

GRAPE INSECT PESTS OF THE HOME GARDEN

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Growing grapes is becoming increasingly popular for the home gardener. Once grapevines are established, they can be productive for over 40 years. The productivity of the grapevines relies heavily on the careful choices of the home gardener. Home fruit gardeners can be successful if they select the right cultivars, properly prune grapevines annually, and maintain good fertility and pest management programs.

Accurate insect identification is essential in any pest management program. In this publication we have compiled a list of insects commonly found on grapes in Minnesota. Please remember that careful, timely inspection of grapes and good cultural practices will aid in reducing the need for insecticide applications.

FOLIAGE PESTS

Grape Phylloxera

Grape phylloxera, *Daktulosphaira vitifoliae* (Hemiptera: Phylloxeridae) possess both a root and foliar form. Although the two forms behave differently, both belong to the same species of phylloxera that occurs on the leaves and roots of grapes. In Minnesota, it is only the foliar form that potentially can cause damage as the rootstocks used in Minnesota are tolerant of feeding by the root form of phylloxera.

IDENTIFICATION & LIFE CYCLE

Adult grape phylloxera are tiny aphid-like insects with a yellow body. The foliar form of grape phylloxera causes the formation of tiny galls, i.e. abnormal growths, to form on the leaves. Grape phylloxera survive the winter as eggs under the bark of the grapevine. In the spring, eggs hatch and nymphs move onto new leaves and develop new galls. Once mature, the female begins to lay eggs within the gall. Nymphs hatching from these eggs crawl to new leaves at shoot tips, settle on

the leaves, and form new galls. There are two to three generations of phylloxera each season with the majority of the galling occurring in the first generation in the spring.

DAMAGE

In most cases, grape phylloxera only affects the appearance of the leaves without impacting the health of the grape. Severe infestations of foliar phylloxera can reduce the photosynthetic ability



Figure 1. *Grape phylloxera*. (Credit: Unknown)



Figure 2. *Grape phylloxera*. (Credit: Eric Burkness, U of MN)

of grape leaves. In addition, high levels of leaf galls cause leaf distortion, necrosis, and premature defoliation. Premature defoliation may delay ripening, reduce crop quality, and predispose vines to winter injury.

MANAGEMENT

Routinely monitor grapevines and be aware of any gall formations on grape leaves. The galls may not be visually appealing; however, grapevines can support small to moderate populations of foliar phylloxera without it resulting in decreased vine vigor.

INSECTICIDAL

In general, management of grape phylloxera is not required. If grape vines have a history of severe grape phylloxera infestations, an insecticide application may be needed, although management is challenging. Apply during the bloom stage with an appropriate insecticide, such as carbaryl.

Japanese Beetle

Japanese beetle, *Popillia japonica* (Coleoptera: Scarabaeidae), feeds on nearly 300 species of plants, including fruits, vegetables, ornamentals, field and forage crops and various weeds. Although it is considered established in Minnesota, it is not necessarily common throughout Minnesota yet.

IDENTIFICATION & LIFE CYCLE

Adult beetles can be identified by their brilliant metallic green head and thorax with copper-brown wing covers and five patches of white hairs on each side of the abdomen and two patches of white hair on the tip of the abdomen. Eggs are very small (approximately 0.03 inch in diameter) and are laid in grassy areas. Larvae are typical white grubs, with a conspicuous brown head, legs, and a body bent into a c-shape.

Japanese beetle larvae overwinter as well-developed larvae in the soil. In the spring, larvae move toward the surface where they continue to feed on the roots of grasses and weeds and pupate. Japanese beetle adults emerge from the ground in June and July and begin feeding upon foliage. Eggs are laid in the soil in July and August in grassy areas. Eggs begin to hatch in late July and



Figure 3. Japanese beetle. (Credit: Jeff Hahn, U of MN)



Figure 4. Japanese beetle damage on grapes. (Credit: Jeff Hahn, U of MN)

larvae feed and grow until cold weather, at which time they tunnel 3 to 12 inches down and make overwintering cells. There is one generation per year.

