

beneficial effects in the areas of soil conservation, prevention of mulch crusting, mulch stabilization, frost damage control, and weed control.

CORNUS KOUSA AND ITS PROPAGATION

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Cornus kousa, the Kousa dogwood, is one of the most outstanding and trouble-free small trees available to horticulture. It is indigenous to Japan, Korea, and China and is hardier than our native *C. florida*. In June it produces a profusion of flowers with showy white bracts, several weeks after *C. florida* has finished blooming. Other features include its month-long floral display, its attractive fruits, its autumn color, and its mottled, exfoliating bark, which is prominent on trunks and branches of older plants.

When plants are raised from seeds, seedlings grown from some plants duplicate one another with monotonous uniformity. Seedlings of other plants, however, may contain individuals which differ greatly from other members in the same lot. Such variation can lead to new and worthwhile selections with horticultural merit.

Both *C. kousa* and *C. florida* provide striking examples of the variation that can arise when plants are raised from seeds. They can show great variability in all respects — bract size, fruit size, tree shape, and peduncle length. In the early 1950's an amateur horticulturist in the Boston area obtained seeds of *C. kousa* var. *chinensis* from the Arnold Arboretum and started a collection of plants. They were lined out orchard fashion in a field where they could be observed. From time to time more were added and the planting now contains over 150 specimens. Much of the information presented here is based on observations made in that collection.

VARIATION IN CHARACTERISTICS OF THE FLOWERS

Both *C. kousa* and *C. florida* have small, globose clusters of insignificant flowers that are accompanied by four showy bracts (Figure 1).

Rudimentary flowers of *C. kousa* appear in spring with the developing leaves. They are small, green and inconspicuous. By mid-June expansion of the bracts and development of the flowers is complete.

Flowers from *C. kousa* var. *chinensis* show a wide difference in size, symmetry, bract shape, and shade of color. It can be noted that no two flowers are precisely alike. The ornamental characteristics of some are obviously far superior to others. In addition to the widely varying floral structures, growth habits are also diverse. Plants tall and narrow, broad and rounded, extremely fastigate, pendulous, and dwarf also have all appeared.



Figure 1. Both *Cornus kousa* and *C. florida* have small, globose clusters of insignificant flowers accompanied by four showy bracts. They are bisexual and both sexes are evident in this enlarged photograph.

Flowers of *C. kousa* are borne on the upper side of the branches and when seen from above the tree appears so covered with blossoms that it would be difficult to find a space for one more. Many plants also present floral characteristics that are pleasing when viewed at eye level. Occasionally trees bear flowers with additional bracts of varying number, and I saw one with bracts fused together in a manner whereby they formed a square.

During my time at the Arnold Arboretum I occasionally had phone calls and written correspondence from people who claimed to have a *kousa* dogwood that flowered all summer long. This was a misunderstanding, of course, for what they had were trees with persistent floral bracts. After the flowers are pollinated and the bracts have served their purpose they usually fall away. On some trees, however, they remain through the summer and fall in autumn while still attached to the ripened fruit (Figure 2). Often their color is a dirty white and this leads to a tree of untidy appearance. Still others that persist turn green and, no doubt, function as leaves.

