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Plum Varieties for Oregon

QUENTIN B. ZIELINSKI, W. A. SISTRUNK, T. P. DAVIDSON

Introduction

Oregon's extensive plum variety program now includes nearly 150 varieties. This bulletin describes the results of the testing program and presents outstanding features of varieties best suited to various areas of Oregon. Choice of variety depends upon where plums are to be grown and the use to be made of the fruit.

The best varieties to grow for commercial fruit are not always the best ones for farm orchards or for backyard gardens. The large commercial grower needs only a few varieties that crop heavily every year. His fruit must handle, ship, or process well and it must be attractive in appearance.

For home use more varieties may be chosen because heavy yields are not too important. Emphasis should be placed on high quality, season of maturity, value for canning or drying, resistance to diseases, and adaptability to local conditions.

For local markets more varieties should be grown to spread the marketing period and to satisfy various consumer preferences. Less attention should be given to handling and shipping tolerance and more to high dessert quality and suitability for home canning and drying.

Improvement of present plum varieties can only be made by constantly testing new varieties. Trying out new varieties adds interest to growing plums in a home orchard or yard. Any new variety that appears promising can be planted without hesitation. However, it is wise to keep plantings small (only two or three trees) until new varieties are found to be superior to older ones. Commercial growers should be even more cautious about overplanting new varieties. Planting a considerable acreage proves to be costly if the new variety turns out to be inferior, not suited to particular market conditions, or difficult to sell because it is unknown.

Care is necessary in choosing plum varieties for the colder parts of Oregon. Careful attention should be given to frost hardiness of blossom buds, time of bloom, and especially to winter hardiness and sunscald.

The problem of winter hardiness is a complex one. Some of the things involved are: physiological condition of the plant, variety, rate of maturity,
resistance to exposure, winter desiccation, time and rate of development of cold resistance, and ability to regain cold resistance. Several of these factors and their effect on the hardiness of plums and prunes are not understood clearly at present. However, a careful evaluation of the hardiness of most Oregon plum varieties is available from data recorded in the Milton-Freewater area and at the Umatilla and Malheur branch experiment stations.

Terms used

The alternative use of the terms prunes and plums often is not clearly understood. All fruits of this type are basically classified as plums. In the classification of plums into five natural groups, one group is designated as prunes. Generally speaking, a prune is a type of plum which dries successfully into a firm, edible, long-keeping product. This classification means that all plums with a high percentage of solids, especially of sugar, and which are fairly fleshy are referred to as prunes. A prune is always a type of plum since the name plum is the basic name. Even though a large number of plum varieties are in cultivation, only a few meet horticultural requirements to be designated as prunes. All prunes belong to the Domestica group and they constitute a distinct pomological group within this species.

Certain terms relating to pollination need to be defined in order to indicate the way in which they are used in this bulletin. Self-unfruitful refers to the production of insufficient fruits following self-pollination for a full commercial crop. Self-fruitful indicates the equivalent of at least a full commercial crop. Self-incompatible denotes a condition when no fruits are produced following self-pollination. Self-sterile, in the strict sense, refers to the inability of a variety to produce fruit with viable seeds following self-pollination. If a combination of two or more varieties is unfruitful when either one is used as the pollen parent, the combination is termed inter-sterile.

The varieties within each group listed below are in the approximate order of ripening. Seasonal climatic conditions and elevations of sites may appreciably affect time of ripening. Any specific reference to time of ripening of a variety applies to the Willamette Valley area unless otherwise noted. Many varieties are also under test in other areas of the state, especially in Umatilla County.

Data for the plum and prune variety testing trials were obtained from three orchards: the Lewis-Brown Horticultural Farm in Linn County near Corvallis, test plots at Milton-Freewater, and the Umatilla Branch Experiment Station at Hermiston, Oregon. Record trees ranged from 7 to 15 years of age. Evaluation data represent a composite of information recorded between 1955 and 1960 at these three locations.

Among the many varieties tested over the past decade, the varieties described below appear to be worthy of consideration. With the exception of well established commercial varieties, the Experiment Station cannot, without some qualification, recommend planting these varieties on a large scale at the present time. However, they are at least worthy of commercial trial or for home orchard use, since they are the few survivors of many rigid cultural tests and of a critical appraisal of their handling and market qualifications.
European Types

The European group of plums is distinguished by having firm, thick, broad, and coarsely serrate leaves with pubescence on the underside. Fruit colors range from almost black through shades of red, purple, blue, green and yellow, to white. Fruit varieties in this group also vary greatly in size and shape and they are nearly always freestone.

Most of the plums and prunes grown in commercial orchards in Oregon belong to this group. These varieties or the original breeding stocks were introduced to America from species native to Europe. Thus a number of our newest varieties, while they were developed in America, are still referred to as European types. The important distinction is that the parent species or germ plasm was of European origin.

Peach Plum is a very dependable old variety of unknown origin that has succeeded well in Oregon. It is one of the largest of the very early plums, though not especially high in quality. The fruit is large, round, and attractive. The flesh is gold-yellow, juicy, and sprightly flavored. Peach Plum is good fresh for home use. The fruit matures quickly and drops from the tree. It ripens about July 20-25.

