

Crown Gall - *Agrobacterium vitis*

Crown gall of grapes is caused by the bacterium *Agrobacterium vitis* and is common throughout the world where grapes are grown. Vines suffering from winter injury due to cold winter temperatures are much more likely to be affected, because the pathogen infects through injury to the lower trunk and callus formation following trunk splitting initiates gall development. In the absence of any trunk injury, vines may carry the bacterium for many years without forming any galls.

Symptoms and Disease Cycle



Crown gall on grape vine
(Photo courtesy of M. Ellis, Ohio State Univ.)

Symptoms begin near the base of the trunk as small, smooth cankers. Galls can also occasionally be observed on fruiting canes and even on roots. Infected grape vines have weak vigor with chlorotic leaves and usually smaller clusters. These plants are more prone to injury by low temperatures.

The bacterium, *A. vitis* is found in the soil, infected plant debris, vines and galls. Infection occurs through wounds, i.e. winter damage, late pruning, hail damage.

Subsequent to infection the bacteria injects small piece of its DNA into the host DNA, resulting in plant cell transformation. The foreign bacterial DNA 'programs' the host cells to produce metabolites (opines) utilized by the pathogen. The infected hyperplastic and hypertrophic host cells result in the gall formation. The galls are in fact the plant's own misshaped parenchyma and vascular cells. The involvement of the vascular bundles (phloem and xylem) results in limiting water and nutrient transport – girdling and eventually killing the plant. Experimental data shows that *A. vitis* infects the plant systemically.

Any propagating material from infected plants has the potential of spreading the disease.

Control

The major measure to prevent this disease is to use disease-free stock when establishing a new vineyard. In established vineyards infected vines should be removed from the site prior to replanting. Avoiding mechanical injury during cultural practices will reduce the incidence of the disease. Utilizing chemicals to control crown gall has proven ineffective. Crown gall can usually be avoided by planting cold hardy varieties that are not susceptible to trunk splitting winter injury.

References

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