

# Tree Fruit Culture and Varieties in North Dakota

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Growing your own fruit can be fascinating and fun. Many different kinds of fruit including apples, crabapples, plums, sandcherry-plum hybrids, Nanking and Korean cherries can be successfully grown in North Dakota. Sour cherries, apricots and pears are less hardy and are not always reliable for fruit production.

Moving west and north across the state, conditions become less favorable for growing fruits because of higher elevation with lower relative humidity and reduced annual rainfall. With proper varietal selection and the necessary cultural practices, the home gardener can be provided with ample fruit most seasons.

Protecting fruit trees from drying winds in both winter and summer cannot be overemphasized. City dwellers usually have a more favorable environment for establishing fruit trees than rural residents because the concentration of buildings and ornamental trees can greatly reduce wind velocity. On farms, the fruit tree planting should be located within the building site. Wind protection may be provided by hills, buildings or shelterbelts. Shelter is necessary from all directions except the east.

Fruit trees should be planted at least 40 to 50 feet from farm shelterbelts to prevent breakage from snowdrifts and reduce competition for soil moisture and nutrients between the two. In town, where backyard space may be limited, locate fruit trees away from large shade trees for similar reasons. Most fruits do well on any fertile garden soil that has good surface drainage.

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## How to Select a Fruit Tree

A consumer visiting a local nursery is often overwhelmed with the selection available. Choosing a good tree from the inventory is not as simple a task as one might first think. There are certain criteria that, if followed, will help make a good selection: tree size, branch number, branch angle and, to help get the properly selected tree off to a good start, planting time.

### Tree Size

Look for trees that are at least  $\frac{1}{2}$  inch in diameter just above the graft union. Experience has shown that trees smaller than this do not establish as well as larger ones. However, bigger is not always better! If a tree is allowed to get too large at a

nursery (1 inch diameter or more), a significant part of the root system may be damaged or removed in digging. This will give an unbalanced ratio between the top and root system of the tree, creating problems in establishment and survival.

## **Branch Number**

Ideally, a tree should have three to five symmetrically spaced branches that are about 4 to 6 inches apart starting about 2 feet above the graft union. Well-branched trees can be developed by the homeowner even if only healthy, unbranched trees are available that are between 5 and 6 feet tall. After planting and before the buds break, the tree can be cut about 36 inches above the graft union. A healthy tree will respond with several branches developing below the cut, allowing the homeowner to make selective cuts later on for good branch distribution.

## **Branch Angle**

Wide angle branches (60 to 90 degrees from the central axis of the tree) will be the strongest. Vigorous, upright branches -- often called water sprouts -- will not be contributors to the overall production and strength of the tree. Branches that are a wider or flatter angle will produce fruit earlier than sharp-angled branches. Overall, the basic shape of the tree should have a pyramidal shape in order to make efficient use of the sunlight.

## **Planting Time**

The urge for spring planting is overwhelming in North Dakota! This desire can be met easily by planting bare-root stock as soon as the frost is out of the ground. Experience has shown that bare-root planted trees, if healthy, will exhibit vigorous growth and establishment the first year. Some nurseries order out bare-root stock to offer to early shoppers, then pot up the remainder for sale throughout the growing season.

Often overlooked is the fall planting season. At that time, the trees are moving and storing carbohydrates into their root systems. Consequently, no visibly active growth is witnessed above ground. All the action is taking place in the roots, which continue until the soil temperature reaches about 40 degrees Fahrenheit. Fall-planted trees will often exhibit greater vigor the following spring than spring-planted ones in comparable situations.

The challenges and rewards of growing fruit trees in North Dakota attract the dedicated and beginning gardeners alike. While North Dakota may not be an export producer of tree fruits, homeowners can enjoy the wholesome goodness of harvesting fruits from their own backyards.

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## **Dwarf Apple Trees -- Not Recommended**

Dwarf apple trees are smaller than standard trees because of the influence of the rootstock on which they are grafted. Dwarf apple trees of any variety are not recommended for general planting because presently available dwarfing rootstocks are of questionable hardiness and not well anchored because their roots tend to be brittle.

