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Cover: Myrciaria cauliflora (jaboticaba) nursery stock designed and planted in this container three years ago. Photo: P. Chvany.
Subtropical Bonsai for Indoor Gardening

by Constance Tortorici Derderian

Traditional bonsai are trained hardy trees and shrubs grown in classic containers on shelves or benches and brought indoors to be enjoyed for a day or two, then returned to the growing area. In winter they require dormancy, as do the same species growing in the ground. If one has succumbed to the charm of these miniatures of nature and one lives in a cold climate, winter is a time of parting, for the bonsai must go into a cold frame or other storage place until spring.

Happily, such deprivation is no longer necessary because bonsai enthusiasts have discovered a new challenge: growing subtropical trees and shrubs in containers indoors, at all seasons if desired.

The purpose of this article is to provide an introduction, rather than a detailed guide, to this new facet of the ancient art. Anyone experienced with hardy materials will find subtropicals a "breeze" to work with. They require a much shorter period to develop from potted tree to bonsai; in two years of training a specimen can be developed that would take four or more years with the use of hardy material. If one starts with nursery stock, it is not so risky to cut back large-sized plants, and because subtropicals have comparatively shallow root systems, they adapt well to shallow pot culture. Surface roots develop nicely because they are growing almost twelve months of the year; branches thicken and form fine twigs sooner because growing and pinching also are continuous.

As a group subtropical material is more colorful than hardy material. Many of the trees and shrubs produce showy blossoms, some blooming more than once a year, or even constantly. Among frequent bloomers are Malpighia, Calliandra, the jasmines, and Serissa foetida, known as the snow rose in the south.

In addition to flowering trees and shrubs, some also produce fruit that is a delight to see. Outstanding in this category are some of the citrus family; Punica granatum nana, bearing perfect miniature pomegranates; Carissa grandiflora, with edible
fruits preceded by very fragrant blossoms; Severinia buxifolia, which develops interesting black fruits; and Triphasia triphylla, offering scented white flowers followed by tiny, lime-shaped fruits.

Bark and leaf forms also are appealing in color and variety. Bark color ranges from almost white to almost black; texture can be spongy to “hard as nails.” In appearance bark can have a matte finish or a high shine, and its character is evident as soon as one year of growth in a seedling.

Melaleuca quinquenervia, cork tree or punk tree, has a bark so spongy that a flying golf ball will penetrate it an inch or more. The bark is matte creamy-beige and shaggy in appearance. Bright red-brown, shiny, and peeling a little in a very thin layer is the bark of the gumbo limbo, (Bursera simaruba); that of the Malpighia coccigera is the more familiar dark brown,
Above: Bark, blossom, and leaves of Malpighia coccigera.
Right: Bark of Myrciaria cauliflora. Photos: P. Chvany.
Punica granatum nana fruit. Photo: P. Chvany.
Malpighia coccigera — 8 inches tall, grown as a bonsai for fifteen years. Branch on right allowed to grow out of proportion to thicken as it replaces original one that was broken accidentally. Photo: P. Chvany.

and lightly furrowed like our hardy trees. *Malpighia punicifolia* has tiny white, birchlike horizontal markings that are interesting in a group planting. Little known because it is on the list of protected trees is holywood or lignum-vitae (*Guaiacum*), with bark that is almost white and rough in texture. The wood is so hard that it will sink in water. A tree with mottled bark is jaboticaba (*Myrciaria cauliflora*). Whereas the bark on a four-year-old *Stewartia* shows no variation of color, a four-year-old jaboticaba shows all the colors of an adult tree.

Some subtropicals have foliage as interesting as flowers. First among these is the *Malpighia coccigera* or Singapore holly which bears at the same time spiny, holly-shaped leaves and smooth-edged oval ones, both very shiny deep green. *Breynia distica*, called Jacob's coat, has leaves of many colors; they are mottled in shades of red, white and green. The leaf of *Hibiscus rosa-sinensis* 'Snow Queen' is light gray-green in the center with a white border tinged all around with pink. *Serissa foetida variegata* has tiny creamy-white rimmed, dark green leaves. From a distance it looks as if it were in bloom.

*Pithecellobium brevifolium*, commonly called ebony, has a light green compound leaf with leaflets so small that the tree has a feathery, fernlike appearance. *Acacia baileyana* has a
similar leaf but it is bluish-green and silvery underneath. The foliage of Sparmannia, African hemp, is shaped like a maple leaf, but is fuzzy and yellow-green. Even some of the very large-leaved trees like Grevillea and Jacaranda can make acceptable bonsai because the leaves are deeply cut and light in feeling.

The same general rules for selecting hardy bonsai materials apply to the subtropicals. Choose plants with small leaves and short internodes. If possible, avoid grafted material because it usually has ugly swellings on the trunk. In the south one often finds nursery stock has been grafted on nematode resistant roots. For example, Gardenia radicans is grafted on Gardenia jasminoides stock; Gardenia radicans is very desirable for bonsai because it has small leaves and small flowers. If there is no choice and the graft is well done or can be concealed neatly, the design of the bonsai may not be ruined.

Since subtropicals are in bloom frequently, choose plants with small flowers so that the proportions of the bonsai will not
be destroyed. Hardy material blooms for such a short period that this selectivity is not always a requirement.

