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Persimmons for Maryland

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An Alternative Crop or Home Fruit

Department of Natural Resource Sciences and
Landscape Architecture
College of Agriculture and Natural Resources
University of Maryland, College Park

Persimmons for Maryland: An Alternative Crop or Home Fruit

Introduction

Although the name persimmon is derived from the Native American tongue, it is also commonly used to designate the "Oriental" persimmon (*Diospyros kaki*) as well as the "American" persimmon (*D. virginiana*) in the same way that we differentiate the "European" pear from the "Asian" pear. The Oriental persimmon is native to China and was first introduced to this country from Japan in the mid-19th century. In this bulletin, the Oriental persimmon will be referred to by the common name "persimmon."

Persimmons are a world fruit and are sometimes considered the national fruit of Japan, where they reached their highest degree of development. A recent report by Collins, George, and Mowatt (Australia) gave production figures (metric tons) for several countries as follows: China—567,750 T; Brazil—450,000 T; Japan—287,000 T; Italy—70,000 T; Korea—65,000 T; and the U.S.—4,000 T. Australia and New Zealand have recently increased production to supply the Asian market in the off-season. U.S. production has centered in California and in the Gulf States from North Florida to Texas.

Persimmons have value as an ornamental tree with attractive and edible fruit requiring little or no care as compared with the more common deciduous tree fruits. Maryland Cooperative Extension initiated a demonstration planting at the Wye Research and Education Center (WREC) in 1966. This was prompted to a large extent by two workers at the U.S. Plant Introduction Station at nearby Glenn Dale, Maryland. William H. Preston and Eugene Griffith obtained scion wood from the farm of the late J. Russell Smith, located on the east side of the Blue Ridge Mountains near Round Hill, Virginia. Some of this material came from China, where Smith had done plant exploration in the 1920's, and the remainder from USDA collections from the Orient made in the 1930's or earlier.

Although western Maryland is beyond the limits of persimmon culture because of severe climate, the eastern Maryland areas (in USDA hardiness zone 7a, and possibly 6b, with average minimum temperatures of 5 to 0 °F and 0 to -5 °F, respectively) could be areas of reliable tree survival.

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Selection of Suitable Varieties

Obviously, winter survival and fruiting characteristics are important in evaluating varieties for home planting together with some information on tree habit of growth. Many varieties have a high tendency to produce parthenocarpic (seedless) fruit and so do not require pollination, while other varieties require pollination for fruiting. Most named varieties bear only female (pistillate) flowers, which grow singly in the leaf axils of new shoots. Trees with only male flowers (staminate) are not grown, but some trees have both pistillate and staminate flowers. The staminate flowers are borne in a cymose inflorescence and are much smaller than pistillate flowers. A single tree for home planting should thus fruit well without pollination or have both pistillate and staminate flowers to provide its own pollen. Trees with flowers of both sexes, however, do not usually fruit as heavily as those with only pistillate flowers.

The fruits are classed in three types based upon astringency. The species is high in compounds called tannins. When

tannins are present in soluble form, they cause the common unpleasant "puckery" sensation in the mouth. All fruits contain tannins in some form that become insoluble at different stages and so no longer cause the astringent or puckery sensation.

1. Most varieties contain soluble tannins, rendering the fruit astringent until the ripening process is fairly well advanced. The fruit is "climacteric," as are apples and bananas. The ripening response is triggered by ethylene, following which the fruit softens and increases in flavor and sweetness. The astringency of hard, color-ripe astringent fruits can be removed without softening by exposing the fruit to ethanol vapors for 5 to 10 days, depending on the variety. Layers of fruit are misted with any 70 to 80 proof liquor before sealing in a vapor-tight container at a cool temperature (55 to 60 °F).

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2. Any soluble tannins disappear quite early in the life of the fruit together with a much lower concentration of tannins. These fruits are known simply as "nonastringent," and are favored by many because they can be eaten as crisp as an apple and not cause the astringent sensation.