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## **Pollination**

Many tree fruit varieties cannot set fruit with their own pollen, so it is necessary to select and plant two different varieties to insure proper pollination. For apples and crabapples, an ornamental flowering crab will suffice as a pollinating tree.

For stone fruits, you'll need to plant two varieties such as Waneta and Toka plums, or two varieties of apricots, such as Moongold and Sungold.

Plums and sandcherry-plum hybrids will cross-pollinate, but plums will not cross-pollinate with other cherries or apricots. Wild plums located nearby will satisfactorily pollinate plums and sandcherry-plum hybrids.

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## **Spacing**

Apple trees should be spaced for easy cultivation and full tree development. Minimum spacing is 20 by 20 feet and preferably 25 by 25 feet.

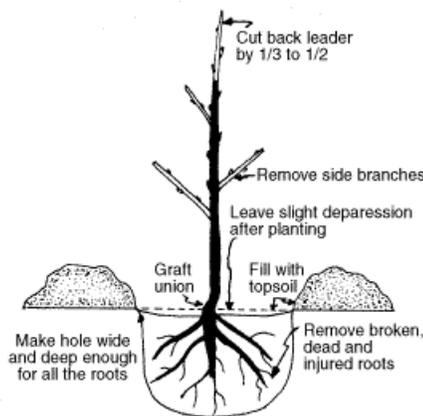
City dwellers can fit apple trees into their landscape plans. Spacing of a few trees may vary to suit the needs of the homeowner.

Spacing for hardy plums, sandcherry-plum hybrids, sour cherries and apricots should be 20 feet by 20 feet. Nanking and Korean cherries should have a spacing of 10 to 16 feet between rows with the plants 4 to 8 feet apart in the row. Where space is available, Nanking and Korean cherries can substitute for ornamental plants in a landscape shrub border. They then serve a dual purpose role for beauty and for fruit production. Supplemental water and clean cultivation will aid in success.

## Fruit Culture

Early spring planting of dormant bareroot fruit trees is recommended while potted nursery stock can be planted throughout the growing season.

When planting bareroot trees, dig a hole larger than the root spread of the tree to avoid crowding or bending the roots (Figure 1). Take care when planting potted trees (that are growing and in full leaf) to prevent loss of soil around the roots when removing the container at planting time. Always remove containers before planting.



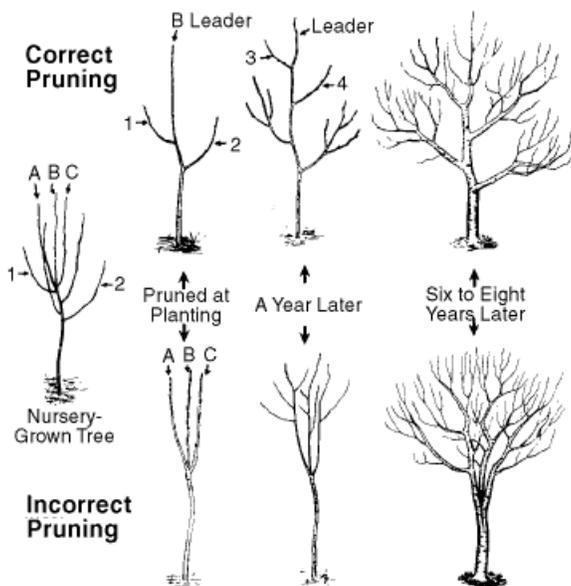
**Figure 1. How to plant a one-year-old tree.**

Locate the graft (the bulge near the union of root and top) 1 to 2 inches above the soil level, except with sour cherries and apricots. For these it is advisable to place the graft at least 4 inches below the soil level. Tamp firmly. Leave a depression around the tree and water thoroughly. When planting, it is recommended that the lowest branch be located on the southwest side of the tree for future shading to reduce sunscald problems.

