

Growing Apples and Pears

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Apple and pear trees require patience, knowledge and skill to grow well. Despite the effort required, apple trees in particular remain a popular addition to many home gardens. Pear trees are not as commonly grown by Minnesota home gardeners as are apples. Perhaps this is due to the pear tree's reputation for becoming very large, for its history of susceptibility to fire blight disease. Yet, high quality, hardy pears are moderately easy to grow in the southern half of Minnesota - easier in some ways than apples. And even northern Minnesota gardeners have a hardy option.

Selecting Apple and Pear Varieties

Apple flowers must receive pollen from another variety of apple to produce fruit. Therefore, plan to plant two or more varieties of apple, unless there are ornamental crabapple trees or other apple trees in your neighborhood. Two trees of the same variety cannot provide pollen to each other. Apples are insect pollinated, with bees and flies transferring pollen from flowers on one tree to those on another.

Pear trees, as a rule, also require cross-pollination by another pear variety to produce a large crop. However, evidence indicates that some pear varieties may be self-fruitful under some conditions, and you might be able to get a small amount of fruit with only one tree. Like apples, pears are insect-pollinated.

When choosing which apple varieties to grow, consider what you plan to do with the fruit. If your goal is to have a supply of fruit to eat for snacks and desserts, you probably will want to choose an early variety and a later one, so that you are not overwhelmed by too many apples all at once. If you want to dry, can, freeze and/or press cider from the fruit, you may be able to handle two trees' worth of fruit ripening at the same time.

Disease-Resistant Apple Varieties

There are a few varieties of apple available that are resistant to apple scab, the most important and destructive disease of apples in Minnesota. Scab resistant varieties will not require fungicide sprays for this disease, an appealing factor for many people. The quality of the fruit from these disease-resistant trees is acceptable, although it may not measure up to that of some other varieties. However, home growers who prefer not to spray fungicides may enjoy growing these varieties. Scab resistant varieties, however, are not resistant to insect damage and may still require insecticide sprays to manage insect pests.

Site Selection

Apple and pear trees require a site in full sun, so choose a spot where the sun shines directly for at least 8 hours each day. Because they bloom fairly early in spring, the trees should not be planted on low sites where cold air may settle.

Any good garden soil should suffice, but avoid areas where water stands for several hours after a rain. Good drainage is important to the health of fruit trees. The pH of the soil should be slightly acidic to neutral,

about 6 to 7. Conduct a soil test to determine soil conditions before planting and amend the soil as suggested by the results.

How much space do you need for apple or pear trees? A good rule of thumb for a home garden fruit tree is to provide at least as much horizontal space as the anticipated height of the tree. Closer planting will make training and management of the trees difficult and the trees may shade each other so that fruit quality is harmed. For standard trees, allow 20-25 feet in all directions from buildings or other trees. Allow 12-15 feet for semi-dwarf trees and 8-10 feet for dwarf types. For best pollination, plant your apple or pear trees within 100 feet of each other.

Planting Fruit Trees

Dig a hole for each tree that is no deeper than the root ball, and about twice as wide. You may mix in up to one-third by volume compost, peat moss, or other organic matter. Most of what goes back in the planting hole should be native soil. This is particularly important in heavy soils.

Apple and pear trees may be sold bare-root or in containers. If purchasing bare-root nursery stock, closely examine the root system and remove encircling roots or J-shaped roots that could eventually strangle the trunk. For containerized trees, inspect the root systems for encircling woody roots. If woody roots are wrapped around in a circle, straighten them or make several vertical cuts through the root ball prior to planting.

Position each tree so that the graft union (identifiable as a swelling several inches above the root system) is 2 to 4 inches above the soil line. If the graft union is placed close to or below the soil line, the scion will take root, causing a semi-dwarf tree to grow to full size. Spread the roots of bare-root stock, making sure none are bent. Begin adding the backfill soil, removing air pockets as you go.

After the hole is filled, tamp gently and water thoroughly to remove air pockets. The soil may settle an inch or two. If this happens, add more soil. Throughout the life of the tree, you should water its root zone thoroughly during the growing season whenever there is a dry spell. Ideally, the tree should receive one inch of water from rainfall and/or irrigation every week from May through August.

Apply wood chip mulch four inches deep in a three-foot circular area around the tree. Keep the chips away from the trunk of the tree. The mulch will keep weeds and lawn grass from competing with the tree for water and nutrients, while also contributing organic matter to the soil and moderating soil temperatures in the root zone. Reapply the mulch every few years as it breaks down.

