

Chapter 22

FRUIT TREES



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Chapter 22

Fruit Trees

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I. Introduction

Growing fruit can be an important part of home gardening, but it demands a year-round and year-to-year commitment by the gardener. In addition to the personal satisfaction and enjoyment of tree ripened fruits, fruit trees have considerable landscape value. Properly cared for, they are attractive in form and display beautiful flowers in the spring. If judiciously placed, they can enhance a well-designed landscape.

II. Site Selection

An ideal location for fruit trees:

A. Is Without Frost Pockets—A gentle slope with good air drainage will work well. Plant the trees three-quarters of the way down the hill. Cold air will drain down the hill and will help limit frost damage in the spring (Fig. 1). Frost damage can occur any time from bloom to late spring.

Frost damage to blossoms is a likely problem, particularly with early blooming fruit trees (Table 1). For example, apricots may

Fig. 1. Frost damage is best prevented by proper site selection. Choose a gentle slope with good air drainage.

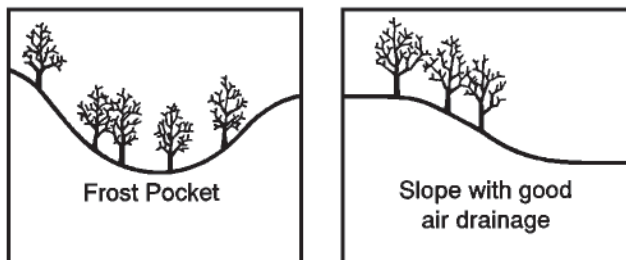


Table 1. Usual order of bloom in fruit trees.

Earliest	Apricots Japanese plums Peaches Oriental pears Italian plums Cherries Pears
Latest	Apples

produce a crop only once every 5 years because of early spring frosts. Small fruit may fall off soon after a killing frost. Stone fruit, such as peaches, may stay on the tree until mid to late June, and then drop. Diagnose for frost damage by cutting open the small fruit. If the ovules (the portion that becomes the seed) are brown, the fruit is dead.

B. Is in Full Sun—Fruit trees should be planted well away from areas of shade such as large trees and buildings. Not only must the tree itself receive full sun, but it must also be properly pruned so that light can penetrate to the inner leaves. This is necessary in order to maintain good flower production and fruit set throughout the tree.

C. Has Well-Drained But Not Droughty Soil—A site with deep, fertile, sandy loam soil increases the probability of successful tree growth and fruit production. A site with poor drainage increases the probability of winter injury to fruit trees. A drainage problem, such as a perched water table, can be lessened by breaking through the hard pan layer in the soil. Stone fruits, particularly peaches, do not tolerate “wet feet.”

III. Fruit and Nut Cultivars for Idaho

Once the decision is made to start a home orchard, a lot of thought must go into cultivar selection. Cultivars must be adapted to the climate and soils of your specific area, must provide fruit at the desired time, and must be suited to uses such as freezing, canning, and preserving. Select cultivars that will extend the harvest season from July through October. Since some cultivars are easier to grow than others, choose only the ones you, your family, and friends really appreciate so your horticultural efforts will be justified. In addition to local expertise, “Western Fruit Berries & Nuts—How to Select, Grow, and Enjoy,” is a good reference. Some cultivars can be ordered if you give your local nursery enough notice.

Note: Fruit and nut trees are propagated either by grafting or budding to obtain true-to-name trees. A seedling fruit tree cannot produce the same kind or quality fruit as its parent and it comes into production much later.

IV. Types of Tree Fruits

The complexity of tree fruits can be simplified for study by grouping tree fruits into two categories: pome fruits and stone fruits. Both pome fruits—apples (*Malus*) and pears (*Pyrus*)—share many cultural similarities and pest problems. The stone fruits (*Prunus*)—apricots, cherries, nectarines, peaches, and plums—share cultural similarities.

