

BEFORE YOU GO INTO COMMERCIAL GRAPE GROWING

By: A.N. Kasimatis, Extension Viticulturalist, Davis



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BEFORE YOU GO INTO COMMERCIAL GRAPE GROWING . . .

there are several factors to consider. To grow grapes successfully, you need a favorable combination of locality, variety, cultural methods, and good utilization of the crop. Before you buy a plot or plant grapes on a plot you own already, consult your county farm advisor and talk with successful growers in the area. Get all the information you can on climate, temperature, wind, frost, rainfall, topography, soil depth, fertility, water availability, roads, distance to market, and labor sources.

It is usually safer to plant a variety that has proved successful in the area even though it tends to increase competition. Planting a new variety in an old grape-growing area or any variety in a new area is risky and should be done only on a trial basis.

TEMPERATURE

Most vinifera grapes need long, warm-to-hot, dry summers and cool winters for best development. They are not adapted to humid summers, whether temperate or tropical, because they are susceptible to certain fungus diseases that flourish under such conditions. Nor do they withstand intense winter cold (below 10° F.) without protection. Frosts that occur after vine growth starts in the spring can kill most of the fruitful shoots and disastrously reduce the crop.

The fruit needs a long growing season to mature. In winter, rain is desirable, although irrigation can make up deficiencies. Rains early in the growing season make it hard to control disease, but do not otherwise hinder vine growth. Rains or cold, cloudy weather during the blooming period, however, may cause

poor berry setting. During the ripening and harvesting periods, rains can cause serious damage by rotting the fruit. Grapes can tolerate a higher humidity in relatively cool regions than in warmer regions. If you plan to make raisins by natural sun-drying, you will have to have a month of clear, warm, rainless weather after the grapes are ripe.

American grapes—Concord and others—withstand humid summers and cold winters better than pure *vinifera* varieties. They do better in regions of moderate summer humidity than in the very dry, semiarid climate of California's interior valleys. Few grapes can endure a tropical climate of high humidity coupled with high temperatures.

Vinifera grapes need a winter rest period of 2 or 3 months, with an average daily mean temperature below 50° F. and some freezing but no temperatures below 10°. They start spring growth soon after the daily mean temperature reaches 50° F. For proper development and ripening, most varieties require daily mean temperatures of at least 65°; some need slightly higher temperatures of 70° to 85°. The effective-heat summation for a given place largely determines how much time each variety takes from blooming to ripening.

To determine which region a growing area falls into:

1. Subtract 50° F. from the monthly mean temperature.
2. Multiply this figure by the number of days in the month. The result is degree-days for that month.
3. Repeat this procedure for the months of April through October to accumulate the degree-days for the season.
4. As an example: 62.6° F. is the mean temperature at Bakersfield for April. $62.6^{\circ}\text{F.} - 50^{\circ}\text{F.} \times 30\text{ days} = 378\text{ degree-days}$ for the month of April.

The earliest varieties require about 1,600 degree-days to mature; the latest at least 3,500 degree-days. If the summation of heat is begun at full bloom, Thompson Seedless will be ripe for table

use (18° Balling¹) when the temperature summation above 50° reaches 2,000 degree-days. This variety will be fully ripe for raisins when the summation reaches 3,000. Similarly, Tokay will be ripe for table use at about 2,000, and Emperor at about 3,300 degree-days.

Temperature, especially during the ripening period, also strikingly affects the grapes' sugar and/or acid content and thus affects their value for various uses. Based on the summation of heat as degree-days above 50° F. for the arbitrary period April 1 to October 31, California grape-producing areas fall into one of five convenient temperature groups or regions. These regions, with representative locations, are as follows:

- Cool regions—less than 2,500 degree-days of heat from April 1 to October 31—Napa, Hollister, Mission San Jose, Saratoga, Bonny Doon, Guerneville, Santa Rosa, and Sonoma.
- Moderately cool regions—2,501 to 3,000 degree-days of heat from April 1 to October 31—Rutherford, St. Helena, Glen Ellen, Healdsburg, San Jose, Los Gatos, Soledad, and Santa Barbara.
- Warm regions—3,001 to 3,500 degree-days of heat from April 1 to October 31—Calistoga, Ukiah, Hopland, Cloverdale, Livermore, Paso Robles, and Alpine (in San Diego County).
- Moderately hot regions—3,501 to 4,000 degree-days of heat from April 1 to October 31—Davis, Manteca, Lodi, Modesto, Ojai, and Ontario.
- Hot regions—more than 4,000 degree-days of heat from April 1 to October 31—Merced, Madera, Fresno, Delano, Visalia, Bakersfield, Chico, Red Bluff, and Redding.

The cool and moderately cool regions produce the best table wines; the warm regions, the best natural sweet wines; and the moderately hot and hot regions, the best dessert wines, together with the commercial table and raisin grapes.

¹Degree Balling is a measure of the total soluble solids content of grapes, approximately the percentage of grape sugars in the juice.

