

# SOUTHEASTERN INSECTARIES, INC.

606 Ball Street • P.O. Box 1546 • Perry, Georgia 31069  
Office (478) 988-9412 • Fax (478) 988-9413 • Toll-Free 1 (877) 967-6777

Entomological Research, Sales, and Consultation

## SEI Price List 2009

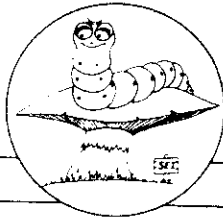
### Heterorhabditis indica Packaged on Gel Carrier

No. Nematodes (millions)	Cost Per Million (dollars)	Total (dollars)
5	4.00	20.00
10	3.00	30.00
25	2.20	55.00
50	2.00	100.00

Minimum order \$20.00 plus shipping and taxes

Prices subject to change without notice

Shipment by US Postal Service (Priority Mail) & FedEx



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## Beneficial Nematodes

### Biological Control of Insect Pests in Soil

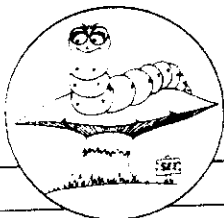
Nematodes are microscopic roundworms found living naturally in most soils. Many species of nematodes exist and each has a unique purpose in nature. Nematode species produced by SEI are used to attack and kill certain soil dwelling insect pests. These pests include white grubs, Japanese beetles, root weevils, small hive beetles, armyworms, cutworms, clearwing moths, fleas, and fungus gnats. Nematodes are highly effective against these pests, but they are safe to handle and do not attack humans, pets, wildlife, or plants. Also, they pose no threat to the environment and are exempt from registration and regulation by the EPA and FDA.

Beneficial nematodes are used by applying them to the soil while suspended in water. They may be applied in pressurized spray or simply poured from a watering can. Nematodes applied to soil burrow downward to search for insect pests. Once found, nematodes enter the body of the insect and release a powerful bacterium which quickly kills the pest insect. Released bacterium dissolves the internal tissues of the insect which, in turn, serves as food for more nematode growth and development. Mature nematodes then mate and lay eggs to produce more nematodes within the dead insect. Several such generations may occur over just a few days. After the insides of an insect are consumed, tiny infective stage nematodes leave the dead insect and begin searching for more pests. As many as 350,000 nematodes may emerge from a single dead insect after only 10-15 days. Numbers emerging depends on insect size and suitability of the insect as a food source.

Beneficial nematodes are an important method of pest control for use by homeowners, organic food producers, or others who just want to reduce the use of toxic chemicals for pest control.

SEI produces and markets beneficial nematodes carried on gel and contained in small plastic packages. Most users separate the gel from nematodes by filling the plastic package with water and then pouring both into a tea strainer held over a pail and collecting water and nematodes that pass through. The gel is discarded and the pail of water and nematodes is further diluted for application to the soil.

One SEI plastic pouch of 5 million nematodes is adequate for treating an area of 218 square feet (14.8 x 14.8 ft). For beekeepers, one package is adequate for treating soil around 10 hives. For more information about biological control of insect pests with nematodes please contact us at SEI toll free.



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## GEL FORMULATION

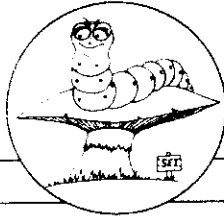
### Handling and Application of Beneficial Nematodes

We recommend that nematodes be separated from gel before application to the soil. Proceed as follows:

1. Add about one-half pint water to contents of zip-loc package.
2. Agitate package for a few seconds.
3. Pour the nematodes, gel, and water into a tea strainer held over a one-pint collecting container.
4. Rinse the gel in strainer with an additional one-half pint of water.
5. The gel can then be discarded or incorporated into garden soil (this gel is an excellent soil conditioner).
6. Pour the pint of collected water and nematodes into a larger container of water to yield about 5 gallons of suspended nematodes ready for use. A package of 5 million nematodes mixed with 5 gallons of water is enough to treat 218 sq. ft. of soil. For beekeepers, this is enough to treat around 10 hives.
7. The water-nematode suspension must be stirred frequently during application because nematodes settle to the bottom of the container after only a few minutes.
8. The best method for applying suspended nematodes to gardens, around bee hives, or around kennels by use of a sprinkle-type watering can. Nematodes may also be applied with a pressurized sprayer.
9. Nematodes suspended in water should be used within an hour or two. To maintain nematodes suspended in water for long periods, they must be aerated.
10. For maximum effectiveness apply nematodes early morning or late afternoon and irrigate over the treated area if possible. Avoid application during intensely sunny and hot periods of the day. Nematodes on gel should be used as soon as possible; however unopened packages can be safely stored in a refrigerator at about 50° for 7 to 10 days.

Never place nematodes in direct sunlight or in very hot places such as the trunk of a car. The effects of nematode treatment can be expected within several days after their application. Suppression of pest may continue for several weeks. Under ideal conditions, infected insects will produce a second surge of nematodes from killed pests, providing additional pest control. Chemical nematicides should not be applied after nematode application.

