



Understanding the Western Grapeleaf Skeletonizer: Management in Commercial Vineyards

Shaku Nair^{1,2}, Naomi Pier¹, Matt Halldorson², Jeremy Weiss²
¹Dept. of Entomology, ² Cooperative Extension
 University of Arizona

Grapes have been cultivated in Arizona since very early times, starting with native varieties, followed by European introductions by Spanish colonists around the 16th century. Today, grapes are widely cultivated in three American Viticultural Areas as well as many home gardens in Arizona. An important pest affecting grapevines in Arizona is the **western grapeleaf skeletonizer (WGLS)**. The pest is native to the southwestern US, including central California, Arizona, New Mexico, Texas, Utah, and Colorado and extending to northern Mexico.

Description and identification

The western grapeleaf skeletonizer, *Harrisina metallica* (also *Harrisina brillians*), is a moth belonging to the insect order Lepidoptera and family Zygaenidae, which includes several other species of moths, commonly referred to as forester or smoky moths.

The **adults** are metallic dark bluish or greenish black with narrow iridescent wings and long, feathery antennae. They have stocky, cylindrical bodies, about ¾ inch long and the wingspan is slightly over one inch. The wings are held at an angle to the body when at rest, not folded over like other moths.

The **eggs** are cream colored, barrel-shaped, and laid in clusters on the undersides of the leaves.

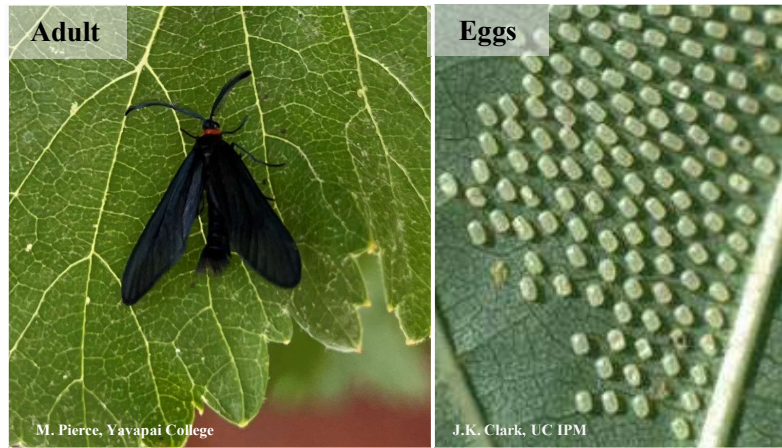
Newly hatched **larvae** are cream colored, later turning brownish yellow with faint stripes. During maturation they turn bright yellow with two purple bands bordered with black towards the front and rear ends, along with additional black bands. **They have stinging hairs on their bodies, that can cause irritation to the skin if touched.** The larvae pass through four to five instars before pupation. Full grown larvae are about ¾ inch in length. Pupation takes place in cracks or crevices on the vine bark, or under debris in the ground. Pupae can be identified by the dirty white cocoon they form.

Life history

In Arizona, WGLS can have up to three generations per year, with adults emerging in spring, starting in May. Adults have a life-span of about a week, during which they mate and the female lays eggs on the undersides of the leaves. The eggs hatch in 7-10 days. Larvae tend to appear in June and July. Larvae take 30-45 days to reach pupation and the pupal stage lasts about 15 days. Overwintering is in the pupal stage, with the cycle repeating when adults appear in spring.

Alternate host plants

WGLS has been recorded only on plants belonging to the grape family, Vitaceae. Alternate hosts include wild and cultivated grapes, as well as Virginia creeper, *Parthenocissus quinquefolia*, and Boston ivy, *P. tricuspidata*.



Newly hatched larvae feeding on a leaf. Note how the green matter is removed, leaving the upper leaf surface and veins intact.