A. Pome Fruits (Apples and Pears)

1. Apple trees are among the most cold tolerant fruit trees, but climate adaptability varies according to cultivar. In colder areas of Idaho, it is best to plant mid-season cultivars that will escape spring frosts and ripen before extreme cold in the fall. The best vegetative growth and optimal fruit production are obtained in well-drained, deep soil.

Many apple cultivars require a second cultivar for cross-pollination by bees to ensure adequate crops. Crab apples can also cross-pollinate apple cultivars. Bloom times of the cultivars need to overlap to ensure pollination.

Choose cultivars to grow at home that are not readily available in your local grocery store, that you especially enjoy, and that are best for your purpose.

Less commonly grown cultivar suggestions are:

- a. *King*: Large, waxy yellow with red striping. Crisp and sweet. Good for eating and baking.
 - b. *Northern Spy*: Large, red apple with tender, fine-grained flesh. One of the finest for flavor. Stores well. The tree is slow to reach bearing age, and tends to bear alternate years.
 - c. *Spitzenberg*: Medium, red with yellow dots. Crisp, fine-grained flesh with a tangy, spicy flavor.
 - d. *Wealthy*: Red-tinted white flesh and a deserved reputation for quality. Good cooking apple; satisfactory for fresh use. It is a particularly good tree for colder areas. Tends to bear alternate years. Good pollinizer for other apples.
 - e. *Winesap*: Large, round, and with a lively flavor, these apples make good desserts. An old-timer that remains a favorite. The trees are vigorous, and are early, reliable bearers.
2. Pears will tolerate poor drainage and neglect better than other fruit trees. For best vegetative growth and optimal fruit production, pears should be planted in a well-drained, deep soil and spaced about 16 to 18 feet apart.

The major problem with pears is fire blight, which primarily attacks young, vigorous wood. Treatment is to cut out and destroy the blackened diseased wood. Train and prune trees only to shape them, limiting cuts to smaller branches as much as possible. Excessive pruning can stimulate vigorous, susceptible growth. Heavy rain during bloom as well as hail-inflicted wounds will increase the chances of fire blight infections. To lessen the incidence of the disease, application of copper can be made during the delayed dormant stage. This will reduce the bacterial inoculum levels on the surface of the tree.

Avoid the use of nitrogen fertilizer unless trees show obvious signs of a deficiency. Excess nitrogen application promotes vigorous growth that will then be vulnerable to fire blight.

Cultivar suggestions include:

- a. *Bartlett*: A standard commercial variety, matures toward the end of summer and has excellent fresh eating as well as canning quality.
- b. *Bosc*: A fine-flavored dessert variety ripening after Bartlett.
- c. *Clapps Favorite*: Matures before Bartlett and is the earliest pear of good quality.
- d. *Seckel*: A small gourmet pear with a russet skin; a pickling as well as a dessert pear.

B. Stone Fruits

1. Apricots—Flower very early in spring; consequently, the occurrence of spring frost will affect fruit production. It may help to plant apricots on a northern exposure (but not in shade) to delay bloom, but a safer course of action is to choose later-blooming cultivars. Bloom and maturity dates vary, depending on area, cultural practices, tree age, and season.
2. Cherries—Do best in deep, well-drained soil. Space sweet cherries about 30 feet apart. The trees may not fill that much space, but the cherry fruits need sunlight to ripen.

Most sweet cherry cultivars need an aid in pollinating in order to produce fruit, so choose the second tree carefully.

Black Tartarian, Corum, Republican, Sam, and Van will pollinate any other cherry tree. Stella, Compact Stella, and Garden Bing are self-fertilizing and require no second tree for pollination. Bing, Lambert, and Royal Ann will not produce fruit in any combination.

The most dependable cherries for colder areas of Idaho are the sour type that are self-fertilizing. Montmorency is the most popular cultivar for the home garden as well as being a leader in commercial sour cherry production. Sour cherry trees may be planted 20 feet apart.

