



# Growing Grapes in the Home Garden

The grapevine is one of the oldest cultivated plants in the world. Grapes can be eaten fresh (table grapes) or processed into jam, jelly, juice, or wine. Home gardeners can successfully grow grapes in Iowa. Basic requirements include a good planting site, hardy varieties (cultivars), and proper culture.

## Growth and Fruiting Characteristics

Grapes are deciduous, woody vines. An established grapevine consists of a root system, trunk, and shoots or canes.

Grape root systems are deep and extensive. The majority of roots are in the upper 2 to 5 feet of soil. However, roots can penetrate 25 to 40 feet in coarse, sandy soils.

The trunk is the permanent stem of the plant that supports the fruit-bearing canes. The trunk transports water and nutrients from the roots to the shoots. It also transports food manufactured by the foliage to the root system.

Shoots develop from dormant buds on the previous year's growth. As the shoots elongate, new buds form in the axils of the leaves. Initially the shoots are succulent, but they gradually harden and become woody by winter. The woody shoots are then called canes. Only one-year-old growth bears flowers and fruit clusters.

Grapevines are self-fruitful. A single plant produces fruit. While not necessary for fruit set, many home gardeners plant several varieties for their enjoyment.

## Site Selection

Grapevines grow on a wide range of soil types. Well-drained soils produce the best growth and yields.

Avoid soils that are persistently wet during the growing season. Highly fertile soils are not essential. Grapevines tolerate a wide pH range. Grapes prefer a slightly acidic soil with a pH of 6.0 to 6.5, but grow well with a pH from 5.5 to 7.5.

Because of space restrictions, planting sites are often limited in the home garden. Select a site that receives at least 6 hours of direct sun each day. Avoid sites shaded by trees and shrubs.

Also consider the possibility of herbicide drift. Grapes are very susceptible to injury from 2,4-D, dicamba, and similar broadleaf herbicides. In rural areas, select sites protected by large trees (windbreaks) or topography. In urban areas, inform neighbors of the location of your grape planting. If your neighbors control their broadleaf weeds with broadleaf herbicides, encourage them to apply these materials to their lawns in fall. Fall applications provide the best broadleaf weed control and are less likely to injure grapevines.

## Plant Material and Sources

Purchase dormant, bare-root grapevines from a reputable garden center, nursery, or mail-order company. Choose plants free of known viruses and diseases. Table 1 lists suggested grape cultivars for Iowa. Consider winter hardiness, time of ripening, and intended use (fresh, jam or jelly, juice, or wine) when selecting grape cultivars. Gardeners in northern Iowa must select cultivars that possess excellent winter hardiness and ripen early. Mid- or late-maturing cultivars may not ripen fully in northern areas because of the shorter growing season.

## Planting

The best time to plant dormant, bare-root grapevines in Iowa is early spring (late March in southern Iowa to late April in northern Iowa).

If planting must be delayed for several days after the plants arrive from the nursery, moisten the packing material around the roots, place the plants in a plastic bag, and store in a cool garage or refrigerator.

Before planting dormant grapevines, soak their roots in water for two to three hours. Make the planting holes slightly larger than the root systems of the plants. Set plants into the soil at about the same level they grew in the nursery. The soil line mark and root initials indicate this level. Backfill with the original soil from the hole. Firm soil around the roots and construct a basin around each plant.

Water well. Grapevines require approximately 1 inch of water per week through the first growing season. Water plants every 7 to 10 days during dry weather.

Plant grapevines 6 to 8 feet apart within the row. Plant vigorous cultivars, such as Concord, 8 feet apart. Less vigorous cultivars may be planted 6 feet apart. Space rows at least 9 feet apart.

After planting a grapevine, cut its strongest cane back to two or three healthy buds; completely remove all other canes. If a trellis is not used during the first growing season, set a 5- to 6-foot stake into the soil near each vine and train the new growth to it. Tie the shoots loosely to the stake to avoid girdling the stems. Support the new growth until it reaches the 6-foot wire on the grape trellis.

## Training Systems

Grapevines are trained to a specific system to facilitate cultivation, harvesting, and pest control, and to maximize yield. The four-cane Kniffin, six-cane Kniffin, and single curtain are the most suitable training systems for home gardeners.