It's a good idea to stake the tree for the first few years. Either a wooden or metal stake will work. It should be six to ten feet long, and pounded two feet into the ground. Use a wide piece non-abrasive material to fasten the tree to the stake. Narrow fastenings such as wire or cord may cut into the thin bark.

Tree Guards

Planting time is a good time to install a tree guard to protect your tree from winter injury and bark chewing by small mammals. One type of tree guard is a plastic spiral. These exclude voles ("meadow mice") and rabbits, preventing them from feeding on the bark. The white plastic also reflects sunlight from the trunk, which helps prevent the trunk from heating up on a cold, sunny winter day. If the bark temperature gets above freezing, water in the conductive tissue under the bark becomes liquid and begins to flow through the cells. When the sun goes down or behind a cloud, the liquid water suddenly freezes, damaging the cells and sometimes killing all the conductive tissue on one side of the trunk.

Plastic tree guards are not a perfect solution, however. Because some types fit tightly to the trunk, they can cause the bark to stay moist, leading to disease. They also can constrict the trunk as it grows. If you use plastic tree guards, make sure they are pushed down into the soil to a depth of two inches. This will keep voles from burrowing under them to get at the trees. Loosen the guard periodically, if necessary, to allow the tree to expand. The best way of using a plastic tree guard is to remove it for the growing season and put it back on in fall.

Another option is to put a hardware cloth cage around the base of the tree. Like a plastic tree guard, it should be pushed into the soil to prevent entry of voles. It should extend up the trunk to just below the first branch, and should not fit tightly around the tree. Leave a few inches of room for the tree to expand. The hardware cloth cage will not protect the tree against winter injury, so if you plan to use this method, first paint the trunk of the tree with white latex paint. The paint will reflect the heat of the sun just as the white plastic tree guards do.

Once the tree has rough and flaky mature bark, neither winter sun nor chewing animals can harm it, so tree guards will not be necessary. For the first years of its life, however, it's important to protect the trunk of your fruit tree.

When the snow is deep, however, rabbits can eat branch tips and strip bark on scaffold branches. Leaving pruned branches on the ground may be an effective method to reduce this kind of damage. The rabbits will chew the bark from the branches and leave the living trees alone as long as the branches remain above the snow.

Limiting damage caused by deer may be more difficult. Deer typically eat branch tips throughout the year, but particularly in winter. One method of control is to hang a very strongly scented bar of soap in each tree in summer. The deer do not like the smell of the soap and are discouraged from eating the tree. Since the deer may become desensitized to the soap over time, you may need to periodically change the brand of soap.

Other repellents, such as spray-on bittering agents, may discourage browsing by deer. Keeping a dog in the yard will also provide some protection. Some home fruit growers construct chicken-wire cages around their fruit trees to keep deer from eating their trees in winter. These structures may be unsightly but effective.

Pruning for Fruit Production

Pruning a tree grown for fruit is somewhat different than it is for a landscape tree such as a birch. Although there is more than one way to prune a fruit tree, home gardeners in Minnesota commonly prune and train using a "central leader" system, where a single central trunk runs the entire height of the tree and supports the fruiting branches.

The ideal central leader fruit tree has a single main trunk and a number of well-spaced branches. This form allows light and air to penetrate the canopy, aiding in fruit ripening and disease prevention. The goal in pruning fruit trees is to develop and maintain this conical form, always keeping the central leader the tallest and most vigorously growing shoot, and allowing the lowest branches to spread the widest. Prune to keep enough open space between each level of scaffold branches that you can imagine tossing a football through: at least a foot of vertical space between branches on the same side of the tree.

For a nonbearing fruit tree, prune to develop a basic structural framework that will support future crops. In order to develop this framework, the first pruning task is to select and develop what we call "scaffold branches." These 4 to 5 scaffold branches should begin about 30 inches from the ground (40 inches if turf will be located beneath the branches and need to be mowed), should be spaced as equally around the trunk as possible and should be spaced vertically at least 6 inches from one another.

Begin pruning your fruit tree when you plant it. Remove any suckers originating from the base of the tree. Remove any branches lower than 30 inches. Remove or cut back any branches that are competing with the leader. Now select 4 or 5 scaffold branches from those that remain, pruning out any "duplicate" branches that are growing just above or just below scaffolds. The scaffold branches should have wide angles, at least sixty degrees relative to the trunk.

