LONG-TERM MANAGEMENT OF NEMATODES

Using Telone® Soil Fumigant
When determining the best method of controlling nematodes in potatoes, your plan of attack should be a long-term plan. Nematodes are not like a typical “outbreak” pest, where thresholds are met and treatments are made with no real consideration of the long-term populations of that pest.

Nematodes are different, and their populations are affected – short-term and long-term – by the treatment made. While one treatment option may get you through to harvest without significant tuber damage, that option may also jeopardize future potato plantings in that field due to high “residual” populations of nematodes.

**Residual Nematodes and Their Importance**

When potatoes are planted in a field infested with nematodes, the race is on – will the nematodes reach the potatoes prior to harvest? But with nematodes, the real “race” is not a one-year sprint; it’s a multi-year marathon. For growers, the goal is not to manage nematodes for one year on one crop. It is to manage nematodes for all crops and for the life of that field.

“Residual” nematodes are what are left in the soil after potato harvest. When matched with rotational crops that are hosts for nematodes, those residual nematodes continue to reproduce. Eventually, when potatoes are planted to that same field, nematode populations can be very high. Such high numbers make nematode management extremely challenging and may cause a change in cropping pattern. Conversely, lower nematode populations can be easier to manage and may allow growers more treatment options when managing the pest.

**Rotational Crops Can Increase Nematode Populations**

Crop rotation is often an effective method to reduce pest pressure whether insects, weeds or nematodes. The rotation strategy is simple: plant a crop that a certain pest will not live or thrive on and eventually pest populations will be reduced. But it is not that easy in the Pacific Northwest, due to the tremendous amount of host crops for nematodes.

Many of the crops grown in rotation with potatoes are strong hosts for root knot and lesion nematodes. Wheat, corn and alfalfa, for example, are hosts for Columbia root knot and lesion nematodes. In fact, these rotation crops can actually increase populations of nematodes. Deep-rooted crops, such as corn, tend to increase deep populations of nematodes. When potatoes are eventually planted in fields with interim host crops, the risk of damage to the potato crop is incredibly high.

**Sales Flexibility**

Additional incentive to keep nematode populations down is the added marketing flexibility it allows growers. In many cases, potatoes that are exported can be rejected from the presence of just one nematode. Seed potatoes also require a “zero tolerance” to be certified for shipment. Fumigation can give growers more options for selling a crop, especially on the open market.

### Host Crops for Nematodes

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Source: Dr. Saad Hafez, Univ. of Idaho nematologist

Chart shows that many rotational crops with potatoes are hosts for nematodes. In potato-growing areas, it is common to plant potatoes following corn or wheat/barley. Those host crops will increase nematode populations throughout the growing season.
A decade of research at Washington State University has evaluated the efficacy of various nematode treatments. In recent years, the research has also measured the effect of those treatments on residual nematode populations and on “free-living” nematodes, thought to be beneficial to soils.

Conducted in Prosser, WA by:
- John Wilson, WSU Research Tech Supervisor

Treatments
- Telone II soil fumigant (20 gal/A)
- Telone II (15 gal/A) + metam sodium (30 gal/A by soil injection)
- Metam sodium (37.5 gal/A by soil injection)
- Vydate insecticide/nematicide (4.2 pt/A at-plant followed by six chemigation applications at 2.1 pt/A)
- Untreated control

Trials were set up in randomized strip plots with two replicates per plot and five subplots per replicate. Nematode samples were taken at three different timings – pre-treatment, pre-plant and post-harvest. The pre-plant samples were taken to evaluate how effective each treatment was in reducing resident nematode populations. Post-harvest samples evaluated “residual” populations.

Three different nematode species were counted – Columbia root knot (M. chitwoodi), stubby root and root lesion. Populations of each nematode were measured at 1- and 2-foot depths. Deep nematodes – those two feet deep and lower – are capable of infecting tubers during the growing season.

Conclusion: The Telone II and the Telone + metam sodium treatments generally reduced nematode populations to near zero after treatment. Populations were equally low at 1- and 2-foot depths. Post-harvest nematode sampling indicated that populations remained very low in plots treated with Telone. By comparison, nematode populations in the untreated plot increased seven-fold during the season. Harvest-time populations were also high in the metam sodium and Vydate plots.
**Conclusion:** Residual nematode populations in the untreated plot rose more than three times between pre-treatment and post-harvest evaluation dates. The 2-foot depth is the primary root-tuber zone for potatoes, so higher populations would be expected without treatment. The plots with metam sodium and Vydate also had very high nematode populations at harvest suggesting that those products offer little control of nematodes at deep levels. Plots treated with Telone showed lower levels of nematodes at harvest compared to previous fall levels.

**Conclusion:** The economic threshold for treating stubby root nematode is one when the Tobacco rattle virus is present. The Telone + metam sodium treatment brought a high pre-treatment population down to zero at pre-plant, where it remained even at the post-harvest evaluation.

**Conclusion:** Treatments that included Telone and/or metam sodium led to an initial decrease in free-living nematode populations. However, those effects were short-lived. Post-harvest sampling showed that populations of free-living nematodes rose through the season, eventually reaching levels higher than measured at pre-treatment.
To Learn More

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