



Beneficial True Bugs: Minute Pirate Bugs

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Do You Know?

- Minute pirate bugs are generalist predators of spider mites, aphids, thrips, psyllids, white flies, insect eggs, and small caterpillars.
- Minute pirate bugs are commercially available, but they are also very common in ornamental and agricultural landscapes.
- Reducing the use of broad-spectrum and systemic insecticides will help conserve minute pirate bug populations.

Minute pirate bugs (*Orius spp.*) are generalist predatory hemipterans (true bugs) in the family Anthracoridae. Predatory insects can help naturally regulate pest populations. This is referred to as biological control. By conserving and enhancing minute pirate bug populations, plants can be protected from excessive damage caused by specific pests.

Minute pirate bugs have piercing-sucking mouthparts and incomplete metamorphosis (egg, nymph, and adult stages). Minute pirate bugs can be found in a range of habitat from large agricultural fields to small, backyard gardens. They are often found in and around flowers, and are sometimes referred to as flower bugs.

DESCRIPTION

Adults have an oval, black body and are 1/12 to 1/8 inch long (2-3 mm), depending on the species. The wings cross over the back to create a black and white "X" pattern (Fig. 1). The head is fairly narrow with bulging, round eyes. Adult minute pirate bugs are predaceous.

Nymphs have a yellow to orange teardrop-shaped body and red eyes (Fig. 2). They develop through five instars (immature stages), they are smaller than the adults (<2-3 mm), and all nymph stages are predaceous. Nymphs do not have wings.



Fig 1. Adult minute pirate bug.



Fig 2. Minute pirate bug nymph.

Eggs are very small and laid within plant tissues. One generation from egg to adult requires about 20 days when food is available and temperatures are warm (70°F to 90°F).

LIFE CYCLE

Minute pirate bugs overwinter as adults in protected places, such as tree bark cracks and leaf litter. They are among the first predatory insects to become active in the spring, mating and laying eggs shortly after emergence.

An adult female can lay up to 100 eggs in her lifetime. Eggs hatch in 4 to 5 days. Nymphs require 15 to 20 days to develop through five immature stages into the adult

stage. Adults live about 3 to 4 weeks. Factors affecting development rate and life span include temperature and food availability, and plant hair density (more hairs decrease life span).

Foraging

Minute pirate bugs are generalist predators of spider mites, aphids, thrips, psyllids, white flies, insect eggs, and small caterpillars. They actively search for, pierce, and feed on their prey with straw-like mouth parts. Nymphs and adults can eat 30 or more spider mites a day.

Minute pirate bugs are omnivorous and supplement their diet with plant pollen and sap. Feeding damage to plants is minor and this omnivorous feeding behavior is important for development and maintenance of a healthy population when prey sources are scarce.

While minute pirate bugs have been known to give a painful bite to humans, they are not blood-feeding insects; they do not inject venom or toxic saliva. Many people are not affected by the bite while others may have a reaction similar to a mosquito bite.

PROMOTING BENEFICIAL INSECTS

Conservation and Enhancement

Minute pirate bug species occur naturally throughout North America. Careful production practices will usually help maintain the natural balance between pest and natural predators. Conservation utilizes practices that do not damage or reduce native beneficial insect populations. Minute pirate bugs can be conserved by eliminating or reducing broad spectrum insecticides (pyrethroids and organophosphates) whenever possible. Many pesticides, even biopesticides such as spinosad, have been shown to decrease minute pirate bug populations. If pest populations get high enough to justify broad-spectrum insecticide application, it is important to note that minute pirate bug populations may be severely reduced. Because minute pirate bugs feed on plant sap they are also susceptible to the harmful effects of systemic insecticides. Therefore, selecting 'soft' pesticides such as horticultural oil, insecticidal soap, or products containing *Bacillus thuringiensis* (*Bt*) will help to conserve beneficial predators. Even spraying with a stiff blast of water at target pests as a non-chemical approach if feasible can maintain predators in the environment.

Enhancement is implementing practices that encourage the establishment and survival of beneficial populations. Minute pirate bugs are most likely to become established

in flowering annuals and perennials, shrubs, and trees that provide protection and alternative food sources. The pollen from a diversity of flowering plants with blooms throughout the growing season will help supplement the diet of an existing minute pirate bug population until the pest populations begin to increase and will maintain a healthy predator population. Perennial plantings are most effective as a border crop or as intercropped strips within the crop area, whether on a large farm-scale or in the home garden situation. Since some plants may attract pests more than beneficial populations, plant selection should be done intentionally.

Table 1. Plants that attract minute pirate bugs. (Dufor, 2000)

carrot and sunflower family	other plants, crops, trees
<ul style="list-style-type: none"> • Queen Anne's lace • tansy • coriander • bishop's weed • chervil • cosmos • tidy tips (<i>Layia</i>) • goldenrod • daisies • yarrow 	<ul style="list-style-type: none"> • baby blue eyes (<i>Nemophila</i>) • hairy vetch • alfalfa • corn • crimson clover • buckwheat • blue elderberry (<i>Sambucus caerulea</i>) • willows

Predator Release

In cases where predator populations are non-existent or need to be restored, minute pirate bugs are commercially available for release. One approach is inoculative augmentation which is the deliberate introduction of new predators in smaller amounts with the expectation that the offspring will provide pest suppression later as the pest population builds. The second approach is inundative augmentation which is a predator release in larger amounts expecting the released predators to provide pest suppression and little contribution from subsequent generations. Augmentative releases of minute pirate bugs are especially effective in greenhouses or high tunnels.

Predator Release Process

Minute pirate bugs are usually shipped overnight in an insulated container with an ice pack to improve survivability. When the shipment is received, immediately open and inspect the container to determine whether the predators are still alive.

They are typically combined with a carrier material, such as vermiculite, or rice hulls. Apply a light spray of water



Fig 3. Minute pirate bugs purchased from an insectary are typically shipped with a carrier material and are applied with a shaker container.

to the target application area to help the predators and carrier material stay in place when they are applied. It is best to apply living predators to the field, garden, or greenhouse as soon as possible to improve their survival and efficacy. Avoid extreme heat or cold that can decrease predator success. Apply minute pirate bugs in the early morning or late evening. Carefully follow the supplier's handling and application instructions.

Predator releases are more successful if early scouting has detected pests before the population gets too high. Gently batting flowering plants over a white sheet of paper should dislodge resident insects and the tiny, dark minute pirate bugs will show up readily. Effective scouting for pests and predators requires a hand lens (10-30× magnification) and practice with accurate insect identification. Begin in spring, and check plants weekly for pests and predatory insects.

There are many suppliers of beneficial insects across North America. To find lists or links to beneficial insect suppliers a good search phrase to use in your internet browser is 'beneficial insect suppliers'.

ADDITIONAL READING

Andrews, H. & Kuhar, T. (2010). The Minute Pirate Bug (*Orius*) [fact sheet]. <http://pubs.ext.vt.edu/3002/3002-1437/3002-1437.html>

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Mahr, D. Augmentation: The Periodic Release of Natural Enemies [online newsletter]. <http://www.entomology.wisc.edu/mbcn/fea104.html>

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IMAGE CREDITS

Fig 1. Phil Sloderback, Kansas State University, Bugwood.org

Fig 2. Adam Sisson, Iowa State University, Bugwood.org

Fig 3. Evergreen Growers Supply, www.evergreengrowers.com

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