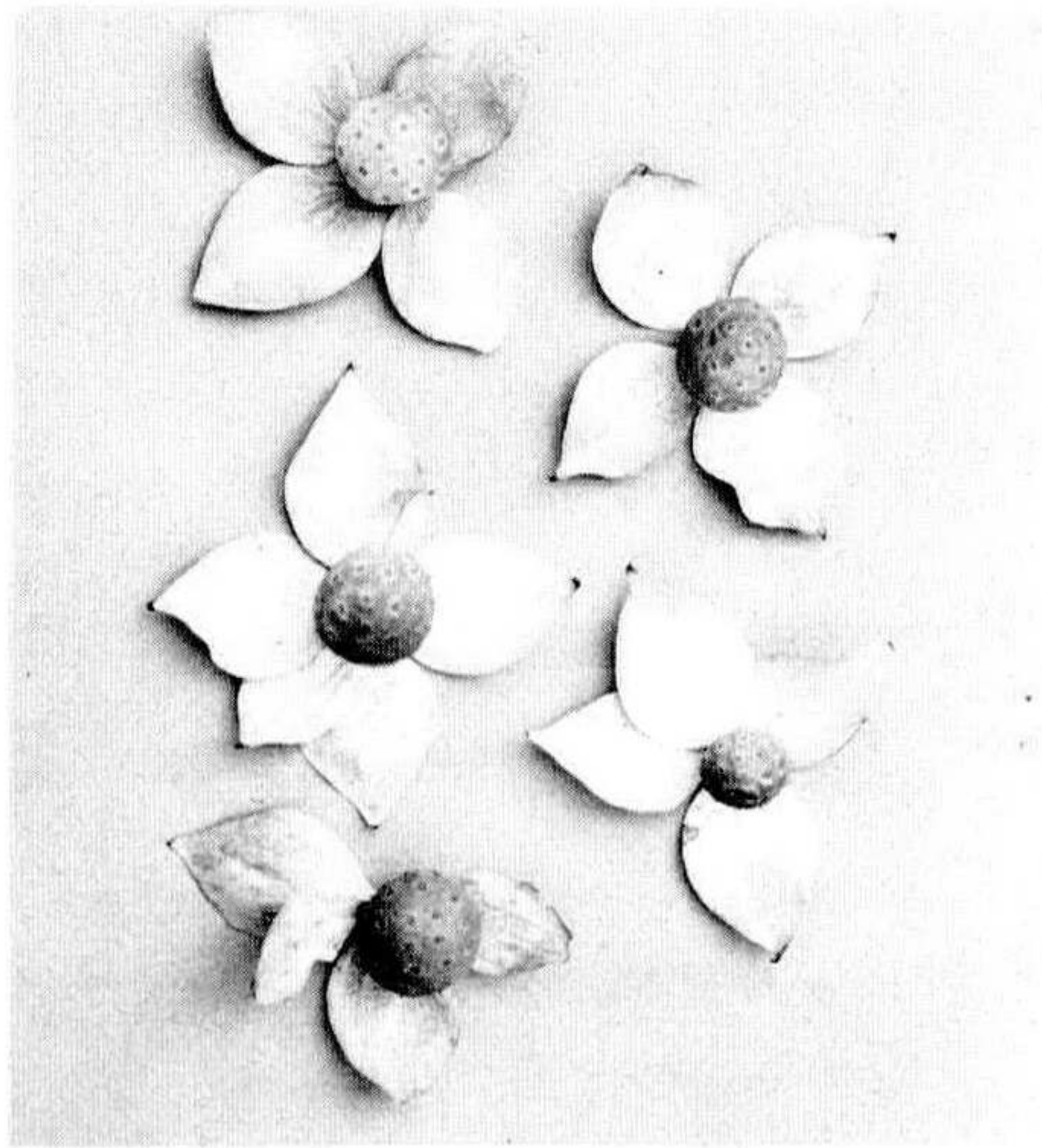


Figure 2. After pollination, bracts have served their purpose and usually fall away. However, on some *Cornus kousa* plants they persist and fall in autumn together with the ripened fruit. This photograph was taken in early October. Such trees present a very untidy appearance.

RED FLOWERED KOUSA DOGWOOD

At Weston Nurseries, Hopkinton, Massachusetts, during July of 1979, many *C. kousa* flower bracts became strongly flushed with pink as they aged. This intensity of color had not happened before and has not happened since. Other kousa dogwoods in eastern Massachusetts did likewise that year and it is reasonable to suppose it was caused by weather conditions. It is not unusual for some pink to appear on bracts as they senesce or when the flowers abort.

In the nursery of the Arnold Arboretum, there are two clones of *C. kousa* which came from Brookside Gardens, Wheaton, Maryland. They had been selected for red bract color at the Shibuchi Kanjaro Nursery Company, Saitama, Japan. Their performance leaves something to be desired for they show little red. While anthocyanin is present in varying quantities in some bracts we hope red coloration comparable to that found in red bracted clones of *C. florida* will soon appear.

VARIATION IN THE FRUITS

In fruit of *C. kousa* the skin is rich red and dotted with the remains of calyxes. They are compound fruits, and examination of 100 fruits revealed an average of 4.5 seeds in each. *C. kousa* is self-sterile and the fruits used in the test came from a

plant of *C. kousa* var. *chinensis*, growing in proximity to other trees of the same variety. Fruits from isolated trees contain few if any seeds, remain small in size, and drop prematurely.