3. Peaches and nectarines—Differ in their tolerance of cold or mild winters. Be sure to select cultivars that are adapted to your climate.

Generally, there is a risk of damage where winter temperatures fall below -10° to -15° F. Trees planted on a hillside where the coldest air drains to low-lying areas or trees planted near large bodies of water may tolerate areas otherwise too cold for them.

Reliance and Polly (Haven Polly) are considered some of the hardiest peach cultivars. Nectarines are more tender than peaches.

Peaches and nectarines are generally self-fruitful, or self-pollinating.

4. Plums and prunes—The most popular cultivars are derived from either European or Japanese species. These cultivars can grow 15 to 20 feet high and about as wide. European varieties bloom late and are better adapted to areas with late frost or cool, rainy spring weather than are the early-blooming Japanese varieties. Many plum and prune cultivars need another cultivar growing nearby for pollination. The European-type plum, called the Italian prune, is a high yielder, requires no thinning, hangs on the tree, and ripens to a taste treat that more than justifies its place in the home garden.

C. Nuts

1. Filberts or hazelnuts—These make an attractive, small tree for the garden. Spring to fall, the roundish, ruffled-edged leaves cast a pleasant spot of shade. Showy male catkins hang long and full on bare branches in winter. Female flowers are small and red in color. A crop of round or oblong nuts comes as a bonus in the fall. Plant trees in early spring in well-drained, soil and plant at least two compatible cultivars for cross-pollination. Filberts tend to sucker. If you wish to maintain a single trunk, remove these shoots three to four times a year. Filberts can also be grown as a bush.
2. The Persian (English) walnut—Should not be planted as a landscape tree except

on a large lot with deep soil. Established trees take some drought, but deep, regular watering is required. Older trees need pruning only to remove dead wood. Plant walnut trees 40 to 60 feet apart. Walnut flowers are susceptible to spring frosts.

3. Almonds—Will survive in southwestern Idaho, but don't produce annual crops because they bloom early in the spring and are usually killed by frost.

V. Rootstock

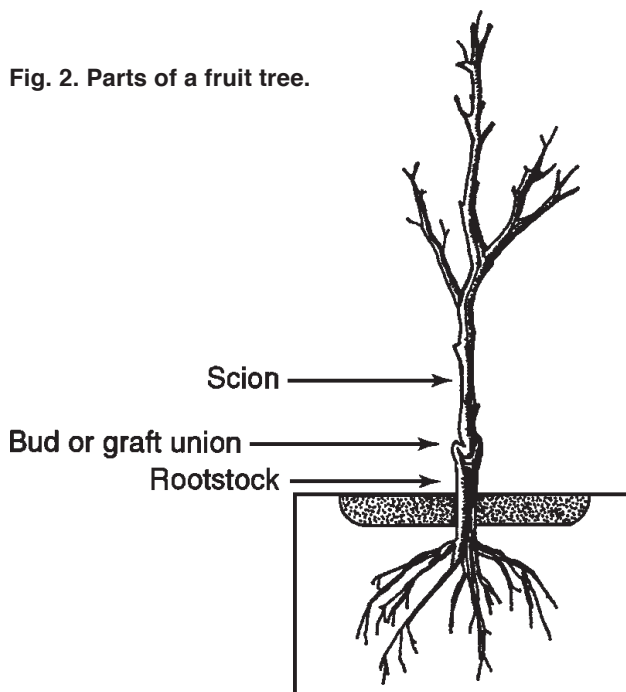
Fruit trees consist of two parts: a scion and a rootstock. The scion, or fruiting cultivar, is the most above-ground part of the tree. It is grafted or budded onto a rootstock to form a new tree (Fig. 2). This tree is the same cultivar as the scion and will produce fruit of that cultivar. A wide range of rootstock, varying in size as well as other attributes, are available for apples. However, rootstock selections for other tree fruit are more limited.

Dwarfing rootstock is preferred since it produces a more compact fruit tree. It bears fruit earlier in its life, is easier to prune and spray, and is easier to harvest.

