Nematode Control in the Home Garden

MISSISSIPPI STATE UNIVERSITY EXTENSION

Nematodes are slender, wormlike animals too small to be seen with an unaided eye. They live in soil, water, and plant tissues, and they can be spread from one area to another in infested soil clinging to cultivation equipment, in water, and on roots of transplants.

Although nematodes are hidden in the soil, they may cause much damage to plants. Typical aboveground symptoms are general stunting, yellowing, loss of vigor, and general decline.

One nematode that is especially damaging in home gardens is the root-knot nematode, which attacks many common vegetables. This nematode enters the root tissue and feeds, stimulating the development of swellings, or galls.

The ability of the plant to take water and nutrients from the soil is reduced by this nematode. Nematodes also damage plants by allowing other harmful organisms in the soil to enter the roots.

The best time to determine if you have a nematode problem is in the summer and fall, when nematodes are most numerous. Roots may be dug from the soil and examined for the presence of root-knot nematode galls.

The kinds and number of nematodes in the soil may be determined by sending soil samples to the Extension Plant Diagnostic Laboratory, 190 Bost North, Rm. 9, Box 9612, Mississippi State, MS 39762. Nematode testing costs $11 per sample.

While it is practically impossible to rid the soil completely of destructive nematodes, you can reduce them to nondamaging numbers by the methods listed in this publication. Apply one or more of these methods when a root-knot nematode hazard is determined by root inspection or nematode assay.

Table 1. Root-knot nematode-resistant varieties. Look for N on the seed packet to indicate root-knot nematode resistance.

Plant	Variety
Tomato	Abraham Lincoln Improved, Beefmaster, Better Boy, Big Beef, Burpee Supersteak, Celebrity, Goliath, Miracle Sweet, Mortgage Lifter, Park's Whopper, Terrific
Yellow tomato	Lemon boy
Cherry tomato	BHN-986(F1), Small Fry, Sweet Chelsea, Sweet Million
Lima bean	Nemagreen
Snap bean (pole)	Alabama No. 1
English pea	Wando
Southern pea	Mississippi Purple, Mississippi Pinkeye, Magnolia Blackeye, Mississippi Silver
Pimiento pepper	Mississippi Nemaheart
Hot pepper	Carolina Cayenne, Charleston Hot
Sweetpotato	Jewel, Murasaki 29 (a purple-skinned, white-fleshed Japanese variety)

Resistant Varieties

The root-knot nematode is unable to feed on the varieties listed in **Table 1**. As a result, the nematode population dies of starvation in soil planted to these varieties, if weed hosts are not present.

Using resistant varieties is the easiest, least expensive, and most effective means of nematode control. Unfortunately, varieties resistant to root-knot are available only in certain crops. Asparagus, onions, and strawberries (all varieties) are resistant to most root-knot nematode populations in Mississippi.

Fallow

Fallowing is preventing any vegetation from growing, which starves the nematode population. Fallowed soil should be plowed every 2 weeks to reduce weeds and to expose the nematodes to the sun, which kills them.

Change Locations

If space is available, it is a good practice to change location every 1 to 2 years. The "resting" location may be either fallowed or incorporated into the lawn.

Marigolds

Marigolds give off a substance from their roots that is toxic to nematodes, making these flowers a valuable aid in nematode control when they are planted in solid beds. For best results in small gardens, use the French marigold varieties Tangerine, Petite Harmony, or Petite Gold. Space plants 7 inches apart in 7-inch rows.

Solarization

Solarization is using heat from the sun to kill nematodes in bare soil. This technique involves placing clear plastic (1–1½ ml thick) on moist, tilled soil and sealing the edges with soil, bricks, or other materials. The plastic should be tight and smooth, allowing water to run off rather than pool on top of the plastic.

Apply the plastic in May or June. It should remain in place for at least 8 weeks (the longer, the better). The plastic may be removed in August in time to establish a fall garden, if desired. If not, remove the plastic before cold weather begins.

Sanitation

Remove and burn plants (including the roots) in root-knot nematode-infested gardens immediately after the last harvest of each crop. Work the soil two to four times in winter, allowing the sun and weather to exert their killing effect.

Combination of Controls

For best results, combine and rotate two or more of these nematode control techniques. Rotation involves dividing the garden in half, using a different control technique on each half the first year, and reversing the treatments the second year.

Members of the Brassica family also may be helpful in reducing nematode populations. Plant mustard and till into the soil after flowering, or do the same with broccoli, tilling it under after the broccoli has been picked. Dense plantings of these cover crops provide the best results.

The nematode-resistant cowpeas (Mississippi Purple, Mississippi Pinkeye, and Magnolia Blackeye) offer one of the best rotations for large garden plots. A pea patch of one of these varieties will reduce nematode populations as effectively as chemical nematicide used to. It takes the peas 2 months to control a nematode population. Some suggested rotations are shown in **Table 2**.

It is important to control weeds so that nematodes will not survive on them. Your success in controlling nematodes can be determined, and recommendations for the following year can be provided, by sending soil samples to the Extension Plant Diagnostic Laboratory.

Some nematodes other than root-knot may cause some damage on vegetables. These nematodes include lance, lesion, stubby root, and sting. No variety is resistant to these nematodes, but the other control methods listed here are effective on them. These nematodes usually cause fewer problems on vegetables than the root-knot nematode does.

Table 2. Suggested rotations for large garden plots.[1]

		Option 1	Option 2
1	Year 1	resistant varieties	cowpeas
	Year 2	susceptible crop	resistant varieties
2	Year 1	resistant varieties	marigolds
	Year 2	marigolds	susceptible or resistant varieties
3	Year 1	resistant varieties	fallow
	Year 2	fallow	susceptible or resistant varieties
4	Year 1	resistant varieties	solarization
	Year 2	solarization	susceptible or resistant varieties

[1]Garden is divided into halves.

Chemical Control

Nimitz (fluensulfone) is a nematicide that may be used to control root-knot, lance, sting, stubby-root, and lesion nematodes in home gardens. The product may be applied only to ground that will receive transplants (not seeds) and cannot be used on all vegetables. This product is not likely to be available on the shelf of your garden supply center and may have to be special-ordered. Hiring a commercial applicator is recommended.

Treatment should be administered 7–30 days before transplants are set in the ground. (See the product label for instructions specific to the plants you are growing.) Follow label directions regarding soil moisture for optimal effectiveness of the product. Do not make applications if soil temperatures are below 60°F. Do not plant any unlisted crops into treated ground for 365 days after application of the product. Do not apply more than one application per crop per year. The label is the law. Always follow label directions when applying pesticides.

Plants that are listed on the label include these*:

Fruiting vegetables: okra, tomatoes, eggplant, peppers (bell and nonbell), and tomatillos

Cucurbit vegetables: cucumbers, summer and winter squash, melons (cantaloupe, watermelon, and honeydew), and pumpkin

Brassica (cole) vegetables: broccoli, cabbage, cauliflower, kale, collards, mustard greens, kohlrabi, turnip, daikon (Japanese white radish), and Brussels sprouts

Leafy vegetables: celery, head and leaf lettuces, spinach, and Swiss chard

Strawberries

*Please contact the plant diagnostic lab or consult the product label for a full listing of garden crops that can be treated.

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