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Fungus Gnats & Shore Flies



Pest & Natural Enemy ID
Greenhouse Scout School
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Part 2: Natural Enemy ID



(Photo by John Sanderson, Cornell Univ.)

Natural Enemies/Biocontrols in Greenhouse IPM



Predators



UC Statewide IPM Project
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Parasites/Parasitoids



UC Statewide IPM Project
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Pathogens



(Photo by Cheryl Frank Sullivan, Univ. of VT)

Generalists (attack a variety of pests) vs. Specialists (attack one or a few pest species)

Stratiolaelaps scimitus

(Acari: Laelapidae)

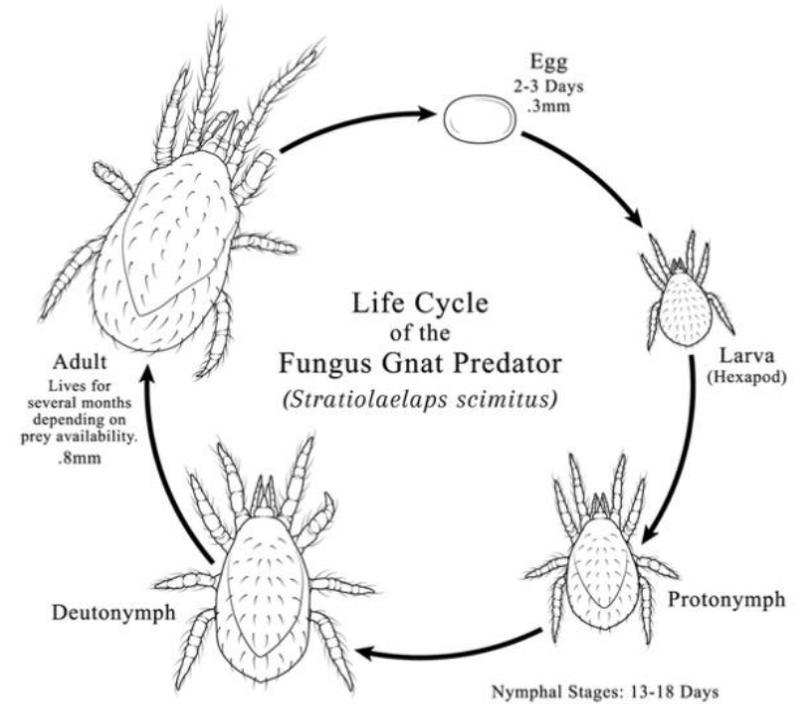
- Soil-dwelling predatory mite.
- Formerly known as *Hypoaspis miles*.
- Generalist.
- Predatory as adults and nymphs (immatures).
- Can consume 1-5 prey per day.



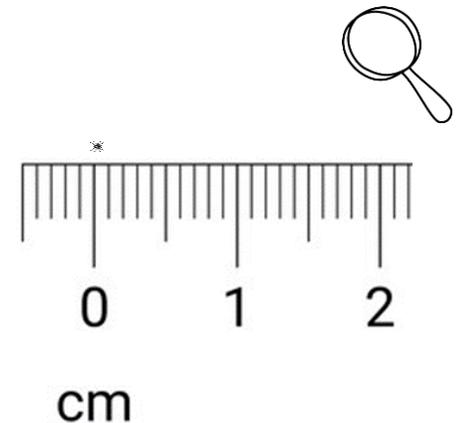
Appearance: Adults ~0.5 mm, two-toned brown (darker on top)

Life cycle: ~18 days to complete at 68°F (20°C). Sex ratio 1:1 females to males. Adults can live for several months if prey abundant.

Monitoring: Use magnifier (10-15×) and focus on top 1 inch (10-20 mm) of soil at base of plants. Can also be observed on potato wedges.