As with all the rules in bonsai, there are exceptions. Plants with compound leaves usually are avoided in hardy bonsai; in subtropical material there are too many to pass over. Therefore, one should simply choose the smallest leaved plants and work with them to see if bonsai techniques will reduce the leaf sufficiently to keep the overall tree in proportion. *Pithecellobium* and *Acacia*, for example, work well for small bonsai. *Grevillea* and *Jacaranda* would have to be large bonsai; be sure you have room for them.

The greatest satisfaction comes from hunting subtropical bonsai material in the wild, which is considerably easier than hunting for hardy trees. The ground is never hard (except when the digging is in coral rock), and the weather is warm.
Calliandra haematocephala nana — nursery stock planted in cascade style and overpotted to allow growth to thicken trunk and branches. In the meanwhile the composition is pleasing; note blossoms. In this container four months. Photo: P. Chvany.
Trachelospermum — 12 inches overall; grown seven years as a bonsai; blooms well. Photo: P. Chvany.

Carissa grandiflora from a cutting. Grown as a mame over ten years. Has never fruited or flowered although its parent did. Foliage is one-fifth normal size. Height is 8 inches. Photo: P. Chvany.
Learn the optimum time for collecting the material desired as well as what equipment will be needed. Keep the collected trees very moist until well-established to insure success. One should not bring material from the southern states to the north unless it has been inspected and approved by the U.S.D.A., by the way.

In the northeast, subtropical material is not so readily available, but prowling the nurseries and flower shops is half the fun for bonsai enthusiasts. With the increased interest in indoor gardening under lights, the variety in the commercial establishments is growing, and a wider selection is appearing.

There are a few plants that are especially amateur-resistant and therefore satisfactory as a beginner's bonsai. Calliandra, powder puff plant, has red feathery blossoms shaped like a semihemisphere. They burst forth from a bud shaped like a red raspberry, and the leaf is compound. The plant responds well to top and root pruning and will blossom sporadically all winter — the number of blossoms depending upon the amount of light. In a north window with no sun there will be one to six or more at a time; in an east or south window the bonsai will be covered with blooms.

Exotic, modern in appearance, and altogether appealing is the sea grape, (Coccoloba uvifera). It is grown for its leaves, which are reddish in color when they first come out, later turning a deep green and then bright red and yellow before they drop. In the south the first crop of leaves is cut off to cause the second to be smaller; in New England the normal light in winter is weak and short in duration so that the leaves grow small and in good proportion. The sea grape is tolerant of poor light and dry soil.

The genus Ficus provides a whole range of rugged bonsai for beginners. The plants are fast growers and soon produce the effect of a mature tree. They are also tolerant of poor soil, poor light, and poor humidity.

Again, Malpighia must be mentioned — both M. coccigera and M. punicifolia, the latter having a perseverance that is a comfort to the novice. Even when a specimen has been defoliated due to desiccation, placement in the shade and careful watering will induce new growth.

Nicodemia diversifolia with its oak-shaped leaves is easy to grow, but attention to its shaping must be given.

When explaining that bonsai are made from trees and shrubs one should also mention vines, for they, too, are woody-stemmed plants. Although many subtropical vines have blos-
soms that are too large for bonsai (blossoms and fruit do not reduce in size even though the leaves do), there are many desirable materials from which interesting specimens can be made.

Among these are *Trachelospermum* (confederate jasmine) and *Clerodendron*, which have attractive growth patterns, foliage, and flowers; *Hedera helix* and *Ficus repens*, which make handsome mame (mah-may) bonsai — miniature trees not more than six inches overall. *Trachelospermum* grows slowly and has fragrant blooms occasionally; should its shape be neglected, it responds to a few snips or a severe pruning. *Hedera helix* has one major problem: the initial pruning. Once a plant is found with a sufficiently large trunk, it is very difficult to cut away the luxuriant long growth that such a specimen would have!

Spectacular in bloom is bougainvillea. It does require attention to its needs, however, and must be warm and dry to produce flowers.
In designing bonsai the ideal is to represent nature in miniature. Neither grotesque forms nor unnatural designs are acceptable to modern bonsai enthusiasts. (In ancient times creators of bonsai exaggerated the twisted trunks beyond those found in nature, and the practice was encouraged by the approval of a royal personage upon a visit to a nursery.) But styling a bonsai to the same form found in nature is not always practical. Formal upright style is represented by the araucarias which, although good house plants, are difficult to reproduce in miniature. *Taxodium distichum* will make a magnificent formal upright bonsai, but it requires a cooler winter than summer even though indoors. To have a bonsai of this design one may substitute compatible material that is easier to shape, such as *Eugenia myrtifolia*, *Ficus nerifolia regularis*, or *Ulmus parvifolia*.

Informal upright and slanting styles are most often seen in nature and are the easiest to duplicate as bonsai. Under slanting style is windswept style and one can have fun with it in deciding “how the wind is blowing” and which way the tree will lean. If the “wind” gets out of hand the result may be a semi-cascade style. Cascade style trees do not grow in nature in the south. The closest to cascade would be a vine that has traveled as far upward as it can and then begins to grow downward. Plants other than vines that lend themselves to cascade styles are *Calliandra*, *Carissa*, *Gardenia*, *Lantana*, *Serissa*, and juniper.

Driftwood style is found mostly along the shores where trees have survived the struggle against storms; inland, with few exceptions, they decay and soon disappear if damaged. *Conocarpus erectus*, *Jacquinia keyensis* and *Taxodium distichum* are good subjects for this style, for the wood is slow to deteriorate and “silvers” nicely.

