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Growing Prunes

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Growing Prunes

The word "prune" in this circular refers to varieties of the European prune plum, *Prunus domestica*, which are suitable for processing into a product known as "dried prunes." Several of the same varieties are suitable for processing as "canned purple plums." Prunes grown in the Milton-Freewater district of Eastern Oregon are usually sold fresh in eastern markets. Primarily because of the greater danger of brown rot infections during shipment, prunes grown in Western Oregon are normally dried or canned. The size of the prune crop has varied greatly from year to year and prices to growers have varied inversely with the crop. In years of a heavy crop the grower price has often been at or below his cost of production while in short-crop years the price increase has often not compensated for low production. Large crops of dried prunes in California have depressed the market price in Oregon for dried prunes. The marketing situation has been improved through the efforts of the Oregon Processed Prune and Plum Growers Commission, a commodity commission which is funded and managed by prune growers. The commission and the Washington-Oregon Prune Marketing Committee also finance research in prune production problems.

Sites for Prune Orchards

The depth of the soil, the distance from the surface to an impervious layer or an area of poor drainage, is one of the most important factors for determining the success of an orchard. For successful prune growing, the soil depth should not be less than 3½ feet.

To determine the soil depth it is necessary to dig holes (using a soil auger, post hole digger, or shovel) and examine the soil removed from them. Examine the soil to a depth of 4 feet and in enough

spots in the field to discover variations in soil depth. Poor drainage is indicated by a grayish, yellowish, or reddish mottling of the soil. If soil drainage in part of an orchard site is poor, tiling may be a practical solution.

Extremely sandy or gravelly soil does not have sufficient moisture-holding capacity for non-irrigated orchards but may be satisfactory with irrigation. Although the shallow soils often found on hill tops may support a prune orchard, low production and poor fruit quality may make the enterprise uneconomic. Even on good sites, irrigation may increase yield and fruit size. More weight may be lost in drying fruit from irrigated orchards. There are fewer damaging spring frosts in hillside orchards than in orchards on the lower bench lands or river bottoms. Do not plant an orchard on a site with poor air drainage. Late maturity is sometimes a problem at the higher elevations.

Varieties and Pollinizers

Italian—The principal prune variety grown in Oregon for canning or drying is Italian. Although most of the prunes shipped fresh from Eastern Oregon are the early strains, some regular Italians are also shipped. Italian has a distinctive tart flavor which some people prefer. With normal ripening the flesh is a rich amber color and the skin attains a deep purple which is especially desirable in the fresh or canned product. Particularly in years of light crops it is susceptible to internal browning which markedly reduces quality. In Western Oregon the principal weakness of Italian is its irregular bearing habit. Low fruit set is associated with cool, rainy spring weather. In addition, often up to 50 percent of the fruit which is set by mid-June falls off the tree in summer. A hormone spray to prevent this summer fruit drop has been used. See the current spray calendar for recommendations. Italian ripens in the last half of September in most of Western Oregon.

Early Italian prune varieties resemble Italian but they ripen 7 to 14 days earlier. Primarily the Milton and Richards strains have been planted since 1955. They are virtually identical. Both are more prone to internal browning than regular

Italian. In addition, the growth and production of Early Italian has been decidedly inferior to that of Italian.

Brooks originated near Lafayette, Oregon, about 1930. The fruit tends to be very large, about 1½ inches in diameter. Due to its low acid content, relatively thick skin and slightly coarse flesh, Brooks is not canned commercially. Because of its large size and sweet flavor it is a good prune for drying. Small quantities have also been sold fresh. Brooks, like Italian, is self-pollinating, but unlike Italian, it tends to bear every year. The tendency of Brooks trees to overset sometimes necessitates a fruit-thinning program. The limbs of a Brooks tree tend to be long and sparsely branched. They frequently break under a heavy fruit load.

