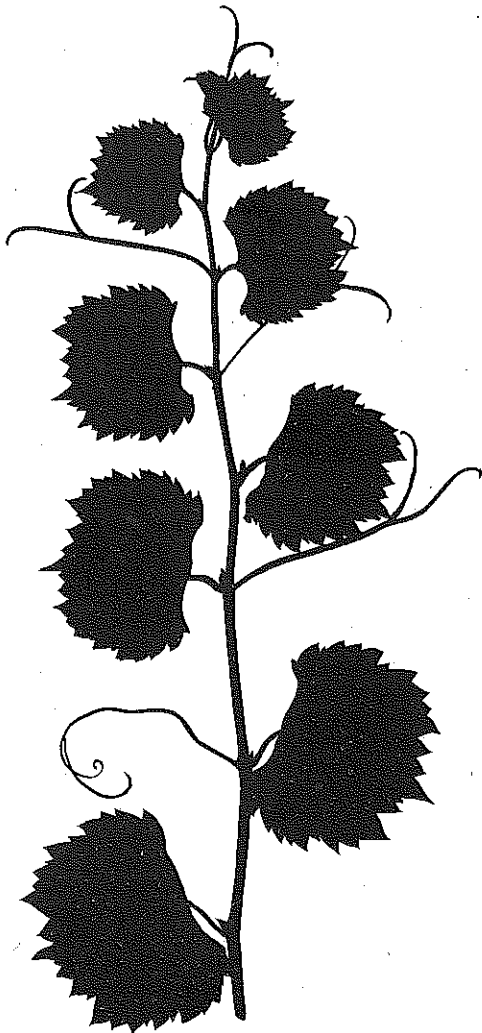


# GRAPE ROOTSTOCK VARIETIES



During the past 80 years, many varieties of grape rootstocks have been grown and tested in California. Only a few of these have been commercially accepted or are still of interest to experimenters.

There is an increasing need for rootstocks as more of the old vineyard sites are replanted. The grower should be able to identify rootstocks and recognize the relative merits of the different varieties.

Rootstock varieties are carefully selected and tested, as are the fruiting varieties. Since the rootstock varieties are named, have their own individual characteristics, and are propagated by cuttings, the term "wild vines" does not apply.

Grape rootstock varieties are primarily identified by their foliage characteristics. You should inspect and label vines during the growing season even though cuttings are not made until the vines are completely dormant. For this reason we make only occasional descriptive notes on dormant vines.

We have included two species of grapes native to California—*Vitis californica* and *V. girdiana*—even though many tests have demonstrated that they are not useful to viticulture.

The information on viticultural uses is somewhat limited, since recommendations for the use of a rootstock would usually not be made until the vineyard site was thoroughly examined. For more specific information, consult your farm advisor or refer to *Nematode-Resistant Rootstocks for California Vineyards*. This publication is available at your local Cooperative Extension Farm and Home Advisors' office.

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The authors are A. N. Kasimatis, Extension Viticulturist, and Lloyd Lider, Professor of Viticulture, Davis.

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Formerly AXT-47

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**GRAPE ROOTSTOCK VARIETIES****ST. GEORGE**

**ORIGIN**—A variety of *Vitis rupestris*, a phylloxera-resistant species native to the eastern United States

**SYNONYM**—Rupestris du Lot, Rupestris St. George

**IDENTIFYING CHARACTERISTICS**

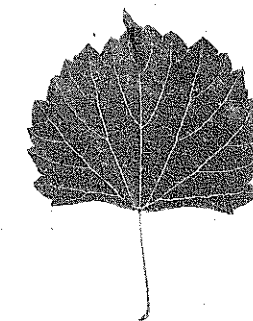
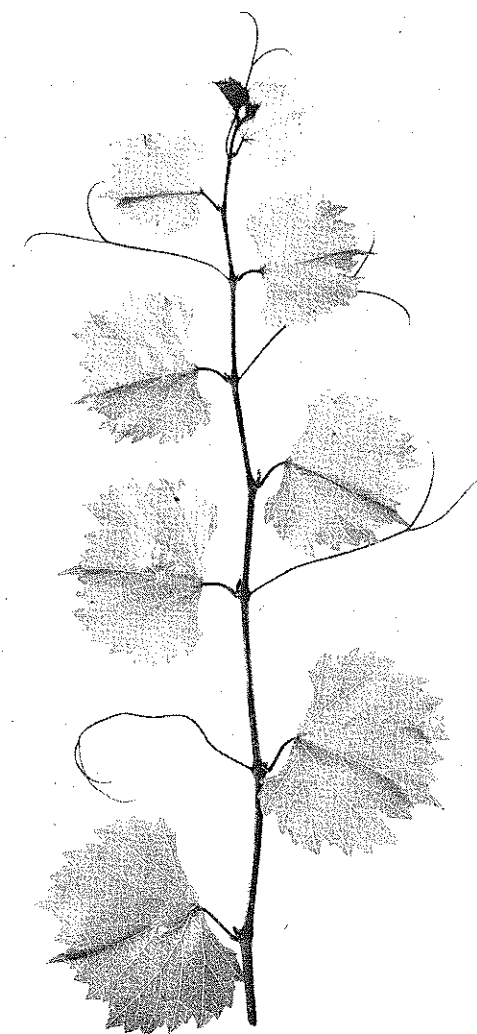
**Leaves:** Small, entire, round, with very distinct, open or flat petiolar sinus; distinct and quite uniform serrations around leaf edge; light glossy-green in color; smooth, with a somewhat leathery texture; completely lacking in tomentum

**Shoots:** Small to medium length with short internodes; upright in growth, giving the vine a compact, bushy appearance; profuse development of lateral shoots; tendrils forked, medium sized, and light-green; dormant canes are limited in length and often markedly tapered; bark smooth, thin, and deep-tan to reddish-brown

**Vine:** Vigorous, upright, with compact, bushy appearance; bears small clusters of male or pollen-producing flowers only

**VITICULTURAL CHARACTERISTICS**

This stock produces quite vigorous grafted vines. It is drought-tolerant, highly resistant to phylloxera, and is especially recommended for the drier hillside locations of the non-irrigated coastal valleys. It is not resistant to nematodes or to oak root fungus. The stock readily roots its cuttings, and is easily budded or grafted. Carefully disbud the cuttings before planting, since the stock suckers profusely. With lighter bearing wine grape varieties, its high vigor has resulted in reduced yields.