A. Apples

Apple tree growth may be manipulated to three basic sizes: standard, semi-dwarf, and dwarf.

Fig. 2. Parts of a fruit tree.



1. The standard (seedling) rootstock is adaptable to most conditions. It has an extensive root system and should be planted about 20 feet apart.
2. The semidwarf rootstock (MM-111, MM-106, and EM-7) make a tree one-half to two-thirds the size of a standard tree.
3. The dwarf rootstock (M-26 and EM-9) make a tree one-third to one-half the size of a standard tree. The more dwarfing the apple rootstock, the more support the tree will require. When the tree is bearing a crop, dwarfing rootstock (M-9 and M-26) will need a stake to hold the tree up in the wind. In general, the more dwarfing the rootstock, the faster the tree will bear. It is important to allow sufficient vegetative growth to fill the space before allowing the crop to slow vegetative growth.

B. Pears

Pear cultivars are available on semidwarf or seedling rootstock. The seedling rootstock are hardier than other rootstock, making larger but more manageable trees.

C. Stone Fruits

Nectarines, peaches, and apricots are grown on seedling rootstock and form fruit on 1-year-old wood. It is easy to keep them the desired size by pruning and still have fruit production on seedling stock. Cherry trees produce large canopies. There is no such thing as a true dwarf cherry. Semidwarf trees on Mahaleb rootstock reduce tree size a maximum of only 10 percent. Work is being done to develop a rootstock that will reduce size, but the end results are a few years away.

VI. Cultural Practices and Problems

A. Planting

Fruit trees may be planted in the fall or spring. Bare root trees are usually available only in the spring. Planting early in the season before the roots dry out will ensure the best success. With containerized trees, the time of planting is less critical. Follow these steps to plant a fruit tree:

1. Dig a planting pit with vertical sides and make it large enough to accommodate the

root system without crowding. The pit should be a minimum of 2 to 3 feet deep and should allow at least a 6-inch clearance from the end of the roots.

2. After removing all broken or damaged roots, place the tree in the planting pit. Spread the planting soil around the tree and tamp to firm. Use planting soil that is as good or better than the soil in which the tree originally grew. Avoid using planting soil around the tree that is so different from the native soil that water and roots either do not penetrate the native soil, or that water runs around the planting soil in the pit and into the native soil.
3. Pour water into the planting pit until the consistency of thick liquid is attained. Gently raise and lower the tree to allow the soil to fill between the fibrous roots and to eliminate air pockets. Add water and planting soil alternately until the pit is filled to grade.
4. The tree should rest at the depth at which it grew in the nursery, and the bud union (the place where the tree was budded in the nursery) should be about 6 inches above the soil level after planting. A collar at the base of the tree, lighter in color than the rest of the trunk, indicates the original growing depth.

B. Training and Pruning

Both can influence apical dominance, or the tendency for the apex (uppermost bud) to grow more rapidly than the lower buds. Apical dominance is thought to be caused by a hormonal stimulus produced by the growing apex that suppresses the development of lateral bud growth. Cuts on higher or lower parts of the tree will have differing results in vegetative growth depending on the distance from the apex.

1. Training—This is the process of giving desirable structure to fruit trees from 1 to 4 years after planting. The objective of training young trees is to establish the essential structure of the tree and to bring the tree into bearing.
2. Pruning—This is used to maintain the shape of trees 3 or 4 years after planting as well as after trees are bearing fruit.

The objective of pruning older trees is either to open the trees to sunlight or to maintain fruiting by pruning back the overhanging limbs in the upper part of the tree, so that sunlight reaches the lower and inner portions of the tree.

There are two types of pruning cuts:

- a. *Heading-back cut*: This is an invigorating cut that causes an increase in vegetative growth in the immediate area of the cut. Because the hormonal gradient is destroyed, the growth of the lateral buds is no longer suppressed.
- b. *Thinning-out cut*: This type of cut removes shoots but does not stimulate vigorous regrowth. Because the hormonal gradient is not interrupted, vegetative growth continues. A thinning-out cut can also be used on upright and overhanging growth. This type of cut will result in an increased flower bud production over the whole tree.

