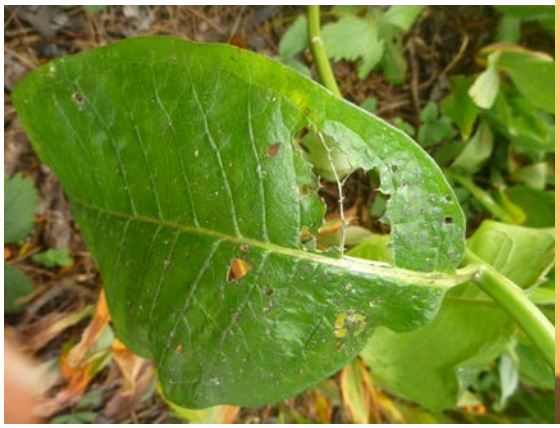
**Herbivore Damage and Invertebrate Guide**

**Chewing Damage.**
Chewing damage is identifiable as an area where leaf tissue was obviously removed, usually leaving a ragged edge. Leaf damage might be on the edge of the leaf or an area inside of the leaf. For sample images, see photos with monarch caterpillars, tussock moths, or milkweed beetles below.

**Leaf Miner Damage.**
Examine leaves for leaf miner damage. Leaf miner damage is identifiable as a small "bubble" on the leaf inside which the leaf miners burrow and leave their droppings behind. They are discolored compared to intact leaf tissue, typically white while inhabited, although they may become brown over time. Photos by Joe Zito (top left), Ilona L (top right), and Conrad Vispo (bottom).

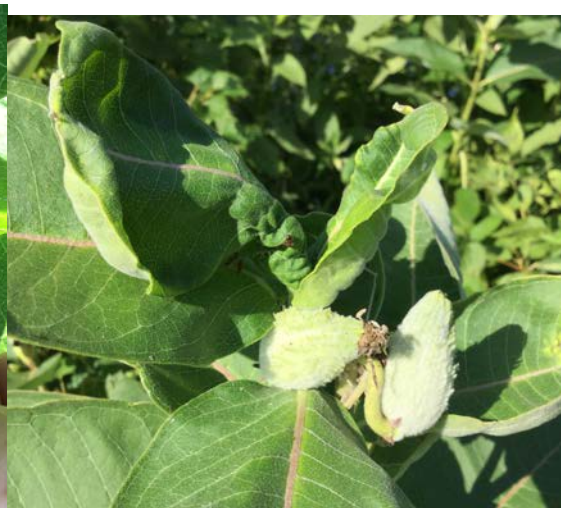


**Mollusk Damage.**
Snails and slugs are mollusks that leave slime trails behind them. They typically cause skeletonized damage on the leaves, meaning they cut out lots of little holes on the inside of the leaf. Don't confuse this with damage by the colonies of tussock moth caterpillars. You'll know it's mollusk damage if you see the slime trails. Photos from https://keekeepod.wordpress.com/2013/05/30/what-eats-milkweed/; Emily Mohl

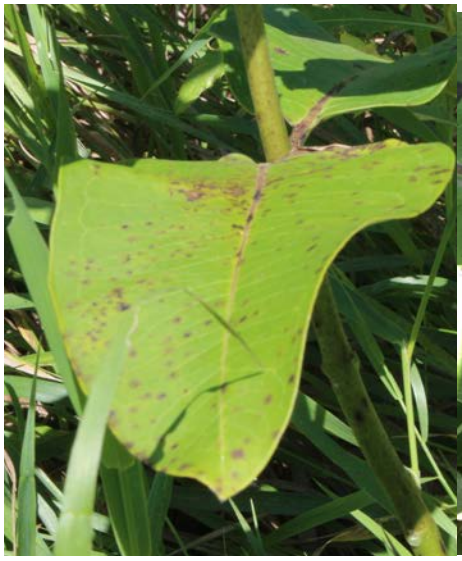



**Insect-Imposed Stem Damage.**
Examine the stem for insect-imposed stem damage. Scars on the stems of milkweed plants typically indicate that weevils have laid their eggs inside the plant, where the larvae grow and feed, sometimes severely impacting plant growth. See the images of weevils and their damage created by Lina Hernandez, attached at the end of this guide.