© Sound Horticulture

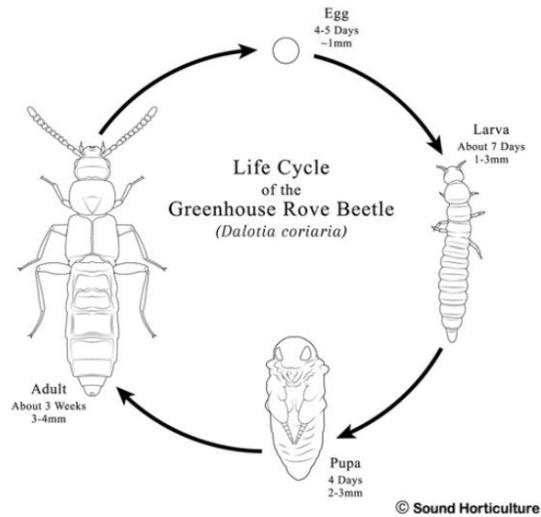


Dalotia coriaria

(Coleoptera: Staphylindae)

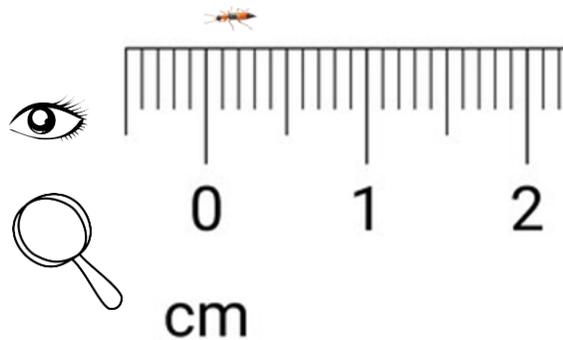
- Soil dwelling beetle.
- Formerly known as *Atheta coriaria*.
- Generalist.
- Predatory as adults and larvae (immatures).
- Can consume 10-20 prey per day.
- Adaptable to wide range of soil conditions.
- Adults are mobile and fly (mostly nocturnal).