California Blue was originated by W. W. Smith in Vacaville, California, and introduced in 1914. The fruit is notably large, round, and blue, with a heavy bloom. The flesh is yellow, quite coarse, sweet, and pleasant. The pit is small and free. This plum ripens about July 20-August 1. It is good fresh for home use or local markets only.

Sugar was originated by Luther Burbank in 1899. The fruit is medium in size, oval, fairly attractive, reddish-purple, and covered with a thick bloom. The flesh is tender, gold yellow, juicy, rather coarse, sweet, and mild. The crop ripens rapidly and falls from the tree. It ripens about 7-10 days after Peach Plum—about August 1. It is good fresh for home use. The variety name “Improved Sugar” is considered to be the same as the original Sugar.

Utility was originated by Thomas Laxton about 1915 in England. The
fruit is medium to large in size, only moderately attractive, oblong to oval, and purplish-blue. The skin is thick and tough. The flesh is soft or tender, juicy, yellow, with a small stone that is semi-free. This plum ripens about August 1 and is moderately good fresh for home use only.

**TIMME SEEDLING** has a tender red skin. The flesh is sweet, aromatic, bright yellow, fine textured.

**Timme Seedling** originated at Toledo, Oregon, about 1945. The fruit is very large, oval, with tender red skin, and a very attractive appearance. The flesh is moderately soft, sweet, aromatic, bright yellow, semi-freestone, and very fine textured. The quality is rated as good to excellent. The fruit of this seedling must be carefully handled because of its tender skin and soft texture. It ripens about August 20-30.

**Trail Blazer** originated at Hillsboro, Oregon, and was introduced about 1954. The fruit is oval, 1¼ to 1½ inches in diameter, and bright cherry red, with a light bloom. The flesh is greenish yellow, fairly tart, and firm. It is a clingstone type and rated as fair to good in overall quality. The tree has very handsome bright red leaves and a profusion of blooms. It is a heavy producer and the fruit hangs well. It is an attractive ornamental tree besides producing edible fruits for fresh eating purposes. Trail Blazer ripens about August 15 at Corvallis.

**Merton** originated at Milton, Oregon, about 1950 as an unknown seedling. The fruit is attractively blue-colored, with a heavy bloom, ovate to slightly flattened, and medium to large in size. The flesh is yellow, firm, moderately fine in texture, fairly dry, and freestone. The flavor is weak but quite sweet. It is an early ripening prune possibly suitable in some areas for shipping. There is a slight tendency for a few fruit to crack along the suture in certain seasons. Merton ripens about September 1.

**Bradshaw** is of unknown origin but probably is an old European variety. The fruit is medium in size, oval, only moderately attractive, purplish-red, and covered with a thick bloom. The flesh is dull yellow, firm, coarse, fibrous, sweet, and moderately pleasant, with a moderately large semi-free stone. It is rated fairly low in overall quality. It ripens about September 1. Some BRADSHAW is a moderately large semi-freestone variety which is frequently canned and dried.
Bradshaw plums are canned and dried but they are better for fresh fruit use at home.

**Edwards (U. S. Patent No. 1213)** was propagated in California about 1950. The fruit is an attractive blue, oval to round, and very large. The flesh is moderately firm, yellow, semi-freestone, medium in texture, sweet, aromatic, and quite juicy. The skin is thin but tough. The overall fresh fruit quality rating is good. It ripens about September 1.

**Parson (U. S. Patent No. 872)** originated at Forest Grove, Oregon, about 1930. The fruit is medium in size, oval, attractively blue-colored, and thin skinned. The flesh is medium in firmness, yellow, slightly dry, completely freestone, and very fine in texture. The quality is rated as good. Parson is a sweet type of prune that is rated as very good for drying purposes but unsatisfactory for canning. It ripens about September 1-15. Young orchard trees often tend to overbear resulting in fruit smaller in size than the Italian variety.

**Tragedy** originated as a chance seedling in California and was commercially introduced in 1887. The fruit is medium in size, oval to round, and dark purplish-black, covered with a thick bloom. The flesh is greenish-yellow, juicy, tender, sweet, mild, and clingstone. Tragedy ripens early, about September 1 and the season is short since the plums fall quickly when mature. The fruit is too soft for good commercial handling and this variety is now seldom planted in Oregon.

Early Italian prune varieties somewhat resemble Italian but they ripen 7-14 days earlier. At least four strains have been propagated and grown commercially during the last 30 years. These types include, among others, Demaris, Greata, Milton, Richards, and Reuter.

Trees are often offered for sale designated only as Early Italian. Therefore, these five types have not always been maintained as separate or distinct entities. Most of them resemble Italian (Fellenberg) but they tend to be rounder in shape and they ripen earlier. These strains are being heavily planted particularly in the early fresh-fruit shipping areas. In general, they ripen about September 1.
Miller Early Sweet originated at Eugene, Oregon, about 1930. The fruit is medium sized, oval, and blue. The flesh is soft, golden yellow, very free-stone, very sweet, and medium to fine in texture. The skin is thin and tough. This variety is rated as good for drying purposes, but poor for canning. It ripens about September 5.