Parsons originated at Forest Grove, Oregon, about 1930. The fruit is medium to small in size, oval, blue-colored, and thin skinned. Parsons is a sweet prune that is very good for drying but unsatisfactory for canning. It ripens in early September. Parsons is self-unfruitful. It must be cross-pollinated by another variety; some strains of Italian or Millers Sweet are satisfactory. Introduction of bees at bloom time will increase cross-pollination and fruit set. The tree tends to be smaller and less upright than Italian.

Moyer Perfecto originated as a seedling at Roseburg, Oregon, about 1925. It is a large, firm-fleshed sweet prune not suitable for canning but exceptionally good when dried. The fruit matures late, about 10 days after Italian. It has a pronounced tendency to crack in a light rain. For this reason and because of its late maturity, it is not well adapted to the Willamette Valley. In the dryer sections of the state, especially in Douglas County, it is an excellent commercial variety. The tree tends to have long, sparsely branched limbs with brittle wood. Even with careful pruning they often break with a heavy crop of fruit.

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, and fair in drying

quality. Processors in Michigan consider Stanley an acceptable canning prune. In some years the sugar content has been lower and the drying ratio much higher than Italian. Stanley is also noted for its hardiness and annual productiveness. In some seasons it produces some doubled or lopsided fruits but this does not completely disqualify it as a commercial variety. Since few Stanleys have been grown in Oregon, we do not know whether this would occur often enough to seriously limit its commercial usefulness. Stanley is the principal prune grown for canning in Michigan. Additional small commercial trials of Stanley under Oregon conditions appear to be justified.

President is a large purple plum especially suitable for fresh shipment. It has become a successful commercial variety in the Milton-Freewater area. In Corvallis it ripens in late September. The fruit is very large, $1\frac{3}{4}$ x 2 inches, oval, and purple with a thin blue bloom. The flesh is yellow, juicy, and sweet.

President is self-unfruitful and requires pollen of another variety to set fruit. Italian is a satisfactory pollinator for President. Bees are required to effect cross-pollination.

Rootstocks for Prunes

Most of the old commercial prune orchards in Oregon are (or were) planted on peach roots. Therefore, we have more experience with trees on peach roots than with those on plum. However, many of the trees which were originally planted on peach, later scion rooted and were partially on Italian prune roots. Particularly in poorly managed orchards, these scion roots produced numerous suckers. Scion rooting can be avoided by planting with the graft union several inches above the ground.

Advantages of peach roots over plum:

- (1) Trees are less susceptible to bacterial canker;
- (2) Fruit matures earlier in most seasons;
- (3) Peach roots do not produce suckers whereas some kinds of plum roots often do;

- (4) Trees on peach roots appear to be more winter-hardy than those on plum roots.

Advantages of plum roots over peach:

- (1) Trees are more tolerant of drought;
- (2) Trees are more tolerant of excess soil moisture;
- (3) Plum-rooted trees are more easily established after removal of peach-rooted trees;
- (4) Most plum-rooted trees are more vigorous than peach-rooted trees;
- (5) Plum roots are less susceptible to oak root fungus (*Armillaria* spp.) than peach roots.

Seedlings of the myrobalan plum or rooted cuttings of myrobalan selection 29C have been used as rootstocks for prunes to a limited extent in Oregon. Observations of their performance are in general agreement with the comparisons already listed. In prune rootstock experiments in Western Oregon, trees on Marianna selection 4001 have often exceeded all others in vigor and productivity.

Orchard Design and Planting

The square system with a planting distance of about 20 feet is commonly used. On rich river bottom land or deep soil where irrigation is used, a 25-foot planting distance is necessary to avoid overcrowding. Planting on a rectangular system with trees closer together in the rows but more space between rows will permit more efficient mechanized harvesting. In orchards with long tree rows, less time is wasted in turning at the ends.

Interplanting with temporary prune trees will reduce the time from planting to the first commercial crops. Interplants should be gradually pruned back to make room for the permanent trees. For example, trees could be planted 11 x 20 and thinned on the diagonal to give a spacing of about 22 feet in a triangular arrangement, or thinned to a 22 x 20 rectangle.