The four-cane Kniffin is popular because of its simplicity. This system consists of four canes, two on each side of the trunk, trained onto two trellis wires. In addition, four very short one- or two-bud canes (termed renewal spurs) are present. The renewal spurs produce canes in the desired direction for the following year. (See Diagram 1.)

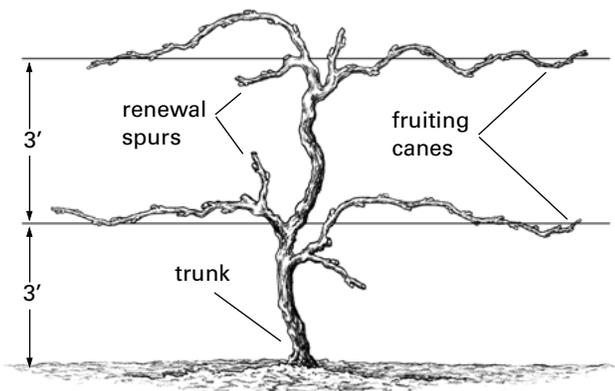


Diagram 1. Four-cane Kniffin



The six-cane Kniffin system (Diagram 2) is similar to the four-cane Kniffin system, but has six canes trained to three trellis wires instead of four canes to two wires. Six one- or two-bud renewal spurs are also present. The six-cane Kniffin system is best for less vigorous cultivars.

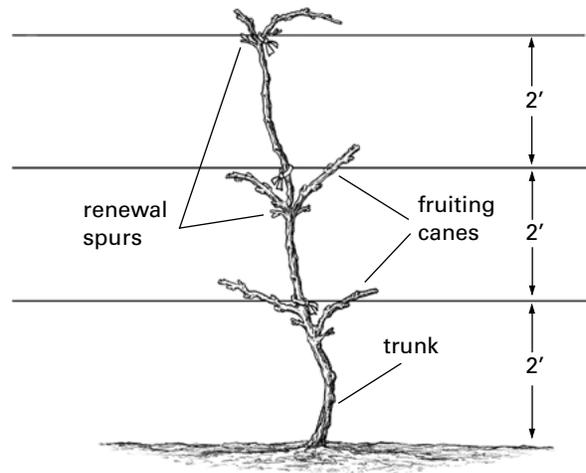


Diagram 2. Six-cane Kniffin

In the single curtain system (Diagram 3), the trunk of the grapevine is attached to a wire 6 feet above the ground. Two horizontal cordons (essentially lateral extensions of the trunk) grow along the wire and extend approximately 4 feet in each direction. Five-bud canes on the cordons produce the fruit crop. Single-bud renewal spurs on the cordons provide canes for training in the following year.

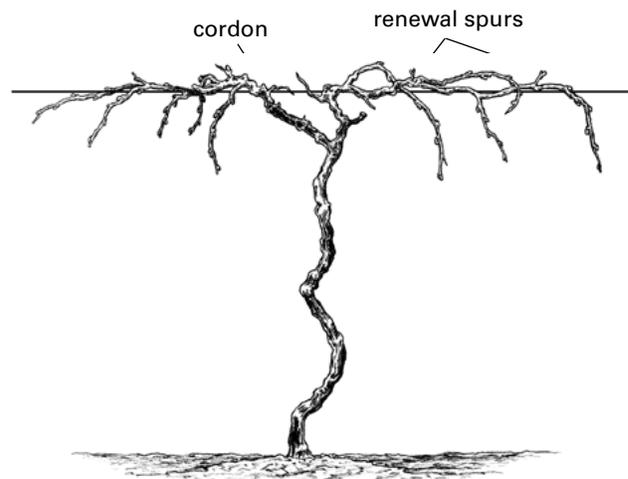


Diagram 3. Single curtain

## Grape Trellis Construction

Constructing a grape trellis is similar to constructing a farm fence. A trellis basically consists of one, two, or three tightly stretched wires secured to firmly set posts. It must be substantial enough to carry the weight of the vines plus a heavy crop during high winds. The best time to construct the grape trellis is during the first growing season.