3. The third class are those which without seeds are astringent until soft-ripe, but if seeded are nonastringent. In most cases the flesh color of seeded fruit becomes darker or almost chocolate brown. The variety *Giboshi* is an example of this type of fruit.

The last major consideration in selection of a suitable variety is compatibility with rootstocks. Neither stem nor root cuttings have been successful in propagation, and grafting or budding must be practiced. Seedling persimmons grow readily, so *D. kaki* is used as a rootstock in some areas. In the eastern U.S., where *D. virginiana* is native, this has been the preferred rootstock because of its adaptability. Seed germinates readily after stratification and after young seedlings are planted in the field or in containers for future planting after grafting. Seedlings can be grafted or budded after 2 years and container plants taken to the field after 2 years in the nursery.

The Wye Planting

Trees were planted out of containers in rows 20 feet apart with 10 feet between trees. This in-row spacing should have been 15 feet, because most trees became larger than had been anticipated at planting. Because this experiment was originally planned as a low-care trial for home planting, the trees were permitted a natural habit of growth with little or no pruning. Grass between rows was cut several times during the season and a light application of a complete fertilizer given each spring. No insecticide or fungicide has been applied since the planting was established in 1966. Temperature highs and lows for the research station were recorded daily.

Persimmons are frequented by such common pests as Japanese beetles, but these do not cause serious damage. The most persistent insect observed has been the psyllid or woolly aphid, which frequently infests the second flush of growth and causes young leaves to curl. A late summer form of tent caterpillar has caused little damage.

Winter injury due to low temperature or to desiccation from high drying winds has been the most serious problem, although older wood has demonstrated a phenomenal ability to resume growth from latent buds. Such injury, however, seems to permit the entrance of nonspecific fungal pathogens, which furthers the injury or promotes death if a cambial infection occurs. Records have indicated damaging low temperatures at WREC in 1976 (-1 °F), in 1982 (-6 °F), in 1984 (-6 °F), and in 1994 (-4 °F). While not the only factor in winter injury, low temperature is the one most readily quantified. At the Western Maryland Research and Education Center (WMREC) at Sharpsburg where persimmons were also planted, low temperatures of -14 °F in 1984 and -22 °F in 1994 were recorded. Only the more winter hardy varieties survived -14 °F and no trees survived -22 °F. Only the more winter hardy varieties have survived with little or no damage and borne fruit following temperatures below 0 °F, although we have seen moderate fruit crops in a few varieties following -8 °F. Heavy fruiting can lead to the death of many young twigs or branches, which gives the appearance of winter kill.

Deer roam at the WREC and an occasional green twig has shown deer damage. Bucks can destroy small trees by rubbing antlers and marking them. The much greater deer population at WMREC seriously damaged the persimmon planting until the trees were placed within the protection of an electric fence.

Important sources of scions, which we grafted on *D. virginiana* seedlings, were:

- U. S. Plant Introduction Station at Glenn Dale, Maryland;
- U. S. Plant Introduction Station at Chico, California;
- University of Florida at Gainesville, Florida;
- University of California at Riverside, California;
- USDA Plant Industry Station at Beltsville, Maryland;
- Chollipo Arboretum, Seoul, Korea;
- Yatabe Agricultural Station, Ibaraka, Japan;
- William Davis, Aliquippa, Pennsylvania, direct from China; and
- many private nurseries and individuals in Pennsylvania, Maryland, Florida, Alabama, Louisiana, and Texas.

In all, 84 cultivars were received from 1964 to 1984 and planted at WREC (see Table 1).