Damage to grape plants

Newly hatched larvae form side-by-side groups on the lower leaf surface, feeding on green matter, leaving the veins and upper surface intact. This results in white patches on the upper sides of the leaves. The larger late fourth and fifth instar larvae remove entire sections of green tissue, leaving only the veins. This causes the typical 'skeletonization', which gives them their name. In large numbers, larvae can cause severe defoliation as well as damage to developing fruit, resulting in bunch rot or sour rot. Loss of leaves can expose fruit, causing sunburn and weakening of the vines.



Digital version available at:
<https://tinyurl.com/jkukxpbw>



Management

Take management actions based on results from monitoring. Mild infestations are tolerated by the plants and may not need intervention. If granulosis infection (see below) is not present with the observance of larvae, intervention can take place after bloom. Later in the season, if treatment is needed, do so when smaller larvae are found, before they mature into later (larger) instars.

Monitor plants regularly, starting from late spring (April) and watch for signs of leaf damage. Pay attention to the undersides of leaves. Typically, skeletonizers are found on the perimeter of fields and monitoring should start there. To monitor adult numbers, **pheromone traps**, incorporating specific WGLS pheromones, can be used. Pheromone traps should be deployed before April, when adults are suspected to emerge and should ideally be checked at least once a week. Corrugated cardboard placed around plant trunks can be used to monitor for pupae. Monitoring the numbers of adults and pupae is important in understanding the population numbers in your field and will help inform management decisions. Traps alone are not to be used as a control method.

For small plantings, **sanitation** helps reduce infestations. Severely infested leaves should be removed and discarded. Fallen leaves and plant debris at the base of plants should also be removed periodically because they serve as pupation sites. This may not be practical for commercial growers, or large acreage, but is encouraged when possible. Hand-picking larvae or eggs, is also a good option. Be sure to wear gloves to protect your skin from the stinging hairs on the larvae.

Biological. *Bacillus thuringiensis* (Bt) or spinosad sprays are very effective in controlling heavy infestations. Bt only affects larvae. Choosing the right strain of Bt (kurstaki) is important. Ideally control measures for larvae should be taken while populations are at the first to third instar stage.

Natural enemies. The wasp, *Apanteles harrisinae*, and tachinid fly, *Ametadoria misella*, are two parasitoids that kill WGLS larvae and help control populations naturally. The granulosis virus, (HbGV) naturally occurs in WGLS populations, and under normal circumstances keeps skeletonizer population growth in check. Viral infection is indicated by erratic laying of egg groups and larvae feeding in random patches and not in organized groups.

Chemical. A number of chemical insecticides are listed for grapes. Chemical insecticides used to control other lepidopteran larvae may also be effective on WGLS. Treat larvae after bloom, if the granulosis virus is not observed. Treatment later in the season should be done when small larvae are found. More targeted controls, such as Bt or spinosad, are suggested for use at the action thresholds from the [University of California, IPM](https://www.ipm.ucanr.edu/).

References, further information:

University of California Cooperative Extension. Pest monitoring guide for Western Grape Leaf Skeletonizer. Hobby Vineyardists Newsletter. Volume (58409). https://cenapa.ucanr.edu/newsletters/Hobby_Vineyardists_Newsletter58409.pdf

University of California Cooperative Extension. Western Grape Leaf Skeletonizer. <https://ipm.ucanr.edu/agriculture/grape/western-grapeleaf-skeletonizer>

DeGomez, T. 2015. Growing Grapes in the Home Garden. Arizona Cooperative Extension Publication AZ 1657.

<https://extension.arizona.edu/sites/extension.arizona.edu/files/pubs/az1657-2015.pdf>

Roltsh, W.J., Villegas, B. (2004). Western Grapeleaf Skeletonizer Harrisina Brillians Barnes and McDunnough (Lepidoptera: Zygaenidae). In: Encyclopedia of Entomology. Springer, Dordrecht. https://doi.org/10.1007/0-306-48380-7_4565



Severely damage grape leaves, exposing developing fruit and characteristic “skeletonization”. Early and Late instar larvae with frass and leaf damage (inlay photo).



Ametadoria misella

Apanteles harrisinae



Erratic egg laying and feeding patterns following HbGV infection.