**Presence/Absence of Leaf Curling.**
Some milkweed plants have highly curled leaves. This can be the result of viruses, aphids, or spider mites. Photos by Emily Mohl

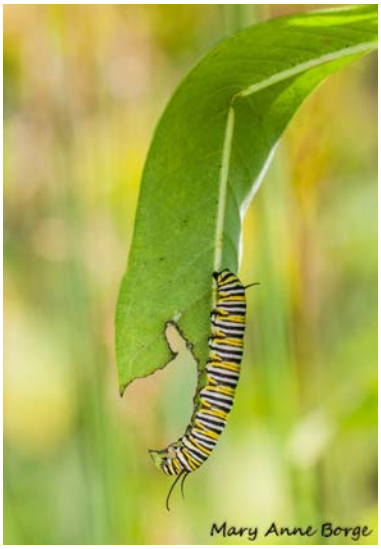



**Leaf Spots.**
Dark spots or patches can occur on milkweed leaves for many reasons, ranging from disease to ozone damage to sticky patches of mold. Photos by Olivia Sullivan and Emily Mohl.

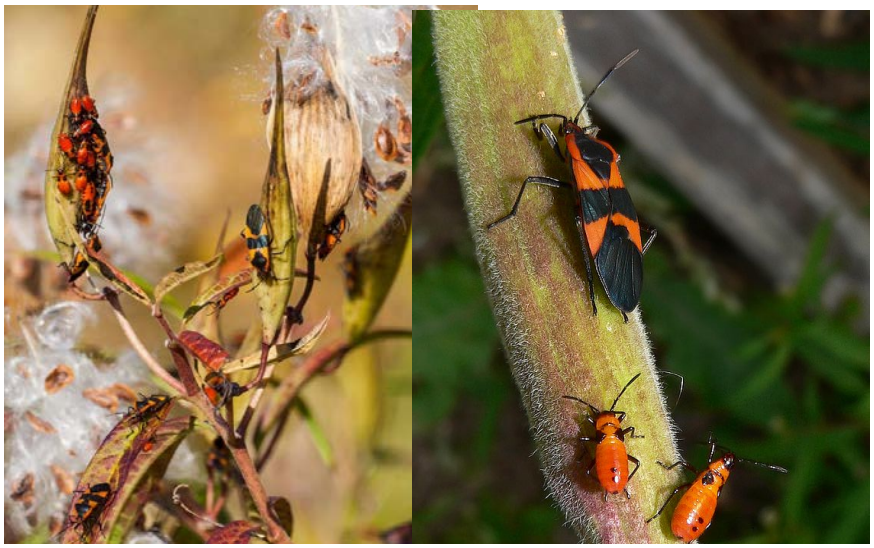



**Invertebrate Guide**

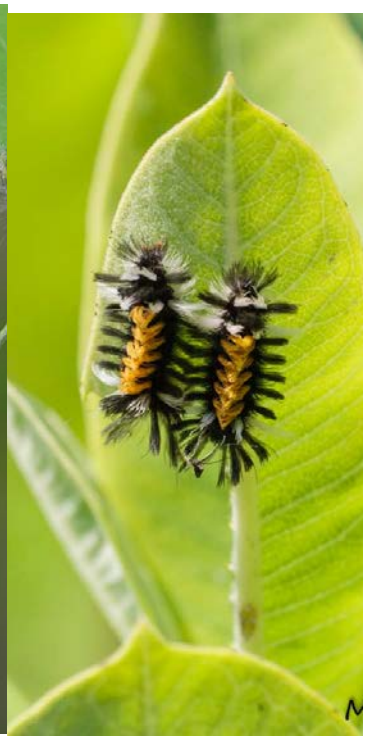
a. **Monarch caterpillars**. Usually there is just one monarch caterpillar on a plant. They go through 5 different growth stages and can range from very small to quite big. The smallest ones will eat small holes in a leaf, but the larger ones will chew through the midvein to prevent the latex from flowing to the rest of the leaf, and then begin eating from the tip of the leaf toward the base. Photo by Mary Anne Borge.



