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Cherry varieties in New York State

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In 1968, the sale of cherries in New York grossed about \$6.3 million; this compared with \$50 million for apples, \$16.4 million for grapes, and \$1.9 million for strawberries. New York ranks second to Michigan in red tart cherry production and fifth among the states producing sweet cherries. A survey made by the New York State Department of Agriculture and Markets in 1970 showed that 542,530 red tart trees (5,985 acres on 585 farms) produced 22,000 tons, and 132,049 sweet cherry trees (2,038 acres on 553 farms) produced 5,000 tons. Between 1966 and 1970, the acreage of red tart cherries decreased 15 per cent, and the acreage of sweet cherries decreased 23 per cent, but the tonnage production of both red

tarts and sweets has been increasing slightly in recent years.

Red tart cherries in New York are almost all of one variety, Montmorency. About two-thirds are grown for freezing and the rest for canning. More than 75 per cent of the State's crop is harvested by machine. Mechanical harvesting has been facilitated by the use of ethephon to loosen the fruits. The cherry industry, however, has had setbacks by low prices, high labor costs, competition from other cherry growing areas, hurricanes just before harvest, killing spring frosts, and cold, rainy weather during bloom.

The most important sweet varieties grown in New York are Windsor, Napoleon, Schmidt, Emperor Francis, and Gold. Most of the fruit is processed into maraschino cherries by bleaching it in a sulphur dioxide-calcium carbonate solution for several months, after which artificial color and flavoring are added. In recent years, growing dark sweets for roadside stand marketing has been increasing.

Sweet cherries are more difficult to grow than tarts. Trees suffer from winter injury, they bloom early and blossoms are frequently killed by spring frosts, and the nearly ripe fruits often split after rainstorms. Birds also destroy much of the early ripening fruit. In spite of these odds and fluctuating prices, growing sweet cherries can be profitable if the proper site and varieties are selected.

The characteristics of cherry varieties which are described in Table 1 are based chiefly on my experience with them over a quarter of a century in a cherry variety test orchard at the Geneva Station and my observations in New York commercial orchards, as well as records of their performance at other

Table 1.—Cherry variety characteristics.

	Average ripening date at Geneva, N. Y.	Fruit color	Av. fruit width (in.)	Flesh firmness	Skin cracking in rainy seasons	Winter hardiness of tree	Productivity	Estimated future commercial usefulness
I. Red tart cherry varieties								
Commercially important varieties								
Montmorency	July 21	Medium red	3/4 to 7/8	Semi-firm	None	Hardy	Very productive	Excellent
English Morello	July 30	Very dark red	3/4	Semi-firm	None	Hardy	Very productive	Some; small tree
Northstar	July 26	Very dark red	3/4	Soft	None	Very hardy	Productive	Some
Meteor	July 29	Light red	7/8	Soft	None	Very hardy	Productive	Some
Sweet cherry varieties								
Commercially important varieties								
Windsor	July 16	Dark red	3/4	Firm	Little	Hardy	Very productive	Good
Napoleon	July 11	Yellow, red bluish	3/4 to 7/8	Firm	Severe	Below av.	Very productive	Good
Schmidt	July 10	Nearly black	7/8	Firm	Some	Medium	Moderate	Fair
Emperor Francis	July 10	Yellow & red	7/8	Firm	Little	Moderately hardy	Productive	Good
Gold	July 15	Yellow	5/8	Firm	Very little	Very hardy	Heavily cropping	Good
Minor profitable varieties								
Bing	July 10	Nearly black	7/8	Firm	Severe	Tender	Productive	Little
Hedelfingen	July 17	Nearly black	7/8	Firm	Little	Medium	Very productive	Good
Hudson	July 25	Very dark red	3/4 to 7/8	Very firm	Little	Medium	Medium	Very late; roadside
Lambert	July 18	Purplish red	7/8	Firm	Severe	Tree med., buds hardy	Productive	Medium
Rainier	July 8	Yellow, red bluish	7/8	Firm	Little	Extremely hardy	Very productive	Pollinates Napoleon
Ulster	July 14	Nearly black	3/4 to 7/8	Firm	Little	Medium	Productive	Good
Van	July 15	Nearly black	3/4 to 7/8	Very firm	Some	Very hardy	Very productive	Fairly good
Vista	July 3	Nearly black	7/8	Semi-firm	Little	Medium	Medium	Fair
Promising new varieties								
Chinook	July 5	Nearly black	1	Firm	Very severe	Medium	Medium	Fair
Compact Lambert	July 18	Purplish red	7/8	Firm	Severe	Hardy	Productive	Small tree
Corum	July 8	Yellow, red bluish	3/4 to 7/8	Semi-firm	Little	Hardy	Productive	Pollinates Napoleon
Merton Bigarreau	July 16	Very dark red	7/8	Firm	Very little		Productive	Medium
Sam	July 6	Black	3/4 to 7/8	Very firm	Little	Hardy	Moderately productive	Small tree, late bloom
Stella	July 13	Very dark red	1	Semi-firm	Medium	Medium	Medium	Self-fruitful
Venus	July 6	Dark red	3/4 to 7/8	Semi-firm	Little	Medium	Very productive	Medium
Viva	July 4	Dark red	3/4	Semi-firm	Crack-resistant		Medium	Good

