NC STATE UNIVERSITY

Grapes & Berries for the GARDEN

North Carolina Cooperative Extension Service
North Carolina State University

Contents

Grapes and berries are well suited to the home garden. A small planting can produce an abundance of fruit to eat fresh, to freeze, and to use in making juice, pies, and preserves. In North Carolina, our soils and climate permit growing a wide range of small fruit crops. The most popular small fruits are strawberries, grapes, brambles (blackberries and raspberries), and blueberries (Table 1).

Although home-grown fruit does not require as much care as that grown commercially, good horticultural and pest management practices are important. This publication presents detailed suggestions for establishing and caring for each of the small fruits.

Table 1. Bearing Age, Average Yield, Plant Quantity, and Potential Lifespan

Fruit	Bearing Age	Average Annual Yield (lb/plant)	Number of Plants for Four People	Life Expectancy (years)
Blueberry				
Highbush	3	8	6	20-30
Rabbiteye	3	12	4	20-30
Blackberry				
Erect	2	4	6	5-12
Semitrailing	2	20	2	5-20
Raspberry				
Red and black	2	2-4	6	5-10
Grape				
Bunch	3	15	4	15-20
Muscadine	3	25-50	2	15-30
Strawberry				
Everbearing	1	1/3	50	2-3
Springbearing	2	1/2	50	3-4

Variety Selection

There are many varieties of each fruit, but it is best to select only those adapted to the climactic conditions in your area. This will ensure good fruit quality and help prevent serious insect and disease problems, which are more likely to occur when using varieties not adapted to an area. Start with disease-free, certified plants from a reliable nursery. It is not a good practice to use your own plants or your neighbor's plants.

Generally, choosing two or three varieties with different ripening dates will extend the harvest season for any fruit. Selecting a number of varieties of a fruit may also improve pollination, especially for some varieties of muscadine grapes (female types) and rabbiteye blueberries. Experimental data and experience show that cross pollination is very beneficial with blueberries. Planting alternate pairs of rows of any two varieties of the same species has proved satisfactory.

BLACKBERRIES

Blackberries are of two types: semitrailing thornless and erect (Table 2). Semitrailing thornless blackberries have canes that are not self-supporting; they must be tied to poles or trellises. The fruit ripens about one month after that of the erect type. The semitrailing type should not be grown in areas where winter temperatures may drop below O° F. Erect blackberries can tolerate temperatures slightly below O° F without significant injury to canes.

BLUEBERRIES

The highbush blueberry (*Vaccinium corymbosum*) is the type grown commercially in eastern North Carolina (Table 3). Home gardeners in the coastal plain, upper piedmont, and mountains can also grow it as long as they closely follow the planting instructions. The rabbiteye type (*V. ashei*) is more widely adapted to different soil types but will not tolerate the cold climate of the mountains. Being resistant to drought and heat, it bears heavier crops than the highbush type; therefore, rabbiteye varieties are highly recommended for home gardens in the coastal plain and piedmont. Their fruit ripens about one month after that of the highbush type.

RASPBERRIES

Red raspberries are better suited to the mountains of western North Carolina. Black raspberries, which can better tolerate the heat, are more suitable for the piedmont and coastal plain (Table 4).

GRAPES

Grapes are not as particular to soils as are other small fruit crops. In fact, fertile soils stimulate excessive vine growth at the expense of fruit quality. It is therefore advisable to take soil samples and follow the resulting recommendations. Homeowners may choose to grow the vinifera varieties (the old-world grape) and French hybrids (crosses of vinifera and American grapes) for winemaking. Examples of the latter are the Cabernet Sauvignon, Chardonnay, and Seyval. Better known to the home grape grower is the American bunch grape, which includes varieties such as Concord, Niagara, and Catawba. The varieties listed in Table 5 are classified by region rather than type of vine.

STRAWBERRIES

Choosing a strawberry variety depends on many variables: disease resistance and fruit size as well as taste and length of season (Table 6). If you wish to plant in the coastal plain, choose anthracnose-tolerant varieties because plants raised in this area are very prone to the disease. For the mountain areas, mid- and late-season varieties that are resistant to red stele are recommended because the longer, cooler spring encourages this cool-season fungus. Day-neutral varieties, Tribute and Tristar, are worthy of trial in the mountains if you wish to grow the everbearing type of strawberries.

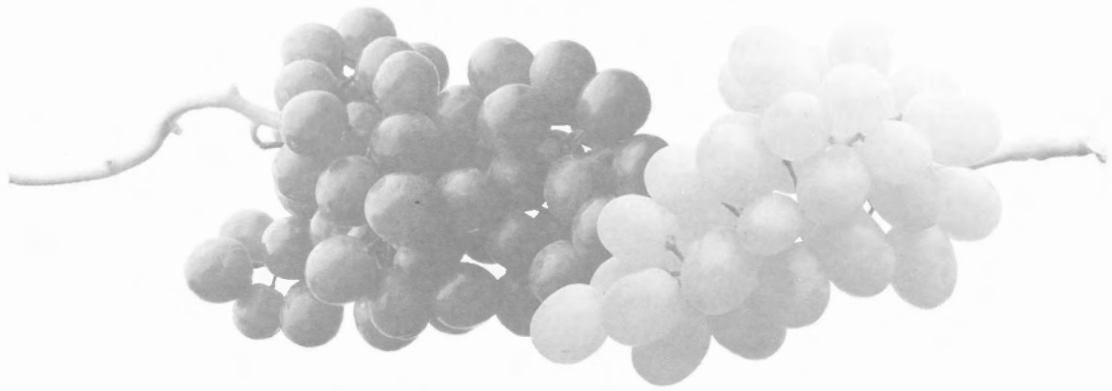


Table 2. Blackberries for North Carolina

Variety	Season	Area	Hardiness	Yield	Remarks
Erect Varieties					
Shawnee	Mid to late	All	Good	Good	Thorny canes; sweet, large fruit
Kiowa	Early to mid	All	Good	Excellent	Thorny canes; sweet, very large fruit
Arapaho	Very early	All	Good	Fair	Thornless canes; sweet
Navaho	Late	All	Good	Good	Thornless canes; sweet; stores well
Cherokee	Early	All	Good	High	Thorny canes; very sweet
Cheyenne	Mid	All	Excellent	Good	Thorny canes; good producer; sweet
Chickasaw	Mid to late	All	Good	High	Thorny canes; very large fruit
Apache	Late	All	Good	High	Thornless canes; very large fruit
Semitrailing Varieties					
Dirkson thornless	Early to mid	All	Moderate	Good	Requires trellis; semitart, large fruit
Hull thornless	Mid	All	Low	Excellent	Requires trellis; sweet, soft fruit

Table 3. Blueberries for North Carolina

Variety	Season	Color	Size	Flavor	Remarks
Highbush Varieties for the Coastal Plain and Piedmont					
Bluechip	Early to mid	Light	Very large	Excellent	Upright plant
Blueray	Mid	Medium	Large	Good	Vigorous, upright
Croatan	Early	Medium	Medium	Fair	Vigorous, upright
Jersey	Late	Light	Medium	Good	Vigorous, upright
Highbush Varieties for the Mountains					
Berkeley	Mid to late	Light	Very large	Good	Susceptible to canker
Blueray	Mid	Light	Large	Very good	Performs well in all areas; tight clusters
Collins	Early to mid	Light	Large	Good	Susceptible to canker; no cracking
Patriot	Mid to late	Light	Very large	Very good	Difficult to pick
Jersey	Late	Light	Medium	Good	Vigorous; productive
Rabbiteye Varieties for the Coastal Plain and Piedmont					
Climax	Very early	Medium	Medium to large	Very good	Upright; concentric ripening
Powderblue	Mid to late	Very light	Medium	Good	Long season; no cracking
Premier	Very early	Light	Large	Very good	Disease resistant; upright
Tifblue	Early to mid	Light	Medium to large	Good	Standard variety; vigorous, productive
Ira	Early to mid	Medium	Medium	Good	Firm fruit; productive
Yadkin	Early to mid	Medium	Medium to large	Very good	Very good flavor