Spring is always the best time to pot up hardy bonsai. Subtropicals (with exceptions) can be started successfully throughout the year at the grower’s convenience. Naturally, heavy pruning of the top must be done when the roots are severely cut back; after that, light pruning and pinching of branches and twigs can take place at any time, as can wiring. (It may be prudent to paper-tape the wire, for many subtropical plants have tender bark.) Established subtropical bonsai have two periods of strong growth: spring and fall. Reshaping and heavy top pruning should be done before these periods.

Style dictates the shape and depth of the container used. Shallow round, oval, or rectangular trays are most appropriate since they are complementary to the informal upright and
slanting styles of subtropicals. Cascade and semicascade styles, of course, require a deep container for balance.

Even though the tray is shallow, a free-draining soil is very important. Subtropical bonsai, with rare exceptions, prefer a light humus and sand-soil mixture slightly acid to neutral. Watering is simplified under these conditions; generally, a heavy application once a day should suffice. In the dark winter months as the light and temperature decrease, reduce watering; except for the mames it is even possible to skip a day.

With heavy watering of a small amount of soil, a regular program of fertilization is advisable to replace the nutrients that have leached out. Frequent but VERY dilute applications of an all-purpose product are recommended.

Ficus neriifolia regularis — five-tree grove planted six years ago from nursery stock. Height is 22 inches. Photo: P. Chvany.
Ficus benjamina — from nursery stock grown as a bonsai fifteen years. Height is 28 inches. Note surface roots. Photo: P. Chvany.
Above: Ficus neriifolia regularis. Cuttings newly planted to make a mame group planting.

Below: Pinus halepensis. Both plants grown from seed six years ago; the right one as a bonsai for four years. Photos: P. Chvany.
The familiar indoor pests — mealy bug, scale, spider mites, etc. — will attack subtropical bonsai, but unless the air is very still and very hot, it is possible for the plants to go through the winter without trouble. If infestations do occur, they may be dealt with in the usual manner by spraying with insecticides. This is not always practical in a house or small apartment, however. A simple solution is to use a 1/2-inch-wide soft paint brush dipped in alcohol to brush the entire plant trunk, branches and both sides of the leaves; then rinse off under a spray of water. (The surface of the soil should be covered with plastic during this operation.) An alternative is to wash the plant with soapy water. In case of heavy infestation, both treatments can be used consecutively.

It is possible to leave these small gems of horticulture untended for a few days if precautions are taken to prevent desiccation. The easiest procedure is to water and drain each bonsai thoroughly and enclose it in a plastic bag placed out of the sun; that will keep it from three to five days. Or water the bonsai thoroughly and set it in a tray filled with 1/2 to 1 inch of water. The plant will be sitting in it for only a day; in three days the water will have evaporated and the bonsai will be drying. Alternatively, if the thermostat is lowered and the shades drawn, the plant will not use much water and can wait forty-eight hours for its next application.

A way to determine if there is sufficient light to grow bonsai indoors is to photograph the growing area with a simple Instamatic or similar camera, and film normally used for outdoor photography. If there is no image when the film is developed, there is not enough light; conversely, the better the photograph, the better the growing conditions.

Small subtropical bonsai — those about 14 inches or less — grow well under fluorescent lights. Taller bonsai require more complicated light systems to assure good light on the lower branches. A combination of good natural light, plus artificial light to lengthen the day, has proved to be most productive of good plant health and blossom.

A dear friend and accomplished horticulturist recently said to me, "I've always considered bonsai the chamber music of horticulture and up to now I've not been ready to get into that." When one finds one's self "into that," the return is immeasurable in new interests, pleasurable activity, visual delights, and satisfaction to the soul.

Constance Derderian is Honorary Curator of the Bonsai Collection at the Arnold Arboretum.
Top: Jacquinia keyensis — collected in 1972. Has very brittle branches; still breaking with leaves from wood that seemed dead.

Below: Ficus aurea — 3½ inches high planted in the rock two years.

Photos: Deborah Thompson
Subtropical Plants Suitable for Indoor Bonsai

These are plants with which I have had from two to fifteen years of experience. The list of possible subtropical material is almost endless.

1 — do very well in normal house conditions
2 — adapt easily
3 — need careful attention
4 — difficult requirements