SOILS

Although some growers prefer certain soil types, grapes grow fairly well in many different soils. Throughout the world, grapes are commercially grown in practically every type of soil from gravelly sands to clay loams, from shallow to very deep soils, and from high to low fertility.

It is better, however, to avoid very heavy clays, very shallow soils, poorly drained soils, and soils with relatively high concentrations of alkali salts, boron, or other toxic materials.

The deeper and more fertile soils usually produce the heaviest crops and are usually preferred for raisins, common wine grapes, and table grapes like Tokay and Thompson Seedless. Certain varieties, such as Malaga and Emperor, reach higher quality on soils of limited depth.

PREPARING THE LAND

Before planting, clear the land of trees, stumps, large stones, noxious weeds, and rodent pests. If you plan to irrigate, level or grade the land. Then plow 8 or 10 inches deep; subsoiling is advisable if there is a plow sole or other hard substratum that can be economically broken up. The soil surface need not be pulverized and compacted as for a seedbed, but free it from large clods that might interfere with the planting line and the actual planting.

After you have determined the row positions, it is a good idea to subsoil the row. The labor this saves in planting and staking more than repays the cost of this operation.

CHOOSE STOCK TO SUIT YOUR NEEDS

You should generally use 1-year-old rootings of the desired fruiting variety in planting a vineyard in any location except

where phylloxera or a heavy infestation of nematodes require the use of special resistant rootstocks. Nearly the whole north region and parts of the Sacramento and San Joaquin Valleys are infested with phylloxera. Within such areas, plant only grafted vines, or plant rootings of phylloxera-resistant rootstocks that will later be budded or grafted to the desired fruiting variety.

VINE SPACING

Wide vine spacing, particularly in one direction, makes for ease and economy of operation. The cultivation cost, for example, is determined more by the number and length of rows than by the vineyard's actual acreage. Harvesting labor and costs are materially reduced if the grapes can be hauled out from between the rows rather than carried out to the avenues. The brush disposal cost is nominal if the brush can be disked or shredded, but becomes a considerable item when the material must be carried or hauled away. Power dusting equipment can only be used if the rows are far enough apart so that the machine can move through the vineyard.

The initial costs—vines, planting, stakes, and training—are directly proportional to the number of vines, not to the acreage.

Spacing (feet)	Between avenues (feet)	Rows in square 10 acres	Vines per row in square 10 acres	Vines per acre
7 x 7	200	89	87	774
8 x 8	200	78	78	608
7 x 9	200	70	87	609
6 x 10	300	63	102	643
7 x 10	300	63	86	542
8 x 10	300	63	76	479
8 x 12	620	53	78	413

The table shows the number of rows and the vines per row in a square 10-acre planting with the various common spacings; the table also shows the number of vines per acre. Avenues about 20 feet wide are allowed for on each side of the 10-acre block.

Moderately close planting, on the other hand, usually produces larger crops while the vines are young. Unless the wide spacing is carried to extremes, the crop is about the same after the vines are mature

The most desirable spacing therefore, is the widest possible without reducing the crop in the mature vineyard. A closer planting is usually used for small-growing varieties, cool regions, and poor soils; wider spacing for large-growing varieties, warm regions, and fertile soils. In California 7- x 7-foot and 8- x 8-foot spacings have been customary in the cooler regions, and 10- x 10-foot or 8- x 12-foot in the hotter areas.

Square planting—the rows and the vines in the row the same distance apart—permits cross-cultivation, an advantage where small tools are used. Avenue arrangement—the rows farther apart than the vines in the row—makes it possible to use large equipment in one direction. Special tools such as French plows eliminate the need to cross the vineyard in cultivation. Economical tractor-powered cultivation, power dusting, and hauling the grapes out of the rows require 10-foot or wider row spacing. Since the advantages of the avenue arrangement seem to far outweigh the disadvantages, such a pattern is recommended for all new vineyards.

LAY OUT THE VINEYARD CAREFULLY

In large vineyards of 40 acres or more, surveying instruments are convenient for accurately dividing the area into blocks of the desired size. You can determine each row's position with the surveyor's chain or with a special "row chain" made by melting solder buttons on a No. 11 smooth galvanized wire at the distance the rows will be spaced. A soldering flux of hydrochloric acid and zinc chloride will help to make the solder stick to the wire.

Individual vines in each row are usually placed by using a planting line, made as described for the row chain, spacing the solder buttons according to the distance between vines in the row. Mark the vine positions by driving temporary planting pegs, 1 x 1 x 12 inches, or permanent stakes at each button on the planting line. Consistency in lining up vines and stakes and in planting vines is necessary to economically handle the vineyard later.

KEEP CUTTINGS MOIST WHILE PLANTING

Prune rootings or grafted vines before planting; cut back the tops to a single good spur of one or two buds. For convenience in planting, shorten the roots to 3 or 4 inches; if you are going to use hydraulic planting equipment, cut roots back to 1 inch. Remove all roots 8 inches down from the top of the pruned vine.

