



J&L Garden Center

*The All Season Gift
and Garden Center*

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Beneficial Nematodes

Beneficial Nematodes (predatory nematodes) are tiny, microscopic, worm-like organisms that naturally feed on insect larvae and eggs. They are so small that several thousand would fit on the head of a pin. Beneficial nematodes do not have a brain or eyesight. They move aimlessly in the soil until they encounter one of the many different insect species they feed on. Beneficial nematodes attack and kill more than 230 different species of soil dwelling and wood boring insect pests, such as cutworms, corn rootworms, strawberry root weevils, gypsy moth larvae, cabbage root maggots, white grubs, billbugs, fruit fly larvae, and many more caterpillar and beetle pests.



Life Cycle:

Infective juvenile nematodes migrate through the soil, actively searching for insects to feed on. They enter an insect host through its mouth or other body openings. Once inside the insect, the nematodes release a special bacteria. This bacteria multiplies rapidly and kills the host insect. The nematodes feed on this bacteria and on the decomposing host tissue. They continue to feed and reproduce inside the host insect until either the food supply is exhausted or they become over populated within the insect. The young, undeveloped juvenile nematodes leave the host insect and form a protective cuticle around them which protects them from the soil environment. They become **Infective juvenile nematodes** and they begin searching for a new source of food; a new host insect to begin their life cycle over again.

Release:

Beneficial Nematodes may be applied as a top dressing to the soil, mixed with mulch or potting soil and worked into the soil, or sprayed from a hose sprayer or pressure sprayer. They may be applied any time of the year, as long as the ground is not frozen. The ideal temperature range is 60 to 70 degrees Fahrenheit. One package of ten to twenty million nematodes will cover up to 2,000 square feet, but faster and more thorough results are obtained with the treatment of smaller areas.

Nematodes need a moist environment to

survive and move through the soil. The soil should be damp prior to application and should be re-watered after the application to aid the nematodes dispersal into the soil. Keep the soil moist for several days after application for best results. Nematodes should be applied in the evening to avoid exposure to the ultraviolet light and the sun's drying effects. Temperatures above 80 degrees may kill beneficial nematodes.

Directions:

Mix the entire contents of the container (beneficial nematodes and the inert carrier) with 1 cup cold water. Shake well and let stand for 1/2 hour at about 68 degrees Fahrenheit. For best results do not let the beneficial nematodes stand in water more than one hour without agitating or aerating the water. **(Do not use Chlorinated Water)**

To apply as a top dressing:

1. Mix 5 quarts peat moss, vermiculite, potting soil, or sandy humus with 2 quarts water or until the mulch is thoroughly wet.
2. Add the previously dissolved mixture. Rinse the container with 1/2 cup cold water and add the rinse water to the mixture.
3. Apply the mixture to the soil surface at dusk, to moist surfaces. After treatment, water the area thoroughly. For best results, use the mixture within 12

hours, otherwise refrigerate between 38 to 42 degrees (up to 2 months).

To mix into the soil:

Mix the previously dissolved nematodes and inert ingredients with peatmoss, vermiculite or potting soil (as described on the first page). Place this mixture above and below seeds (800 feet of 3" furrow is the recommended coverage) or above and below the new flower's, tree's or shrub's roots (200 plants spaced 4" apart can be treated).

To apply as a sprayable solution:

1. Add the previously dissolved preparation of nematodes and inert ingredients (do not add the peatmoss, vermiculite, or potting soil) to 2 gallons of cold water. Mix well.
2. Let the mixture stand for 1/2 hour. The inert ingredients will rise to the surface.
3. Skim the carrier from the surface. (Do not discard this mixture. It can be used as a top dressing for soil pests.)
4. Water the area to be treated thoroughly before spraying the mixture. Direct the spray at burrow entrances, corn silks, plant roots, flower buds, etc.

Pressure Sprayers or Watering Cans

Pour solution into the tank through a clean sieve. (Use the filtered material as a top dressing product.) Use clean (non chlorinated) water to fill the tank with water. Adjust sprayer to a coarse spray. Agitate the solution frequently during spraying.

Hose sprayers:

Skim the carrier and let the water stand for about 1/2 hour. Pour away the top water, leaving the last pint of sediment. Pour the remaining sediment into the sprayer. Set the sprayer on the largest setting possible and spray liberally, agitating the sprayer frequently.

For best results use the mixture within one hour of first placing the beneficial nematodes in water.

General information:

Beneficial Nematodes (neoplectanids) are

naturally occurring organisms. They are microscopic in size and cannot be seen with the naked eye. Beneficial nematodes are not harmful to humans, pets, wildlife, birds, soil, earthworms, water sources or the atmosphere. They are completely compatible with other beneficial insects such as ladybugs, lacewings, praying mantis, predatory mites, encarsia formosa, and trichograma. They may be used safely and legally on all crops.

Beneficial nematodes will remain effective for about 2 years, but annual applications are recommended, especially in areas with very cold winters. Refrigerate newly purchased nematodes until you are ready to apply them; for best results use them immediately.

There are three basic strains of beneficial nematodes. The most common strain is *Steinernema Carpocapsae*. These nematodes are very effective controlling leafminers, cutworms, termites, fruit fly larvae, army worms, root weevil, codling moth larvae, webworms, and other caterpillar and beetle larvae.

Heterorhabditis Bacteriophora, another strain of beneficial nematodes, are effective in controlling white grubs, billbugs, japanese beetle larvae, strawberry root weevil, wireworms, onion weevil, cucumber beetle larvae, and other caterpillar and beetle larvae.

