PLUMS

for cold areas of Eastern Canada

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PLUMS FOR COLD AREAS OF EASTERN CANADA

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Introduction

Plum culture has never been popular in the colder parts of Canada. The better quality European and Japanese plums are not hardy and the native American varieties lack size and quality. New varieties developed by hybridizing and selection offer promise. Some of these produce fruits up to two inches in diameter and of excellent quality, while having sufficient hardiness to withstand winter conditions in the colder regions. Many of these varieties have been developed at the Central Experimental Farm, Ottawa, and at the Experiment Stations in Minnesota and South Dakota. They offer a good opportunity for growers to develop small plantations to serve local markets for which the fruit is well adapted provided proper care is taken in packing and marketing.

Classification of Plums

The varieties of plums commonly grown in Canada fall into four main groups or classes, European, Japanese, American and Hybrid Plums.

European Plums—

These are mostly varieties which were brought from Europe. They include such popular sorts as Lombard, Imperial Gage, Italian Prune, Damson, Grand Duke, Reine Claude, and Mount Royal. High quality of the fruit and tenderness of the trees are characteristic of the European Plums, which are adapted only to the milder districts.

Japanese Plums—

These include varieties that have been imported directly from Japan or developed in America from seedlings of such importations. They are probably native to China. Two of the best known varieties are Abundance and Burbank. The fruits are large, attractive in appearance, and of fairly good dessert quality. They are not, however, considered good for cooking. The Japanese plums are too tender for any but the mildest districts and, even there, fruit buds are sometimes winter-killed.

American Plums—

These grow wild throughout a large part of North America from Mexico to Manitoba and from coast to coast. Although there are a number of species, cultivated varieties have developed mainly from the species *Prunus americana* and *Prunus nigra.* Amongst the most commonly grown varieties are Assiniboine, Cheney, and McRobert. These native plums are extremely hardy but are of mediocre quality. They are grown mainly in those districts where other sorts will not survive.

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Hybrid Plums—

These have developed from crosses between American and Japanese varieties. Many fine sorts have been developed, outstanding amongst which are Grenville, Fiebing, Kahinta, Superior, and Underwood. Another group of hybrids, which includes such varieties as Sapa, Opata, and Algoma, resulted from crosses with the native sandcherry.

1. Mount Royal tree propagated on sandcherry root. Poor anchorage because shallow roots of the under-stock.

Propagation

The hardy varieties are generally grafted on seedlings of the native wild plums. Varieties resulting from combinations of Japanese and American plums are usually worked on seedlings of the hardy hybrid plums. On the prairies, native sandcherry seedlings are used as rootstocks for the sandcherry × plum varieties, but when sandcherry stocks are used for plums they should be planted with the graft unions well below the ground level to encourage rooting from the scion otherwise the trees are shallow rooted and may blow over. Trees on sandcherry stocks should not be planted on soils high in lime since they are susceptible to growth disorders on such soils.

Detailed information on propagation methods is contained in the illustrated folder "Budding and Grafting of Fruit Trees", published by the Department of Agriculture, Ottawa, Canada.

Location

Soil—

Plums may be grown satisfactorily on a wide variety of soils. The European plums do best on well drained clay loam. While they will thrive on sandy soils and heavy clays, they yield better on the clay loam soils. Japanese varieties seem best adapted to warm loamy soils. American plums have a preference

for clay loams but will grow well on other soil types. In every case, good drainage is required for satisfactory tree development. Generally speaking, the colder the climate the warmer the soil type should be.

Site—

Where a choice is possible, select a site with a gentle gradual slope. This promotes soil drainage and helps to prevent frost damage. In districts where late spring frosts are common, a northern slope is preferred since this retards the blooming period.

Planting

Preparation of the Soil—

The soil should be in first-class condition before setting out young trees. It is usually best to prepare the land a year in advance by ploughing down a good coat of manure and growing a hoed crop such as corn, potatoes, or roots. If the site is already in good tilth, this treatment is not necessary. However, it is important to have the ground free from grass and weeds prior to planting. Extra care given to soil preparation and the provision of ample plant food will pay well in the improved development of young trees. Prior to planting, the land should be ploughed, preferably in the fall, and worked thoroughly with a disk or a drag harrow.