If you have purchased a smaller tree with little or no branching, remove any branches, and prune the trunk to about 30 to 40 inches above the ground. Pruning the trunk back in this way will induce branching, resulting in scaffold branch options the following year. This may be a difficult cut to make, but it will be worth it!

After the initial pruning at planting, fruit trees should be pruned on an annual basis in late winter—preferably after the coldest weather is past—before they break bud. Prune minimally, especially with young trees, as excessive pruning may delay or reduce fruiting and create too much leafy growth. Once the first set of scaffold branches has been selected, select a second set above it, with the new scaffold branches beginning about 12 inches above the top branch of the first. Always keep the conical form in mind.

Once all scaffold branches have been selected, pruning consists mostly of removing the following:

- Any vertical branch competing with the central leader
- Dead, broken, or obviously fire blight-infected branches
- Suckers coming up from the roots or low on the trunk
- Watersprouts, which are vigorous vertical branches
- Downward-growing branches.
- Vigorous new growth in the middle or upper levels of the tree. Such growth can ruin the desired cone shape of the tree. The lowest branches should always be the longest.

The need for annual pruning is a good reason to choose dwarf or semi-dwarf trees, since it's safer and easier to prune from the ground or from a low ladder.

Fireblight, a serious and potentially fatal disease, can enter fresh pruning wounds during misty or rainy weather, so it is important to prune in winter. If you must prune during the growing season, to do it on a day when no rain is forecast and the air is dry.

Training

As you prune your young tree to achieve a good form, you may also need to train it. Training primarily consists of bending young, flexible branches that are growing vertically into more horizontal positions, toward an optimal 60 degree angle from the main stem. Pear branches in particular have a tendency to grow in a more vertical fashion than is optimal for early fruit production, although apple branches can also grow too vertically. Some apple varieties produce strongly vertical growth and need more training; others tend to produce branches that are naturally well-angled.

Training branches at about a 60 degree angle from the main stem slows down the production of new leaves and branch growth, and encourages fruiting. The more vertical a branch, the more vigorously it grows, and the less fruit it tends to produce. Branches that have relatively wide crotch angles are also stronger and better able to support the weight of the crop. Branches that grow more vertically often break away from the tree under the weight of fruit. You don't want to train a branch to be truly horizontal or to grow downwards; it should still be growing more or less upwards.

If a young branch is well placed, but has a narrow branch angle, the use of a device called a "spreader" may help. The spreader—as simple as a notched stick, but otherwise available in various forms at a well-stocked garden center—is wedged in between the branch and the trunk to create a wider angle. To train new branches less than six inches in length, use a wooden spring-type clothespin. Clip the clothespin onto the leader and position the flexible shoot between the other ends of the clothespin. Move the clothespin up or down the leader until you have the young shoot at the proper angle. Always go back and remove the spreaders at the end of the growing season.

Fertilizer

Once established, an apple or pear tree planted on a favorable site, in properly prepared soil, should thrive with minimal fertilization. Nitrogen is normally the only mineral nutrient that needs to be added on an annual basis.

The branches of non-bearing young apple trees will normally grow 12 to 18 inches per year (15 to 20 inches for pears), while the branches of bearing apple trees will grow 8 to 12 (8 to 15 for pears) inches in a season. If growth exceeds these rates, apply no fertilizer at all, as excessive growth inhibits fruit production, and lush growth is more susceptible to fireblight infection. If growth is normal, however, apply a low-

phosphorous fertilizer, such as a lawn fertilizer containing no herbicide, at the rate of 1 ounce of actual nitrogen per year of tree age, not to exceed 16 ounces per tree.

To calculate the amount of fertilizer to apply, divide the actual nitrogen needed by the percentage nitrogen (indicated by the first number in the three-number analysis listed on the bag, e.g. 28-0-5) in the fertilizer. For example, you would calculate an application of ammonium nitrate (33-0-0) for a three-year old tree this way: 3 ounces actual nitrogen ÷ 0.33 nitrogen in fertilizer = 9 ounces fertilizer.

Thinning Fruit

Both apple and pear trees will set abundant crops of fruit if conditions are good during bloom. Some of the fruitlets will drop in mid-June, but the tree may be left with more fruit than is optimal for fruit quality development. Heavy crops can also result in limb breakage, especially in younger trees. In addition, heavy crops can cause a phenomenon known as **biennial bearing**, in which a heavy crop is followed the next year by little or no crop. Fruit thinning can minimize biennial bearing.

