

Stratiolaelaps scimitus

Biological Control Agent of Fungus Gnats and the Western Flower Thrips

Stratiolaelaps scimitus (formerly *Hypoaspis miles*) is a predatory mite that resides in the growing media of container-grown plants. The predatory mite feeds on the larval and pupal stages of certain insect pests associated with ornamental and vegetable greenhouse production systems. This publication discusses the biology, behavior, commercial availability, and use of *S. scimitus* in greenhouses.

Biology and Behavior

Stratiolaelaps scimitus females are approximately $\frac{1}{64}$ of an inch (0.4 millimeters) long and light brown, with a pale-brown dorsal shield (Figure 1). Males are smaller than females. Females lay up to three oval-shaped eggs per day in the growing medium. The number of eggs laid by a female during her lifetime depends on the nutritional quality of the prey fed upon. Unfertilized females produce only males, whereas fertilized females produce males and females. A population can consist of 50% to 70% females.

Nonfeeding larvae emerge (eclose) from eggs in one to three days. The six-legged larvae become eight-legged nymphal stages (protonymph and deutonymph). Eggs and larvae are white. Nymphs are white at first, becoming light brown as they age. Nymphs are present for four to five days and become adults after six days. The life cycle, from egg to adult, can be completed in 10 days at 82 degrees Fahrenheit (28 degrees Celsius), 12 days at 75 degrees Fahrenheit (24 degrees Celsius), 18 days at 68 degrees Fahrenheit

(20 degrees Celsius), and 34 days at 59 degrees Fahrenheit (15 degrees Celsius). The optimum temperature for development and reproduction is between 59 and 86 degrees Fahrenheit (15 and 30 degrees Celsius).

Stratiolaelaps scimitus inhabits the top 1 inch (2.5 centimeters) of the growing medium. *Stratiolaelaps scimitus* is most active at temperatures up to 86 degrees Fahrenheit (30 degrees Celsius) with activity reduced when temperatures are lower than 57 degrees Fahrenheit (14 degrees Celsius).

Stratiolaelaps scimitus nymphs and adults feed on fungus gnat, *Bradysia* spp., larvae and the pupal stages (prepupae and pupae) of the western flower thrips, *Frankliniella occidentalis*. The nymphs and adults can consume up to 30 prey per day. After capturing prey, *S. scimitus* insert their saw-like mouthparts into the body, cut apart the internal tissues, and withdraw body fluids. In the absence of prey, *S. scimitus* will feed on algae and plant debris in the growing medium. Adults can survive three to four weeks without food.

Commercial Availability and Use in Greenhouses

Stratiolaelaps scimitus is shipped in 1-liter containers (Figures 2 and 3) with pasteurized peat (Figure 4) or sawdust. Each 1-liter container has approximately 25,000 mites of all life stages (eggs, larvae, nymphs, and adults).



Figure 1. *Stratiolaelaps scimitus* adult (Photo: Raymond Cloyd).



Figure 2. Container of *Stratiolaelaps scimitus* (Photo: Raymond Cloyd).

Immediately release *S. scimitus* upon arrival from the supplier. Distribute the predatory mites by shaking the contents of the container onto the growing medium surface (Figure 5). *Stratiolaelaps scimitus* then enters the growing medium. In addition, *S. scimitus* can be applied to soil or gravel flooring underneath benches where fungus gnat larvae and western flower thrips pupae may be located.

Release *S. scimitus* early in the crop production cycle when fungus gnat and western flower thrips populations are low. One application of *S. scimitus* can establish a population for an entire growing season that will manage fungus gnat larvae or western flower thrips pupal populations. Consult supplier information on release rates of *S. scimitus*. The rove beetle, *Dalotia coriaria*, will feed on *S. scimitus*, so avoid using both biological control agents simultaneously.

If *S. scimitus* kills enough fungus gnat larvae and western flower thrips pupae, fewer adults of both insect pests will be present in subsequent generations; however, in most cases, using *S. scimitus* alone will not be effective in managing fungus gnat and western flower thrips populations. Therefore, releases of *S. scimitus* should be used in combination with other plant protection strategies such as cultural controls (sanitation and proper watering) and applying insecticides.

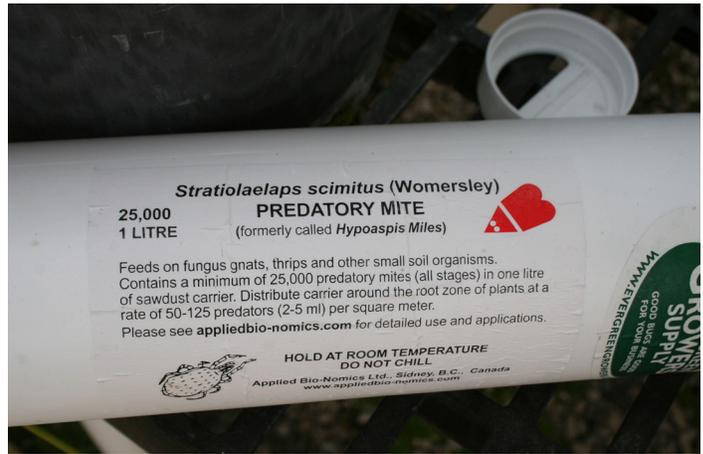


Figure 3. Container of *Stratiolaelaps scimitus* (Photo: Raymond Cloyd).



Figure 4. Pasteurized peat is one of the carrier materials in the 1-liter containers (Photo: Raymond Cloyd).



Figure 5. Applying *Stratiolaelaps scimitus* to the growing medium surface (Photo: Raymond Cloyd).

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