



Notes from James Stamp Seminar



One thing every grape grower has in common is grapevines. In the past, growers often grew their own rooted cuttings, and some even grafted their own vines. But now, especially with more exotic rootstocks and clones, commercial grape growers rely on grapevine nurseries. Your vines are, of course, among the most fundamental and essential components of the vineyard. Every grower desires healthy, productive, and true-to-type grapevines. Yet, in our modern age of viticulture, the vine component of vineyard terroir, consisting of soil, climate, plants and viticulture, might be considered the weakest link any effort to achieve high quality wine. On a recent visit to Napa Valley, almost every grower I met stated emphatically that poor quality vine material was the greatest threat to vineyard sustainability and profitability. This is a rather stunning indictment of, well, something. The plant material supply system is incredibly

complicated and fraught with hazards, from boot-legged vines entering the U.S illegally to compromised certified increase blocks in commercial nurseries. They vary greatly in size and quality, and all must endure the challenge of doing business in the boom-bust planting cycles of the wine industry (currently in boom). As a grower for 20 years, I have directly experienced the mysteries and frustration of plant material quality in the U.S. In any given year, vines from Nursery A would be excellent and poor from Nursery B then the following year it would be just the opposite. There seemed to be little rhyme or reason, or assurance of quality. A grower recently told me that over 300 vines of an 1800 vine order were infected with crown gall and will have to be replaced. As an extension educator, I tend to be a first responder to situations like this, especially since new growers are usually unaware of the problems with nursery stock. It is, to say the least, disheartening to me and the grower, who is anticipating a flourishing new vineyard. I cannot stress enough the importance of vine and vineyard uniformity to wine quality, not to mention the possible added significance of vine age to quality. It all begins with a healthy grapevine to plant in the vineyard. Despite the problems with plant materials, most grapevines do well once they are planted and manage to grow into functioning vineyards.

I have known Dr. James Stamp for almost 25 years. He was a scientist at Agritope, the agricultural division of a biotechnology company located in Beaverton, Oregon. At the time, they were doing research into the use of tissue culture to propagate grapevines, which wasn't necessarily new technology, but doing it rapidly and in very large quantities was. Unfortunately, a good idea failed because a lack of practical knowledge and experience, and to my knowledge,

has never been pursued again. James moved to Sonoma where he helped to found [Novavine](#), a major commercial nursery, and since has become a vine quality consultant to many of the best names in California. His company, [Stamp Associates Professional Viticultural Services](#) helps its clients get the best vine materials possible, ensuring the health, quality and longevity of their vineyards. He mainly does this by monitoring the provenance of vine materials from the mother vine all the way to the loading dock. He sees the good, the bad and the ugly in the commercial grapevine nursery business and has figured out how to work with and within the system to acquire high quality vines. Lucie Morton does similar work for her clients.

Apart from the vineyard land itself, grapevines are often the largest expense in developing a commercial vineyard. As vine density increases in modern red wine vineyards (up to 2000 vines per acre on 7x3 spacing) and bench grafted with exotic rootstocks and clones are desired, the costs can soar to nearly \$10,000/ac just for the plant material. It is a wonder to me, then, why so many growers pay so little attention to this critical aspect of their vineyard's success. For most new growers it's simply a matter of not knowing the hazards in the system, although there is ample warning given to them in new grape grower workshops. But even experienced growers often treat a vine order much like ordering a book from Amazon. It deserves a lot more attention than that. In addition, given the environmental challenges that vines growing outside the comfy climates of California and Oregon will face in the form of winter injury, frost, drought, diseases, exposure to prodigious amounts of pesticides, etc. anything but the most healthy plant from the moment the vineyard is planted is less likely to perform at its optimal potential.

James was in Pennsylvania to attend a board meeting for his university and offered to give a seminar in Lancaster. I could hardly contain my excitement and instantly accepted his generous offer. If you are a commercial wine grower you should be familiar with him through the articles he writes for [Wine Business Monthly](#), which are insightful and practical, and well worth reading (they are archived on his website). After some discussion he agreed to speak on two topics:

- [How to Source Clean and Healthy Grapevines from Commercial Nurseries](#)
- [Pathogenic Status of Grapevine Nursery Stock and its Implications for Vineyard Longevity](#)

Because he is a scientist, James' conclusions about the grapevine propagation system are not based merely on observation, but backed by a significant amount of testing and data. James freely admits that he is not a trained plant pathologist but over a span of 12 years working in grapevine propagation he has learned a lot about trunk diseases through direct experience and attending scientific conferences.