Emily originated about 1925 in California as a seedling of the Sugar prune. The fruit is very large, oblong with flattened sides, blue, and thin skinned. The flesh is yellow, very coarse, firm, juicy, very sweet, lacking in flavor, and semi-free-stone. The fresh fruit quality is rated as fair or poor. It does not appear to have commercial value in Oregon. It ripens about September 10.

Date Prune (Coates 1418) probably originated in California about 1920. The fruit is oval, medium in size, and deep purple-blue, with a light blue bloom. The flesh is yellow, sweet, fairly soft, semi-clingstone, fine in texture, and rated high in overall quality. This variety resembles the French or Petite prune but it is larger. A well-established commercial drying prune, it is grown to a limited extent in the Willamette Valley. It ripens about September 7-15.

Stanley originated at the New York Experiment Station and was introduced in 1926. The fruit is medium in size, dark blue, and oval to obovate, with a fairly distinct neck. The flesh is yellow, sweet, juicy, pleasantly flavored, outstanding in canning quality, and good in drying quality. Stanley is also noted for its hardiness and annual productiveness. In some seasons it produces some doubled fruits and some which are lopsided and deformed. This weakness does not, however, render the crop unprofitable to harvest. Stanley ripens about September 10—about one week earlier than Italian.

Weatherspoon originated as a chance seedling near Elgin, Oregon, about 1915. The fruit is very large, about 1 1/2 inches in diameter, oval to long, with attractive dark blue skin. It is very firm and fleshy, colors early, and is distinctively necked in shape. The flesh is firm, yellow, sweet, aromatic, semi-free-stone, medium in texture, and rated as good to excellent
in fresh fruit quality. The skin is moderately thick and tough. In Oregon it has been difficult to obtain good commercial crops and now this variety is seldom planted. It requires heavy cross-pollination by other Italian prune types. It ripens about September 10.

**Noble French** originated at Myrtle Creek, Oregon, about 1925. The fruit is large, oval to obovate, necked, and reddish-purple. The flesh is firm, sweet, somewhat coarse, pleasantly flavored, and juicy, with high soluble solids. Noble French was once popular as a sweet-type drying prune but has not been planted in recent years. It ripens about September 12.

**Reine Claude** (Bavay's Green Gage) is a European variety probably several centuries old. There are a number of strains or varieties of Gage plums but all have certain similar characteristics. The fruit is about 1½ inches x 1½ inches, round, and flattened on both ends. The suture line is broad and conspicuous. The skin color is chartreuse green, which on ripening becomes a yellowish-green. The flesh is greenish-yellow, very juicy, tender, sweet, and of rich flavor. REINE CLAUDE is an old European variety and is one of the strains of Gage plums. Fruit is sweet.

The stone is semi-free, round, and thick. This plum is excellent for fresh use and is often canned commercially. It ripens about September 10-20. Trees begin to bear when 3 to 4 years of age and are noted for prolific bearing.

A red sport of **Green Gage** was introduced by the Idaho Experiment Station in 1951, and it has fruited well at Corvallis. The fruit is essentially identical to Green Gage except for the pinkish-red color of the skin.

**Brooks Italian** is good for drying, poor for canning. Fruit is large, oval, and has a blue skin.

**Brooks** originated near Lafayette, Oregon, about 1930. The fruit is very large, about 1½ inches in diameter, oval, with an attractively blue-colored skin that is moderately thick. The flesh is firm, greenish-yellow, slightly acid or tart in flavor, semi-freestone, moderately juicy, and coarse in texture. This variety is rated as medium in overall quality, good for drying, and poor for canning purposes. It ripens about September 15.

**Imperial Epineuse** is an old French variety which originated about 1870. It has long been rated highly by those who appreciate fine quality. The fruit is oval to obovate, with an attractive...
reddish-purple skin, fairly large in size, and beautiful in shape. The flesh is greenish-yellow, fibrous, tender, sweet, pleasant in flavor, and semi-clingstone. It is a good prune for drying and it is fine for fresh use in the home. In some areas of Oregon it has been difficult to obtain good commercial production. Imperial requires a pollinator. It ripens about September 10-20.

**Italian (Fellenberg)** is an old, well-known variety which probably originated in Italy where it is known as Italian Quetsche. The fruit is large, oval, moderately tapering to the stem end, and hangs well on the tree. The skin is blue with small yellow dots and carries a heavy blue bloom. The flesh is greenish-yellow, firm, dry, sweet, and richly flavored. Italian is an excellent dual-purpose prune, for fresh, dried, and canned uses and is the leading commercial variety in Oregon. It ripens about September 20. There is also at least one strain or variety of so-called Late Italian which ripens 7-10 days later.

**Moyer Perfecto** originated as a seedling at Roseburg, Oregon, about 1925. The fruit is large, 1½ inches in diameter, ovate, and attractively blue, with a heavy whitish bloom. The flesh is firm, yellow, semi-clingstone, moderately coarse, and juicy. The skin is thick, and the quality is good. This variety hangs well to the tree and is good for drying purposes. It ripens 7-10 days after Italian or about September 30 at Corvallis.

