TREE FRUITS
for Alaska

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Common chokecherry has possibilities as a fruiting shelterbelt

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TREE FRUITS FOR ALASKA

This circular has been prepared with three major objectives in mind. 1) to define areas in which tree fruit culture is possible in Alaska and the types of fruit that can be grown in each, 2) to name and describe the varieties that at the present time seem more desirable for planting in Alaska, and 3) to point out the main problems limiting tree fruit culture and suggest, rather than discuss, the probable means by which they may one day be solved.

Fulfilling the first two of these objectives was a relatively simple matter, since it was only a matter of defining and description. But the third objective was not—and is not—so easy of attainment. In what may be an oversimplification, it has been stated that there are two main problems, winter hardiness and earliness of maturity, and methods have been indicated by which, it is believed, each may be overcome.

However the very problems themselves are not as simple as they have been made to appear. That of winter hardiness is one of the most widely debated and investigated subjects in plant science. And the characterization of the second as "earliness of maturity" makes it sound too simple, for actually the factor involved, as it applies to fruit growing in Alaska is aiding or hastening natural earliness of maturity. This is a far more complex matter.

In describing the solutions of these problems, mention has been made of such factors as pruning and training, fertilization, furnishing protection to increase available heat, and limiting the water supply to the trees during the period of fruit maturation. Each of these subjects has also been the subject of numerous investigations and some of them have been the subject of textbooks. The discussion of them here has been limited to simple statements as to their merit in achieving specific objectives.

Most of the statements made are based on research in Alaska. In one particular, however, they have knowingly been extended beyond the domain of research-supported conclusion. This is in advocating the withholding or decreasing water available to the trees during the maturation of the fruit. Some will disagree with this recommendation, for it runs counter to what is considered good orchard management in commercial fruit producing regions of the world. In these an ample water supply is advocated for this period to increase fruit size and heighten, though not to increase, coloration. In Alaska both considerations should be waived in favor of obtaining reasonable yields of fruit, suitable for culinary purposes.

In all three regions of Alaska where tree fruit production is at all possible, lack of winter hardiness in the trees and failure of fruit to mature properly are the two chief limiting factors.

Winter hardiness Lack of winter hardiness is the most commonly stated reason for the failure of tree fruit production in Alaska. This may be either failure of the root stock to withstand adverse conditions or it may be lack of hardiness in the tops resulting in kill-back or death of the entire fruiting structure.

These two characteristics are not necessarily related for a hardy root stock does not greatly increase the hardiness of a non-hardy top, nor does a hardy top so influence a tender root stock as to make it entirely hardy. But their effects on fruit production are equally disastrous, for though death of the root system kills the whole tree the death of, or severe injury to, a non-hardy top is equally effective in limiting fruit production. The ideal of course, would be a perfectly hardy top on a perfectly hardy root stock. This perfect combination has not yet been realized, and may never be, but measures can be taken to improve the varieties we already possess.

Thus, Yellow Transparent, or sports of it, can be and have been grown in the more southerly and in the south-central portion of Alaska with limited success. The Dolgo crab appears to be reasonably hardy in these same regions. Much research has been and is being done by several northern experiment stations to find or develop hardier root stocks. Considerable progress has been made in recent years, and it may be that some of the newer stocks will provide the additional hardiness needed in Alaska.

There is also the possibility that the natural hardiness of these or similar varieties can be improved by double budding or top working technics by which hardier under stocks can be inserted between the root stock and the fruiting portion of the trees. Some promising work of this nature has already been done but much more should be known concerning the effects of different under stocks and the proportionate portion of the top they should provide, i.e., whether the conventional double budding or the conventional top working method will give best results.

Such measures coupled with the selection or creation of better planting sites, proper fertilization and cultural methods may so improve natural hardiness that tree survival as such will no longer be a major obstacle to fruit growing in these regions.

Maturity of fruit The second obstacle to tree fruit production in Alaska is failure of the fruits to develop fully or to ripen sufficiently for culinary use. Such failure is common to both the standard and the crab apple groups. This problem is actually more difficult to solve than lack of winter hardiness because from a practical viewpoint, there is so little that can be done to alter the natural date of ripening of a given variety.