4 Acacia baileyana (golden mimosa) — wants cool growing temperatures
3 Acacia farnesiana — will adapt to warm temperatures
3 Bougainvillea spp. — will drop leaves if too wet or too cold
2 Breynia distictia var. roseopicta (Jacob’s coat) — needs sun for best leaf coloration
2 Bucida spinosa (black olive) — water well, root prune quickly and lightly
2 Buxus japonica (boxwood) — keep in cool spot, root prune lightly
2 Buxus microphylla nana — do not overwater or overfertilize
1 Calliandra haematocephala and C. h. nana (powder puff plant) leaves fold at night
3 Camellia sasanqua — depending on variety blooms Oct. to Feb. in cool temperatures
2 Carissa grandiflora (Natal plum) — resents heavy root pruning
3 Citrus spp. (calamondin, marco orange, meyer lemon, grapefruit)
1 Clerodendron thomsonae (glorybower) — keep well watered
1 Coccoloba uvifera (sea grape) — do not overwater or overfertilize, likes alkaline soil
1 Conocarpus erectus (buttonwood) — water well, tend to pinching
2 Cuphea hyssopifolia — needs sun for bloom
1 Eugenia myrtifolia (brush cherry) — grows quickly, easy to shape
1 Eugenia uniflora — full sun for edible fruit
3 Eurya japonica — keep warm and well-drained
1 Ficus aurea (strangler fig) — tolerant of heat and dryness, leaf reduces drastically
1 Ficus benjamina (weeping fig) — will develop aerial roots
1 Ficus diversifolia (mistletoe fig)
1 Ficus neriifolia regularis — responds well to heavy pruning of top
1 Ficus pumila minima — very slow but worthwhile
1 Ficus retusa nitida — tolerant of poor light
3 Galphimia gracilis — shape by pruning; brittle
2 Gardenia jasminoides nana — uniform temperature and moisture
2 Gardenia radicans — will grow in window without sun
1 Guaiacum officinale (lignum vitae) — grow warm and in full sun for truly blue flowers
1 Hedera helix (English ivy)
2 Hibiscus rosa-sinensis ‘Snow Queen’ — do not overwater; full sun for best leaf color
2 *Ilex vomitoria* (Yaupon holly) — wire carefully; prune roots lightly; pot up quickly
2 *Ixora* spp. — acid soil, tolerant of poor light but needs sun for full bloom
3 *Jacaranda* spp. — difficult to achieve lavender-blue flowers on terminals
3 *Jacquinia keyensis* (joewood) — collected only. Keep roots damp, pot quickly
2 *Jasminum dichotomum* (pinwheel jasmine) — stands pruning well
2 *Jasminum pubescens* (star jasmine) — keep warm, moist, and in good light
3 *Juniperus chinensis sargentii* — best in cool temperatures, pinch carefully
2 *Juniperus procumbens nana* — stands heavy pruning; keep foliage thinned out
3 *Lagerstroemia indica* (crapemyrtle) — keep moist and in good light for bloom. Adapts to any style.
2 *Lantana* spp. — brittle to wire, easy to shape by pinching
4 *Leptospermum scoparium* (tea tree) — resents heavy root pruning
2 *Ligustrum japonicum* (Japanese privet) — wants neutral to alkaline soil; easy to shape
1 *Malpighia coccigera* (Singapore holly) — burns in sun; do not keep wet
1 *Malpighia punicifolia* — when a twig breaks it heals and grows if not severed
2 *Melaleuca quinquenervia* (cork tree) — stands heavy top and root pruning
2 *Myrciaria cauliflora* (jaboticaba) — fertilize carefully to prevent yellow leaves; needs sun for its edible fruit
2 *Olea europaea* (olive) — tolerant of heat and dryness
2 *Pinus elliottii* (slash pine) — needles do reduce; start with young plant
1 *Pinus halepensis* (Aleppo pine) — tolerant of heat and dryness; do not repot often
1 *Pithecellobium brevifolium* (ebony) — best shaped by pruning
2 *Pittosporum tobira* — best shaped by pruning because of growth pattern
2 *Podocarpus macrophylla* 'Maki' (southern yew) — root prune carefully; responds well to top pruning
1 *Punica granatum nana* (dwarf pomegranate) — tend to pinching
1 *Pyracantha angustifolia* — likes alkaline soil; tolerant of dryness
4 *Quercus nigra* — same as *Q. virginiana*, water well
4 *Quercus virginiana* (live oak) — start with young plant; do not repot often, and root prune very lightly
2 *Raphiolepis indica* (Indian hawthorn) — slow grower; brittle to wire
3 *Rhododendron indicum* (azalea) — 'Coral Bells' (Kurume) an excellent variety
2 *Serissa foetida* (snow rose) — tend to pinching, do not overfertilize
2 *Serissa foetida variegata* — tolerant of poor light but becomes leggy if grown too dark; tend to pinching for shape
1 *Severinia buxifolia* — very brittle to wire
1 *Sparmannia africana* (African hemp) — grows quickly, shapes easily by pinching
4 *Taxodium distichum* (bald cypress) — needs a cool and dry period to lose foliage, then plenty of water to grow
1 *Trachelospermum jasminoides* (confederate jasmine) — pinch out vining growth
1 *Triphasia triphylla* (limeberry) — keep warm, well watered; watch for wire cuts
2 *Ulmus parvifolia sempervirens* (evergreen or Chinese elm) — good shallow root system
1 *Vitis munsoniana* (bird grape) — fast grower, tolerant of poor light and heat
Bibliography

Jenkins, Dorothy H and Wilson, Helen Van Pelt. 1954. House Plants for Every Window Barrows, New York.

A fine, old specimen of Sassafras growing in Dorchester, Mass. The picturesque, craggy crown is typical of mature trees of this species.

Photo: R. Weaver.
Sassafras: A Neglected Native Ornamental

by Richard E. Weaver, Jr.

One of Boston’s fine old trees is the specimen of Sassafras (Sassafras albidum) pictured on the opposite page. It is growing in the front yard of a home owned by Mrs. B. Carney at 153 Savin Hill Avenue, Dorchester, and it measures 43 feet in height with a trunk circumference of 6 feet, 5 inches. Although little is known of its history, the tree is certainly more than a hundred years old.