TABLE 1. Alphabetical List of Persimmon Cultivars Planted at WREC, 1966 to Present

Aizu Michirazu	*Kishimoto*	*Smith #1*
Akadango	**Komosaki*	*Sung-hui*
Atoma	*Kubo*	*Suruga*
Chienting	*Kubokaki*	*Taber 129*
**Chocolate*	*Kyungsun Ban-Si*	*Tanenashi*
DaiDai Maru	**Lantern*	*Taebongsi*
Davie #2	*Lundy's Giant*	*Tan-Kam*
Davie #3	*Man Ehrshitsu*	*Tamopan*
Eureka	*Mansen*	*Tecumseh*
Frederick	*Maru*	*Tribble*
Fuji	*Matsumoto Wasefuyu*	*Tsuru*
Fuyu	*Mazugata*	*Tsurushigaki*
Fuyugaki	*Midai*	*Triumph*
**Gailey*	*Midzushima*	*Twentieth Century*
Giboshi	*Miss Kim*	*Wasefuyu*
Ghonko	*Niu Nai*	**Yamagaki*
Gosho	*Ogosho*	*Yemon*
Great Wall	*Okame*	*Yemato Hyakume*
Gwangyang	*Orpet*	*Yeddoichi*
Hachiya	*Otani*	*Yotsumizo*
Hagakushi	*Otera*	*Yokono*
Hana Fuyu	*Peiping*	*Zengi*
Hiragaki	*Pen*	
Hiratanenashi	*Pontiac*	Seedlings:
Honan Red	*Sagocki-Si*	
Hyakume	*Saijo*	50—*Great Wall x Yamagaki*
Ichidagaki	*Sanja*	
Ichikijiro	*San Pedro*	55—*Giboshi x Yamagaki*
Inchon	*Shakami*	
Jiro	*Shogatsu*	
Kawabata	*Sheng*	*Pollinators

Some Winter Hardy Varieties:

The varieties surviving for the past 20 to 30 years represent the best adapted to the area and to American persimmon rootstock, and are the most winter hardy. Some of the more recent acquisitions might prove to be as winter hardy and will be mentioned later in this bulletin. The reported fruit quality (expressed as flavor, sweetness, or texture), except as reported by a group or panel, is mainly the judgment of the senior author. The average fruit weights given represent production in a typical good growing season.

Aizu Michirazu: Trees usually branch low and can be more shrub-like than tree-like. Medium quality fruit ripens midseason. Has had some winter injury at WREC, but survived 30 or more years at Round Hill, Virginia. Average fruit weight: 5.0 oz.

Great Wall: Very sturdy tree, usually a central leader, and moderate growth habit. Medium-size, squared fruit ripens early, is of very good quality, and astringent until soft-ripe. Tree bears heavily without pollination and much too heavily if pollen is present. An excellent medium-size tree for the home landscape. Leaves turn bright red in fall. Average fruit weight: 4.5 oz.

Giboshi: Sturdy, round-headed, freely branching tree. Must be pollinated to bear fruit that is nonastringent and dark fleshed with seeds. Small to medium size, fruit is round, pointed, ripens early. Tends to have blackened sun scald blotches on the south side of the tree. Fruit has excellent flavor and consistency and can be eaten before soft-ripe. Parthenocarpic fruit can be induced by a spray of 25 ppm gibberellin to the blossoms in late May. The fruit produced will be light fleshed and astringent. Average fruit weight: 4.0 oz.

Similar varieties are *Taber 129* and *Smith #1*.

Hagakushi: Very hardy tree, but fruit ripens so late as to be worthless in Maryland.

Kyungsun Ban-Si: One of the most winter hardy along with *Great Wall*. Tree has strong, upright trunk; later branching to form a round-headed tree at maturity. Fruit is medium size, roundish, with excellent flavor, ripening midseason, and astringent until soft-ripe. As with *Giboshi*, the flowers must be pollinated to form fruit, but also responds to gibberellin to form seedless fruit. Average fruit weight: 4.5 oz.

Lantern: Tree can need pruning to develop a strong central trunk. Bears staminate inflorescences as well as pistillate flowers so will always bear seeded, bright orange, astringent fruits of medium to large size, ripening mid- to late-season. Very small fruits can form on staminate racemes; they will taper to a point.

The larger, more vigorous kinds are useful as shade trees. Some are notable for their bright orange-red fall color.

Niu Nai: Round-headed to spreading tree bearing large, round, orange-yellow fruit of good quality, ripening mid- to late-season. Fruit is astringent until soft-ripe. Tendency to parthenocarpy not known. Average fruit weight: 6.3 oz.

