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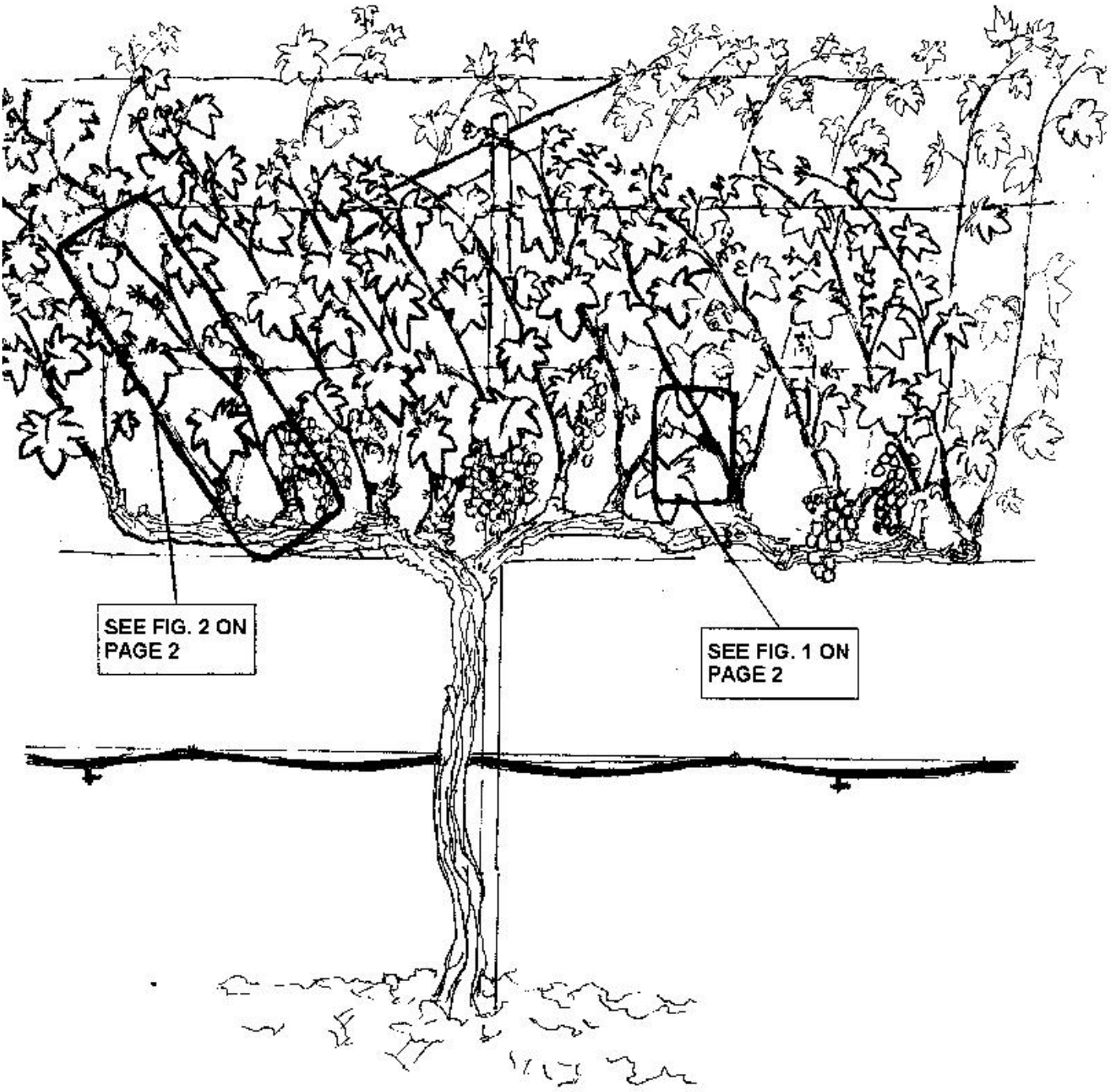
Environmental Horticulture Notes

EHN 97

GUIDELINES FOR THE HOME VINEYARD



TERMINOLOGY

- Arm — Old growth on canes and spurs
- Berries — The individual fruit
- Bud — Rounded organ in the node of a cane or shoot; shoots and grape clusters grow from buds
- Cane — Mature, woody shoot
- Cluster — Grape bunch
- Cordon — Permanent branch trained to grow along a wire in spur pruning method and in arbor training methods
- Flower cluster — Portion of plant containing the reproductive organs
- Head — Upper portion of a cane-pruned vine consisting of the top of the trunk from which shoots grow
- Lateral shoot — Side shoot of the current season's shoot arising from a secondary bud
- Leaf petiole — Stem attaching leaf blade to shoot
- Node — Enlarged portion of cane or shoot where leaves, clusters, tendrils, buds, and/or lateral shoots grow
- Pith — Soft center of the shoot or cane
- Shoot — Current season's growth from which grape clusters and lateral shoots grow; a shoot matures into a cane when more than half of the shoot becomes woody (referred to as a cane when it becomes woody)
- Spur — Lower section of a cane, usually with two buds, allowed to remain after pruning on spur-pruned vines
- Tendril — Twining and clinging organ used for support
- Trunk — Main stem or body of a vine between roots and the head or cordons of the vine

