

NEMATODES AND PENERGETIC



Lettuce root (*Lactuca sativa*)

Both soils infested with nematodes (*Meloidogyne* spp.)

Is it possible to produce on soil infested with nematodes?

Yes. But it is necessary to use soil biology to balance the populations of phytonematodes.

Many farmers are interested in addressing concerns of nematode populations.

Questions: What is meant by: “balancing the soil by means of soil biology?” Is this by means of microbial populations?.....Does “bioactivation” refer to by penergetic k - soil activator alone or as part of a boarder holistic approach? Were there any microbial inoculations added, any specific cover crops added?

>> Native soil populations are always more efficient in forming symbiosis with plants and in controlling soil pathogens (including nematodes). This is one of the reasons that Penergetic is a fantastic technology for improving production systems. Penergetic stimulates these native microorganisms, thus improving the entire soil-plant system.

There are very efficient biological agents to protect plants from nematode attack. Trichoderma is one of these. We know that the use of Penergetic + biological agents (such as, for example, Trichoderma) stimulates the action of this agent, resulting in an increase in the efficiency of biological control.

Penergetic is essential in improving soil conditions, so biological agents can “work” better.

In the management of nematodes in the field it is important to use cover crops that produce root exudates that reduce the activity of nematodes in the soil.

There are specific plants to control the different species of nematodes. Experts, such as Ademir Calegari, knows how to guide the best combinations of plants.

** The best control of nematodes is through a combination of Penegetic / native soil microbes activated / agents / cover crops.

As shown by these roots (on page one) the results are clear! Penegetic 1 - nematodes 0... This effect can change the farmer's life. Nematode infested areas are a major problem.



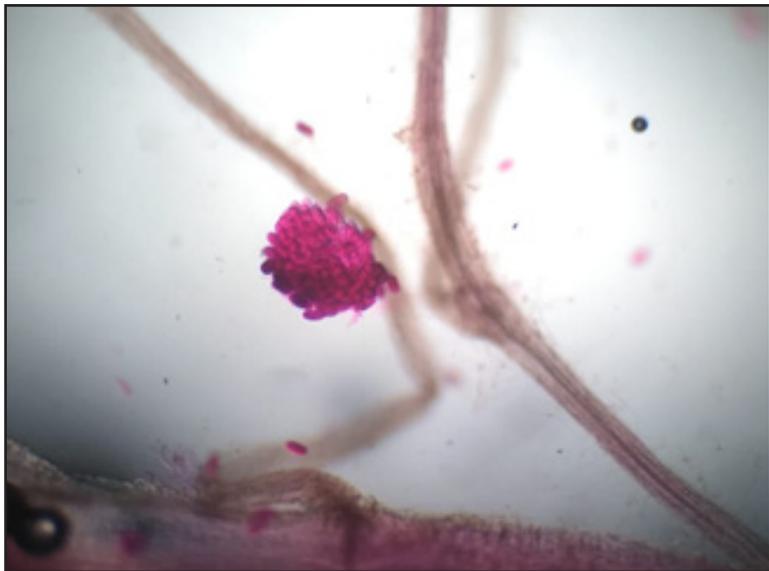
Juvenile phase of the nematode penetrates in the root.



Differentiation of tissues and gall formation occurs.
Galls are tumors in the root cells.



The female begins to release the eggs.

