



GRAPE LEAFHOPPERS IN WASHINGTON

Leafhoppers are small insects which feed on a wide variety of plants. The name leafhopper is derived from the ability of the adults to rapidly initiate flight when disturbed. This habit creates the impression of a hopping motion. Leafhoppers are economic pests of many commercially grown crops.

The two most important leafhopper pests of wine grapes in Washington state are the Western Grape leafhopper (WGLH), *Erythroneura elegantula*, and the Virginia Creeper leafhopper (VCLH), *Erythroneura ziczac*. Both species proceed through three stages of development-egg, nymph, and adult. This pattern holds true for all leafhoppers.

Identification

Egg

The eggs of both species are bean shaped, 0.8 mm in length, and laid mostly on undersides of leaves just under the epidermis. The eggs of WGLH are laid singly, most often near veins or on margins of leaves (Figure 1). The eggs of VCLH are more often laid in clusters of two to nine (Figure 2). The latter are covered with a light blue material not readily visible to the unaided eye. This material extends past the eggs to also cover some leaf tissue surrounding the egg. The covering apparently repels individuals of the same or other species. When nymphs feed heavily on leaves, the result is an area of darker green leaf tissue surrounding the eggs (Figure 3).

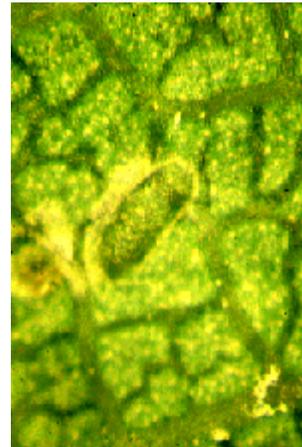


Figure 1.
Egg of the Western
Grape leafhopper



Figure 2.
Eggs of the Virginia Creeper
leafhopper.

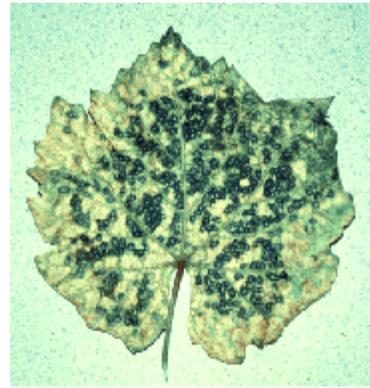


Figure 3.
The antifeedant effect
associated with the eggs of
VCLH. Green areas are
plant tissue surrounding
eggs.

Nymph

The newly hatched nymphs of both species are white, approximately 0.8 mm in length (Figure 4). After one day red spots appear on the back (dorsum) of VCLH nymphs. Faint yellow spots begin to appear on the same area of WGLH, but they are not readily visible to the unaided eye.

Both species proceed through five nymphal growth stages or instars. The entire nymphal period lasts from 2 to 3 weeks, depending on temperature. As nymphs age, spots on both species become darker. Fifth instar nymphs average 2.5 mm in length.



Figure 4.
Western grape leafhopper nymph, left, nad Virginia Creeper
leafhopper, right.
Note dark spots on VCLH nymph.

Adult

Adults of both species are 3 mm in length and possess stripes on their dorsal surfaces (Figure 5). VCLH can be distinguished from WGLH by the red spots on the back behind the eyes. When disturbed, adults may annoy pickers by flying in their faces or by attempting to pierce the skin.

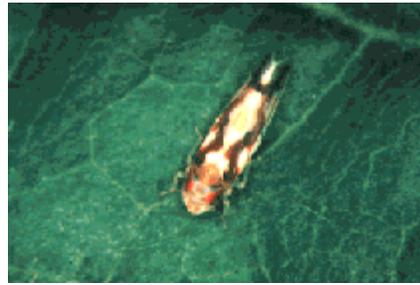


Figure 5.
WGLH adult, left and VCLH adult right.
Note red spots behind eyes on VCLH.

Damage

Leafhoppers pierce leaf cells with stylet-like mouthparts and remove contents, including chlorophyll. As a result leaves turn yellow or brown and may eventually fall off the vine. In managed canopy systems where vines are carefully pruned to improve fruit quality, severe infestations can alter the managed system drastically, and may reduce sugar content of the fruit (Figure 6).



Figure 6.
Leaf damage caused by grape leafhopper feeding.

Life History

Grape leafhoppers overwinter as adults in plant debris and leaf litter in protected locations. Many adults emerge from overwintering sites early in the spring at or before bud break in grape vineyards. At first, they feed on alternate hosts such as annual weeds, hops, or balsam root. As grape foliage becomes available, leafhoppers migrate to grapes, where they mate and lay eggs. Two to three generations per year of both species occur in Washington. The first generation lasts from early May to late June; the second lasts from early mid-July to late August. As grape vines drop their leaves in the fall, adults move to the leaf litter or to surrounding vegetation (weed patches or willow clumps) where they may overwinter.

Management

Successful management of leafhoppers on grapes depends on several factors, including grape variety and cultural practices. Both VCLH and WGLH prefer wine grape, *Vitis vinifera* varieties such as Chardonnay, where hairs on leaf undersurfaces are sparse or absent. Other varieties that require special attention (sampling) include Semillion, Cabernet sauvignon, and Chenin blanc. On the other hand, varieties such as White Riesling and Meunier seem to produce fewer leafhoppers. Leafhoppers are rarely economic pests of the Concord grape, *Vitis labruscana*, which has dense hairs on the leaf undersurface. Another factor in the management of grape leafhoppers is canopy management. Wine grapes being grown under closely managed canopy conditions have a lower threshold for leaf damage. Leafhoppers tend to feed on leaves inside the canopy ("shade" leaves as opposed to "sun" leaves). Grapes grown without close canopy management can tolerate more injury to "shade" leaves. Close canopy management depends on remaining leaf surfaces being present to mature the designated crop load. The loss of leaf surface to leafhopper injury poses a serious problem because the grower cannot compensate for the lost foliage at that stage in crop development.

To prevent loss of foliage in closely managed grape canopy systems, the grower must rely on an insecticide. Several are registered for grape leafhopper control (see Pacific Northwest Insect Control Handbook, available from Washington State University Cooperative Extension offices or Oregon State Extension Service, or Pest Management Guide for Grapes in Washington, WSU EB0762).

The most common time to treat for grape leafhoppers in conventional programs is around mid-July to intercept second generation nymphs as they hatch. Organically certified growers often treat first generation nymphs to prevent population increases that cannot be controlled by chemicals acceptable in organic programs. Growers with a closely managed grape canopy also may choose to treat first generation nymphs to prevent loss of critical foliage.

Growers should base chemical control decisions on careful monitoring of foliage for eggs and nymphs. A wasp parasitoid of grape leafhopper eggs can be useful in leafhopper management. The incidence of parasitized grape leafhopper eggs is roughly 20% for first generation, 40% to 60% for the second generation, and as high as 80% for third generation eggs. Parasitized eggs quickly develop a light cream-colored spot (the young wasp larva). Later the parasitized egg will have an orange spot with a darkened area at one end, which represents waste material from the parasitoid. Newly parasitized eggs (less than 48 hours) are indistinguishable from unparasitized eggs.

Carefully observe and monitor grape leafhopper activity so that appropriate decisions can be made for specific wine grape production conditions.

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Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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