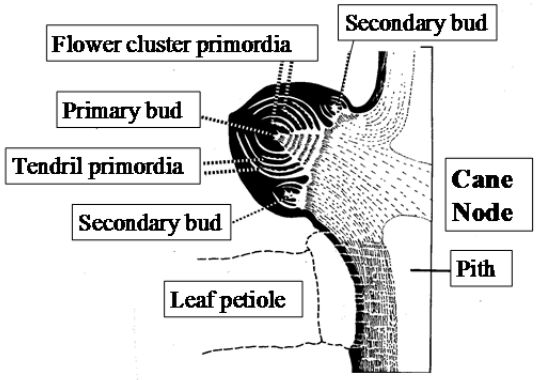


Figure 1: Grape Bud

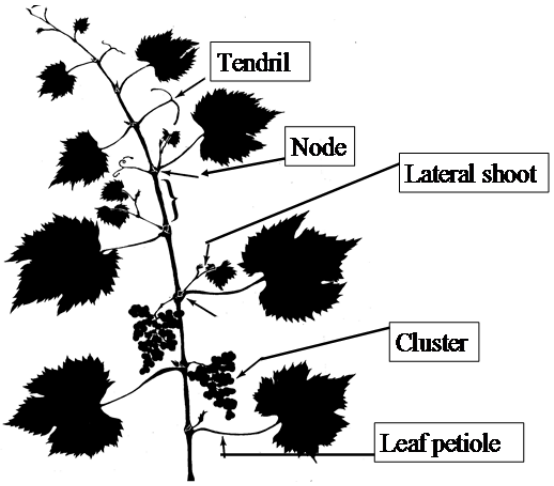


Figure 2: Grape Shoot

Grape buds grow out of the node. Buds usually contain three growing points with partially developed shoots, including rudimentary leaves, tendrils, and grape clusters. In most instances, only the middle or the primary bud grows out in the spring.

PLANTING AND CARE OF GRAPEVINES

PURCHASING PLANTS

Select a bare root or potted grape plant that is young and fresh looking. The potted plant should not be root bound or have signs of rot. Do not buy a plant with a mottled trunk or canes, an indication it had powdery mildew last year. Most plants from nurseries are one year old. Because bare root vines dry out quickly, plant them immediately.

PLANTING SITES

Plant in full sun if possible, or in an area with at least six hours of sun exposure. Decreasing the hours of sun can reduce yields, affect grape quality, and increase disease incidence. Construct an arbor or trellis to support the vines. Plant where the soil is at least 2 feet deep, preferably where there is no compacted soil layer below. Grapes prefer well-drained soil.

PLANTING THE POTTED GRAPE

Potted grape plants may be put in the ground any time as long as the plant has developed roots. Dig a hole twice as wide as the plant's container. However, if the soil is compacted, make the hole up to 3 feet in diameter. Be sure the hole is about as deep as the grape was growing in the container. Carefully remove the grape plant by squeezing the sides of the pot and then turning the pot upside down with your hand supporting the soil. Spread roots that are growing around the pot, and trim off any damaged or broken roots. Plant the grape using the soil that was removed from the original hole. Amendments are not needed in the planting hole.

If planting in the dormant season, remove all side shoots, prune main trunk down to two buds. During the growing season, remove the weakest growth and save two strong and healthy shoots.

PLANTING BARE ROOT

Grape plants also come in the bare root form, either heeled in a large box filled with wood shavings, sawdust, or packaged in plastic sleeves filled with mulch-type materials and soil. Before planting, soak the roots in water for about an hour or two since most likely the roots have not been watered since being shipped. At planting time, prune back trunk to 2 buds.

STAKING THE VINE

Attach the new vine to a stake, post, or arbor as it grows the first year; narrow green plastic tape works well. Tying the new shoot will ensure a straight trunk. If the trunk is crooked, ties may be necessary in several places along the trunk.

WATERING THE VINE

After planting, water deeply. Bare root plants may not need watering again for several weeks, but potted grapes planted in summer may require frequent watering initially. Check for moisture with your finger or dig down into the soil. Once established and growing well, water deeply and less frequently, about weekly if flooding or bi-weekly if drip irrigated. Use mulch to reduce soil moisture loss.