DAMAGE

Japanese beetle adults are leaf skeletonizers, i.e. they eat the leaf tissue between the veins, giving the leaf a lace-like appearance. Leaves fed upon by Japanese beetles soon wither and die. Grapes can tolerate small to moderate amounts of damage, while severely defoliated grapes can be injured.

MANAGEMENT

Examine plants at least twice per week during the growing season to check for Japanese beetle adults. Look for both adults and symptoms of their feeding.

CULTURAL

Japanese beetles prefer foliage exposed to direct sunlight, and vines with thin, smooth leaves, such as French hybrids, are preferred over those with thick, pubescent leaves. Therefore variety selection is important if Japanese beetle is of a concern to the home gardener.

PHYSICAL

If a few or a moderate number of adult beetles are found on grape foliage, handpicking them can provide acceptable control. The best time to physically remove Japanese beetles is in the morning before they become very active. Just knock them off into a pail of soapy water.

INSECTICIDAL

If the population of beetles is such that handpicking them is not a feasible option, foliar applications of an insecticide such as permethrin, carbaryl, or malathion can help reduce the Japanese beetle population. There is no published threshold for Japanese beetle, however, if >15% of leaves are damaged; an insecticide spray may be warranted. It is important to note that Japanese beetles are gregarious and they may be present in great numbers on just a few vines. Therefore a localized spot treatment may be appropriate.

FLOWER & FRUIT PESTS***Grape Flea Beetle*****IDENTIFICATION & LIFE CYCLE**

Grape flea beetles, *Altica* spp. (Coleoptera: Chrysomelidae), are approximately 1/10 inch, long, shiny blue purple to blue green, with enlarged hind legs for jumping. Grape flea beetles overwinter as adults under the soil surface or in wood crevices, in and around the grapevines. In the early spring, adults emerge from overwintering sites, feed upon grape buds, mate and lay eggs. Larvae emerge in about two weeks and feed on leaves. Between late June and late July larvae will fall to the ground to pupate. Adult beetles emerge in late July and feed on grapevine leaves, but do not mate or lay eggs. In the fall the adults move to overwintering sites. There is one generation per year.

DAMAGE

Adult beetles damage primary buds when they feed on them, which prevents them from developing into shoots, which results in decreased grape yield. Larvae feed on the foliage but this is typically limited to several leaves and vines. Fortunately, larval damage does not usually affect grape quality or yield.

MANAGEMENT

Monitor grapevines in the early spring for grape flea beetle activity. Although grape flea beetles are active later in the summer, it is not important to monitor their activity then.

CULTURAL/PHYSICAL

Remove debris and leaf litter in and around grapevines. This will help to eliminate



Figure 5. Grape flea beetle and damaged grape bud. (Credit: Eric Burkness, U of MN)



Figure 5. Grape flea beetle and damaged grape bud. (Credit: Eric Burkness, U of MN)

overwintering sites.

INSECTICIDAL

In particularly heavy infestations, if >4% of grape buds are infested, spray an application of carbaryl, esfenvalerate, or pyrethrin to reduce grape flea beetles. Proper timing of the insecticide is imperative to provide good control of grape flea beetles.

Grape Berry Moth

IDENTIFICATION & LIFE CYCLE

The adult grape berry moth, *Endopiza vitana* (Lepidoptera: Tortricidae), is a small, inconspicuous, mottled brown-colored moth with a bluish-gray band on the inner halves of the front wings. It is approximately 3/8 inch long, with a wingspan of 1/3 to 1/2 inch. The newly hatched larva is creamy white with a dark brown head while late instars are green to purple in color, and are 1/3 inch in length when fully grown.