Table 4. Raspberries for North Carolina

Variety	Season	Area	Plant	Fruit	Remarks
Red Varieties					
Southland	June and mid August	Mountains Upper piedmont	Erect	Light red, good quality	Heat tolerant, two crops annually
Dormanred	June	All	Trailing, vigorous	Glossy red, fair quality	Good processed
Heritage	June to August	Mountains Upper piedmont	Erect	Deep red, good quality	Excellent flavor
Titan	June to July	Mountains	Trailing	Red, large	Well drained soils
Black Varieties					
Allen	June (early)	Mountains	Erect	Large, firm	All-around variety
Bristol	June	Mountains	Erect	Large, good quality	Susceptible to anthracnose
Cumberland	June	Mountains	Erect	Large, excellent quality	Firm berry, hardy

Table 5. Grapes for North Carolina

Variety	Season	Color	Size	Use	Remarks
Piedmont and Western Region					
Catawba	Late	Red	Medium	Fresh, juice, wine	Good all-purpose grape
Cabernet Franc	Late	Black	Small	Wine	Vinifera, more cold hardy and disease resistant than cabernet sauvignon
Cabernet Sauvignon	Very late	Black	Small	Wine	Vinifera, good quality
Carmine	Late	Black	Medium	Wine	Vinifera, excellent quality
Chambourcin	Late	Black	Large	Wine	Hybrid, cold hardy, weak growth
Chardonnay	Mid	White	Small	Wine	Vinifera, excellent quality, early bud break—requires good site
Concord	Early to mid	Black	Medium	Fresh, juice	Doesn't ripen evenly in hot sites, not recommended for piedmont
Himrod	Very early	White	Medium	Fresh	Seedless, excellent quality
Jupiter	Early to mid	Blue	Medium	Fresh	Seedless, good flavor
Lakemont	Early	White	Medium	Fresh	Seedless, neutral flavor
Mars	Mid	Black	Small	Fresh	Vigorous, disease resistant, good quality
Moored	Early	Red	Medium-large	Fresh	Fruity, productive
Neptune	Mid	White	Large	Fresh	Seedless, good quality, moderate vigor
Niagara	Mid	White	Medium	Juice, wine	Fruity, good sweet wine
Norton	Late	Black	Small	Wine	Excellent cold hardiness, disease resistant, lower yields
Reliance	Mid	Red	Medium	Fresh	Excellent quality, fruit cracking can be a problem
Seyval	Late	White	Large	Wine	Hybrid, tendency to overcrop
Sunbelt	Mid	Black	Large	Fresh, juice	Similar to Concord, but will perform better in piedmont
Vanessa	Mid	Red	Small-medium	Fresh	Seedless, good quality, fruit may crack
Vidal	Late	White	Small	Wine	Hybrid, cold hardy, disease resistant, good yields
Viognier	Early	White	Small	Wine	Vinifera, excellent quality, early bud break—requires good site
Coastal Plain and Lower Piedmont Region					
Carlos	Early	White	Medium	Juice, wine	Coastal plain, piedmont, good scar
Cowart	Mid	Black	Medium	Fresh, juice	Coastal plain; good pollinizer
Fry*	Early to mid	Bronze	Very large	Fresh	Coastal plain; susceptible to blossom rot
Higgins*	Very late	Pink	Very large	Fresh	Coastal plain; pink/bronze color
Nesbitt	Mid	Black	Very large	Fresh, juice, wine	Coastal plain, piedmont
Noble	Mid	Black	Small	Fresh, juice, wine	Coastal plain, piedmont
Supreme*	Mid to late	Black	Very large	Fresh	Coastal plain; exceptional size, needs further evaluation for cold hardiness
Triumph	Early to mid	Bronze	Large	Fresh	Coastal plain

**Female vine needs perfect-flowered variety to pollinate, such as Carlos, Noble, Cowart, Triumph, or Nesbitt.*

Table 6. Strawberries for North Carolina

Variety	Area*	Season	Size	Yield	Quality Fresh/Processing	Remarks
Apollo	All	Mid to late	Large	High	Good/Good	Needs pollination; anthracnose tolerant
Allstar	P	Mid	Large	High	Good/Good	Resistant to red stele
Titan	CP, P	Early to mid	Very large	Medium	Excellent/Very good	Hollow center; susceptible to anthracnose
Tennessee Beauty	M	Late	Small	Medium-high	Fair/Fair	Susceptible to red stele
Earliglow	P, M	Very early	Small	Medium	Excellent/Excellent	Best quality; red stele resistant
Sweet Charlie	CP, P	Early	Large	Medium-low	Excellent/Fair	Adapted to matted row and hill culture
Tribute	P, M	Everbearing	Large	Medium	Good/Good to high	Deep red
Tristar	P, M	Everbearing	Medium-small	Medium	Excellent/Good	Deep red

**CP-coastal plain, P-piedmont, M-mountains.*

It is best to test the soil four to six months before planting to allow adequate time to amend the soil based on test results. If the pH is too low, raise it to the level suggested by the soil test with dolomitic lime. If the pH is too high, it can be lowered by applying wettable sulfur (90 percent). On sandy soils, apply 1 pound per hundred square feet for each unit the soil pH is to be lowered. For heavier clay soils, apply 2 pounds per hundred square feet to lower the pH one unit. Test the soil again before planting, and till it well.

Keep plant roots moist until planting by either heeling them into the ground temporarily or by wrapping them in wet burlap. Do not leave the roots exposed to the drying effects of sun and air. If strawberry plants arrive when the soil is too wet for planting, they can be stored in the refrigerator until the soil can be worked.

Prepare a planting hole large enough to allow the roots to spread out naturally. Except for strawberry plants, spread out the roots of grapes and berries in the planting hole. Strawberry plants should be planted with the roots straight down. Do not prune the roots except to remove damaged ones. Set most fruit plants at the same depth they were planted in the nursery. The crown (the point where the stem and root merge) should be placed at these depths:

- Blueberries—same as in the nursery if mulched, 1 inch below ground level if not
- Blackberries and raspberries—dormant plants 1 inch below ground level; tissue culture plants at ground level
- Grapes—at or slightly below ground level
- Strawberries—at ground level.

After planting, tamp the soil firmly to remove air pockets around the roots. Water all new plantings well immediately after planting.

Blueberries, blackberries, raspberries, and grapes are generally planted in rows. Raspberries grow best in cool climates on deep, sandy loam soils. The soil should be well drained to a depth of 3 feet. Wait one year before planting raspberries in ground on which sod has been grown.

Strawberries are best planted in matted-row systems. For a matted-row bed, set the plants 1 to 2 feet apart in the row. Space the rows 3 to 4 feet apart (Figure 1). A matted row is encouraged to develop from the runner plants that grow from the mother plant. Wait one year before planting strawberries in ground on which grass sod has been grown. Set plants with the roots straight down (never bent) and with the crown even with the top of the ground (Figure 2).