Area (sq. ft.)	Number of Nematodes Required
1	23,000
100	2,300,000
500	11,500,000
1,000	23,000,000
43,560 (1 Acre)	1,000,000,000



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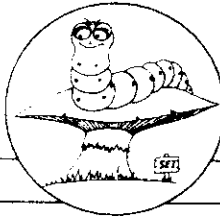
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## How Beneficial Nematodes Work

Southeastern Insectaries produces two genera of nematodes known as *Steinernema* and *Heterorhabditis*. Both are used for insect pest control. The lifecycles of steinernematids and heterorhabditids are similar. Microscopic infective juveniles of these nematodes are the forms that attack insects. They search out insect pests in the soil or latch on to pests as they pass by. Once they contact an insect, they enter natural body openings such as the mouth, anus or spiracles. Then they penetrate the wall of the midgut or trachea and enter the hemocoel (body cavity). Some nematodes are able to penetrate the body wall from outside the insect at the soft intersegmental membranes to enter the hemocoel. Nematodes are effective only in environments that are damp, such as soil.

Infective juveniles carry mutualistic bacteria (*Xenorhabdus* or *Photorhabdus*, respectively) in their intestines which release once they enter the hemocoel. These bacteria grow very rapidly and are the organisms that actually kill attacked insects. Insect death is caused by septicemia and occurs about 48 hours after attack. Infective juveniles then feed on the bacteria and decomposing insect tissues and develop into large adult nematodes. Adult nematodes lay eggs inside the dead insect (cadaver) which quickly hatch into juveniles. These juveniles may become either infective juveniles, or adults that produce still more infective juveniles. There may be 2 or 3 nematode generations within an insect cadaver. The number of generations is likely a function of the availability of food which is governed primarily by the size of the cadaver. Once the food supply inside the insect becomes depleted, infective juveniles emerge from the cadaver and search for new insect prey. In most cases the process of infection to emergence requires from 10 to 15 days.

*Steinernema* and *Heterorhabditis* nematodes only attack certain insects. They will not attack other animals such as humans, pets, birds, other wildlife, or plants. These nematodes are safe to use and pose no threat to the environment.



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## Beneficial Nematodes Availability

For ease in communication with our customers about the nematodes produced by SEI, we have abbreviated their Latin names to **Sc**, **Hb**, **Sf**, **Hi**, **Hm** and **HbO**. Following each species is a list of pests they attack.

### *Sc (Steinernema carpocapsae)*

Attacks a fairly broad range of insect pests including artichoke plum moth, cranberry girdler, wood borers, root weevils, armyworms, cutworms, webworms, billbugs, bagworms, certain fruit flies, German cockroaches, mole crickets, fleas, and pecan weevils.

### *Hb (Heterorhabditis bacteriophora)*

Attacks grubs or larvae of Japanese beetles, May beetles, June beetles, carrot weevils, strawberry root weevils, sweet potato weevils, black vine weevils, citrus root weevils, billbugs, Colorado potato beetles, cucumber beetles, and flea beetles. Other root feeding white grubs found in the soil around plants are also attacked by this species.

### *Sf (Steinernema feltiae)*

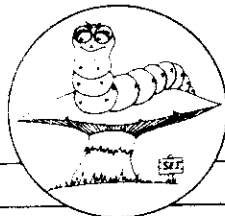
Attacks flies, including dark-wing fungus gnats, fungus gnats, shore flies, hump back flies, and root knot nematodes.

### *Hi (Heterorhabditis indica)*

Attacks many different types of beetle grubs and is especially effective against small hive beetles.

Other nematodes species and strains available include **Hm** (*Heterorhabditis murelatus*) and **HbO** (*heterorhabditis bacteriophora* Oswego strain).

For more information, please call or fax the above number.



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## Ordering, Delivery and Storage of Beneficial Nematodes

### Ordering

- We normally ship by U. S. Postal Service (Priority Mail or Fed Ex) and delivery can be expected in 2-3 days. We suggest that purchasers anticipate their needs and place orders 2 weeks prior to day of shipment. We accept telephone (toll free) and email orders at the numbers listed on the page heading. Additionally, we are available to answer specific questions about nematode use.
- We accept payment by Visa or Master Card.
- Total costs are the price of the nematodes, sales tax for Georgia residents, and shipping charges. Special request for handling and packaging costs may apply.

### Delivery

- We ship nematodes in ventilated plastic packages containing a special gel to keep them alive and fresh. Once they are received, nematodes should be applied as soon as possible for maximum effect against target pests or stored in refrigeration.

### Storage

- If storage is necessary, packages of nematodes on gel can be stored for two weeks in a standard refrigerator at 50°F.
- Nematodes cannot be held in hot conditions such as in direct sunlight or in the trunk of an automobile. Also, nematodes will not tolerate freezing temperatures. As with all living organisms, the longer nematodes are kept stored and kept from their natural environment, the greater their mortality and effectiveness.