Note: Excessive pruning, especially heading-back cuts, will delay fruiting in the early years and reduce fruiting on older trees.

3. Seasons of pruning—Trees can be pruned any time after the leaves fall in autumn and before bud break in the spring. Avoid making large saw cuts (over 3 inches in diameter) until hazardous winter temperatures are over. If you have only a few trees, resist the temptation to prune your trees on the first non-subzero day that seems warm enough to be doing something outside. Some commercial peach growers wait until bloom time to see what blossoms exist before they prune.
 - a. *Winter (dormant) pruning*: The dormant period is the most desirable time to prune out broken, damaged, diseased, and weak wood; to remove limbs crossing over other limbs; or to eliminate narrow angled crotches. (Wide angled branch crotches of 45 to 90 degrees are the strongest.)
 - b. *Summer pruning*: Trees can be pruned any time during the growing season.

Pruning during this period decreases the shoot growth and, therefore, is a common practice where better control of shoot growth is desired. Rub off or pull off water sprouts and suckers that shade the inner parts of the tree, fruits, and spurs. This should be done when shoots are 3 to 4 inches long and before they become woody. Shoot removal by pulling at this stage damages adventitious buds at the base of the shoot, which limits regrowth.

Note: Pruning after the first of September or before trees become dormant stimulates growth, making the trees more susceptible to winter injury during early fall freezes.

4. Pruning tips

- Don't leave stubs! Cut close to the trunk at the branch collar. Cut back to a live branch or bud.
- Don't paint wounds. Paint traps moisture and encourages rot. Slant cuts so rain runs off.
- Remember, the art of pruning comes from knowing how and where to cut.

C. Water Management (Irrigation)

Soil moisture (e.g., not too much and not too little) is important in maintaining tree vigor, productivity, and fruit size.

1. Drought or moisture stress alone rarely kills healthy, well-established fruit trees. However, newly set trees with limited root systems or plants damaged by cold injury, diseases, or insects are more susceptible to moisture stress. Occasionally, a prolonged drought results in extensive feeder-root death, which destroys large trees. This is most severe in sandy soils with poor moisture-holding capacity.
2. Good soil drainage is important, especially in the spring. During the summer and early fall, the trees deplete the available soil moisture. Irrigation is usually required! Poor drainage is common in soils with a high clay content and dense, impervious subsoil, or in lowlands with a high water table.

3. Although fruit trees have deep root systems, most of the roots are concentrated in the upper 2 feet of soil and extend outward slightly beyond the spread of the limbs.
4. Oftentimes trees in lawns and under grass sod are irrigated to maintain a good grass cover, but insufficient water is applied to the root zone of the tree. Tree roots do not compete well with grass roots. To remedy this problem, clean out all grass growing under the dripline of any fruit tree.

Note: High soil moisture levels or frequent watering around the base of the trunk, particularly in heavy soils, can result in the development of crown rot, a fungal disease that attacks the roots and kills the tree. Overwatering by itself can also kill roots. Because oxygen is only partially soluble in water and becomes depleted under waterlogged conditions, the roots are asphyxiated. Root or crown damage from excess moisture turns inner-bark tissue brown. Often, damage is not apparent for several months, especially if the excess moisture occurs in late fall or early spring. Crown rot causes earlier leaf color change in the fall.

Note: Prunus species, including cherries, peaches, and nectarines, are most susceptible to death of feeder roots in poorly drained soils. Pears, apples, plums, and most small fruits are more tolerant to temporary excess soil moisture, but they can be severely injured or weakened by extended periods of very wet soil conditions.