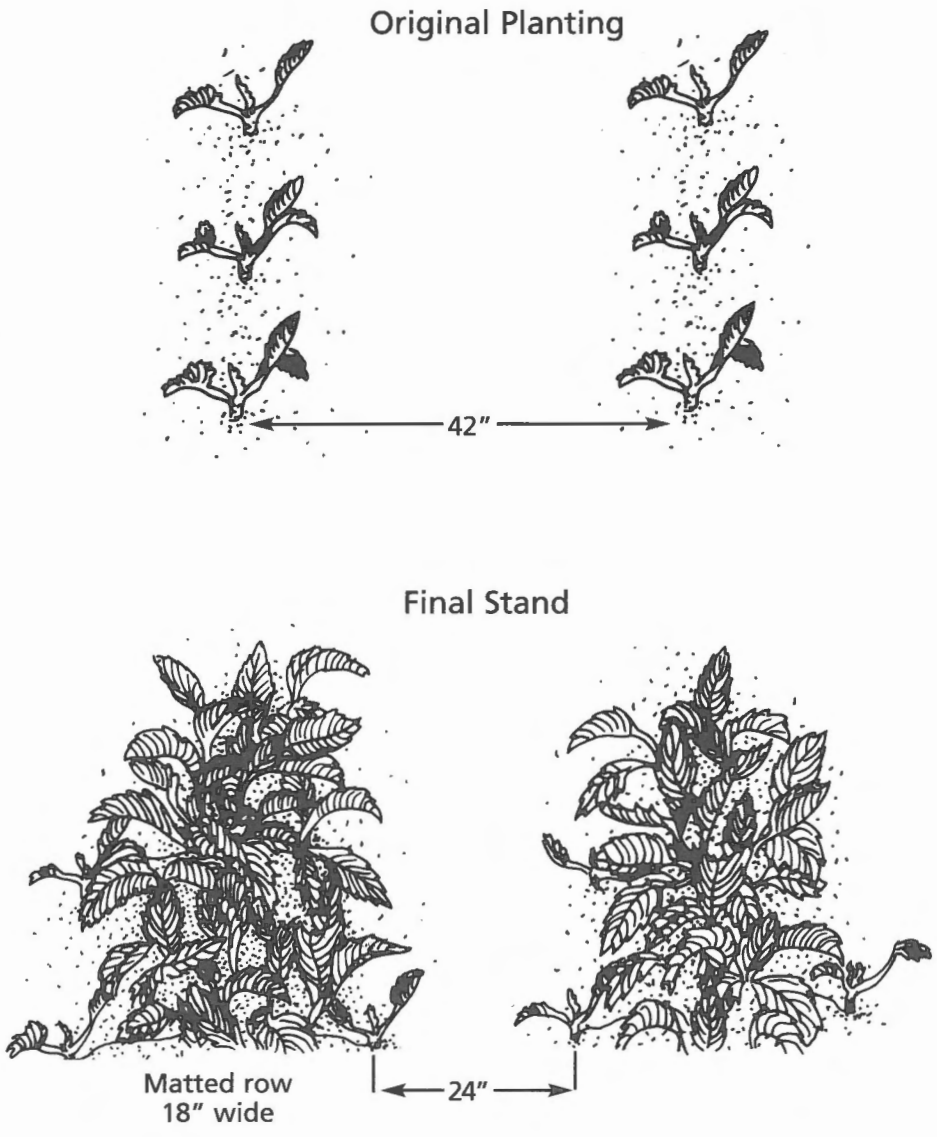


Figure 1. Matted-row system for planting strawberries. Spacing is 1 to 2 feet within the rows and 3 to 4 feet between the rows. Runners are allowed to set in all directions. Cultivation helps to straighten the runners into rows and to limit row width.

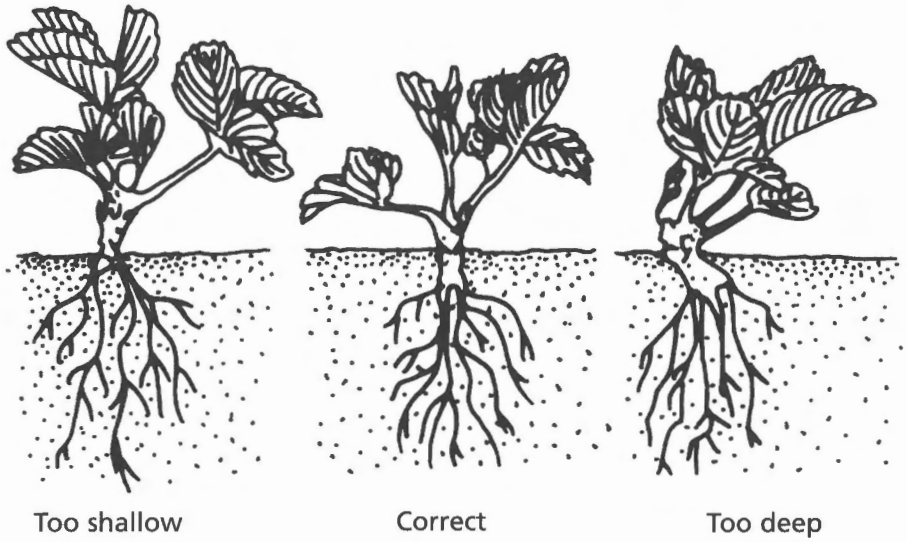


Figure 2. Correct planting depth for strawberry plants.

Fertilization, Irrigation, Cultivation, & Mulching

BLACKBERRIES

Mixed fertilizers are satisfactory for blackberries. For best results, apply fertilizer when growth starts in early spring and again in summer just after harvest. Use a 10-10-10 commercial mix at the rate of 5 pounds per hundred linear feet of row. For late-ripening thornless blackberries, apply the fertilizer mix no later than July to avoid forcing late-season growth that will be subject to winter injury. For the first year or two, before the root system of the plants develops fully, spread 3 or 4 ounces of fertilizer in a 12-inch radius around the base of each plant.

Blackberries require abundant moisture while the berries are growing and ripening. If rainfall is not adequate, provide irrigation water equivalent to 1 inch of rainfall per week. A minimum rate of drip irrigation for mature blackberry plants is 2 gallons of water per day while berries are developing.

Mulching reduces watering frequency and helps control weeds and grasses that compete for moisture and nutrients. Good mulching materials include pine straw, wood chips, and seed-free grain mulches, such as wheat or rye.

Blackberry plantings should be cultivated thoroughly and frequently or mulched very well to keep grass and other weeds from getting a start. Once started, weeds are difficult to control. Begin cultivating in the spring as soon as the soil is workable. Cultivate as often as necessary to control weeds. Avoid deep cultivation so that you do not cut the blackberry roots. Undesirable suckering becomes much more severe, especially on the erect varieties, when roots are damaged. Discontinue cultivation at least one month before freezing weather normally begins. Herbicides can be useful on established blackberry plantings; contact your county Cooperative Extension agent for suggestions.

BLUEBERRIES

Do not fertilize newly set plants until the first leaflets have reached full size. Apply 1 tablespoon of special azalea fertilizer or other fertilizer with a 10-10-10 formulation in a circle 1 foot in diameter around each plant. Repeat at six-week intervals through mid-August in the coastal plain and mid-July in the mountains. Increase the amount applied each year until a total of 1 cup in three applications is being made by the fifth year. Reduce fertilizer rates by 50 percent on rabbiteye bushes when they grow taller than 5 feet and vegetative growth is excessive.

Cultivate carefully, as blueberries are shallow rooted. If mulching is maintained, hand pulling of a few weeds should be all that is required.

Maintain a 4- to 6-inch mulch of pine bark, sawdust, wood chips, or pine straw in a 3-foot diameter, or band and renew yearly as needed.

RASPBERRIES

Before planting, spade or till into the bed 1 pound of 10-10-10 fertilizer per hundred square feet of soil. Cultivate by hand and hoe between rows to a depth of 1 to 2 inches to prevent suckers from taking hold. Mulch with lawn clippings, pine straw, or pine bark.

Fertilize just after new growth starts in the spring (May) with a 10-10-10 commercial mix at a rate of 5 pounds per hundred feet of row. Repeat in July with another 2 to 3 pounds per hundred feet of row if vigor is low. In subsequent years, apply 8 pounds per hundred feet of row in March and repeat in May. Spread the fertilizer uniformly in a foot-wide band over the row, or side-dress with half the recommended amount of fertilizer on each side of the row.