FERTILIZER

No fertilizer is needed at planting time, and very little nitrogen, if any, is needed later. Too much nitrogen promotes excessive vegetative growth, which can cause diseases and poor grape quality. Poor growth or yellowing leaves could indicate the need to fertilize.

PRUNING

Training in the first year is the same for both spur and cane-pruned vines. If first-year growth is minimal, cut back the vines to only two healthy buds in the winter after the first growing season. Train the most vigorous shoot up the stake to form the trunk, and prune out the weaker of the two shoots. The variety of grape determines the type of pruning (spur or cane) to use starting in the second or third year.

STARTING A GRAPE VINE…PLANTING TO SECOND SPRING

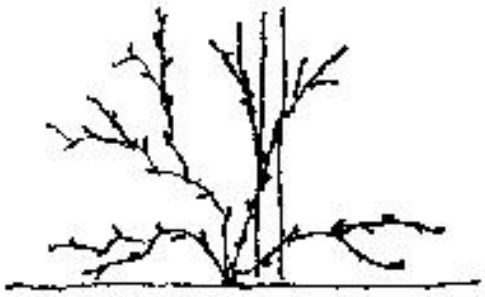


Figure 3

First Winter After Planting

Let the plant grow after planting, allowing it to form several shoots. On vigorous vines, start training them using the "Second Spring After Planting" instructions to the right.

Figure 4

Second Spring After Planting

When shoots are a foot long, select the most vigorous one to serve as a permanent trunk. Tie to stake loosely. Cut off all other shoots on the trunk below the head. Leave one extra shoot and head it as a back-up.

If you don't have branching where you want it, cut off the top of the trunk to force a shoot to grow from a latent bud.

The following sections will guide you on how to prune different varieties after the second year.

HEAD TRAINING AND CANE PRUNING

Figure 5

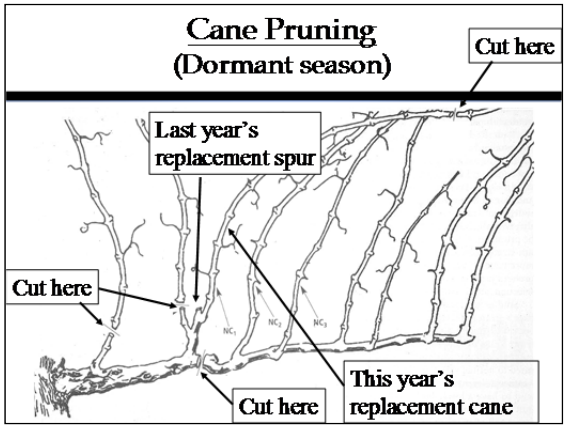
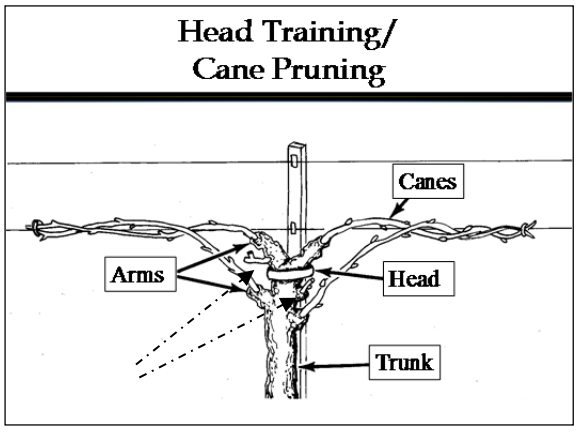


Figure 6



Used for varieties that produce little or no fruit on shoots that grow from lower buds (e.g., Thompson Seedless, Concord).

- Leave 4 canes per vine, or fewer on weak vines or more on very vigorous vines.
- Cut canes to 14 buds long, or about 3 to 4 feet.
- Wrap or tie canes along wire.
- Leave about one spur for every cane to produce replacement canes for the next year's growth.
- Select canes that received the most sunlight as they tend to be the most fruitful.

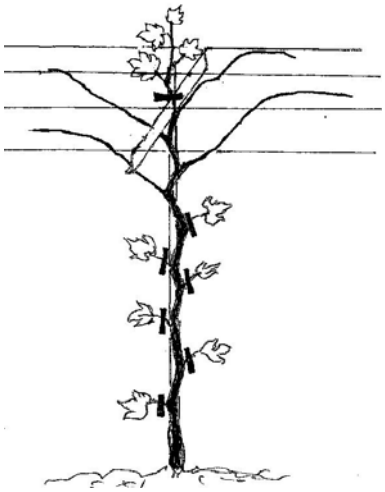


Figure 7

Second Summer

When the trunk grows to several inches above the desired height, cut it back to force branching just below the wires. Allow the four strongest shoots closest to the wires to grow and remove any other shoots. Remove side branches below the head, unless they are well placed.