End posts serve as anchor points as well as wire supports. They are generally 8 feet long with a 4-inch diameter. Set end posts approximately 2 feet deep in the soil. They may be braced in several ways. A common method is to set an extra post a few feet from the end post. A heavy piece of wood or another post makes a good brace between the two end posts (Diagram 4).

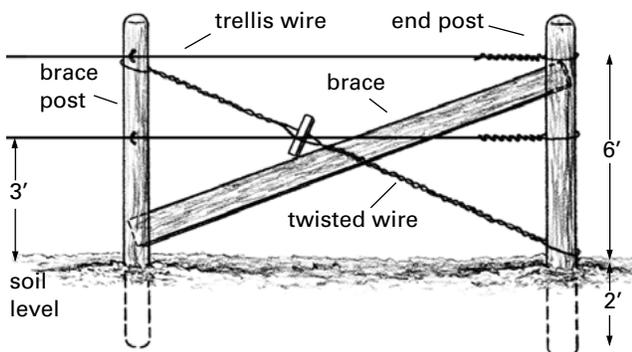


Diagram 4. Brace post construction

Line posts also are approximately 8 feet long, but with a 3-inch diameter. Set line posts approximately 2 feet into the ground and space approximately 24 feet apart within the row.

Use galvanized wire in trellis construction. It is durable and does not cause serious chafing of young vines. Soft or hard wire can be used. Soft wire is easier to install than hard wire, but stretches more during the growing season and requires more tightening in the spring. Commonly used wire sizes include numbers 9, 10, and 11.

Wires can be secured to end posts in various ways. A common method involves winding the wire around the post once or twice and then twisting the end several times around the wire as it is stretched to the next post. Some gardeners use special devices that simplify tightening of the wires. These devices employ cranks that eliminate wire removal from the end post when tightening.

Fasten wires to the line posts with fence staples. Determine wire placement by the training system followed. For example, a four-cane Kniffin system uses two wires, one 3 feet high and the second 6 feet high. The six-cane Kniffin



system requires three wires positioned 2, 4, and 6 feet above the ground. In the single curtain system, the single wire is about 6 feet high.

## Training Young Plants

By early spring of the second year, the gardener should have selected the training system and constructed an appropriate trellis. In spring, select a vigorous, straight cane and remove all the rest. Tie the cane securely to the uppermost wire with twine. Cut the cane off just above the wire (Diagram 5).

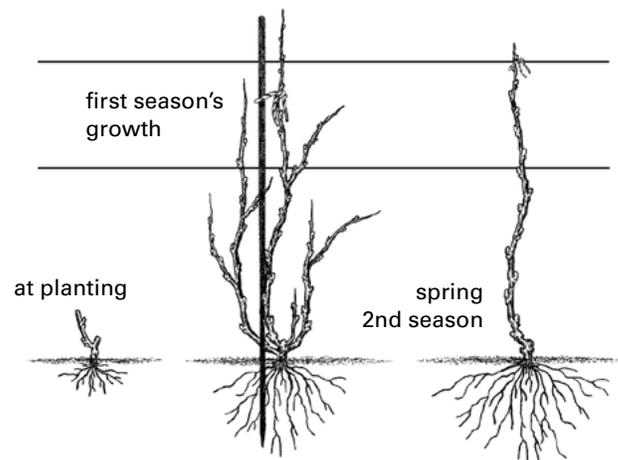


Diagram 5. Grapevine through year 2

As the buds begin to swell, retain 4 to 6 buds near each wire; rub off (remove) all remaining buds. Later, remove all flower clusters that form on the shoots. Fruit production at this stage of development reduces vegetative growth.

If the best cane does not reach the lowest wire on the trellis, prune it back to a point where it is approximately pencil-size in thickness. Weak plants may require a second year to develop a strong trunk.



## Pruning

Grapevines must be pruned annually to obtain maximum yields of high quality grapes and allow adequate vegetative growth for the following year. Grapevines produce fruit on the previous season's growth. Two-year and older wood is not fruitful.

