

**Grapevine fungal vascular diseases.** Elsa Petit, Stockbridge School of Agriculture, University of Massachusetts Amherst, epetit@umass.edu

Grapevine fungal trunk diseases, from esca to dead arm, are very destructive worldwide. Vascular diseases are less obvious than foliar and fruit diseases but they can infect the perennial wood, grow unchecked and become worse as a vineyard ages, resulting in significant dieback and decline over the years. There is a strong demand for novel disease management strategies. In order to improve control of grapevine trunk diseases, we need to better understand them.

## **1- What are fungal vascular diseases of grapevine?**

Eutypa dieback is the best known of the vascular fungal diseases in Northeastern American viticulture. It is diagnosed by the characteristic wedge-shaped area of dead tissue when cutting part of the permanent woody structure of the grapevine. However, there are many unrelated fungi that can cause vascular diseases on grapes (Bettiga, 2013): (1) Species in the Diatrypaceae family including *Eutypa lata* the causal agent of Eutypa dieback ; (2) 21 species in the Botryosphaeriaceae family causing Botryosphaeria dieback and comprised in the genera *Botryosphaeria*, *Diplodia*, *Dothiorella*, *Guignardia*, *Lasiodiplodia*, *Neofusicoccum*, *Phaeobotryosphaeria*, and *Spencermartinsia*, have been isolated from grapevine dieback symptoms, some of which cause a wedge-shaped canker indistinguishable from Eutypa dieback; (3) Species in the genus *Phaeoacremonium* and *Phaeoconiella*, the causal agents of esca or black measles and Petri disease; (4) Species in the genus *Cylindrocarpon*, the causal agent of black foot disease, a root and trunk disease. This list of fungi is absolutely not exhaustive as additional species are frequently being isolated from wood cankers and branch dieback worldwide. Each fungus has its own biology and therefore should theoretically be managed differently.

## **2- Do you have a fungal vascular diseases in your vineyard?**

- On perennial parts:
  - Wedged-shaped perennial cankers could be an indication of either Eutypa dieback or Botryosphaeria dieback.
  - Vascular streaking could be indicative of esca, Petri disease, Botryosphaeria dieback or black foot disease.
- On fruits: One of the most noticeable symptoms of esca occurs on the fruits and inspired the common name “black measles”. Superficial dark spots develop on the berry epidermis between fruit set and ripening. If the spots appear early in the season, the dark spots coalesce, causing berries to shrivel and entire clusters to dry on the vine.
- On leaves: Leaf symptoms of esca usually develop on cane with symptomatic fruits. Leaves show interveinal discoloration and dark-colored cultivars display red-margin around the dead interveinal areas.
- On shoots:

- Flag shoot: For esca, during the active seasons, the first symptom to appear would be a shoot tip dieback where the entire tip appears blighted.
- Stunted shoots: Shoot symptoms of vines help separate Botryosphaeria from Eutypa diseases. In the case of Eutypa, shoots have short internodes and show stunted spring growth with leaves small cupped and chlorotic. In the case of Botryosphaeria, a given cordon could show a total absence of spring growth and normal healthy development of shoots.

### **3- Preventing and managing fungal vascular diseases of grapevine.**

#### **Prevention:**

Plant material should be inspected before planting and young vines should be properly handled during their establishment. Abiotic stress (water-stress...) could be a predisposing factor.

Fungal vascular diseases infect primarily through pruning wounds. In young vineyards (< 5 years old), prevention starts by avoiding infections of new pruning wounds. This can be done by either not pruning during a season when pruning wounds could get infected or by practicing double pruning (i.e. pruning when there is a chance of infection and pruning later on when infection are less likely to remove the part of the trunk that might have been exposed to trunk pathogens). Pruning wounds can also be protected with either fungicides that are labelled for the dormant season or non-fungicide materials that create a physical barrier against infection.

Many grape growers in cool climate viticulture have renewals such as double trunk. This practice could be useful in a case where a canker would have expanded significantly low in the perennial wood in one of the trunk and removal of that trunk is necessary.

#### **Eradication:**

Preventative measures reduce the chance of new infections but do not eradicate diseases. If a vine is infected, one should prune any perennial part with cankers 4 or 5 inches below the visible canker and destroy the wood by burying or burning. Because the fruiting bodies of fungal canker pathogens can be found on dead wood, it is essential to destroy it. Sanitation creates large wounds; therefore it is recommended to apply a pruning-wound protectant if conditions are conducive to disease when pruning (i.e. rain) or one expects the inoculum to be present. In New-York state, a concentrated solution of Topsin-M 70 WSB (3.2 oz/gallon of water) can be applied to pruning wounds where extensive cuts have been made due to the presence of a canker and therefore potential surrounding inoculum is expected (Wilcox, Wayne, 2015).

#### **References cited:**

Bettiga, L. J. (Ed.). 2013. *Grape pest management*. Oakland, California: University of California, Agriculture and Natural Resources.

Wilcox, Wayne. 2015. *Grape disease control*.