

# EARTH-KIND NEMATODE CONTROL DURING SUMMER MONTHS

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If you have nematodes in your garden sooner or later they will decrease or end production. Nematodes will severely damage all garden crops except corn, onions, garlic and nematode-resistant tomatoes. Even these nematode-tolerant crops will be adversely affected if a severe nematode population is present.

How does one know if nematodes are a problem in their garden? Above ground symptoms of nematode infestations are similar to many other root diseases or environmental factors limiting water and nutrient uptake. These symptoms consist of wilting during periods of moisture stress, stunted plants, chlorotic or pale green leaves and reduced yields. Most characteristic symptoms are those occurring on underground plant parts. Infected roots swell at the point of infection and form knots or galls. Several infections may occur along the same area resulting in large fleshy galls. The appearance of the galls will depend in part upon the plant being affected and the nematode species involved. Fast growing annuals will have a large fleshy gall and woody perennials, small hard galls. Infected roots are retarded in growth and lack fine feeder roots. Rotting of roots develop late in the season. When tubers, corms or other edible root portions are infected, small swellings or pimpling is evident on the surface.

Vapam was the most effective nematicide available. Unfortunately, the chemical control for nematodes named Vapam is no longer available. Organically, only the planting of cereal rye (Elbon) in the fall to grow during the winter will decrease nematode populations. Excessive drying called solarization (soil pasteurization) of the soil during July will also help. It consists of covering well-tilled, highly moist soil with clear plastic, sealing the edges and leaving it for several weeks. Do not use black plastic because soil heating is not as great as heating under clear plastic. Best results have been reported with fungi control, principally those causing root rots. Certain weeds and nematodes are controlled but not consistently. Solarization also stimulates plant growth possible by creating a good environment for beneficial microorganisms; however, this phenomenon is not fully understood. Solarization works best during the hottest months; July and August are ideal for home garden sites. Continue the treatment at least one month.

Another possible solution may be the solid planting of marigolds for 3 months in areas heavily contaminated with nematodes. The marigold, when grown on soil infested with nematodes, suppresses the population of these nematodes and reduces the numbers found in the roots of susceptible host plants. Three compounds of an a-terthienyl type, toxic to nematodes, have been identified in root exudates from these plants. Terthienyls are released from growing roots, even without their decay, but benefits require three to four months to become clear. There is some evidence that a-terthienyl is inhibitory to some plant-pathogenic fungi too. Marigolds also function as a trap crop since larvae which penetrate the roots do not develop beyond the second larval stage and do not lay eggs.

Marigolds have never been used for a biological nematode control because Vapam was less trouble-some and more economic. Since Vapam is no longer available and since cereal rye does not survive in hot weather, use

of the marigold for nematode control must now be examined. Of course, you will want to follow proper planting procedures. Marigolds perform best if planted in a well drained location which receives at least 8-10 hours of sun daily. Incorporate generous amounts of organic material (pine bark mulch, peat moss, or compost), or fill with a commercially available landscape mix. Then add slow-release lawn fertilizer (no herbicide, please!) at 2 pounds per 100 square feet. Soak the bed immediately after transplanting and, depending on the weather, irrigate when the soil becomes dry and the plants begin to wilt slightly. (CAUTION: DO NOT keep these plants wet after they become established! Keep the soil feeling slightly moist to the touch but not wet. Continuously soggy, wet soil in the planting bed will stunt marigolds growth and eventually kill them.)

The new MARI-MUM marigolds are especially popular for planting. Buy transplants which are completely green or those that are just forming buds. Transplants covered with open blossoms will not produce the normally expected growth after planting. Bloom removal and/or fertilization WILL NOT overcome the detrimental affects of transplanting a MARI-MUM in full bloom. MARI-MUMS are among the most durable of transplanted annuals and are also the easiest to transplant. Unlike impatiens, begonias, petunias and bluebonnets, MARI-MUMS cannot be planted too deep. Other annuals rot if planted too deep; MARI-MUMS root. In fact, many times roots can be seen on the stems of transplants when purchased at nurseries. Transplanting depth does not affect ultimate plant height. Because of this never-too-deep transplanting phenomenon, large, leggy transplants can be salvaged by planting deeper to provide support during establishment.

The name marigold conjures up thoughts of pests. Some people think marigolds repel certain pests while other folks fear the devastating spider mite which the beautiful flowering plants seem to attract. Marigolds DO NOT repel rabbits, other rodents or deer. Marigolds also don't repel insects; in fact, they are attacked by and shelter the formidable spider mite.

So why should anyone who fears a spider mite invasion plant MARI-MUMS? MARI-MUMS are recommended for transplanting in August because spider mite populations decline in cooling fall temperatures. The optimum temperature for spider mite reproduction is 97 degrees F. during which the mite population can double every 5 days. As fall temperatures cool to 77 degrees F., mite populations require as many as 20 days to double. Because mite populations are virtually eliminated when planting beds are renovated for MARI-MUM establishment in August and since mite populations do not have an adequate time of favorable temperatures to regenerate their masses, spider mite damage to fall MARI-MUM plantings is minimal, even without a single pesticide application!

MARI-MUMS ARE NOT spider mite resistant; the lack of mites on fall plantings is merely a function of temperature and population control. Interested gardeners who have a nematode infested area should transplant marigolds 12 inches apart in August and allow them to grow there until fall planting of cole crops begins in October. Tops of the marigolds should then be removed and the root system tilled into the soil. By using marigold in the summer, you can rid the planting area of those devastating nematodes without endangering yourself or the environment, a truly EARTH-KINDTMpractice.