GRAPES

Proper fertilization is essential to high yields and quality. Before planting vines, broadcast and work fertilizer and lime into the soil as indicated by your soil test (usually about 2 pounds of fertilizer and 5 pounds of dolomitic limestone per 100 square feet).

After setting the vines and just before growth starts, apply 1/2 cup (1/4 pound) of 10-10-10 fertilizer in a 20-inch circle around each vine. Repeat monthly until July 15th. In the second year, double the first-year amounts but follow the same time schedule. For bearing vines, scatter 1 to 2 pounds of 10-10-10 fertilizer per plant over the area. Repeat with 1 pound per vine in mid-June.

For at least the first two years, keep an area 1 to 2 feet in diameter around each vine free of weeds by hoeing, hand cultivation, or mulching. Black plastic is a satisfactory mulch material, but it does not add to the humus content of the soil. Do not use a combination fertilizer and weed killer on lawn areas near grape vines; the weed killer may be absorbed by the grape roots and injure the vine.

STRAWBERRIES

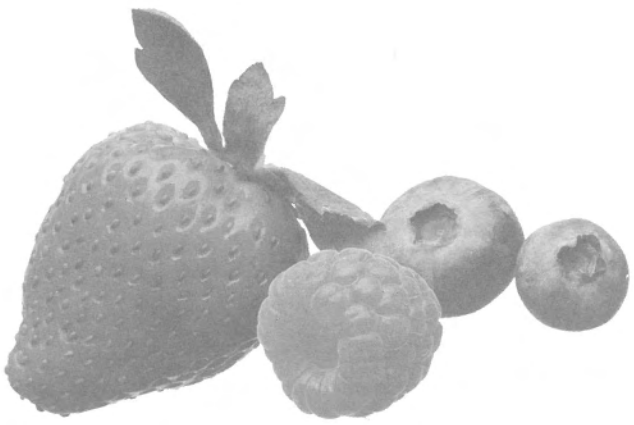
Before planting, follow the soil test recommendations. If no soil test is made, broadcast about 4 pounds of 8-8-8 fertilizer for each hundred feet of row two weeks before planting. For each plant, apply approximately 1 teaspoonful of material containing 16 percent nitrogen (or its equivalent) each time. Fertilize each plant set in spring with 2 teaspoonfuls about a month after setting. Apply this 16 percent nitrogen at least 4 inches from the plant crown. Apply nitrogen fertilizer again between August 15 and September 15. Three pounds of a 16 percent nitrogen material, 2 1/2 pounds of 20 percent, or 1 1/2 pounds of a 33 percent material are adequate for each hundred feet of row. Scatter the material over the top of the plants while they are dry and use a broom to brush it off the foliage.

Very sandy coastal soils usually need additional nitrogen again in late January or early February. The rate suggested is half that of the fall application. Measure and apply nitrogen carefully; too much will cause rank top growth and soft berries that rot easily. For old plantings, use the same amounts and same timing as for new plantings.

Strawberry plants are shallow rooted. Dry weather and drought seriously reduce the size and yield of berries and the number of new runner plants. For this reason, if drought occurs during planting, harvest, renovation, or bud set (from August through October), plan to irrigate.

If you used disease-free plants in a matted row and if they are still healthy at the end of the picking season, keep the same plants for the second year's crop. Thin the plants to approximately 8 inches apart in all directions. Pull off runners as they form. Cultivate the row middles, keeping them clean of grass, weeds, and new runner plants. Fertilize as recommended for first-year plants. For hill system plants, set new ones each year; use only large runner plants. Transplant new plants during November or March when the soil is moist.

Apply pine needles or grain straw in February in the coastal plain and piedmont and in December in western North Carolina. Scatter lightly over plants and in the middles between rows. Do not completely cover the foliage but cover well enough to protect the crowns. Use a light application on top of the plants at the higher elevations after the ground has frozen. In the mountains and elsewhere where high winds are expected, use old wire mesh or other suitable material to hold the mulch in place.



BLACKBERRIES

Semitrailing blackberries should be trained to a trellis, such as the one shown in Figure 3A. Construct the blackberry trellis by stretching two wires between posts set 20 feet apart in the row at heights of 3 feet and 5 feet from the ground.

Generally, only a small crop of fruit is produced in the first season. If growth is poor during this first season, cut the canes back to within several inches of the ground in late winter to force development of sturdier, more fruitful canes. In the second and succeeding years, shoot growth is more vigorous and upright. Tie these new shoots to the trellis when they reach a length of 4 to 6 feet. Some growers prefer to wait until harvest is over and old canes have been removed before tying new shoots to the wires. Pruning the old canes is critical to the prevention of disease. After harvest, prune damaged or weak canes, leaving four to eight new shoots. Tie these canes to the trellis in a fan shape (do not bunch them). In the spring before growth starts, prune any laterals back to 12 inches to encourage larger fruit.

Erect blackberries such as Cherokee and Cheyenne do not require support if the tops of new canes are pruned during the summer to keep growth below 3 to 4 feet. Erect blackberries that are not topped may be trained to a one-wire trellis (Figure 3B). During the growing season, it is desirable to allow root suckers to develop to about a 12-inch-wide row. Any growth beyond this should be eliminated.

When the new shoots of erect blackberries reach 30 to 36 inches tall, cut off the tips. This will force branching lower on the canes and will cause the canes to thicken, making them better able to support a heavy fruit crop. During the winter, prune the laterals to 12 to 14 inches for convenient harvesting and larger berries. In late winter, remove any remaining dead or weak wood. Leave healthy, vigorous canes spaced at six canes per linear foot (Figure 4).

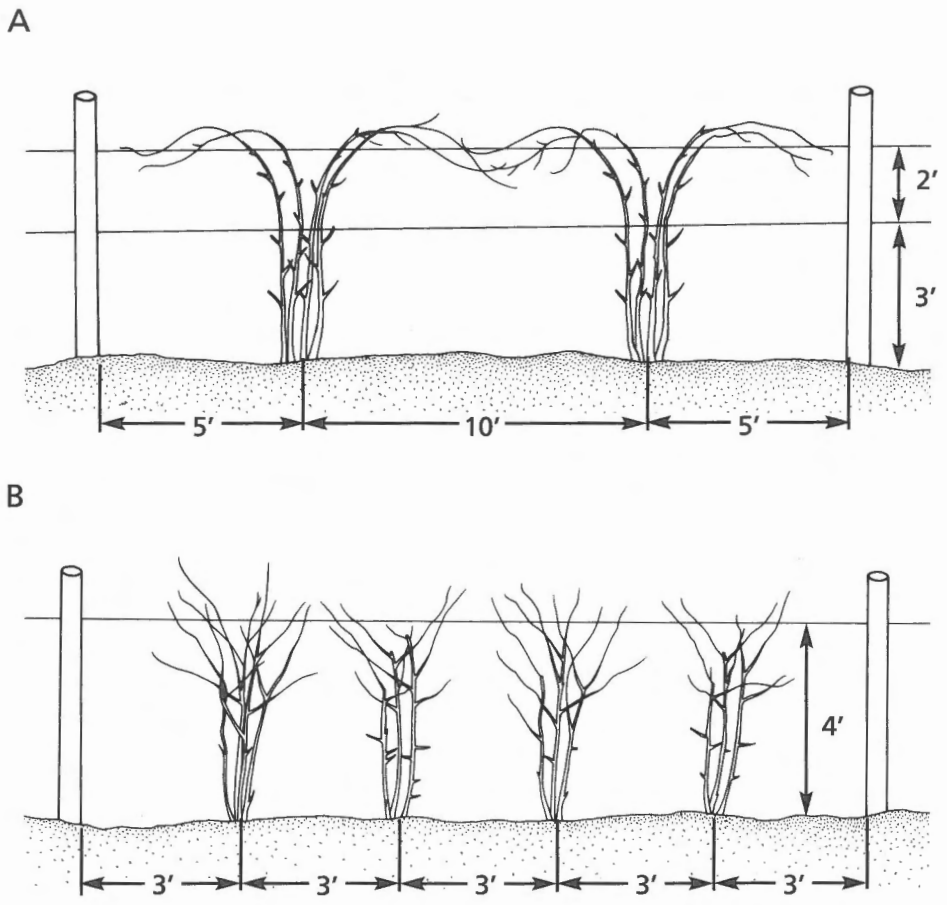


Figure 3. (A) Train trailing plants to a two-wire trellis. (B) Train erect blackberry plants to a one-wire trellis.

