

Growing Prunes

R.L. Stebbins

The word “prune” in this publication refers to varieties of the European prune plum, *Prunus domestica*, that 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 the 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 market prices 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 funded and managed by prune growers. The commission also finances research in prune production problems.

Sites for prune orchards

The depth of the soil—that is, 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 3.5 feet.

To determine the soil depth, it is necessary to dig holes (using a soil auger, post-hole digger, or shovel) and to 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 nonirrigated orchards but may be satisfactory with irrigation. Although the shallow soils often found on hilltops 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. On the other hand, 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. But, late maturity is sometimes a problem at the higher elevations.

Do not plant an orchard on a site with poor air drainage.

Varieties and pollinizers

Italian is the principal prune variety grown in Oregon for canning or drying. 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 that some people prefer. With normal ripening, the flesh is a rich amber color, and the skin attains a deep purple that is especially desirable in the fresh or canned product.

Particularly in years of light crops and heat stress, 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, up to 50% of the fruit that is set by mid-June falls off the tree in summer. Italian ripens in the last half of September in most of western Oregon.

Early Italian prune varieties resemble Italian but ripen 7 to 14 days earlier. Primarily the Milton and Richards strains, which are virtually identical, have been planted since 1955. Both are more prone to internal browning than regular Italian, and their growth and production has been decidedly inferior to that of Italian.

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Brooks originated near Lafayette, Oregon, about 1930. The fruit tends to be very large, about 1.5 inches in diameter. Because of 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 used for drying, but it has a very high dry-away ratio. 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. Brooks is prone to quality problems, such as red fruit and fruit rots.

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, but Stanley is the best pollinizer. 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 drier 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. It does not

set well when weather is wet during the bloom season.

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, but poor in drying quality. It is highly susceptible to fruit rots. 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 for 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 don't know whether this would occur often enough to seriously limit its commercial usefulness. Stanley is the principal prune grown for canning in Michigan.

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, 1.75 x 2 inches, oval, and purple with a thin blue bloom. The flesh is yellow, juicy, and sweet.

Use pesticides safely!

- **Wear** protective clothing and safety devices as recommended on the label. **Bathe or shower** after each use.
 - **Read** the pesticide label—even if you've used the pesticide before. **Follow closely** the instructions on the label (and any other directions you have).
 - **Be cautious** when you apply pesticides. **Know** your legal responsibility as a pesticide applicator. You may be liable for injury or damage resulting from pesticide use.
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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 that 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 about 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 removing peach-rooted trees;
4. Often, 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 the performance are in general agreement with the comparisons already listed. In prune rootstock experiments in western Oregon, trees on Marianna selection 4001 have usually exceeded all others in vigor and productiveness. Pixie and Citation are rootstocks that produce semidwarf trees.

Orchard design and planting

The square system with a planting distance of about 20 feet is commonly used. 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, remove them from their original package and heel them in. This consists of digging a trench, placing the tree roots in the trench in a row, and covering them with moist but well-drained soil or sawdust. Never expose the trees to freezing temperatures; keep the roots from freezing.

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; 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 that 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. Plant with the soil line at about the same place the tree stood in the nursery or very slightly higher.