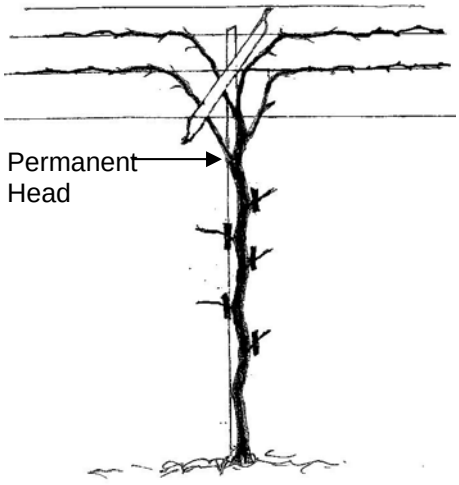


Figure 8

Second Winter

You should leave canes for fruit in third year. These will form the permanent head from which the fruiting shoots and replacement spurs will grow. They should be bearing in year 3!

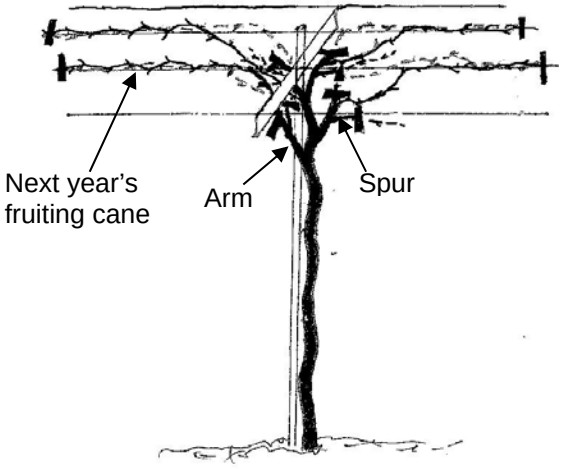


Figure 9

Third Winter

Last winter's spurs should have produced long canes. Cut back each cane to 14 buds; shoots that grow from these canes will bear fruit next summer. Select one strong cane on each of the four arms near the trunk and cut each to two buds; the lower bud is at least ¼ inch above old wood. These are the replacement spurs.

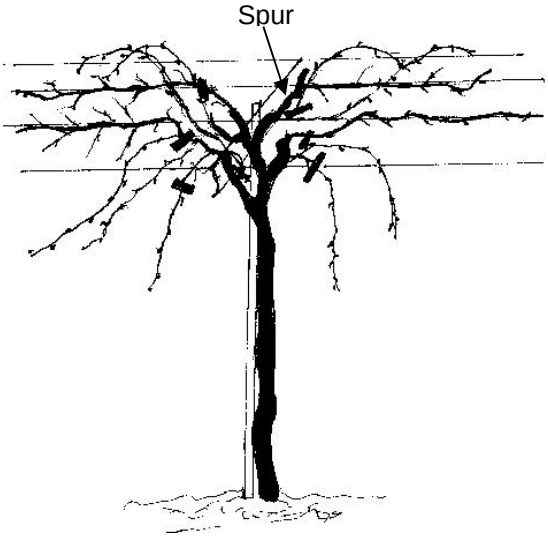


Figure 10

Fourth Winter…and After

During the fourth winter and every winter thereafter, remove the fruiting canes at their base, or back to a strong cane (see Figure 5). Each spur sent out two shoots; select the more vigorous sun-lit cane as the fruiting cane (up to 14 buds) and prune the lower cane to a two-bud spur. Each of the four arms should have one fruiting cane and one replacement spur. You will have four canes and four spurs total.

CORDON TRAINING AND SPUR PRUNING

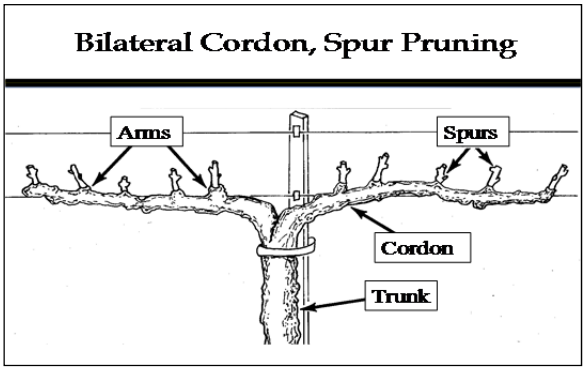


Figure 11

- Use this method for varieties that produce fruit on shoots that originate on lower buds (e.g. Flame seedless).

