

NATIONAL CLEAN PLANT NETWORK

Clean vines for healthy vineyards

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A healthy vine is fundamental to the successful beginning and sustainability of all grape vineyards. Growers depend on commercial grapevine nurseries for vine stock that is pathogen- and virus-free with the desired cultivar, clone, and rootstock. To achieve these conditions is not an easy task, either for the nursery or the clean plant program that provides importation and certification services.

Viticulture has become much more complicated in the past decade with a tremendous variety of grape material that wine growers in vastly different conditions can select. Interest in new varieties, clones and rootstocks has increased and resulted in the importation of many new materials from diverse international sources.

Some cold hardy Minnesota hybrids can survive temperatures below -30°F , allowing grapevines to be grown in previously forbidding areas. The grape breeding program at Cornell University (New York) has produced many commercially successful varieties including Chardonnay and Traminette.

The wide variety and variability in plant material comes with great promise for improved wine diversity and quality but not without considerable risk for disease and virus problems and mis-identification.

For decades, Foundation Plant Services (FPS) at University of California, Davis, (formerly known as the Foundation Plant Materials Service), has been the major source of vine materials for grape vineyards in the U.S.

FPS Director Deborah Golino holds U.S. Department of Agriculture (USDA) grape importation permits that allow introduction of new materials from outside the U.S.

Scientists in New York and Missouri possess importation permits allowing them to introduce new clones and varieties for regional variety and breeding trials. Recently, Washington state established a foundation plant service at the Washington State University research facility in Prosser.

Development of smaller regional facilities, including one planned in the Mid-Atlantic region to serve vineyards in the eastern U.S., are a clear indicator of the increasing need for programs addressing region-specific plant material needs. New funds and resources are being sought to improve clean plant

programs. As these programs develop, it will be important to coordinate their activities for maximum efficiency and quality.

The National Grape and Wine Initiative (NGWI) is cultivating a national landscape for grape and grape product research and extension services. After a series of meetings to set priorities, one of seven program areas identified was **Clean Plant Materials** with the following objectives and benefits:

OBJECTIVE: Provide growers with a broad range of disease-free grape varieties, rootstocks, and clonal materials which have been evaluated for suitability and quality attributes.

BENEFIT: Improves plant health and quality. Prevents loss of vineyards, plants, and crops to disease. Improves quality of final products by increasing selection of and information about a wide variety of plant materials. Provides practical guidelines for evaluation of vine-site suitability.

Nancy Irelan, the NGWI research committee chair, collaborated with Golino to organize a September 2005 meeting in Davis, CA to address this directive at the national level. It was an opportunity for foundation plant ser-



Intensive care and special growing media are required to grow a 0.5mm shoot tip into a rooted plant in a test tube. This shoot-tip grape plant is ready to transfer to soil at Foundation Plant Services, UC Davis. (Photos courtesy of UC Davis)

GRAPEGROWING

vice scientists interested in clean plant programs to assess current resources and capabilities and to evaluate how regional programs can improve their products and services through greater cooperation.

Assessment and gap analysis of program resources and facilities were provided by each FPS group. One example is an urgent need for regional programs

that can deliver cold-hardy and crown gall-free vines for vineyards threatened by winter injury. Petri disease, eutypa, bot canker, and other trunk-related maladies are increasingly recognized as a problem for young and old vines in all viticulture regions. Tomato ringspot virus is a serious problem in Vidal Blanc, an important hybrid variety popular in cold climate vineyards.