Planting Distances—

Plum trees need plenty of sunlight and require thorough spraying. They should not, therefore, be planted too closely together. While the vigour of the variety will govern the spacing, a good rule is to set the rows twenty feet apart with eighteen to twenty feet between the trees.

Time of Planting—

Spring planting is usually preferred. In cases where well matured trees can be secured early enough, fall planting is satisfactory but losses frequently follow fall planting of trees that have matured late in the nursery. Best results usually follow when spring planting is done just as soon as the land is workable.

Laying Out the Plantation—

Trees should be planted so that they will line up in all directions. This is not difficult but it calls for considerable accuracy in laying out the plantation. From a base line, a line at right angles should be established. This may be done by using a large wooden square twelve to fourteen feet long with an accurate right angle. The square is laid on the base line and stakes driven at the other two corners to establish a right angle that may be continued by sighting right across the field. This procedure can be repeated at the other corners. The spacing of the rows and the locations of the trees in the row can be determined by measuring and sighting, and stakes should be planted at each tree location. In cases where the field is too hilly or too large to sight from one side to the other, a line may be run across the centre and the two halves staked separately.

Planting—

After setting the stakes, a planting board will have to be used so that the stakes may be removed to allow the trees to be set. The planting board consists of a piece of lumber about six feet long with a notch cut at the centre and a hole bored at each end. The planting board is set so that the notch fits around the stake and a small peg is then driven through each end hole. The board can then be removed while the hole is dug and then replaced so that the position of the notch will indicate the exact location of the tree. When this procedure is

repeated at each stake, the trees will line up as accurately as did the stakes. The holes should be made a little larger than the spread of the roots of the young tree and the trees should be set an inch or two deeper than they stood in the nursery row. The roots should be covered with good top soil which should be firmly tramped about the roots.

Care should be taken to see that young trees do not dry out before they are planted. If they arrive from the nursery before the ground is ready they should be heeled in and watered thoroughly. To heel in, dig a trench large enough to hold all the trees in an upright position so that when filled in, the roots will be completely covered with soil. The trench should be made in a cool shady place and the soil tramped well about the roots. Care should be taken to see that the tree roots are not exposed during the actual planting operations.

Pollination

The pollination of plums is an important consideration and a rather complex problem. Except for a few European varieties, most kinds require cross pollination and will not set a crop of fruit when grown by themselves.

2. When necessary, bouquets scattered through the orchard provide for effective pollination.

European plums fall into three groups—those that cannot set fruit with their own pollen (Grand Duke, Pond, and Washington); those that set some fruit but not enough to produce a commercial crop with their own pollen (Italian Prune, and Shropshire Damson); and those that produce commercial crops when self-pollinated (Bradshaw and Yellow Egg). Varieties of the first and second groups must be inter-planted to secure good crops. It is usually best to inter-plant with varieties of the self-fruitful group.

While a few Japanese varieties will set fruit with their own pollen, for the most part they require cross pollination. Japanese varieties will usually pollinate one another and they are also pollinated by American varieties. The combination of Japanese and European varieties is not recommended since the Japanese plums will not pollinate the European varieties.

Hybrid plums, which are the most important ones grown in the colder parts of Canada, will not pollinate themselves nor any variety of similar parentage. Most of the American varieties appear to make satisfactory pollinators for hybrid plums. Assiniboine and Cheney are two of the best American varieties. Hybrids between the Chinese apricot plum and the American species will also pollinate the hybrid plums. Kaga and Superior are two of the best of this group. Japanese plums also may be suitable pollinators for the Hybrid varieties but since the Hybrid plums are largely grown in regions too cold for the Japanese varieties, the American and Chinese apricot plum hybrids are recommended.

Pruning

The purpose of pruning the young non-bearing tree is to develop a main frame of strong, well spaced branches capable of bearing fruit without breakage. Early shaping of the tree can be done with a minimum of cutting. Excessive pruning invariably retards tree development and delays fruiting. Pruning of bearing trees is intended to prevent the trees from becoming so dense that sun-

3. Well trained Mount Royal tree.

light and air are excluded. Well pruned trees facilitate spraying, thinning and harvesting. Pruning older trees that have borne heavily for a number of years stimulates the development of shoots and spurs.