Pen: Small- to medium-size, roundish fruit of good quality, ripens early. Astringent until soft-ripe. Pollination not needed. Average fruit weight: 4.9 oz.

Peiping: Strong, wide-spreading tree bearing early, mid-size fruit of good quality. Bears heavily without pollination. Average fruit weight: 5.5 oz.

Sagocki-Si: One tree has had winter injury, but has recovered to form a large tree. The astringent fruit ripens midseason, but is of poor quality. Probably forms parthenocarpic fruit. Average fruit weight: 4.3. oz.

Sheng: Not quite as hardy as others of this group, but fruiting following -5 °F has been observed. The tree has somewhat irregular branches forming a wide canopy. The large, square, attractive four-lobed fruit is astringent until approaching soft-ripe and is of finest quality in both flavor and texture. It loses astringency readily. Average fruit weight: 6.0 oz.

Tecumseh: A chance seedling thought to be from *Great Wall*, because of the similarity in fruit size and shape. Astringent until soft-ripe. This is one of the more vigorous trees, forming a large but upright canopy. Fruiting is heavy without pollination and as with *Great Wall* will overbear with small fruit if pollen is present. Excellent for home landscape planting. Average fruit weight: 2.7 oz.

Yamagaki: Very winter hardy and reliable fruiting as both staminate and pistillate flowers are borne. Tree has a round, upright growth habit. Valuable as a pollinator, particularly for *Giboshi*, because the fruit is similar in shape although smaller and, being seeded, is nonastringent and dark fleshed. It is of good quality and not subject to sun scald like *Giboshi*, although will not bear as heavily. Average fruit weight: 4.0 oz.

Notable Recently Acquired Varieties:

Davie #2: From China, ca. 1985. Fairly upright tree with strong trunk. Medium-size fruit is squarish, of good quality, and astringent until soft-ripe. Average fruit weight: 3.7 oz.

Davie #3: Tree is similar to above, but fruit is larger, conical in shape, and of good quality. Tree might be more winter hardy than *Davie #2*.

Inchon: From Korea, 1982. Low growing and free branching, most fruit can be picked from the ground. Excellent quality, small- to medium-size fruit is squarish, flattened, and astringent until soft-ripe. Tree bears heavily and likely needs no pollination. Apparently quite winter hardy. Average fruit weight: 3.5 oz.

Ichidagaki: From Japan, 1984. A slower growing tree, moderately winter hardy. Fruit is small to medium size, round, tapered, and is sweet and juicy. Average fruit weight : 3.0 oz.

Miss Kim: From Korea, 1982. Very similar to *Inchon*, but the tree can be more upright and the fruit larger. Astringent until soft-ripe. Bears heavily without pollination. Average fruit weight: 3.7 oz.

Sung-hui: From Korea, 1982. Very similar to *Miss Kim*, but perhaps not as winter hardy. Average fruit weight: 5.0 oz.

Taebongsi: From Korea, 1982. A vigorous, strong, upright tree. Unfortunately not very cold hardy. Should be grown only in protected areas. Fruit is large, round, slightly tapered, of very high quali-

ty, and astringent until soft-ripe. This fruit is very comparable to *Hachiya*, which has not done well at WREC. Taebongsi has been severely damaged at temperatures of 0 °F or below. Average fruit weight: 7.2 oz.

Nonastringent Persimmons:

These cultivars are listed separately, because they are not generally considered to be as cold hardy nor as flavorful as the best of the astringent persimmons. They are listed below in order of winter hardiness (apparent in our observations).

Tan-Kam: From Korea, 1982. Our most winter hardy nonastringent tree has fruited following a -5 °F temperature. The fruit is large, squarish, four-lobed, bright orange, of excellent quality, and ripens midseason. Pollination is not required for heavy fruiting. The tree is of moderate vigor, wide branching, forming a round canopy. Average fruit weight: 6.0 oz.

Gwangyang: From Korea, 1982. Winter hardy, but with more cold temperature injury than *Tan-Kam*. The tree is also more vigorous than the *Tan-Kam* and bears fruit without pollination. Fruit is similar to *Tan-Kam*, but ripens later and lacks quality if picked before being fully colored. Average fruit weight: 6.0 oz.