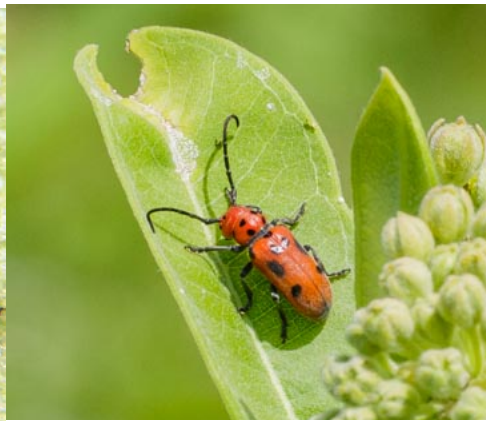
b. Milkweed bugs. Milkweed bugs feed on the seeds by sticking their sucking mouthparts into the seed, injecting it with saliva, and then sucking up the pre-digested food. Notice that the nymphs look very different from the adults, and they tend to be highly gregarious, or live and feed in groups. Some of the northern populations of milkweed bugs are known to migrate when it gets cold. Photos by Mary Anne Borge (left) and Greg Hume (right).



c. Tussock moth larvae. Tussock moths are gregarious when they are young, meaning they live together in groups. Often, they will skeletonize a leaf. As they get older, they live in smaller groups and tend to consume more of the leaf tissue. Photos by Alison Hunter (left), Mary Anne Borge (right).

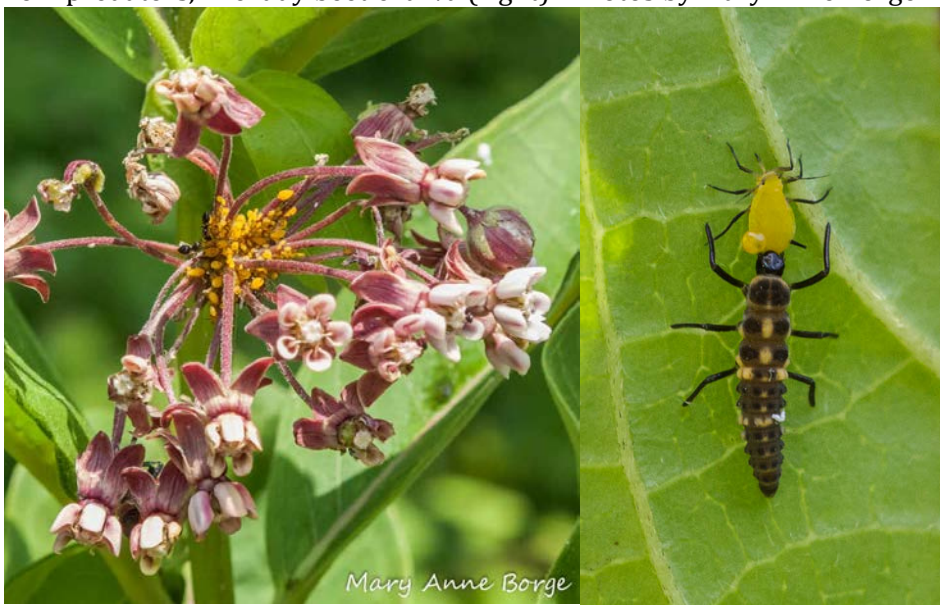



d. Red milkweed beetles. A type of longhorned beetle, the scientific name for these beetles recognizes that if you look closely, they have four eyes, two on top of the antennae and two beneath. There are related species of red milkweed beetles that are specifically adapted to different species of milkweed plants. The adults feed on leaves, flowers, and fruits, but the larvae live underground where they eat milkweed roots. Photos by Bruce Marlin (left) and Mary Anne Borge (right).