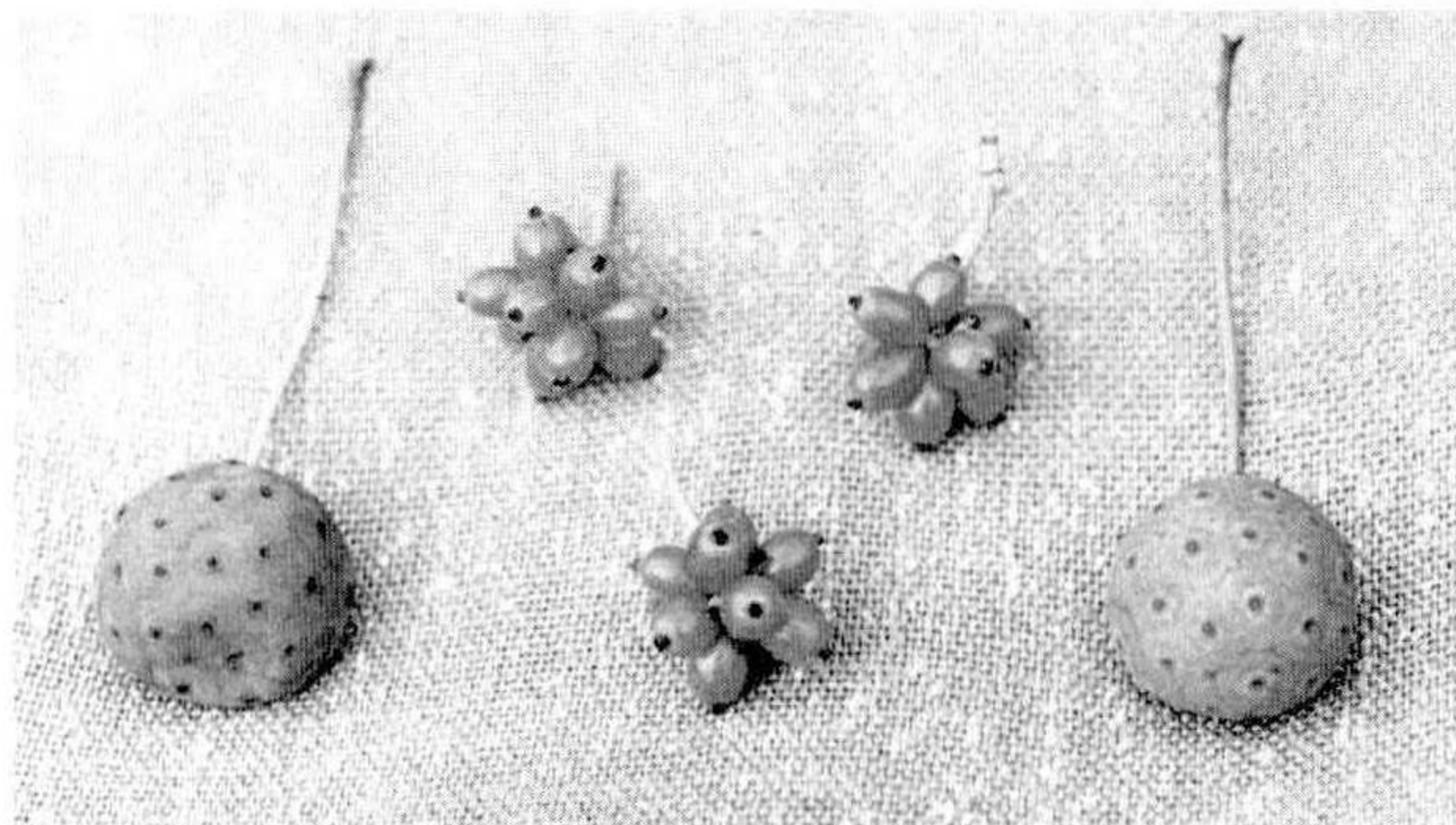


Figure 3. Fruits of *Cornus florida* and *C. kousa* are somewhat similar. *C. florida* fruits (center) are borne in a cluster with each berry terminating in the remains of a calyx. Those of *C. kousa* (left and right) are compound fruits embedded in a fleshy ball-like mass with calyxes dotting its surface.

Fruit samples were gathered from a number of individual trees, and an effort was made to select a specimen typical of those found on each tree. In size the fruits ranged from that of a marble to a diameter of $1\frac{5}{8}$ in. The heaviest weighed 32 g (one ounce equals 28.35 g). *C. kousa* fruits are edible and have a flavor that appeals to many people. Large size would be important to those wishing to eat them. Variation was also present in the fruit stalks; they ranged in length from under 2 to over 4 in. There was no relationship between fruit size and stalk length.

Fruits of *C. florida* and *C. kousa* have similarities. (Figure 3). Both show the remains of calyxes. In *C. florida* the fruits are in a cluster, and each individual berry is terminated by the remains of the calyx. In *C. kousa* the fruits are embedded in a fleshy ball-like mass with calyxes dotting its surface.

An interesting sidelight is that *kousa* dogwood fruits are occasionally pecked at by birds but they do not eat the seeds. Chipmunks, however, remove seeds from the fruits and leave the plants with their cheek pouches bulging. This defeats natural dispersal, for chipmunks store seeds in their larders, where germination would be impossible. In its native habitat or during its evolution, *kousa* dogwood must have had a carrier such as a deer, bear, boar, or monkey, that would eat the fruits and carry the hard-coated seeds in its digestive system until they were eliminated in droppings. The seeds were thereby scattered about the countryside.