Pruning practice may vary with the variety. Some varieties tend to produce long growth with few laterals, and, with such, more heading back is required. Other varieties produce a large number of laterals, and pruning practice will consist mainly of suitable thinning of the laterals. Bearing trees of the Japanese and hybrid types require more pruning than do those of the European and American types. Since Japanese and hybrid varieties bear much of their fruit on wood of the previous season's growth, some heading back of the teminals should be done each year. Renewal pruning is needed earlier with Japanese and Hybrid varieties than with European and American sorts. The general treatment for bearing trees of the latter two types should consist of pruning to invigorate the spurs, to keep the tops properly thinned out, and to prevent crossing branches. Any cutting back of these varieties should be relatively light. The best time for pruning is in the early spring before terminal growth starts. Wounds made at this time will heal quickly. In the colder regions no pruning should be done until the danger of low temperatures is past.

When one-year-old whips are used for planting, they should be headed back when set out to a height of about four feet, cutting back to a good strong bud. This will induce the bud below the cut to elongate and side shoots to develop.

The first step in pruning a two-year-old tree is the selection of laterals for the scaffold limbs. Such trees have usually been headed back in the nursery and have produced a number of laterals closely spaced along the trunk. If the trees have been headed low (30 inches) in the nursery only one lateral should be selected; this should come away from the trunk at the desired height of the bottom scaffold limb. The leader and lateral branch should be headed back. When the trees are headed high (40 inches or better) in the nursery two or three laterals, well spaced at least six to eight inches apart along the trunk and extending in different directions, are selected. The strongest uppermost lateral is retained for the leader and is headed back slightly and the rest of the shoots are removed. Additional branches will arise from the leader during the succeeding seasons and from these the required number of scaffold limbs to complete the framework are selected. Pruning in the third and fourth years should be light and consist primarily of thinning out rather than heading back branches. Some heading back, of course, will have to be done to maintain balance in the head. Pruning the young bearing tree involves very little removal of wood; annual corrective pruning is preferable.

Soil Management

The clean cultivation with cover crop system is most generally advocated for plums. The main objective should be to keep the orchard as free of weeds as possible during the early growing season when the trees are making most of their growth, thus conserving as much moisture as possible to aid tree development.

The orchard should be thoroughly disked as soon as it is practical to work the land in the spring. Subsequent cultivation should be just sufficient to keep the weeds in check. During the latter part of June it should be seeded down to a cover crop. The principal objective of a cover crop is to maintain a satisfactory content of organic matter in the soil A crop that will make as much growth as possible in the time available should therefore be used. In the colder regions where winter injury is a factor a rapid growing cover crop such as buckwheat, millet, or Sudan grass is preferable because it will remove moisture from the soil early and thus aid the trees to ripen off their growth for the winter. A

cover crop also helps to protect the trees in these regions from root injury by holding the snow on the surface of the soil in the winter. In districts where dry conditions prevail during the summer, Sudan grass and millet are preferred.

Where there is ample moisture during the growing season, buckwheat and a mixture of barley ($1\frac{1}{2}$ bushels), field peas ($\frac{3}{4}$ bushel), and vetches ($\frac{1}{2}$ bushel) are recommended. Millet and Sudan grass are sown at the rate of twenty-five pounds per acre and buckwheat at the rate of one bushel per acre.

On hillside orchards the cultivation should be across the slope rather than up and down so as to reduce soil erosion to the minimum. Where erosion is serious, it may be necessary to seed the orchard down to grass, using a mixture of timothy (10 pound per acre), orchard grass (10 pounds per acre), and Kentucky blue (5 pounds per acre) and to follow the sod mulch system by supplying supplementary mulch when needed.