When trees are received from the nursery but cannot be planted in the orchard at once, they should be removed from their original package and heeled in. This consists of digging a trench, placing the tree roots in the trench in a row, and cover-

ing them with moist but well-drained soil or sawdust. The trees should never be exposed to freezing temperatures and the roots should be kept moist.

Prune trees may be planted in winter or early spring whenever the soil is not too wet. Planting with the bud union 4 to 5 inches above the ground level will prevent rooting of the scion variety. Also, the Pacific peach tree borer is less likely to become a problem than if the union is below ground.

Often the trees will settle in the holes so that if the bud union is at ground level at planting, it will be below ground level later. Scion rooting is undesirable because the desirable characteristics of the rootstock may be lost. Scion roots often send up many suckers which are a nuisance in the orchard. If scion rooting occurs with prune on peach roots, the trees will lose the resistance to bacterial gummosis imparted by the peach roots.

Pruning and Training

After planting, trees are headed back to a height of 30 to 36 inches in order to balance the top with the roots. Higher heading facilitates movement of equipment under the trees which is particularly important with mechanical harvesting. Trees headed too high lean with the wind too easily.

Since pruning young trees delays fruiting, prune only as much as is needed to produce a strong framework of scaffold branches. More heading of Brooks and Moyer trees is needed to stiffen the tree and cause branching.

Mature prune trees should be pruned at least every other year to maintain tree vigor and for good fruit quality. Remove dead or broken limbs, limbs which are crossing over one another, and thin out excessively crowded areas. Thin out shoots in tree tops to maintain vigor throughout the tree.

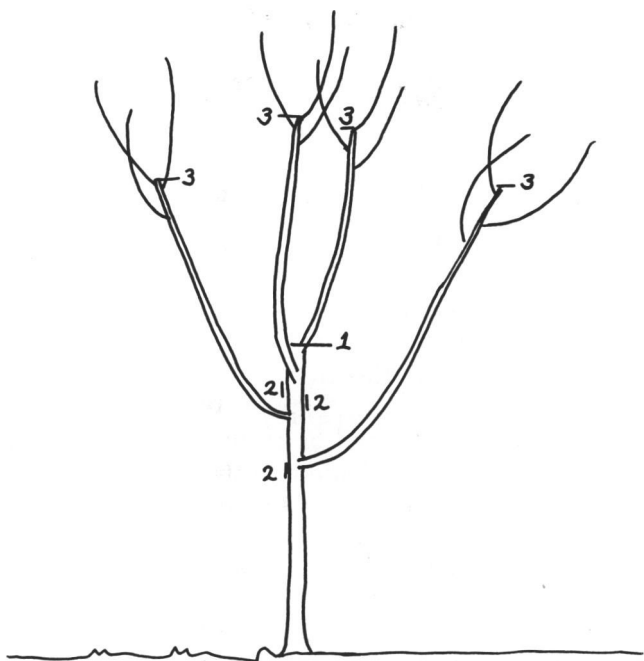


Figure 1. Training a prune tree, cut #1—headed at 30-36 inches at planting. Cuts #2—reduce number of scaffolds to three or four in first and second seasons. Cuts #3—head scaffolds at 24-30 inches from trunk, especially Brooks and Moyer. For wider crotch angles with Brooks prunes head 36 inches above ground at planting and again at about 30 inches after upper shoots have grown 3 to 4 inches.

Soil Management and Weed Control

The basic objective of soil management is to maintain an environment favorable to vigorous root growth. Ample moisture, oxygen, and mineral nutrient supplies are the most important aspects of such an environment. Good soil structure, where the soil tends to be in small crumbly aggregates with much pore space, helps to provide these three basic requirements. Cultivation is detrimental to soil structure, and it should be done only for the following reasons: (1) to incorporate a cover crop; (2) to suppress weed growth; (3) to prepare for harvest; and (4) to plant a cover crop.

