

American Persimmon, an Emerging Horticultural Crop

JOSEPH C. MCDANIEL¹

"The plumes are of two kinds, red and gray, of the making and bignesse of nuts, and have three or foure stones in them. They are better than all the plumes of Spaine, and they make farre better prunes of them." This Elizabethan English of Hakluyt (1607), translating the Spanish chronicle of the De Soto expedition some 60 years earlier, gives us one of the earliest accounts of the American persimmon, *Diospyros virginiana* L. (Page 169 of the 1851 edition.)

The Indians of what is now the southern U. S. probably made more food use of the wild persimmon than they did of their less sweet and more perishable true native plums. We have other contemporary accounts, such as Captain John Smith's of the "putchamin" or "kind of apricocke" harvested by the inhabitants of tidewater Virginia in the early 1600's. To Smith we can also trace the still prevalent misinformation that a persimmon is not fit to eat until after frost. In reality, there are good ripe fruits on some trees in August.

Today, the commercial prunes of the U. S. are still "made" from the same *Prunus domestica* species as they were in 16th Century Spain, but a growing number of fruit fanciers will agree with De Soto's chronicler that the "gray plum" or persimmon is "better than all the plums of Spain."

Although the species *D. virginiana* is native from lower Connecticut to southeast Iowa and south to Texas and most of Florida, horticultural selection during the past 100 years has been concentrated in the Midwest, or with seedlings grown from selections of Midwestern origin, and their cultivation is primarily north of the lower

Ohio River, which is about the present limit for the hardiest cultivars of the Oriental *D. kaki* L.f. The latter, in China and Japan, has had cultivar selection for perhaps 1000 years longer.

Early ripening *D. virginiana* cultivars tracing back to sources in Illinois are now fruiting successfully throughout most of U.S.D.A. Plant Hardiness Zone 5. Some developments now under way in preparing American persimmon fruits for market, together with wider propagation and planting of the choice cultivars, could make this a more common fruit in American markets.

Pros and Cons of American Persimmons

The present American persimmon cultivars already have a lot going for them as home fruit trees:

- (1) *A self-pruning tree.*
- (2) *Blossoms (on new growth) very seldom hurt by frost, and consistent cropping.*
- (3) *Little need for spraying.* No known curculio infests the fruit. The fall webworm and in southern areas the twig girdler can be damaging to trees at times. In the Midwest a persimmon leaf roller, of cyclic occurrence, sometimes scars the skin adjacent to webbed leaves. Mites and aphids seldom are serious pests.

The principal disease, persimmon wilt (caused by *Cephalosporium diospyri*) is not known to affect trees north of Tennessee, North Carolina, or Arkansas, and apparently is not now spreading much there. Most cultivation of *D. virginiana* is north of these states.

¹Assistant Professor of Horticulture, University of Illinois, Urbana, Ill. 61801.

(4) *Wide climatic adaptation.* Cultivars selected in the Midwest are performing well near the Gulf of Mexico, in the Finger Lakes region of New York, in southern New England and in California. One seedling of 'Garretson' bears heavily on Prof. E. M. Meader's farm at Rochester, New Hampshire. For U.S.D.A. Plant Hardiness Zones 5 and 6, the choice is narrowed to the earlier cultivars that are reasonably mature before the date of killing frost in fall. In subtropical south Florida, the northern selections do not get enough chilling to grow well and good cultivars are yet to be selected or bred from the south Florida native *D. v.* var. *Mosieri*.

(5) *A fruit ideally suited to freeze preservation.* Frozen as whole ripe fruits or as pulp with the seeds removed, persimmons keep in very good edible condition for years, even when thawed and refrozen.

(6) *Tolerance of less than ideal soil conditions.* Persimmons will grow on very sandy soils, and on heavy clay loams, within a wide pH range.

(7) *Fruit maturing over a considerable season.* Some cultivars at Urbana, Illinois, have part of their fruit ripe in mid-August, and are still earlier southward. Our principal cultivars at Urbana are in the September-October period of maturity. Others hang on when ripe and can be harvested in November or even later.

(8) *A long productive life.* Where persimmon wilt is not present, an uncrowded persimmon tree can produce fruit for 50 years or more. Old trees cut down will usually produce sucker growth that can be grafted in a year or two for renewal.

(9) *Fruit preferred by many Americans over the Kaki.* The American cultivars usually bear smaller but firmer and sweeter fruits than the *D. kaki* cultivars. Preference seems to be for the known persimmon. Most East Asians prefer *D. kaki*, but Americans

who know both tend to prefer *D. virginiana* fruit.