**ST. GEORGE**—a vigorous, phylloxera-resistant stock.  
(2/5 natural size)

## A x R #1

**ORIGIN**—A variety arising as a hybrid between the species *Vitis vinifera* var. *Aramon* and the phylloxera-resistant species *Vitis rupestris*, var. *Ganzin*

**SYNONYM**—Ganzin No. 1; Aramon x Rupes-  
tris Ganzin, No. 1; A x R G, No. 1; A x R

### IDENTIFYING CHARACTERISTICS

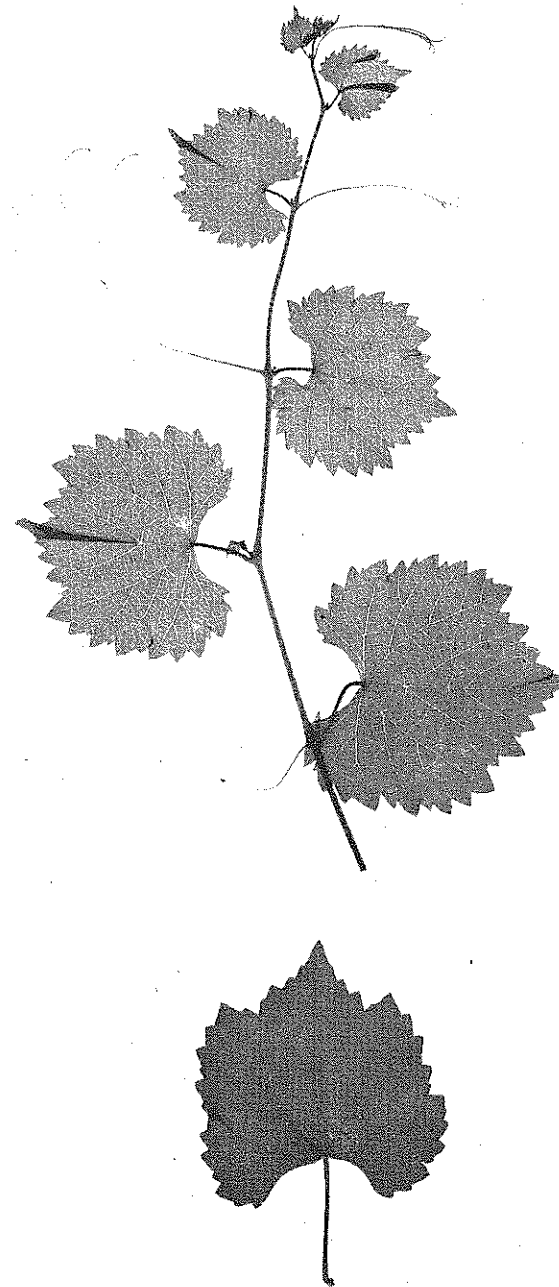
**Leaves:** Medium to small, entire, round to a short heart shape, with distinct, curved, open V-shaped petiolar sinus; small, uniform serrations, somewhat enlarged at apex; light, glossy-green; smooth with a somewhat thin, leathery texture; completely lacking in tomentum on both surfaces

**Shoots:** Vigorous, semi-upright to trailing; internodes medium to long; dormant canes fairly large in diameter; bark tan to light-brown; some lengthwise cracking at the bases of large canes

**Vine:** Vigorous, semi-upright, spreading, fairly heavy shoot growth; bears male (pollen-producing) flowers profusely in small to medium size clusters

### VITICULTURAL CHARACTERISTICS

This rootstock produces vigorous grafted vines that bear good yields of high-quality fruit. It is phylloxera-resistant but susceptible to nematodes. It has performed well under irrigation and in the deeper, heavier soils of the floors of the coastal valleys, and, especially, with the lighter bearing varieties. It is also recommended for use with raisin and table varieties in the heavier, phylloxerated soils of the San Joaquin Valley. This stock roots its cuttings quite readily, and buds and grafts easily.



A x R #1—a vigorous, phylloxera-resistant stock.  
(2/5 natural size)

## 1202

**ORIGIN**—A variety arising as a hybrid between the fruiting type Mataro (Mourvédre) and *Vitis rupestris*

**SYNONYM**—Couderc 1202; Mourvédre x Rupes-  
tris No. 1202

### IDENTIFYING CHARACTERISTICS

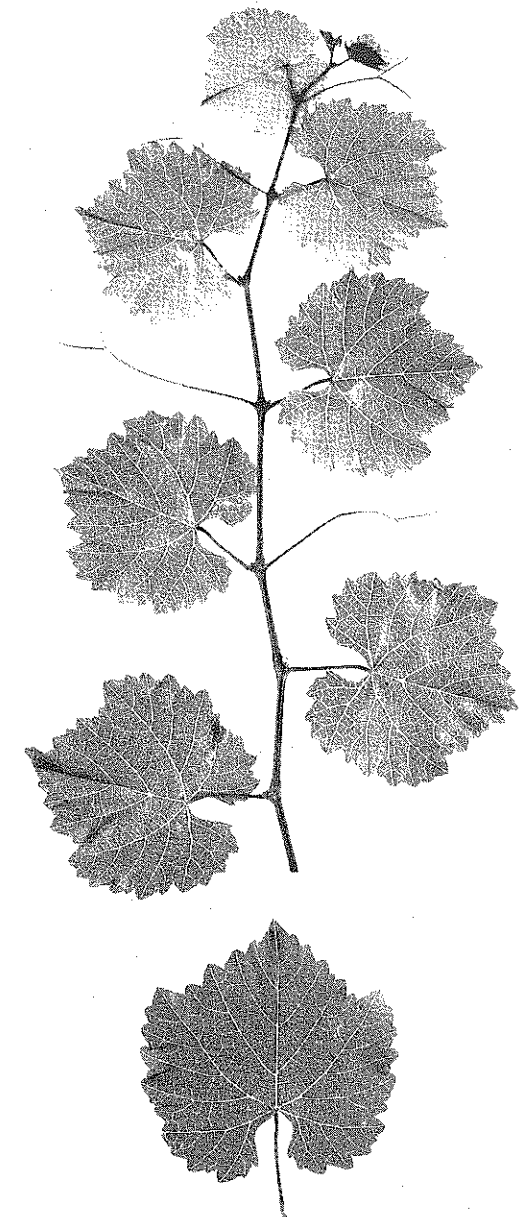
**Leaves:** Small to medium-small, entire, round to heart shape, with deep, narrow U-shaped petiolar sinus, with a tendency to close; small, uniform serrations around leaf edge; medium to dark glossy-green; smooth, with a thin, leathery texture; lacking in tomentum; slight tendency toward three-lobing

**Shoots:** Vigorous, upright to semi-upright; internodes fairly short on well-developed, long shoots; dormant canes deep-tan to brown

**Vine:** Fairly vigorous, semi-upright, with somewhat dense appearance; vine bears perfect flowers that develop into small- to medium-size, loose clusters of small, black berries

### VITICULTURAL CHARACTERISTICS

This stock, although resistant to phylloxera, is susceptible to nematodes. Although it is rarely used in California, it produces excellent vines with table varieties in the heavier soils of the San Joaquin Valley. Like A x R #1, it has produced vigorous, productive scions on the fertile soils of the coastal valleys. Cuttings root readily, and it buds and grafts with ease.