Sassafras is a common and familiar tree throughout most of the eastern half of the United States, from southern Maine west to Iowa and south to Florida and Texas. The picturesque common (and generic) name is of obscure origin, but it was used by the French settlers in Florida as early as the sixteenth century. The tree is characteristically a plant of forest margins and clearings, but it also is often somewhat weedy, appearing in old fields, hedgerows, and along roadsides where it rapidly forms clumps by means of suckers and stolons. It is often thought of as being a rather small tree, but in the southern part of its range it occasionally reaches considerable size. The largest specimen on record (American Forests 75(2):24. 1969), growing in Owensboro, Kentucky, is 100 feet tall with a trunk circumference of 17 feet, 3 inches. Therefore the tree featured in this article is rather a small one in comparison to the “national champion,” but still an exceptional specimen considering that it is growing in an urban environment near the northern limit of the species’ hardiness range. Still, it is by no means the largest tree of its species in Massachusetts. That distinction goes to a specimen in East Taunton with a height of 56 feet and a trunk circumference of 9 feet, 10 inches. An even larger one, long since gone, was reported (Russell, G. W. 1886. Gardener’s Monthly 28: 22.) to have grown in West Cambridge in the mid-nineteenth century.
Sassafras, with one American and two Asiatic species, is a member of the Laurel Family, a large group of primarily tropical woody plants; several genera are native to the United States, but the only other representative in the New England flora is the Spicebush (*Lindera benzoin*). The family is named for the Grecian Laurel, *Laurus nobilis*, of the Mediterranean region (not to be confused with the native Mountain Laurel, a member of the Heath Family or Ericaceae), the leaves of which are the source of the bay leaf used as a seasoning in cooking. The leaves, stems, and/or bark of most members of the Laurel Family contain pleasant-smelling oils, and therefore are strongly aromatic when crushed or scraped. These oils are distilled from the wood of *Cinnamomum camphora*, an Asiatic member of the family, to produce the camphor of commerce: the dried bark of another species of *Cinnamomum* yields the spice cinnamon.

Various parts of the Sassafras tree also give off a spicy fragrance when crushed, and the oil distilled from the bark of the roots has been used commercially as a flavoring in candies, medicines, and soft drinks, such as root beer and sarsaparilla, and as a perfume in soaps. The oil also has mild antiseptic qualities, and it was used in dentistry as a disinfectant of root canals. In addition, a tea brewed from the roots and served either hot or cold, has long been a popular drink in rural areas of this country, both as a refreshment and as a "spring tonic."

The healing qualities of Sassafras were once believed to be quite considerable. As early as 1574, soon after the tree's discovery, various extracts were hailed as a virtual panacea, and they commanded high prices in Europe. Several expeditions were sent to the New World with the express purpose, among others, of collecting Sassafras. Among these was the voyage of Bartholomew Gosnold and Bartholomew Gilbert in 1602, one of the earliest to the coast of New England. Good accounts of this fascinating aspect of our history may be found in the following: Carroll, C. F. 1973. The timber economy of New England. Brown University Press, Providence, pp. 42-44; and Randall, C. E. 1964. A toast to a tree. American Forests 70(5): 22-24; 42.

Eventually Sassafras fell into disrepute as a panacea, and recently oil of sassafras actually has been found to be potentially hazardous. Experiments carried out by Lehman (Assoc. Food Drug Officials U.S., Quart. Bull. 25: 194. 1961.) under the auspices of the United States Food and Drug Administration, found that if safrol, one of the primary constituents of
Foliage, male flowers (#1), female flowers (#2), and fruits of Sassafras albidum. From Michaux, F.A. 1818. The North American Sylva, vol. 2, plate 81 (as Laurus sassafras).
the oil, were fed to rats in large quantity, they developed liver
cancer, and if fed in smaller quantities, it produced other, non-
cancerous damage. And, as reported in the 25th edition of the
Dispensatory of the U.S.A. (1955), safrol, if taken in sufficient
dose, quickly kills by paralysis of respiration; lesser doses cause
death by "widespread fatty deterioration of the heart, liver,
kidneys, etc." The same reference also reports, from the De-
cember 1888 Cincinnatti Lancet-Clinic, that a teaspoon of the
oil itself "... produced in a young man vomiting, collapse,
somewhat dilated pupils, and pronounced stupor." The FDA,
as a result, placed a ban on sassafras oil in 1960.

Sassafras lumber has never been of commercial importance,
partly because trees of timbering size are few and far between
and partly because the wood is brittle and coarse-grained. How-
ever, since it is quite resistant to rot and it shrinks very little
upon drying, the wood has been used for fence rails, railroad
ties, buckets, barrels, and small boats.

Even though its wood is weak, its healing powers mostly fa-
bale, and its oil a potential hazard, Sassafras is still a useful tree
and a very beautiful one as well. Few of our native trees have
so many ornamental qualities and yet are so infrequently culti-
vated.

Sassafras is attractive at all seasons. The yellow-green flow-
ers appear in the springtime before the leaves, in late April or
early May at the Arnold Arboretum, and although individually
they are not showy, a tree in full bloom is pleasing, giving about
the same effect as a Norway Maple, Spicebush, or Cornelian
Cherry. The leaves are a fresh yellowish-green during the sum-
mer, and they are unusual in that basically three different types
are found on an individual tree (see illustration). The fruits
are of a type unique to the Laurel Family. Those of Sassafras
resemble a small dark blue cherry perched atop a red stalk-
like structure reminiscent of the shape of a golf-tee. The
fruits, though attractive, are seldom seen for several reasons:
(1) Sassafras trees are basically either male or female, as in
hollies, so not all individuals produce fruit; (2) fruit produc-
tion is evidently sporadic, even in basically female trees; and
(3) the fruits are eaten by a variety of bird species as soon as
they ripen. The color and the effect of the fall foliage is about
as spectacular as that of any tree, the leaves typically turning
orange with tints of yellow, red, and salmon, and for this rea-
on alone the tree deserves more recognition as an ornamental.
Finally, Sassafras is attractive even in the winter with its bright
green twigs and picturesque profile. In younger individuals,
the branches are horizontal with upturned tips, while older specimens, like the one pictured here, develop a rugged, craggy crown.

