

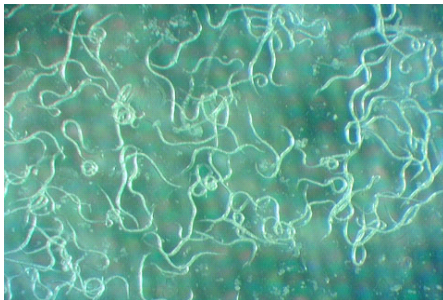
GROWERTALKS

Pest Management

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The Effect of Growing Medium on *Steinernema feltiae*

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Steinernema feltiae is an entomopathogenic nematode used in greenhouse production systems to manage fungus gnat (*Bradysia* spp.) larval populations in the growing medium of greenhouse-grown container plants. *Steinernema feltiae* is 1/64 of an inch (0.5 millimeters) long, slender, transparent and difficult to see with the naked eye (Figure 1).

Figure 1. Steinernema feltiae is an entomopathogenic nematode used to manage fungus gnat larval populations in greenhouse production systems.

Infective juveniles enter the body cavity (hemocoel) of fungus gnat larvae through the mouth, anus or breathing pores (spiracles). After entering a fungus gnat larva, *S. feltiae* releases a bacterium (*Xenorhabditis* spp.), which multiplies in the blood stream (hemolymph). The bacterium produces toxins that can kill a fungus gnat larva within 24 to 48 hours.

The third stage infective juveniles inside the fungus gnat larva feed on the bacterium and liquefied insect tissues, which subsequently increases their numbers. The fungus gnat larva eventually dies of bacterial septicemia. The infective juveniles complete their development inside the dead fungus gnat larva becoming adults that produce a new generation within the fungus gnat larva. After two to three generations (10 to 14 days) in which over 1,000 *S. feltiae* are produced, infective juveniles leave and search for new fungus gnat larvae in the growing medium to infect. *S. feltiae* is susceptible to desiccation, which is why the entomopathogenic nematode is used primarily against fungus gnat larvae located in the growing medium.

Growing medium moisture and temperature can affect the survival and ability of *S. feltiae* to locate fungus gnat larvae, which can directly affect management. In addition, persistence or longevity is influenced by growing medium moisture and temperature. *S. feltiae* requires moist growing medium for survival. Growing medium moisture affects the ability of *S. feltiae* to move through the growing medium profile (matrix), which can influence the effectiveness of *S. feltiae* in managing fungus gnat larval populations. Low growing medium moisture may inhibit the ability of *S. feltiae* to locate fungus gnat larvae because of an insufficient film of moisture, which restricts movement within the growing medium. Furthermore, low growing medium moisture can affect *S. feltiae* by inducing inactivity. That's why it's important to irrigate before and immediately after applying *S. feltiae*. Infective juveniles will drown if the growing medium retains too much water. Therefore, avoid over-watering and use a well-drained growing medium.

Growing medium temperature also can influence the effectiveness of *S. feltiae* in managing fungus gnat larval

populations. Growing medium temperature should be between 46 and 86F (8 and 30C) for infection, and 50 and 77F (10 to 25C) for reproduction. A growing medium temperature >90F (>30C) can negatively affect survival and reproduction, thus reducing the ability of *S. feltiae* to manage fungus gnat larval populations. *S. feltiae* is most effective in managing fungus gnat larval populations when the growing medium temperature is between 59 and 79F (15 and 26C).

Greenhouse producers need to understand how growing medium moisture and temperature affect the ability of *S. feltiae* to manage fungus gnat larval populations, which will influence the success of *S. feltiae* when used in greenhouse production systems. **GT**

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