The early stages of development of a canker and trunk staining, young trunk of Pinot Noir infected with *Botryosphaeria.* (United Kingdom)

GRAPEVINE TRUNK DISEASES: A new global vineyard threat?

Dr. Richard Smart

Grapevine trunk diseases, a complex of fungal diseases, seem recently to be taking on a whole new dimension. Let me explain.

In the 1970s, I had a small vineyard in the Barossa Valley (Australia), and some vines were more than 30 years old. This is a winter rainfall area, like California. I was not surprised that many vines showed Eutypa trunk disease symptoms. However, as was common in the area, infection was generally limited.

The old vines were often unwanted varieties, so the problem was not major. That is not necessarily the case today, as younger vineyards of desirable varieties are now showing Eutypa symptoms. The spread of the disease, through infected pruning wounds, is difficult to avoid.

During my travels, I also became exposed to Esca, called Black Measles in California. It can be a very difficult disease to control in Europe, and can be very damaging. I have seen Tuscan vineyards with very high incidence, and substantial crop losses.

Both Eutypa and Esca have been known for many decades, but a new group of fungi of the genus *Botryosphaeria* is the group lately receiving research attention. I have seen this fungus disease recently in many countries, and generally the problem had been unobserved and undiagnosed.

Problem in UK vineyards

I moved to Cornwall (United Kingdom) in May 2011, and visited vineyards to advise on sustainability issues. This program and private visits gave me the opportunity to visit over 35 vineyards in three tours — in summer, autumn, and winter. Many vineyards had unhealthy vines and some dead vines, often in patches. Looking for causes for the problem I found trunk staining; the more staining the more unhealthy, or even dead, was the vine.

Contact with colleagues around the world and web searches led me to *Botryosphaeria* trunk disease, which was confirmed as *Botryosphaeria parva* by government scientists. This disease was unknown in UK vineyards before, and there has been some reluctance by growers to accept this as a common cause of ill thrift, yet I found symptoms in all but one UK vineyard.

Now, after several workshops, and a seminar involving an Italian researcher specialist, growers are coming to grips with the need to protect pruning wounds in the wet, mild UK winter. There is no cure for infected vines, as is common for trunk diseases, and they must be removed from the vineyard as they are a source of spores and thus spread of infection.

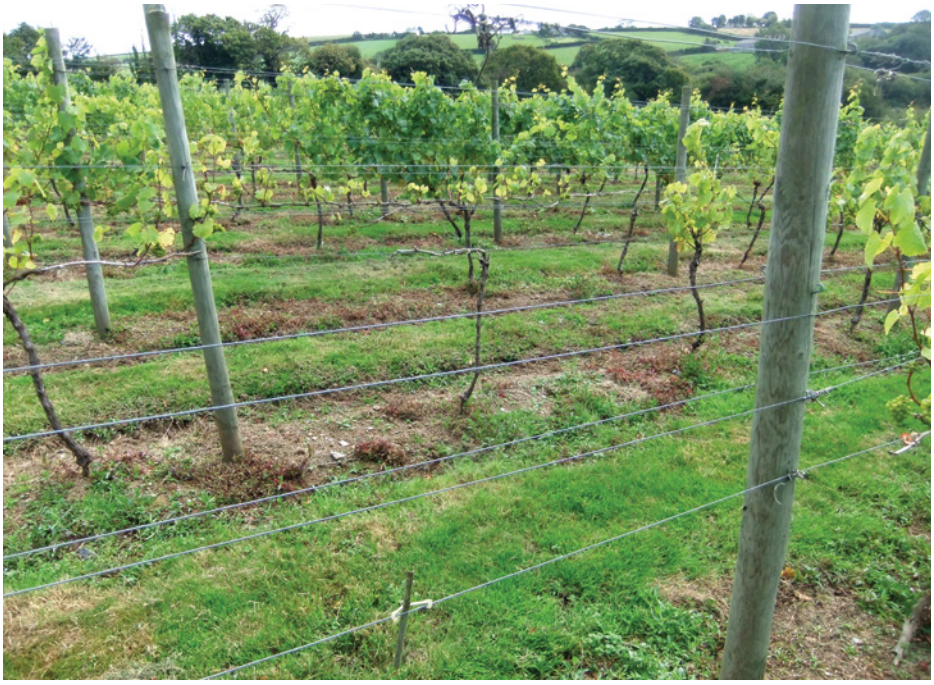
Unfortunately, many newly planted vineyards are also affected by trunk disease in the UK. Grafted vines are imported from Europe and high proportions of vines fail in the first and second year. Staining of the trunk and scion wood can be seen in some delivered plants, suggesting a possible double infection by *Cylindrocarpon* at the base, and *Botryosphaeria* in the scion. Many of these plants die, or fail to thrive. *Cylindrocarpon* is another fungal trunk disease often found in plants delivered from nurseries, and it is sometimes called "Black Foot" disease.

Elsewhere in the world

In 2011, I visited several other countries where I saw trunk disease, to the extent I wondered if it was following me around! My first visit was in Mexico, noting problems on young and old vines, and I have subsequently seen excellent papers in the *American Journal of Enology & Viticulture* describing what I saw. A local scientist is studying the problem, and she is a member of the International Council of Grapevine Trunk Diseases, which is having its eighth meeting in Valencia, Spain in 2012.

