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Hemiptera: The True Bug Predators

Insects in the order Hemiptera are commonly called ‘The True Bugs’. This large and diverse order includes many insects that feed on plant sap.

Some of these, such as aphids, stink bugs, and scales, are significant home garden pests. However, the Hemiptera also includes several important garden predators. There are a few key features that aid in the identification of predatory Hemiptera. First, the predators within this order have a thickened forewing, a leathery hind wing, and a membranous front wing. Their hind wings are smaller and completely membranous — perhaps the inspiration for the Latin name Hemiptera, which means “half-wing.” Second, predatory Hemiptera share a unique mouthpart called a stylet, or beak. This mouthpart functions like a straw: the predator pierces its prey and many will release saliva with enzymes that are able to partially digest the prey, allowing the insect to ingest the meal thought its beak. Because of this, many true bug predators can inflict a painful bite. Make sure to handle them with extreme care.

Insects in the order Hemiptera develop by gradual metamorphosis (see Chapter 2), meaning that females lay eggs that hatch into wingless nymphs and develop through several molts before reaching the adult stage. Predatory true bugs feed on a large diversity of garden pests as both nymphs and adults. This chapter identifies some of the common families of predatory Hemiptera you may encounter within both your home garden and backyard water features.
Damsel Bugs (Nabidae)

All species in the family Nabidae are predatory. The majority are dull and tan in color with slightly enlarged raptorial front legs and a curved beak. Adult damsel bugs are approximately 6-10 mm in length. Adults and nymphs look similar, but nymphs will have wing-buds instead of fully formed wings, which develop as they molt and become functional with the final molt into the adult stage.

Damsel bugs complete one to five generations per year depending on location, and most species overwinter as adults in leaf litter. Female damsel bugs begin laying eggs in the early spring shortly after emergence from overwintering. The eggs, which are elongated and flattened, are inserted into plant tissue. Eggs hatch into nymphs that feed on arthropod prey and complete several nymphal instars to reach the adult stage.

Nabidae use their enlarged front legs to capture and hold prey. They are important garden predators that feed on aphids, eggs, small caterpillars such as corn earworm, European corn borer, imported cabbage worm, armyworms, leafhoppers, small sawfly larvae, and mites.

This family includes common garden predators in the genus *Nabis* including *N. americus* (broad distribution in North America), *N. roseipennis* (found in the north central US) and *N. alternatus* (common in the western US). The Nabidae family also includes the black damsel bug *Nabidae subincisivata*, which is wingless as an adult, black in color with light yellowish legs, and has a light stripe around the exterior of its abdomen.

Flower Bugs or Minute Pirate Bugs (Anthocoridae)

The family Anthocoridae is commonly referred to as the flower bugs or minute pirate bugs. From the name minute pirate bug it is evident that these insects will not be that easy to spot in the garden! However, they are a common and important group of predators that can be found throughout the U.S. Adult minute pirate bugs are approximately 3-6 mm long and are oval to triangular in shape. They typically have a dark head and thorax and fore-wings with light and dark patches. Nymphs are tear-drop shaped and bright yellow to pink in color. The nymphs are very fast-moving. Two of the most common genera of Anthocoridae found in the garden are *Orius* and *Anthocoris*.

Female minute pirate bugs lay tiny eggs embedded within plant tissues. Their offspring undergo five instars as nymphs before molting to adults. The adults are active within the garden for about one month, and females can lay more than 100 eggs over their lifetime.

Both nymphs and adults feed on a diversity of garden pests including aphids, scales, mites, thrips, small caterpillars, and insect eggs. These predators also feed on pollen and nectar from flowering plants, providing these resources can increase their reproductive potential and longevity. They are able to bite humans; however, their bite is only mildly irritating.
R
duviidae is one of the largest families of
Hemiptera, and all species within this group are
predatory or blood-feeding. They are sit-and-
wait predators who grasp their prey with raptorial front
legs and subdue it by injecting a paralytic fluid with their
curved beak. This also facilitates ingestion of body fluids
by the reduviid. Reduviids overwinter most commonly as
adults, but some as eggs or nymphs. They may have one
or two generations per year. Female lay eggs in clusters,
and after hatching their offspring undergo 4-7 molts to
reach adulthood, depending on the species. There are
many species of reduviids that can be found in home
gardens and includes the thread-legged bugs, ambush
bugs, and assassin bugs.

As their name suggests, thread-legged bugs (Jiarvo spp.,
Florea spp., Stenolemoides spp., Gardena spp.,
Pseudometapterus spp., Ghinullielia spp., Stenolemus spp.,
Empicoris spp., and Emocys spp.) have very slender bodies
and long thin legs. The nymphs of thread-legged bugs
look similar to adults but without fully formed wings.
These bugs walk on the hind two pairs of legs and use the
front raptorial pair to capture prey. They feed on a
diversity of arthropods, and some specialize on spiders
and are able to hunt within webs.