D. Fertilization

Nutritional deficiencies are not a direct cause of tree death unless excessive or improper fertilizing results in tree damage. Normally, it is not advisable to fertilize at planting. Young tree roots are easily burned, and the tree may die back or die completely. After growth has begun, however, use a complete fertilizer having essential nitrogen

Table 2. Recommended annual terminal growth of fruit trees.

Nonbearing trees	
Apple	24 to 36 inches
Pear	12 to 26 inches
Peach and other stone fruits	16 to 24 inches
Bearing trees	
Apple	12 to 14 inches
Pear	6 to 12 inches
Peach and other stone fruits	10 to 15 inches

(N), phosphorus (P), and potassium (K) or (N-P-K) with 10 percent N (such as 10-6-4 or 10-10-10), particularly in the sandy soils. The amount of N to apply in late fall or early spring (preferably before bud break) depends upon the type of tree fruit and its productive status (Table 2). Much less than these recommended growth rates will result in reduced fruiting wood and a smaller crop the following year.

If you are just starting a fertilizer program, 1/8 pound of actual nitrogen should be soil applied to stone fruits for every inch of trunk diameter (measured 1 foot above ground level). In the case of pome fruits (apples and pears), 1/10 pound of actual nitrogen should be used for each inch of trunk diameter.

The actual amount of N differs among products, and this difference must be taken into account when computing the amount of fertilizer needed. For example, a 5-inch diameter peach tree will need 5/8 pound of actual nitrogen (A.N.):

$$\text{diameter} \times \text{pounds A.N. required} = 5 \times 1/8 = 5/8 \text{ lb (.625 lb) A.N. needed}$$

If ammonium sulfate 20-0-0 (20% N) is used, 3 1/8 pound of fertilizer will be required to provide the N needed for a 5-inch peach tree:

$$\frac{\text{lb AN needed}}{\% \text{ N}} = \frac{5/8 \text{ lb}}{20\%} = \frac{0.625}{0.20} = 3.125 \text{ lb}$$

In the case of ammonium nitrate at 33 percent N (33-0-0), a little over 1 7/8 pounds of ammonium nitrate is needed for the same 5-inch diameter peach tree:

$$\frac{\text{lb AN needed}}{\% \text{ N}} = \frac{5/8 \text{ lb}}{33\%} = \frac{0.625}{0.33} = 1.89 \text{ lb}$$

The amount of nitrogen to be applied is determined by the amount of growth in the previous year. If too little growth is occurred, increase the nitrogen application. If too much growth occurred, reduce the nitrogen application. Knowing how much nitrogen to apply requires accurate record keeping.

Where organic mulches are used, the amount of N fertilizer may be decreased as the mulch begins to decay, releasing N. Fertilizing with manure is tricky because N and salt levels vary depending on the age and source of the manure.

Other nutrients need to be applied according to the results of a leaf analysis. Zinc, iron, and boron are micronutrients that are often deficient.

E. Insect and Disease Control

Success in growing fruit depends on effective control of insects and diseases, recognition of the common diseases and insects, selection of effective pesticides, proper timing of pesticide sprays, and thorough coverage of fruit and foliage with the spray mixture.

1. Organic control measures are available for some pests but, in general, their results are mixed.
2. Commercial fruit growers, because of the size of their operations, can afford to buy large equipment to effectively apply pesticides.
3. Home orchardists with a few fruit trees are at a disadvantage when it comes to obtaining equipment that will do a satisfactory job of spraying fruit trees. In most cases, they are restricted largely by the cost of hand-operated sprayers or those operated by small electric or gasoline motors. The capacity of these machines is small, the pressure is low, and the energy expended to do an effective job is considerable. Yet the homeowner fights the same pests, often on the same size trees, as the commercial grower.

4. It has been shown repeatedly that failure of homeowners to adequately control pests on their fruit trees can generally be attributed to not knowing what is causing the damage or what could cause the damage, not applying enough material to cover the trees completely, not making applications on time, and not continuing the spray program late enough into the summer.