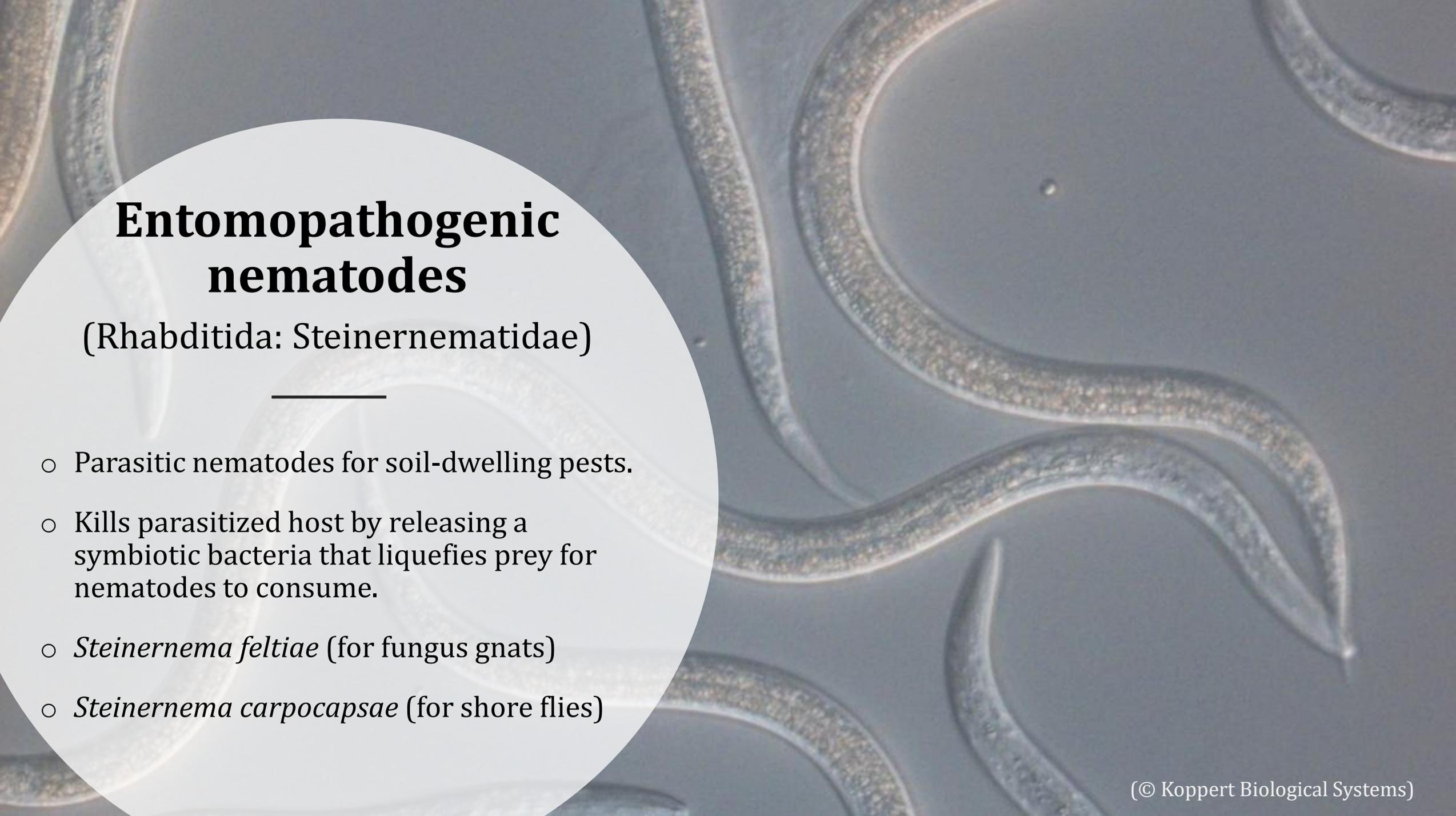


Appearance: Adults: 3-4 mm, glossy black/brown. Larvae: pale yellow/cream color. Both stages have an 'S' posture.

Life cycle: ~21days to complete at 70°F (21°C). Sex ratio 1:1 females to males. Create silk pupal chambers. Adults live ~ 21 days.



Monitoring: Fast moving adults and larvae observed at top 1-2 cm soil when disturbed. Can also be observed on potato wedges. Sometimes caught on sticky traps.



Entomopathogenic nematodes

(Rhabditida: Steinernematidae)

- Parasitic nematodes for soil-dwelling pests.
- Kills parasitized host by releasing a symbiotic bacteria that liquefies prey for nematodes to consume.
- *Steinernema feltiae* (for fungus gnats)
- *Steinernema carpocapsae* (for shore flies)

Appearance: Variable depending on species:

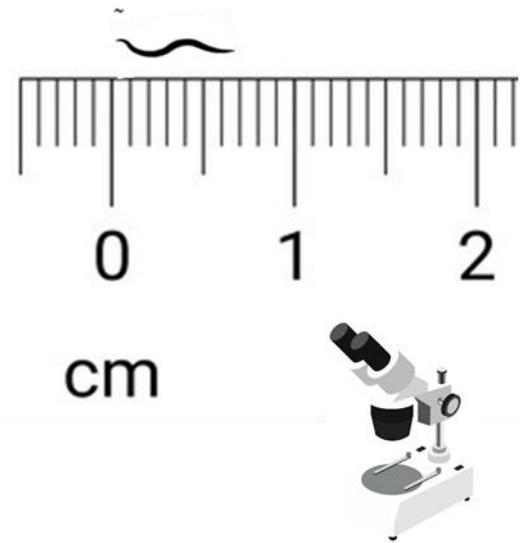
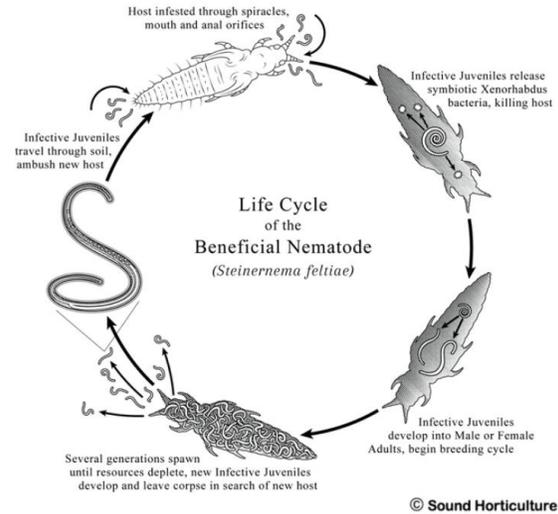
Ss Adult females: 7 mm ; IJs 0.88