experiment stations and nurseries. The 4 red tart varieties listed were selected as the best available from more than 40 named varieties in the test orchard, and the 21 sweet varieties are best of more than 100 tested.

Red tart varieties have two juice color types. Amorelle varieties with essentially colorless juice are Montmorency and Meteor. Morello varieties with dark red juice and very dark red skin are English Morello and Northstar.

Sweet cherry varieties are of two color classes: white and dark. The flesh of white varieties is light yellow; their skin colors range from 100 per cent light yellow (Gold), through half yellow and half red (Napoleon), to 100 per cent red and partially dark red (Emperor Francis). The flesh of dark sweet varieties is red to very dark red, with the skin color ranging from red (Windsor), through purplish red (Lambert), to nearly black (Schmidt).

Cherries bloom early in the spring while there is still a serious threat of killing frosts. Complete crop loss due to frost after the blossoms open can occur as frequently as 1 year in every 3. Bloom dates are not listed in Table 1 because in the Northeast all varieties of sweet cherry generally begin to bloom within a 4- or 5-day period. At Geneva, New York, the average bloom date for sweet cherries is about May 8 and ranges between April 25 to May 17. Sweet cherries generally bloom about 8 days before the McIntosh apple blooms. The average bloom date of Montmorency is May 13, 3 days before McIntosh, and it ranges from May 6 to 23. The bloom periods of the several sweet varieties almost always overlap; thus, they can cross-pollinate each other. In the western states where spring temperatures rise more gradually, provision for early and late blooming pollinators must be watched more closely. Early blooming varieties are Windsor, Napoleon, Emperor Francis, and Corum; late bloomers are Lambert and Sam.

Red tart cherry varieties are self-fruitful. They set good crops with their own pollen and can be planted in single-variety orchards. However, all varieties of sweet cherries, except Stella, are self-unfruitful. One of the most important considerations in laying out a new sweet cherry orchard is to provide for proper cross-pollination of varieties. No more than four rows of one variety should be planted in a block. The four (or fewer) rows of the main variety should be followed by at least one row of a pollinating variety, and then the main variety again. Another satisfactory arrangement is to plant a pollinating variety every third tree in every third row.

Although self-unfruitful, sweet varieties do produce good, viable pollen which will effectively set fruits on most other varieties. Because of self-sterility genes, they cannot fertilize their own flowers. Certain groups of varieties belong to the same incompatibility

types (Table 2). All varieties within a group are ineffective pollinators on other varieties in the same group. However, varieties which belong to unlike incompatibility groups can effectively pollinate each other. One such cross-incompatibility group consists of Napoleon, Emperor Francis, Bing, Lambert, and Compact Lambert. Thus, in an orchard of Napoleon, neither Bing nor any other variety in this group could serve as the pollinator. Another group of varieties which are cross-incompatible includes Windsor, Van, Venus, and Merton Bigarreau. A third group is Chinook, Hudson, and Rainier.

