

## Using Beneficial Nematodes

by Debbie Lauer, Bell County Master Gardener

What is a nematode you ask? A nematode is a microscopic round worm. In nature there are billions of nematodes, each with a different function in nature. Some feed on plants, others on animals or decaying material and some, the beneficial ones for gardeners, feed on insects. I want to talk about how you can use these creatures in your yard and garden as an alternative to, or complimentary to pesticides. There are literally hundreds of types of nematodes that prey on insects. These small creatures can help control many different types of garden pests to include, fire ants, fleas, grubs, fungus gnats, termites, and cutworms. Now do I have your attention?

Nematodes have a complicated six stage life cycle including egg, four juvenile stages and the adult stage. It is the third juvenile stage called the dauer that enters the insect body. This happens when the insect is in a larval soil dwelling stage. Dauers live in the film of water that coats soil particles. They do not feed, it is their job to hunt down and infect the insect. They have two hunting styles; some are "ambushers" while others are "cruisers" actively moving around seeking prey. When the dauer enters the insect body it releases a toxic bacterium that kills the host. This process usually takes a couple of days. Meanwhile the dauer becomes an adult and the adult nematode uses the dead insect body as food. Over the next couple of weeks the nematodes pass through several generations inside the insect carcass. When the nematodes are about to finish off the insect, the entire population seems to know their food is about to run out and they all, up to 200,000 of them, turn into dauers that can infect another insect larva. Since they do not feed, dauers can last for several weeks in the soil before finding another host, and starting the whole cycle again.

To use nematodes effectively it is important to understand them and their prey. Timing is important. You want to spread the nematodes when the insect pest you are targeting is in the soil dwelling larval stage. After white grubs turn into June bugs would not be the time to treat your turf grass with grub eating nematodes. You still have some time to treat for grubs as they have not yet become adult beetles and they are still in the soil and therefore vulnerable to nematodes. Other pests that can be targeted such as ants and fleas have multiple life cycles during the year and the nematodes can attack the eggs and larval stages as long conditions are right for them.

When you purchase nematodes they are packaged several different ways, either impregnated in a moist sponge, gel, or in a granular type of material. They must be kept cool and moist and should not be exposed to heat or sunlight as both can kill them. To keep them cool, store them in your refrigerator. Be careful not to freeze them. You should use them as soon as possible (within two weeks) after you purchase them. Since they are sensitive to UV you should spread them under conditions of lower light; early morning, evening, or even better, on a cloudy cool day. Usually the directions that come with them call for you to add water to create a "soup" of nematodes. After that you can spread them according to what you want to use them for. You can put them in a hose end sprayer and spray over the yard or put them into a sprinkler can or pump sprayer and go around and douse things like fire ant mounds with the nematode water. After treating you need to water them in, the extra water helps them to move deeper into the soil. Be careful not to soak the soil as too much water makes it hard for them to infect their prey. If soil conditions are especially dry you may want to water a little before treating. Soil needs to be at least 60 degrees and below 93 degrees for them to survive. These nematodes are harmless to humans so no special safety equipment is needed when using them.

After you spread them and water them in, all you have to do is wait. You will not see nematodes at work because all of their work is done in the soil. Also remember that they attack larval stages of insect life, adults will still be running around. Nematodes don't bother them; instead they are busy killing and eating the next generation. If you want hard evidence that they are working, dig around looking for dead larva. Infected white grubs will turn yellow or brown depending on the type of nematode that infected them. Repeat applications of nematodes may be necessary but the impact on the insect population can be just as effective as a chemical pesticide. The trick is to get a high enough population of nematodes to deal with the insect problem.

Nematodes are also sensitive to chemicals you may have treated your yard or garden with. It is a good idea to wait two weeks after using a fertilizer before treating with nematodes. Because they can be sensitive to chemicals, be sure that the containers you mix and spread them with are not contaminated with some type of chemical residue from a prior use. While some pesticides work well with nematodes, others will kill them. Check labels to find out. Chemicals to avoid are bendiocarb, chlorphrifos, ethoprop, and isazophos. Fungicides anilazine, dimethyl benzyl, ammonium chloride, fenarimol, and mercurous chloride should be avoided. Herbicides to avoid are 2-4D, trichlopyr, and nematicide.

Nematodes are a great alternative to fight some insect pests in the yard and garden. They can be just as effective as a pesticide without the possible harmful effects to children, pets and the environment.