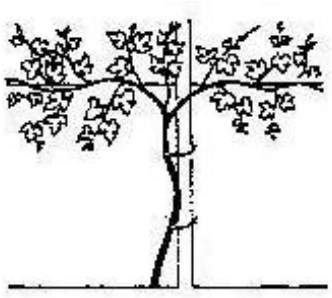


Figure 12

Second Summer

When the trunk reaches several inches above wire, cut it back just below wire. When the top two buds sprout, train shoots along the wire to form two cordons. Tie each shoot to the wire in a couple of places. Remove all new growth on the trunk below the cordons.

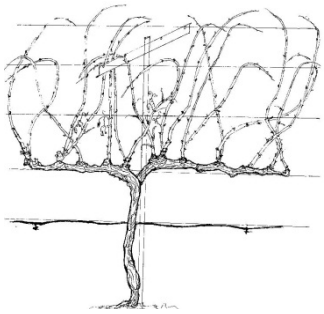


Figure 13

Second Winter

Cut off all shoots from the two main cordons. However, if your vines are vigorous, some strong canes may have grown from the cordons; create spurs from these canes as in third winter.

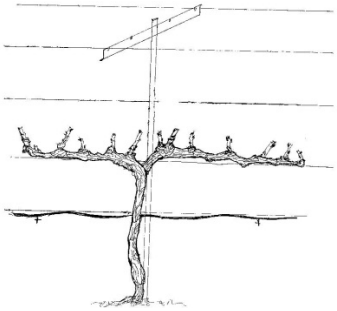


Figure 14

Second Winter After Pruning

You generally aren't pruning for fruit yet, although some clusters will form in the third summer. The main goal is to develop a strong framework.

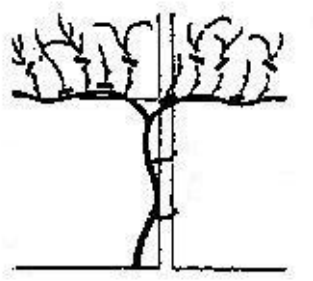


Figure 15

Third Winter

Now begin pruning for fruit production. First cut out all weak and crowded shoots. Create 2-bud spurs by selecting one-year-old upright or semi-upright canes approximately 6 inches apart. The first bud should be at least ¼" above the cordon. Remove all other canes. Each spur will provide two fruit-bearing shoots during the next growing season.

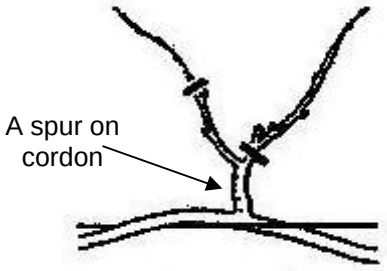


Figure 16

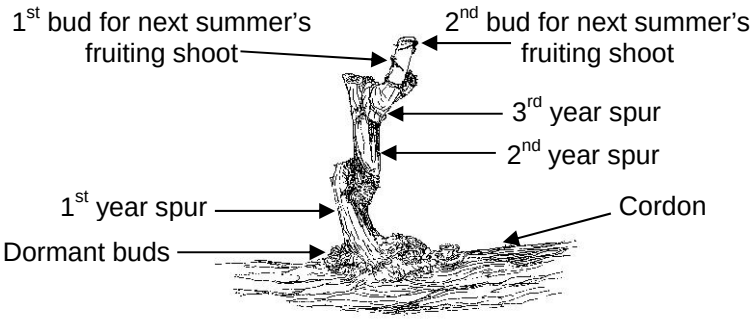


Figure 17

Fourth Winter…and After

Two canes grew from last winter's spurs and had fruit. Now select the strongest, most upright, and preferably the lowest of the two canes to be next year's spur. Remove the upper cane. Prune the selected cane to two buds, counting the first bud that is at least ¼" above the cordon or old spur.

Fourth Winter Spur

During the next winter and every winter hereafter repeat this process. Generally after the third year spur, the entire stack of spurs will become too tall, therefore, at the third year spur pruning, look for potential next year's spurs on the cordon.

ARBOR PRUNING

A cane- or spur-pruned vine on an arbor is maintained similar to a cane- or spur-pruned vine on a trellis, except the structure is different. Train the trunk to the height of the arbor, removing any side growths on the trunk. This may take 1 to 2 years. When it reaches the top, train the cordon/arm following the instructions on the prior pages for spur pruning. For cane pruning, canes and arms arise from the cordon, instead of from a head.