Sc Adult females: 2.8-5.1 mm; IJs 0.44-0.65mm

Opaque, white color.

Life cycle: Non-feeding infective juveniles (IJs) seek out hosts and infect through openings like (mouth or anus). Host dies within 24-48 hours. Adults reproduce and more IJs are released from deceased host. Complete life cycle ~ 12-15 days (77-86°F/25-30°C).

Monitoring: Magnifier (possible at 10-15× with hand lens, easier with dissecting/stereo microscope (up to 100×). Observe larvae for infection but difficult due to rapid breakdown of infected host. Holding up to dark surface helps.



Fungus gnat larva infected with *Steinernema* nematodes.



(Photo by John Sanderson, Cornell Univ.)

Freebies

Adult with fungus gnat.



Coenosia attenuata

(Diptera: Muscidae)

- Aka “The Hunter Fly”.
- Adults and larvae predaceous.
- Adults attack flying insects.
- Immature stages live in soil. Larvae feeding on larvae of several greenhouse pests.

Adult with shore fly.



Adults



— Shore Fly



— Male Hunter fly
(Length: 2.5 - 3 mm)



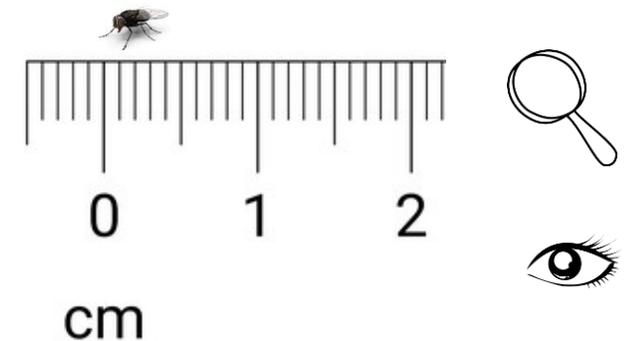
— Female Hunter fly
(Length: 3 - 4 mm)

