Washington State
Grape Quarantined Pests - Management Plan Basics

Quarantined Pests Covered: *Xiphinema index*

Operations Covered: All grape producers, including grape stock producers.

WAC Rules:

WAC Chapter 16-483; Grape Pest Quarantine.

https://apps.leg.wa.gov/wac/default.aspx?cite=16-483

Management Plan General Approach: Eradication

Description: Xiphinema index is a nematode in the dagger nematode family. It is currently not found in Washington State. Unlike similar dagger nematodes that are found in the state (i.e., nematodes in the Xiphinema americanum group), it is believed that the soil temperature and moisture content extremes experienced in eastern Washington is not a suitable environment for X. index. While X. index does directly feed on grapevine roots, and can be problematic in young vineyards, it is a primary concern to grape growers due to its ability to vector nepoviruses such as Grapevine fanleaf virus, Tobacco ringspot virus and Tomato ringspot virus. Given that it is not currently found in Washington, a detection of this nematode triggers an eradication approach to try an eliminate its presence from a site as quickly as possible.

Additional Resources:

Nematodes in the PNW Pest Management Plant Disease Handbook:
https://pnwhandbooks.org/plantdisease/pathogen-articles/common/nematodes

Nematodes in Field Guide for Integrated Pest Management in Pacific Northwest Vineyards (2nd edition). PNW Extension Publication #644.
https://pubs.extension.wsu.edu/field-guide-for-integrated-pest-management-in-pacific-northwest-vineyards-2

Nematodes in Pest Management Guide for Grapes in Washington. Washington State University Extension Publication #EB0762.
https://pubs.extension.wsu.edu/2019-pest-management-guide-for-grapes-in-washington

Nematodes. Washington State University – Viticulture and Enology webpage:
https://wine.wsu.edu/extension/pest-management/

Management Plan Specific Approaches

Eradication Protocols:

Establishment of infestation area: If *X. index* is found at a location, the first step in developing a response plan is to determine the extent of the outbreak. Some best practices for this are:

• Soil samples from each position in the field need to be about 250 g (just over 1 cup of soil). However, you should follow the requirements from the soil testing facility.

• Soil cores should be collected from 12 – 48 inches deep. *Xiphinema* nematodes can travel deep within the soil.

• Soil cores should be taken every 10 feet radiating out from the initial point of detection, including in-row and under-vine locations. Do this for 50 feet radiating from that initial sampling point, with a minimum of 4 cardinal sampling lines (a total of 20 soil samples)

• Soil sampling for nematodes is typically best done in the spring or fall, when host plant roots are actively growing.

Eradication Fumigation: Given that *X. index* has a wide host range, the site, including under vine and alleyways, will need to be fumigated to a minimum depth of 24 inches. This will require the removal and burning on-site of existing vines prior to full-site fumigation. Please consult your Washington State University Extension or your licensed agronomist for fumigation recommendations. There are no currently-listed Organic options for this fumigation event, so those vineyards that are certified organic or who are a part of certified sustainability programs will need to notify their inspector of this process. Given *Xiphinema* species also dislike soil disturbance, the act of removing the vines will disrupt the population. All equipment must be thoroughly cleaned on-site after the plant removal and fumigation process. For a site to be determined as officially *X. index* free, WSDA will need to conduct follow-up soil sampling.

Isolated zone*:* If *X. index* is only found immediately (within 20 feet) around the original detection point, isolated fumigation can occur. This would encompass the entire length of the detection row, and include all rows where there was a positive detection, plus 2 adjacent rows on either side beyond the point of first no-detection, Vine removal and fumigation practices are as described above.

Follow-up Plans

1. *Scouting and sampling post-eradication efforts:* Additional site sampling, following the sampling guidelines described above in Eradication Protocols, should occur within 3 months of fumigation, and again the following season in the spring (March – May), and fall (Sept – November).

a. If *X. index* is found at the site during any follow-up sampling, repeat the Eradication Protocols described above. Zonal eradication will no longer be allowed.

b. If. *X. index* is not found at the site for 3 consecutive years after the original detection, the site is no longer considered infested.

2. *Equipment cleaning requirements:* All equipment used for cultivation of the soil in the infested site must be thoroughly washed or steam cleaned to remove all soil and root debris prior to movement out of an infested site. This must be completed until the site is no longer under quarantine pest management regulation.

3. *Fallow period during quarantine pest regulation:* Given *X. index* has a wide host-range, following the Eradication Protocols above, the quarantined location must undergo a fallow period until deemed no longer infested. This includes no irrigation to the site, and complete weed management to prevent alternative hosts from growing. Please consult your Washington State University Extension or your licensed agronomist for chemical and cultural weed management recommendations.