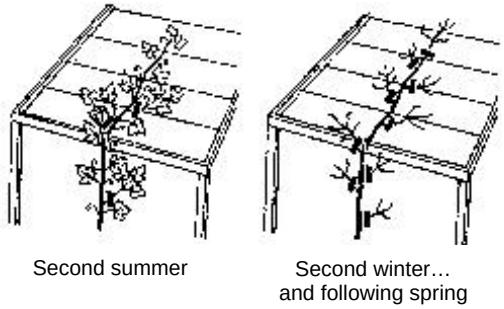


Figure 18

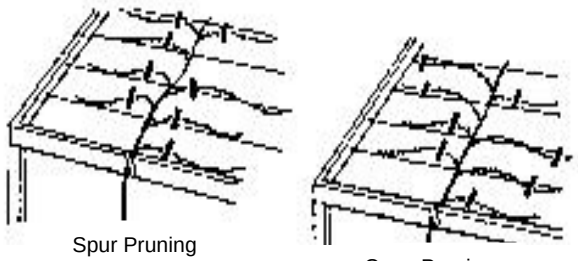


Figure 19

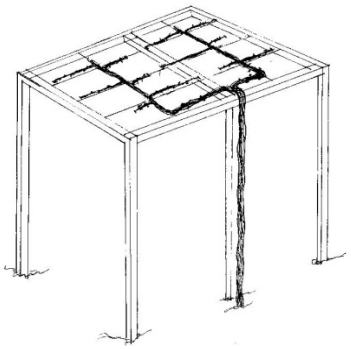


Figure 20
Multi-Cordon Method

PEST MANAGEMENT

When growing grapes, you may encounter powdery mildew, bunch rot, erineum mites, grape leaf hoppers, and/or eutypa.

POWDERY MILDEW

Powdery mildew is the most common disease of grapes. It is caused by a fungus, and it does not require wet or humid weather to spread rapidly. It grows best at temperatures between 70° and 85°F, and the spread is stopped when the high temperature exceeds 95°F for several hours. American juice varieties, such as 'Concord' and 'Niabell' are resistant.

Symptoms: On dormant canes in the winter, infections from the previous season appear as red blotchy areas. On leaves, initial symptoms appear as yellow spots on the upper leaf surface. As spores are produced, the colony has a white, powdery appearance. The disease resembles a white dusting on leaves and fruit. The disease creates a web-like russetting and causes the fruit to remain small, shrivel, crack, and not ripen. Spores are produced in chains that can be seen with a hand lens. It is often not necessary to control it the first season because there is no fruit.

Control: Plant in full sun where possible. Do not over-water or apply excessive nitrogen fertilizer. Keep grapes carefully pruned and remove non-fruitful shoots in the spring to allow exposure of fruit to sunlight and good air flow through the canopy; this will also help control bunch rot.

Research has shown that **infections can occur when temperatures reach 70°F for six or more hours, three days in a row.** In some years, these temperatures may be met just as new shoots emerge, and in some years, it may be as late as early May. Conditions remain favorable through much of the spring, and mildew growth is minimal when high temperatures exceed 95°F.

The standard method of control is to spray wettable sulfur at 7- to 10-day intervals through the spring, beginning in the spring when temperatures are favorable, and continuing until the hot weather sets in. If temperatures remain hot after late June, spraying is less necessary, but mildew can spread if cooler spells persist. Once the grapes begin to ripen, they are less susceptible to mildew. If a rain occurs, reapply the sulfur as soon as possible after the foliage dries. You may want to use wettable sulfur early in the season, and then as foliage thickens, use dusting sulfur for improved coverage. Good coverage is important, which means thoroughly covering the tops and bottoms of all leaves; however, you can choose to direct your sprays to the fruit only. Safer's "Garden Fungicide" (and similar formulations) consists of sulfur combined with surfactants similar to those in dishwashing detergent. Sulfur is used to prevent rather than eradicate infections, so regular applications are necessary for control. Other products (mixed with water) that may have potential include neem or other oils.

For additional management information, refer to Pest Note #7494 Powdery Mildew on Fruit and Berries.

BUNCH ROT

Bunch Rot occurs when rain infects the fruit with a fungus (gray mold) or bacteria (sour rot).

Symptoms: Infected berries shrivel, leak, turn brown/black, and look like the grape bunch is rotting.

Control: Excellent control has been achieved using canopy management and leaf removal. Remove the leaves around the clusters on the north or east sides when the grapes are the size of peas (usually early June). Leaf removal allows better air circulation around the clusters and, therefore, reduces disease. On cordon-trained vines, only remove leaves from the side of the vine that receives morning sun. Do not remove lateral shoots, which will help prevent sunburn. No spraying necessary if leaf removal is done.

ERINEUM MITES

Erineum Mites are microscopic pests that cause large, puckered spots on leaves.

Symptoms: The underside of the leaves are puckered, white, furry initially, and turn brown in the summer. The problem is cosmetic only and does not reduce fruit production or quality.