Before pruning, a grapevine may have 200 to 300 buds that are capable of producing fruit. If the vine is left unpruned, the number of grape clusters becomes excessive. The vine is unable to ripen the large crop or sustain adequate vegetative growth.

The best time to prune grapevines is in late winter or early spring, typically March and early April in Iowa. The extent of pruning is dictated by vine vigor. Determine vine vigor by estimating the amount of the previous season's growth. Pruning grapevines based on plant vigor is called "balanced pruning."

First, estimate the amount of one-year-old wood in pounds. Next, retain the appropriate number of fruiting canes per vine. A grapevine trained to a four-cane Kniffin system requires four fruiting canes. Retain six fruiting canes when using the six-cane Kniffin system. To aid identification, some gardeners tie brightly colored strips of fabric or place clothes pins on those canes they wish to retain. Leave equal numbers of renewal spurs (canes pruned back to one to two buds). The buds on renewal spurs provide shoots and ultimately produce the canes for next year's grape crop.

Completely remove all other canes and weigh the pruned material. Use the weight of the canes to determine the number of buds to leave on the grapevine. Use the balanced pruning formula, "30 plus 10." For the first pound of canes removed, leave 30 buds. For each



additional pound, leave 10 additional buds. Include the buds on the fruiting canes and renewal spurs when counting the number of buds retained on the grapevine.

For all training systems common in Iowa, the maximum number of buds retained on a grapevine is 60. If too many buds are present after the initial pruning and weighing, remove the extras.

### The following examples illustrate the balanced pruning concept.

A grapevine had two pounds of canes removed at dormant pruning. The gardener, therefore, leaves 30 buds for the first pound of canes plus an additional 10 buds for the second pound, for a total of 40 buds. With the four-cane Kniffin system, each of the four fruiting canes would have eight to nine buds. The four renewal spurs would have one or two buds each.

If three pounds of canes are removed, leave 30 buds for the first pound of canes, 10 for the second pound, and a final 10 for the third pound, totaling 50 buds.

## Soil and Weed Management

Weeds compete with grapevines for moisture, nutrients, and sunlight. Keep the area directly under the trellis weed-free. Hand hoeing is the most practical weed control method for home gardeners. Cultivation should be shallow to prevent damage to the grapevine roots. Mulches also help control weeds. Shredded leaves, grass clippings, straw, and wood chips work well. In most situations, 2 to 3 inches of mulch are adequate. Maintain a permanent cover crop between rows.



Permanent cover crops help control weeds and prevent soil erosion. Kentucky bluegrass is an excellent cover crop. It grows well in Iowa and competes with grapes less vigorously than other cover crops. Maintain bluegrass at a height of 2 to 3½ inches. Leave grass clippings on the area.

## Fertilization

Fertilization is generally not necessary for grapes in Iowa. Our fertile soils contain adequate supplies of essential plant nutrients. Excessive fertilization is harmful. Too much nitrogen may promote rampant vegetative growth and delay vine and fruit maturity. Fertilize grapevines only when plants exhibit weak growth or poor leaf color.

If necessary, apply a complete, low analysis fertilizer, such as 10-10-10, in early spring. Do not fertilize grapevines in late spring or summer. Late spring or summer fertilization encourages succulent, late season growth, which is more susceptible to winter damage.

## Irrigation

Grapevines require one inch of water per week, either from rain or irrigation, for good growth and crop production. Irrigate plants weekly during hot, dry weather.

## Harvesting

Grapes must be harvested at the right stage of maturity to ensure high quality. There are several indicators of grape maturity. Berry color, size, sweetness, and flavor are the most useful indicators.

Depending on the cultivar, berry color changes from green to blue, red, or white as the grapes approach maturity. Color alone, however, should not be the sole basis for harvesting grapes. Berries of many cultivars change color long before they are fully ripe. At maturity, individual berries are full size and slightly less firm to the touch. As a final test, taste a few grapes for sweetness when berry size and color indicate the fruit is approaching maturity. Harvest grape clusters when the berries are sweet.

When harvesting grapes, remove clusters with a knife or hand shears. Sound grapes can be stored in perforated plastic bags in the refrigerator for up to two months.