Since cultivation is detrimental to soil structure, less frequent and more shallow cultivation permits the maintenance of better soil structure. Also, due to the greater availability and concentration of mineral nutrients in the surface soil, shallow

cultivation is preferred because it permits "feeder root" development in this zone. Use of a harrow, rod weeder, or knife weeder for weed suppression is less damaging than discing.

Very little moisture is lost from the soil because of direct evaporation. Almost all of the moisture lost is by passage through plants. Therefore, the theory that a "dust mulch" will save soil moisture is a false one. A cover crop or substantial weed growth is needed in winter to prevent erosion. This growth must be destroyed early in spring to conserve moisture for the trees. Under irrigation, of course, this is not so important. Weed control should be accomplished as early in spring as it is practical. Use of herbicide in a strip down the tree row eliminates the need to cross-cultivate and prevents damage to roots and trunks. Discs should be equipped with effective depth-control devices to prevent damage to tree roots.

Non-tillage weed control which combines use of herbicides in the tree row with close mowing of the cover crop using an orchard flail is a management system which is used extensively in nut orchards. A cover crop of sub-clover or annual blue grass is mowed very close to the ground in early spring. It dies shortly after effective rains have stopped without using much of the soil moisture needed by the trees. This system is also suited to prune culture when a shaker and catching frame are used for harvest. Firm prunes may be damaged if they are shaken onto the hard flailed soil surface.

Major Pests and Diseases

Brown rot, caused by two closely related fungi, *Monilinia laxa* and *M. fructicola*, is the most common disease problem in prune orchards. The fungi survive the winter on old withered fruits in the ground and in the trees. The organism sometimes attacks blossoms during moist bloom seasons and also the ripening fruit when wet weather occurs. Twigs may also be infected causing them to wither and die. Infected blossoms turn brown, take on a scorched appearance, and in wet weather are covered with grayish tufts of spores. Occasionally brownish infections also develop on the fruit when green. Masses of light brown spores are wide-

spread over ripening fruit surfaces during rainy harvest periods. Such fruit sometimes dries up and becomes mummified in the tree. See a current spray schedule for control measures.

The peach and prune root borer is one of the most serious insect pests of prune orchards. The larvae burrow in the crown and roots, girdle young trees, and weaken others. Frass appears at the base of the tree indicating that insect damage has occurred. The adult is a steel blue, clear-winged moth. The female has an orange band around its abdomen. Full grown larvae are one inch long, whitish, with a brown head. See the current spray calendar for prunes for control measures.

Another serious pest of prunes is the peach twig borer. Small brownish larvae about $\frac{1}{2}$ inch long over winter in hibernacula, they burrow into terminal growth in spring, causing flagging. Later broods enter the fruit, making it unsaleable. The insect is controlled through spray applications at petal-fall and again in late May or early June if necessary.

Occasionally aphid infestations become serious enough to justify control measures. They cause leaf curl, reduce terminal growth and devitalize the trees. Insecticides for aphid control should be applied when the over-wintering eggs hatch during pre-bloom or petal-fall. Summer applications should be made before leaves curl.

Particularly in Eastern Oregon, spider mites are sometimes a problem on prune trees. They feed by sucking up plant juices and contribute to a devitalized condition of the trees and premature leaf drop. Thrifty trees, growing under conditions of adequate moisture, are less seriously damaged by mites than trees that are dry and in poor condition. Dormant sprays of oil or oil-lime sulfur are helpful in controlling mites. See a current spray calendar for specific control recommendations.

Lecanium scale is an insect pest of prunes which is capable of inflicting severe damage. These insects over-winter on limbs and twigs and appear as rather large, dark brown, strongly lumped scales. The standard method of control is to apply an oil emulsion spray (4% actual oil) in

the early spring as the buds begin to swell. Summer sprays may also be used.