It is surprising (or not) that up to 50% of the propagated scion materials from California nurseries are not certified against grape viruses, and 25% of vines do not meet California Department of Food and Agriculture (CDFA) minimum standards, and participation by commercial nurseries is voluntary. There are some important semantics to be explained here, that "certified" does not mean a vine is guaranteed to be free of designated pathogens, but in reality it indicates that the minimal numbers of sampled vines have been tested for certain pathogens, implying that they do not harbor the pathogens, and have been produced in accordance with a state's certification standards and regulations. To my knowledge, none of the commercial grape plant materials coming from Eastern nurseries are certified. Outside of California, I believe only Washington has an active certification service at the [Clean Plant Center](#) operated by Washington State University.

Once vine materials are cleaned up by a foundation plant service, certified propagation wood is purchased by nurseries and “blown up” in increase blocks at the nurseries. These are regulated and monitored by state departments of agriculture, in the case of California, which produces almost all of the grapevines in the U.S. it is CDFA. Karen Ross, the current secretary of agriculture, was the long-time executive director of the California Association of Wine Growers, and she understands intimately the wine industry in and out of California and its benefits and challenges. The specific definition of [#1 and #2 grapevine](#) plants are given in the *CDFA Nursery Inspection Manual*. Other states, including Pennsylvania, have their own statutes governing grape certification programs, but many, like the one in New York, have been dormant for decades.

The take-home message that James delivered to the growers who attended the seminar is to take a keen interest in your grapevines, in other words, it is the duty of the grower to make sure he or she gets high quality grape materials to plant, not the nursery, and the more involved you are in the entire process, from vineyard design to post-planting care, the more likely you are to have a healthy vineyard. This may seem to be the classic “no brainer” but most growers are incredibly blasé about their nursery orders, and take it for granted that the plants they receive will be just fine. His suggestion (and mine) is to be actively involved with your plant material order so the nursery or their representative (e.g. the person you meet at Wineries Unlimited, Unified or Eastern Winery Expo) knows that you care deeply about the quality and quantity of your order, that it is not just a bunch of numbers on a piece of paper. You can have someone like James get involved, or you can visit the nursery yourself, or, at minimum, regular conversations at key production points, can help to expose problems, show you care about your vines, and assure that in the end you get what you ordered. It would be very helpful to understand the grapevine production process at nurseries, which you can do by visiting one at key times of the year or reading some of James’ articles. James will visit nurseries in the summer to check his orders for sound quality and proper quantity of vines. If you have a foundation of knowledge, the nurseryman will respect you more and probably take better care of your order.

The Nurseries (California in particular)

One of the largest California nurseries will produce about 15 million grapevines this year. It may or may not sound like a lot, but to enforce quality control on that many plants is an incredibly difficult task. A vine is not a widget that can be stamped out in mass quantities with exacting quality control standards applied to each one: instead it is a living organism that requires TLC to thrive, or even just survive. This nursery, like many of the large California nurseries, is located in southern California and, in many cases, nursery stock is grown near citrus orchards, a known host for grape mealybug, the insect vector for leafroll virus. Keeping grapevines free of pathogens, much as with fruit and foliar diseases in your vineyard, has much to do with sanitation and cleanliness. James looks for visual cues such as paved roads instead of dirt roads, ozone and other sanitation methods of work areas and surfaces, the amount of dust and wind present at a nursery, and that in and out traffic is strictly regulated because vehicles are vectors for all kinds of pathogens and pests. In this business, cleanliness is second only to accurate record keeping. Lack of attention to these minute details can prevent you from receiving a clean and/or true-to-type grapevine. Cleanliness extends, perhaps most importantly, to the source material of rootstocks and scion wood, whether from a certified increase block or a commercial vineyard, every effort should be made to insure that the wood is free of virus and disease, and in generally healthy condition. It is in this important step of a grapevine’s journey to your vineyard where James can inject some quality control and, if necessary, intervention. He

will trace the vineyard origin of the material and, if he feels it is necessary, do the necessary testing to insure cleanliness.

