2020-2021 Nova Scotia Pest Notes

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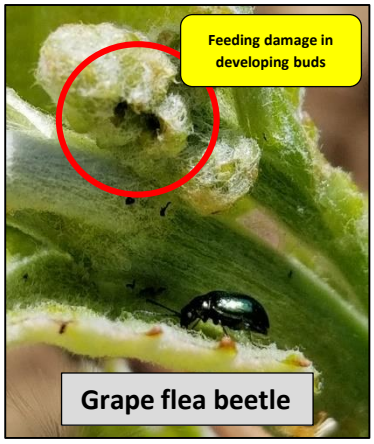
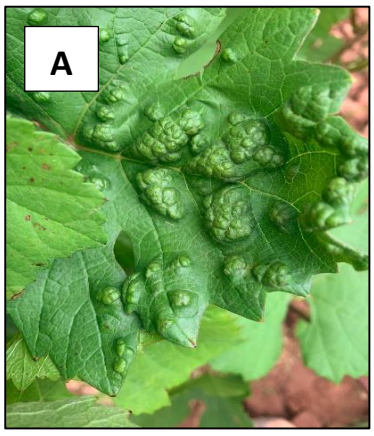
July 2020 #2

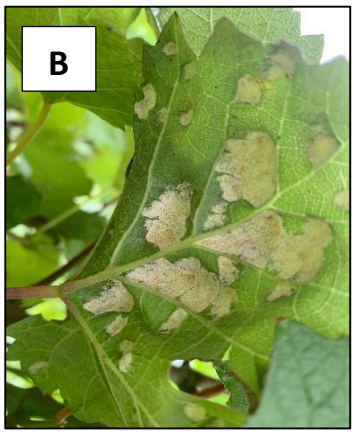
Now that hybrids are at pea-size (will vary by variety and location) and vinifera at fruit set / peppercorn-size the main pests to be on the watch for include some Lepidoptera species (i.e. leaf-folders and rollers, Sphinx moths), erinea mite, and phylloxera. I am still seeing the grape flea beetle in some vineyards but risk of damage is now low. New vines can remain be vulnerable to feeding damage if beetle populations are high. I am also observing early signs of very localized erinea mite. Leaf-feeding caterpillars, like the red-banded leafroller and leaffolder, are present in vineyards but do not usually require management unless economic damage is observed (severe defoliation or species that feed in fruiting clusters). Due to COVID-19 restrictions, our monitoring of phylloxera is limited this year, however, we are finding the root-form in our bucket traps, which means that they are leaving the soil and moving up the vines. I have observed leaf galls in Marquette, Vidal, Petite Pearl, Frontenac, and L'Acadie to date.



Flea Beetles

- Grape flea beetle can feed on primary buds and developing inflorescences
- Adult Red-headed flea beetles feed on new leaves (feeding can cause severe damage in new plantings)
- Both species cause 'shot-hole' damage in leaves
- Pest pressure can vary from year to year
- Vineyard borders adjacent to woods are often most affected
- Action can be taken when thresholds are exceeded or when concerned with damage