1202—a vigorous, phylloxera-resistant variety.  
(2/5 natural size)

## 99-R

**ORIGIN**—A variety arising as a hybrid between the species *Vitis berlandieri* and *V. rupestris*

**SYNONYM**—Richter 99; Berlandieri x Rupes-  
tris, No. 99

### IDENTIFYING CHARACTERISTICS

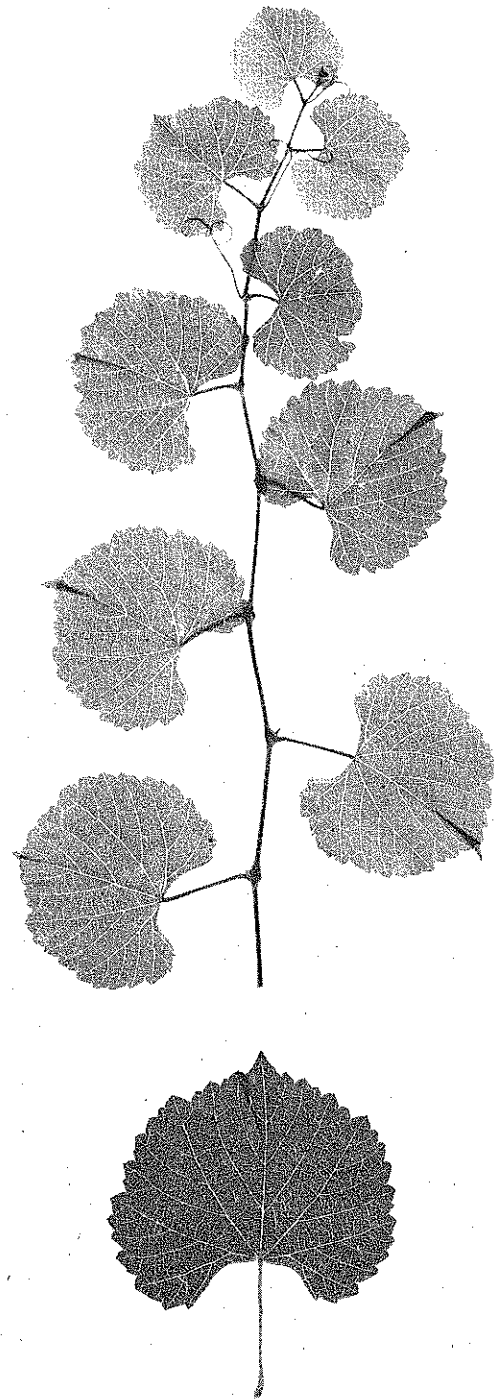
**Leaves:** Small, round, entire, with very distinct shallow, open U-shaped petiolar sinus; serrations small, sharp, quite uniform; upper surfaces have deep bluish-green color, contrasting with light-green veins; lower surfaces have metallic brownish-green cast; texture is tough or leathery, but smooth; completely lacking in tomentum

**Shoots:** Average vigor, semi-upright, with medium-length internodes; small tendrils and petioles; some sparse tomentum confined to shoot tips; dormant canes reddish-brown and well-matured

**Vine:** Moderate vigor; compact with overall dark-green appearance; bears male (pollen-producing) flowers in small clusters

### VITICULTURAL CHARACTERISTICS

This low-vigor stock is quite drought-tolerant, resistant to phylloxera, but susceptible to nematodes. In experimental plantings, it has produced moderately small vines that bear excellent crops. It can be planted in hillside plantings that show drought conditions or in more fertile, but shallow, valley-floor locations. Because of its low vigor, it is generally not recommended for commercial use. Its excellent tolerance to high-limestone soil conditions is of little or no benefit in California vineyards. This stock readily roots its cuttings, and is easy to bud and graft.



99-R—a drought-tolerant, phylloxera-resistant stock.  
(2/5 natural size)

## 3306

**ORIGIN**—A variety arising as a hybrid between the species *Vitis riparia* and *V. rupestris*

**SYNONYM**—Couderc 3306; Riparia x Rupes-  
tris, No. 3306

### IDENTIFYING CHARACTERISTICS

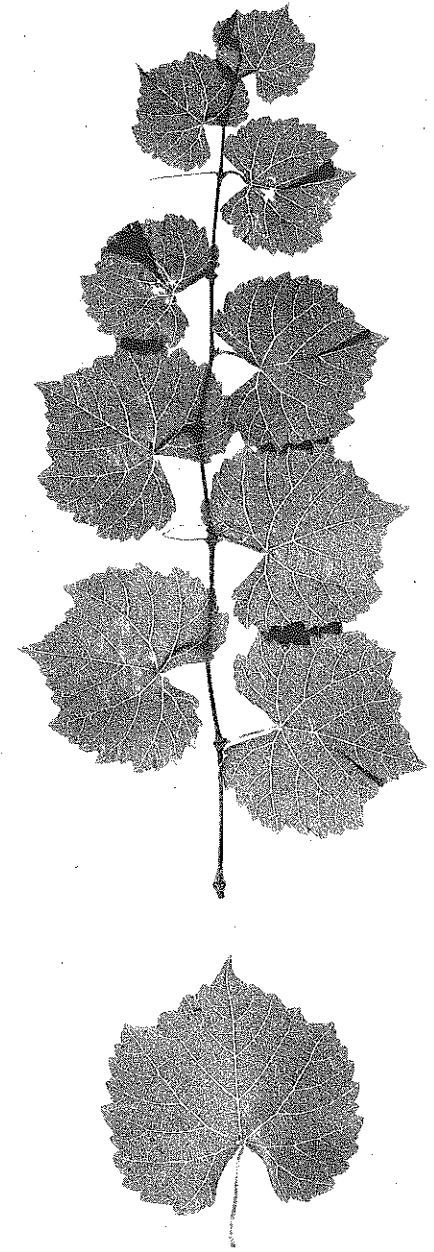
**Leaves:** Small, entire, round to a blunt heart shape, with a tendency toward three-lobing; serrations distinct, somewhat irregular, enlarged at apex; medium-green; smooth texture; dense, short, upright hairs uniformly covering the petioles and veins on lower surfaces; only light tomentum on blades and veins on upper sides; petiolar sinus deep, open V-shape

**Shoots:** Small in diameter; internodes medium in length; covered uniformly with dense, short, upright hairs that persist on dormant wood; tendrils small, inconspicuous, also covered with short hairs; dormant canes tan with gray cast

**Vine:** Vigorous, open, semi-upright to trailing; bears male flowers on small, inconspicuous clusters

### VITICULTURAL CHARACTERISTICS

This phylloxera-resistant rootstock, widely tested throughout the world, produces moderately vigorous, grafted vines that bear good crops. In experimental trials in California, it has usually been surpassed by one or more other stocks, and for this reason, is not recommended for California vineyards.



