NO. 14

Vinews
Viticulture Information News, Week of 29 August 2016
Columbia, MO

Nematodes

When thinking of establishing a vineyard or expanding a vineyard a number of problems can be encountered including nematodes. Root-knot nematodes (*Meloidogyne* spp.) are one of the most destructive and the most prevalent in vineyards in the US. Feeding on grape roots results in the formation of giant cells and often the formation of root galls. Galls and giant cells disrupt water and nutrient flow upward in the plant and decreases vine growth. In most woody perennial plants including grapes, damage from root-knot nematodes seldom kills the plant. However, damage to the plant roots does provide an opportunity for soilborne pathogens to enter the plant and cause further damage. There is a great deal of research that has evaluated the synergistic effect of nematodes and soilborne pathogens. Recently I had the opportunity to evaluate the complexity of nematodes, a soilborne pathogen, and a nematode susceptible grape cultivar.

Root galls from root-knot nematodes (*Meloidogyne* spp.)

Plant samples including roots were collected from the vineyard site. The vineyard was established in early May 2016. Soil samples were also collected from the hole where the plants were removed. Soil was washed from the roots. Eight of the 10 plants had root galls. A soil sample from one of the galled plants was evaluated for nematodes. Next plants were split longitudinally to evaluate the vascular system. All 10 plants showed symptomology of a vascular rot. Three of the ten plants were tested for phytophthora root rot. All three plants tested positive for phytophthora root rot.

Phytophthora root rot can be problem during prolonged wet growing conditions or in poorly drained soils. Phytophthora has a resting spore stage that can remain viable in moist soils for several years. In the presence of free water and a susceptible host the spores germinate producing motile spores. In the presence of water these motile spores can penetrate roots or the crown area of a susceptible host. Although, plant injury is not needed for the motile spores to gain entry, feeding sites or wounding from nematodes likely compounds infection by phytophthora.

Managing phytophthora is reliant on soil water management. The following management strategies need to be implemented prior to planting. In soils with hardpans, the hardpan should be broken up with deep tillage to promote drainage. Soil can also be mounded in the planting rows, resulting in a raised planting surface that will promote soil drainage. These mounded planting areas should be 8 to 10-inches high. During site selection a percolation test should be performed to determine soil drainage.

Rooted cutting was split to expose vascular system. Vascular tissue has turned brown suggesting infection by Phytophthora spp. Lab testing of vascular tissue confirmed Phytophthora spp. infection.

Managing root-knot nematodes is reliant on the use of root-knot nematode resistant rootstocks. In 2010, USDA-ARS released three root-knot nematode resistant rootstocks; Matador, Minotaur, and Kingfisher. These rootstocks are now available from Foundation Plant Services. Currently, I am not aware of the utility of Matador, Minotaur, or Kingfisher in Missouri. In addition, prior root-knot nematode resistant rootstocks released were Freedom and Harmony. Both Freedom and Harmony are no longer resistant to some populations of root-knot nematodes. Some of the more common rootstocks that have been used in Missouri have some level of resistance to root-knot nematodes. For example, 101-14 and 1103 have medium resistance to root-knot nematode whereas 3309C has low levels of resistance to root-knot nematode. When considering rootstocks for nematode resistance also consider the characteristics the rootstock imparts on the scion under local conditions. This means that you may have to establish a small trial of different rootstocks with scion cultivars you are considering.

I know it is very common for many grape growers to send in soil sample(s) for nutrient analysis prior to planting. Certainly consider having another soil sample also evaluated for nematodes. Especially, if you are planting a grape cultivar on its own roots that has known susceptibility to nematodes.

Sampling instructions for plant-parasitic nematode identification and Nematode Soil Sample Submission Form

Cumulative Growing Degree Days for the Seven Grape Growing Regions of Missouri from April 1 to August 29, 2016.

Region	Location by County	Growing Degree Days[1]		
		2016	2015	30 Year Average
Augusta	St. Charles	3087	2978	2927
Hermann	Gasconade	2910	2837	2794
Ozark Highland	Phelps	3179	3103	3006
Ozark Mountain	Lawrence	3120	3038	3001
Southeast	Ste. Genevieve	3175	3150	3014
Central	Boone	3023	2887	2879
Western	Ray	2874	2782	2794

[1]Growing degree days at base 50 from April 1 to August 29, 2016. Data compiled from Useful and Useable at https://mygeohub.org/groups/u2u/tools . Click on link below to determine growing degree days in your area.

To determine the number of growing degree days accumulated in your area since April 1, click this link Search for GDD at your location using this tool.

Please scout your vineyards on a regularly scheduled basis in an effort to manage problem pests. This report contains information on scouting reports from specific locations and may not reflect pest problems in your vineyard. If you would like more information on IPM in grapes, please contact Dean Volenberg at 573-882-0476 or volenbergd@missouri.edu