If you are planting two or three or many fruit trees, draw a map of the planting for future varietal identification. In many instances a small map can be laid out in pencil on the garage or shop wall since paper maps are often lost or misplaced. Do not leave wire tag labels on the branches. The wire will girdle the branch as the tree grows.

Cut back the top of bareroot fruit trees at planting time to compensate for root loss in transplanting. Remove all weak and poorly placed branches. Shorten the leader and remaining branches by one-third to one-half their original length. Failure to prune at planting time can result in weak new growth or loss of the tree.

Potted fruit trees may or may not have been pruned sufficiently by the local nurseryman. You may need to do additional pruning at planting time or, if leafed out, wait until the following spring to develop a strong structure for your fruit trees (see Figure 2).



**Figure 2. Pruning for strong structured apple trees.**

A young tree needs little pruning except to select proper main branches. When the tree reaches fruiting age, annual pruning will help maintain a healthy, well-structured tree and encourage annual bearing. On all fruit trees, prune out all suckers that originate from the rootstock.

Branches with narrow 'V' shaped crotch angles should be pruned out and avoided. These crotches tend to split under the weight of a fruit crop.

The hardy plums, sandcherry-plum hybrids, apricots, Nanking and Korean cherries produce their best fruit crops on relatively young growth. Prune these trees more severely.

The proper time to prune is in the early spring after severe cold weather has passed and before new growth occurs. However, broken and diseased branches should be removed any time of the year. Sterilize pruning tools between cuts with household bleach diluted to 10 percent (1 ½ cups to 1 gallon water) if removing branches infected

with fireblight (see Circular PP-454 Revised, "Diseases of Apples and Other Pome Fruits").

Treat large wounds with a wound dressing to prevent rotting or disease organisms from entering the wood. Either asphalt-water emulsion or shellac makes a good wound dressing. Household paints may contain materials toxic to the tree and should be avoided.

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## Growing Young Fruit Trees

### Suggested Home Orchard

	Early	Mid-Season	Late
Apple Trees (select four)	Red D Mantet Hazen Dakota Gold	Sweet Sixteen  Northern Lights	Redwell Haralred Haralson Wodarz
Crabapple (select one or two)			Dolgo Chestnut Centennial
Hardy Plums (select two)			Tecumseh Underwood Alderman Pipestone Toka Waneta

Cultivation is essential in establishing young fruit trees. In town, one or more trees can be grown in the lawn or along the edge of the property as screening trees for backyard summer privacy. A circle of cleanly cultivated soil, 5 to 6 feet in diameter, should be maintained around the trunk of each tree.

For orchard plantings on farms, clean cultivation is recommended for the growing season. However, a cover crop of an annual species, such as wheat, should be planted between the rows the first week of August for the first five to seven years. Keep this cover in place until the following spring and then work it into the soil. This cover crop will slow tree growth in the fall and permit proper fall maturity of the wood. The cover crop will also trap a snow layer, providing an excellent mulch to help protect the root system.

A permanent grass cover crop such as bluegrass, orchardgrass, or fescue may be used if water is available.

Sunscald is a very serious problem on apple trees in North Dakota. Injury usually occurs in late winter or early spring when bright afternoon sun warms the south and southwest side of the trunk and exposed lower branches. The absorption of heat by the dark bark of susceptible fruit trees activates the growth of cells beneath the bark. These cells may be killed by later freezing.

Sunscald injury can be prevented by shading the trunks with boards or installing various tree wraps in early November each season. Another means of protection is to paint the trunk (south and southwest sides only) with a light colored interior latex water base paint. Less heat is absorbed, reducing sunscald injury.

Rabbits and mice might become a problem in the winter, especially if their food supplies are low. Put a cylinder of small meshed hardware cloth around the trunk for protection. A good rabbit repellent sprayed or painted on the limbs will protect the rest of the tree.