3306—a phylloxera-resistant stock.  
(2/5 natural size)

3309

**ORIGIN**—A variety arising as a hybrid between the species *Vitis riparia* and *V. rupestris*

**SYNONYM**—Couderc 3309; Riparia x Rupes-  
tris, No. 3309

**IDENTIFYING CHARACTERISTICS**

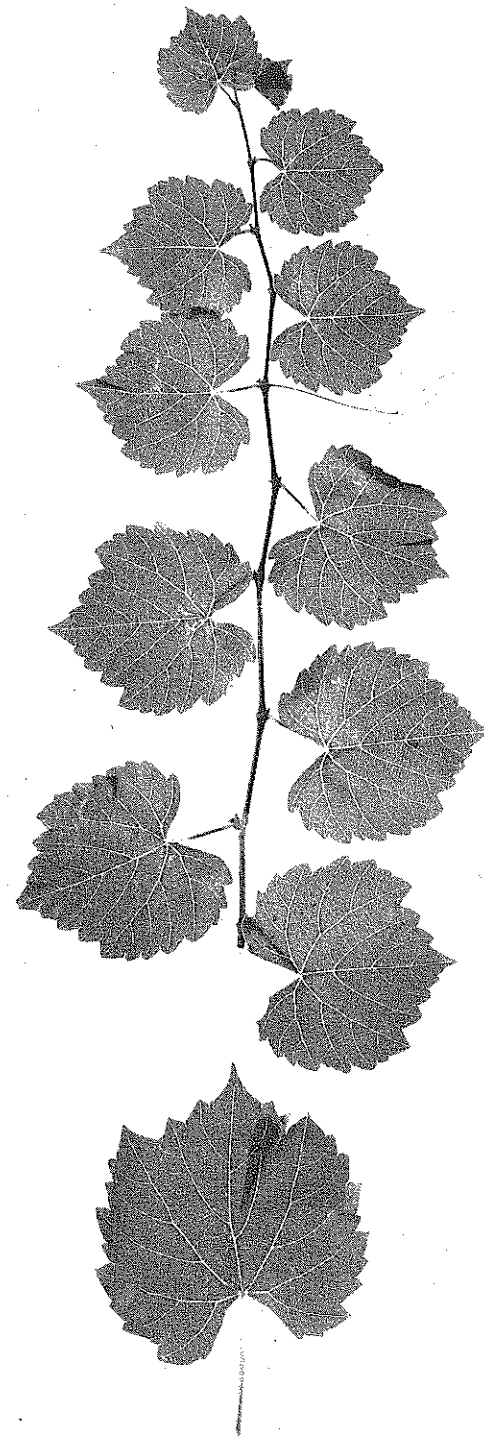
**Leaves:** Small, entire, round to a blunt heart shape, with a tendency toward three-lobing; serrations distinct, irregular, and somewhat larger than 3306; apex prominent; medium-green; smooth textured; in contrast to 3306, the upper surfaces are glabrous; lower surfaces glabrous except for discrete tufts of relatively long hairs at the junctions of large veins; petioles glabrous; petiolar sinus deep, open V-shape

**Shoots:** Small diameter; internodes short to medium in length, lacking hair; tendrils small; dormant canes tan to light-brown

**Vine:** Moderately vigorous, open, semi-upright growth habit; bears male flowers in small, inconspicuous clusters

**VITICULTURAL CHARACTERISTICS**

Since 3309 is used extensively in other countries, this phylloxera-resistant stock has been widely tested in California. It produces only moderately vigorous vines that bear well, but it is not recommended for commercial use since its performance is generally surpassed by other stocks.



3309—a phylloxera-resistant stock.  
(2/5 natural size)

**RIPARIA GLOIRE**

**ORIGIN**—A seedling selection from *Vitis riparia*, a phylloxera-resistant species native to the eastern United States

**SYNONYM**—Gloire de Montpellier; Gloire

**IDENTIFYING CHARACTERISTICS**

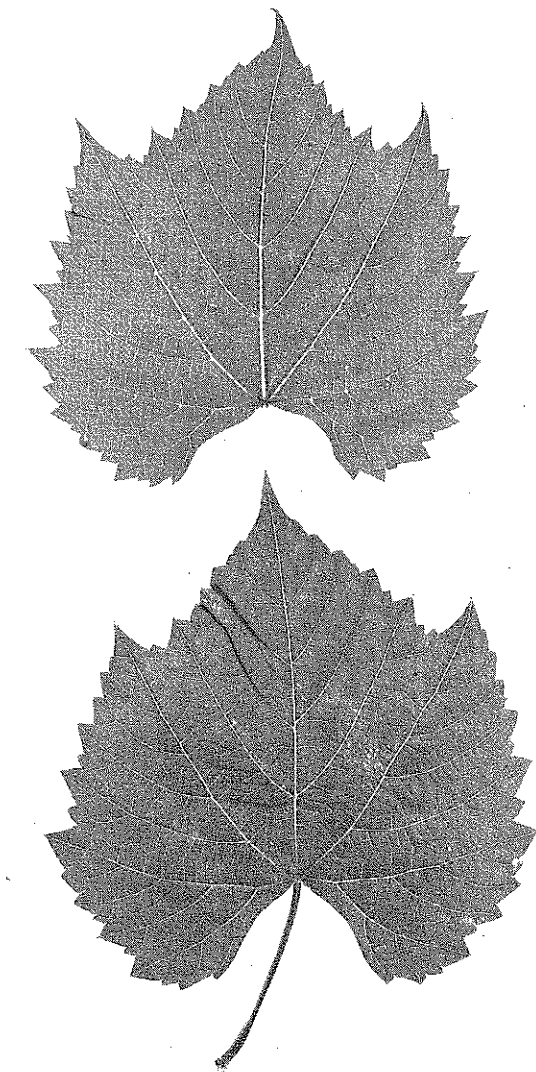
**Leaves:** Large, entire, heart shape, with a tendency to form three lobes; serrations sharp, alternating in size, and distinctly enlarged at the apices of the lobe; medium-green, but slightly darker on upper surfaces; tomentum light above and below, generally confined to the veins, and tufted at the interstices; petiole large, with uniform short hairs; petiolar sinus open, broad V-shape

**Shoots:** Vigorous, with very long internodes; diameter medium to large; dormant canes smooth, tan; tendrils large, forked

**Vine:** Vigorous, open, spreading, prostrate to semi-upright growth; bears small clusters of male (pollen-producing) flowers

**VITICULTURAL CHARACTERISTICS**

This old phylloxera-resistant stock has been widely tested and, in the past, widely planted in California vineyards. It is not drought-tolerant, and appears suited only to moist, fertile soils. It has done poorly in nonirrigated plantings, and is not recommended for use in commercial vineyards.