Note: Dormant sprays are an important step in controlling insects and diseases. However, there are different dormant sprays; some control only diseases, while others control only insects. Consult the *Pacific Northwest Insect Control Handbook* and the *Pacific Northwest Plant Disease Control Handbook* for specific recommendations.

F. Rodent and Deer Damage

Fruit trees are susceptible to mouse, gopher, and deer damage.

1. Mice—Eat the bark of the trunk and roots near the soil surface. Damage is easily detected by removing soil from around the base of the tree and the larger roots near the surface. Bark completely removed by gnawing rodents will girdle, weaken, and finally kill the tree. As with other types of mechanical injury, plants weakened but not killed by rodents are more susceptible to drought, cold injury, disease infections, and insect infestations. To reduce the hazard of mouse damage, clean out all grass and weeds in a 3- to 4-foot diameter circle around the trunk of the tree. This rids the area of ground cover that might protect mice from predators. Wire guards, constructed from fine wire mesh and placed 1-inch deep in the soil, are effective around young trees.
2. Gophers—Are best controlled in the home garden by trapping. Poisoned baits are available for mouse and gopher control.
3. Deer—May damage fruit trees planted near woods or other areas with adequate deer cover. Deer feeding on young grow-

ing shoots and buds of fruit trees can severely stunt and weaken the plants. In the late summer and fall, buck deer often break and kill young trees while rubbing the velvet from their antlers. Tall fences or repeated use of approved repellents may be required for adequate deer damage control.

4. Moles can sometimes present problems by burrowing directly under trees. In this case, roots dry out and tunnels are used by mice who feed on the roots. Moles do not feed on tree roots.

G. Vegetation Management Due to Weed and Herbicide Injury

Weeds weaken fruit trees by competing for soil moisture and nutrients. The wise combination of cultivation and approved herbicides helps reduce weed competition.

Improper or excessive herbicide use frequently causes fruit tree death. Contact-action herbicides, when misused and allowed to drift onto foliage or tender green bark, can severely injure and ultimately kill the plant. Similarly, systemically absorbed herbicides for weeds can be lethal to fruit plants when improperly sprayed.

Long term use of the same soil-residual herbicide may eventually result in excessive soil accumulation, causing root injury, plant weakening, or death.

Do not plant fruit trees on sites immediately after corn or grain crops where a persistent herbicide, such as atrazine, was used for weed control. Fallow the soil for one or two growing seasons before planting fruit trees. This allows herbicide degradation and prevents tree injury or death.

Herbicides are safe, effective tools for reducing weeds in fruit crop planting. To prevent herbicide damage or plant death, pay careful attention to label guidelines for application, apply the correct rates, and use only herbicides approved for specific fruit crops.

H. Preventing Winter Injury

Normally, vegetative growth stops about early August, and a terminal bud is set. Unusually warm fall temperatures and exces-

sive amounts of nitrogen may cause continued or renewed growth in the fall. These conditions may predispose trees to cold injury; keep trees in moderately vigorous condition before winter arrives.

1. Lethal winter injury occurs most frequently in the lower trunk, in the crown region, or in the roots near the soil surface. The tree will generally die shortly after growth begins in the spring, if the damage has been severe enough to destroy the inner bark tissue.

Damaged inner bark is brown, while healthy bark and cambium tissue are a greenish yellow. Severe cold injury may result in split bark, however, the splits may later heal.

2. Sunscald, another type of injury, normally occurs in late winter on the south to southwest side of the main trunk and large branches. Bark, whether brown or gray, absorbs the sun's rays in midafternoon and often warms up as much as 20°F above the surrounding air temperature. As a result, bright sunny days in late winter may activate the cambium and

bark tissues on southwestern trunk exposures. This reduces cold resistance and may result in injury because of extremely cold night temperatures. The bark dries, then splits, and finally wood-rotting fungi enter. This may seriously weaken or even kill the tree. The problem is most severe for young trees and smooth-bark trees such as cherry and plum.