PROPAGATION OF CORNUS KOUSA BY SEEDS

Seeds of *Cornus kousa* can be readily separated from the pulp by flotation. The fruits are placed in a plastic bag and after a few days the pulp will have softened. They should be checked each day to make sure fermentation is not occurring. When soft, the bag's contents can be kneaded by hand. Next the contents are placed in a tall, narrow vessel which is filled with water. The pulp is buoyant and the seeds sink. Tallness of the vessel is important for it provides a greater separation between pulp and seeds, enabling one to work quickly. Several fillings and pourings will lead to clean seeds.

Next, the seeds are combined with a damp medium such as sand, peatmoss or such, and the combination is placed in a polyethylene bag. The bag is bound at the mouth with a rubber band and placed in a refrigerator at 40°F. After 3 months the cold requirement is satisfied, dormancy is broken, and the seeds are ready to be sown.

PROPAGATION BY CUTTINGS

Cornus kousa cuttings rooted in a high percentage when collected from mid-June through July. A variety of root inducing materials have been used with good success. Indolebutyric acid (IBA) has proven satisfactory. The cuttings are wounded on one side and treated with an 0.8% formulation of IBA in talc, containing Thiram added at the rate of 15%. Five sec dip treatments using IBA plus naphthaleneacetic acid at 2,500 ppm of each have also been effective.

GRAFT COMPATIBILITIES

Leonard Savella of Bald Hill Nurseries, Exeter, Rhode Island, recommends the use of *C. kousa* for top grafting *C. florida* cultivars. His method is to sow seeds close together in a bed and to then let the seedlings grow undisturbed for 3 or 4 years. The closeness provides tall straight plants without lower branches. They are established by potting one growing season in advance of their use. Established *C. florida* understocks are satisfactory for grafting scions of *C. kousa*.

SUMMATION

In summation we conclude with the thought that those concerned with *Cornus kousa* should select clones that combine the more desirable traits and provide them with cultivar names. An ideal plant would exhibit good floral characteristics when viewed from eye level, large bright red fruits, pleasing autumn color, and prominent exfoliating bark.

VICKI GINGAS: Please distinguish between *Cornus kousa* and *C. kousa* var. *chinensis*.

AL FORDHAM: The variety *chinensis* was named by Wilson in 1908. It is a geographic variation. I don't think that the designation holds any weight because of the great variation found in the seedlings of that plant.

BILL FLEMER: For New Jersey conditions *C. kousa* var. *chinensis* is superior to straight *C. kousa*. It has bigger and wider bracts, and the leaves appear to be thicker. Under hot dry conditions the species will exhibit considerable marginal burn on leaves whereas the variety we originally got from the Arnold Arboretum does not exhibit that burning. Certainly for New Jersey and south the variety makes a better garden plant because it is more showy in bloom and resistant to leaf burn.

NEW PLANT FORUM

JACK ALEXANDER AND ROB NICHOLSON, MODERATORS

MODERATOR ALEXANDER: Ruth Kvaalen will begin the new plants session with a presentation on *Orixa japonica*.

RUTH KVAALLEN: Landscape plants which lack showy flowers or colorful autumn foliage are often overlooked in favor of the brightly colored plants. But a plant with good foliage appearance during the whole growing season can be more valuable in the landscape than one with a week of vivid color but poor appearance the rest of the year.

Orixa japonica is a plant with excellent foliage. *Orixa* is a deciduous shrub with rounded growth habit, usable as a specimen, in groups, or naturalized. In the Indianapolis to Chicago region it reaches 6 to 8 ft with equal spread or slightly less. The lower branches sometimes layer where they touch moist soil, so the plants are able to spread and create larger clumps.

Its ornamental character lies in its glossy foliage. Leaves are about 4 in long, giving a medium-coarse texture. Typically leaves are a bright, deep green. Some plants, in some years, develop a yellow autumn color, but usually the leaves fall without much color change. *Orixa* grows well in lightly shaded sites. It also does well in sun if adequate moisture is present. In hot weather in sun, the foliage may turn pale. It is a member of the citrus family, and the foliage is aromatic when crushed.

A form with variegated foliage exists, but it is rare and I doubt if it is in the trade. It appears to be less hardy than the green-leaved form. The green form is root hardy to USDA zone 5 (−20°F) but the variegated form has died in zone 6 (−10°F). In the Morton Arboretum west of Chicago, *Orixa* suffered some dieback after the 1983-84 winter — a severe one — but usually just branch tips or portions of the top of the plant are affected. In milder climates, *Orixa* might exceed 8 ft in height. However, it is easily pruned and kept lower if desired.