**RIPARIA GLOIRE**—a phylloxera-resistant variety.  
(2/5 natural size)

5A

**ORIGIN**—A hybrid of *Vitis berlandieri* and *V. riparia* produced in Hungary by Teleki

**SYNONYM**—Teleki 5A; Berlandieri x Riparia 5A

#### IDENTIFYING CHARACTERISTICS

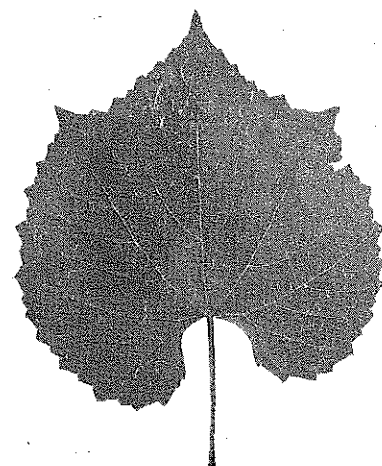
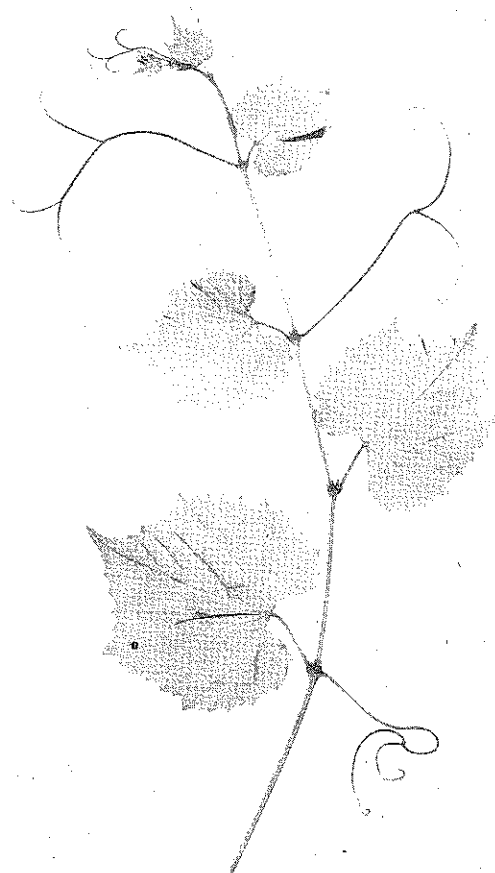
**Leaves:** Large, entire, heart shape, with a slight tendency toward three-lobing; serrations uniform, shallow; medium-green, but darker on upper surfaces; mature leaves medium dark-green, with glabrous upper surfaces; lower surfaces have short, upright tomentum, usually found only along the veins and petiole; petiolar sinus moderately open U-shape; petioles have a reddish tinge

**Shoots:** Vigorous, with long internodes; medium diameter; young shoots tufted with tomentum; mature canes reddish-brown; heavy, persistent tendrils

**Vine:** Vigorous, prostrate to semi-upright; growth tends to be open; produces female flowers that may develop into small, loose clusters with round, black berries

#### VITICULTURAL CHARACTERISTICS

5A has a high degree of phylloxera resistance and a high tolerance to lime soils. The latter quality, useful in parts of Europe, is of little importance in California. While not extensively tested in the phylloxerated areas of California, its performance has been erratic in field trials, although on occasion, it has produced excellent crops of fruit. In vineyard trials in the nonirrigated coastal valleys, it was surpassed both in vigor and yield by one or more of the phylloxera-resistant stocks with which it was compared. However, in trials in phylloxerated sites in the interior valleys, it has produced vigorous, heavy-bearing scions. It is not recommended for California use.



5A—a phylloxera-resistant stock.  
(1/3 natural size)

SO4

**ORIGIN**—A variety selected in Germany from the *Vitis berlandieri* x *V. riparia* hybrids of Teleki

**SYNONYM**—Selection Oppenheim No. 4

#### IDENTIFYING CHARACTERISTICS

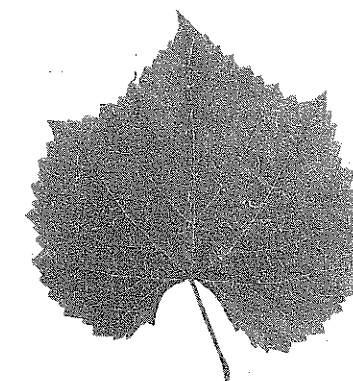
**Leaves:** Large, entire, heart shape, with a mild tendency toward three-lobing; serrations sharp, relatively uniform in size and shape, enlarged at the tips of the lobes; medium-green; older leaves appear slightly roughened; short, uniform tomentum on lower surfaces, with a tendency to tuft, especially along the veins; upper surfaces and petioles have sparse, light tomentum, with tufting tendency; slightly curved, V-shaped petiolar sinus

**Shoots:** Vigorous, with long internodes; shoot tips lighter green with light tomentum; mature canes medium-brown, somewhat slender, lightly tufted; tendrils large and persistent

**Vine:** Vigorous, spreading, prostrate to semi-upright; growth heavy; bears small clusters of staminate (male flowers)

#### VITICULTURAL CHARACTERISTICS

Although this stock is commercially used in German vineyards, it has not had sufficient testing in California to draw conclusions about its adaptability. It seems to have little drought tolerance on non-irrigated coastal soils. Because it is a vigorous stock with good phylloxera resistance, it is recommended that more field testing be done on the heavier soils of the irrigated interior valleys.



SO4—a phylloxera-resistant stock.  
(1/3 natural size)

## 1613

**ORIGIN**—A variety arising as a hybrid between the species *Vitis solonis* and the fruiting variety Othello

**SYNONYM**—Couderc 1613; *Solonis* x Othello 1613; *Solonis*-Othello

### IDENTIFYING CHARACTERISTICS

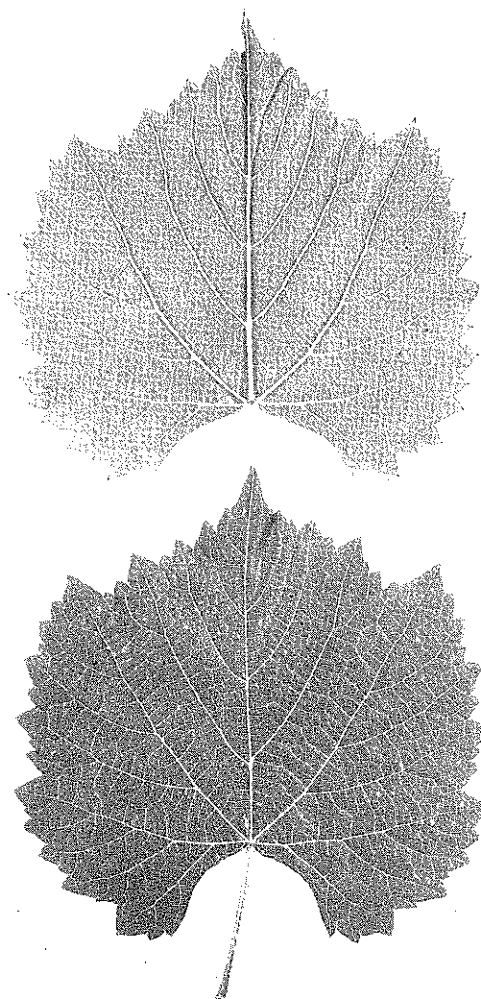
**Leaves:** Large, entire, with a slight tendency to form lobes; broad, with nearly straight sides; serrations distinct and fairly uniform, but enlarged at tips of lobes; dull gray-green above, grayish with heavy tomentum below; petioles and upper surfaces tufted with tomentum; petiolar sinus open with broad U-shape

**Shoots:** Vigorous, with long internodes; gray-green, with tomentum covering all young growth; mature growth and dormant canes brown and tufted with tomentum

**Vine:** Spreading, prostrate, vigorous growth; produces female flowers that develop into small, compact clusters of small, black berries

### VITICULTURAL CHARACTERISTICS

This stock, which imparts moderate vigor to its scions, is resistant to the more prevalent strains of root-knot nematodes and is moderately resistant to phylloxera. It has been used with wine, raisin, and table varieties in all but the lightest soils in the San Joaquin Valley and southern California. Cuttings of this stock readily root in the nursery, and it buds and grafts easily. Even though it does not sucker excessively, disbudding is recommended before planting.