Fertilizers

The following fertilizer recommendations should be regarded as supplementary to a satisfactory humus content in the soil No rule for yearly and general fertilizer applications can be made. Only by watching the growth of the tree and the foliage condition can the grower maintain a correct balance of nutrients in the soil. In general, the application of the minerals (phosphorus and potash) separately from the nitrogen is a very good practice. Nitrogen should be applied early in the spring in advance of tree growth. Mineral fertilizers should be applied either in the spring or fall at a time when it is possible to work the soil. The following general recommendations are given:

1. Where a complete fertilizer is desired a 9–5–7 is suggested at the rate of 700 pounds per acre or $1\frac{1}{2}$ pounds per each inch of trunk diameter.
2. Where barnyard manure is available annual applications of 6 to 7 tons per acre are considered adequate. This is equivalent to 700 to 800 pounds of 9–5–7 fertilizer.

4. Grenville tree with good framework that has resulted from careful training.

Thinning

The immediate advantage of thinning plums is to increase the size of the fruits. Some varieties of plums set much heavier than others. This is particularly true of the American, Japanese, and Hybrid plums. European plums on the other hand usually do not set very heavy crops. The time to thin is after the fruit is well set and when it is fairly certain that the remaining fruit is going to stay set. There is also a dropping of plums during the month of June caused principally by improper pollination. As soon as possible after these have dropped hand thinning should be carried out. In experiments conducted at Ottawa with American plums it was found that the fruits should be thinned to two inches apart in order to get satisfactory size. The most profitable spacing will depend on the variety. Some varieties will not need thinning at all, and even where trees are bearing heavily, the labour costs may prevent the profitable thinning of the fruit.

Harvesting

Experience, alone, will teach the fruit grower the proper time to pick each variety of plum for shipping. Some may be picked greener and some riper than others. European plums usually should be picked when they are well coloured but still firm. Varieties that are subject to rot should be picked a little on the green side. American varieties are so juicy that they have to be picked before fully mature if they are to be shipped any distance. When used locally, they should be allowed to mature well on the trees as this will develop better flavour. Japanese and Hybrid varieties may be picked earlier than either the European or American varieties as their colour and flavour will develop well even though they are harvested on the green side. Plums should be picked with the stems on when it is possible to do so.

Varieties

The European and Japanese varieties commonly grown in the fruit belts are not sufficiently hardy to withstand the winters in the colder regions of Canada. The Nigra and Americana varieties along with a few hardy European sorts and the Hybrid plums with Japanese and native blood in them can, however, be grown quite successfully in these regions for home use and local markets. There is still need of additional hardy European varieties. There is, however, a very good collection of hardy Hybrid plums that produce fruits of large size and high quality. These hybrids will not pollinate themselves nor will they pollinate one another. Therefore, when planting these sorts provision must be made for adequate pollination. At present, Assiniboine, Bounty, and Cheney are considered the best of the American plums, while Kaga is preferred among the apricot-plum hybrids, to pollinate the hybrid varieties. One tree of a suitable pollenizer, such as Assiniboine, should be planted along with every six trees of the hybrid varieties to provide for proper cross pollination. These pollenizers are rather poor market plums but are suitable for canning.

Grenville, Underwood, Fiebing and La Crescent are the best of the early maturing varieties; Superior, Kahinta, Mount Royal, and Pipestone are the pick of the mid-season sorts; and Ember, Elliott, Latchford, and Raynes are outstanding among the late maturing varieties. The average picking date of the above varieties is shown in the following table:

	Variety	Average Date of Ripening	Season
Red	Grenville	Aug. 21	early
	Underwood	" 23	"
	Fiebing	" 24	"
	Pipestone	" 24	"
	Superior	Sept. 12	mid
	Kahinta	" 13	"
	Ember	" 18	late
	Elliott	" 19	"
Blue	Mount Royal	" 12	"
	Raynes	" 15	"
	Latchford	" 25	"
Yellow	La Crescent	Aug. 28	early

Hybrid Plums—

Grenville was originated at Ottawa and is the result of a cross between Burbank and the native wild plum. The tree is very hardy, somewhat like Burbank in habit, a heavy yielder and biennial bearer. The fruits are very large, round, bright, attractive red, juicy, sweet and of very good quality.