Little information is available on the behavior of Sassafras in cultivation. It has not been used as a street tree to any appreciable extent, so it is not known whether or not it would be a suitable species for this purpose. The fact that such a large apparently healthy specimen is present in Dorchester, however, suggests that it will tolerate urban conditions. Sassafras apparently prefers acidic, sandy, well-drained soils, but I have seen it growing perfectly well in heavy limestone soils. It is not susceptible to any serious diseases, and the Japanese Beetle is its only major insect pest. The larvae of several other species do feed on the leaves of the tree, causing but minor damage, but this may not be an unfavorable attribute since two of them, the Spicebush Swallowtail and the Prometheus Moth, are among our more attractive insects.

Sassafras is somewhat difficult to propagate and definitely difficult to transplant, perhaps helping to explain why it is not more frequently cultivated. According to Mr. Alfred Fordham, Propagator at the Arnold Arboretum, the seeds germinate readily if stratified when fresh, but they are seldom available in large quantities. Propagation by cuttings is difficult if not impossible, unless the cuttings are taken from sucker shoots. The root system is extensive and the roots themselves are fleshy; only seedlings or small saplings can be successfully transplanted as a rule. But perhaps with the ascendancy of sophisticated containerized growing by nurseries, the Sassafras, one of our most ornamental native trees, will become more readily available to the horticultural public.
Small Shrubs with Noteworthy Winter Bark

by Margo W. Reynolds

The homeowner with a large expanse of land has the opportunity to experiment somewhat and develop separate areas devoted to specific genera of perennials, showy shrubs and the like. In a small garden, because of its limited size, all things must be rolled into one. If done well, with forethought and careful planning, it can have nearly as much variety as its larger counterpart without sacrificing style or aesthetics.

Since numbers of plants must of necessity be restricted, it is important to select those that can fulfill multiple purposes. Shrubs planted solely for their flowers, fruits or form are too limiting for the small garden. Every attempt should be made to seek out materials that have a combination of attributes—good form plus fragrant flowers, attractive fruits as well as eye-catching blossoms, low maintenance with fruit tempting to birds, etc.

Toward that end, this article proposes to present shrubs that, in addition to other primary attributes, have the secondary characteristic of interesting bark to recommend them. Since bark, for the most part, is not readily discernible until the leaves have fallen off in the autumn, these plants are especially valuable in the winter landscape. Inexperienced gardeners, if they think of the winter garden at all, think of it as the dull period that follows autumn’s foliage extravaganza and precedes spring’s bulb display. Adding a few shrubs such as these to the garden could make it an object of year-round interest rather than “just another garden.”

Shrubs With Red Winter Color

A number of shrubs exhibiting a characteristic red winter bark are suitable for planting in the small garden. Space dictates that we limit these to only a few, and the ones selected
are some of the best. The selection includes both upright shrubs and groundcovers, evergreens and deciduous specimens, plants with prominent floral displays, and those with inconspicuous flowers. Certainly there should be something for everyone.

**Dogwood.** As a group, shrubby dogwoods afford some of winter's most attractive colors. There are at least ten species that could be used, but, undoubtedly, the most spectacular of the group is *Cornus alba* 'Sibirica', the Siberian Dogwood. With a maximum height of 9 feet, it can be used as either a prominent specimen shrub in a moist area or as a backdrop for lower growing dwarf conifers. Its twigs reach maximum coloration in winter when they become a lovely coral-red.

Faster growing than the Siberian Dogwood but equally at home in moist locations is *Cornus sericea*, commonly known as Red Osier Dogwood. The winter twigs of the species are a brilliant red and when seen "en masse" they almost appear as a sheet of flame. Two varieties exhibiting differing twig colors are also available. *Cornus sericea* 'Flaviramea' colors yellow and *C. sericea* 'Nitida' is green. Because they spread rapidly by underground stolons, this species and its varieties are especially suited to bank plantings where they succeed in checking erosion.
Rose. Among red-twigged shrubs, some of the roses present themselves as possibilities. Many have a dull or dark red bark that is perfectly satisfactory in the winter landscape. There are several, however, whose coloring is a more glossy red, and one of these is *Rosa virginiana*, the Virginia Rose. Indeed, as an all-round rose in general, this is certainly one of the best. Flowers appear in late spring, followed by good summer foliage, blazing autumn color and fruits, and brilliant red twigs in the fall. It attains a height of approximately 6 feet and is most effectively used as an informal barrier hedge. A vigorous growth habit requires that this shrub be kept under restraint in the small garden, but if cut to the ground every few years or so it grows back into a handsome specimen in no time at all.