1613—a moderately vigorous, nematode-resistant stock.  
(2/5 natural size)

## DOGRIDGE

**ORIGIN**—A variety of *Vitis champini*, a nematode-resistant species native to north-central Texas

**SYNONYM**—Dogridge, sometimes spelled Dog Ridge

### IDENTIFYING CHARACTERISTICS

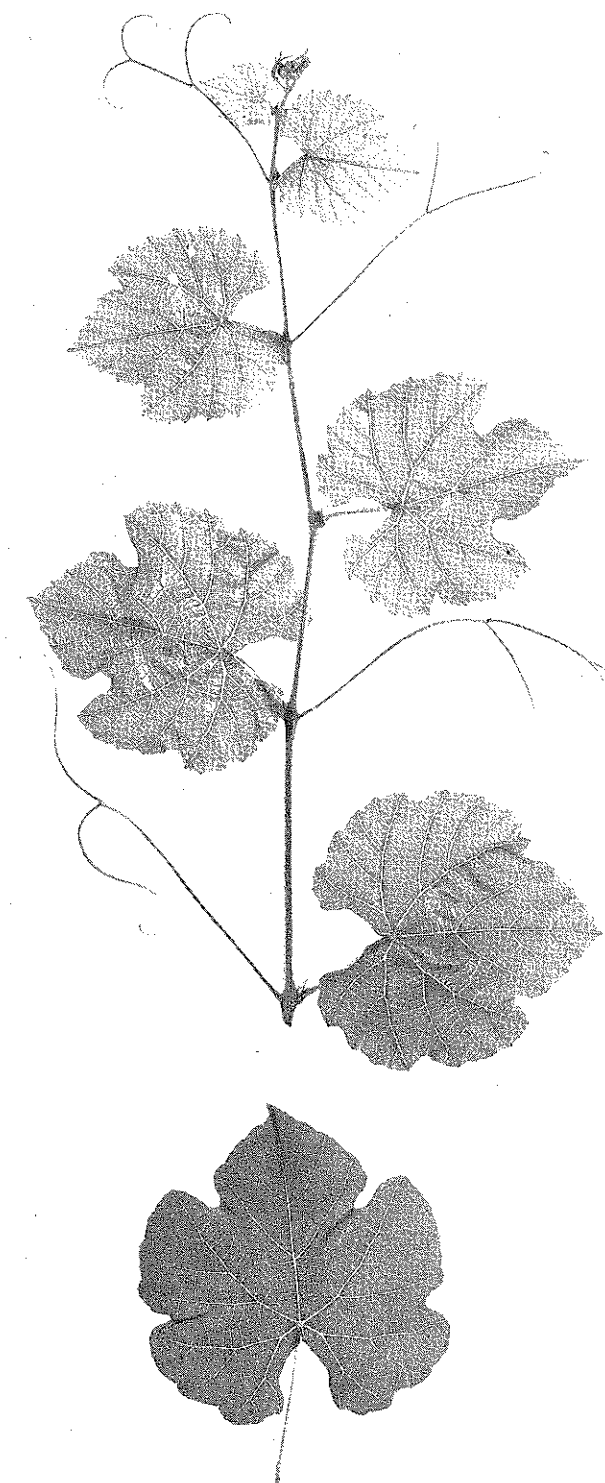
**Leaves:** Medium; moderately to distinctly three- to five-lobed; upper surfaces lightly tufted with long hairs; lower surfaces moderately heavy with tomentum, particularly with heavy tufts along veins and petioles; serrations very shallow, even, and quite rounded; medium-green; petiolar sinus deep, open V-shape

**Shoots:** Vigorous, with long internodes; shoot tips white to gray with heavy tomentum; older shoots gray-green; tendrils long, forked, pronounced, with purple-red tinge

**Vine:** Very vigorous, spreading, prostrate habit; vine produces female flowers that develop small, compact clusters of medium-size black berries; dormant canes medium in diameter, with few laterals; brown but appears gray, with tufted tomentum

### VITICULTURAL CHARACTERISTICS

This stock imparts great vigor to its scions. It is resistant to nematodes and moderately resistant to phylloxera. Because of its high vigor, scions frequently show symptoms of zinc deficiency. Dogridge is only recommended for use in the lighter, less fertile sandy soils of the irrigated interior valleys. This stock has given best results with heavy-bearing wine and raisin varieties and where cultural practices were adapted to use the vigorous growth. Cuttings of this stock root with difficulty. However, the rootings bud and graft readily. Suckering may be a problem; disbudding the cuttings is recommended.



DOGRIDGE—a very vigorous, nematode-resistant stock.  
(2/5 natural size)

## SALT CREEK (RAMSEY)

**ORIGIN**—This variety appears to have originated as a *Vitis champini* type and is closely related to Dogridge. It should not be confused with the true variety, 'Salt Creek,' which was selected from *Vitis doaniana*

**SYNONYM**—Ramsey, *Vitis champini* 'Salt Creek'

### IDENTIFYING CHARACTERISTICS

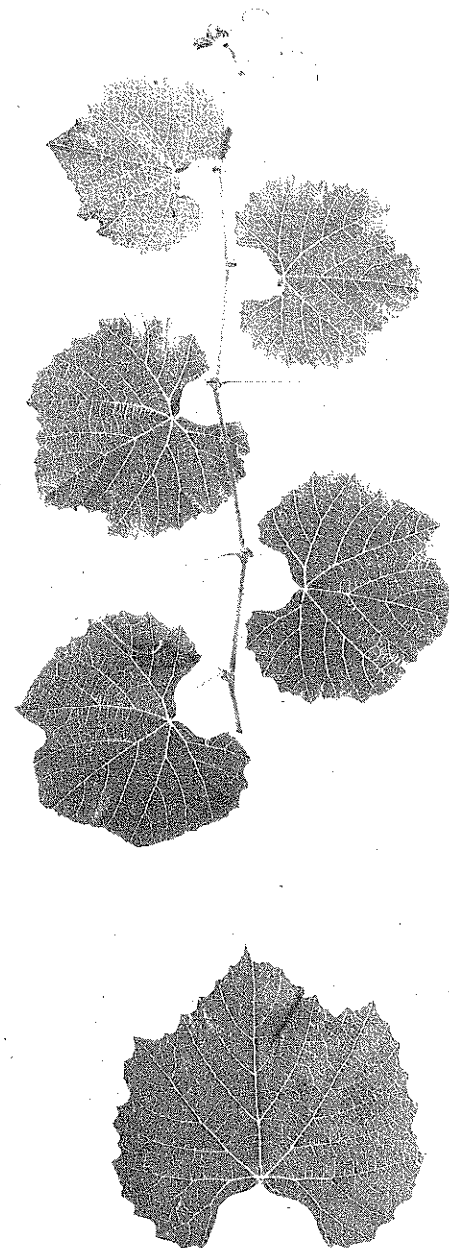
**Leaves:** Medium to medium-small, slightly three-lobed, roundish; serrations uniform, distinct, shallow, sharp or acute; upper surfaces lightly tufted with tomentum; lower surfaces and petioles moderately tufted; medium-green with bright glossy cast; petiolar sinus deep, with open U-shape