There was less awareness in Turkey, where I again saw problems with old and young vineyards, but fortunately very restricted. In Thailand, the situation was very different. Here there

Typical *Botryosphaeria* symptoms Pinot Noir trunk (United Kingdom).



A vineyard in United Kingdom showing effects of *Botryosphaeria* spread. Note missing vines, low vigor and yellow vines, and vines with failed bud break.

is a limited area of wine grape viticulture, but some very enthusiastic winemakers, and some good wines are being produced from vines yielding two crops per year. This means that they are pruned twice each year, and again the weather can be wet and humid.

Old Thailand vineyards were in a dreadful state, with many dead vines, and trunk staining everywhere. A *Botryosphaeria* disease is recorded there in mango, so I suppose it is also quite common in the vineyards; symptoms would indicate it as an initial isolation. More work needs to be done there to stop what is a very obvious spread of disease, so that the present young vineyards may become old and remain productive.

Staining in top of rootstock of failed one–year-old vine apparently from a pruning cut made at a United Kingdom nursery, present under the wax which was present when the vine was delivered.

My last two visits were to northern Europe, to zones at the very edge of cool climate viticulture, Belgium and Norway. In both places I have tasted surprisingly very pleasant wines, including Pinot Noir in Belgium. Both countries were planting new vineyards, and they showed an unacceptable proportion of dead and sick vines. The vines I looked at had trunk and rootstock staining, again typical of trunk disease. Here, as in the UK, many young vineyards planted by enthusiasts are destined to fail because of trunk disease. Again the grafted grapevines were imported from Europe, suggesting problems with nursery procedures and maybe grafting material.

During a three-year project completed in June/2010, Dion Mundy (Scientist at Plant & Food Research, Marlborough Wine Research Centre), reports that regional surveys of vineyards in six of New Zealand's major wine-growing regions provided incidence data for grapevine trunk pathogens including species of *Botryosphaeria*, *Phaeomoniella*, Eutypa, *Phomopsis* and *Phaeoacremonium*.

Returning to California

What is the situation now in California? Are there any contaminated vines being planted, as elsewhere in the world? Studies in many countries have shown that rootstock and scion source blocks can be infected by trunk diseases such as *Botryosphaeria* and *Cylindrocarpon*. Yes, you guessed it, through untreated pruning wounds of vines

CALIFORNIA INPUT

"After the appearance of the new biotypes of Phylloxera, followed by new plantings state-wide, there was a big demand to replace lost vines and meet market demand," recalls Paul Verdegaal, University of California Farm Advisor. "This led to much new planting material that was substandard from a short supply of propagation materials. Also, improper planting in new and replant vineyards caused stress; making new vines more susceptible to dieback problems.

"Since *Botryosphaeria* has the same canker development, but shows no foliar symptoms in the spring, it's possible the organism has been around quite awhile before it was identified as a separate pathogen in vine dieback. Northern regions have tended to test more for *Eutypa,* while southern regions have more *Botryosphaeria*. The Lodi region seems to split with half of each on a vineyard-by-vineyard basis.

"Along with *Eutypa* and *Botryosphaeria* attention to Esca, which includes the complex of pathogens such as *Phaeoacremonium Phaeomoniella spp*, and others, requires further study, as part of the overall canker disease problem.

"In addition, during recent years more susceptible varieties have become dominant in commercial production. Vines that are pushed to produce early, followed by deficit irrigation, and spur pruning; have all possibly led to increased incidence of grapevine trunk diseases."

in source blocks. Some of these source blocks have dead or sick vines, which have hitherto been ignored. This is recorded in Australia and Europe. What is the case in California?

My mind goes back to the late 1980s and early 1990s, after the AXR and phylloxera biotype debacle, when so many California vineyards were removed. I do remember the piles of dead vines, waiting to be burned after removal from vineyards, what a graphic sight!

Then examples of poor young vine growth followed, even death, for vines grafted on "alternate" rootstocks. Thus we had Lucy Morton crying "all is not well," to protests from nurserymen and others. Eventually good sense and science won out, the term "Black Goo" was dropped (but did not die), and the first meeting of the newly formed International Council of Grapevine Trunk diseases was held in California in 1998.

Now California takes the lead again, with awareness of Eutypa and *Botryosphaeria* in vineyards. Dr. Doug Gubler and colleagues from UC Davis published a ***PWV*** article in Jan/Feb 2005 on these diseases. Both are important in California, as both lead to loss of production and high treatment costs.

Researchers around the world note that trunk diseases are becoming **more** rather than less common. Why is this, especially for young vines? I wonder if "source blocks" planted 10 to 30 years ago to combat virus problems might not be a problem themselves, having accumulated enough pruning wounds and maybe infecting fungi, to produce contaminated cuttings?

Conclusions

Reports of trunk disease of vineyards continue to come in from most every vine-producing country, many more than my personal sample listed here. Trunk diseases are also reported in New York State, and elsewhere in the eastern U.S. Are we seeing a new "epidemic," or at least widespread disease? Only time will tell. ■