# Rootstock Selection

Almost all the wine varieties described in *Wine Grape Varieties in California* are of pure *Vitis vinifera* parentage. This species is particularly prone to attack by two root pests: grape phylloxera and parasitic nematodes. *Vitis vinifera* vines can be protected from these pests by grafting them to rootstock varieties derived from other vine species and resistant hybrids. Many of the rootstocks used for this purpose are adapted to particular soil types, chemistry, and fertility. They may also be used to overcome vineyard problems such as drought, excess water, and salinity.

It is important that growers select rootstocks that are:

- resistant to present and potential soil pests
- suitable for the soil's texture, depth, and fertility
- compatible with soil chemistry (pH, salinity, lime content)
- favored for the anticipated soil water availability, drainage, and irrigation practice
- appropriate for the vineyard design, and
- appropriate for the fruiting variety's growth and fruiting characteristics.

| Rootstock | Vitis parentage | Phylloxera resistance | Nematode Resistance | | Tolerance | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Root knot | Dagger (*Xiphinema index*) | Drought | Wet soil | Salinity | Lime |
| **Riparia Gloire** | *riparia* | High | Low | Med. | Low | Low | Med. | Low |
| **St. George** (*Rupestris du lot*) | *rupestris* | High | Low | Low | Low–med. in shallow soils; high in deep soils | Low–med. | Med.–high | Med. |
| **SO4** (Selection Oppenheim) | *berlandieri* × *riparia* | High | Med.–high | Low–med. | Low–med. | Med.–high | Low–med. | Med. |
| **5BB** (Kober) | *berlandieri* × *riparia* | High | Med.–high | Med. | Med. | Low | Med. | Med.–high |
| **5C** (Teleki) | *berlandieri* × *riparia* | High | Med.–high | Low–med. | Low | Low–med. | Med. | Med. |
| **420A** (Millardet et de Grasset) | *berlandieri* × *riparia* | High | Med. | Low | Med. | Low–med. | Low | Med.–high |
| **99R** (Richter) | *berlandieri* × *rupestris* | High | Med.–high | Low–med. | Med.–high | Low | Med. | Med. |
| **110R** (Richter) | *berlandieri* × *rupestris* | High | Low–med. | Low | High | Low–med. | Med. | Med. |

In this publication, each wine variety's description includes information on rootstock suitability and experience. Additionally, the following table provides comparative information that may assist growers with rootstock decisions. This information is based on written reports throughout Europe and the New World, including California. The ratings and comments provided here are based on prevalence in the literature and those reports most likely to fit California conditions. As more experience is gained in California's diverse viticulture environment, deviation from the information in the table can be expected. Widespread University of California and grower rootstock trials will continue to provide updated information on rootstock performance. Growers should also consult with their Cooperative Extension farm advisor, other local growers, consultants, and nursery representatives when selecting a rootstock.

*—L. Peter Christensen*

| Influence on scion | | Soil adaptation | Ease of propagation | Other characteristics |
|---|---|---|---|---|
| Vigor | Mineral nutrition[1] | | | |
| Low–med. | N, P: low<br>K, Mg: low–med. | Deep, well-drained, fertile, moist soils | High | Early maturation; scions tend to overbear |
| High | N: high<br>P: low on low-P soils, high on high-P soils<br>K: high | Deep soils | High | Fruit set problems with some scions; latent virus tolerant |
| Low–med. | N: low–med.<br>P: med.<br>K: med.–high<br>Mg: med. | Moist, clay soils | Med. | Noted as a cool-region rootstock |
| Med. | N: med.–high<br>P, K, Zn: med.<br>Ca, Mg: med.–high | Moist, clay soils | High | Susceptible to phytophthora root rot; adapted to high-vigor varieties |
| Low–med. | N: low<br>P, K: med.<br>Mg: med.–high<br>Zn: low–med. | Moist, clay soils | High | — |
| Low | N, P, K: low<br>Mg: med.<br>Zn: low–med. | Fine-textured, fertile soils | Med. | Scions tend to overbear when young |
| Med.–high | P: med.<br>K: high<br>Mg: med. | Tolerant of acid soil | Med. | Young scions may develop slowly |
| Med. | N: med.<br>P: high<br>K: low–med.<br>Mg, Zn: med. | Hillside soils; acid soils | Low–med. | Develops slowly in wet soils |