Hana-Fuyu: More cold tolerant than *Fuyu* and the fruit is much larger, of medium quality, and ripens midseason. The tree has an open branching habit, requires pollination and has fewer fruits, but makes up in production by its large size. Average fruit weight: 12.8 oz.

Twentieth Century: A commercial variety in Japan, this cultivar has fruited at WREC following -4 °F. Tree has medium vigor with round canopy. Fruit is medium to large, slightly squarish, and of good quality. Average fruit weight: 6.6 oz.

Fuyu: The most popular of all the nonastringent persimmons. Shipped to Eastern supermarkets from California along with *Hachiya*. Fruit is medium to large, round and flat in shape, ripens midseason. Trees have survived 0 °F at WREC, but without fruiting. Average fruit weight: 6.8 oz.

Jiro: The fruit is identical to *Fuyu*; the tree is less vigorous but can be slightly more winter hardy. Average fruit weight: 4.9 oz.

Kawabata: About the same hardiness as *Fuyu*, but the fruit can be slightly larger and slightly pointed with slight ring near the calyx. Has excellent flavor and unusually smooth texture. Habit of growth is upright with round canopy. As with most other nonastringent cultivars, expect no fruit following 0 °F or below. Average fruit weight: 7.9 oz.

Foliage:

All Oriental persimmons have large, glossy, dark green leaves, which with their large yellow- to orange-colored fruits become quite attractive in the home landscape. The larger, more vigorous kinds are useful as shade trees. Some are notable for their bright orange-red fall color. Our notes show the following to be outstanding in fall leaf color: *Davie #3*, *Great Wall*, *Hagakushi*, *Inchon*, *Miss Kim*, *Niu Nai*, *Sung-hui*, and *Tecumseh*. Many other cultivars can just turn yellow or brown before abscission.

Seedling Evaluation and Breeding

Many large old trees have been reported to produce 1,000 pounds of fruit.

In the early 1980's the only pollen available in the WREC planting was from *Yamagaki*, so seeds collected in the fall of 1982 were of known parentage. Seeds from *Great Wall* and *Giboshi* fruits were germinated the spring of 1983 and planted at orchard spacing at WREC in the spring of 1985. First flowering on a few trees of the cross *Giboshi x Yamagaki* was in 1989 and of the cross *Great Wall x Yamagaki*, in 1990. In all there were 60 seedling trees of the first and 55 trees of the second cross. It was not possible to obtain data from all members of each cross because poor trees were destroyed early or did not survive for other reasons. A breakdown of several plant characteristics of these crosses is shown in Table 2. One outstanding seedling has been named and introduced to several persimmon growers in Maryland:

Patapsco: (*Giboshi x Yamagaki*): A round-headed, well-branched tree adapted to *D. Virginiana* rootstock. Quite winter hardy, having survived at both WREC and WMREC. Leaves are large, dark glossy green, but with no fall color. Fruits heavily without pollination. Fruit is medium size, round, slightly tapered, ripening in mid- to-late October. Fruit is of excel-

lent flavor and is astringent, but loses astringency readily with ethanol treatment. The fruit is easily picked due to a longer than usual petiole. Average fruit weight: 4 oz.

Fruit Production

An interest in the commercial production of persimmons aside from their use as a home fruit and landscape tree began in the early 1980's. Questions of what cultivars, how soon, and what the production potential might be over the years needed to be answered. General recommendations for culture in California, Japan, or New Zealand might need to be modified for Maryland. Since our primary concern was for winter survival, we felt that any practice that might result in reduced cold tolerance was important, and late fertilization or irrigation should be avoided.

General recommendations, particularly on *D. virginiana* rootstock, are quite simple, because almost any type of soil is suitable. There are no particular acidity requirements and it is not necessary to ahere to a spray schedule.

