

tance is reversed. Although total number of citrus trees has gradually decreased in Florida, the number of grapefruit trees has increased since 1969. In Texas, the number of grapefruit trees has increased between 1977 and 1979, and the number of orange trees has decreased slightly. Commercial citrus production (oranges, grapefruit, Temples, tangelos, tangerines, limes, lemons, and others) is more varied in Florida than in Texas. Consequently, more cultivars are grown

in Florida. The trend toward greater planting density is evident in data from recent years in both states.

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Plum and Prune Cultivar Situation in the West Coast of North America

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INTRODUCTION

Plums and prunes are the 4th most important deciduous tree fruit crop of the west coast. In 1979 they were surpassed in production only by apples, peaches, and pears (1). The term "prune" describes *P. domestica* (European plum) cultivars which can be dried without fermenting at the pit. Fruits of several prune cultivars are dual purpose, being shipped fresh or canned as well as dried. Other European plums are used for purposes other than drying, such as for fresh consumption, canning, freezing, and crushing. *P. salicina* (Japanese plums) are widely grown in California, mainly for fresh consumption.

PRODUCTION AND ACREAGE

California is the major producer of plums and prunes in the United States, accounting for 87% of these fruits produced in 1979 (1). In 1978, 154,000 tons of plums were produced (Table I) (2). The yield per acre for plums has increased from 2.2 tons in 1935 to 4.4 tons in 1968 and 6.4 tons in 1979.

The number of bearing acres of plums has increased slightly from 24,000 acres in 1946 to 27,400 acres in 1979, with year-to-year fluctuations (3). Plum production in Placer, Solano, Sacramento, and San Joaquin Counties has steadily declined from 47% in 1944 to 2% of California's total in 1979, while production has increased in Fresno and Tulare Counties from 30% in 1944 to 90% of California's total in 1979 (3). The major plum-producing area is now in the southern San Joaquin Valley counties of Fresno, Tulare, Kern, Madera, and Kings.

California prune production in 1978 was 132,000 tons (Table I) (1). For the season of August 1978 to July 1979, 85,000 tons of dried prunes were shipped domestically and 46,000 tons were exported (4). Domestic use was juice and concentrate (45%), dried prunes (36%), pitted prunes (14%), canned (3%), baby food (<1%), and puree (<1%). Production per acre has increased from 1.8 tons per acre in 1965 to 2.2 tons per acre in 1977. In 1969,

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there were 97,560 acres of prunes, declining steadily to 74,640 acres in 1979. Prune production, however, has remained fairly constant over the past 15 years. The major prune-producing areas are the Sacramento Valley (Sutter, Yuba, Butte, Tehama, Colusa, and Glenn Counties), Sonoma County in the north coast, Santa Clara County in the central coast, Placer County, and Tulare County. Most prunes are harvested mechanically and dried in dehydrators.

Oregon produced 24,400 tons of prunes and plums in 1979 and only 17,000 tons in 1978 (Table I) (1). The average for the last 5 years is 26,000 tons. Plum production is of minor importance in Oregon. In 1974, there were 7,400 acres of prunes and plums in Oregon (5) and it is estimated that this has decreased by about 1,000 acres in 1980 and that acreage will continue to decline. Oregon prunes are used as fresh, dried, and canned in almost equal proportions. Fresh market prunes are grown entirely in the Milton-Freewater district of Umatilla County in eastern Oregon. Prunes for canning are grown west of the Cascade Mountains from Portland to Roseburg, with most of the acreage being west of Portland.

Washington state produced 17,857 tons in 1979, 21,300 tons in 1978 (Table I) (1), and an average of 21,800 tons of prunes and plums for the last 5 years. In 1974, there were 2,400 acres of prunes and plums in Washington state (5). Acreage has been fairly stable since 1974, with only a few new plantings or orchard removals being made. About 90% of the crop is used for fresh market and the rest is canned or frozen. Major production is centered in the Yakima Valley and Walla Walla-Clarkston area, producing 70% and 30% of the fresh production, respectively.

British Columbia produced 3,786 tons of prunes in 1978 (Table I) and has produced an average of 4,300 tons

Table I. Plum and prune production and acreage (1978).

	Tons (fresh weight)	Acres ¹
California		
Prunes	132,000 ²	83,430
Plums	154,000	35,050
Oregon	17,000	7,400 ^{3, 4}
Washington	21,300	2,400 ^{3, 5}
Idaho	7,500	1,727 ⁶
British Columbia	3,977 ⁷	770

¹Includes bearing and nonbearing.