Adult moths emerge in mid to late May, mate, and lay eggs on or near grape flower clusters. Larvae hatch from eggs in 4-8 days and emergence of the overwintering generation peaks in mid-June and continues to mid-July. Larvae that hatch in June make up the first generation. Larvae feed on tender stems, blossom buds and berries. Some larvae pupate in the fruit cluster where they have fed.

First generation adults begin to fly in late July, and the flight peaks in early August, however, adult moths continue to emerge until early September. Second generation larvae usually enter where the berries touch each other or where the berry joins the stem, and tunnel directly into the green berries and feed internally. Conspicuous red spots develop on the berries at the point of larval entry, and are referred to as “stung” berries. Larvae of the second generation complete their development in late September and pupate in fallen leaves. There are 2 generations/year.

DAMAGE

The larva is the damaging stage of the insect, and causes damage by feeding on the grape berry. In addition, larvae can be a contaminant or act as an entry point for diseases. Injured berries ripen

prematurely, split open and shrivel. Webbing produced by larvae prevents the berries from dropping. When grape clusters are ready to be picked, severely infested clusters may contain



Figure 7. Grape berry moth. (Credit: Ted Galvan, U of MN)



Figure 8. Grape berry moth damage. (Credit: note shriveled berries. (Credit: Ted Galvan, U of MN)



Figure 9. Grape berry moth damage (note webbing). (Credit: T.L. Galvan, U of MN)

several larvae.

MANAGEMENT

CULTURAL/PHYSICAL

Because grape berry moth over-winters as pupae in leaf litter on the ground, removing and destroying dead leaves can help reduce grape berry moth emergence in the spring. In addition, covering leaf litter with one inch of compacted soil will prevent emergence. Both of these options must be completed three weeks prior to bloom. In light infestations, remove injured berries by hand.

INSECTICIDAL

Where grape berry moth is an annual problem, a post bloom insecticide application may be

necessary, and a late summer application may be needed to control the second generation. The number of spray applications depends on the amount of infested berries a home gardener is willing to accept. Effective insecticides include spinosad, pyrethrin, or carbaryl.

Multicolored Asian Lady Beetle

IDENTIFICATION & LIFE CYCLE

The multicolored Asian lady beetle, *Harmonia axyridis* (Coleoptera: Coccinellidae), is a predatory lady beetle native to eastern Asia that was first detected in Minnesota in 1994. Multicolored Asian lady beetle adults are approximately 1/4 - 1/3 inch long and round. The coloration of multicolored Asian lady beetle adults is commonly orange to red with zero to 19 black spots, and rarely black with red spots. The most distinguishing feature of adult multicolored Asian lady beetles is the black “M”-shaped marking on the center of the pronotum (shield-shaped area behind the head). Eggs are yellow and oval-shaped. Multicolored Asian lady beetle larvae are alligator-shaped with black and orange markings, and are spiny in appearance.

In the spring, multicolored Asian lady beetle adults leave their overwintering sites and mate. Adults then seek out colonies of aphids and lay eggs. Larvae develop through four instars (stages). In the fall, multicolored Asian lady beetle adults move to grapes when their primary food source (aphids) is not available. At this time, grapes are close to maturity and may be injured due to splitting, or by wasps and birds, which creates feeding sites for adult beetles. Adult multicolored Asian lady beetles migrate from fields and wooded areas to buildings in the fall where they overwinter in cracks or spaces. There are 2 generations/year.

DAMAGE

In Minnesota, multicolored Asian lady beetle adults seem to only be attracted to grapes that have been previously damaged by wasps, birds, or physiological splitting. Once grapes are damaged, adult beetles feed on the injured areas of the berries. In addition, adult beetles are a contaminant in wine production. Multicolored Asian lady beetle adults are difficult to remove



Figure 10. Multicolored Asian lady beetle – adult (top left), larva (top right) and pupa (bottom). (Credit: Dept. of Entomology, U of MN)



Figure 11. Multicolored Asian lady beetle on damaged grape. (Credit: Ted Galvan, U of MN)

from clusters of grapes after they are picked; therefore some may be crushed with the grapes during processing. The flavor of the resulting wine is often tainted by the alkaloids contained in multicolored Asian lady beetles.

