Marigold Roots Produce Ozone That Kills Nematodes

Nematodes are roundworms. The total number of nematode species has been estimated to be about 1 million.

Marigolds are part of the Sunflower family. The genus *Tagetes* is native to North and South America, but some species may be found around the world.

July 30, 2014

**Marigold Roots Produce Ozone That Kills Nematodes**

Worldwide, modern, industrial agriculture has developed a system known as monoculture to maximize profits. The term refers to a practice of growing a single crop or plant species over a wide area for several years.

All over the world, political and economic forces have created large farms that use capital-intensive technology, pesticides, and synthetic fertilizers. A reliance on pesticides has created a need to continually develop new pesticides because pests become resistant to chemicals.

**Conventional Plants Are Starved on a Diet of NPK**

In the 1950s, agrochemical companies arbitrarily decided that plants need three elements to survive:

- Nitrogen (N)
- Phosphorus (P)
- Potassium (K)

In contrast, there are 98 elements on the Periodic Table of Elements that exist in Nature. When plants are starved, human and animal diets suffer due to missing constituent minerals.

Increased application of chemical fertilizers leads to decreased soil fertility and higher insect infestation. Very few Americans understand that agriculture is facing an environmental crisis. Chemically fertilized crops exhibit higher foliage levels of free Nitrogen making them more susceptible to pests. The solution will not be found in genetic engineering, but a return to biological diversity and Nature’s built-in, self-regulating mechanisms.

**What Are Parasitic Nematodes?**

Nematodes are roundworms that are the most numerically abundant animals on Earth. According to the February edition of *Scientific American*, four out of five animals on Earth are nematodes (1). Some nematodes are endoparasitic, living and feeding within the tissue of roots, tubers, buds, and seeds, while others are ectoparasitic, feeding externally on plant walls (2).

Endoparasitic root feeders include economically important pests such as the root-knot nematode (*Meloidogyne* species), the cyst nematode (*Heterodera* species), and the root-lesion nematode (*Pratylenchus* species). Direct feeding by nematodes can drastically decrease a plant’s uptake of nutrients and water. Nematodes have the greatest impact on productivity when they attack roots of seedlings immediately after germination (3). Nematode feeding creates open wounds also provide entry to a wide variety of plant-pathogenic fungi and bacteria (3).

Nematode control requires prevention strategies because once a plant is parasitized, it is impossible to kill a nematode without destroying the planet (3).

**Marigold Cover and Interplanting Creates a Natural Barrier in Root Systems**

Crop rotation is the practice of growing a series of dissimilar/different types of crops in the same area in sequential seasons. Crop rotation, also called fallowing, is a land-management practice that dates back to the ancient Egyptians (4).

Marigold is a nematicidal, non-brassica crop that acts as a nematicide. Brassica is a genus of plants in the mustard family (Brassicaceae) and the members of the genus are also called cruciferous vegetables. Because several brassicas are known to be hosts for parasitic nematodes, crop rotation to a non-host crop is an effective strategy for preventing nematodes from becoming established. According to horticulturist Shepherd Ogden, nematodes are attracted to marigold roots, but then the nematode attacks, the root releases ozone that kills the nematode (5).

To obtain full benefit, a cover crop of marigolds, free of weeds, needs to be planted for a full season. Interplanting, also called trap planting, can also be used to ensure that
crops are protected. There are two types of planting trap crops:

- **Perimeter trap cropping**
  Perimeter trap cropping (border trap cropping) is the planting of trap crop completely surrounding the main cash crop. It prevents a pest attack that comes from all sides of the field. It works best on pests that are found near the borderline of the farm.

- **Row interplanting**
  Row interplanting is the planting of the trap crop in alternating rows within the main crop.

### Researchers at UC Davis Inject O3 into Soil Using Drip Tubes

In 2009, researchers at the University of California tested reduction of a Root-Knot Nematode (RKN, Meloidogyne javanica) infestation by fumigating soil samples with ozone. Ozone gas was produced with an electrical discharge O3 generator. The researchers demonstrated a significant reduction in the levels of RKN in carrot and tomato crops (6).

### References

1. "Nematode Roundworms Own This Place," Jennifer Frazer, February 9, 2013.