A spacing of 15 by 15 or 15 by 20 feet should be adequate. Clean cultivation or mulching should not be necessary. The trees, once established, are quite drought resistant, although first-year irrigation of bare root trees is necessary. Container-grown trees are an advantage in setting out. In some instances, seedling trees can be set in place and budded or grafted in the field after 2 or more years of growth. An annual spring application of a complete fertilizer, such as 10-10-10, should be adequate. Most training should be to a central leader with strong branches.

Heavy fruit loads frequently break long branches or branches with weak crotch angles. In addition, overbearing results in smaller fruit and/or biennial bearing. Napthalene acetic acid can thin fruits effectively, but this should not be necessary with proper consideration for parthenocarpy and presence of pollen. Harvesting requires considerable care as the fruit should be clipped to avoid tree damage, except in a few varieties where the fruit can be snapped because of a longer or weaker petiole. For a complete discussion of production procedures, refer to Kitagawa, H. and P.G. Glucina. 1984. *Persimmon Culture in New Zealand*. DSIR, Wellington.

In March 1990, a planting of three trees of each of the most suitable cultivars in the original planting was made of 1-year grafts in 1-gallon containers. Minimum care was given, as in the first planting. Two years in the field was adequate for a number of cultivars to form flower buds, as they bore fruit the following year (fall 1992). The fruit production for 4 years (1993-1996) and the mean weight per fruit is shown in Table 3.

Many persimmons begin bearing fairly young provided that pollen is present, as was the case in this trial. Without pollen it is likely that fruiting would have been delayed another year or in the case of cultivars requiring pollination, such as *Kyungsun Ban-Si*, which would not have fruited at all. Heavy bearing is characteristic of many cultivars to the extent that many weak limbs are broken by the weight of the fruit. Many large old trees have been reported to produce 1,000 pounds of fruit. Heavy fruiting, however, results in smaller fruit, while fewer fruit following a hard winter (as in 1994) will result in larger fruit. Cultivars known to bear heavily without pollination will overfruit if pollen is present and so have smaller than normal fruit.

TABLE 2. Characteristics of Two Crosses

		Giboshi x Yamagaki	*Great Wall x Yamagaki*
Flowers			
	Pistillate	20	25
	Staminate and Pistillate	9	10
	Staminate	9	9
Fruit			
	flesh color:		
	Light (seeded)	9	16
	Dark (seeded)	7	2
Trees			
	Winter hardy as parents	5	3
	Survived -22 °F at WMREC	0	0
	Worth Saving in 1995	8	5
	Worth Naming in 1996	1	0

There were several trees from *Giboshi* seedlings that were light fleshed and nonastringent. Dark-fleshed fruits were nonastringent and all fruits were seeded.

Marketing and Fruit Preferences

The third author has had a flower stand on weekends at farmer's markets for many years with persimmons being offered as seasonal items from October to early November. Through observation, taste panel results, and consumer questionnaires, a number of conclusions have been reached. The fruit offered for sale came from WREC and home plantings of the authors. The fruit was sold by count with pricing up to $1 each for large fruit (e.g., *Hana Fuyu*) to 5 for $1 for small fruits, such as *Ichidagaki* and *Great Wall*. Customers with an Oriental background showed immediate interest, followed by those from a rural background who could make an association with the native American persimmon. Older people were generally more interested in trying a new fruit than were younger people. In any case, explanations and personal contact were important in establishing both first-time and repeat customers. Although nonastringent and seedless fruits were generally preferred, many were interested in astringent fruits once they learned that persimmons left sealed in a plastic bag with an apple for 3 days produced ripened fruit suitable to eat out-of-hand like apples or plums.

The preferred fruit characteristics, established by questionnaires, taste panels, and conversation, were:

1. bright orange color;
2. large size;
3. tapered or round fruit (over flat fruit);
4. nonastringent fruit;
5. bright-colored fruit flesh; and
6. freedom from blemishes.

Some test results are shown in Table 4. Unfortunately, the results were not always consistent, but indications are that appearance (size and color) are at least of equal importance to flavor. When astringent fruits were brought to the same point of ripeness there was no preference for naturally nonastringent fruits but, of course, the former would have a shorter shelf life and the convenience of naturally nonastringent and seedless fruit should be self-evident.

