



## The Minute Pirate Bug (*Orius*)

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### Introduction

Minute pirate bugs (also known as flower bugs) are small, fast-moving predacious insects in the order Hemiptera and family Anthicoridae. Several species of minute pirate bugs in the genus *Orius* occur in the U.S.; the dominant species in Virginia is the insidious flower bug, *Orius insidiosus* (Say).

### Description and Life Cycle

Adults are small (2-3 mm long), oval-shaped, black bugs with white markings on the wing patches (Figure 1). The hindwings are longer than the forewings and extend beyond the abdomen. Nymphs are tiny and tear drop-shaped. Hatchlings are colorless, soon darkening to yellow and then brown as they grow and molt. Both adults and nymphs have a piercing-sucking beak, which is used for sucking juices from the bodies of prey, and all life stages move hastily (Elkassabany 1994).



Figure 1. *Orius insidiosus* adult. John Ruberson, Kansas State University, Bugwood.org



Figure 2. *Orius insidiosus* nymph. Adam Sisson, Iowa State University, Bugwood.org.

Multiple generations of *Orius* develop each year. The bug can complete its life cycle in ~3 weeks at 21°C (70°F); however, development can be slowed by cooler temperatures or lack of prey. Adult females deposit eggs within plant tissue ~2-3 days after mating (Isenhour and Yeargan 1981). Upon hatching, nymphs undergo five instars after which the fifth instar develops into an adult with fully developed wings. Adults live for ~3-4 weeks. When day lengths are less than 13 hours during the fall, *Orius* will undergo diapause (a quiescent resting state) during the winter (Van den Meiracker 1994).

### Food

*Orius* feeds on virtually any soft-bodied insect close to their size or smaller. They are particularly fond of thrips, mites, aphids, whiteflies, leafhoppers, many kinds of insect eggs, and tiny newly hatched caterpillars (Barber 1936). Both immature and adult bugs can consume many prey items daily. The bugs will also feed on pollen in flowers when prey is not available (Wong et al. 2013).

## Habitat

*Orius* are found in a wide range of agricultural crops and natural habitats (McCaffrey et al. 1986). They are attracted to flowers and to plants that host soft-bodied prey insects, therefore are commonly found where flowering shrubs and weeds are located (Kiman and Yeargan 1985). Area planted to corn serves as habitat for *Orius* where they can often be found in silks, as well as in alfalfa fields and stands of thistle weeds (McCaffrey et al. 1986). Figure 3 shows an *O. insidiosus* adult in a cotton flower.



Figure 3. *O. insidiosus* adult in a cotton flower.

## Biological Control with *Orius*

*Orius* are important biological control agents and are abundant components to the guild of natural enemies that inhabit many agroecosystems. Large enough populations of *Orius insidiosus* alone can maintain densities of flower thrips below damaging levels in peppers (Funderburk et al. 2000). They were described by Marshall in 1930 as an important predator of the corn earworm and have been shown to dramatically reduce the number of eggs of corn earworm in sweet corn (Winburn and Painter 1932).

Minimizing the use of broad-spectrum pesticides, such as organophosphates, carbamates, and pyrethroids by employing economic thresholds rather than preventative spraying can help maximize the biological control potential of *Orius*. Additionally, using more narrow-spectrum insecticides with reduced toxicity to beneficial insects can further enhance this potential (Roubos et al. 2014).

Maintaining beneficial plant habitats or farmscaping can help increase *Orius* populations (Hinds and Barbercheck). Farmscaping uses a variety of techniques to attract and encourage beneficial

organisms by growing hedgerows, insectary plants, cover crops and installing water reservoirs. *Orius* are also available commercially for mass release, particularly, in greenhouse settings.

## References

- Barber, G.W., 1936. *Orius insidiosus* (Say), an important natural enemy of the corn ear worm (No. 504). *US Department of Agriculture*.
- Elkassabany, N.M., 1994. Biology of the insidious flower bug *Orius insidiosus* (Say)(Heteroptera: Anthocoridae). University of Arkansas.
- Funderburk, J., Stavisky, J. and Olson, S. 2000. Predation of *Frankliniella occidentalis* (Thysanoptera: Thripidae) in field peppers by *Orius insidiosus* (Hemiptera: Anthocoridae). *Environmental Entomology*. 29(2): 376-382.
- Hinds, J. and Barbercheck, M.E., 2020. Diversified floral provisioning enhances performance of the generalist predator, *Orius insidiosus* (Hemiptera: Anthocoridae). *Biological Control*, 149, p.104313.
- Isenhour, D.J. and Yeargan, K.V. 1981. Effect of temperature on the development of *Orius insidiosus*, with notes on laboratory rearing. *Annals of the Entomological Society of America*, 74(1): 114-116.
- Kiman, Z.B. and Yeargan, K.V., 1985. Development and reproduction of the predator *Orius insidiosus* (Hemiptera: Anthocoridae) reared on diets of selected plant material and arthropod prey. *Annals of the Entomological Society of America*. 78(4): 464-467.
- McCaffrey, J.P., R.L. Horsburgh. 1986. Biology of *Orius insidiosus* (Heteroptera: Anthocoridae): A Predator in Virginia Apple Orchards. *Environmental Entomology*. 15 (4): 984–988, <https://doi.org/10.1093/ee/15.4.984>
- Roubos, C.R., Rodriguez-Saona, C. and Isaacs, R., 2014. Mitigating the effects of insecticides on arthropod biological control at field and landscape scales. *Biological control*, 75: 28-38.

Van den Meiracker, R.A.F., 1994. Induction and termination of diapause in *Orius* predatory bugs. *Entomologia Experimentalis et Applicata*, 73(2): 127-137.

Winburn, T.F. and Painter, R.H., 1932. Insect enemies of the corn earworm (*Heliothis obsoleta* Fabr.). *Journal of the Kansas Entomological Society*, 5(1): 1-28.

Wong, S.K. and Frank, S.D., 2013. Pollen increases fitness and abundance of *Orius insidiosus* Say (Heteroptera: Anthocoridae) on banker plants. *Biological Control*, 64(1): 45-50.

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