**President** is an English variety, originated by Thos. Rivers and introduced in 1901. The fruit is very large, 1½ x 2 inches, oval, and purple with a thin blue bloom. The flesh is yellow-grained, juicy, sweet, pleasantly flavored, and especially suitable for dessert use. President is an excellent late-ripening variety and suitable for fresh fruit shipment. It has become a successful commercial variety in the Milton-Freewater area. It ripens about September 25 at Corvallis.

**Rich Pride** was originated at Junction City, Oregon, by Chris Rich and was introduced in 1946. The fruit is large, oval, and light purple in color, with a moderate grey bloom. The flesh is fairly soft, meaty, very sweet, juicy, fine textured, and nearly freestone. This French-type variety ripens about 2 weeks after Italian—about October 1 at Corvallis.
Blossoming Dates of European-type Plums
(Corvallis, Oregon)

Mar.

Apr.

20 21 22 23 24 25 26 27 28 29 30 31
1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16

Tragedy
Utility
Green Gage
Edwards
President
Brooks
Noble
Stanley
Lombard
Weatherspoon
California Blue
Merton
Imperial
Jeffers
Timme
Damson
Silver
Date
Pond
Early Blue
Peach
Moyer Perfecto
Horton
Miller Sweet
Milton Early
Italian
Bradshaw
Parson
Late Italian
Japanese Plum Varieties

The Japanese or oriental group of plums is distinguished as follows: strong-growing small trees, with smooth, often shining reddish or cinnamon-brown twigs; leaves prominently pointed, bright shining green above and dull beneath. The flowers expand early and they are nearly always heavy bloomers. The fruit is mostly large, very firm, meaty, juicy, and high in quality for fresh fruit use. Fruit ranges in color from green through yellow and brilliant red and is highly attractive. Plums of this group are for fresh fruit use only and the ratings in this section apply only to this market outlet.

Methley originated in Natal, South Africa, about 1915 and was introduced in the United States as P. I. 31652. The fruit is dull red becoming purplish, large, and conical. The flesh is light to dark purple-red, clingstone, and fair in quality. The fruit drops easily from the tree at maturity. It ripens very early, about August 1 at Corvallis.

Beauty was originated by Luther Burbank in California about 1920. The fruit is attractively red to crimson-colored, medium to large, and roundish-conic. The flesh is light crimson shaded amber, very attractive, quite juicy, sweet, stringy, clingstone, and delicious in flavor for the early season. Beauty ripens about August 5.

Formosa was originated by Luther Burbank in California about 1909. The fruit is brilliantly red colored, roundish oblate, conical, usually very large, and very attractive. The flesh is yellow, very juicy but firm, fine in texture, semi-clingstone, and excellent in quality. In some areas it is difficult to obtain satisfactory crops due to pollination problems. Formosa ripens about August 5 at Corvallis—7 to 10 days after Beauty.

FORMOSA is a brilliant red fruit originated by Luther Burbank. The flesh is juicy but firm.

Burmose originated at the California Experiment Station and was introduced in 1950. The fruit is medium to large, round-oval, and with a clear, bright, attractive red blush cov-
cring the yellow undercolor. The flesh is creamy-white, sweet, mild, firm-melting in texture, juicy, very fine textured when fully ripe, and nearly completely freestone. Burmosa ripens early, in the Beauty season, about August 5. It is a very promising new variety that has fruited well at the Lewis-Brown Horticultural Farm.

Marvel originated at the Missouri State Fruit Experiment Station and was introduced in 1947. The fruit is medium in size, of average diameter (1½ inches), red, and moderately attractive. The flesh is solid red, very firm, nearly freestone, medium to coarse in texture, sweet, with only a slight aroma. The skin is medium in thickness and fairly tender. Marvel is rated as good in overall quality. It ripens at Corvallis about August 7.

Santa Rosa was originated by Luther Burbank about 1907. The fruit is dark purple, oblong-conic, very large, moderately attractive, and with a distinct suture. The flesh is red, very juicy, clingstone, and fair in quality. Santa Rosa keeps and ships well in commercial handling. This variety is not well adapted to the Willamette Valley and it is difficult to obtain satisfactory fruit set. It ripens at Corvallis about August 15.

Abundance is an old variety imported into America by Luther Burbank in 1884. The tree has a strong upright habit of growth, is a heavy annual bearer, and is widely adapted to varying soil and climatic conditions. The fruit is of only fair quality, red, roundish-ovate, medium in size, and a poor keeper. The flesh is a deep greenish-yellow, tender, very juicy, sweet, and clingstone. This variety ripens about August 15. Fruit drops readily to the ground, a fact which makes harvesting difficult. Abundance is seldom planted in Oregon.

Shiro was originated by Luther Burbank and introduced about 1898 in California. The fruit is a bright lustrous yellow and very attractive. Shiro, when properly matured on the tree, is good in quality. The flesh is light yellow, very juicy, fibrous, sweet, mild, and melting. Shiro is the most dependable bearing variety in the Station collection. It needs a pollinizer, like other Japanese plums, and it tends to be biennial in bearing. It ripens at Corvallis about August 15.