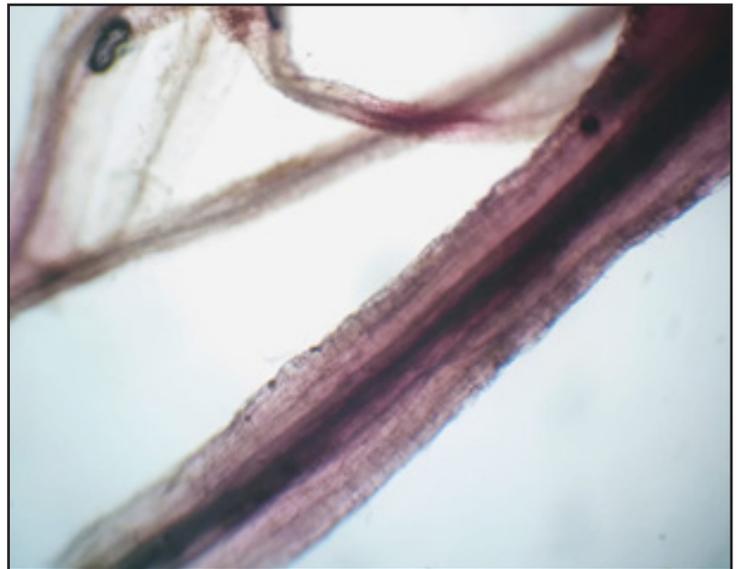
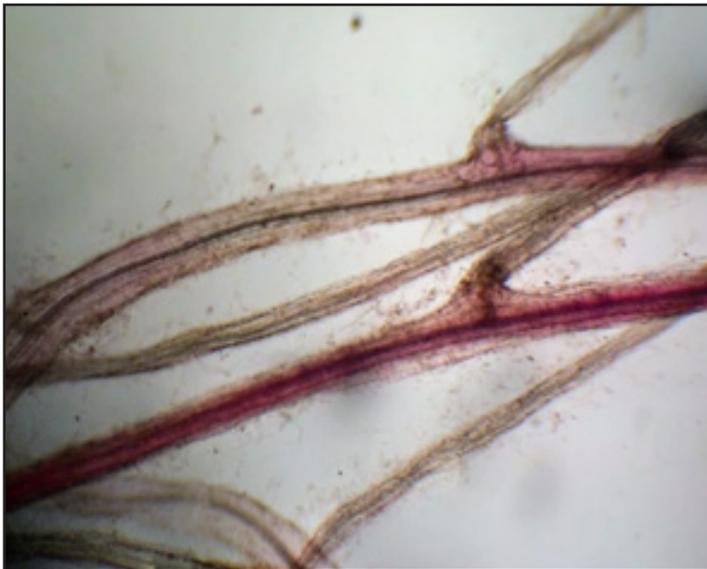
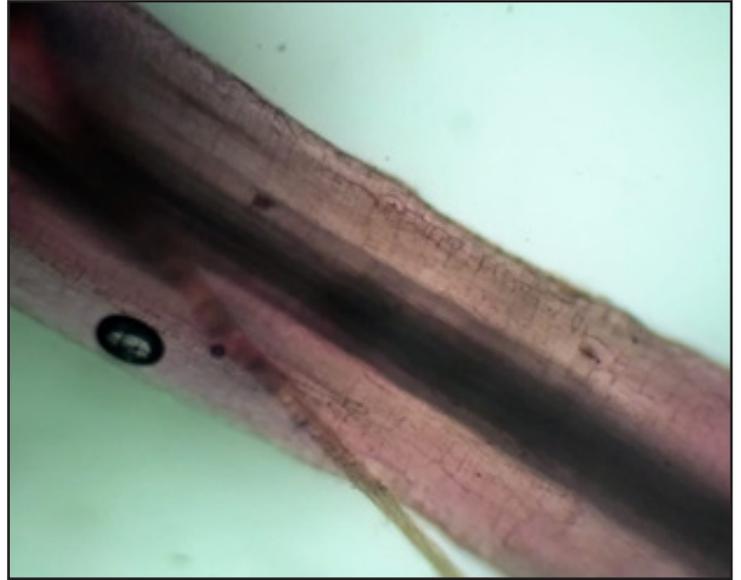
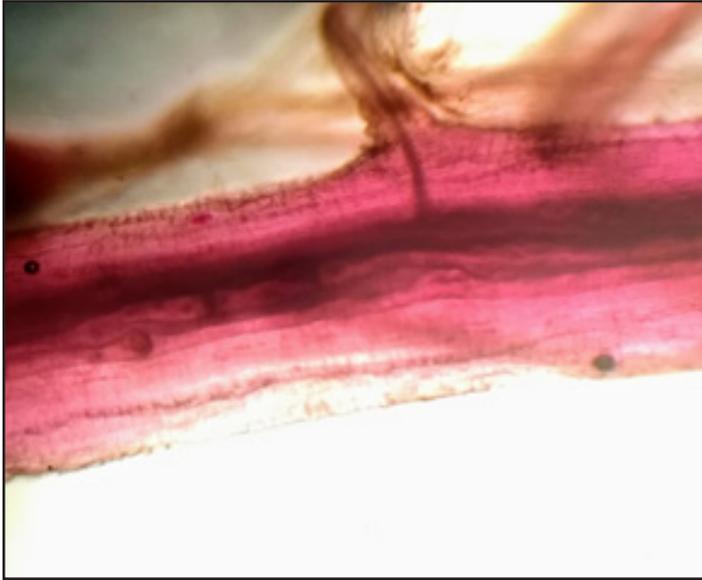


Hundreds of eggs.



After the eggs are released, the root tissue (where there was a female) remains open. This is where infection by soil pathogens occurs. Fusarium, Rhizoctonia, Pythium, Macrophomina are more intense in soils with nematodes. [Note: These photos were taken with lettuce roots in soil without Penegetic.]

Whereas, the following pictures are roots in soil with Penergetic.



The result is clean and healthy roots.

[Note: The evaluation methodology uses heat. Sometimes air bubbles form – this appears as a black dot in one of the photos.]

There are good and bad nematodes.

Penergetic has no direct action against nematodes (none of them). Penergetic stimulates fungi and bacteria that will not allow nematodes to enter the roots.

Fungi and bacteria have two modes of action against nematodes.

- 1) Form physical barriers on the roots
- 2) Produce organic acids that reduce nematode activity.

The lettuce plant (on page 1) with the highest volume of roots is the one with Penergetic.

The other lettuce root (on the right) has many “balls” in the roots. These are the galls – places where the female of the nematode settles to release the eggs and complete the pathogen cycle. Galls do not allow the root to absorb water. So the damage is quick and proportional to the intensity of the attack.