Lest anyone think otherwise, grafting grapevines is not easy, or necessarily reliable. I learned to graft in a viticulture course at UC-Davis and was not very successful. Whereas most growers hope for 95% or more take of planted vines, a rootstock like 420A is such a difficult grafter that nurseries must produce 300-400 percent over their target amount to insure that they achieve it. James said that even easy grafters are produced at 170% over target quantities. Then there are the hazards of growing the vines in the nursery, which are planted up to 17,000 vines per acre, including diseases and insect pests.

Nurseries will do speculation grafting on varieties that they believe will in demand, but most growers will want to place an order to meet their needs, rather than rely on the spec vines.

Certified increase blocks in nurseries are inspected by CDFA inspectors once or twice a year. Visual inspections, especially in the fall when leaves show coloration can reveal problems but testing is the most reliable method for insuring cleanliness of materials. Novavine provides a good [vine certification explanation](#) written by UC-Davis Foundation Plant Service scientists.

The Grower (what you need to do)



Ed Boyce and James at Black Ankle Vineyard in Maryland

In my experience, chances are the material you get from a commercial nursery will be fine and will produce a healthy, productive vine. But when quality goes astray, it can be a very frustrating and costly mistake for the grower. There are two main problems that can be transferred from the nursery to a vineyard: outright poor quality vines (poor roots, mismatched scion-rootstock diameter, inadequate rootstock and-or scion caliper, poor quality graft union, poor scion-bud quality), and incorrect vine material, i.e. the wrong variety, clone or rootstock, or any ill-fated combination. Of course, just as when you buy a carton that says “milk” on it, or a car that is supposed to have “V-6 turbo” engine, the buyer assumes that’s what he or she is getting. It’s a fair assumption but with grapevines it doesn’t always apply. Therefore, any care that can be taken

to assure the quality and true-to-type of an order will help to assure that the vineyard you planned is the one that is planted. The service that James offers greatly lowers the risk.

After vines arrive at the vineyard, growers are usually given 48 hours to inspect the order, and to accept or reject it. James urges growers to use this time to test your vines, and make a detailed list of the reasons for rejecting vines (lesions, poor roots and graft unions, etc.). Document everything as carefully as possible with photos and notes. If the nursery doesn’t hear from you, it will assume everything is okay, but in this business the squeaky wheel gets the grease so make your issues known as soon as possible. Ideally every grafted vine should have a visual inspection and a bend test before it is accepted and eventually planted.

Contrary to my recommendations James says bench grafted vines, and especially 420A, should be held in cold storage for as little time as possible. A better recommendation would be to determine the earliest possible planting date then work with the nursery to have the vines dug and delivered a week before anticipated planting. Once vines are received, they should be stored in a cool, moist place, and in a cold room if extended storage is necessary. Extended exposure to cold can damage the callus and vine tissue, which becomes discolored. He strongly encourages growers to let nursery vines warm to ambient air temperature before they are planted.

While there is little doubt that troubled plant material comes out of nurseries and into vineyards, when it comes to nursery stock failure and the blame game, growers are not always exempt. James told stories of negligence and ineptitude on the part of growers that led to plant failure. Every nursery wants its customers to have a successful planting experience and most will offer very specific instructions about how to properly prepare and plant grapevines. It is very worthwhile to heed these instructions, even if they do not exactly agree with your own methods. That way, if there is a problem later on, your awareness of the nurseries planting methods will be part of the discussion.



James offered this description of an ideal rooted and-or grafted grapevine – it should be 12-14” long for a grafted vine and 13-16” for an own-rooted vine (over 16” is too long), with a straight trunk and uniform and strong roots. The trunk diameter should be about 3/8th inch an inch below the graft union, although 5/16th is okay if roots are strong. A spiral root pattern is best with a mix of smaller and larger roots, the smaller ones activate first. Keep as much of the root system as possible

before planting, although trimming to 4-6” for a laser planter appears to do no harm. James suggests letting a scion bud swell to no more than 1/16” before planting just to make sure the vines are alive. Vines planted in the North Coast are typically mounded up by hand to prevent the graft union from drying out, or a milk carton is placed over the vine. James does not favor potted vines as they easily become root-bound in the small pot.