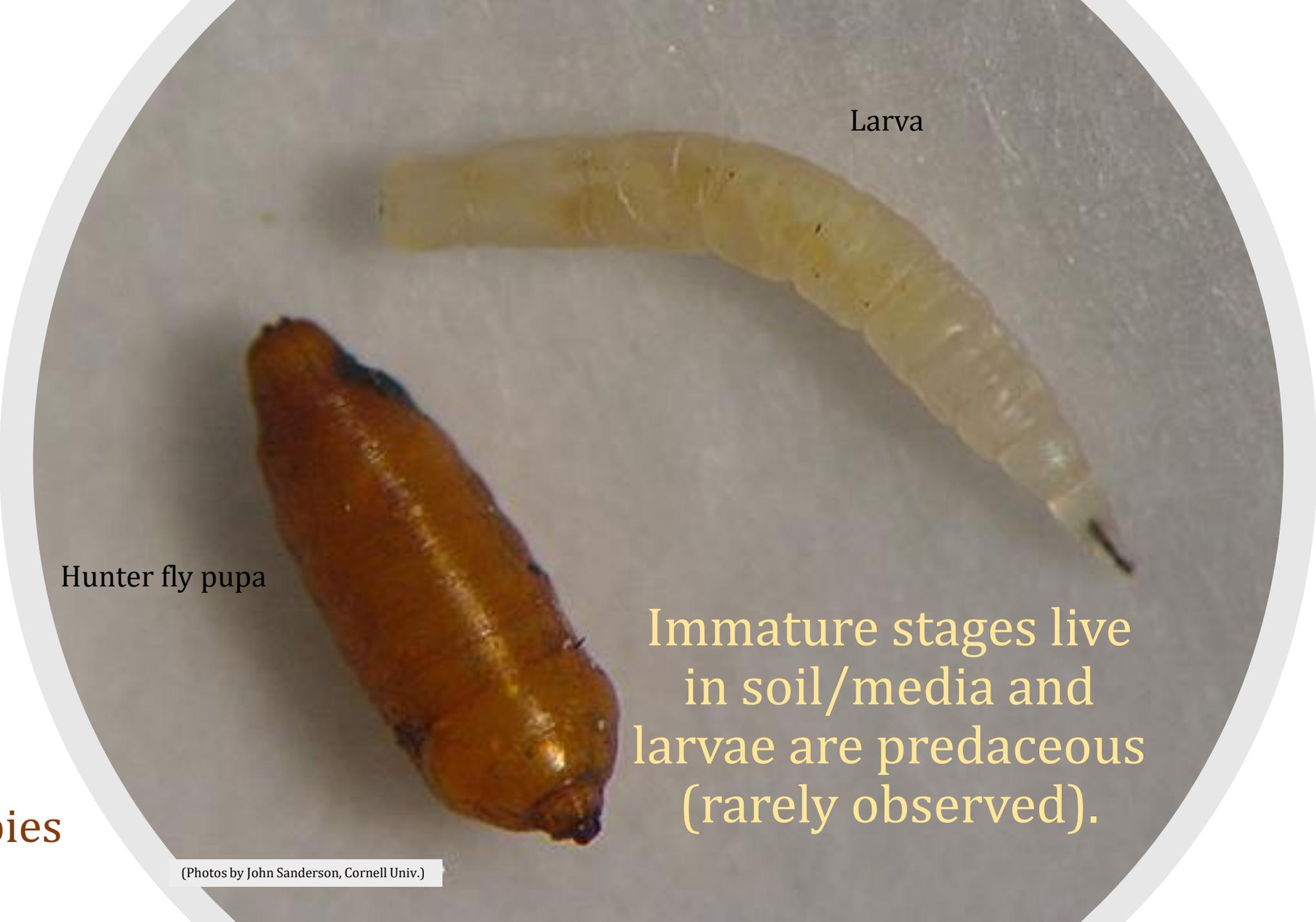
Appearance: Adults 2.5 - 4mm, Pale brownish or greyish body, with big reddish eyes. Antennae and legs are yellow in males.

Life cycle: To complete, ~40 - 43 days at 20°C/68°F; 26 - 27 days at 25°C/77°F. HF Larvae can consume upward of ~230 fungus gnat larvae

Monitoring: Adults can be found on sticky cards or observed perched on leaf edges.

Freebies



A circular inset photograph showing two insect stages. The top stage is a pale, segmented larva, and the bottom stage is a darker, more robust pupa. The background is a light, textured surface.