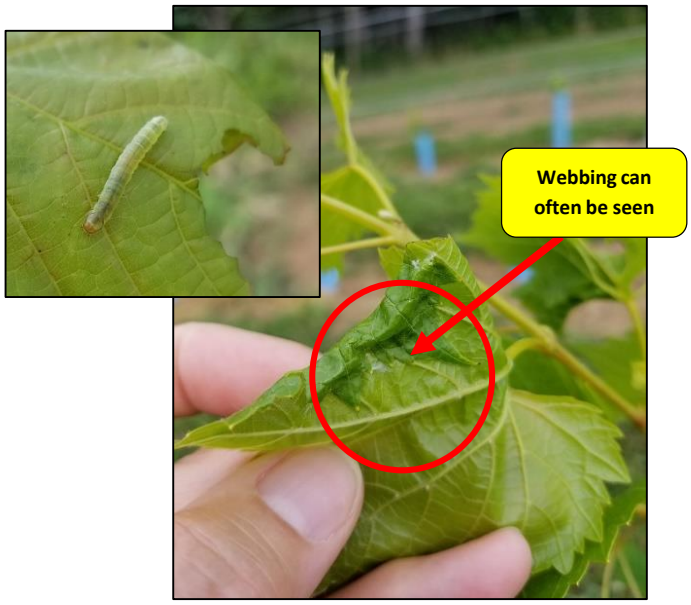
Grape Erineum Mite

- Feeding causes blisters ('galls') on the upper surface of the leaf. **(A)**
- Blisters will appear white to cream-coloured (turning reddish-brown in time) and look 'furry' or 'felt-like' on the lower side of the leaf. **(B)**
- Blisters usually appear when inflorescences are visible
- Populations usually localized and typically do not require management.
- Predatory mites are effective natural enemies of erinea mites and can be supported through use of cover crops and established wildflower beds.

GRAPE LEAF-FOLDERS AND OTHER COMMON MOTH PESTS

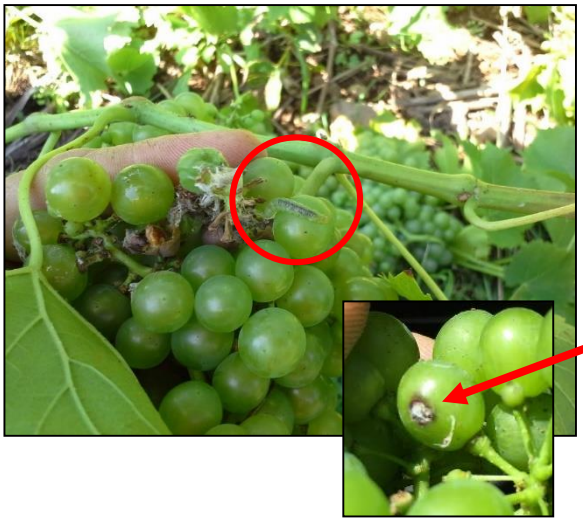
Grape Leaffolder (*Desmia funeralis*)

- An occasional pest in Nova Scotia
- Can defoliate vines if numbers high enough
- Risk of damage highest when inflorescences are visible through fruit set
- Management usually not needed / limited economic impact



Common unwanted visitors in June/July (and Fall):

- Forest tent caterpillar
- Webworms
- Skeletonizers



Redbanded Leafroller (*Argyrotaenia velutinana*)

- Common in Nova Scotia
- Pest in apple
- Webbing and small, pale-green caterpillars can be seen in leaves and/or clusters
- Caterpillars can eat holes into sides of berries but do not enter the fruit like Grape Berry Moth*
- * No record of Grape Berry Moth in Nova Scotia to date
- Management usually not needed

Sphinx or Hawk Moths (Family Sphingidae)

- Some species can feed on grape
- Caterpillars are very large and commonly called 'horntails' (have a small horn-like tail)
- Caterpillars can easily defoliate vines ('big eaters)
- Feeding often seen in August
- Management usually not needed / limited economic impact (except on young vines)

PHYLLOXERA

PEST DESCRIPTION

- Complex life cycle with two life forms (gallicola and radicola) develop at the same time on the vine
- Gallicola form develop on the leaves
- Radicola forms develop on the roots
- One mature female can produce 400-600 eggs inside each gall
- Development from egg to adult female takes ~ 22 days
- Five to seven generations per year (still confirming for Nova Scotia)
- Overlapping generations later in the growing season makes managing more challenging