The easiest way to control insects and diseases is to maintain a good sanitation program. This involves collecting dropped leaves and fruit from the planting. Burn or destroy all prunings, leaves, and dropped fruits to avoid harboring pests. Chemical sprays may be needed to control a problem. Follow the recommended rates of application and allow the proper interval between the last spray and fruit harvest. Failure to do so might render the crop unfit for use. (For current recommendations, see Circular [E-299 Fruit Insect and Disease Control Guide](#))

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## Hardiness

For planting in North Dakota, always select fruit tree varieties that are known to be hardy and that will produce good quality fruit. A fruit tree is no hardier than its rootstock. For the most part, apple trees available in area nurseries have been propagated by grafting on hardy crabapple rootstocks.

Hardy plums and cherry-plum hybrids are usually propagated on hardy native wild plum rootstocks. No satisfactory hardy rootstock is available for sour cherries. Apricots are usually propagated on hardy apricot seedlings or more tender peach seedling roots.

Hardiness is especially important in new fruit tree plantings. After some experience, you may wish to try some semi-hardy

varieties, but beginners should start with a few trees that are not only hardy but practical. The Dolgo crabapple, Haralson apple, and Sapahta sandcherry are examples.

Soil conditions, available moisture, and both winter and summer temperatures strongly influence growth of woody plants in North Dakota.

### Hardiness Zones

Under natural conditions, soil and moisture seem to influence the growth of woody plants more than do temperature differences within the limits of the state. The map (Figure 3) is based largely upon observed growth response of woody plants. Zone A is considered the most favorable and Zone C the least favorable. Many variations occur within each zone and a poor site in Zone A, for example, may be less favorable for a given tree than a good site in Zone C. Consider these zones as general selection and planting guides, not as hard and fast rules.

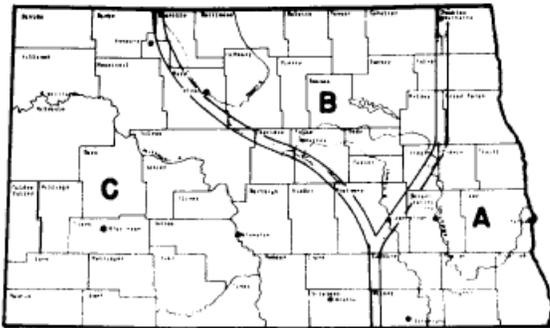


Figure 3. Hardiness zone map of North Dakota.

### Varieties

Many varieties are available from nurseries, but not all are hardy or adapted to North Dakota conditions. Select varieties that will mature fruit in somewhat shorter growing seasons if you reside in the northern half of the state.

### Apple Varieties

Maturity dates given vary from year to year due to season and location. Home storage conditions affect keeping quality of fruit.

R = recommended for general planting

T = recommended for trial

G = graft on branches of hardy tree (for example on Dolgo Crab).

Be sure to plant at least two varieties to ensure pollination.

Variety	Hardiness Zone			Reaction to Fireblight	Description
	A	B	C		
Mantet	R	R	R	Susceptible	Yellow, stripe and blushed with red. Medium size. Excellent quality. Hardy and productive. Fresh and sauce. Mature August 20. One week storage.
Red Duchess	R	R	R	Moderately Resistant	Red. Medium size. Reliable, hardy. Pie, sauce, jelly. Mature August 25. Two weeks storage.
Hazen	R	R	R	Moderately Resistant	Dark red. Bears when young. Fresh and cooking. August 25. Stores one month.
State Fair	T	T	T	Moderately Resistant	Bright red. Pleasing acid flavor. Medium size. Fresh or cooking. September 1. Stores one to two months.
Wealthy	RT	GT	G	Susceptible	Yellowish, striped and blushed with red. Medium size. Good quality. Fresh and cooking. Mature September 15. Four weeks storage.
Sweet Sixteen	R	T	T	Moderately Resistant	Red striped. Dessert apple. Medium size. Mature mid-September. Stores two months.
Red Baron	R	RT	T	Moderately Resistant	Bright red. Medium size. Blocky shaped. Fresh and

cooking. Mature mid-September.  
Stores three months.