Nurseries have very specific expectations and requirements of themselves and their customers. I would encourage growers to read, understand and question the entirety of a nursery’s website very carefully, and the fine print on a nursery order contract. It is only by being fully informed of the conditions of a sale that a grower can fulfill his or her responsibilities.

Foundation Plant Service in Davis, CA

The [Foundation Plant Service](#) is the center of the grapevine universe in the U.S. It is the primary importation location (others include Cornell and SW Missouri State) for new grape varieties in

the U.S. Once they arrive, the vines enter quarantine and are examined and cleaned up before release to commercial nurseries and grape growers. It is an enormously complicated and expensive task to undertake and FPS has had its share of successes and failures. With assistance from the USDA [National Clean Plant Network](#) (NCPN), it is developing a new foundation block at its [Russell Ranch](#) (RR). It is hoped that getting a fresh start on a virgin site with a strict production protocol that clean vines to be produced and maintained. All new materials will be tested to be free of *Agrobacterium vitis*, the bacteria that causes crown gall. James says that vines planted on 420A are especially susceptible to crown gall. Rootstock susceptibility to crown gall (reported by Dr. Tom Burr at Cornell University) are highly resistant (Riparia Gloire), resistant (3309C, 101-14MGT, 5BB), moderate (5C, SO4), susceptible (1103P) and highly susceptible (110R, 420A). Nursery stock without crown gall should be very helpful to wine growers in colder wine regions. James said that foundation materials from RR will be ready for distribution by 2015.

Plant material considerations include the status of viruses, fungal and bacterial pathogens, and the physical quality of the plant. For its purposes, FPS concerns itself with the biological health of grapevines. The list of screened pathogens is a daunting one and includes Pierce's Disease, the associate leaf roll viruses (GLRaV-1 types 1 and 3, and GLRaV-3 are most severe), Vitivirus B that causes corky bark, Rupestris stem pitting in Syrah, Red Globe virus, Syrah decline organisms, Tomato Ringspot virus, and Tobacco Mosaic virus. What most people do not realize is FPS does NOT certify vines to be free of fungal and bacterial pathogens such as the Petri diseases (black goo and young vine decline), cylindrocarpon, botryosphaeria, and crown gall, all of which have been found in Eastern vineyards. In a nursery setting, wind, rain, equipment, people and other vectors can spread fungal diseases and are almost impossible to manage. James stated that problems with opportunistic fungal trunk pathogens is often related to vine stress, and that if new vines are planted and cared for correctly they will have a better chance to mature and grow into healthy, long-lived vines. It would be hard to over-emphasize the importance of this amount of care to a healthy and productive vineyard.

It would be very wise for every commercial wine grower to understand the function that FPS serves in our grape supply system. For example, you can purchase certified vines directly from FPS, afterwards you will pay an annual royalty, but you can then propagate from the certified materials for your vineyard. The FPS website has a ton of great information on it, including a list of all the varieties it has available, many I have absolutely no familiarity with, but someone cared enough to have it imported. The FPS newsletter is also an outstanding source of information.

Testing grapevines

James does a lot of testing of vine materials and relies on the CDFA analysis lab, as well as private labs like [STA](#) and [Agri-Analysis](#). In his talk, and past articles, James illuminates how problematic it is, even in certified increase blocks, to keep vines free of problems like leafroll. His testing has revealed a significant presence of leafroll, which is transmitted by grape mealybugs, in certified nursery increase blocks. An additional challenge is that virus symptoms do not appear in rootstock blocks, only scion materials. Growers in the East can talk to Dr. Marc Fuchs, the grape virologist at Cornell University, who surveyed vineyards in the Finger Lakes for leafroll in 2006/7 (click [here](#) to see the survey report) or send samples to a private lab.

The Pathogens

Where to begin? The disease and virus landscape gets more complicated and onerous by the day in the wine industry. You have no doubt read about the rapid spread of leafroll in northern Napa Valley. James says that fan leaf virus is also a problem and only one rootstock, 039-16, offer resistance against the nematode vectors. In the East, leafroll is definitely in vineyards, but in the warmth of 2012, Pierce's disease has extended its range to northern Virginia, yet vineyards in the area report lesser amounts of grapevine yellows. Cylindrocarpon, Petri diseases (black goo), crown gall, Botryosphaeria, and others, along with harsh environmental conditions, contribute to vine decline. In all cases, vine longevity, health and productivity would be improved using clean nursery stock.