MANAGEMENT

CULTURAL/PHYSICAL

For home gardeners, the most important means of controlling multicolored Asian lady beetles is to remove injured grapes or clusters from grapevines. This will help to reduce the attractiveness and infestation of grape clusters by multicolored Asian lady beetles. Grapes should be picked late in the day, when beetles are less likely to be active. In addition, shake the clusters to dislodge the multicolored Asian lady beetles prior to picking.

INSECTICIDAL

Insecticides labeled for home gardeners are not a very effective management option because they need to be applied relatively close to when the grape clusters will be picked, which is when the multicolored Asian lady beetles are present. An insecticide with a 1-day or 0-day pre-harvest interval, such as pyrethrin, may provide some control of multicolored Asian lady beetles. If multicolored Asian lady beetles are present when picking the grape clusters, it is imperative that they be removed prior crushing to prevent tainted wine or juice.

Yellowjackets

IDENTIFICATION & LIFE CYCLE

Yellowjackets, *Vespula* spp., (Hymenoptera: Vespidae) are approximately 1/2 inch long and have alternating yellow and black bands on the abdomen and are relatively smooth-bodied. Yellowjackets can be mistaken for honey bees because of their similar appearance and ability to sting. Honey bees are slightly larger than yellowjackets, are brown and black, and are covered with setae (hair). Foraging honey bees can also be identified by the pollen baskets on the rear legs that are often loaded with a ball of yellow or green pollen. The yellowjacket has a smooth stinger that can be used to sting multiple times, whereas the honey bee has a barbed stinger



Figure 12. Yellowjacket on damaged grape. (Credit: Eric Burkness, U of MN)



Figure 13. Yellowjacket on grapes. (Credit: Ted Galvan, U of MN)

than can be used to sting only once.

Yellowjacket nests are constructed of several layers of combs made of tiny bits of wood fiber chewed into paper-like pulp. The colony rapidly increases in size and the number of adult yellowjackets may reach several hundred to several thousand by August.

DAMAGE

In late summer and early fall when their populations peak, the standard insect diet of the yellowjacket changes to sugar sources such as berries and grapes. Their feeding can cause damage to the grapes and can also be a danger because of their stings to people picking the grapes.

Table 1. Common names of insecticides and the pests they control

| Insecticide | Example of Brand Name | Pest | Residual | Notes |
|---------------|------------------------------------|--|-------------|---------|
| Pyrethrin | Bug Buster-O | Grape flea beetle, Grape phylloxera, Multicolored Asian ladybeetle, Grape berry moth | Short | Contact |
| Malathion | Spectracide malathion | Japanese beetle, Grape phylloxera | Short | Contact |
| Spinosad | Monterey Garden & Insect Spray | Grape berry moth | Short | Contact |
| Carbaryl | Sevin | Grape flea beetle, Japanese beetle, Grape phylloxera | Medium | Contact |
| Permethrin | Eight Garden & Home Insect Control | Japanese beetle | Medium-long | Contact |
| Esfenvalerate | Ortho Bug-Be-Gon MAX | Grape flea beetle | Long | Contact |

MANAGEMENT

CULTURAL/PHYSICAL

Grape clusters should be picked as soon as they ripen to discourage yellowjacket feeding. Remove any overripe or damaged fruit from the grapevines. In addition, do not leave any food items near the grapevines, as they may attract yellowjackets to the area.

INSECTICIDAL

Insecticides are not an effective management option for controlling yellowjackets.

CAUTION: Always use insecticides strictly in accordance with label precautionary statements and directions. The label should state that the insecticide may be used on grapes or generally on fruit. Carefully observe the waiting period. Protect pollinators--do not spray grapes or other fruits when they are blossoming. If suggestions in this publication contradict label recommendations, the label is the final authority on how to use that specific product.

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