Thin the crop within the first month after bloom occurs, when the fruits are still marble-sized (Figure 3). Aim for one fruit per cluster, or for truly optimal fruit quality, about eight inches between fruits on any branch. Leave more fruit on the outer portion of the tree and less in the shaded center, where it will not get good sunlight.

Apple Pests

Apples are hosts to many insects and diseases. Some common diseases include apple scab and fireblight. Some common insect pests on apples are apple maggot, plum curculio, and codling moth. Growing clean fruit requires a careful program of sanitation and, often, spraying chemical pesticides.

Apple scab is the most damaging disease of apple trees in Minnesota. Scab spores overwinter on fallen apple leaves, so removing all leaves from under the tree in autumn can lessen the severity this disease, although it may not prevent it. Some varieties are resistant to apple scab.

The most damaging insect pest in most Minnesota home orchards is the apple maggot, a small fly whose larvae tunnel through the flesh of the apple, making it inedible.

A new non-chemical technique for preventing apple maggot involves fastening plastic sandwich bags over the apples when they are still small and green. The apples develop normally inside the bags, and the adult flies cannot lay eggs in the flesh. Clip the lower corner off the bag so that any rainwater can drain.

Many pest insects overwinter in weedy areas near the trees. Thorough clean-up of flower beds and vegetable gardens may reduce overwintering sites for these pests.

Pear Pests

Although pear trees are generally susceptible to a number of disease and insect problems, the fact that they are relatively uncommon in the Minnesota landscape often prevents these problems from becoming severe for home gardeners. For now, however, sanitation (promptly removing and destroying fallen fruit and leaves), cultural practices designed to promote optimum tree health, and perhaps occasional physical or chemical intervention are all that is normally needed to obtain a satisfying crop in most years.

Fireblight easily ranks as the major pest of pears in Minnesota. This bacterial disease has the potential to spread quickly and damage—or even kill—unprotected trees. However, in a home garden situation, the observant gardener can keep this problem from getting out of hand. The best solution is to choose varieties with some resistance to the disease. If fire blight symptoms are spotted, infested branches should be promptly removed.

The same insects that are pests of apple - codling moth, plum curculio and apple maggot among them - may harm developing pear fruits as well. However, damage is often not serious enough to warrant chemical control.

Harvesting Apples

The redness of an apple is not a good indicator of its ripeness. When assessing maturity of apples, look for a change in the background color, the part of the skin not covered with red pigment. When the ground color begins to change from green to a greenish yellow color, the apple is starting to ripen. Among Minnesota apple varieties, only 'Northwestern Greening' is truly green at harvest. All other apples should have a yellowish background color when fully ripened.

Pick a few apples that appear to be ripe and taste them to be sure they are at the maturity stage you prefer. As apples ripen, starch in the flesh is converted to sugar. An unripe apple will be starchy and leave a sticky film on your teeth. A ripe apple may still be tart, but it should also be sweet and have developed aromatic flavors. You may need to pick the fruit several times over the course of a week or two, in order to get all the fruit at the right stage of maturity.

To pick an apple, gently take the fruit in the palm of your hand, then lift and twist in a single motion. Alternatively, use one hand to hold the short, thick fruiting spur that bore the apple, and the other hand to lift and twist the fruit. Avoid pulling or yanking the fruit, as you could pull off the spur, taking with it next year's flower buds.

Harvesting Pears

The most common mistake novice pear growers make is to let the fruit ripen on the tree. Fruit that ripens on the tree ends up gritty and unpleasant. Instead, fruit is picked at a "physiologically mature" stage and then is ripened indoors. A pear fruit is ready to harvest when:

- The skin color turns from dark green to a lighter yellowish green
- The lenticels (dots) change from white to brown (not in all varieties)
- The skin develops a smoother, waxy look and feel

To harvest a pear, gently take the fruit in the palm of your hand and lift and twist in a single motion. Alternately, use one hand to hold the spur and the other hand to lift and twist the fruit. Avoid pulling or yanking the fruit; such an action may well remove the small woody "spur" to which the stem of the fruit is attached, taking with it next year's flower buds.

Conclusion

The growing of apple and pear trees requires attention to detail in a number of areas—site selection, scion/rootstock selection, soil preparation, pruning, mineral nutrition and pest management. The reward, however, is high-quality, tree-ripened fruit unlike almost anything one can buy at the grocery store. For such a reward all the effort may be worthwhile.

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