As soon as the last fruit has been picked in summer, cut all the old canes—whether erect or semitrailing—and burn them. This is also a good time to tip prune and thin new shoots.

BLUEBERRIES

Highbush blueberries should be cut back severely (removing all fruit buds) after planting. In late winter remove all diseased and damaged canes. During the second year, again remove all fruit buds. In the third year you may leave a few fruit buds. During the fourth and succeeding years, leave half of the fruit buds and prune out diseased and damaged canes. To control height, cut back tall, vigorous shoots to force lower-level branching.

Rabbiteye blueberries should be pruned similar to the highbush varieties for the first three years; however, taller and more limber shoots should be cut back to stimulate lower, thicker branching. On mature bushes, cuts in late July to remove or shorten vigorous upright shoots will control height and increase yields the following year.

RASPBERRIES

Red raspberries tend to sucker and spread. Most of their fruit production is concentrated in the top third of new shoot growth, so it is not advisable to prune them into a hedgerow as you would with blackberries. Instead, they should be trellised.

Train Dormanred to a vertical trellis with a narrow wall of foliage. Space posts 20 feet apart and attach wires at a 5-foot height (Figure 5). For the Heritage variety, use a crossbar or horizontal trellising system. Two-foot crossarms are attached to the posts at a height of about 4 feet, and two wires are secured at the ends of the arms (Figure 6). The new canes will grow between and be supported by the wires with a minimum of tying. Remove first-season blooms to help plants get established and increase vegetative growth. Do not attempt to produce a crop the first season.

During late February, thin the canes to 4 to 6 inches apart over the width of the row. Keep rows to an 18-inch width. Be sure to select healthy canes and remove weaker ones. After the harvest in summer, remove all canes that fruited to allow better growth of new season shoots and to prevent disease. Make cuts close to the ground. It is preferable to thin new shoots in mid-summer, leaving three or four canes per foot of row. For Dormanred, tie the new shoots loosely to the trellis.

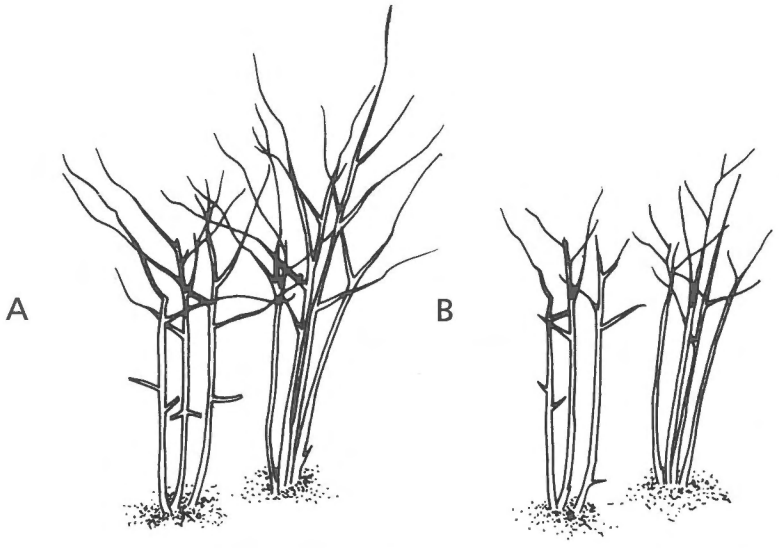


Figure 4. An erect blackberry plant (A) before pruning and (B) after pruning.

Black raspberries do not need to be trellised at all. They are treated much the same as erect blackberries. Summer prune by pinching back in June when new shoots reach 18 to 24 inches. It is sometimes necessary to do this a number of times, as not all shoots will be tall enough for pinching on the same date. Terminal (end) growth stops when shoots are pinched back, but the three to five buds below the pinched area develop vigorous lateral growth. This allows the canes to become self-supporting.

After harvest, remove canes that have just fruited. In winter before growth starts, cut back side branches, leaving two to six buds (8 to 12 inches long) per cane. Remove very small canes (Figure 7).

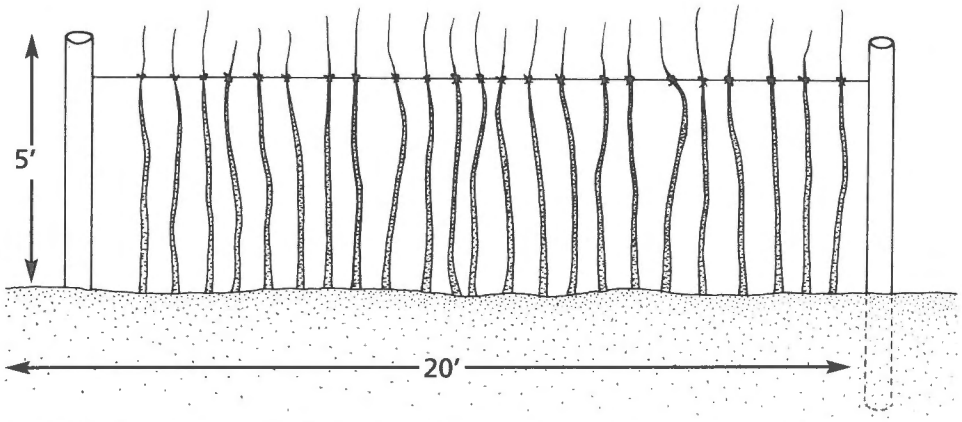


Figure 5. Red raspberry trellis for Dormanred variety. Wires are set at 5 feet above the ground. Treated posts are spaced 20 feet apart and set at least 24 inches into the ground.

GRAPES

To simplify installation and avoid damage to young vines, build and set the trellis system before the vines are planted. Use wood treated to resist decay or a durable type of wood such as cedar or locust. Construct the trellis according to the diagram in Figure 8. Set the line posts 20 feet apart down the row. Brace the end posts as shown.

During the first season, the primary objective for grapevine growth is development of a healthy root system and straight trunk. After setting the vine, prune it to one stem and cut this stem back to two or three buds. When new growth begins and the first shoots from the two-bud cane reach 6 to 10 inches in length, select the most vigorous and prune away the others. Tie the shoot gently to the training stake several times during the first season (Figure 9). Pinch lateral shoots back to the leaf growing from the main shoot. This allows the main shoot to grow more rapidly, possibly saving as much as a year in establishing a healthy vine.