Differential fertilization, which is often very effective with certain herbaceous plants, is of little value for apples. Moreover, in Alaska there is a definite, and rather low limit to the quantity of fertilizer that can be used without causing excessive tree growth with consequent loss of natural hardiness. This ap-

plies especially to nitrogen which, if used in excess, may cause late fall growth which cannot mature before the occurrence of freezing temperatures.

Limitation of water supply during the period between fruit set and maturity might hasten ripening to some extent. This might be accomplished by the use of a fast growing cover crop around the trees during this critical period to take up excess moisture and nutrients and force the tree into a state of premature maturity. If a choice of sites for the fruit trees is available, it might also be accomplished by the deliberate choice of a site that is known to be rather dry or lacking in moisture holding capacity during the middle of the summer and early fall. If this latter method is used, however, it would be necessary to take into account the slope or exposure of the location as well as its droughty nature because a faulty slope would more than offset the advantage gained by its natural dryness. In no case should the tree be subjected to such severe drought conditions as to cause injury, for this would defeat the primary objective of securing good fruit.

Since the fundamental reason for failure of naturally early maturing apples to ripen is lack of sufficient heat, several methods of increasing the supply can and have been employed. The first of these, the "espalier method", dates back almost to the beginning of recorded history. It consists of planting trees close to a high structure such as a stone wall or building so that the light and heat are reflected back through the tree. Sometimes, and in its strictest application, the method is developed to the extent that the trees are made to grow flat against the wall by a combination of pruning and tying. This method involves considerable labor and skill and is hardly worthy of use except to gratify a hobby or to produce a few select fruits.

A practical variation of the espalier method is that of planting the fruit trees behind or between shelterbelts. Such shelterbelts modify the local environment for the trees by making it warmer in the summer. They may also furnish competition for excess soil moisture during the late summer and early fall, thus hastening the maturity of both the apple trees and their fruit. In the winter they furnish protection from cold, violent storms and assist in collecting and holding a covering of snow around the fruit trees. This snow cover prevents soil heaving caused by alternate freezing and thawing of the soil in winter. It later becomes a source of water during the early weeks of spring growth. Several trees and shrubs may be used for such shelterbelts. Two of the very best, European bird cherry (*Prunus padus*) and its relative, the Common chokecherry (*P. virginiana*), may themselves be considered as fruit crops in Alaska.

In southeastern Alaska, almost any of the hardy crab apple varieties and several of the more hardy, early-maturing standard apple varieties are worthy of planting. Hardy varieties of sour cherries have also been grown with some degree of success.

In the southern region, the Kenai Peninsula and similar areas, extra-hardy, early-maturing varieties of crab apples can be grown and even some of the larger-fruited sorts are successful in favorable locations. Some standard varieties of apples are also sufficiently hardy to survive and set fruit, but except in very

favorable years or locations the fruit seldom matures properly. Commercial sour cherries are seldom hardy but the more hardy species of wild cherries could probably be more widely grown.

In the south-central region, including Anchorage and the Matanuska Valley, commercial sour cherries are not hardy, but some of the wild cherry species appear to be worthy of culture as fruiting hedges or shelterbelts. A relatively few trees of standard apple varieties, or sports from them, survive in this region but rarely mature fruit. This also applies to the larger-fruited varieties of crab apples.

VARIETY TESTS

Since 1949 a fairly extensive tree fruit testing program has been conducted at the Matanuska Experiment Station Farm, and to a somewhat less degree at the College Farm. In these tests an effort was made to include all of the early-maturing, winter-hardy varieties available. A minimum of from four to six trees of each variety were planted for each test. If any of these showed indications of hardiness, or if they were especially desirable, the test was repeated with an equal or greater number of trees.

To the present time none of the standard varieties of apples nor any of the large fruited crab apples have proved hardy. However some of the small-fruited, early-maturing crabs have shown promise of being sufficiently hardy to warrant further testing and planting on a limited scale by those who are anxious to make a start in fruit growing. None of them can be described as of excellent dessert quality though some of them will make an acceptable substitute. All of them make excellent jelly and some can be used for both jelly making and for canning. These varieties are described in this circular. There is also appended a fairly complete list of the varieties that have been tested or are under test at the present time.