**Shoots:** Moderately vigorous, upright growth; medium-size internodes; shoot tips moderately tomentose; yellow-green; tendrils small to medium, forked, yellow-green; mature dormant canes usually medium to small in diameter, with many brown laterals, and with sparse tomentum confined to nodes

**Vine:** Moderately vigorous, dense, upright habit; produces female flowers that develop small, compact clusters of medium-small black berries

### VITICULTURAL CHARACTERISTICS

This stock imparts great vigor to its scions; it is quite resistant to nematodes and moderately resistant to phylloxera. It has performed well with wine and raisin varieties in light sandy soils of low fertility. Because it is not quite as vigorous as Dogridge, it has a greater range of use. This stock roots its cuttings with difficulty, but buds and grafts readily. Suckering is less of a problem than with Dogridge, however, disbudding is recommended.



**SALT CREEK (Ramsey)**—a vigorous, nematode-resistant stock.  
(2/5 natural size)

## HARMONY

**ORIGIN**—A cross between a selected seedling of 1613 (#39) and a selected seedling of Dogridge (#5) made in 1955 at the U.S. Horticultural Field Station, Fresno, California

**SYNONYM**—US 16-154

**IDENTIFYING CHARACTERISTICS** (Described by John H. Weinberger, Horticulturist, USDA-ARS, Fresno)

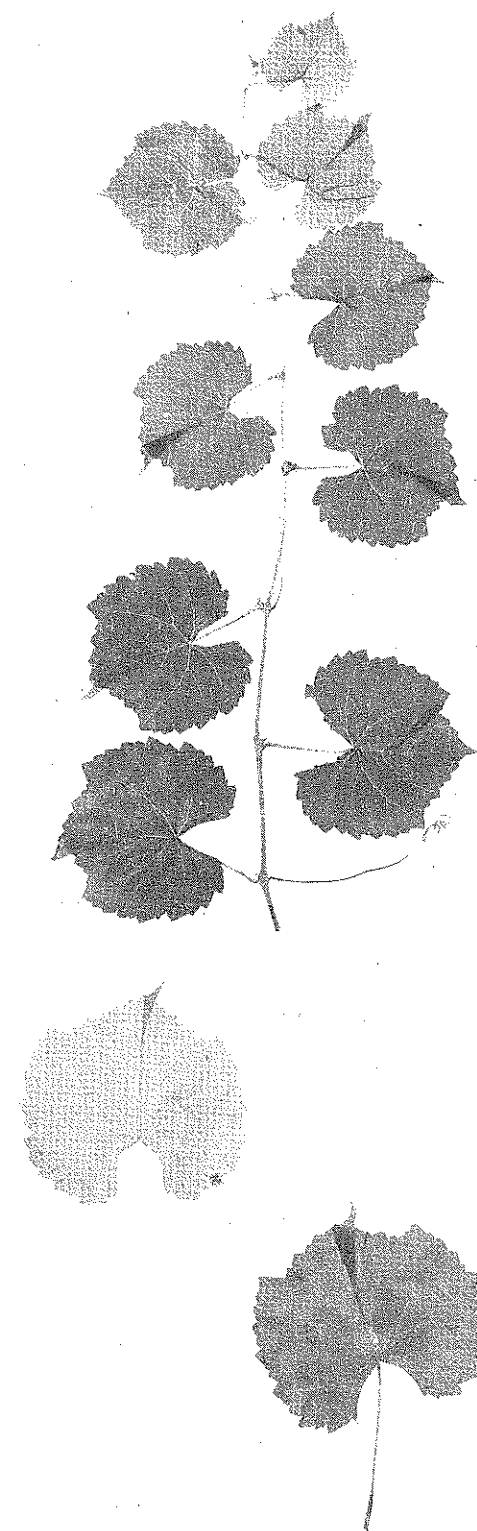
**Leaves:** Medium to medium-small, slightly three-lobed, roundish in shape; serrations shallow, distinct, sharp, not regular; petiolar sinus deep, open, slightly U-shaped; upper surfaces and petioles lightly tufted with gray tomentum; lower surfaces very lightly tufted; medium-green with bright cast; petiole long, one-half to two-thirds length of blade

**Shoots:** Moderately vigorous, medium-size internodes; medium to small diameter; shoot tips lightly tomentose; tendrils small, forked; mature growth reddish-brown in color, with very little tomentum and a light-bluish bloom

**Vine:** Moderately vigorous, semi-upright, dense growth; produces female flowers that develop small, compact clusters of small black berries

### VITICULTURAL CHARACTERISTICS

Vines grafted on Harmony have been consistently more vigorous than vines on 1613, but not as vigorous as those on Dogridge and 'Salt Creek' rootstocks. Harmony has shown greater resistance to root-knot nematode and phylloxera than 1613, but is not immune to either. Cuttings of this stock readily root in the nursery and vineyard. It buds and grafts easily. In the San Joaquin Valley, Harmony seems suited to all but the very lightest soils, and is particularly adapted to the Thompson Seedless variety for raisin and wine production. Early tests indicate that Harmony is probably satisfactory for table grapes.