Willow. Once seen, it is difficult to forget the graceful weeping willow with its long, slender yellow branches gently raking the ground in the breeze. One of the most handsome willows by far is *Salix alba* ‘Chermesina’, the Redstem Willow. If left to mature into a tree this will reach a height of 75 feet, but if cut back frequently and regularly it can be maintained as a good-sized shrub with conspicuous, vibrant red-orange twigs. As a tree its color is considerably less pronounced. Like all willows it prefers moist soil, but beware of planting near septic lines or drainage pipes. A very invasive root system has the tendency to clog the pipes and cause problems.

Green-Twigged Shrubs

Broom. Two of the most attractive green-twigged shrubs belong to the same genus — *Cytisus*. Commonly called “brooms” because of the use to which they were put in centuries past, these relatives of the pea maintain a uniform green all winter, giving them an evergreen look. Add to this the fact that they are lovely in flower, have small, dainty leaves, and are virtually insect and pest free and it is understandable why so many people have developed an affection for these plants. They are not terribly fussy as to site requirements and actually prefer a poor, dry, sandy soil with good sun. Two of the very best are *Cytisus × praecox* and *Cytisus scoparius*.

The former, the Warminster Broom, is more reliably hardy in New England than the Scotch Broom (*C. scoparius*), although the latter has managed to naturalize itself on Cape Cod and Nantucket. Pale yellow flowers cover the 6-foot Warminster Broom in profusion each May, making this one of the first brooms to flower each spring.
Cytisus scoparius, up to 9 feet, is slightly taller and offers hybrids with great variation in flower color.

Shrubs With Exfoliating Bark

Plants with exfoliating bark are among the most eye-catching in the white world of winter. Whether the bark peels off in long, thin strips, as on the White Birch, or in small, irregular patches as it does on the Stewartias, the contrasts and color tones between the layers are unparalleled for visual interest.

Stewartia. Although most Stewartias fall into the tree category, the Showy Stewartia (Stewartia ovata grandiflora), at 15 feet, is worthy of inclusion in the small lot. In addition to tree bark, which on older trees flakes off in irregular patches exposing lighter colors beneath, there are the flowers and autumn color to consider. The large (4-inch diameter) white flowers are extremely showy with very attractive purple stamens, and the foliage colors up to a distinctive orange in fall. Devoid of leaves in the winter, the Showy Stewartia nonetheless remains prominent in the landscape because of its very distinctive bark. An excellent small tree accent plant, it is not reliably hardy north of southern New England.

St.-John's-Wort. Hypericum prolificum (Shrubby St.-John's-Wort) is one of the taller of these woody shrubs at 3-4 feet. It is a vigorous grower and forms a rounded mound covered with yellow flowers and glossy green leaves. Like the brooms, most Hypericums will do well in a dry, sandy soil with plenty of sun. The bark is a cinnamon-like red-brown that separates readily into masses of thin scales.

Curious Barks

Euonymus. The Winged Euonymus (Euonymus alatus) is one of the hardiest of all Euonymus species. It reaches a maximum of 9 feet and has ornamental value for several reasons. Its autumn color is a vivid scarlet, suggesting its other common name — Burningbush. It is often noticeable in the autumn in highway plantings along major roadsides.

The twigs are covered all over with a corky growth that lends this shrub an aura of the exotic. Although not as visible from the distance as the shrubs with colored twigs, Winged Euonymus still merits planting if only because it is somewhat unusual. It makes an excellent hedge as well as a specimen shrub. Be forewarned, however, that all Euonymus are susceptible to se-
rious infestations of scale. The vine types are attacked more frequently, but all species should be carefully watched for signs of the pest.

A few notes on cultural practices necessary for the maintenance of optimum color are in order here. As many of these shrubs mature and grow older, the glossy, vibrant twig coloration displayed in their youth tends to grow dull and almost disappear. Heavy pruning annually in the early spring generally results in the vigorous production of new young shoots that will color up nicely by winter. Oftentimes it is entirely in order to cut a rank, overgrown shrub right down to the ground in order to stimulate new shoot growth. In most of the above-mentioned shrubs, resurging growth develops quickly and in the *Rosa virginiana*, for example, it will have achieved a lovely form only two years after being cut down.

As is the case with autumn foliage coloration, twig coloration is dependent upon sunlight and reasonably good soil. The addition of a nitrogenous fertilizer to the soil is an additional factor often spelling the difference between adequate and superlative coloration.

The list of plants with interesting bark is a fascinating one and could go on almost endlessly. For the person with a small property and the desire to cultivate a winter garden, the above suggestions are listed as mere starting points. The scope and aesthetics of plants with winter appeal are limitless and certainly worth pursuing.
The Arboretum’s herbarium is a reference collection of dried, mounted plant specimens numbering more than one million sheets, and is a valuable source of information as a complement to the living collection and the library.

Currently on display at the Administration Building in Jamaica Plain is an educational exhibit designed to show how the plant specimens are collected and pressed, the methods used in mounting them to their protective sheets of paper, the system by which they are arranged and stored, examples of ways the specimens are used in research, as well as other facets of an herbarium such as ours.

Visitors to the Arboretum are invited to study this extensive display which will be open weekdays through March from 9 A.M. to 5 P.M.

Ida H. Burch
Arnoldia Reviews


The author's concept of vegetation refers to the ecological organization of flora in communities, and its interrelationships with other forms of life. The paper jacket depicts an overview from West Virginian mountaintops and is synoptic of the work within, which is a companion to a predecessor, the Flora of West Virginia.