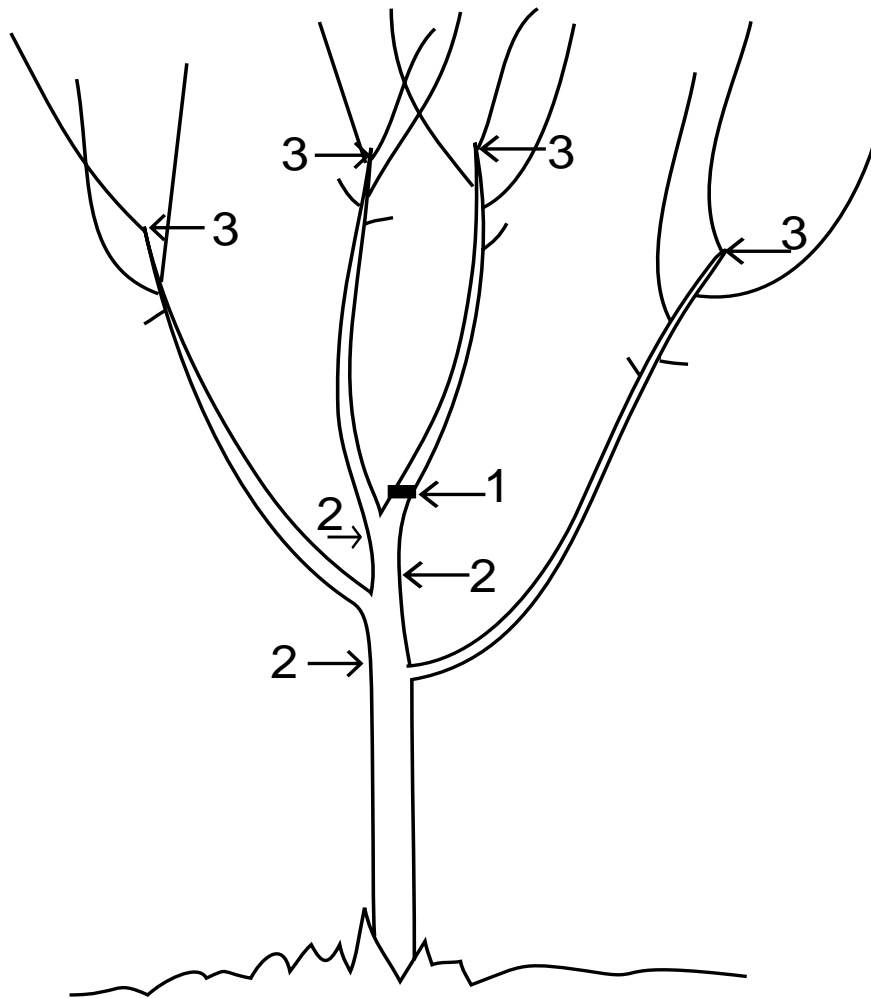


Figure 1.—Training a prune tree. Cut #1: headed at 30 to 36 inches at planting. Cuts #2: reduce number of scaffolds to three or four in first and second seasons. Cuts #3: head scaffolds at 24 to 30 inches from trunk, especially Brooks and Moyer. For wider crotch angles with Brooks prunes, head 36 inches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

Pruning and training

After planting, trees are headed back to a height of 30 to 36 inches to balance the top with the roots (Figure 1). 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.

Varieties such as Moyer, which form very narrow crotch angles, will benefit from limb spreading done in the first and second seasons. 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.

Prune mature prune trees at least every other year to maintain tree vigor and for good fruit quality. Remove dead or broken limbs and limbs that are crossing over one another; thin out excessively crowded areas. Thin out shoots in tree tops to maintain vigor throughout the tree.

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 tend 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.

Nontillage soil management

Nontillage weed control, using a flail mower between the tree rows and herbicides in the row, offers the following advantages over cultivation:

1. It eliminates the need for extensive ground preparation for mechanical harvest;
2. It eliminates all damage to tree roots due to cultivation;
3. It greatly reduces soil erosion;
4. Tree roots can grow in the fertile top 6 inches of soil;
5. Sometimes water penetration is improved; and

6. Nontillage can also protect against loss of top soil in a flood.

It does require purchase of special equipment, a flail mower, and smooth-tread, high flotation tires on all vehicles used in the orchard when the soil is wet. Another disadvantage is that it is difficult to travel steep slopes on a wet cover crop with smooth tractor tires. In an unusually rainy summer, more frequent mowing will be required, thereby increasing costs.

Suppression of cover crop or weed growth very early in the season is absolutely essential to success of nontillage weed control using a flail mower.

Commonly, grasses and herbs that volunteer are used as cover crops. Competition from more vigorous perennial plants can be a problem, especially where much sunlight reaches the orchard floor. If the cover is allowed to remain too tall too late in the season, it will use moisture needed for tree growth.

Mowing will usually begin in March or early April. Clip the cover to within 1.25 inch of the ground by late May. Very soon after the rains stop, the cover must die. Such close mowing can only be achieved if the orchard is dragged and floated the season before flail culture is begun in order to remove all hillocks and depressions.

Sometimes it will be necessary to drag or scrape the flailed surface to fill small ruts prior to nut harvest. Rapid regrowth of perennial weeds before harvest is a serious problem if it occurs.

Although volunteer weed growth is often all that is required to prevent erosion, a cover crop of subterranean clover is quite compatible with nontillage using a flail mower. Cover crops with more vigorous growth habits are less easily handled in this system. Mole and gopher mounds are particularly troublesome in flail-mowed orchards.

