

Oregon Wine Advisory Board Research Progress Report

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Field Grafting Grapevines in Oregon

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There are basically two types of grafting, bench grafting and field grafting. Worldwide the main reasons for bench grafting vines are: a) to obtain vines of the desired fruiting variety on roots resistant to phylloxera or nematodes, or b) to obtain vines on roots tolerant to certain soil conditions such as drought or high lime. The main reasons for field grafting are: a) to correct mixed varieties in an established vineyard, or b) to change the variety of an established vineyard. In Oregon, the current main objectives of grafting are to correct mixed varieties within a block and to change one variety to another, because the existing variety is unsuitable for the site or the winery. Phylloxera is not yet a problem in Oregon so grafting *vinifera* onto resistant rootstocks may not be required.

There has been an increase in interest in field grafting grapevines in Oregon. Field grafting in Oregon as well as other cool climate areas has had very limited success. Previous studies indicate that percent graft success in Oregon can range from about 30% to 95% depending on, among other factors, the weather in the Spring. Results this Spring indicate that percent take can be as low as 1%.

Factors important for a successful graft

Compatibility between the rootstock and the scion is important. Usually varieties belonging to the same botanical species will graft on one another. Thus, there is almost no incompatibility between *V. vinifera* varieties.

Callus formation is the first step in the formation of a successful graft union. Callus tissue is simply a mass of cells produced by the cambium layer located just below the bark. The callus tissue has no specific function, but becomes conductive tissue once the gap between the cambium layers of the stock and scion has been bridged. This necessitates a **close proximity between the root stock and scion** or the two cambium layers; the narrower the gap, the more rapid the union. If the union, once formed, is broken by the movement of the scion or stock, the bridging of the gap must start all over again. Thus, it is important to have **mechanical strength** to maintain the position of the scion on the stock until the union is formed. Once the conductive tissue has been formed, nutrients and water flow freely between the stock and scion and the graft is successful.

The formation of callus tissue requires **favorable conditions of temperature, moisture, and aeration**. Temperatures between 75 and 85 degrees Fare ideal; below 70 degrees callus formation is slow and below 60 degrees it almost ceases. Grapes have a high root pressure in the Spring and show excessive sap flow or "bleeding" when cuts are made in preparation for grafting. Grafts made with moisture exudation around the union will not heal. The bleeding can be overcome by making slanting saw cuts

towards the base of the rootstock. Drying out is prevented, without losing aeration, by covering the graft with a porous grafting compound such as black top or gold top sealer. It is often necessary to repaint the graft union area a few days after the graft is made, because the sealer cracks in the sun.

The **age of the vine** is important. Young vines are easier to graft than old vines. Naturally, it is important to collect and maintain **healthy scion wood**.

OSU research on grafting

Ken Brown, Steve Price, Arden Sheets, and myself are studying the effect of grafting method and time of grafting at The Courting Hill Vineyard. Pinot noir is being grafted onto Riesling. The methods being studied are a side graft (inverted "J") with and without the top portion of the rootstock intact, a T bud graft, and a cleft graft. Also there has been a "sleeve" treatment on the cleft graft; in this treatment a clear polyethylene sleeve was placed over the grafted area, tied at the bottom, filled with potting soil, and stapled shut at the top with the scions protruding from the top of the sleeve. In the Summer a "dormant on green" graft (scion dormant and rootstock actively growing) was attempted. The dates on which grafts were done are: March 30, April 18, and June 30. The weather was very poor in May and the last time for grafting was delayed until the last week in June when the weather improved.

The percent take has been very poor so far; an initial estimate indicates it may be as low as 5 to 1 OW. This is likely due to the cool and rainy weather we had after these dates. The sleeve treatment offered only a very slight advantage. However, this treatment would likely increase percent take under clear weather conditions, as the sun would cause an increase in temperature inside the poly sleeve. Whether or not the increase in graft success with the sleeve used in sunny conditions would offset the increase in cost remains to be seen.

This research is being funded by the Wine Advisory Board. Further results from the grafting experiment will be presented in later issues.

Influence of grafting on the character of the scion

Homo-grafting, the process of grafting a variety onto its own roots, has shown that the process of grafting acts like a girdle and increases fruit set. However, grafting by itself does not modify yield or must sugar content.

Grafting a variety onto another variety has different effects. There is an interaction between the rootstock and the scion that is very specific to the varieties used. Grafting may alter the nutrition of the plant, thus affecting any parts of the scion that are susceptible to changes in nutrition. Grafted vines may be either more or less vigorous or more or less fruitful, produce larger or smaller berries of a lighter or darker color, and ripen their fruit earlier or later than ungrafted vines of the same variety. Winkler mentions that no changes in varietal character have been produced by grafting. Since, however, the changes in vigor, fruitfulness, and character of the fruit that may occur with grafting can affect the profitability of a vineyard of grafted vines, the stock selected should be well suited to the particular variety under the given conditions. Lucie Morton discusses the factors that must be considered when selecting a rootstock for your particular vineyard requirements.

Should you field graft?

When grafting simply to change variety one does not have the liberty of choosing a rootstock. The question is: "How is *V. vinifera* as a rootstock?" - and more specifically "How is Riesling as a

rootstock?". When Lucie Morton was asked this question she said, "I have no idea"! This uncertainty must be considered before grafting.

The decision of whether to graft or not to graft and replant instead must be carefully made. Grafting certainly has some advantages. Compared to replanting, a grafted vineyard has about 40 to 60% of full production the year after grafting and full production the year after that. Of course a newly planted vineyard would only have a partial crop in the third year. Also, grafting a vineyard is less expensive than replanting, assuming that the percent take is good.

The disadvantages to grafting in Oregon are many. The uncertainty associated with having a *V. vinifera* rootstock has been discussed; the effects of the rootstock on the scion are not known and the vineyard is planted on a rootstock without all of the desirable characteristics found in many commercially available rootstocks. The rootstock may carry latent (symptomless) 'viruses which may affect the yield or quality of the scion. Realistically the success rate of grafting vines in Oregon is extremely poor. This is partly due to our cool Spring weather, but also to the lack of expertise available for grafting in cool climates. A grower or commercial grafter could have a very high success rate one Spring if the time of grafting is followed by dry, warm weather. Yet, in another year the same grafter could have very poor success due to bad weather. This Spring, for example, 1400 grapevines in an Oregon vineyard were grafted by a commercial grafter from California. The graft used was a side graft with two grafts per plant. The percent take was only 1%.

The variable percent take in a vineyard causes problems such as mixed varieties in a vineyard when latent buds on the rootstock grow and produce fruit; this is especially a problem when both the scion and rootstock are a white grape for example. If the vines that did not take are re-grafted then the vineyard becomes less uniform and this is undesirable for management.

The grower must consider all of the above factors before making a decision. Remember that replanting has the advantages of being able to change plant spacing and use phylloxera-resistant rootstocks, if desired. Certainly one must hesitate with the poor success rate in the past and with comments like "I don't know what Riesling (or any *vinifera*) is like as a rootstock". Remember, there is always the possibility of the market changing in the future.