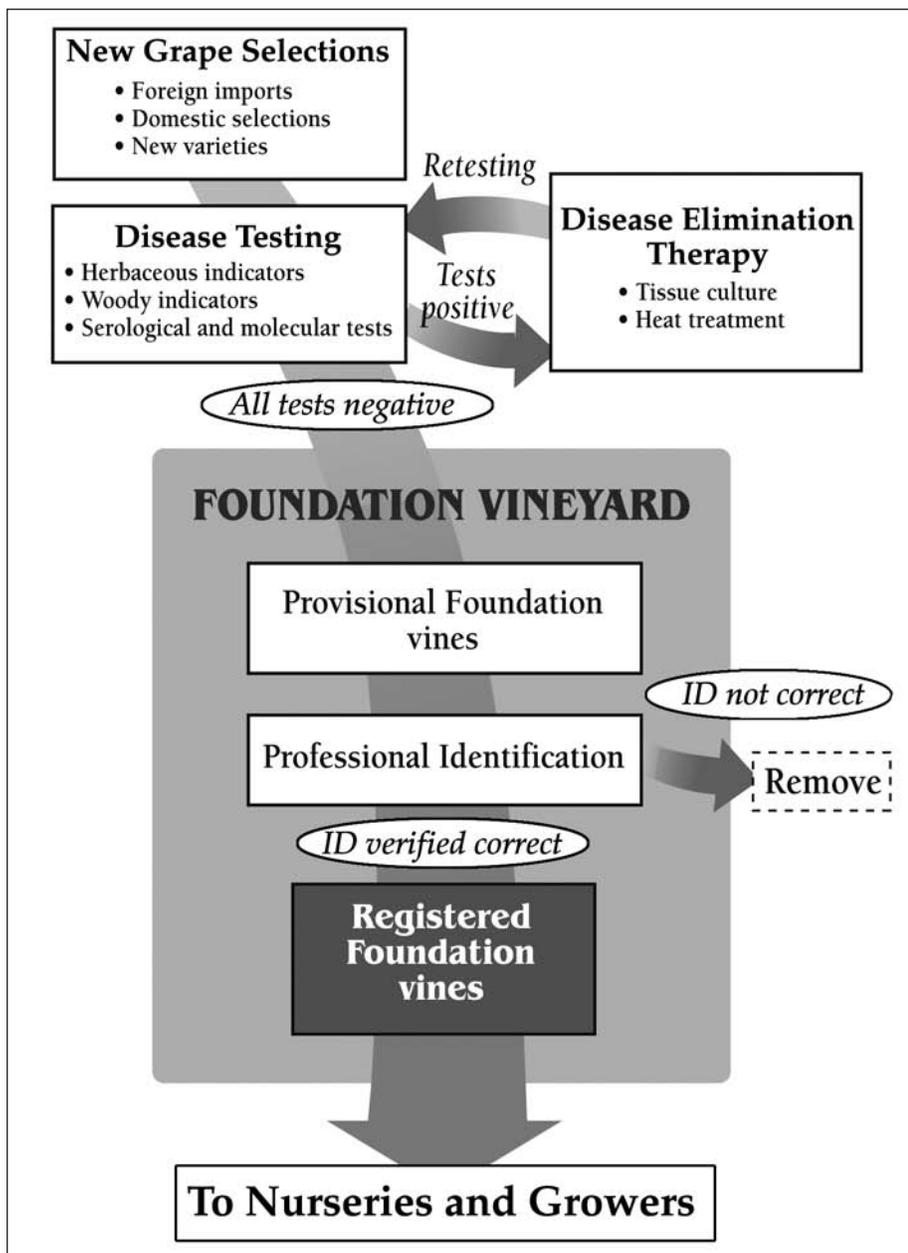
Grape importation services are provided by FPS to private industry and public researchers on a fee-for-service basis. This is an extremely valuable entry point for grape varieties, clones, and rootstocks from regions around the world. FPS provides many other services to industry, including disease testing, biological indexing, elimination of plant pathogens, professional identification of grape varieties, foundation block maintenance and distribution, outreach and education, and characterization and registry of grape plant materials.

A tour of the foundation facilities showed the great complexities in each area and the enormous record-keeping burden needed to preserve a paper trail on all plant material entered, treated, and delivered. Recent cooperation with other foundation services such as ENTAV in France has led to a proliferation of high-quality grape materials available to the wine industry in the U.S. Please visit <http://fps.ucdavis.edu/Grape/GrapeProgram-Index.htm> for more information about the history and services of FPS.

In Washington state, the Northwest Grape Foundation Service was created with cooperation from Oregon and Idaho, at the Washington State University research station in Prosser. Initiated in the 1970s, the program was revitalized in 2003 with significant federal and state funding. It seeks to provide virus- and crown gall-free vines to an industry that has grown to over 30,000 acres and is threatened by winter injury.

In Prosser, disease testing is offered and a foundation vineyard has been established, but there is no importation permit. Other vine problems in Washington include viruses (leaf roll and fan leaf, corky bark, rupestris stem-pitting, arabis mosaic virus, tomato ringspot), Petri disease, crown gall, and eutypa. All of these are common to most grape regions but vary in degree of severity. More information about the NWGFS is available at: <http://nwgfs.wsu.edu/>.