RECOMMENDED VARIETIES

ADAM originated by W. J. Boughen of Valley River, Manitoba sometime before 1906. It is a seedling of Siberian crab and was described as the "hardiest of the hardy". It has been under test at Matanuska since 1951 and has shown only moderate winter injury. It is an annual bearer with a bloom period from about June 1 to June 9. **Tree** rather stout-limbed, open or spreading, rather slow growing. **Fruit** small to medium, 7/8 to 1 inch in diameter, nearly round but slightly flattened at both ends; yellow skin washed or striped by bright red. Calyx persistent. **Flesh** crisp, juicy, acid, slightly astringent; quality fair to good and by some considered to be of dessert value, fine for canning or jelly. Ripens in early September and is rather persistent on the trees.

Adam crab apple fruit

Anaros crab apple

ANAROS (Rosthern No. 2) originated at the Experimental Station, Rosthern, Saskatchewan as a seedling of Antonovka. It has been on test at Matanuska since 1951 and has shown but slight winter injury. **Tree** vigorous, open or spreading with medium stout branches. **Fruit** round-oblate, 1½ to 1¼ inches across by ¾ to 1¼ inches in depth; yellow washed with crimson. **Flesh** yellow, crisp to mellow, rather acid but pleasant, quality good, canning quality fair, ripens in early September.

JACQUES originated at the Experimental Station, Rosthern, Saskatchewan and is described as three-fourths apple. It is an annual bearer. It has been on test at Matanuska since 1951 without showing the slightest trace of winter injury. **Tree** very vigorous, distinctive in its very upright type of growth. **Branches** long, slender but with stiffness characteristic of *Malus baccata*. **Fruit** oblong-conic, 1½ inches across by 1¾ inches in depth, sometimes slightly ribbed; yellowish-green washed with dull red, frequently spotted with dull

Jacques crab apple

brown areas. **Flesh** juicy, greenish-white, firm, sub-acid; dessert quality only fair, very good for sauce and pies, ripens in early September.

OSMAN originated at the Experimental Farm, Ottawa, from a cross of Siberian crab x Osimoe made in

Osman crab apple

1904 by Dr. Wm. Saunders. It was named in 1911. It has been on test at Matanuska since 1951 and has shown considerable winter injury in some years but is presently rated as fairly hardy. **Tree** moderate vigor, open or spreading, branches rather slender. **Fruit** 1 to 1¼ inches across by 1¼ to 1½ inches in depth or roundish oblate, slightly ribbed, pale yellow washed with dull crimson, often with russeted stripes on ribs. **Flesh** yellow, crisp, tender, acid and slightly astringent; quality fair to good as dessert when fully ripe, good for canning and jelly. Ripens from first to middle of September.

RED SIBERIAN originated in France. On test at Matanuska since 1951 and has never shown winter injury. **Tree** moderate vigor, upright growth habit; **branches** long, slender but with stiffness of *Malus baccata*. **Fruit** small, ¾ inch in diameter, borne in clusters, roundish oblate to slightly oblong, somewhat irregular; **stem** long and slender, **calyx** often deciduous; **skin** pale yellow, striped and blushed with bright red at ma-

turity and slightly overspread with bluish bloom; **flesh** crisp, juicy, subacid, rather astringent. Not a dessert fruit but excellent for jelly. Ripens September 1 to 15. This variety should also be considered an ornamental and be grown where advantage can be gained from its profuse bloom and the beauty of its small, bright red fruits in the fall.

RESCUE originated about 1936 at the Scott Experimental Station, Scott, Saskatchewan as a seedling of Blushed Calville. On trial at Matanuska since 1951 and has shown only a very moderate amount of winter injury. **Tree** moderate in growth, open or spreading. **Fruit** small apple or large crab, 1½ by 1½ inches or globular; greenish yellow washed with dark red at maturity; **flesh** yellowish white, firm, sweet, subacid to sweet, free from astringency; **quality** good; flavor excellent. Ripens in late August or as early as any crab tested. Because of its profuse white bloom and showy red fruits in the fall, this may be considered as an ornamental as well as a fruiting variety.

