

MANAGING NEMATODES AND SOIL PATHOGENS IN AUSTRALIA AN OVERVIEW

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CHOICES/SOLUTIONS: To manage Nematodes and Soil Pathogens Dr. Morales has developed a portfolio of biological solutions to protect and improve the health and productivity of crops and agricultural soils with the highest rate of success and the lowest environmental impact. *Live Systems Solutions International* products will be utilized to manage and solve the Australian nematode and soil pathogen problem.

Soil infection corresponds to an unbalance of the microfauna and the mesofauna of agricultural soils where phytophagous populations (such as nematodes and pest insects) and phytopathogens (microorganisms that make crops sick) overpopulate generating great economic losses.

There are different strategies for handling these problems:

1. Attack overpopulated pathogen species with toxic substances at sufficient dosages in an attempt to kill the pathogens.
2. Try to increase the population of beneficial species that compete with the phytopathogenic and phytophagous populations with the goal of reestablishing the natural balance.
3. Introduce plant varieties resistant to pathogen attacks.
4. A combination of some or all of the above.

When implemented each strategy has its own levels of effectiveness, short, medium and term-term impacts, costs and sustainability issues.

Unfortunately, the current strategy, stated above for soil disinfection, nematode and pest control is Metam Sodium. This toxic chemical presently used to solve the nematode and soil pathogen problem in Australia has proven to be less than 60 percent effective. Metam Sodium as a soluble concentrate product SL at 50% w/v reaches a satisfactory efficacy in greenhouses, applying between 750 and 1000 liters per hectare and in the field between 400 and 500 liters per hectare. Before applying Metam Sodium the area to be treated is broken into clods to facilitate uniform distribution. Soil humidity has to be kept at 50 to 75% of the water holding capacity for 5 to 10 days before application. Either applied by soil injection and/or drip irrigation the chemical has to be applied 10 to 40 cm. deep. After being treated the soil is left 2-4 weeks until the product is completely decomposed before planting can even take place. Any Metam Sodium residue left has extreme phytotoxicity. Metam Sodium is toxic to fish, highly toxic to zooplankton and extremely toxic to crustaceans. Dilution of the product with water or acids generates poisonous or flammable gases. The product is corrosive to the skin and if ingested or inhaled can be fatal.

The alternate strategy is the use of Live Systems Solutions International biological products. **AgroGuard WG, Nemata SC, Ecoterra WG** are dispersible in granules of water, directly into the soil or on the infected plant. NEMATA controls phytophagous nematodes, AGROGUARD controls phytopathogenic fungi and ECOTERRA increases the retention capacity and effectiveness of nutrient absorption to increase root development and crop productivity, regulate pH, cationic exchange capacity and oxygenation and decreases the population of phytopathogens in the rhizosphere. The three products can be mixed and applied separately or together without reducing effectiveness and the dose is 1 kilo per hectare. These products are formulated as SC concentration suspension or water dispersible granules with active ingredient concentration between 5×10^{12} and 10^{13} CFU per liter or per kilo and a dose of 1 to 2 liters or kilos per hectare and on average two applications per cycle in short cycle crops. These *LSS/LST* products have proven effective in Latin America with crops that include but are not limited to: Strawberries, Rice, Soybeans, Cotton, Sugarcane, Lettuce, Broccoli, Tomatoes, Grapes, Avocados, Asparagus, Sorghum, Potatoes, Carnations, Pineapples and Coffee. There are no negative soil, plant or human dangers. Live System Solutions products are absolutely environmentally safe.

These products are friendly to the environment, biodegradable and not toxic to humans and degrade to a natural balance in the applied areas.

The cost, effectiveness, flexibility and safety of Live System's products equals or surpasses chemical products without the negative environmental impact of chemical solutions.