Table 2.—Pollen cross-incompatibility groups of sweet cherry varieties.

Cross-incompatibility group	Varieties*
II	Windsor, Van, Venus, Merton Bigarreau
III	Napoleon, Emperor Francis, Bing, Lambert, Compact Lambert
IV	Viva
VI	Gold
VII	Hedelfingen
VIII	Schmidt
IX	Chinook, Hudson, Rainier
XIII	Ulster
Unknown	Vista
Unknown	Sam
Unknown	Corum
Self-fruitful	Stella**

Varieties in the same group are cross-incompatible and cannot effectively pollinate each other; varieties in different groups will pollinate each other.

** Stella is self-fruitful and also will pollinate all other sweet varieties.

Any variety of one group will serve as a pollinator for any variety in any other group. For example, Rainier and Emperor Francis are cross-compatible. Thus, solid blocks of white cherries for the brining market might consist of Emperor Francis and Rainier. Each of the 9 varieties listed in Table 2 but not included in any of the above three incompatibility groups is in its own group and will effectively pollinate any of the 20 other varieties. Red tart varieties will not pollinate sweet varieties because they bloom too late, after the flowers of sweets have passed. When just a few varieties of sweet cherries are grown in large plantings, colonies of honey bees, one colony per acre, should be brought into the orchard just before bloom.

Red tart varieties have rather soft fruits, but in sweet varieties, firm flesh is an important attribute so that they can be marketed without bruising. Soft-fleshed varieties such as Black Tartarian are no longer

planted. All of the 21 sweet cherry varieties in Table 1 have good eating quality, Schmidt being one of the best. Actually, the range in flavors and eating qualities is much narrower in sweet cherries than in apples or other fruits; sweet cherry varieties all taste very much alike. Flavors are more affected by tree vigor, crop load, and stage of maturity than they are by different varieties.

Skin cracking of sweet cherries is not a problem in dry seasons, but if it rains just before harvest, as much as 90 per cent of the crop can be rendered completely unmarketable because of cracking. Cracking is caused by the absorption of rain water or dew through the skin, and the fruits burst open. Within just a few days after the skin cracks, the exposed flesh will be attacked by the brown rot fungus. Chinook, a bad cracker, produces excellent crops of large, luscious cherries in dry weather, but rain will crack them. Very firm-fleshed varieties often crack more than soft-fleshed varieties, though the degree of cracking is not always proportional to flesh firmness. Van, for example, has a very firm flesh but cracks less than many semi-firm varieties. The extent of skin cracking is also affected by the relative crop load carried by a tree. Fruits on a heavily cropping tree tend to crack less than fruits of the same variety on a tree carrying a light crop.

Three major breakthroughs have been achieved by sweet cherry breeders in recent years: (a) a crack-resistant variety, Viva; (b) a self-fruitful variety, Stella; and (c) compact habit of tree growth, Compact Lambert. Viva was introduced in 1972 by the Horticultural Research Institute of Ontario; Stella and Compact Lambert were introduced by the Research Station, Summerland, British Columbia. Another significant advance in cherry growing is the sale of virus-free trees by commercial nurseries.

Mazzard and mahaleb rootstocks are used in the commercial propagation of cherry trees. Red tart cherries are generally budded on mahaleb rootstocks. Mahaleb is more resistant to very low winter temperatures and is more dwarfed than mazzard, but mazzard is more vigorous, longer-lived, and shallower-rooted which makes it more tolerant to poorly drained soils. Mazzard stocks are preferred for sweet cherries. Van is bud incompatible on mahaleb and must be budded only on mazzard. No other case of bud incompatibility is known. *Prunus fruticosa* has been tried as a strongly dwarfing stock for cherry trees.

