



Choose Planting, Grafting, and Budding Wisely

* [*Bill Peacock*](#)

Planting, Grafting, and Budding Stock Should Be Virus Free

Virus diseases are spread with infected rootstocks, buds, cuttings, and rootings. To keep the spread of virus diseases under control, it is important to use certified virus-free planting, grafting, or budding stock.

Leafroll virus can dramatically reduce sugar and color development resulting in unmarketable fruit for some varieties some years. Fanleaf virus seriously weakens vines and dramatically reduces yields. The fanleaf virus is particularly infectious since it can be spread from vine to vine when Xiphinema index dagger nematodes are present in the soil.

California Grapevine Certification Program

Growers can obtain virus-free and state-certified planting, budding, or grafting stock from nurseries participating in the California State Department of Food and Agriculture's (CDFA) California Grapevine Certification Program. The Foundation Plant Materials Service (FPMS), at the University of California, Davis, is the repository for the virus-indexed, true-to-variety vines, and provides planting stock of these vines to nurseries participating in the Certification Program. Participating nurseries plant registered field increase blocks with stock provided by FPMS and under the supervision of CDFA. The nursery's increase block is then used to provide certified budding, grafting, or planting stock to growers. A list of registered grape varieties/selections and a list of California nursery participants in the Certification Program are available from FPMS on request (see [FPMS address](#) below).

Recognizing Symptoms in the Field

The most striking fruit symptom of leafroll virus is poor color development (greenish berries) on red varieties. Prior to 1945, leafroll virus was referred to as White Emperor disease because of the low fruit color. Low fruit sugar is also associated with infected vines.

Leaf symptoms can occur late in the season and include rolled yellow or red leaves with veins remaining generally green. The entire vine may take on a yellowish or reddish cast by harvest, but in many cases leaf symptoms are difficult to recognize, especially with white varieties.

Diseased vines are usually randomly dispersed throughout the vineyard. The extent of infection varies from vineyard to vineyard depending on the extent of virus present in the vineyard from which the planting stock was collected. Some vineyards are disease free, some vineyards may have a few infected vines per row, but there are vineyards with every vine infected.

The fanleaf virus is much more debilitating than leafroll. Vines infected with fanleaf gradually become weaker and less productive with each passing year. Flower clusters on fanleaf-diseased vines are often smaller than normal, and clusters are generally straggly with numerous shot berries.

Leaf symptoms most commonly associated with fanleaf are vein banding (bright yellow bands developing only along the major veins) starting in early or midsummer. Other symptoms may include extensive patches of bright yellow diffusing in yellow-green patterns (yellow mosaic) or leaves that are asymmetric, with an open petiolar sinus (fanleaf deformation).

When the dagger nematode is present, the disease spreads from infected to healthy vines. This results in patches of diseased vines within the vineyard, and the size of the infected areas increases each year. If dagger nematode is not present, the distribution of the disease is more random, and the extent of infection depends on how widespread the virus was in the vineyard from which the planting stock was collected.

The *Grape Pest Management* manual is an excellent resource for more detailed information on grapevine viruses and their symptoms (reference cited below).

Rapid Assay for Grapevine Viruses Is Commercially Available

Recently, molecular methods have been developed for the rapid identification of viruses in infected vines. This has made it possible to assay vines for virus infection in a few days; whereas, the traditional biological assay takes two years and involves chip-grafting a bud from the grape selection in question onto a sensitive indicator vine. The most commonly used molecular method is called ELISA (enzyme-linked immunosorbent assay). ELISA assays are now routinely used to rapidly identify viruses and complement the standard biological assay.

The development of the ELISA assay has made it feasible and practical to survey a vineyard for virus. This can provide valuable information when collecting grafting, budding, or planting stock from a vineyard with an unknown or questionable virus status. Currently, the only commercial laboratory in California using ELISA for detection of viral pathogens is Agri-Analysis Associates, 45133 Co. Rd. 32 B, Davis, CA 95616, phone 916-757-4657. Agri-Analysis Associates can assay for fanleaf virus, grapevine yellowvein virus, and grapevine leafroll associated virus Types I, II, III, and IV. Results are provided within a few weeks.

Keeping Exotic Virus Out of the U.S.A.

There are more than 40 viruses or virus like diseases that affect grapevines worldwide. Fortunately, relatively few of these diseases occur in the United States and only four are of concern in California -- fanleaf degeneration, leafroll, corky bark, and rupestris stem pitting.

To keep exotic virus diseases from entering the United States, quarantine laws prevent the entry of grapes into the U.S. except when they have passed a series of careful tests. A National Grapevine Importation Program is conducted under the administration of Foundation Plant Materials Service (FPMS) at the University of California, Davis, in cooperation with the United States Department of Agriculture and California Department of Food and Agriculture. This service organization has been supplying disease-tested, California Foundation stock across the United States and throughout the world for more than 30 years on a self-supporting basis. If you want to import grapevine planting stock into the United States, it may enter through the National Grapevine Importation Program. Application forms to apply for grapevine importation services are available upon request from the [Foundation Plant Material Service](#).

For More Information on the Certification and Importation Program:

California State Department of Food and Agriculture
Nursery Service/Pest Exclusion
1220 N St.
Sacramento, CA 95814
916-654-0435

Foundation Plant Materials Service
University of California
Davis, CA 95616-8600
916-752-3590

Reference:

Deborah Golino, Jerry Uyemoto, and Austen Goheen. 1992. Grape Virus Diseases. Grape Pest Management. University of California, Division of Agric. Sciences. Pub. No. 3343, pp. 101-110.

**Bill Peacock is a University of California Cooperative Extension Farm Advisor, Emeritus*