Ambush bugs are more stout-bodied than assassin
bugs or thread-legged bugs. They are often brightly
colored with front legs that are more enlarged than
thread-legged or assassin bugs and range in size from 7-18
mm. The nymphs of ambush bugs look similar to the
adults but without fully formed wings. Species within
three genera, Lophoscutus spp., Phymata spp., Macrocephalus
spp., are found in the U.S. Ambush bugs are often found
hunting in flowers, and as they are generalist predators,
they will feed on pollinators as well as pests.

Assassin bugs are typically dark brown, black, or grey
in color, although some, particularly in the genus Zelus,
are brightly colored. They have long narrow heads and a
diamond-shaped body. The nymphs of assassin bugs look
similar to adults but without fully formed wings. Some
assassin bugs found in the garden include the wheel bugs,
spined or spiny assassin bugs, masked hunter,
Zelus spp, and corsairs.

Wheel bugs (Arilus spp.) are one of the largest true
bugs in North America, at up to 40 mm in body length.
They are grey to black in color and get their name from a
characteristic half-wheel of spines on the top of their
thorax. Although they are fairly common, wheel bugs are
rarely seen in the garden due to their camouflage
coloration and sit-and-wait hunting strategy. Spined and
spiny assassin bugs (Sinea diadema and Sinea spinipes) are
light grey to brown and smaller than wheel bugs, about
20 mm in length. Assassin bugs in the genus Zelus, such as
the milkweed assassin bug (Z. longipes), leafhopper
assassin bug (Z. remardi) pale green assassin bug (Z.
luridus), and four-spurred assassin bug (Z. tetracnthus) have
slender bodies and can be brightly colored with green,
orange, or yellow bodies with dark markings on their
wings, thorax, and legs. The masked hunter (Reduvius
pernatus) is an introduced species that is not common in
the eastern and central US. They get their name by the
behavior of the immature insects, which are covered in
soil and other debris. The adults are dark brown to black.
You can sometimes find a masked hunter in your home.
They are known to feed on bed bugs and bat bugs. The
nymphs of the masked hunter cover their bodies in dirt
and debris, which provides camouflage and protection
from predators. Corsairs (Melanolestes spp.) are 20-25 mm
in length and unique among the reduviids in that males
and females look and behave differently. Males have
fully-formed wings and can disperse readily to hunt and
search for mates, whereas females lack wings or have
small non-functional wings. Females are found hunting
for ground-dwelling prey in gardens on the soil surface or
within mulch or leaf litter.

△ A wheel bug employing its typical sit-and-wait hunting strategy.

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△ Note the bright color and enlarged front legs on this stout ambush bug.

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Predatory Stink Bugs
(Pentatomidae)

The stink bug family Pentatomidae includes many plant feeding pests, but also a few key predatory species. These predators can be identified by their 5-sided shield-shaped body and large triangular plate called a scutellum, which is part of their thorax. Predatory stink bug nymphs are more rounded than shield-shaped and often brightly colored or patterned. Predatory stink bugs overwinter as adults or late instar nymphs, and in the spring females begin laying clusters of barrel-shaped eggs on plant leaves and stems. Nymphs undergo several molts to reach the adult stage.

\[\text{△} \quad \text{Note the five-sided shield-shaped body on this stink bug, and its large triangular scutellum.}\]

The water features near your garden might look simple, but they can contain a range of microhabitats.

True Bug Predators in Garden Water Features

There are several families of predatory Hemiptera that may colonize garden ponds and other water features and provide biological control of the pests found within them, including mosquito larvae and pests of aquatic pond plants. Like terrestrial Hemiptera, these aquatic predators feed on prey as both adults and nymphs. Nymphs will molt several times to reach the adult stage, and they will overwinter as either late instar nymphs or adults. One or more generations are possible within a single growing season.

Giant Water Bugs (Belostomatidae) are large (25-45 mm), oval shaped, and flattened with enlarged raptorial front legs and hind legs lined with swimming hairs. Females lay eggs either on emergent vegetation or on the backs of males. The nymphs undergo several molts before reaching the adult stage and overwinter as adults in mud. Belostomatidae live below the surface of ponds and are voracious predators that attack prey many times their size, including fish and frogs, but the majority of their diet consists of insect larvae. These true bug predators are also called ‘toe biters’ because they produce hydrolytic enzymes that they inject into their prey, which causes pain and swelling if you inadvertently step on one.

The spined soldier bug (Podisus maculiventris) is a common predatory stink bug in gardens throughout the U.S. These predators are about 10 mm in length, and brown in color, with ‘pointy shoulders’ or points on either edge of their thorax. Spined soldier bugs also have a black spot on the membranous tip of each front wing. They feed on a diversity of garden pests including caterpillar and beetle larvae.

The two-spotted stink bug (Perillus bioculatus) is 8 mm in length and black in color with yellow, orange or red outlining the abdomen and thorax. This species is known to commonly feed on Colorado potato beetle eggs and larvae and is found throughout the U.S.