To protect a tree from sunscald, wrap the trunk with strips of burlap or a tree wrap material; or paint the trunk with a white indoor latex paint, which will lower bark temperature by reflecting light.

I. Cropping Problems

Biennial bearing (crop overproduction in one year and a need to rest the next year) confuses many home orchardists. This condition will alternate until finally the tree will produce fruit only every other year. To correct or reduce this problem, annual thinning done when fruit is still small will allow the tree to handle the crop and produce higher quality fruit. Thinning is done by hand when the fruit is about 1/2 inch in diameter. After thinning, the fruit should be spaced

Table 3. Why fruit trees don't bear.

Symptoms	Prevention strategy	Possible causes
Trees 4 to 8 years old have never set fruit buds or bloomed	Trees growing too vegetatively pruning especially heading cuts	Spread or tie down branches; reduce nitrogen; reduce dormant
Few fruit buds form	Trees under stress (shade, "wet feet," drought, lack of nutrients)	Choose sunny, well-drained site; fertilize and irrigate properly;
(same as above)	Trees too vegetative pruning; increase summer pruning	Reduce nitrogen; reduce dormant
Fruit buds form only at tips	Fruit buds were killed by low temperatures during bud swell	Choose site with good air drainage
Tree blooms, but all flower parts fall off when petals fall, so few or no fruit sets	Frost killed open blossoms	Choose site with good air drainage; choose late-blooming or frost-resistant cultivars
(same as above)	Flowers were not adequately cross-pollinated	When choosing cultivars, be sure to include pollenizers; during spring bloom, place flowering branches of another cultivar in buckets of water in the tree
Tree bears only every other year (e.g., biennial bearing)	Heavy crop one year weakens tree, so few fruit buds form for next year's crop	Thin fruit 4 to 6 weeks after year, bloom when crop is heavy

approximately 6 inches between fruits. Do not delay thinning. The later the thinning occurs, the smaller the fruit will be.

Additional cropping problems, their possible causes, and prevention strategies are found on Table 3.

Further Reading

Books

- A Catalog of New & Noteworthy Fruits* (annual). 1992. New York State Fruit Testing Cooperative Assn. Inc., Geneva, NY.
- All About Growing Fruits & Berries*. 1982. Chevron Chemical Corporation (Ortho Books), San Francisco, CA.
- Fitzgerald, T. J. 1984. *Gardening in the Inland Northwest, A Guide to Growing Vegetables, Berries, Grapes & Fruit Trees*. Ye Galleon Press, Fairfield, WA.
- Walheim, L., and R. L. Stebbins. 1981. *Western Fruit, Berries & Nuts—How to Select, Grow and Enjoy*. HP Books, Tucson, AZ.
- Westwood, M. N. 1978. *Temperature-Zone Pomology*. Timber Press, San Francisco, CA.

Booklets and Pamphlets

University of Idaho Extension

- PNW 341 Choosing Pear Rootstocks for the Pacific Northwest
- PNW 221 Cold Resistance of Stone Fruit Flower Buds
- CIS 726 Cytospora Canker Disease in Idaho Orchards
- PNW 496 Grafting and Budding Plants to Propagate, Topwork, Repair
- BUL 820 Growing Apples for Local Markets in Cold Climates
- CIS 866 Homeowner's Guide to Fruit Tree Fertilization
- CIS 603 Insect Control for Apples and Pears in the Home Orchard
- CIS 605 Insect Control for Stone Fruits in the Home Orchard
- PNW 121 Nutrient Disorders in Tree Fruits
- CIS 898 Pears in the Home Garden
- CIS 752 Phytophthora Collar-Rot of Orchard Trees
- PNW 400 Training and Pruning Your Home Orchard
- CIS 776 Why Home Fruit Trees Die

Washington State University Extension

- EB1436 Apple Cultivars for Puget Sound
- EB 665 Fruitfulness in Pome and Stone Fruits

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