

# INTEGRATED NEMATODE CONTROL

## INTRODUCTION

Identified as the "***biggest predator of the agricultural industry***" nematodes represent one of the major factors in low agricultural productivity, especially in developing countries. Not a single chemical spray, new method, technique or Nematicides has succeeded in eradicating this menace. The result is compound growth of nematode population and resistant new species, which result in devastated agriculture.

## WHAT ARE NEMATODES?

Estimated to exceed half a million species and costing American farmers billions in crops, Nematodes are minute, multi-cellular worm-like creatures that live in freshwater, salt waters and in soils. The comparatively few plant-parasitic species live in the films of water lining a maze of interconnected soil pores. The heaviest infestation takes place in the root zone of warm, tropical and sandy soils where reproduction rates can be maximized up to 10 generations per each growing season.

Parasitic Nematodes are economically devastating because they feed on the roots, seeds, buds, and tubers of plants. Some nematodes live and feed within the tissue of these parts. Thus, whether it is carrots or potatoes, citrus trees or grapevines, these plants either die or have poor productivity, especially when the attack is on the roots of seedlings immediately after germination. In the case of developed plants, direct root feeding can drastically decrease plant's uptake of nutrients and water as well as create open pass-ways that allow a wide variety of plant-pathogenic micro-organisms to entry into the plant. Such microbial infestations are often more damaging than the direct effects of nematodes feeding on the roots. Thus, the combination of the two can be fatal to the plant.

For example, Root-knot nematodes (*Meloidogyne* species), the Cyst nematodes (*Heterodera* species), and the Root-lesion nematodes (*Pratylenchus* species) are amongst the most economically devastating endoparasitic root feeders. Root-knot nematodes form galls on injured plant tissue, which block water and nutrients flow, stunt the growth of plants, impair its fruit production, and cause foliage to wilt. Roots become rough, pimpled and cracked. Cyst nematodes make plants appear severely malnourished with diminished tops. Foliage wilt and curl easily, roots thicken, and become tough, red or brown. Root-lesion or Meadow nematodes cause internal browning in potato tubers and in the roots of corn, lettuce, peas, carrots, and tomatoes.

## **OUR CEDAR OIL FORMULATION (PCO CHOICE) AS A UNIQUE EFFECTIVE SOLUTION.**

Conventional methods of Nematode combating advocate prevention as the most effective solution. Usually, the assumption is that: "once a plant is parasitized it is impossible to kill the nematode without also destroying the [plant]."

However, PCO CHOICE presents a far superior and most effective alternative. Because it can be used even up to the time of harvest. Systematic protocols and procedures employing PCO CHOICE can be used consistently from the seed stage to the harvest time without any damage or problems to the plants, fruits or grains. Apart from protecting plants from nematodes, PCO CHOICE can also effectively protect plants from other insect and pathogenic infestations, enhance plants' immune system and promote healthy growth.

### **WHAT ARE THE ADDITIONAL BENEFITS OF PCO CHOICE?**

Apart from eliminating or dramatically reducing nematodes, PCO CHOICE can actually reverse the effects of past use of inorganic chemical pesticides, herbicides and fertilizers on plants, which generally weaken, damage or completely destroy the plants' defense mechanisms, leaving the plants more susceptible to harmful organisms. When PCO CHOICE is used, it promotes high carbon microbial enhancement to the soil.

PCO CHOICE will also neutralize, kill and repel all non beneficial insects including dehydrating the exoskeleton of the eggs. These insects would include:

Ants, spider mites, glassy wing sharpshooter, Flies, Moths, Grubs, Army Worms, Mole Crickets, Fleas, Ticks, Chiggers, Grasshoppers, White Fly, Mediterranean Fruit Fly, Mites, Citrus Rust Mite, nematodes, bark beetles, darkling beetles, Japanese Beetle, June Bugs, Box elder Bugs, Aphids, Scale, Stink Bugs, Bag Worms, Eastern Tent Caterpillar, Slugs, Snails, and numerous other flying, crawling and subterranean pests including termites of all species. PCO Choice is also a organic Bactericide and fungicide and will effectively control **Powdery Mildew** and other related fungal organisms such as Brown Patch, Take All Patch, Dollar Spot and other Leaf and Turf Yellowing disease. As a larvicide, it will destroy both egg and larvae in standing water and other areas. PCO Choice is effective in control of heat seeking and pheromone driven venomous snakes including but not limited to Coral, Rattler, Water Moccasin, Copper Head and others.

However it has no effect on beneficial insects like honey bees, butterflies, lizards and toads...

## **FOR THE CONTROL OF NEMATODES and other insects:**

The best time to deliver a lethal dosage of PCO Choice is right before a rain storm. Rain will enhance the results of the PCO Choice as it drives it into the soil. PCO Choice can be effectively used to control or eliminate nematodes. Depending on the intensity, type of infestation, and cultivation cycle, PCO Choice can be used for short term control or long term.

The standard dilution rate for the initial soil treatment is 1 gallon of PCO Choice to 4000 gallons of water per 20 acres...200 gallons per acre. It is always better to use PCO Choice before the crop is planted, preferably when the soil is being plowed and turned over. Then the land is left for 72 hours before planting. Sometimes, depending on the intensity of infestation, it might be necessary to repeat the process. [For densely infested soil, it might be necessary to use a higher concentration)

Then the land is plowed again after drying. After planting, the soil is irrigated with water mixed with PCO Choice at the rate of 1 to 4,000 gallons of water.

In the case of greenhouses, the mixture ratio depends on the type of plant being grown. The average concentration can vary between 3% in small applications up to 1 gallon PCO Choice to 200 gallons water in a larger container. [PCO Choice does not work well with acidic plants].

For mature trees, the soil must be turn up as wide and deep as possible before it is irrigated with a concentration of 1 gallon PCO Choice to 2000gallons of water. This process should be repeated as often as necessary.

Although certain difficulties can to be expected, the systematic use of PCO CHOICE becomes necessary. For example, Cyst and Root-knot nematodes are very difficult to combat because they are very difficult to reach due to their within-root lifecycle. However, because PCO Choice is 100% water soluble, it is absorbed by the roots and thus exposes those nematodes to the lethality of PCO Choice. That is why the best way to eradicate nematodes is to integrate the use of PCO Choice in the Soil Management approach. PCO Choice remains in the soil, and accumulate with repeated use to form a protected environment that is inhospitable for insects and pathogens.

Water is usually a major source of nematodes. It is highly recommended that irrigation water in holding ponds, tanks, reservoirs or canals are treated with PCO Choice to keep them nematode-free. Occasional surface spraying will also eliminate all mosquito larvae