Red Heart was introduced by the California Agricultural Experiment Station in 1950. This variety resembles Duarte in general appearance. The fruit is medium to large, and round-oval to heart shaped, with a moderately heavy grey bloom. The flesh color is bright red becoming dark red at full maturity. The flavor is sweet and mild with a pleasant aroma. The flesh texture is firm, crisp, meaty, and fine grained. The quality is rated as high.
Red Heart ripens one week after Santa Rosa—about August 20 at Corvallis. This variety has consistently produced good crops even when other varieties have failed. It can be recommended for home use and as a good pollinizer for other Japanese plums.

Burbank is one of the main Japanese varieties introduced by Luther Burbank in 1887. The fruit is red and roundish-conical in shape. The flesh is firm, meaty, yellow, sweet, and very attractive. Trees tend to bear biennially and often overbear. If thinned properly they develop a very attractive appearance and good size. This is one of the best Japanese plums for the Willamette Valley. Burbank ripens about August 20-25.

Howard's Miracle (U. S. Pat. No. 721) was introduced in Montebello, California, in 1947. The fruit is very large, of average diameter (2 to 2½ inches), roundish-conical, yellow skinned with a partial red blush, and moderately attractive. The flesh is medium firm, yellow, juicy, aromatic, with no red coloration, clingstone, and with moderately coarse texture. The overall quality is good to excellent. The skin is thin and tender. This variety seems sensitive to cold weather and has not fruited well at Corvallis. It ripens about August 25.

Mariposa (U. S. Pat. No. 111) was introduced commercially in Pasadena, California, in 1935. The fruit is large, of average diameter (1½ to 2½ inches), and conical to slightly ovate in shape. The moderately attractive, thin skin is pink to light purple over the entire fruit. The flesh is dark red, moderately firm, and sweet, with good texture. The overall quality is good. This variety has fruited well at Medford but erratically at Corvallis. Other varieties have more attractive skin color, hence Mariposa has not been planted for commercial use. It ripens at Corvallis about September 1.

Elephant Heart was originated by Luther Burbank and introduced in 1931. The fruit is large, dark red, heart shaped, 2½ by 2½ inches in diameter, and very attractive. The flesh is blood red, solid, mild, sweet, very pleasant, and nearly freestone. In some seasons Elephant Heart develops pitch pockets in the flesh at the base of the stone, making it a questionable com-
ELDORADO is a Japanese variety which appears to be promising for Oregon's Rogue River Valley.

Commercial variety. Growers in Oregon often encounter pollination problems which result in light fruit crops. It can be pollinated by the use of early flowering selected Myrobalan clones. It ripens about September 1.

Satsuma was originated by Luther Burbank and introduced in 1889. The fruit is moderately large, round to heart shaped, deep sutured, dark dull red with greenish dots, and fair to good in quality. The flesh is dark purplish red, juicy, clingstone, sweet, and rather coarse, with thin tender skin. For a commercial variety it is lacking both in appearance and firmness. It is a good dependable home orchard variety. It ripens in mid-season, about September 5.

Duarte fruit is medium to large with a dull greenish-amber skin with a dull mottled-red blush. The flesh color is red over an amber base. Flesh texture is firm-melting, crisp, meaty, excellent in flavor, and nearly freestone. Duarte ripens fairly late, about one month after Santa Rose—about September 15 at Corvallis. This variety is seldom seen now in Oregon due to its lack of eye-appeal.

Red Ace was originated by Luther Burbank and introduced in 1931. Fruit tends to resemble Elephant Heart but is more roundish and regular in shape. The flesh is bright deep red, very firm, meaty, crisp, and well flavored. The overall quality is excellent. This variety ships well and has excellent storage characteristics. Red Ace has been productive and dependable. It is a promising new variety for Oregon. It ripens about September 15 at Corvallis.

RED ACE ships well and is good for storing. It is one of the promising new varieties for Oregon.

Kelsey was introduced into California from Japan about 1870. The fruit is very large, heart shaped, with fairly deep suture, and bright greenish-yellow, with attractive bloom. The flesh is delicate light yellow, juicy, firm, meaty, rich, pleasant, freestone, aromatic, and very good in quality. Stems often adhere poorly to the fruit. Kelsey is one of the larger type Japanese plums and one of the latest to mature. It ripens at Corvallis about October 1. It has fruited well at Medford but not in the Willamette Valley. It has not been planted commercially because the trade prefers a red-colored plum rather than a green-colored one.
# Blossoming Dates of Japanese Plums

(Corvallis, Oregon)

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<tr>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
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<tr>
<td>Eldorado</td>
<td>Hollywood</td>
<td>Apex Plumcot</td>
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<tr>
<td>Inca</td>
<td>Mariposa</td>
<td>Myro-West*</td>
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<td>Howards Miracle</td>
<td>Myro 5Q*</td>
<td>Formosa</td>
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<td>Giant Yellow</td>
<td>Sierra</td>
<td>Beauty</td>
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<td>Mammoth Cardinal</td>
<td>Red Roy</td>
<td>Santa Rosa</td>
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<td>Kelsey</td>
<td>Elephant Heart</td>
<td>Shiro</td>
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<td>No. 16-26</td>
<td>Burbank</td>
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<td>Queen Ann</td>
<td>Harrison Shelby</td>
<td>Myro East*</td>
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<tr>
<td>Red Ace</td>
<td>Stark Golden</td>
<td>Brilliant</td>
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* Myrobalan pollinizers.
Processing Qualities

Processing quality of a new fruit variety or selection is important in variety evaluation. This information is useful as a guide for growers who are making new plantings, for processors, and for plant breeders and nurserymen who are developing and growing new varieties.