TABLE 3. Mean Fruit Production Per Tree by Year

		Fruit Weight: Production per tree in pounds			
	Cultivar	1993	1994*	1995	1996**
Planted 1990:	*Davie #2*	80	50	156	89
	Great Wall	20	34	40	54
	Gwangyang	78	3	30	66
	Ichidagaki	44	1	75	79
	Niu Nai	42	9	142	152
	Pontiac	68	24	109	37
	Saijo	1	12	79	38
	Sung-hui	9	47	39	82
	Tamopan	22	31	63	67
	Tan-Kam	21	12	69	32
	Twentieth Century	52	20	109	46
Planted 1991:	*Giboshi*	19	17	42	47
	Peiping	0	1	38	26
	Sagocki-Si	18	21	50	38
	Tecumseh	40	62	67	100
Planted 1992:	*Aizu Michirazu*	3	31	36	76

* Following low temperature of -4 °F in January 1994.
** Poor fruit set following cool, wet spring.

Conclusions

As an ornamental tree and for home fruit, the well-tried and most hardy astringent fruited trees that do not require pollination, such as *Great Wall* and *Tecumseh*, can be recommended, followed by the self-pollinating *Yamagaki*. In protected areas, the nonastringent, fruited *Tan-Kam* or *Twentieth Century* could be tried. If a pollinator is present, such as *Yamagaki*, a second tree could be *Giboshi* or *Kyungsun Ban-Si*.

For commercial production in southern Maryland or Eastern Shore counties, the nonastringent cultivars *Tan-Kam*, *Gwangyang*, *Twentieth Century*, *Hana*

Fuyu, *Kawabata*, or *Fuyu* are recommended, in that order. The larger, fruited astringent cultivars, such as *Sheng*, *Niu Nai*, or the highly productive *Inchon*, also could be grown.

Although supermarkets have sold California-grown persimmons for years, it seems that farmer's markets and roadside stands might make a better sales outlet for the beginning grower. Consumer education on a personal basis is essential to developing a market. Harvesting can be the most labor-intensive part of production, but persimmons do hold a strong potential as an alternative crop for Maryland.

TABLE 4. Mean test panel scores for 3 years (13 individuals in 1990, 9 individuals in 1993, and 7 individuals in 1995) evaluating fruit appearance, texture, flavor, and flesh color. 10 = best rating. All fruits brought to same point of ripeness for eating.

Cultivars	Astringent	1990	1993	1995
Hachiya from California	Yes	-	8.1	-
Fuyu	No	-	5.1	8.1
Giboshi (seeded, dark flesh)	No	3.0	4.7	-
Giboshi (light flesh)	Yes	-	8.6	-
*Giboshi** (light flesh)	*No	-	6.7	-
Great Wall	Yes	-	6.5	-
Gwangyang	No	-	5.2	7.7
Inchon	Yes	6.6	-	-
Hana Fuyu	No	-	-	8.0
Kawabata	No	8.2	-	8.5
Kyungsun Ban-Si	Yes	-	7.2	-
Midai	No	-	-	8.3
Miss Kim	Yes	6.6	7.4	-
Niu Nai	Yes	7.0	7.9	-
Sagocki-Si	Yes	-	-	7.4
Sung-hui	Yes	7.3	7.1	-
Sheng	Yes	8.6	-	-
Taebongsi	Yes	7.0	7.9	5.1
Tan-Kam	No	-	6.1	8.1
Tecumseh	Yes	4.8	6.2	-
Twentieth Century	No	-	6.7	8.6
Yamagaki	No	5.6	-	-

* Had been ethanol-treated to remove astringency.

James B. Shanks, Professor Emeritus
Michael J. Newell, Horticulturist
University of Maryland, College Park

William H. Preston, USDA/EPA, Retired

Horticulture Research Bulletin (HRB) No. 1 of the Department of Natural Resource Sciences and Landscape Architecture, College of Agriculture and Natural Resources, University of Maryland, College Park.