The program at Southwest Missouri State University, (Mountain Grove, MO), has a collection of Eastern European varieties and hybrids cur-



Schematic showing sequence of tests that new grape introductions undergo at Foundation Plant Services. It can take several years to complete the laboratory and field tests to qualify a grape selection for the Foundation Vineyard. When Foundation Stock vines, fruit, and ampelographers confirm a selection's identity, it qualifies as California Registered Stock.

rently being tested for viticulture and wine suitability, and a disease testing and elimination program for nine viruses. Five important regional varieties have been selected for virus-free certification including Norton, Vignoles, Chardone, Chambourcin, and Vidal. Dr. Wenping Qui is the program leader and holds an APHIS importation license. More information about the SWMSU foundation program is available at: <http://mtngrv.missouri.state.edu/GrapeImport.htm>.

A foundation program has been proposed and funding sought to serve the Mid-Atlantic and eastern regions. A collaboration between Penn State, University of Maryland, Virginia Tech and their states' departments of agriculture seeks to address two major problems in new vineyards, crown gall and tomato ringspot virus. Penn State has invested heavily in recent years to determine the extent and cause of vine decline problems in young and

mature vineyards. Smart cycling PCR technology has been refined for use in pathogen detection and can help to ease and quicken the analysis process.

Cornell University (New York state) has managed a voluntary vine certification program in the past, but it has been dormant until the arrival of grape virologist Dr. Marc Fuchs, formerly director of research at INRA-Colmar in France. Dr. Fuchs specializes in grape viruses, and is now the plant virologist at the New York State Agricultural Research Station (Geneva, NY).

Program goals for Dr. Fuchs are to develop virus control measures through improved detection methods and genomics research. Cornell University is currently evaluating its foundation grape service program and how it may be further developed.

These working and planned foundation programs are part of the National Clean Plant Network (NCPN). While not yet formalized as an organization, there is strong agree-

ment among the principals in each group that a national network would benefit each region and program and the grape and grape products industry as a whole. The current program includes tree fruits, so the term *plants*, not *vines*, is appropriate.

Goals of this group would be to join forces and, as a team, address diverse and specific grape material needs of all grape regions in the U.S. by creating the most efficient and effective network of foundation plant services possible. By forming a closed loop network, the group can avoid duplication, share resources, backup materials and data, improve services, increase efficiency and throughput and be more responsive to regional and national industry needs.

Education and outreach services are important to the success of each foundation program. Growers and commercial nursery cooperators must understand the problems caused by plant viruses and pathogens and the

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FPS laboratory staff utilizes PCR and ELISA technology to accurately detect grapevine viruses. Routine laboratory testing of new introductions, shoot-tip culture plants, and foundation stock complements the visual field indexing. (Photo by Jack Clark)

importance of clean and healthy vine materials, and how to properly and effectively utilize plant materials from foundation services. Users must realize that certified materials are not a guarantee against developing plant problems but rather an additional assurance that a healthy plant will be established.

Industry experience is essential in determining which selections are needed in clean plant programs, what



CAPTION NEEDED.

new cultivars and clones should be imported from abroad, and priorities for therapy of cultivars that are in the U.S. but are not available as clean stock by importing promising cultivars and clones, for example.

Perhaps most important, these foundation programs will seek stable funding through a variety of public and private resources. Currently, FPS relies on grants and fees-for-service for operating expenses. The Washington program has received federal and state grants, but these are limited in duration and will eventually be supplemented by service fees. Once the network is up and running, it will be presented to USDA as a vital resource for an important agricultural industry and should receive stable annual funding from the federal agency.

Additional goals of NCPN include the creation of a national registry of

grape plant materials, creating a national set of standards for testing grape materials, a review of the current APHIS rules that regulate importation and testing, the development of a selection system in cooperation with the grape and wine industries, improvement of outreach and education services, improved plant identification methods, and evaluation of how grape genomics can improve the quality and types of grape materials available to the winegrape industry.

The group will also seek to evaluate and understand the economic impact of the vine materials to the industry and economies of grape growing regions. An educational program is needed to inform industry members and stakeholders and partners of the essential value of clean vine materials, importation capabilities, and other benefits provided by the NCPN.

Next steps include further evaluation of resources, products and services, creating a clear link to industry to understand their plant material needs, developing an understanding of the economic impact of foundation plant services programs and of vine problems experienced by growers.

There is nothing more fundamental to a successful and high quality wine or grape product than starting with a clean and healthy vine. Every grape grower in the U.S. has a stake in the success of these programs. ■