Procedure

Fourteen varieties of plums that appeared to be promising were harvested when the skin and flesh color of the fruit had reached the stage of optimum maturity. Since one-half of the fruit of most of the lots was to be used for drying, it was necessary to ripen it from 1 to 5 days in a room at 70 to 75° F. in order to complete ripening to the desired stage before canning and drying. The ½ to ¾ bushel lots were separated into soft-ripe fruit for drying and firm-ripe fruit for canning.

Fruit for canning was packed in 40% sucrose syrup in 307 x 409 enamel fruit cans and exhausted to 175° F. The cans were sealed and processed in a boiling water bath for 20 minutes.

Fruit for drying was placed on stainless steel trays at the rate of 9 pounds per tray and dried in a counter-current dryer at an ingoing temperature of 145° F. and a humidity of 40-45%. The air flow moved at the rate of approximately 850 feet per minute. Drying time varied from 24 to 34 hours, depending on size and maturity or firmness of the fruit.

Canned fruit was evaluated for eating quality and appearance on a rating ballot by a staff panel of 20 members. Dried prunes were characterized and rated by a selected panel of 6 staff members.

Results

The compositions of the 14 varieties of fresh plums at processing time are shown in Table 1. The percent soluble solids in these varieties ranged from 14.5 in the Stanley variety to 22.8 in Imperial. Although Stanley was low in soluble solids, its acidity was low, and it had the highest soluble solids-acid ratio.

The Italian variety was highest in percent acid because it was harvested too early for drying as indicated by the low score for cooked dried prunes (Table 3). Detailed results are not shown for taste panel evaluations. However, a sharp acid flavor and dullness of flesh color of Italian were the reasons most responsible for the low score.

It can be seen in Table 2 that the appearance and quality of the dried prunes varied considerably with variety. Glossiness of skin and sweetness and texture of flesh are important quality features when grading dried prunes. Dried prunes with a glossy skin as typified by the Stanley and Parson varieties were more attractive than the others (Table 2). The blue-black color was preferred over the red or red-purple color by the 6 panel judges. Varieties that were sweet to slightly acid in flavor as indicated by an acid content of 0.4 to 0.6% (Table 1) rated highest in flavor. Stanley rated high in appearance and texture in the cooked dried prunes. The acidity, however, was too low for most tasters and the product was considered too sweet.

The results of canned plum panel evaluations are shown in Table 3. There were significant differences in
### Table 1. Composition of Fresh Plums at the Time of Processing

<table>
<thead>
<tr>
<th>Variety</th>
<th>Soluble solids</th>
<th>Malic acid</th>
<th>Soluble solids-acid ratio</th>
<th>Total solids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merton</td>
<td>17.6</td>
<td>.469</td>
<td>37.5</td>
<td>18.80</td>
</tr>
<tr>
<td>Parson</td>
<td>18.4</td>
<td>.467</td>
<td>39.4</td>
<td>19.51</td>
</tr>
<tr>
<td>Stanley</td>
<td>14.5</td>
<td>.258</td>
<td>56.2</td>
<td>15.46</td>
</tr>
<tr>
<td>Miller Sweet</td>
<td>17.6</td>
<td>.437</td>
<td>40.3</td>
<td>18.98</td>
</tr>
<tr>
<td>Milton Early Italian</td>
<td>19.5</td>
<td>.403</td>
<td>48.4</td>
<td>21.27</td>
</tr>
<tr>
<td>Demaris</td>
<td>15.8</td>
<td>.378</td>
<td>41.8</td>
<td>16.85</td>
</tr>
<tr>
<td>Early Italian Richard</td>
<td>18.0</td>
<td>.468</td>
<td>38.5</td>
<td>19.22</td>
</tr>
<tr>
<td>Greata Italian</td>
<td>20.1</td>
<td>.618</td>
<td>32.5</td>
<td>21.34</td>
</tr>
<tr>
<td>Early Italian Sweet</td>
<td>20.6</td>
<td>.772</td>
<td>26.7</td>
<td>21.91</td>
</tr>
<tr>
<td>Italian</td>
<td>18.7</td>
<td>1.051</td>
<td>17.8</td>
<td>20.23</td>
</tr>
<tr>
<td>Brooks</td>
<td>14.7</td>
<td>.610</td>
<td>24.1</td>
<td>15.45</td>
</tr>
<tr>
<td>Noble</td>
<td>21.0</td>
<td>.462</td>
<td>45.5</td>
<td>22.15</td>
</tr>
<tr>
<td>Moyer Perfecto</td>
<td>19.1</td>
<td>.574</td>
<td>33.3</td>
<td>20.32</td>
</tr>
<tr>
<td>Imperial</td>
<td>22.8</td>
<td>.483</td>
<td>47.2</td>
<td>23.74</td>
</tr>
</tbody>
</table>