Uneven ripening of the berries within a cluster is sometimes a problem. Possible causes include overcropping (too many grape clusters on the vine), potassium deficiency, moisture stress, and 2,4-D damage. Overcropping is the most common cause for home gardeners.

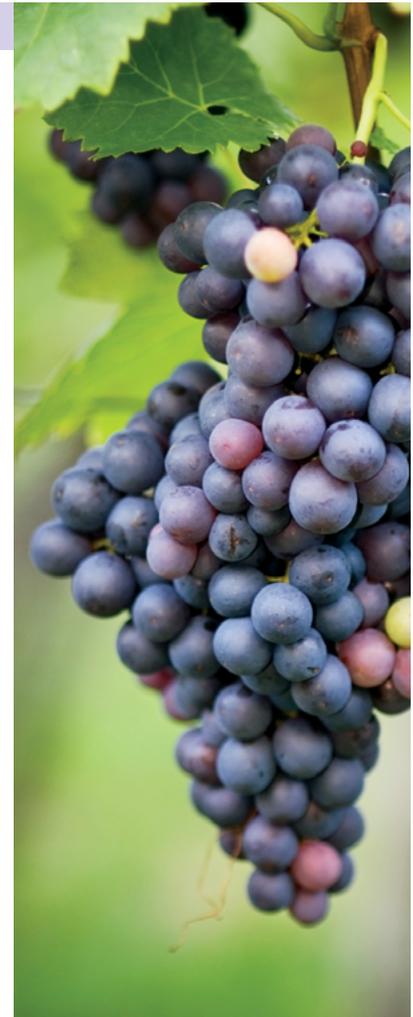


## Bird Management

Birds can devour the grape crop quickly in the home garden. The best way to prevent crop loss is to place netting over the grapevines. Netting can be purchased at garden centers or through mail-order companies. When placing netting over the grapevines, make sure the netting is secured to the ground to prevent bird entry from below.

**Table 1. Suggested Grape Cultivars for Iowa**

Variety	Berry Color	Ripening Season	Principal Use
<b>American Types</b>			
Van Buren	Blue/black	Early	Table, wine
Buffalo	Blue/black	Early to mid	Table, juice, jam/jelly
Price	Blue/black	Early to mid	Table, juice, jam/jelly
Fredonia	Blue/black	Mid	Table, juice, jam/jelly
Steuben	Blue/black	Mid	Table, wine
Delaware	Red	Mid	Wine
Niagara*	White	Late	Juice, jam/jelly, wine, table
Concord*	Blue/black	Late	Juice, jam/jelly, wine, table
Catawba*	Red	Late	Wine, juice, jam/jelly
<b>Table Grape Type</b>			
Mars*	Blue	Early	Table (seedless)
Reliance*	Red	Early	Table (seedless)
Edelweiss	White	Early	Table (seeded)
Swenson Red	Red	Early	Table (seeded), wine
Jupiter*	Blue	Early to mid	Table (seedless)
Marquis	White	Mid	Table (nearly seedless)
Vanessa*	Red	Mid	Table (seedless)
Swenson White	White	Late	Table (seeded), wine
<b>Interspecific Hybrids</b>			
La Crescent	White	Early	Wine
Leon Millot*	Blue/black	Early	Wine
Marechal Foch*	Blue/black	Early	Wine
Baco Noir*	Blue/black	Early to mid	Wine
Brianna	White	Early to mid	Wine
Marquette	Blue/black	Early to mid	Wine
Seyval Blanc*	White	Early to mid	Wine
de Chaunac*	Blue/black	Mid	Wine



Cultivars denoted by an \* are not suitable for northern Iowa. They should be planted only in central and southern areas of the state. Remaining varieties can be grown throughout the state. Additional cultivar suggestions are included in PM 453, *Fruit Cultivars for Iowa*.

Prepared by Richard Jauron, extension horticulturist, and Gail Nonnecke, university professor, Department of Horticulture.

This institution is an equal opportunity provider. For the full non-discrimination statement or accommodation inquiries, go to [www.extension.iastate.edu/diversity/ext](http://www.extension.iastate.edu/diversity/ext).