[1]Influence on scion mineral nutrition refers to comparative petiole tissue levels of nutritional elements.
— not available

# Rootstock Selection *(continued)*

| Rootstock | Vitis parentage | Phylloxera resistance | Nematode Resistance | | Tolerance | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Root knot | Dagger (*Xiphinema index*) | Drought | Wet soil | Salinity | Lime |
| **140Ru** (Ruggeri) | *berlandieri* × *rupestris* | High | Low–med. | Low | High | Low | Med.–high | Med.–high |
| **1103P** (Paulsen) | *berlandieri* × *rupestris* | High | Med.–high | Low | Med.–high | Med.–high | Med. | Med. |
| **3309C** (Couderc) | *riparia* × *rupestris* | High | Low | Low | Low–med. | Low–med. | Low–med. | Low–med. |
| **101-14 Mgt** (Millardet et de Grasset) | *riparia* × *rupestris* | High | Med.–high | Med. | Low–med. | Med. | Med. | Low–med. |
| **Schwarzmann** | *riparia* × *rupestris* | High | Med. | High | Med. | Med. | Med.–high | Med. |
| **44-53M** (Malègue) | *riparia* × *(cordifolia* × *rupestris)* | High | Low | — | High | — | — | Low–med. |
| **1616C** (Couderc) | *longii* × *riparia* | High | High | Med. | Low | High | Med.–high | Low–med. |
| **Salt Creek** (Ramsey) | *champinii* | High | High | Low–med. | Med.–high | Low–med. | High | Med. |
| **Dogridge** | *champinii* | Med. | Med.–high | Low–med. | Med. | Low–med. | Med.–high | Med. |
| **Harmony** | 1613 (*solonis* × *Othello)* × Dogridge | Low–med.[2] | Med.–high | Med.–high | Low–med. | Low | Low–med. | Med. |
| **Freedom** | 1613 (*solonis* × *Othello)* × Dogridge | Low–med.[2] | High | High | Med. | Low | Low–med. | Med. |
| **O39-16** | *vinifera* × *rotundifolia* | High | Low | High | Low | — | Low | Low |

| Influence on scion | | Soil adaptation | Ease of propagation | Other characteristics |
|---|---|---|---|---|
| Vigor | Mineral nutrition[1] | | | |
| High | N: med.–high<br>P, Mg: high<br>K: low | Adapted to drought and acid soils | Med. | Does poorly in non-irrigated, low K soils |
| Med.–high | N: med.–high<br>P, Mg: high<br>K, Zn: low–med. | Adapted to drought and saline soils | High | — |
| Low–med. | N: med.–high<br>P, Ca: low<br>K, Mg, Zn: med. | Deep soils | High | Sensitive to latent viruses; tolerant of cold injury |
| Med. | N, K: med.–high<br>P, Mg, Ca: low<br>Zn: med. | Moist, clay soils | High | — |
| Med. | N, P: med.<br>K: med.–high<br>Mg: low | Moist, deep soils | High | — |
| Med. | N: low–med.<br>P, Mg, Ca: low<br>K: high | High Mg soils | High | Readily Mg deficient in low Mg soils |
| Low | N: low<br>K: med.–high | Best on fertile, med.- to fine-textured soils | High | Poor on low-vigor sites; tolerates wet soils |
| High | N, P: high<br>K: med.–high<br>Zn, Mn: low | Sandy, infertile | Low | Tolerant to *Phytophthora* |
| Very high | N, P: high<br>K: med.<br>Zn: low | Very sandy, infertile | Low | Promotes excess vigor, poor fruit set |
| Med.–high | N: low<br>P: med.<br>K: high<br>Zn: low–med. | Sandy loams and loamy sands | High | — |
| High | N, P, K: high<br>Mg: med.<br>Zn, Mn: low | Sandy to sandy loams | Med.–high | Sensitive to latent viruses |
| High | N, K: high<br>P: low–med.<br>Zn: low | Poor on coarse, sandy soils due to low root knot nematode tolerance | Very low | Tolerant of fanleaf virus |

[1]Influence on scion mineral nutrition refers to comparative petiole tissue levels of nutritional elements.
[2]The degree of long-term phylloxera resistance is questionable due to the unknown *Vitis vinifera* parentage of these rootstocks.
— not available