### Table 2. Descriptive Quality of Dried Prunes after Conditioning for Packaging

<table>
<thead>
<tr>
<th>Variety</th>
<th>Skin color</th>
<th>Flesh texture</th>
<th>Condition of skin</th>
<th>Flavor</th>
<th>General acceptance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Merton</td>
<td>red-purple</td>
<td>smooth</td>
<td>dull, calloused</td>
<td>acidy</td>
<td>good</td>
</tr>
<tr>
<td>Parson</td>
<td>blue-black</td>
<td>smooth</td>
<td>glossy</td>
<td>subacid</td>
<td>very good</td>
</tr>
<tr>
<td>Stanley</td>
<td>black</td>
<td>smooth</td>
<td>glossy</td>
<td>sweet</td>
<td>good</td>
</tr>
<tr>
<td>Miller Sweet</td>
<td>red-purple</td>
<td>smooth</td>
<td>dull, calloused</td>
<td>sweet</td>
<td>good</td>
</tr>
<tr>
<td>Milton Early Italian</td>
<td>black</td>
<td>porous</td>
<td>cracked</td>
<td>acidy</td>
<td>good</td>
</tr>
<tr>
<td>Demaris</td>
<td>black</td>
<td>fibrous</td>
<td>cracked</td>
<td>acidy</td>
<td>fair</td>
</tr>
<tr>
<td>Early Italian Richard</td>
<td>blue-black</td>
<td>fibrous</td>
<td>dull, calloused</td>
<td>acidy</td>
<td>fair</td>
</tr>
<tr>
<td>Italian</td>
<td>black</td>
<td>immature</td>
<td>smooth, dull</td>
<td>acidy</td>
<td>fair</td>
</tr>
<tr>
<td>Brooks</td>
<td>blue-black</td>
<td>woody</td>
<td>smooth, dull</td>
<td>acidy</td>
<td>good</td>
</tr>
<tr>
<td>Noble</td>
<td>reddish</td>
<td>smooth</td>
<td>smooth, dull</td>
<td>sweet</td>
<td>good</td>
</tr>
<tr>
<td>Moyer Perfecto</td>
<td>red-purple</td>
<td>smooth</td>
<td>dull, calloused</td>
<td>sweet</td>
<td>good</td>
</tr>
<tr>
<td>Imperial</td>
<td>reddish</td>
<td>smooth</td>
<td>smooth, dull</td>
<td>sweet</td>
<td>good</td>
</tr>
</tbody>
</table>
eating quality and appearance of some of the varieties. The more highly colored varieties such as Italian, Milton Early Italian, Early Italian Sweet, and Stanley were significantly better in appearance. Fresh fruit with a high acidity content has its flavor enhanced by the addition of syrup. Therefore, Italian rated good in eating quality as canned plums, but rated poor as dried prunes.

One quality factor in dried prunes not mentioned previously is the count per pound of conditioned dried prunes (Table 3). The size of Moyer Perfecto and Noble varieties was approximately twice that of the Merton, Parson, and Milton, and the Early Italian varieties. Obviously, a high soluble and total solids will decrease the drying ratio and yield more pounds of dried fruit per ton. Many of these characteristics of plum varieties may be of interest to the processors of canned and dried prunes.

The quality of canned and dried prunes was found to be affected by color, acidity, soluble solids, total solids, and size of the fresh fruit. The darker colored varieties were more acceptable in flavor in the canned plums. There appeared to be less ob-

<table>
<thead>
<tr>
<th>Variety</th>
<th>Canned plums</th>
<th>Count of conditioned dried prunes</th>
<th>Drying ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Eating quality</td>
<td>Appearance</td>
<td>prunes¹</td>
</tr>
<tr>
<td>Merton</td>
<td>fair</td>
<td>fair</td>
<td>3.5</td>
</tr>
<tr>
<td>Parson</td>
<td>poor</td>
<td>fair</td>
<td>3.6</td>
</tr>
<tr>
<td>Stanley</td>
<td>good</td>
<td>outstanding</td>
<td>2.3</td>
</tr>
<tr>
<td>Miller Sweet</td>
<td>poor</td>
<td>fair</td>
<td>2.6</td>
</tr>
<tr>
<td>Milton Early Italian</td>
<td>very good</td>
<td>very good</td>
<td>2.5</td>
</tr>
<tr>
<td>Demaris</td>
<td>fair</td>
<td>fair</td>
<td>2.9</td>
</tr>
<tr>
<td>Early Italian Richard</td>
<td>poor</td>
<td>poor</td>
<td>1.9</td>
</tr>
<tr>
<td>Great Italian</td>
<td>good</td>
<td>good</td>
<td>.....</td>
</tr>
<tr>
<td>Early Italian Sweet</td>
<td>good</td>
<td>very good</td>
<td>.....</td>
</tr>
<tr>
<td>Italian</td>
<td>good</td>
<td>very good</td>
<td>2.3</td>
</tr>
<tr>
<td>Brooks</td>
<td>fair</td>
<td>poor</td>
<td>3.1</td>
</tr>
<tr>
<td>Noble</td>
<td>.....</td>
<td>.....</td>
<td>2.2</td>
</tr>
<tr>
<td>Moyer Perfecto</td>
<td>.....</td>
<td>.....</td>
<td>2.5</td>
</tr>
<tr>
<td>Imperial</td>
<td>.....</td>
<td>.....</td>
<td>2.1</td>
</tr>
</tbody>
</table>

¹Ranked from 1—poor, to 5—excellent, in quality on five quality factors (flavor, texture, appearance, juice color, and general appearance).
²Dried fruit briefly steamed and conditioned for packaging.
jection to the reddish-colored varieties in dried prunes than in canned plums. This was primarily due to a general loss in blue or purple color in cooked dried prunes.