Eggs in leaf gall

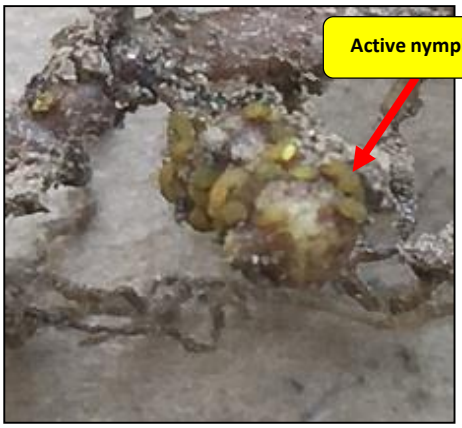
Nymph in leaf gall

DAMAGE

- Leaf-galling is common in hybrid varieties
- Severity of infestation is influenced by vine vigour, soil texture and drainage.
- Hybrid varieties have been considered resistant to phylloxera but the level of 'resistance' appears to vary between varieties.
- In past years, slow decline (poor growth, often not reaching top wires) has been observed in some NS blocks and has eventually led to vine death in some cases. Feeding damage to roots and secondary infections from plant pathogens that get access to vine through feeding sites are the likely cause.

Newly formed leaf galls (Inset: entrance to galls on upper surface)

Gall formation on leaves (often seen in hybrids)



Formation of nodosites and tuberosites (bumps on roots)

MANAGEMENT

CULTURAL & BIOLOGICAL

- Use phylloxera-tolerant rootstocks for *V. vinifera*
- Ensure that planting material is phylloxera-free when establishing new blocks or replanting
- At harvest, assess your vineyard and look for areas where vine growth appears to be weak (this can be a challenge in high vigour varieties). Identify for early monitoring in the next field season.
- If a vine (or small group of vines) is in serious decline or has died, then inspect 'neighbour vines' for signs of phylloxera (i.e. leaf galls, symptoms similar to that seen in potassium deficiencies, slow or stunted growth). Focus on neighbour vines because phylloxera will move away from vines once they are severely impacted.
- June/July – Start visual inspections for galls on leaves. If galls present, cut open the gall to look for 'crawlers' (an magnifying lens is helpful). Insecticides are most effective on active stages (not eggs) that are also feeding.
- When cultivating or using mechanical means to weed, plan your route through the vineyard and visit blocks with phylloxera last to avoid possible spread.
- Create wildflower reservoirs for beneficial species (predators and parasitoids)

CHEMICAL

Registered products for conventional programs:

Movento – Systemic with good efficacy, long-lasting (30 days between applications)

Clutch - Under PMRA review

- Effective but will not eliminate phylloxera populations.
- Early-season chemical control may be more effective than mid- to late-season control in problem vineyards. One overlapping generations are present, it becomes a greater challenge to manage. Foliar applications will have little impact on the eggs and nymphs inside the leaf galls.
- Multiple applications over years are needed for both Movento and Cutch to reduce populations. Both products are toxic to bees. Do not spray at bloom or when bees are active. Clutch can lead to mite outbreaks.
- Please consult the Perennia Grape Management Schedule at https://www.perennia.ca/portfolio-items/grapes/, for recommendations regarding rates, re-entry intervals, etc.

Recommended reading resources:

1. Lasnier, J., McFadden-Smith, W., Moreau, D., Bouchard, P., and Vincent, C. Guide to the key arthropods of vineyards of Eastern Canada. Agriculture and Agri-Food Canada, 2019. http://publications.gc.ca/pub?id=9.868732&sl=0
2. OMAFRA 2009. Grape IPM Guide. http://www.omafra.gov.on.ca/english/crops/facts/88-125.htm
3. OMAFRA 2019. Crop Protection Guide 2020-2021. ttp://www.omafra.gov.on.ca/english/crops/pub360/pub360C.pdf
4. Skinkis, P. , Walton, V., and Kaiser, C. 2009. Grape Phylloxera. Biology and Management in the Pacific Northwest. Oregon state University. https://catalog.extension.oregonstate.edu/sites/catalog/files/project/pdf/ec1463.pdf

Credits: Thank you to those who have shared and allowed me to use their pest photos for educational purposes. I would like to acknowledge Francisco Diez for taking the time to review and provide feedback.

If you notice damage that you think might be insect-related and/or see insects that are of interest, please snap a photo or two and send to me. I will make every effort to identify and can reach out to colleagues for help. Note: If you take photos on your phone, please stick your thumb, coin, or other known object in the image to provide scale.