This system is suited to prune culture when a shaker-and-catching frame is used for harvest. Firm prunes may be damaged if they are shaken onto the hard-flailed soil surface.

Pacific Northwest Insect and Plant Disease Control Handbooks

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Diseases of prunes

Note: This publication does not recommend pesticides for specific situations. These recommendations change from time to time. For the latest information, see your county Extension agent or consult the latest edition of the *Pacific Northwest Plant Disease Control Handbook*.

There are a number of diseases of prunes that can cause crop losses as well as tree death. Crown gall, bacterial canker, and *Cytospora* canker can be important problems while trying to establish an orchard. These bacterial and fungal pathogens can weaken and girdle young trees, causing reduced vigor or death.

Armillaria root rot may be a problem where natural vegetation has been cleared and the new orchard quickly planted. This fungus survives on old roots, particularly of oak, and sends out runners (rizomorphs) that infect and kill young trees.

In mature orchards, brown rot will be a problem every year, particularly in orchards west of the Cascades. The

brown rot fungi attack blossoms, twigs, and ripe fruit during wet, rainy weather. Prune leaf spot, plum pockets, rust and silver leaf are infrequent fungal diseases that may cause problems under unusual circumstances.

Viruses can also cause crop loss and tree decline. Tomato ringspot virus is a problem on grafted trees and can be spread by nematodes. Plant cultivars or use scion wood that is certified free of known viruses.

Insects of prunes

Note: This publication does not recommend pesticides for specific situations. These recommendations change from time to time. For the latest information, see your county Extension agent or consult the latest edition of the *Pacific Northwest Insect Control Handbook*.

The **peachtree borer** is one of the most serious insect pests of prune orchards. The larvae burrow in the trunk, crown, and roots, girdle young trees, and weaken others. Frass appears on the trunk and at the base of the tree, indicating that insect damage has occurred. The female has an orange band around its abdomen. The adult is a steel blue, clear-winged moth. The egg-laying females fly from approximately the first of July through August.

Trees are protected by applying sprays of an approved insecticide to the trunks and crowns. Two sprays are usually sufficient. The first spray is applied about 10 days after flight activity begins, with the second application following about 3 weeks later.

Another serious pest of prunes is the **peach twig borer**. Small brownish larvae about 0.5 inch long overwinter in hibernacula; they burrow into terminal growth in spring, causing flagging. Later broods enter the fruit, making it unsal- able. The insect is controlled through spray applications during the dormant period or a petal-

fall and again in late May or early June if necessary.

Plum rust mites (very small, light-colored Eriophyid mites) cause leaf roll and may damage young trees. Control, when necessary, is achieved with a miticide applied in the late spring.

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 overwintering eggs hatch during prebloom or petal-fall. Summer applications should be made before leaves curl.

A supreme oil, alone or with an organophosphate insecticide, applied during the dormant period gives excellent control of overwintering aphid eggs on the tree.

Spider mites are sometimes a problem on prune trees, particularly in eastern Oregon. 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 some mites.

Lecanium scale is an insect pest of prunes that is capable of inflicting severe damage. These insects overwinter 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 to kill the young scales.

The **Pacific flatheaded borer** feeds 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, applying paper trunk protectors, or shading the trunks with boards. An insecticide applied to the trunk as for peach tree borer control prevents infestation. Timing is usually in late April or early May.

Shothole borers most frequently attack trees that are in an unhealthy or sour-sap condition. Sometimes, they attack young trees that 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. Destroy prunings promptly.

Animal damage

Deer are a serious pest in young prune orchards. Bags of fresh blood and bone meal hung on the trees are partially successful in repelling them. Some repellent sprays may have temporary effect. 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.

Table 1.—Fertilizing young trees

Age	Apply this amount N (lb/tree)
Planting–2 years	none
3–5	0.25–0.33
6–7	0.33–0.5
8–10	0.5–0.75

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 usually not needed—and they may be toxic.

The soils of humid western Oregon tend to be low in bases, especially potassium. Prune trees respond to added nitrogen with substantially higher production, 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 material 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. Table 1 is a guide to fertilizing young trees.

Young trees should grow 18 to 36 inches annually.

Leaf analysis is the best guide to fertilization of bearing orchards. See your Extension agent 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 in autumn before leaf fall. Boron sprays in fall may increase fruit set even when leaf analysis does not indicate a boron deficiency.

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, pick prunes 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 driers 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 field representative can tell you when your prunes have reached proper harvest maturity to meet their product requirements.



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