²Dry basis, 2½ lbs. fresh to 1 lb. dry.

³1974 Census.

⁴Oregon acreage includes 70 acres plums.

⁵Washington acreage includes 320 acres plums.

⁶Idaho acreage includes 906 acres plums.

⁷British Columbia production includes 191 tons plums.

during 1970-1980 (6), with fairly steady production during this time. In 1978, 78% of the crop was sold fresh (20% of this at roadside stands) and the rest processed. Although production has doubled since 1970, plums are a minor crop in British Columbia, with only 191 tons produced in 1978. The total prune and plum acreage has remained fairly constant during the past 10 years and is about 770 acres. Most plums and prunes are produced in the southern end of the Okanagan Valley.

Idaho produces about 7,000 tons of prunes and plums per year (Table I) although the acreage of prunes has declined since 1961. In 1978, there were 821 acres of prunes and 906 acres of plums (10).

CULTIVARS

The Agen (French) prune cultivar was probably first introduced into California by Pierre Pellier in 1856 when he brought it with him from France (7). Soon afterward the Imperial Epineuse, Italian Prune (Fellenberg), and Robe de Sergeant prune cultivars were introduced to California. Not until 1870 was a Japanese-type plum, Kelsey (*P. salicina*), imported from Japan and grown in California. In 1885, Luther Burbank

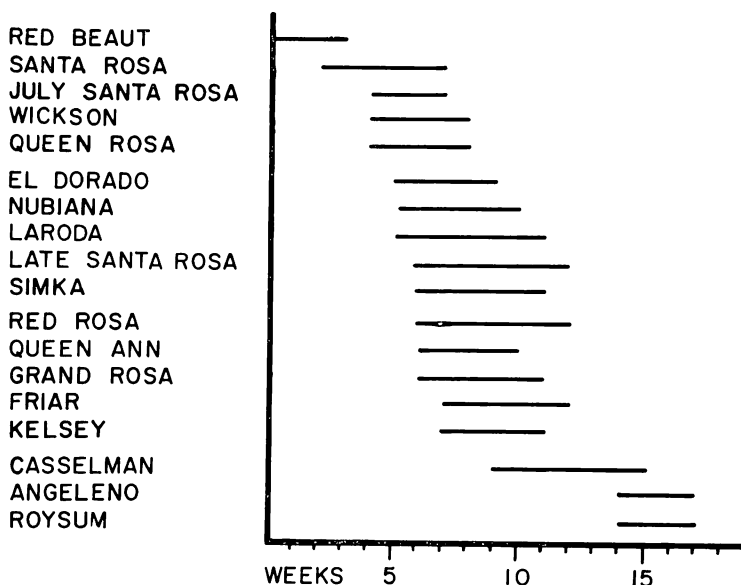


Fig. 1. The 18 principal plum cultivars grown in California and their approximate shipping period. The starting date can vary from May 15 to May 25.

named the cultivars Burbank and Satsuma from 12 plum seedlings he received from Japan. Burbank is well known for popularizing the Japanese plum as well as hybridizing it with *P. hortulana*, *P. simonii*, *P. munsoniana*, and other *P. species*. Kinman (8) listed 10 major Japanese plum cultivars in 1938, of which Beauty, Burbank, Climax, Duarte, Formosa, Gaviota, Santa Rosa, Satsuma, and Wickson were introduced by Burbank. Only Beauty, Santa Rosa, Kelsey, and Wickson are grown commercially today. Since Japanese plums were first introduced into California, many cultivars have been named, and the commercial popularity of most of these cultivars has changed drastically over the years.

The California Tree Fruit Agreement listed 46 major cultivars and 106 other cultivars shipped in 1979 (3). The 18 principal plum cultivars are listed in Table II. Plums for the fresh market are shipped from the middle

of May to October. Approximate maturity dates for each variety are shown in Figure 1. Only four *P. domestica* cultivars, Empress, President, Standard, and Tragedy, are of importance for the fresh market in California. Several new plum cultivars that show promise are Black Beaut (Santa Rosa season), Blackamber (1 week before El Dorado), Armelita (Laroda season), and Rosemary (Casselman season). Santa Rosa continues to be one of the major cultivars, and is still being planted; 43,350 trees of this cultivar were sold in 1979-1980 (9). Friar was first in tree sales (45,050 trees) in 1979-1980 (9). Other major plum cultivars sold in 1979-1980 were Spring Beaut (36,750 trees), Black Beaut (25,100 trees), Rosemary (15,100 trees), Simka (12,600 trees), Red Beaut (10,050 trees) and Rich Red (a sport of Red Beaut) (10,200 trees).