New York State is the northern limit in eastern North America for successful sweet cherry growing. Varietal cold hardiness must be considered when an orchard is planted (Table 1). Commercial growing of sweet cherries should not be attempted where temperatures sometimes drop below —25 F. Trees of red tart cherries are somewhat hardier than sweet cherries. The winter hardiness of cherry varieties does not

remain the same year after year. Hardiness can be reduced by many cultural and environmental factors such as excessively high or low vigor, late summer rains, late summer fertilizer applications, or very sudden drops in the temperature. Virus-infected trees are less hardy than healthy trees of the same variety. Southwest trunk bark killing is a common form of winter injury. On a clear day in late March or early April, the bright sun shining on the bark will sharply raise the bark temperature and activate the cells of the trunk cambium. Because the weather is clear, the temperature that night could drop to sub-freezing levels and kill the cambium. This dead cambium may not be noticed immediately; it may be 15 months after its occurrence when the grower will tap the shell of loose bark on the southwestern side of the trunk and discover that it is dead. Injury can be reduced by painting trunks with a white latex paint. The relative hardiness of the various parts of the tree can be different for different varieties: trunk bark, branch heart wood, dormant blossom buds, open blossoms during spring frosts. Sweet cherry trees do not recover from winter injury as well as many other kinds of fruit crops.

Cherry trees are much more difficult to grow than apple trees. They often die of unknown causes. One of the most common reasons, however, is wet soil; they simply will not grow where drainage is poor. Sweet cherry trees are also very nonprecocious; they are slower than apple trees to come into bearing, sometimes requiring 7 years to produce their first dozen quarts of fruit.

Birds often cause serious damage to the cherry crop. A lower percentage loss by birds occurs in very large orchards than in small orchards. In home gardens where only a few trees are grown, birds often harvest 90 per cent of the crop just as the fruits begin to turn red, long before they are fully black and ripe. Sweet cherries are more subject to bird damage than red tart cherries; dark sweets more than white sweets. Early maturing varieties are more susceptible to bird damage than varieties which ripen later during mid-July. It is for this reason that the many good early dark varieties such as Seneca, Black Tartarian, and Early Rivers are not listed in this bulletin. No completely effective method of control is known except to cover the trees with netting, which is not practical for commercial plantings. Cherry orchards should not be planted near a woods which will harbor the birds. One of the most practical methods of partial bird control is an electric noise making device with speakers tied in the tops of cherry trees and which produces a periodic loud complex of multiple chirps. Other tested methods having varying degrees of success are destroying nests, shooting, trapping, hanging reflective metal pans, repellent chemicals, and exploding devices.

In addition to root-smothering wet soils, branch-killing cold winters, and fruit-devouring birds, cherries suffer from attack by many diseases and insects, the control measures of which are discussed in *Tree-fruit Production Recommendations*, published annually by Cornell University. Growers must apply sprays to control cherry fruit fly, cherry leaf spot, brown rot, plum curculio, botrytis blossom blight, black cherry aphid, powdery mildew, European red mite, and the two-spotted mite. Every cherry fruit could have a worm in it if a cherry fruit fly spray is not applied.

Bacterial canker disease can infect the branches, the twigs, and the leaves, and varieties differ widely in their susceptibility. Sam and Early Burlat are resistant, while the following are quite susceptible: Napoleon, Lambert, Emperor Francis, Hedelfingen, Windsor, and Gold. A complete listing is available in other sources. The John Innes Institute, Norwich, England is breeding new varieties resistant to bacterial canker.

Viruses of cherry trees can be transmitted during the propagation of trees in the nursery. If the parent tree from which the buds are cut is virus infected, then the viruses will be transmitted in the buds to the newly budded nursery trees. For this reason, it is imperative that nurseries use buds only from virus-tested bud sources. Fortunately, most good nurseries now have virus programs, but the grower should still verify this from his nursery and insist on purchasing only certified trees from virus-tested sources.