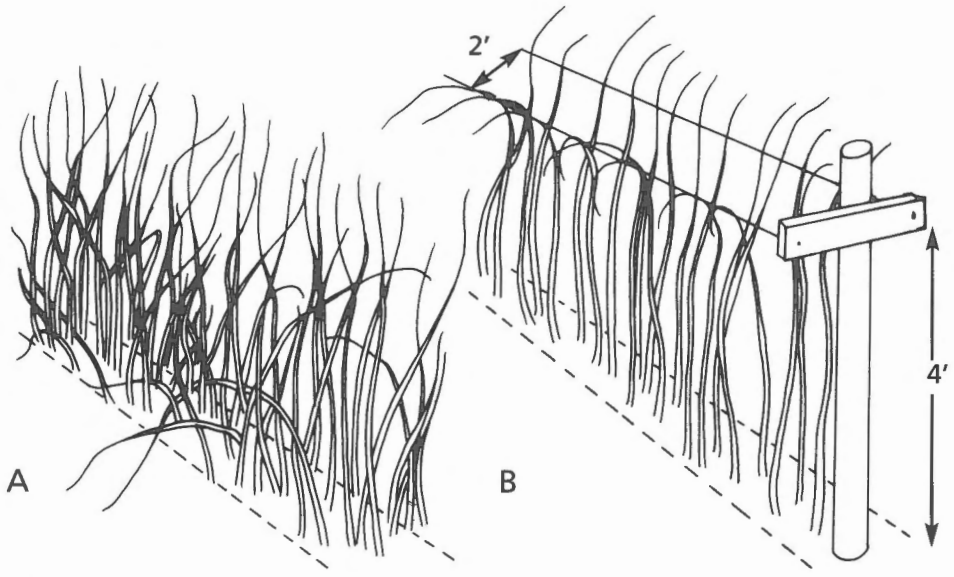


Figure 6. Heritage variety raspberries may be allowed to grow untrellised (A), but crossbar trellising (B) is recommended. Set the crossbars to space the wires 18 to 24 inches apart and about 4 feet above the ground.

Mid-trellis Cordon System (for use with French hybrid vines such as Seyval and vinifera vines such as Chardonnay and Cabernet Sauvignon). Allow the main shoot to grow until it reaches 3 feet tall (Figure 10). Tie it to the trellis, pinch off the tip, and allow several of the lateral shoots to grow. Begin training in the second year by evaluating the extent of growth achieved during the first year. If no cane has reached the first wire, remove all but one cane. Prune this cane back to two buds and treat it as a new vine.

In the winter following the first season of growth, remove all but a few good canes the diameter of a pencil. No added training is necessary, but it is vital to remove flower clusters in the second growing season. Vines that grew extensively in the first year will likely have one or more canes suitable for retention as a trunk. If a cane is long enough to reach the lowest trellis wire and is of adequate diameter (approximately 1/2 inch), retain the cane as a trunk. The distal (tip) portion of such canes can be trained horizontally along the training wire to serve as the basis for a cordon (see Figures 10 through 12).

Cordon establishment begins in the second season of growth and should continue over a two-year period for best results. To establish a 3-foot-long cordon, begin with an 18-inch cane (or trunk extension) in the second year, and complete the cordon in the third year with another 18-inch cane from the distal end of the short cordon (Figures 11 and 12). Canes that are used to establish the cordons should be wrapped loosely around the trellis wire and tied securely at the end with wire to prevent the cordon from rotating or falling from the wire.

During the second growing season, shoots that develop below the lowest trellis wire should be pruned to one or two buds near the graft union. Retain 10 or more shoots that develop on the cordon in the second year.

In the third year the cordon system should be completed. For the trellis mid-wire cordon, canes that rise from the upper side of the cordon arms should be pruned to one- or two-node spurs (see Figure 12). These spurs should be 4 to 6 inches apart. Develop a second trunk and cordon from a cane that originates near the graft union. Keep a small crop of fruit (for example, one cluster for every two shoots) on vines that had at least 1 pound of cane prunings from the second-year growth. Tie shoots to wires as necessary during the growing season. Treat weak vines as second-year vines and remove all crop.

Cordons may be either unilateral or bilateral; in either case, cordons should ultimately span the distance between two adjacent vines in a row.

High-trellis Cordon System (for use with American bunch grapes and Muscadine). The initial training of the trunk is the same as used with the mid-wire trellis system, but in this system cordons are trained along the top wire of the trellis. Spurs (short canes) are retained on the lower sides of the cordons to promote downward growth in American bunch varieties.

The vine must be pruned every year to avoid alternate-year bearing and to make

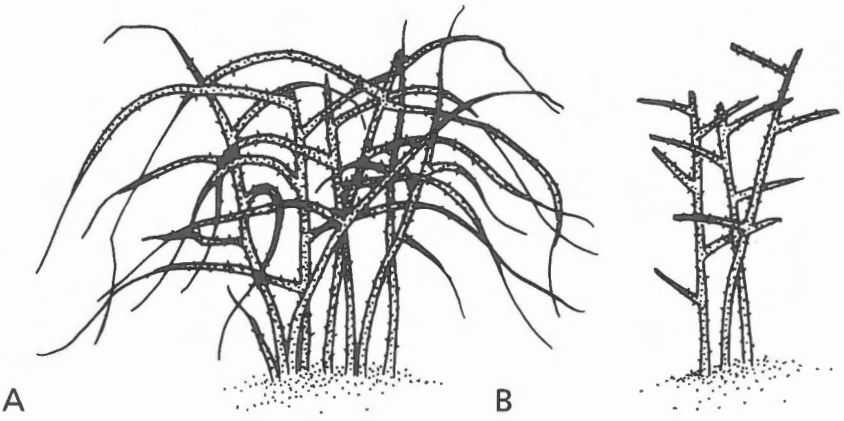


Figure 7. Black raspberry plant (A) before and (B) after dormant season pruning.

harvesting easier (Figure 13). Pruning mature vines consists of three operations. The first step is pruning last season's growth. In the dormant season, prune back all canes that grew during the previous summer to 4 or 5 inches in length. Leave the remaining spurs at a 6-inch spacing on young vines. As the vines age, they will develop clusters of spurs. These spurs must be thinned after the third season to force new spur growth. This process also minimizes the labor necessary for cane tying and keeps fruit and renewal regions at a uniform height, facilitating harvesting and pruning. The second step is to remove suckers or shoots growing from the trunk and any damaged arms. A new cane must be trained (from the renewal canes at graft union height) to replace the removed arm. As the third step, remove all tendrils that attach themselves to the trunk or fruiting arm of the vine.

Overcropping will greatly reduce fruit quality. Some cluster thinning in years of heavy fruit set (thinning to one cluster per shoot) is the simplest way to ensure that those remaining will develop into larger, more fully ripened clusters. A good rule of thumb for mature vines is to allow no more than two clusters per shoot. Excess clusters should be removed before bloom (early May in the piedmont; late May in the mountains).

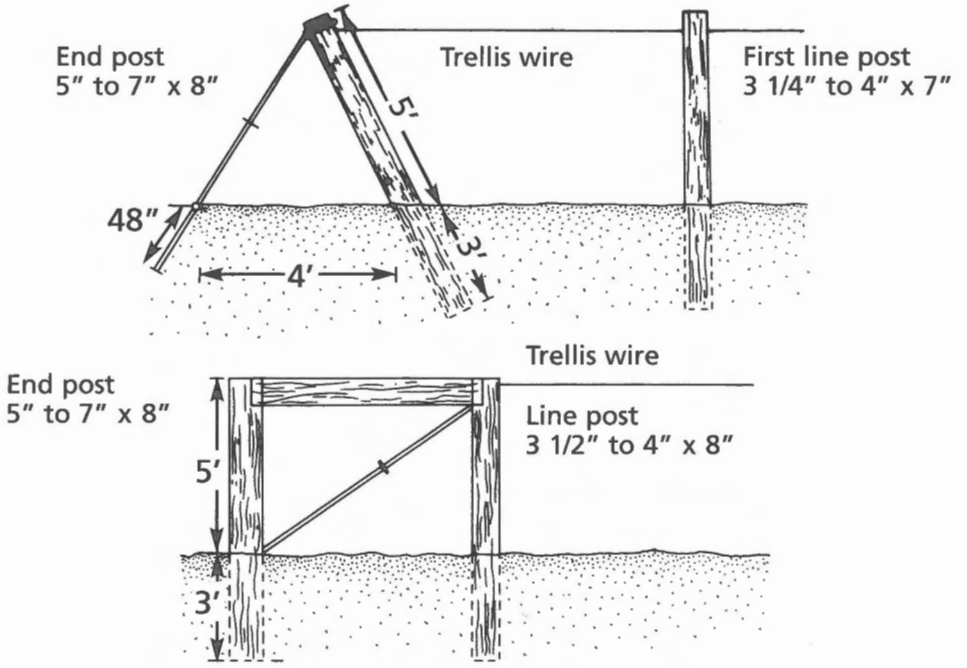


Figure 8. Dimensions for the end post construction for a grape trellis that can be used for either mid-wire or high-wire cordon training systems.