e. Weevils. Milkweed Weevils are small and grey and tend to fall off the plant when disturbed, so keep your eyes peeled for them. They damage the stems by laying their eggs in small holes in the stem. Their larvae eat the stem tissues as they develop. See the images of weevils and their damage created by Lina Hernandez, attached at the end of this guide.

f. Aphids. Aphids are insects with piercing mouthparts that they use to suck sugary phloem (sap) from the plant. They are small insects with soft bodies that reproduce very quickly, so there are often large groups of them on plants. Sometimes they have wings. They poop out sugary honeydew, which provides food for ants (left), who help to protect aphids from predators, like lady beetle larva (right). Photos by Mary Anne Borge.




g. Ants. Ants are frequently found tending aphids for their sweet honeydew. They act as predators against other milkweed-eaters, however.

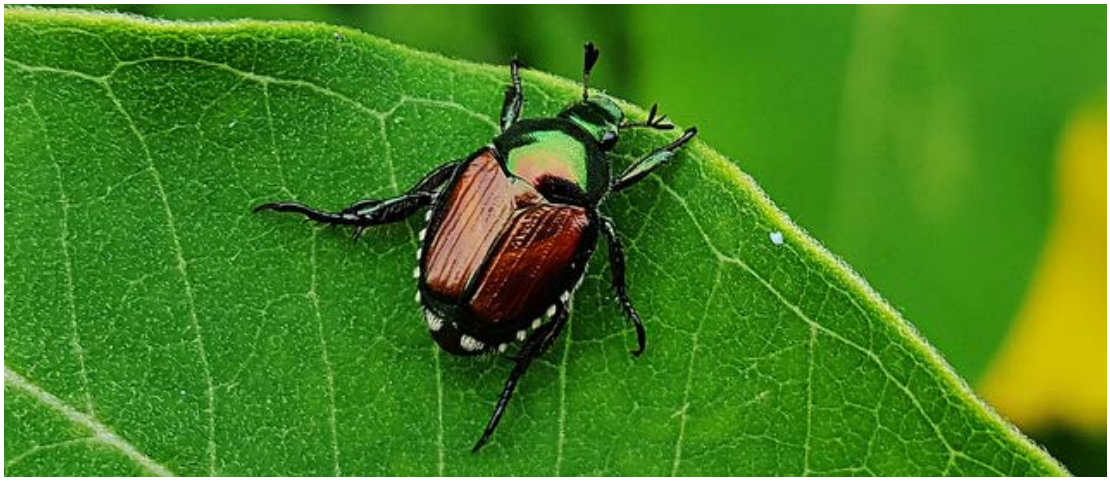
h. Ladybeetles (Ladybugs). Ladybeetles are predators and often eat aphids.

i. Bees or wasps. Bees are pollinators, so they typically visit the flowers. Wasps are also sometimes attracted to the sweet honeydew that falls from aphids onto the leaves.

j. Spiders. Spiders are predators. They can often survive on a plant for a long time, waiting for prey to show up.

k. Snails/slugs. Snails and slugs are generalist herbivores. They eat all kinds of plants, not just milkweed.

l. Japanese beetles. These are an invasive species that have been found primarily eating flowers on milkweeds, where they can impose significant damage. Photo by Matthew Beziat.



l. Other. Let us know what else you are finding.

3. If you have aphids on your plant, record the color. Select all that apply.

a. Bright Yellow. See photo above under Aphids. These aphids live in groups and are bright yellow, so they are easy to spot.

b. Green or Brown. These aphids typically live in groups at the tops of the plants, and they almost always have ants visiting them. Photo by Emily Mohl

c. Clear or Orange. These aphids usually live spread out on the bottom sides of leaves. The adults always have wings, and sometimes they have orange stripes or patches. The smallest nymphs appear almost translucent. Photos by Beatriz Moisset and Kenneth Frank

d. Other. Sometimes there are other kinds of aphids found on milkweed.

d. NA