing 32,000 species and cultivars?! Per page it's actually quite reasonable - \$100 from International Camellia Society, c/o Arthur Landry, Secretary ICS, 10522 Ferncliff Rd., Baton Rouge, LA 70815.

"It is important that students bring a certain ragamuffin barefoot irreverence to their studies; they are not here to worship what is known, but to question it." Jacob Bronowski - *The Ascent of Man* (1975).

For books on the "soul" side of gardening - look at the titles from Spring Publications, Inc., P. O. Box 222069, Dallas, TX 75222. *The Power of Trees: The Reforesting of the Soul*; *The Greening of Psychology: The Vegetable World in Myth, Dream and Healing*; *The Ecology of Imagination in Childhood*; *The Symbolic Rose*; and *The Thought of the Heart and the Soul of the World*.