Haralred (Plant Patent 4824)	R	R	R	Moderately Resistant	Red selection of Haralson. Earlier and sweeter than parent. September 25 to October 1. Stores four to six months.
Haralson	R	R	R	Moderately Resistant	Red. Medium size. Fair to good quality. Stores well. Proven variety. Mature October 1. Stores four to six months.
Redwell	R	T	T	Moderately Susceptible	Bright red. Late maturing Slow to come into bearing. Fresh and cooking. Mature October 1. Stores three months.
Honeygold	T	T	T	Susceptible	Golden to yellow-green. Medium large. Crisp. Dessert and cooking. October 5. Stores two to three months.
Fireside	G	G	G	Moderately Susceptible	Red. Large size. Excellent quality. Late maturity. Questionable for general planting. Mature October 10. Stores three months.
Connell Red	G	G	G	Moderately Susceptible	Red sport of Fireside. Should have same characteristics.
Northern Lights	R	R	R	Resistant	Cross between Haralson and McIntosh. Very hardy tree, red fruit and a tart (McIntosh) flavor. Ripe in early September. Stores at 32-34 F.
Dakota Gold	R	R	R	Resistant	Early apple which ripens with Hazen. Good for eating out of hand, for sauce, pies. Very hardy, tolerant to fire blight. Annual bearer. Fruit are large and do not store.
Wodarz	R	R	R	Resistant	Late apple. Very sweet. Stores very well, even in common storage. Hardy and tolerant to fire blight.

## Crabapple Varieties

Variety	Hardiness Zone			Reaction to Fireblight	Description
	A	B	C		
Dolgo	R	R	R	Resistant	Bright red. Small size. Jelly crab. Hardy tree for grafting tender varieties (topworking). Mature September 1.
Centennial	R	T	T	Moderately Resistant	Medium to bright red. Medium to large size. Productive. Fresh canning, sauce and jelly. Mature September 1.
Chestnut	R	R	R	Moderately Susceptible	Greenish-yellow with a few red stripes. Large size. Very good quality.

Fresh and cooking.  
Matures September 20.  
Stores one month.

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## Hardy Plum Varieties

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Variety	Hardiness Zone			Description
	A	B	C	
Tecumseth	R	R	R	Medium size. Red skin, yellow flesh. Juicy, sweet. Good quality. Fresh and cooking. Mid-August.
Pembina	R	R	R	Large size. Red, yellow flesh, sweet and juicy. Late August.
Underwood	R	R	R	Large size. Medium dark red. Juicy, sweet. Very good quality. Fresh and cooking. Mid-late August.
LaCrescent	R	R	R	Medium size. Yellow skin, yellow flesh. Juicy, tender. Delicious flavor. Excellent quality. Late August.
Alderman	T	T	T	Large size, burgundy red. Flesh yellow, medium soft, sweet. Good quality. Mid-late August.
Waneta	R	R	R	Very large size. Yellow overlain with dark red. Yellow flesh. Sweet, juicy. Good quality. Early September.
Pipestone	R	T	T	Large size. Red, skin, yellow flesh. Sweet, juicy. Very good quality. Early September.
Superior	T	T	T	Large size. Red, skin, yellow flesh. Sweet, juicy. Very good quality. Early September.
Toka	R	R	R	Very similar to Kaga. Both are good quality. Use both as pollinizers. Mid-September.

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Be sure to plant at least two varieties to ensure pollination.  
Some varieties are noted as good pollinizer varieties.

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## Sandcherry-Plum Hybrids

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Variety	Hardiness Zone			Description
	A	B	C	
Red Diamond	T	T	T	Medium-large size. Dark skin and flesh. Late August maturity.
Sapalta	R	R	T	Medium size. Purple skin, red flesh. Sweet, juicy. Excellent quality. Late August.
Compass	R	R	R	Small size. Dark red skin, yellowish flesh. Tart, juicy. Use for canning. Good pollinizer. Early September.