**HARMONY**—a moderately vigorous, nematode- and phylloxera-resistant variety.  
(1/3 natural size)



## VITIS CALIFORNICA

**ORIGIN**—A species native to northern California, ordinarily found along stream banks at lower elevations

**SYNONYM**—California wild grape, Pacific grape

### IDENTIFYING CHARACTERISTICS

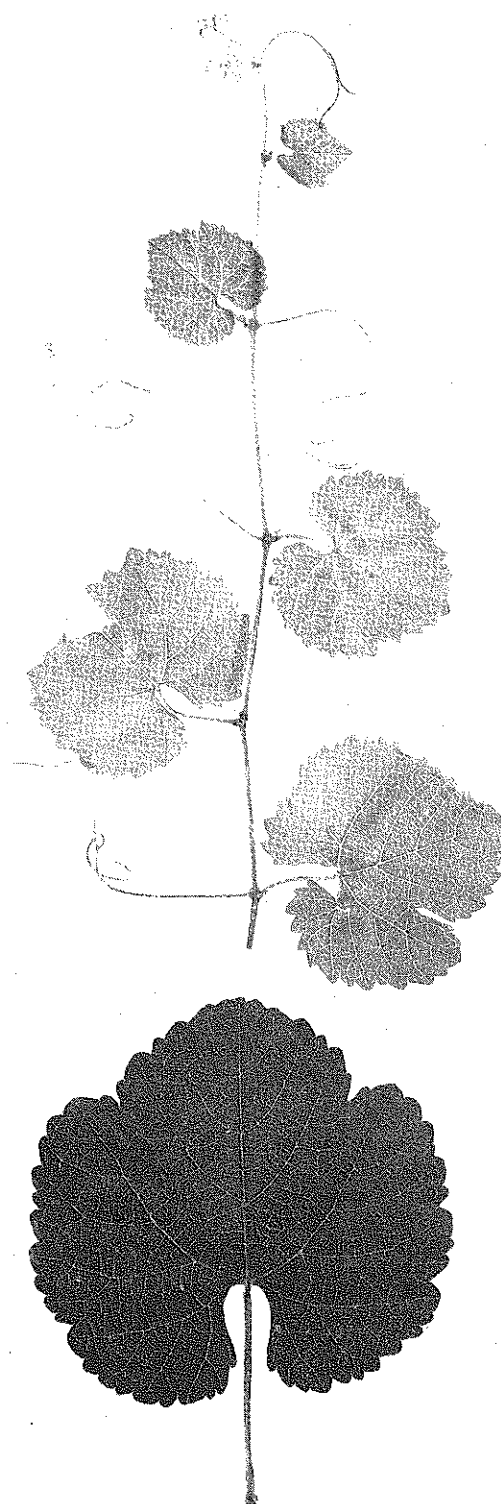
**Leaves:** Medium to large, round, entire, with a slight tendency toward three-lobing; serrations somewhat irregular, rounded; upper surfaces dark-green with gray-green cast; lower surfaces gray-green with profuse tomentum; mature leaves heavily tufted with tomentum on upper surfaces, and densely matted on lower; young leaves covered with tomentum on both surfaces; petiolar sinus deep, narrow U-shape

**Shoots:** Mature shoots strong, with long internodes; tips woolly-white with tomentum; tendrils long, well-developed, tufted

**Vine:** Vigorous, strongly climbing, attaching itself to trees and shrubs, frequently reaching 30 to 40 feet and, at times, forming a fairly dense canopy

### VITICULTURAL CHARACTERISTICS

This native species has little resistance to phylloxera, nematodes, or oak root fungus. Its fruit is borne in irregular, loose clusters of small berries and is of no commercial value. Frequently, this vine crosses naturally with cultivated vines. Hybrids can occasionally be found in areas adjacent to vineyards. These hybrids, however, have no merit as rootstocks.



**VITIS CALIFORNICA**—the native California grape, little resistance to phylloxera.  
(2/5 natural size)

## VITIS GIRDIANA

**ORIGIN**—A species closely related to *V. californica*, occupying an area in Southern California south of the Tehachapi Mountains

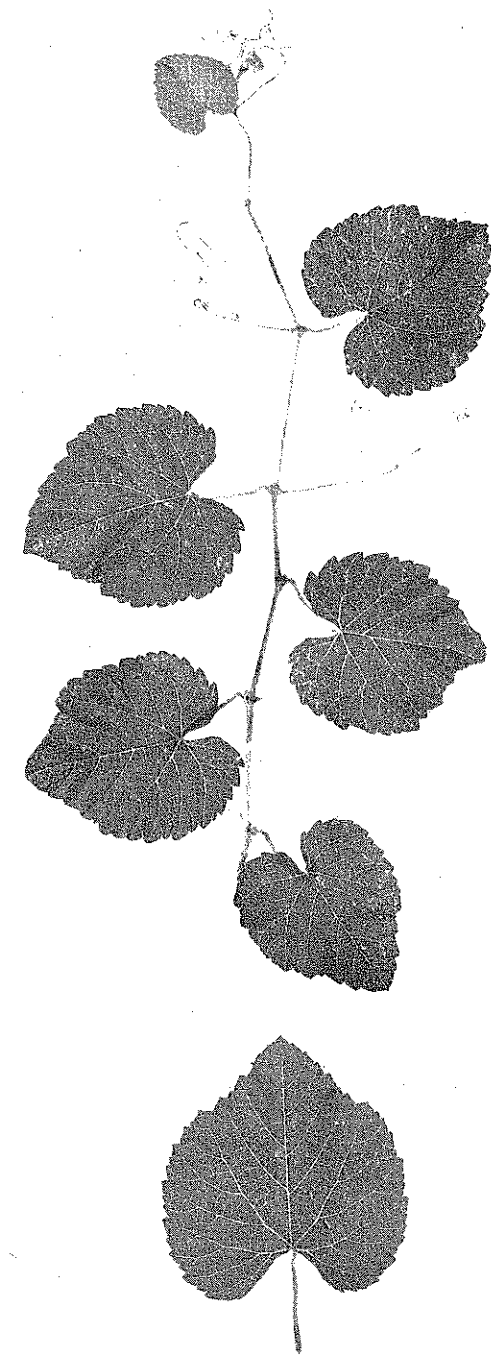
**SYNONYM**—Valley grape

### IDENTIFYING CHARACTERISTICS

**Leaves:** Similar to *V. californica*, except that they are smaller, more heart-shaped, and generally more heavily covered with tomentum

**Shoots:** Moderately vigorous; very densely covered with woolly-white tomentum at tips

**Vine:** Somewhat less vigorous than *V. californica*; more compact or sparse in growth under the more drouthy conditions of its native habitat. No viticultural use has been made of this species



**VITIS GIRDIANA** (2/5 natural size)

## GLOSSARY

**APEX (APICES)** — the tip(s) or terminal point(s) of the lobes of the leaf.

**EPIDERMAL** — related to or arising from the surface layer of cells.

**GLABROUS** — smooth, having a surface without epidermal hairs.

**INTERNODE** — the portion of the shoot or cane occurring between two successive bud locations or nodes.

**INTERSTICE** — a space between things closely set, as a crack or crevice.

**LOBE** — a rounded division or projection on a leaf.

**NEMATODE** — a very small, parasitic worm that lives in or upon grape roots. The root-knot nematode is one of the more common and serious species in California vineyards.

**PETIOLAR SINUS** — a cleft in the leaf margin formed at the attachment of the petiole.

**PETIOLE** — a leaf stalk that attaches the leaf blade to the shoot.

**PHYLLOXERA** — a small, yellowish, aphid-like insect that attacks grape roots.

**RESISTANT ROOTSTOCKS** — grape varieties whose roots are less susceptible to injury by root parasites—phylloxera, nematodes—than are the roots of the scion variety. The term is used in a relative sense.

**SERRATIONS** — small, toothlike variations in the leaf margin.

**TOMENTOSE** — covered with tiny epidermal hairs.

**VIGOROUS VINES** — those with shoots that grow rapidly and produce abundant growth.

**WILD VINE** — any vine that grows in the wild; should not be confused with a rootstock variety.

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