The text commences with the geography, topology, climatology, and geology of West Virginia, illustrated by the necessary charts and tables. Evolutionary ages are presented; the zones of vegetation and their characteristic flora and fauna are offered; endemic and epidemic species are differentiated and enumerated, plant communities are characterized.

These topics are treated in breadth and depth by the author. Documentation in scholarly footnotes is frequent, and there is a well-organized index. Unfortunately the gravity of the presentation makes it onerous reading.

This book is best suited to the student of elementary botany, especially of the south Atlantic states.

ELINORE B. TROWBRIDGE


This rather sumptuous volume is one that most orchid or wildflower enthusiasts would love to own. However, many more of us would have fulfilled our desires if the book were somewhat condensed and therefore less expensive. The color photographs, however beautifully posed and reproduced they may be, are certainly excessive. Many plates, and there are 96 of them — mostly a full 71/2 X 101/2 inches, contain essentially repetitive photographs; a particularly striking example is Plate #51, representing Platanthera peramoena, which is made up of one photograph of a close-up of a flower, one habit shot, and four of inflorescences at different magnifications, three of these taken at the same locality.

Nevertheless, the book, which is the second of a two-volume work (the first on the orchids of Florida), is quite valuable as well as very beautiful. Every species and variety north of Florida is represented. Most treatments include a short, technical description, a list of synonymous names, a distribution map, line drawings of floral details, a full-page color plate, and a generally informative and quite readable text usually concerned with anecdotes or various aspects of the plant's biology. Accounts of the genera include keys to
the species. Introductory material includes a discussion of orchid biology and rather technical keys to genera and higher categories. The book is actually quite technical in general, but the photographs can be enjoyed by anyone.

The author must be given considerable credit for having photographed every single native orchid species in the wild. A minor part of the book, but one that deserves mention, are the often whimsical sketches, also by the author, scattered throughout. Some are unusually clever, particularly those which are of flowers exaggerated so as to conform more closely to the objects whose supposed similarity gave the genus or species its common or Latin name, e.g. Dragon's Mouth, Ladies' Tresses, etc.

RICHARD E. WEAVER, JR.


Flowers are not the only dry things in this book. The prose is rather dull and so littered with indigestible facts that beginners are likely to be overwhelmed. A great deal of information on the history of dried flowers and various drying techniques is presented at the outset, but the uneven writing style and the somewhat excessive use of quotations make it difficult and tedious reading. A section on definitions written in lengthy paragraph style would best be presented in a more succinct glossary at the end of the book. Simple line drawings of the plant parts, at the very least, would be an aid to the beginner, for whom this book is intended.

Dried Flowers is the work of a professional scientist whose hobby is preserving flowers. More than anything else, this book is a diary of his personal experience with various desiccants and preservation techniques. A 77-page table details his results with over 300 flowers, arranged alphabetically by common name. This, together with an interesting bibliography, is the most informative part of the book.

MARGO W. REYNOLDS


Many European-based works are unsuited to America, but this reasonably-priced book translated from the Danish for readers in the U.K. can be quite useful in our area. True, there are some vocabulary differences (what we call Ladybug, the English call Ladybird, for example), and some of the ailments pictured are rare in the American scene. However, these disadvantages are more than compensated for by excellent colored drawings of various organisms, disease symptoms, signs of such injuries as cold and wind damage in leaves, illustrations of lawn-grass pathologies, and so forth. An excellent index with both popular and technical names follows the text.

ELINORE B. TROWBRIDGE

This is a textbook divided into 3 parts. The first deals with theory; the second, with basic problem-solving in horticulture; and the third, with practical horticulture technocracy — i.e. crop-growing.

As the work is intended to furnish all necessary background material to students undertaking the practice of horticulture as a vocation, the treatment of crop-raising is, expectedly, economic in its orientation. Crops both in greenhouse and on large out-door acreages are dealt with. Floriculture has only a few pages.

This is a revision of a 1951 work and some of the cited researches are dated in the 1940s. Most carry no dates and there is no bibliography. The appearance of the text has been brought up-to-date by numerous photographs of mechanized field equipment — spraying by plane, and the like, however, the student will need to modernize his information on plant pathology, and the efficacy and government status of various chemical controls.

**ELINORE B. TROWBRIDGE**


The rather astonishingly high number of hallucinogenic plants in this anthology are comfortably arranged according to families, with plants from Agaricaceae, Cactaceae, Convolvulaceae, Erythroxylaceae, Leguminosae, Malpighiaceae, Myristicaceae and Solanaceae included, plus a selection of plants of uncertain origin, as well as indices of the Latin names of genera and species, and of the vernacular names of plants and plant products.

Hedwig Schleiffer has made an acknowledged attempt to present a cross-section of moral viewpoints wherever possible. These seem somewhat repetitious at times, but I believe this is the result of the lack of cultural background for the descriptions. The few times cultural depth and metaphysical positions are bared, the sources truly take on credibility — as in the explanation of why the Desano Indians of the Columbian northeast Amazon use viho (Piptadenia spp. of the Pulse Family), written in 1968 by Gerardo Reichel-Dolmatoff. In each case, the sources have been carefully documented to facilitate further research of the excerpted texts which date from the 16th century to the present.

In a time when plants have often become little more than another luxurious strip of chrome around outsized human economic endeavors, this anthology also provides refreshing perception as to just what life is all about, and its bearing upon human-plant associations.

**EDWARD H. FLAHERTY, III**
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