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Be sure to plant at least two varieties to ensure pollination.  
Some varieties are noted as good pollinizer varieties.

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## Cherries

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Hardiness Zone

Variety	Hardiness Zone			Description
	A	B	C	
North Star (Sour)*	T	T	T	Medium size. Dark red skin, yellowish flesh. Juicy. Good quality. Early July.
Meteor (Sour)	T	T	T	Bright red skin, bright yellow flesh. Juicy. Good quality. Mid-July.
Nanking Cherry	R	R	R	Half-inch diameter. Bright red skin, yellow flesh. Sweet, juicy with pleasant flavor. Excellent for fresh use or jelly. Early July.

\* No satisfactory hardy rootstock is available for sour cherries. We suggest installing the graft union on 'Meteor' and 'North Star' sour cherries four inches below ground level at planting time. Mulching the first year or two is advised.

## Hardy Apricots

Variety	Hardiness Zone			Description
	A	B	C	
Moongold	T	T	T	Large size. Yellow skin and flesh. Sweet sprightly flavor. Freestone. Good quality. Late July.
Sungold	T	T	T	Large size. Golden orange skin. Sweet mild flavor. Freestone. Good quality. Late July.

Plant two varieties to ensure pollination. Apricots bloom early and frequently are frozen by spring frosts. This usually limits fruiting to about three years out of five. Plant only in a well protected and well-drained site with the graft union at least four inches below the soil surface.

## Pears

Variety	Hardiness Zone			Description
	A	B	C	
Parker	T	T	T	Large size for hardy pears. Medium yellow. Borderline hardiness. Susceptible to fireblight. Mid-September.
Luscious	T	T	T	Large size. Fruit is very juicy and sweet. Borderline hardiness. Requires a pollinator such as Parker. Late September.
Gourmet				Developed by South Dakota State University. Tree are upright, medium in size and winter hardy. A good dessert pear. Medium in size, greenish yellow to yellow. Skin thick but tender. Flesh yellowish, crisp, juicy and sweet. Bloom early May. Fruit matures the third week in September at Brookings.
Summer Crisp				Developed by University of Minnesota Research Center. Recognized for many years as the hardiest pear in their collection. Free of fire blight. An annual bearer. Fruit is pyriform in shape 2-1/2 to 3 inches in diameter and 3 to 3-1/2 inches long. Bloom early May. The fruit should be harvested in mid-August when crisp and still green with a red blush. Fruit harvested at that time is sweet and crisp, and may be stored up to 2 months.

Pears lack winter hardiness and should be tried only in well protected areas. Due to their susceptibility to fireblight,

they should be planted apart from apples and crabapples.

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## Propagation, Grafting and Topworking

### Propagation

Cultivars (named varieties) of fruit trees do not reproduce true from seed. Based on growth and fruiting habits, select individuals have been named and then propagated by vegetative means (grafting) rather than from seed.

Grafting is a way of combining a twig or bud of one plant with a branch or root of another so that a union forms and growth continues. Grafting is used mainly to propagate trees and to develop trees on hardy, disease resistant roots and/or interstocks (topworking). Of the many methods of grafting, only the bud graft, the cleft graft, and the bark graft are discussed here.

### Bud Graft

Many of the apple trees and all of the stone fruit trees (plum relatives) sold in the area nursery trade are propagated by a type of graft called budding. It could be described as the "transplanting" of a single bud of a desired variety into the stem of a hardy seedling rootstock. Budding is done in late July or early August.

### Topworking

When a desired variety is grafted onto the limbs of a hardy tree it is called "topworking." In North Dakota, the primary purpose for topworking apple trees is to increase hardiness. A hardy rootstock is a must for our climatic conditions. In addition, if we choose to grow some of the more tender varieties of apples, it is necessary to use a hardy interstock (trunk and crotch variety).