Control: Where early treatments of sulfur are applied to control powdery mildew, erineum mites are seldom seen. Otherwise, control with insecticidal soap early in the season.

GRAPE LEAF HOPPERS

The leafhopper is a major pest of grapes in the Central Valley and can have several generations within one growing season.

Symptoms: One of the first noticeable symptoms is that the tiny pests fly out when foliage is shaken. There are pale yellow spots or stippling on the leaves. Sometimes the entire leaf may become pale yellow or white. With high populations, there may be leaf drop.

Control: Biological control is often achieved through natural enemies such as beneficial wasps, spiders, green lacewings, minute pirate bugs, lady beetles and predaceous mites. Using oil for powdery mildew also controls leaf hoppers, but don't use oil within 30 days of a sulfur application.

EUTYPA

Eutypa is a fungus that survives in pruning cuts and diseased wood. Cold and damp conditions promote Eutypa. High moisture also spreads the infection. This happens more frequently in the early part of the dormant season when the grapevines are being pruned. The disease is primarily a problem on older vines, rarely affecting vines under 7 years old.

Symptoms: Eutypa dieback delays shoot emergence in the spring and causes shunted shoots and leaves that are chlorotic, tattered and cupped. Dark cankers develop in the vascular tissue of the wood. This can be seen when a cane is pruned, and the cross view of the cane will show a dark pie-shaped spot. This spot should not be confused with a similar pattern that may be present after severe powdery mildew outbreaks.

Control: Late winter pruning is recommended to prevent Eutypa disease.

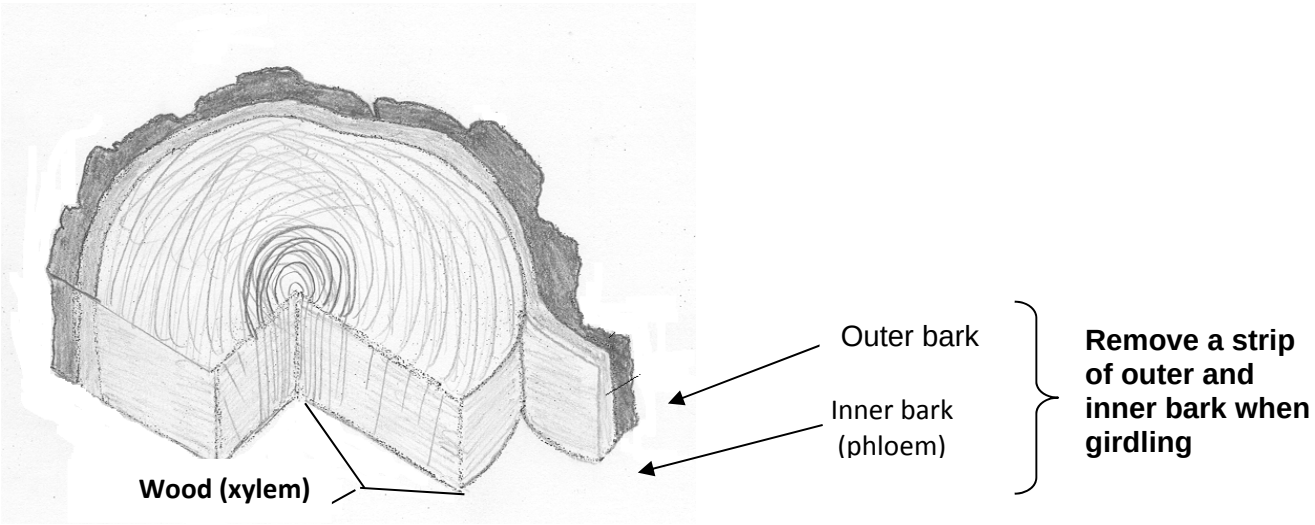
GIRDLING AND CLUSTER THINNING TO INCREASE BERRY SIZE

In commercial table grape vineyards, vines are routinely girdled each year during the fruit set period to increase berry size. Girdling can make berries about 10 to 30 percent larger if done correctly. It is particularly effective on seedless varieties, such as Thompson Seedless, Flame Seedless, Ruby Seedless, and Perlette. It has no effect on seeded varieties.

HOW TO GIRDLE VINES

Girdle in late May, at 10 to 14 days past full bloom. Girdling removes the inner and outer bark from around the trunk. The inner bark, or "phloem" is where carbohydrates (sugars and starches) produced by photosynthesizing leaves move to developing organs (including the fruit and roots). Removal of a strip of bark prevents the translocation of carbohydrates to the root system, thus making more available for fruit growth until the girdle heals in about 4 weeks.