STRAWBERRIES

In matted-row beds, allow the runners to establish a bed 18 to 20 inches wide. The best spacing within the bed is about 4 to 8 inches between plants. Thin the bed to this spacing if more plants develop. Destroy runner plants that root in the row middles and remove all weeds and grass as they appear.

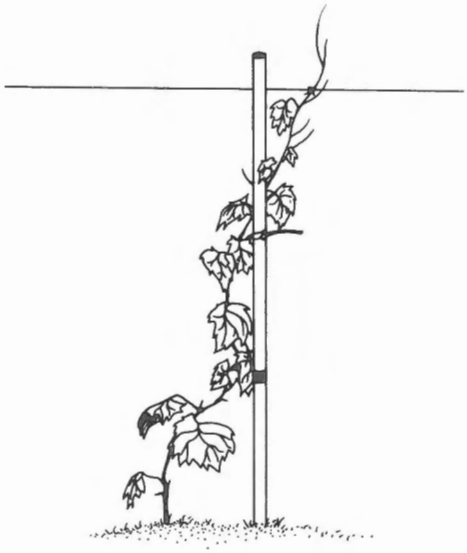


Figure 9. Train the new grape shoot by twisting it around the training stake as it grows. Tie it loosely every 8 to 10 inches.

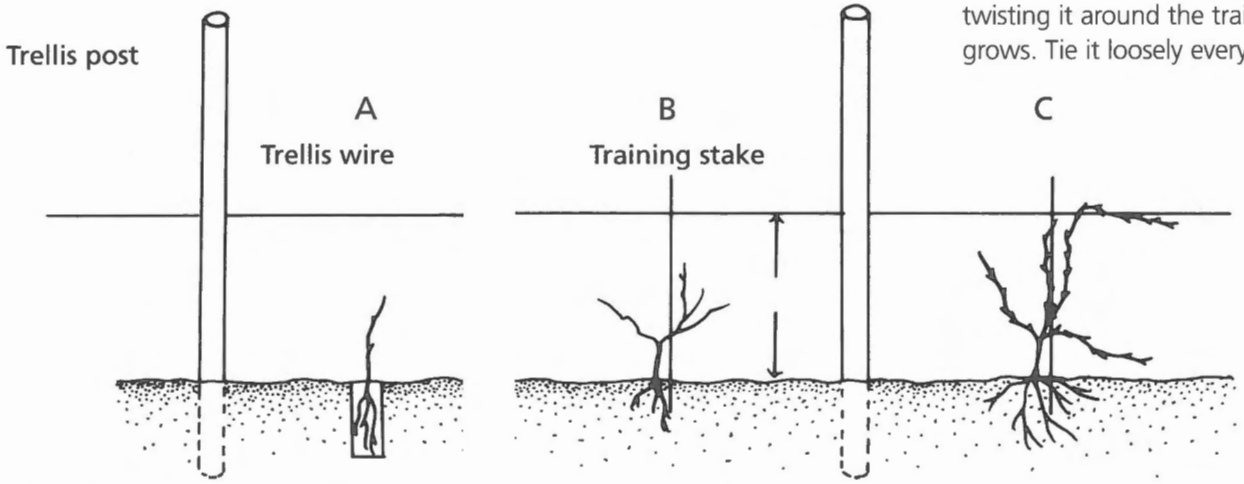


Figure 10. Bilateral cordon training system for grape vines, year 1. (A) Spring, at planting; (B) fall, weak vine at end of growing season; (C) fall, vigorous vine at end of growing season.

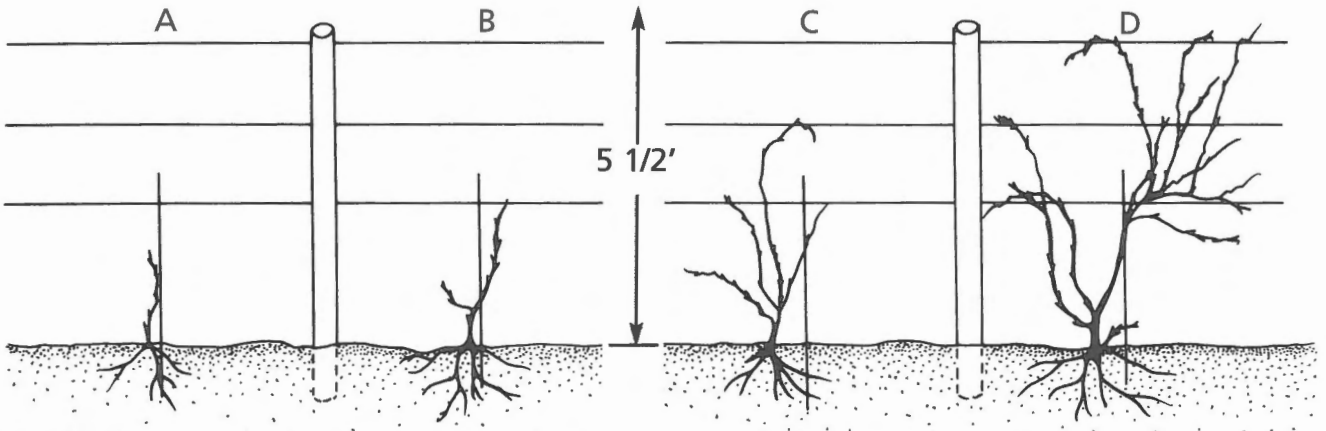


Figure 11. Bilateral cordon training system for grape vines, year two. (A) Spring, weak vine after pruning; (B) vigorous vine after pruning; (C) fall, weak vine; (D) fall, vigorous vine.