Underwood is a Minnesota Experiment Station introduction. The tree is hardy, fairly vigorous and productive. The fruit is of large size, attractive, juicy and of excellent quality.

Fiebing is another Minnesota introduction. The tree is very vigorous and hardy. The fruit is very large, round, bright red, juicy, sweet and of good quality.

Superior is one of the newer Minnesota introductions, and is of real promise as a mid-season variety. The tree is vigorous and apparently hardy. The fruits are large, somewhat pointed, washed with lively attractive red, and have golden, juicy, sweet flesh of excellent quality.

Kahinta is the best of Dr. Hansen's South Dakota introductions under Ottawa conditions. The tree is a very vigorous grower and fully hardy. The fruits are very large, somewhat pointed, bright red, juicy, sweet and of good quality.

Pipestone is the most recent of Minnesota varieties, being named in 1942. The fruits are very large, round conic, handsome, solid deep red; the skin is thin but tough; and the flesh is bright yellow, juicy, sweet, pleasant, of excellent dessert quality, and a good canner. It ripens about a week later than Grenville.

Ember is another of the more recent Minnesota introductions and is the best quality late variety under test. The tree is strong, apparently hardy and a free grower. The fruits are very large, only slightly pointed, lively red, very juicy, sweet, and of excellent quality.

Elliott, also a Minnesota introduction, is a very handsome late variety. The tree is vigorous enough, hardy and a heavy bearer. The fruits are large (if thinned), deep red, juicy, have rather thick skins and are of fairly good quality.

La Crescent, a Minnesota introduction, is the highest quality yellow plum yet tested at Ottawa. The tree is hardy, vigorous and productive. The fruits resemble Shiro in size, shape and appearance, with juicy, yellow, sweet flesh of excellent quality.

European Plums—

Mount Royal, a chance seedling found near Montreal, is the best of the blue plums fruiting at Ottawa. The tree is of medium vigour, hardy and very productive. The fruits are of medium size, blue, juicy, mild, sub-acid, and of good quality. Mount Royal is an excellent canning plum.

Carleton is a European seedling originated at Ottawa. The tree is of medium vigour and is not fully hardy. The fruit is large, purple, firm, of good quality and has golden flesh.

Raynes, is a seedling selected by W. W. Dunlop, Outremont, Quebec. The tree is of medium vigour, upright in habit, hardy and fairly productive. The fruits are large, prune-shape, blue, only moderately juicy, free-stone, mild sub-acid in flavour and of fairly good quality. Raynes resembles the Italian prune.

Latchford, a *P. domestica* seedling sent in for trial by T. Latchford, Ottawa, possesses extreme vigour and hardiness. The fruits are large, prune-type, and the flesh is a bit dry but sweet and of medium quality. It is a good canner.

Bonne St. Anne is a blue plum of medium size and good quality said to have been originated in Quebec. The tree is hardy and of medium vigour.

American Plums—

Assiniboine is a seedling of *Prunus nigra*, originated at the South Dakota Agricultural Experiment Station. The tree is very hardy, of medium vigour and fairly productive. The fruits are medium to above medium in size and bright red in colour. The flesh is yellowish, juicy, a bit stringy, sub-acid in flavour and of good quality. The season is mid August. This is one of the best of the native plum selections and is highly recommended for the northern climates. It is a good pollenizer for the red hybrid plums such as Grenville and Underwood.

Bounty, a seedling of Assiniboine, was introduced by the Dominion Experimental Station, Morden, Manitoba. The tree is upright, spreading, vigorous, very hardy, and annually productive. The fruit is medium size, roundish oblong; and the flesh is orange-yellow, juicy and of medium quality. The season is the third week of August.

Cheney is a selection from the native wild plum that ripens in late August. The tree is a strong grower and moderately productive. The fruit is medium size, somewhat oval in shape, bright red, and has yellow juicy flesh of good quality.

Apricot-Plum Hybrids—

Kaga is a South Dakota origination. The tree is hardy and of medium vigour. The fruit is medium size, somewhat heart-shaped, deep red with greenish-yellow flesh, juicy, of good quality and highly perfumed.

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