



## Beneficial True Bugs: Big-Eyed Bugs

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### What you should know

- Big-eyed bugs are generalist predators that consume a wide variety of small prey including insect eggs, mites, aphids, and small caterpillars.
- These beneficial bugs can be found in landscapes, gardens, and many vegetable and field crops.
- Big-eyed bugs are not sold commercially, but natural populations can be conserved by reducing the use of broad-spectrum insecticides and providing shelter and food.

Predatory insects can provide natural pest control by eating unwanted pests. Insect predators are one factor that help maintain pest populations at non-damaging levels, an action known as biological control. By conserving predatory insect populations, plants can be protected from pest attack and excessive damage.

Big-eyed bugs are predatory "true bugs" in the genus *Geocoris* (Fig. 1). There are about 25 recognized species of big-eyed bugs in the U.S. and Canada. Being a true bug, big-eyed bugs have piercing-sucking mouthparts and incomplete metamorphosis (egg, nymph, and adult stages). Nymph and adult big-eyed bugs are voracious predators and eat many different insect and mite species, categorizing them as generalist predators. Big-eyed bugs kill their prey immediately, sucking them dry, and eat many prey individuals to complete their development. Big-eyed bugs are abundant and found in varied sites from agricultural fields to small backyard gardens. Big-eyed bugs are small, fast, and have excellent vision. Because of these attributes, they often scurry away quickly and are overlooked.

### DESCRIPTION

Big-eyed bugs are small, oval, stout bodied insects that have relatively thick antennae (Figs. 1 and 2). Their head is broad with large, widely separated bulging eyes providing them with a wide field of vision. The big-eyed bug mouth is needle-like, and tucked under the head and body at rest but is flexible and can be positioned in front of the head when feeding. The common species in the western U.S. vary in color from shiny black to grey or yellowish with red-brown spots.



Fig. 1. Adult big-eyed bug feeding on an insect<sup>1</sup>

**Eggs** are white to peach in color, oval, and deposited singly and horizontally on plant tissue or the soil surface.

**Nymphs** (juveniles) look like the adults, only smaller and without wings (Fig. 2). They can also have a bluish-purple to red hue. Nymphs go through five instars (juvenile stages) that are less than 4 mm (3/16 inch) in length. Young instars are tiny and are easily overlooked. With each successive instar they shed their skin, develop wing pads, and grow larger.

**Adults** are 3-5 mm (3/16 inch or less) long with 2 pairs of fully functional wings (forewings and hindwings). The forewings are hardened at the base and membranous at the tip. At rest the forewings cross over the back, one over the other, creating a triangle pattern behind the pronotum ("shoulders"), pointing toward the rear (Fig. 3). These wing features are characteristic of true bugs.



Fig. 2. Big-eyed bug nymph<sup>2</sup>

**Look-alikes:** Be aware that other "true bugs" may look like big-eyed bugs. These include false chinch bugs and black grass bugs which are plant feeders (Fig. 4).



**Fig. 3.** Characteristic features of adult true bugs include a hardened upside-down triangle and membranous wing tips<sup>3</sup>

## LIFE HISTORY

Big-eyed bugs have multiple generations per year and are present throughout the plant growing season. They overwinter as adults in sheltered sites, weedy areas, and within perennial crops and shrubs. Adults become active in spring and begin depositing eggs on plants or soil duff. A female big-eyed bug can deposit an average of 150 eggs, which hatch in approximately 10 days, depending upon temperature. Nymphs emerge and develop over 3-4 weeks. Adults and nymphs may be found taking cover in plant debris, at the base of plant stems, or in cracks at the soil surface.

**Foraging:** Adult and nymph big-eyed bugs will eat aphids, mites, insect eggs, small nymphs, caterpillars, and larvae, and occasionally feed on other predators.

Big-eyed bugs actively search for prey. They pierce prey with their needle-like mouth and suck up the body contents. Sometimes the presence of a big-eyed bug can change the behavior of their prey. For example, the prey may stop feeding or even fall off of the plant. Big-eyed bugs do supplement their diet by feeding on plant tissue, but plant-feeding is minor and does not result in noticeable plant damage.

<sup>1</sup>Image courtesy of Russ Ottens, University of Georgia, Bugwood.org

<sup>2,3</sup>Images courtesy of Bradley Higbee, Paramount Farming, Bugwood.org

<sup>4,5</sup>Images courtesy of Whitney Cranshaw, Colorado State University, Bugwood.org

## PROMOTING BENEFICIAL INSECTS

Big-eyed bugs cannot be purchased through commercial suppliers, but they occur naturally and are common in most landscapes, gardens and crops. There are several strategies that can be used to encourage big-eyed bug populations.

**Conservation:** Many pesticides are just as or more harmful to big-eyed bugs as they are to pest insects. Big-eyed bugs can be conserved by eliminating or reducing pesticides that are toxic to insect predators. Consider using "soft" or selective pesticides that target the pest more specifically and are less harmful to predator populations. Read the pesticide label to find the product attributes.

Encourage big-eyed bug populations and enhance their activity by providing them alternative places to hide, eat, and live. In general, habitats with diverse plantings appear to be more attractive to predators. Consider planting cover crops or flowering plants that may provide alternative food sources, shelter, and overwintering sites.

Keep an eye out for big-eyed bug populations when sampling and monitoring pests and be sure to incorporate them in an integrated pest management (IPM) program.



**Fig. 4.** False chinch bugs (left) and black grass bugs (right) can look similar to big-eyed bugs<sup>4,5</sup>

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