Keep the vines from drying out during all hauling operations—from the time they are removed from the nursery until they are planted in the vineyard. Store them heeled-in—partially or completely buried—in moist sand or soil in a cool place. While moving them from storage to the vineyard, cover the vines with moist sacks or canvas or, better still, haul them in tubs containing 2 or 3 inches of water. At the vineyard, the planters carry the vines in planting cans (often made from 5-gallon paint buckets or oil cans). Two or 3 inches of water in the planting cans keeps the roots wet.

Dig all holes for the vines on the same side of the planting pegs or stakes. When you make the holes with hydraulic pressure, force the hydraulic point into the soil beside the peg to a depth that will take the vine. When you dig the hole, do not remove the peg, but dig so that the side of the hole next to the peg slopes away. The hole should be slightly deeper than the vine is long.

Drop the vine into the hole with the top close to the peg. Partly fill the hole—one-half or two-thirds of its depth—with moist topsoil. Raise the vine to the proper height and solidly pack the soil about the roots with your feet. Fill the hole almost com-

pletely and firmly pack the soil again. Then completely fill the hole and cover the top of the vine, leaving the soil over the top well pulverized but loose. When you have finished, the top of the vine should be exactly at the side of the peg with the roots slanting away. All vines must slant in the **same direction**, so that you can place the permanent stakes close to each vine on the side the vine top slants toward, without breaking the vine.

Plant the rootings of fruiting varieties so that the two buds left after pruning are just above the general ground level. Plant bench-grafted vines with the union about 1 inch above the ground. Rootstock rootings that are to be budded or grafted in the field should have 4 or 5 inches of the main stem above ground level, so that the graft union is above the surface of the soil. You can cover all tops with a mound of loose soil to a depth of $\frac{1}{2}$ to 2 inches to prevent drying before growth starts.

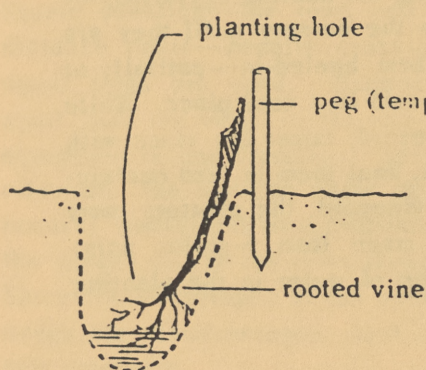


Figure 1. At planting time. Rooted vine placed in planting hole in a slanting position so that the top touches the peg.

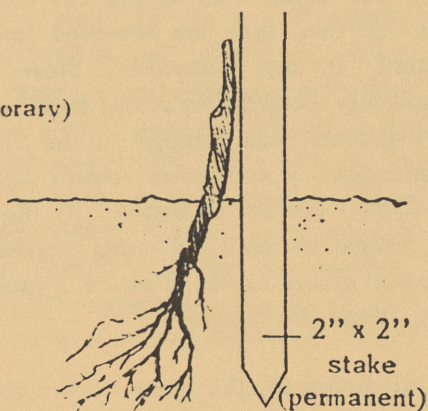


Figure 2. The following year. When the permanent stake is driven at the peg site the following winter, there is no danger of breaking the vine.

PROVIDE SUPPORT FOR YOUNG VINES

All vines need some support, either temporary or permanent. For head-pruned vines, stakes 4 to 6 feet long are sufficient. In 6 to 10 years these can be removed, since the vines should then be self-supporting. For simple two-wire trellises, a 6-foot stake at

each vine is sufficient with two No. 11 or No. 12 smooth galvanized fencing wires stretched along the row at 34 to 46 inches from the ground. It is best to put the stakes in place before you plant the vineyard although for economy the wire can be left off until the winter immediately after planting; but don't delay it longer.

In the past, most grape stakes used in California were split from coast redwood. The best stakes lasted 20 years or more in the vineyard, but those made from young trees or sapwood often rot and break off in as short a time as 3 years.

Since the stakes are costly and replacements often involve considerable labor, it is advisable to treat the stakes with a suitable wood preservative. Soak the stakes for 2 to 3 days in undiluted, wood-preservative creosote, or in a 5-percent solution of pentachlorophenol in diesel oil. Either of these treatments is effective. You only need to treat the portion of the stake that goes into the ground.

More recently, stakes of Douglas-fir or several species of Malaysian hardwood have come into use. These are usually sold already treated with preservative under pressure.

Stakes treated with preservatives should not be placed next to the vines.

For large-growing table-grape varieties, a wide-top trellis is often constructed by tying a crossarm (2" x 2" x 3') to the top of each stake or every other stake and bracing the lower end to hold the crossarm at about a 30° angle from the horizontal. The crossarm's lower end is about 15 inches long; the upper end, about 21 inches. One wire is usually fastened to the stakes just below the crossarms, and three wires are used on the crossarms. This type of trellis has certain advantages: more fruiting wood can be retained at pruning; since the clusters are better distributed, they are more uniformly exposed to light and air; and it facilitates thinning, girdling (on Thompson Seedless), and harvesting.