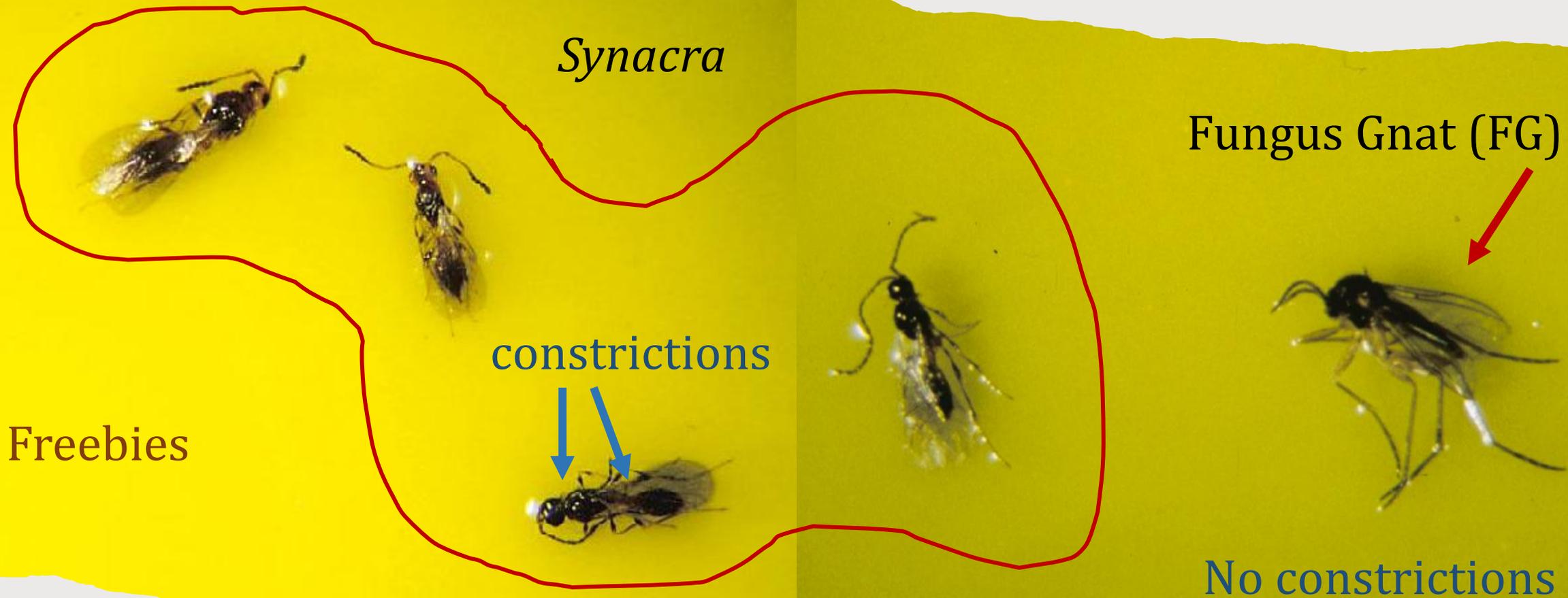
Larva

Hunter fly pupa

Immature stages live in soil/media and larvae are predaceous (rarely observed).

Freebies

(Photos by John Sanderson, Cornell Univ.)



Synacra

Fungus Gnat (FG)

constrictions

No constrictions

Freebies

- Wasp that parasitizes FG larvae (specialist)
- Similar size as FG adults, dark reddish-brown color.
- Constrictions near head and abdomen that FGs lack and abdomen tapers to a sharp tip.
- Antennae beaded and elbowed.
- Found on sticky cards.



Synacra pauperi
(Hymenoptera: Diapriidae)



Hexacola neoscatellae

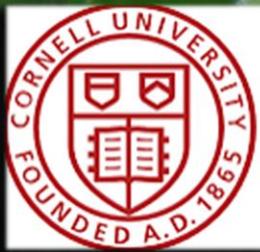
(Hymenoptera: Figitidae)

- Wasp that parasitizes shore fly larvae (specialist).
- Black color with spherical abdomen.
- Smaller than shore flies.
- Found on sticky cards, sometime seen on soil surfaces hunting for larvae.

Spherical abdomen



Thank You!



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