The third strain of beneficial nematodes are called *Steinernema carpocapsae 'Kapow'*. These nematodes control fungus gnats and shore flies.

All three strains on nematodes control a wide range of insects and have a considerable overlap of the insect species they control. Unless you are a commercial grower, after a certain pest, you would not notice any difference from using the different strains of beneficial nematodes. We usually sell the first group of nematodes, *Steinernema Carpocapsae*, for home use.

BENEFICIAL NEMATODES

USE: Beneficial Nematodes (BN) attack more than 230 kinds of soil dwelling and wood boring pests, such as flea larvae, white grubs, cutworms, corn root worms, strawberry weevils, gypsy moth larvae, cabbage root maggots, fungus gnat larvae, and many more.

RELEASE: BN may be released by spraying with water, mixing with mulch and applying directly to the soil or potting mix, or injecting into burrows. They may be used any time of year, as long as the ground is not frozen. Do not release in direct sunlight, as this will kill them. See directions for details.

COVERAGE: Will cover up to 2,000 square feet, but faster results are obtained with higher concentrations.

GENERAL INFORMATION: Beneficial Nematodes (*Steinernema feltiae*) are microscopic in size and cannot be seen with the naked eye. But the 7 million active units in each pint container will hunt down, penetrate, and kill most soil dwelling pests.

BN will remain effective for about 2 years, but annual applications are recommended. Refrigerate if not using immediately (35-40 degrees).

BN will attack over wintering adult insects, pupae, diapausing larvae, and grubs when they are in the soil, bark, or even ground litter.

BN do not affect humans, animals, or plants. They are completely compatible with beneficial insects such as ladybugs, lacewings, and praying mantids and do not harm earthworms.

OTHER ORCON PRODUCTS AVAILABLE:

GREEN LACEWINGS	TRICHOGRAMMA
PREDATORY MITES	ENCARSIA FORMOSA
PRAYING MANTIDS	DECOLLATE SNAILS
EARTH WORMS	DELPHASTUS PUSILLUS
EARTHWORM CASTINGS	APHYTIS MELINUS
FLY PARASITES	FLEA DESTROYER
BENEFICIAL NEMATODES	LADY BUGS
CRYPTOLAEMUS	

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BENEFICIAL NEMATODE DIRECTIONS

There are 3 ways to apply the Beneficial Nematodes (BN). Find your pest on the list at the bottom, then use the recommended treatment number.

- #1 **TOPDRESSING:** Mix the entire contents of the container with a gallon of cold water. Stir well and let stand for ½ hour. Stir again and add 5 to 6 quarts of vermiculite or peat moss or sandy humus.

Apply directly to affected areas. For new plants or transplants, apply around roots. Apply after sundown because sunlight will kill the BN. Water thoroughly after application because BN travel best in moisture.

- #2 **SPRAYING:** Mix the entire contents of the container with ½ to 1 gallon cold water, stir well and let stand for ½ hour. Water the area to be treated before application. Use a watering can, hose sprayer, or pump sprayer. Always use the coarsest or highest rate setting to reduce damage to the BN.

Stir the mixture again and pour into the sprayer, filtering out the carrier as you go (Use a kitchen strainer or a piece of window screen.) Add the left over carrier to your soil. Always agitate the water while spraying and before pouring because the BN sink to the bottom.

Apply after sundown because sunlight will kill the BN. Water thoroughly after application because BN travel best in moisture.

- #3 **INJECTION:** Mix the entire contents of the container with ½ gallon cold water. Stir well and let stand for ½ hour. Strain out the carrier (use a kitchen strainer or a piece of window screen), use the carrier in the soil, and let stand for another ½ hour. This allows most of the BN to sink to the bottom. Pour away the top water, saving the last pint.

Use an eye dropper or squeeze bottle to inject about a tablespoon of liquid into the burrow. Seal the hole if possible.

PEST

USE NUMBERS BELOW TO SELECT TREATMENT ABOVE

Artichoke Moth Larvae	2: Spray Artichoke heads
Black Currant Borers	2: Spray cuttings or bushes
Black Vine Weevils	1: Hoe into soil or add to potting soil
Cabbage Root Maggots	1: Put in seed furrows or on roots
Carpenter Worms	3: Inject burrows
Codling Moth Larvae	2: Spray tree trunks in Fall, Spring, Summer
Corn Earworms	2: Spray or 3: inject silks weekly
Corn Rootworms	1: Apply in seed furrows
Crane Fly Larvae	1: Mix into soil or 2: Spray into soil
Cucumber Beetles	1: Mix in mulch or apply in seed furrows
Cutworms	1: Apply as mulch, keep moist
Fire Ants	2: Use watering can, 1 million per colony
lea Larvae	2: Spray on lawns or soil. Keep moist
Flea Beetles	1: Mix in mulch or apply in seed furrows
Fungus Gnat Larvae	1: Mix into potting soil
Gypsy Moth Larvae	2: Spray on lawns to kill migrating larvae
Japanese Beetles	2: Spray on lawns or 1: Mix into mulch
Mole Crickets	1: Apply to burrows. Keep moist
Onion Maggots	1: Apply to furrows.
Poplar Clearwing Borers	3: Inject burrows
Raspberry Crown Borers	1: Mix into soil near base
Sod Webworms	2: Spray onto sod. Keep moist
Strawberry Weevils	1: Mix into soil and/or apply to roots
Tobacco Budworms	2: Spray or 3: inject flowerbuds weekly
Weevils	1: Mix into mulch or on transplant roots
White Grubs	2: Spray or 1: Mix into soil
Wireworms	1: Apply to seed furrows or transplant roots