Homeowners may wish to learn how to graft in order to produce large apples, for example, on an existing low quality crabapple tree. Use either the cleft graft or bark graft.

### Scion Wood

Dormant scions are used for both the cleft and bark grafts. The grafting is done in early spring, usually before growth starts (April-May 10). Collect scions of one-year-old wood in the fall, winter or early spring. They may come from trees whose fruit you desire -- perhaps those of neighbors or friends. Scion wood is also available from nurseries or experiment stations.

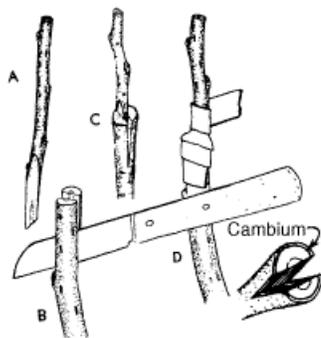
Scion wood should be placed in closed plastic bags and stored under refrigeration (32 to 40°F) until used.

**DO NOT STORE SCION WOOD IN YOUR HOME FREEZER**

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### Grafting

A grafted tree consists of at least two parts, the root system of the stock and the scion variety or top.



**Figure 4. The cleft graft is simple but effective.**

The **cleft graft** is often used to topwork young trees two to three years after planting. This graft utilizes the technique of inserting a section of stem with two buds (the scion) into the stock. To prepare the scion piece, make a 1 to 1 1/2 inch long, smooth, sloping cut on both sides of the scion base to form a wedge (Figure 4-A).

Prepare the stock for receiving the scion. On young trees, select three to five well-spaced scaffold branches, preferably with wide angle crotches. Cut back selected branches to be grafted 12 to 18 inches from the trunk (see Figure 5-A). Remove all other branches and side branches. Next insert a sharp knife 1 1/2 to 2 inches deep into the center of each stock (Figure 4-B). Insert prepared scions into the stocks. Generally, the stock is larger in diameter than the scion; therefore, take care to set the scion to one side instead of on center (Figure 4-C).

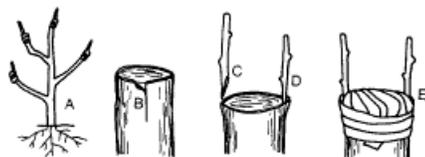
Carefully align the cambium tissue of the scion and the stock. The cambium is the layer of growing cells that is located just under the bark and outside of the wood (Figure 4-D).

Wrap this graft union (Figure 4-E) carefully with a good grade of rubber electrician's tape. As the graft grows the tape stretches and eventually deteriorates without girdling the new growth.

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## Bark Graft

The bark graft can be used with larger stocks (up to 12 inches in diameter) than for cleft grafting, but the scions are similar in size. Several scions can be inserted around the stock. The stock is cut off as for cleft grafting except it is not split through the center. It must be done when cell division in the stock has begun, usually late April or early May in North Dakota, allowing the bark to separate readily from the wood. At this time the bark is said to be "slipping."



**Figure 5. The bark graft.**

Cut the base of the scion on one side with a long, smooth, sloping cut about 1 1/4 inches long, going completely through the scion so that it comes to a point at the base (Figure 5-C). Make a vertical cut about 1 1/4 inches long going through the bark in the stub of the stock (Figure 5-B). Slightly loosen bark at the top of the cut and insert the wood surface of the scion base next to the wood of the stock. Push the scion down in behind the bark to the extent of the cut on the scion base (Figure 5-D).

Rubber electrician's tape should be used to secure the scion in place and to cover the entire cut surface of the stock with tape (Figure 5-E). If other tapes (such as masking tape or plastic tapes) are used, they must be cut after the union develops to prevent girdling. It is not necessary to remove them.

For topworking, place scions every 2 to 4 inches around the stock stub. As for cleft grafting, the intent is usually for only one to eventually remain.

The electrician's tape and exposed scions can be given additional protection by painting with interior latex water base paint to prevent drying.

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