

NemaShield[®]

Application Instructions for Fungus Gnat and Western Flower Thrips Control

NemaShield[®] contains the beneficial nematode *Steinernema feltiae* that is ideally suited for fungus gnat larvae (commonly *Bradysia* species) control. It will also control thrips species that spend a portion of their life cycle in the soil or potting media. A properly applied single application of NemaShield will kill fungus gnat larvae that are feeding on plant roots. NemaShield should be applied at the first sign of pests, when pest pressure is low, to prevent severe infestations. One unit of NemaShield (sprayable formulation) containing 100 million infective stage *Steinernema feltiae* on a clay/gel carrier will treat 1100 - 3400 square feet, depending on insect pressure. NemaShield is available in 100, 250, and 500 million and 2 billion nematodes per unit.

Fungus gnats can cause both direct and indirect damage to plants. Direct damage occurs when the larvae feed on plant roots. Damaged roots do not function efficiently and are susceptible to disease organisms. Fungus gnat adults are nuisance pests and have been known to carry spores of *Pythium*, *Botrytis*, and *Fusarium*, among others.

NemaShield controls fungus gnats by attacking and feeding on the fly immatures in the potting media. This eliminates damage to plants and disrupts the insect's life cycle. If present, adult fungus gnats can linger for several weeks after a NemaShield treatment as they gradually age and die. NemaShield does not control shore flies. Shore flies are a different species and predominately feed and reproduce in algal mats and not potting media.

Application Conditions for Western Flower Thrips Treatments

Steinernema feltiae have been found effective in a control program for treatment of Western Flower Thrips (*Frankliniella occidentalis*) pupae and pre-pupae. The nematodes should be applied to the potting media at rates recommended for fungus gnat larval control.

- Note that the application instructions below apply to potting medium treatment for thrips, not foliar treatment
- Potting media should be moist when nematodes are applied.
- Ensure the soil surface is evenly wet with spray containing nematodes.
- The addition of a wetting agent or surfactant will enhance the wetting ability of the spray mix and encourage nematode movement.
- Ensure that the potting media remains moist for 2 hours after application.
- Do not apply in direct sunlight.

Mode of Action

After application, NemaShield nematodes actively seek out the fungus gnat larvae or thrips pre-pupae and pupae. The nematodes enter the larvae through respiratory, mouth, or anal openings. Once inside their host, the nematodes molt to the next stage and release symbiotic bacteria from their intestinal tract. The bacteria multiply rapidly within the fungus gnat larvae or thrips pre-pupae and pupae dissolving the inner body tissue. The nematode feeds on the host's tissues, gradually molting to the nematode adult stage. The host insects die within a few days; the subsequent nematode generation is released into the environment where they can search out and attack additional fungus gnat larvae or thrips pre-pupae and pupae.

Compatibility

NemaShield is compatible with all other beneficial organisms, including RootShield® (Granules and WP). It is compatible with soils previously treated with botanical insecticides like pyrethrins, rotenone, nicotine sulfate and neem-based products. It is not compatible with many organophosphates and carbamates. Do not combine with other pesticides or fertilizers in a concentrate solution.

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Fungus Gnat Control Thrips pre-pupae and pupae control	Coverage per Unit Container (100 Million Nematodes)
Light Infestation	3400 sq ft with 100 gal water
Heavy Infestation	2200 sq ft with 70 gal water
Highly susceptible crops & newly stuck cuttings	1100 sq ft with 50 gal water

Preparation for Use

(Large volume equipment, overhead irrigation, applying with injector—see below for small volume)

- Do not prepare in direct sun. Sunlight will kill NemaShield.
- Use entire tray during application. Do not split or use partial trays.
- Put the contents of the tray into a bucket containing at least 1 gal of water (60 – 75 °F).
- Stir gently for 5 minutes.
- **For Sprayers:** Pour entire contents into a partly filled spray tank with agitation running. Add the required amount of water to meet the rate recommendation for chosen application. (Use at least 3 gallons of water per 100 sq ft of treated area.)
- **For Injectors:** Set the injector ratio to 1:100, maintain constant agitation, and make application. (Use at least 3 gallons of water per 100 sq ft of treated area.)
- Begin with agitation and maintain constant agitation throughout application.
- Spray immediately after preparation (Apply within one hour of mixing).
- Wash hands following these preparations.

Application Considerations

- Prior to and immediately following application, **water your plants**. Do not irrigate to the point of runoff from the tops of pots/liners. Water is essential to help move the nematodes into the growing media. For optimum results, apply at dusk, especially for outdoor plants.
- Use with a pressure sprayer, injector or hose-end sprayer, irrigation, hand-held backpack sprayer, watering-can.
- If using an injector, set dilution to 1:100.
- Remove all in-line and nozzle filters (50 mesh or less), screens on the intake tube or replace the tubing without a filter. Remove pump filters.
- **Continuous agitation** is essential to prevent the nematodes from settling out.
- Set sprayer at a coarse setting; use spray nozzle openings of at least 0.5 mm (35-mesh).
- NemaShield should pass through all pumps, DO NOT exceed 300 psi.
- Spread the solution evenly over the area to be treated; keep soil moist for 2 weeks.
- After application, water plant foliage with a fine spray to remove any NemaShield on the foliage.
- NemaShield **does not** kill fungus gnat adults, pupae or eggs.
- NemaShield **does** kill thrips pre-pupae and pupae in the potting media or soil

For hand-held backpack sprayers (Small volume)

1. Make a concentrated **Stock Solution** by filling a clean bucket with 2 gallons cool water, add one (1) 100 million tray of **NemaShield** and allow product to hydrate and disperse for at least 5 minutes. Stir well.
2. Measure out the stock solution following the dilution rate chart below, put it into the sprayer and fill to the final spray volume of 3 gallons and mix well.

Application	Amount of Stock Solution Needed	Final Spray Volume
Light Infestation	8 oz	3 gal
Heavy Infestation	12 oz	3 gal
Highly susceptible crops or newly propagated cuttings	24 oz	3 gal

3. Apply the **Final Volume of Spray** Solution (3 gal) to 100 sq ft of moist soil or media. Use all of the **Final Volume of Spray** Solution within 1-hour of mixing, and agitate while spraying to prevent nematodes from settling to the bottom of sprayer tank.
4. Continue to repeat step 3 on additional area with the remaining **Stock Solution**.
5. Irrigate immediately to wash nematodes off plant and onto soil media surface. Do not over irrigate to cause runoff from the tops of the pots/liners.

Re-application rates and intervals

For light or heavy infestations treat the entire house or plant inventory as soon as insect pests appear. Re-apply in 14 to 21-day intervals at the light infestation rate. For heavy infestations on highly susceptible crops or newly propagated cuttings, follow the rate recommended above and re-apply at the light infestation rate when necessary after 5 to 7 days.

Conditions

- Apply when soil temperature is 50 - 86° F. Optimum temperature is 74° F.
- The humidity content of the soil must be high.

Storage

- Optimum storage is 40° F (See Expiration Date). Be sure there is good air circulation around each tray.
- Refrigerated NemaShield will retain potency for about 4 weeks after receiving product.

DO NOT FREEZE