The method of processing determined, in part, the choice of plum varieties. Canning and drying each demand different characteristics in fresh fruit. Color and flavor are important in canning, while drying ratio and size are important for drying. The soluble solids and total solids vary somewhat with time of harvest. After fruit reaches the firm-ripe stage, acidity decreases rapidly as the fruit softens. The acid, which is largely malic acid, also decreases during storage of fresh fruit after harvest. Thus, the soluble solids-acid ratio which is extremely important in determining flavor and general acceptance of either canned or dried prunes is markedly affected by the time of harvest and the length of storage of fresh fruit.

Data on processing are results from a one year study of fruit harvested from experimental plots at Corvallis. However, general comments on quality were drawn from all sources of information on the processing of Italian prunes, as well as from the results of smaller tests on quality of selected varieties over a period of several years. Further research is needed on these varieties when grown at different locations under different weather, fertilizer, and soil conditions.

Winter Hardiness

Testing of winter hardiness of plum varieties is carried on principally at the Umatilla Experiment Station, Hermiston, and at Milton-Freewater. These tests have included over 70 varieties of the most prominent European, American, and Japanese types. In this area, minimum temperatures of -30° F. are occasionally experienced. Winter hardiness is a very complex and variable phenomenon. Consequently, when a large geographical area having widely diverse climatic conditions is being considered only general statements about winter hardiness of varieties are possible. Most of eastern Oregon falls in this category.

A summary of many years of tests indicates that the varieties shown in Table 4 are among those most likely to succeed under extreme low winter temperatures.

Under conditions of less severe winters almost all European type varieties are satisfactory. Most Japanese plum varieties are not sufficiently hardy to grow in the colder areas.

Tests of winter hardiness included over 70 varieties of European, American, and Japanese plums.
One of the causes of nonbearing in plum trees is lack of proper pollination. With most varieties the orchardist must cope with a pollination problem to insure adequate fruit set. Pollination is the transfer of pollen from the anthers of a flower to the stigma of the same or another flower.

Most Japanese plums are self-unfruitful* and some are partially self-unfruitful. Most Japanese varieties will set fruit much better when interplanted with other varieties for cross-pollination.

Self-unfruitful varieties are Abundance, Burbank, Formosa, Gaviota, Satsuma, Wickson, and Elephant Heart. Varieties such as Burbank, Elephant Heart, Santa Rosa, Red Heart, Beauty, and Wickson usually produce large amounts of viable pollen and have generally proved good pollinizers for other varieties wherever compatible.

Varieties that do not blossom at the same time obviously cannot be used as cross-pollinizers. With Japanese plums there is a great deal of variation from year to year in blossoming time of varieties. In years when the blossoming season is very short, there usually is sufficient overlapping for cross-pollination among inter-compatible varieties. When the blooming season is long, distinct gaps occur between the blooming period of early and late blooming varieties. It is important to find a specific pollinator combination, which varies from area to area, because the major variety must be emphasized.

In the Northwest the most important group of plums is the European or Domestica type, represented by such varieties as Damson, Italian, French, Giant, Reine Claude, and President.

Most of the more common varieties grown in Oregon are self-fruitful, or at least partially self-fruitful. Varieties in this category include Blue Damson, California Blue, French Prune (Agen), German Prune, Italian Prune, Sugar, Giant, Reine Claude (Green Gage), Yellow Egg, and Stanley. Varieties which are generally self-unfruitful include Weatherspoon, Imperial, Standard, President, Tragedy, and Pond. Almost all European type varieties will

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*For a definition of these terms see page 4.
effectively cross-pollinate if the periods of bloom coincide since they produce a high percentage of viable pollen. Usually the bloom of European varieties overlaps, but in some years an early-blooming variety such as Reine Claude is past bloom by the time the Imperial Epineuse and Italian Prune bloom. However, most of the European plums bloom in close proximity during midseason. There are apparently no cross-incompatible European plum varieties grown commercially in Oregon.

Many studies have shown that bees must be provided in plum and prune orchards for satisfactory commercial crops, even though the varieties are highly self-fruitful. During the blossoming season, growers should provide one or more colonies of bees for each acre of fruit to be cross-pollinated. Each hive should consist of four or five frames of brood and bees. Colonies of bees should be distributed evenly throughout the orchard, wherever possible. Competing bloom on the orchard floor should be reduced or controlled by mowing such crops as mustard and chickweed.