In addition to transmission through the bud, necrotic ring spot virus and sour cherry yellows virus can be transmitted within the orchard by pollen. Bees may carry pollen from an infected tree to a healthy tree and infect it. Therefore, prevention of transmission is impossible, but despite this, tests show that growers will greatly benefit by starting with healthy trees because of better growth and yields. The spread of these two viruses from diseased to healthy trees is much more rapid in red tart cherries than in sweets. A young, virus-free red tart orchard may become almost completely infected by pollen transmission 5 or 6 years after blossoming begins; sweets require longer.

Sweet varieties differ in their tolerance to virus infection. One of the major reasons why Windsor is the most important sweet cherry variety in New York is its tolerance to virus infection and to winter injury. Schmidt, Emperor Francis, and Van are quickly debilitated after they become infected. In addition to necrotic ring spot and yellows, several other viruses, as well as the mycoplasma, X-disease, can also be troublesome in cherry orchards.

RECOMMENDED RED TART CHERRY VARIETIES

Montmorency is by far the leading red tart variety

and will continue to occupy this position. Because the trade knows this variety best, most growers who plant red tart cherries should plant Montmorency. Its fruits hang well after they become harvest mature, and they can be harvested over an extended period of about 3 weeks.

Morello red tart cherries, English Morello and Northstar, are used by processors for special purposes when a colored juice is preferred.

Trees of Meteor and Northstar are especially winter hardy for planting in northern regions.

RECOMMENDED SWEET CHERRY VARIETIES

White sweet varieties. Eighty-five per cent of New York's modest sweet cherry production goes into brining. The rest are dark varieties for fresh roadside sales. White varieties best for brining are: Napoleon, Emperor Francis, Rainier, Gold, and Corum. Of course, the dark variety, Windsor, is also used for brining, but the fruits are small and they must be harvested immature, before red pigment begins to develop around the pit. The brining solution is incapable of penetrating down to the pit to bleach the red pigment from very dark-fleshed varieties after they have become fully ripe.

Gold for brining is easily bleached as it has no red pigment. Trees are hardy and productive. Blossom buds will come through a cold winter at the time fruit buds of most other varieties are killed. Gold fruits are small, but with machine harvesting, small-sized fruits may not be a disadvantage.

Dark sweet varieties. The 16 dark sweet varieties described in Table 1 can be profitable when sold on the fresh market, either on the roadside stand or as pick-your-own. In order of their profitability, these dark sweet varieties might be ranked approximately as follows: Windsor (possibly the most profitable), Van, Venus, Vista, Hedelfingen, Viva, Schmidt, Compact Lambert, Hudson, Sam, Chinook, Stella, Ulster, Lambert, Merton Bigarreau, Bing. Trees of most of these varieties are sold by commercial nurseries.

Some cherry varieties which have been profitable in commercial orchards but are not emphasized in this bulletin are Black Tartarian, Giant, Victor, Yellow Spanish (hardy tree), Vega, Early Burlat, Valera, Early Rivers, Vic, Black Republican, Vernon, Black Russian, Seneca, Deacon, Hardy Giant, Governor Wood, Lyons, Sodus, Velvet, Gil Peck, Jubilee, Noble, Lamida, Merton Heart, Mona, Early Richmond, and Royal Duke.

In selecting cherry varieties for new orchards, growers are generally advised to give first consideration to those varieties which are already most extensively grown in the State, because these have been profitable and are best known by markets. On the

other hand, the young grower who is inclined to be experimental and who wishes to take advantage of all the latest developments, along with his standard varieties, will wish to try the crack-resistant Viva, the smaller Compact Lambert trees, the self-fruitful Stella, the very late ripening Hudson, the very early ripening Vista, or the heavily cropping, second-early Venus.

Information about the growing and culture of cherry trees can be found in other bulletins.

This bulletin is an updating of Cornell Extension Bulletin 1197. It deals with cherry varieties recommended for New York State commercial and home garden orchards.