The choice of cultivar is the most important consideration a grower must make when growing plums for the

fresh market. Generally, a series of cultivars maturing throughout the season is desired. Therefore, the time of maturity, market demand, quality, and pollination requirements are a few of the characteristics that must be considered. Because of these qualifications, a large number of cultivars are being grown for commercial production. The cultivar situation is constantly changing and new plum cultivars are continually being developed.

Little change has taken place in prune cultivars since they were introduced into California. Adaptability and production are the most important characteristics instead of a complete maturity sequence; therefore, only a few prune cultivars are grown. The French prune, one of the first cultivars imported into California, is still the most important. It accounted for 99% of the production and 92% of the

acreage in California in 1978 (Table III) (4). Other cultivars of minor importance are Imperial Epineuse, Robe de Sergeant, Burton, Early Grans French, Sugar, Moyer, and Improved French.

The Italian Prune is the major cultivar grown in Oregon, Washington, British Columbia, and Idaho. Early types of Italian (Dermaris and Richards Early Italian) are also grown commercially. Minor prune cultivars are Brooks, Milton, Parson, and Moyer.

Plum cultivars grown in Idaho are President (44%), Empress (23%), Friar (10%), Simka (9%), and Queen Ann (5%). President and Empress are European plums; the others are Japanese plums. In British Columbia, the plum cultivars grown are Damson, Green Gage, and President, and a few Santa Rosa and Gold.

Table II. Principal plum cultivars grown in California.

Cultivar	1978 Acres			1979 Production
	Bearing	Nonbearing	Total	(1000 packages)
Santa Rosa	5,084	833	5,917	1,846
Red Beaut	2,677	1,468	4,145	1,772↑*
Casselman	2,625	78	2,703	1,602↓
Laroda	2,308	207	2,515	1,307
Friar	888	1,394	2,282	855↑
Simka	929	432	1,361	711↑
El Dorado	1,238	479	1,717	624
Late Santa Rosa	1,373	40	1,413	621↓
Roysum	870	46	916	387
Nubiana	834	15	849	327↓
Queen Ann	1,039	20	1,059	299↓
Queen Rosa	382	147	529	241
Grand Rosa	308	81	389	186
Red Rosa	233	27	260	166↓
Kelsey	551	51	602	160
Wickson	392	54	446	138
July Santa Rosa	177	98	275	122
Angeleno	119	100	219	112↑

*Direction of arrow indicates recent trends in production.

Table III. Prune cultivars grown in California.

Cultivar	1978 Acres			1978-79 Production (tons, dry)
	Bearing	Nonbearing	Total	
French (Agen)	71,447	7,655	79,102	130,320
Imperial Epineuse	1,746	161	1,907	1,030
Robe de Sergeant	396	—	396	98
Burton	251	—	251	— ¹
Early Grans French	231	—	231	— ²
Sugar	225	—	225	12
Moyer	127	2	129	— ¹
Improved French	124	555	679	— ²
Other	416	95	511	437

¹Included in Other production.²Included in Agen production.

PROBLEMS AND OPPORTUNITIES

Even though most of the prune cultivars are quite old and well tested, they have many cultural problems. The Italian Prune ripens late, and consequently is susceptible to occasional fall rains before being picked, a situation which causes cracking and brown rot. It also tends to have poor quality. Early strains of Italian Prune do not produce well and they also have leaf disorders. Poor set may be caused by late spring frosts or by physiological problems due to minor element deficiencies or other unknown causes. Alternate bearing is also a problem for some prune cultivars. Since many plum and prune cultivars are not self-fertile, pollination and selection of adequate pollenizer cultivars are important for good fruit set and yield. In spite of these production problems, there is very limited prune breeding and only a few plum breeding programs on the west coast. The Japanese plum breeding programs have been orientated to producing cultivars that fill the gaps in the season, ripen

early and late, ship well, and develop large fruit. Emphasis will continue to be placed on these objectives, along with increasing the quality, firmness, and self-fertility.

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