Misconceptions of the persimmons are many, such as:

(1) "Everyone knows that a persimmon is not fit to eat until it has frozen." Not so, at least with the early cultivars.

(2) "A persimmon won't grow this far north." It depends a great deal on where the cultivar (and the understock) originated.

(3) "I planted one, and it grows, but it never has any fruit." It could have been a male seedling, or a female without a pollenizer (male) in the vicinity.

More valid reasons for infrequent cultivation are these:

(1) *Scarcity of sources for grafted trees.* Persimmons are not very difficult to bud or graft, but more so than apples. Very few commercial nurserymen at present offer named cultivars of *D. virginiana* and these are usually specialists in northern nut trees, rather than the common fruits.

(2) *Some difficulty of transplanting.* Persimmons on *D. virginiana* seedling roots are harder to dig and to transplant than the common pome and stone fruits. Like walnuts and pecans, the persimmons need careful handling to avoid desiccation of roots; firm setting in a moist soil; pruning to reduce the loss of moisture through the top following transplanting.

(3) *Unfavorable comparison with Oriental persimmons as to fruit size.* This has led most southern (and California) fruit propagating nurseries to graft only Oriental persimmons.

Botanical Background

Cultivars and their propagation will be discussed in a separate article. Let's first look at their botanical background.

D. virginiana is the hardiest species of a large, mainly tropical genus. Like others of its genus, it bears mainly

two kinds of flowers, pistillate and staminate, but is not entirely dioecious. In "male" trees there can be functionally perfect flowers on the more vigorous flowering branchlets, which produce occasional or sometimes frequent fruits, but never in the large quantities borne by pistillate trees. Staminate flowers are smaller than pistillate and occur mainly in 3-flowered clusters. Pistillate flowers occur singly.

Three related and usually pistillate cultivars, 'Early Golden', 'Garretson' and 'Killen', have been observed at Urbana to produce occasional branchlets with typical staminate flowers. Such branchlets are usually on the more weakly growing branches of older trees. They can furnish pollen to fertilize pistillate flowers of their own and other clones, but do not persist long enough or occur regularly enough to be a reliable source of pollen. Grafts from such branchlets have quickly reverted to the pistillate condition.

It has been known since Baldwin and Culp's 1941 article* that there are two chromosome races in *D. virginiana*. According to my studies, they do not fertilize each other, though they are graft-compatible. The more primitive tetraploid (60-chromosome) race centered in the southern Appalachians but often hardy when carried northward, has had few cultivar selections made from it. North, west and south of that center the native persimmons are mainly hexaploid, with 90 somatic chromosomes, the same as the Oriental *D. kaki*. Some pistillate clones in both races are capable of much parthenocarpic fruit development when unpollinated, or pollinated

by the other race. A few, such as 'Knowles', remain almost entirely seedless where pollinated by both races; such clones are possibly aneuploids derived from rare crossing between the two races, but they have not had cytological study. Seedless fruits in *D. virginiana* do not have as good edible quality as seeded fruits on the same clone, and the known consistently seedless clones are inferior in sweetness to the best seeded cultivars.

Breeding Possibilities

The first, and some more recent cultivar selections in American persimmons, were grafted from trees found growing wild. There have been several selections made among pistillate open pollinated seedlings from select fruiting clones, mainly 'Early Golden' and its descendants. It is now possible, with the three mentioned above as having occasional staminate flowers, to do controlled crossing in years when such flowers are available.

No true interspecific hybrid between temperate zone *Diospyros* species is yet known. Chromosomal differences probably would prevent use of either of the two 30-chromosome diploid species, *D. texana* and *D. lotus*, in crossing with either race of *D. virginiana* or with *D. kaki*. The logical cross would be hexaploid *D. virginiana* x *D. kaki*. This has been tried both in America and in Japan. Most recently, reciprocal crosses by Eugene Griffith at Takoma Park, Maryland, and J. C. McDaniel at Urbana, Illinois have set fruit in both species; some seeds have matured although many have aborted or formed defective endosperms. All crossed seedlings germinated at Urbana appear to have purely maternal inheritance from *D. virginiana*. It is planned to make further crossing attempts, with artificial culture of excised embryos.

*Baldwin, J. T., Jr., and Richard Culp. Polyploidy in *Diospyros virginiana* L. Am. Jour. Bot. 28:942-944. 1941.