101-14 and Phylloxera

I was a bit taken aback during a casual conversation with a Napa grower in August when he said that a very small amount of 101-14 in some areas of the valley appear to be displaying symptoms of phylloxera susceptibility. The Napa growers are very aware of the signs of phylloxera decline, having seen AxR #1 succumb to a new phylloxera biotype in the 80s. Other rootstocks including 5C, 5BB, 3309C, St George, and 1103P have been known to support phylloxera on their roots, which form nodosities that can eventually girdle a root. Monica Cooper, the UC farm advisor in Napa Valley sent out a [fact sheet](#) in her *Vineyard Views* newsletter about the problem earlier in the year. From what I can gather from Dr. Andy Walker and Dr. Jim Wolpert, as well as James and a few other growers in the valley, vines on 101-14 that is planted in heavy clay soils (Andy described them as "heavy, black, mucky, and smelly soils that probably should not have been planted in the first place) seem to be at the greatest risk. While there is not conclusive evidence, and the situation is being closely monitored, it appears that when clay soils dry out during the summer, the delicate fibrous roots of 101-14 can be compromised when nodosities and rootlets to dry out and break, leaving wounds for secondary soil pathogens to exploit. Since heavy clay soils are widespread through Eastern wine regions, I wondered if there was a need for additional concern. In our case, summer rains, and the fact that our soils rarely dry out to significant depth, may mitigate the problem for us. At this point, I would say that in a dry summer ('07, '10) it would be worthwhile to watch vines grafted to 101-14. The following is a description of 101-14 from Pierre Galet's classic reference guide *A Practical Ampelography* (translated by Lucie Morton):

101-14 is more vigorous than Riparia Gloire but less vigorous than 3309C. However, it has a shorter vegetative cycle than 3309C and thus may be preferable in situations where earlier ripening is desired. This variety does well in fresh, clay soils and tolerates lime up to 9 percent. Its root system is thin with much branching resembling RG. It roots and grafts easily.

Final comments

It would be foolhardy and unfair to place the blame for infected nursery stock solely on the manufacturer. The problem is systemic and complex within the wine industry, and yet in my opinion, we as an industry have not done nearly enough to solve it. We have accepted the status quo and growers simply take their lumps. We can improve the plant materials supply system in the U.S. and hopefully NCPN will help to foster those positive changes. It is up to growers, nurseries and foundation services to work together to make improvements. The wine industry has neither stepped forward to demand improvements, nor have they offered to help fund programs that could foster research and infrastructure improvements that would lead to higher quality plant materials. Until something changes, James is one of the few resources that the conscientious

grower can rely on for some plant material quality assurance. I could not capture everything he said in his lectures but you can learn a lot by visiting his website and reading his articles. There are few guarantees in agriculture and most of what farmers do on a short to long term basis is risk management. The most basic need for anyone in farming is either a healthy plant or animal. Given the current state of our grapevine supply system, the more you are involved with the quality assurance of your nursery materials the more likely you are to have a healthy vineyard and be a happy grape grower.

I would like to thank James and Julia Jordan for their visit to Pennsylvania, and Ed Lazzarini and Adrienne Bonser for hosting a vineyard and winery tour, and stupendous dinner feast at Ostararo Cellars. I am also very grateful to Ed Boyce and Sarah O'Herron at Black Ankle Vineyard, and Rutger de Vink, Jackie Ross, Josh Grainer and the RdV vineyard team for sharing their Friday lunch with us, and tours of your vineyards and wineries. Everyone who comes, leaves as a believer.

Reference resources:

Stamp, J. [Sourcing Grapevines for a New Vineyard: Considerations for choosing high-quality, disease-free vines.](#) Vineyard and Winery Management. Jan-Feb, 2012.

Mark L. Chien
Viticulture Educator
Penn State Cooperative Extension
<http://pawinegrape.com/>

November, 2012



A crystal clear lateral cross section of a grapevine trunk