The pacific flathead borer breeds beneath the bark of young trees, especially when the trunk has been sunburned. Often it kills the tree by girdling. Recently planted trees are most susceptible. Protect newly planted trees from sunburn by whitewashing, with paper trunk protectors, or by shading the trunks with boards.

Shot hole borers most frequently attack trees that are in an unhealthy or sour-sap condition. Sometimes they attack young trees which appear to be in good condition. The small, dark-colored beetles bore into the sapwood making tunnels where they lay their eggs. Small, round holes in the bark are characteristic of attack by these beetles. Damage by shot hole borers largely can be prevented by keeping the orchard in a healthy, vigorous growing condition. Prunings should be destroyed promptly.

Deer are serious pests in young prune orchards. Bags of fresh blood and bone meal hung on the trees are partially successful in repelling them. On sites with high populations of deer, fencing may be the only fully effective control measure.

Pocket gophers damage trees by girdling the trunk just below ground level and by cutting the roots. An individual gopher can damage many trees. Gophers are controlled by use of toxic baits and trapping. The bait most commonly used is carrot sticks dusted with strychnine at the rate of one ounce of strychnine to 16 pounds of carrot sticks. Red clover leaves dusted with strychnine are very effective. These baits must be applied by hand into the gophers main runway system.

Mineral Nutrition of Prune Trees

In Eastern Oregon prune trees usually benefit only from nitrogen fertilizer and zinc sprays. The soils provide ample potassium and phosphorus. Applications of boron are toxic.

The soils of humid Western Oregon tend to be low in bases, especially potassium. Prune trees respond to added nitrogen provided requirements for boron and potassium are also met. Soil sampling before planting to determine lime requirement and

the need for potassium or magnesium fertilization is recommended. Liming or application of potassium fertilizer is most effective where the lime is mixed into the soil to as great a depth as feasible during the preparation of the land for planting.

Do not put fertilizer in the hole at planting time. Tree roots are easily injured by high concentrations of mineral salts. Here is a guide to fertilizing young trees.

<i>Age</i>	<i>Apply this amount N (lb./tree)</i>
Planting—2 years	none
3 - 5	$\frac{1}{4}$ - $\frac{1}{3}$
6 - 7	$\frac{1}{3}$ - $\frac{1}{2}$
8 - 10	$\frac{1}{2}$ - $\frac{3}{4}$

Young trees should grow 18-36 inches annually.

Leaf analysis is the best guide to fertilization of bearing orchards. See the fertilizer guide (FG series) for prunes for specific recommendations based on leaf analysis. Boron deficiency symptoms appear at blossom time and shortly thereafter. Buds on shoot tips fail to open, leaves are twisted and malformed and the bloom is sparse. Potassium deficiency symptoms appear in late summer. The older leaves become pale yellow with marginal scorch. Fruit size and sugar content are reduced on potassium-deficient trees.

Boron deficiency is easily corrected with soil and foliar applications of boron. Potassium deficiency is more difficult to correct, especially on soils with a low percent base saturation. Heavy doses of potassium must be placed in a narrow band on the soil surface or drilled into the root zone. Sometimes it may be necessary to apply lime first.

When prune trees have a light crop, the leaves often curl. This is normal. It does not indicate the presence of mineral deficiency.

Harvesting

For fresh shipment, prunes are picked from the trees by hand. Traditionally, prunes for drying or canning have been shaken onto the ground and picked up by hand. Usually trees have been shaken two or three times in order to harvest only the most

mature fruit each time. Prunes for drying have been shaken and picked up by machine as well. More recently growers have used a shaker-and-catching-frame combination in a once-over harvest. This system is economical and there is little damage to the fruit. Some driermen continue to use multiple harvests because they feel that in a once-over harvest too much of the fruit is immature. Although it is possible to shake-and-catch harvest twice in the same orchard, much fruit may fall on the ground between harvests.

Your shipper or processor fieldman can tell you when your prunes have reached proper harvest maturity to meet their product requirements.