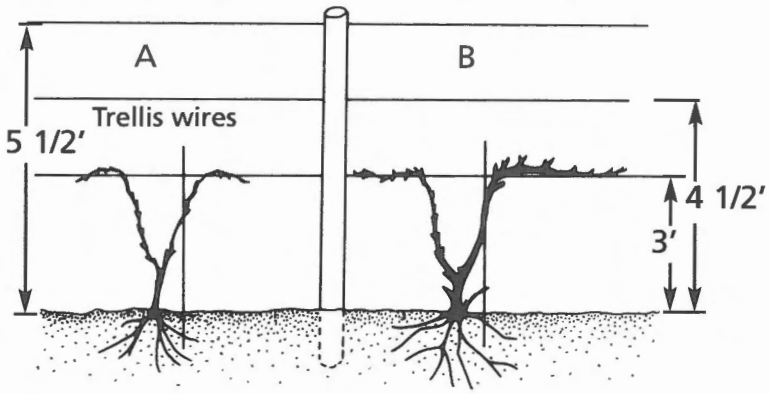
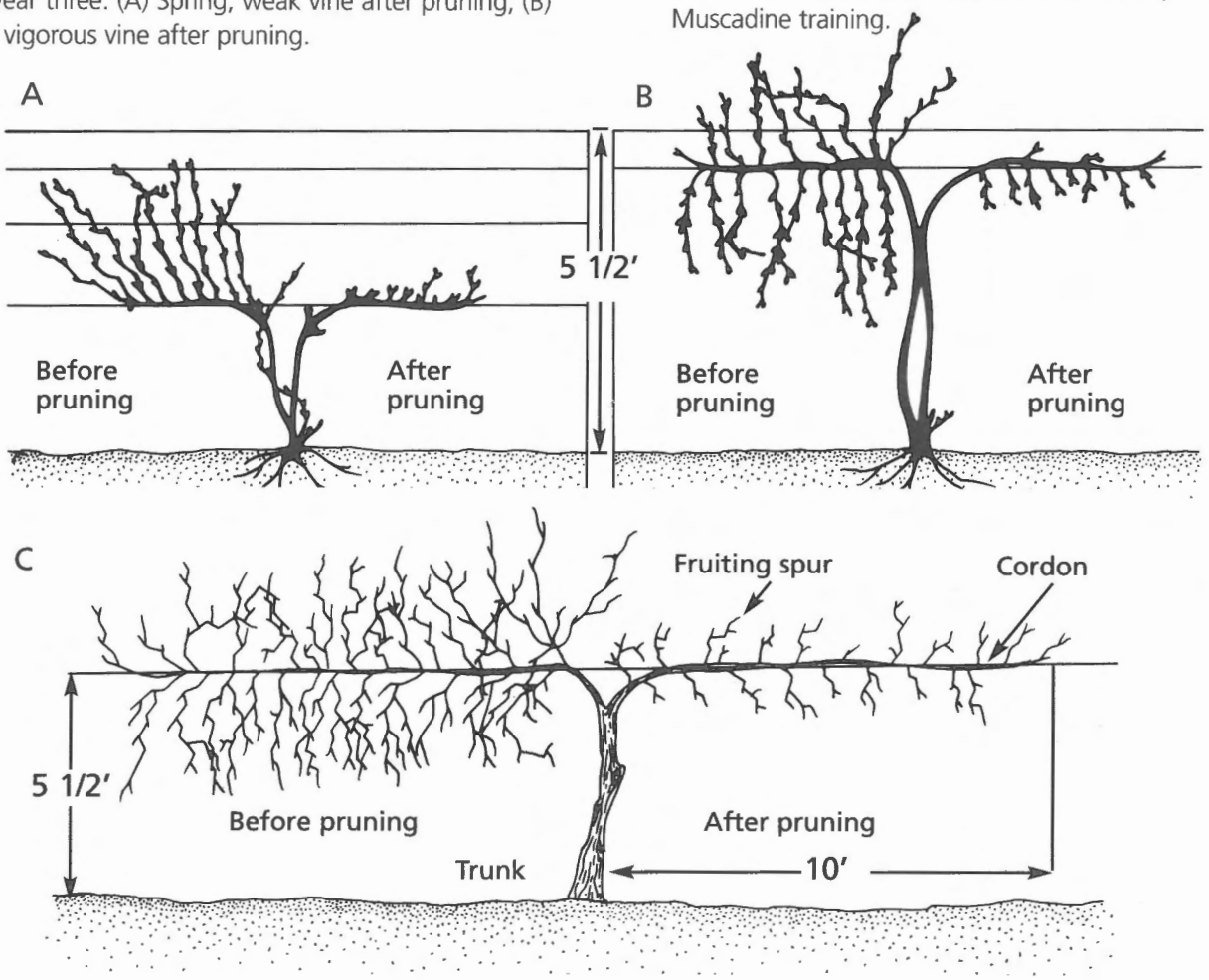


Figure 12. Bilateral cordon training system for grape vines, year three. (A) Spring, weak vine after pruning; (B) spring, vigorous vine after pruning.

Figure 13. (Below) Completed bilateral cordon training system for grapes. (A) Mid-wire system for use with French vines such as Cabernet Sauvignon and Seyval. Spurs are trained upward. (B) High-wire system for use with American bunch varieties. Spurs are trained downward. Spurs should be pruned to four buds and spaced 4 to 6 inches apart along the cordon. (C) System for Muscadine varieties. This is essentially a high-wire system, but the growth characteristics of these grapes prevent training spurs in a downward direction. Approximately 20 two-bud spurs should be retained for each 10-foot permanent arm (cordon); the spur orientation (upward or downward) is not important in Muscadine training.



Harvesting

BLACKBERRIES AND RASPBERRIES

The harvesting of some erect thorny blackberries begins about a week or two after the strawberry season (about the first of June in Raleigh); semitrailing thornless types usually do not begin ripening until midsummer. Pick when the fruit is dull black in appearance. For raspberries, harvest twice a week when fully ripe. Pick in the morning when the air is cool and berries are firm.

BLUEBERRIES

Highbush blueberries begin ripening in mid-May along the southeastern coastal plain and early to mid-July in the mountains. Rabbiteye varieties begin about one month later. When rabbiteye fruit first turns completely blue, it may still be sour and slightly bitter. Wait at least seven days from the time the first berries become blue before harvesting to ensure acceptable flavor. Harvest every five to seven days for highbush, every 10 days for rabbiteye.

GRAPES

On a vine that has not been overcropped, the berries of black varieties will lose their red color, and white varieties will change from green to golden yellow. Ripe berries will soften and seeds become brown. For table use, the deciding factor is taste. In North Carolina, grapes are generally harvested from July through October. Some varieties (such as Carlos) have dry stem scars when pulled as individual berries from the vine. Others (such as Noble) should be clipped to prevent wet and leaking scars that lead to premature spoiling.

STRAWBERRIES

Pick strawberries every other day or three times a week. Pick the fruit only when fully red, with about one-fourth of the stem attached.

Pest Management

INSECTS AND DISEASES

Satisfactory results in home plantings can be obtained with very little use, if any, of pesticides. It is best to avoid using them if possible. Maintaining good sanitation practices goes a long way toward keeping disease and insect damage under control. Rake up and burn or bury rotten fruit and dead leaves from under plants. Cut off and burn dead and injured twigs, branches, or canes.

Japanese beetles are often the most serious insect pest, especially on grapes, blackberries, and raspberries. Observe the plants every few days to avoid severe defoliation.

Should a serious problem develop, your county Cooperative Extension agent can give information on the latest, safest, and most effective chemicals to use. Ready-mixed commercial packages of pesticides can be purchased under various brand names, or the separate materials can be purchased and combined. In either case, read the labels on containers to determine contents and directions for use.

Follow suggestions and directions carefully with regard to dosage and application intervals to avoid pesticide residues on the fruit at harvest.

BIRDS

To keep birds from becoming pests during the ripening season, cover the plants with tobacco cloth, cheesecloth, netting, or similar materials before the fruit begins ripening. Keep the plants covered completely (except when harvesting) until all the fruit has been picked. At present, this is the only practical and sure method known to control bird damage in small plantings.

Scaring devices (such as aluminum whirling devices) sometimes keep birds away. If you use them, put them into service early in the season at the first sign of fruit ripening and before the birds have become established in a feeding area. These devices must be operated from dawn to dark and moved around frequently before the birds become accustomed to noise emitted from a particular location.

WEEDS

Many home fruit gardens are too large for hand weeding and too small for the use of heavy equipment. In many cases, hand pulling and mulching can be used to control weeds. Herbicides can supplement these cultural practices to make the work of controlling weeds easier and faster.

Some chemical manufacturers sell herbicides in small quantities that are ideal for use on small areas. These chemicals are formulated to make them more convenient and easier for homeowners to use. For larger areas, several products can be purchased over the counter at farm chemical retail stores.

Postemergent materials will kill many weeds that are already growing. Remember to keep these materials off the crop plants to prevent damage. To control germinating seedlings, several preemergent herbicides are available. Consult your county Cooperative Extension agent and read all labels closely.

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For more information about growing grapes and berries, see this website: http://www.smallfruits.org/SFC_News/Berrinfo.htm.

8,000 copies of this public document were printed at a cost of $2,000.00 or $.26 per copy.

College of Agriculture & Life Sciences • NC State University
School of Agriculture and Environmental and Allied Sciences • NC A&T State University

Published by
NORTH CAROLINA COOPERATIVE EXTENSION SERVICE

2/04–8M–JMG
E04-43965

(Reprint)

AG-15