Remove a strip of bark that is $^{3}/_{16}$ to ¼ inch wide down to the wood (see diagram). A double-bladed girdling knife makes the job easier. It is essential that all of the phloem tissue is removed, so press fairly hard. Check for completeness about 20 minutes after the girdle is made – a proper girdle will have the appearance of an all white, fibrous ring of wood (xylem). Remove any brown portions of the ring; if there is even an $^{1}/_{8}$ inch of phloem tissue left, the girdle's benefits are lost. Be sure not to cut so deep as to damage the water-conducting xylem and weaken the vine. With a proper cut, the ring should just pop out.



CLUSTER THINNING

Too many clusters of grapes will lower fruit size and possibly vine vigor. Thinning to one cluster per shoot is the simplest way to ensure that those remaining will develop into larger berries and clusters. Excess clusters should be removed prior to bloom.

Another method of increasing berry size is to cut off the bottom a quarter to a third of each cluster.

REFERENCES

- UC Master Gardeners, Sacramento County. (916) 875-6913, http://ucanr.edu/sacmg/
- Fair Oaks Horticulture Center, Workshop and Open Garden schedule: http://ucanr.edu/sacmg
- UC IPM website (Statewide UC Master Gardeners): www.ipm.ucdavis.edu
- California Garden website: cagardenweb.ucdavis.edu
- UC Publications: http://anrcatalog.ucanr.edu
  - Pest Note 7494 Powdery Mildew on Fruit and Berries
  - The Home Orchard, UC Publication 3485
  - Grape Pest Management, UC Publication 3343
  - Master Gardener Handbook, UC Publication 3382
- Sunset Western Garden Book
- USDA, Agricultural Research Service: www.ars.usda.gov

GRAPE VARIETIES IN THE FAIR OAKS HORTICULTURE CENTER VINEYARD - 2012

Variety	Seeds?	Color	Ripens	Suitability for Home Use	Spur or Cane Pruned	Berry Size	Comments
Autumn Black	No	Black	Sept-Oct	Good	Spur	Large	Mellow, thin-skinned, sweet
Beauty Seedless	No	Black	mid-July	Excellent	Spur	Medium	Spicy, sweet flavor
Black Emerald	No	Black	May-June	Excellent	Spur	Medium	Juicy, very tasty, firm, thin skin
Black Monukka	Hollow	Black	early Aug.	Excellent	Cane	Medium	Delicious, popular black grape
Black Rose	Yes	Black	Sept.	OK	Spur	Huge	Thin skin; very sweet, prone to rot
Blush Seedless	No	Red	late Aug.	Very good	Spur	Medium	Patented; limited availability of vines
Centennial Seedless	Trace	Lt. Red	late July	Excellent	Spur	Medium	Firm, tasty
Concord Seedless	No	Purple	mid Sept.	Excellent	Cane	Medium	Juicy, sweet concord flavor without the seeds
Dawn Seedless	No	White	July	Very good	Spur	Medium	Good flavor, skin crisp
Fiesta	No	White	late July	Excellent	Cane	Medium	Tasty greenish-white grape
Flame Seedless	No	Red	July	Excellent	Spur	Medium	Makes good raisins; birds love, too
Italia	Yes	White	early Aug.	Excellent	Spur	Large	Unique flavor, very good
Muscat of Alexandria	Yes	White	early Aug.	OK	Spur	Large	Great flavor, easily sunburned
Muscat, Diamond	No	Green	August	Excellent	Spur	Medium	Great flavor, most popular grape
Perlette	No	White	July	Excellent	Spur	Medium	Great flavor; may rot if not thinned
Princess	No	White	Sept-Oct	Good	Cane	Large	Nice sweet flavor
Ruby Seedless	No	Red	August	Good	Spur	Medium	Tasty late variety, good raisins
Suffolk Red	No	Red	July-Aug	Excellent	Spur	Medium	Sweet, good for desserts and jelly
Summer Royal	No	Red	August	Good	Spur	Medium	Very sweet.
Thomcord	No	Blue-Black	July-Aug	Good	Cane	Medium	Cross between Thompson Seedless and Concord
Thompson Seedless	No	White	August	Excellent	Cane	Sm-Med	Most popular table and raisin variety
Tokay	Yes	Red	Aug-Sept	Very good	Spur	Large	Prone to sunburn, unique flavor

July 2012. Written by Chuck Ingels, Pomology, Viticulture and Environmental Horticulture Advisor; UC Master Gardeners Diana Blasingame, Rose Gong, Connie McMillan. Edited by UC Master Gardeners Martha Moon, June Bleile, and Tom Kurth; Judy McClure, Master Gardener Program Coordinator; and Chuck Ingels, Pomology, Viticulture and Environmental Horticulture Advisor.

Drawings by UC Master Gardener Diana Blasingame; Sunset Western Garden Book; and Grape Pest Management, UC Publication 3343.