Rescue crab apple

SIBERIAN (*Malus baccata*) introduced by Kew Botanical Gardens in 1784 and by several subsequent importations, mostly as seed. From N. E. Asia and N. China. **Tree** generally upright to somewhat spreading; moderately vigorous. **Branches** long, slim, but very hard and wiry. Perhaps the most hardy of all fruit trees. Blooms in early spring with a profusion of white or pink-tinted, very fragrant flowers. **Fruit** from size of large garden pea to ¾ inch in diameter, yellow or red and firm, never becoming mellow, the calyx usually falling off before maturity, rather astringent, but excellent for jelly. They are persistent on the trees throughout the winter and serve as food for birds. There are various horticultural varieties or subspecies which are mainly used as ornamentals.

Siberian crab apple

EUROPEAN BIRDCHERRY—(*Prunus padus*) is the "May Day" tree of English literature. This cherry can be grown in hedge rows as a

shrub or as single trees to 30 feet in height. It seems more productive when grown as a hedge row. Its flowers are white, very fragrant, and are borne in drooping clusters from 3 to 6 inches long. The cherries are about ¼ inch in diameter, red, turning to almost black when fully ripe. They are somewhat bitter but make excellent jelly in combination with apples. It is hardy in Alaska to the Tanana Valley. Several good hedge rows as well as single trees are to be found in Fairbanks.

COMMON CHOKECHERRY—(*Prunus virginiana*) is very similar to the European Birdcherry but is a bush or only occasionally a small tree. Its flowers are also produced in long clusters but somewhat earlier and are less fragrant. They are grouped closer on the central stem and are somewhat less showy. At first they are ascending or upright but become pendulous as the fruit matures. The fruits are deep red varying to yellow. They may be used for culinary purposes.

SOURCE OF TREES

Until a bigger nursery industry develops an inventory of stocks in Alaska, most fruit trees must be imported from the other States or from Canada.* Only a few nurseries in the States list varieties adapted to Alaskan conditions. Instead they are growing plant materials especially for their major market areas.

Prospective purchasers of Canadian nursery stock must first obtain an import permit from the Import and Permit Section, Bureau of Entomology and Plant Quarantine, U. S. Department of Agriculture, 209 River Street, Hoboken, New Jersey. This permit is mailed to the buyer who sends it to the nursery with his order. A package bearing an import permit may be shipped by regular mail, airmail, parcel post, express or freight, directly from the shipper to the importer. Each package must have a permit affixed to it.

When writing to the Import and Permit Section, give details about numbers and varieties, and an estimate of the number of packages. A full explanation often makes further correspondence unnecessary. Allow enough time — six weeks or so — to obtain the permit. Waiting until the last minute may delay shipment until well past a satisfactory planting date.

*Ask your Extension Agent for a copy of Extension Circular 420 (revised), which suggests sources of supply.

VARIETIES TESTED OR UNDER TEST IN ALASKA

STANDARD APPLES

Almata
Alton
Anoka
Antonovka
Battleford
Beacon
Bowyer No. 3
Close
Cortland, Dwarf
Crimson Beauty
Dunning
Early McIntosh
Erickson
Fireside
Gravenstein
Greendale
Haralson
Heyer No. 6
Heyer No. 12
Heyer No. 18
Hibernal
King
Lakeland (Minn. No. 978)
Lodi
Macoun
Maiden Blush
Mantet
McIntosh, Dwarf
Melba
Milton
Min-jon
Minnetonka Beauty
Minn. No. 447
Minn. No. 790
New Victory
Northwest Greening
Ogden
Oriole (Minn. No. 714)
Prairie Spy
Rambo
Red Astrachan
Red Bird
Red Canada
Red Cinnamon
Red Duchess
Red Duchess, Dwarf
Red Gravenstein
Red Hook
Red June
Red van Buren
Redwell
Renown
Rhode Island Greening, Dwarf
Spitzenberg
Stayman Winesap, Dwarf
Sweet Bough
Tolman Sweet
Victory
Wealthy
Yeager Sweet
Yellow Bellflower
Yellow Transparent and dwarf type

CRAB APPLES

Adam
Anaros (Rosthern No. 2)
Beacon
Chestnut
Columbia
Dauphin
Dolgo
Early Strawberry
Florence
Golden Anniversary
Hyslop
Jacques
Osman
Piotosh
Prairie Gold
Quality
Red Fleshed
Red River
Red Siberian
Rescue
Reward
Robin
Rosthern No. 15
Rosthern No. 18
Siberian
Sylvia
Trail
Transcendent
Virginia
Whitney
Young America