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Potato cyst nematodes

Complex problems and strategies – choosing the right catch crop!

Unlike sugar beets, where beet cyst nematodes are almost the only pests that present a direct problem, various types of nematodes with different patterns of damage are on the rise in potato cultivation. The following is an overview:

Potato cyst nematodes

The damage caused by potato cyst nematodes is indisputably high. There are two different species of potato cyst nematodes: Golden nematode (*Globodera rostochiensis*) and white potato cyst nematode (*Globodera pallida*), a quarantined pest for which reporting is mandatory. Both species can survive in the soil for years in the form of cysts, leaving them only when potatoes are planted on the field. Catch crop selection does not require much thought, as they are neutral to these nematodes.

Free-living nematodes – free, mobile, uncontrollable?

In terms of potato crop rotations, the following four free-living nematodes are considered to be the most harmful pathogens:

- Root lesion nematode (*Pratylenchus penetrans*)
- Stem nematode or onion bloat (*Ditylenchus dipsaci*)
- Stubby-root nematodes (trichodorids)
- Root-gall nematodes (*Meloidogyne chitwoodi*)

Unlike cyst nematodes, free-living nematodes are identified by the fact that they do not rely on the potato as a host plant. They can propagate on other cultivated crops as well, meaning that selecting the right species is crucial in regulating and reducing these harmful species. What is particularly insidious about free-living nematodes is that they go through several propagation cycles in a year. This means that explosive outbreaks are a possibility.

Root lesion nematode (*Pratylenchus penetrans*)

Root lesion nematodes can cause yield losses of over 50%. In recent years, they have been increasingly destroying maize and cereal stands as well as potatoes. Under favourable conditions, the nematode can have up to six propagation cycles per year. The crop rotation system in combination with the right catch crop selection can greatly influence the situation. Use of fodder radish should be avoided on heavily infested fields. Planting of neutral plants is preferable. The roots of bristle oat, for instance, provide no basis for the propagation of the pathogen. By depriving the pest of nutrition, its population can be reduced by over 80% every year. Tagetes (marigold) cultivation in problem locations has resulted in active nematode reduction. Once pierced by the nematodes, marigold roots secrete a poison which kills the pathogen.

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I Fallowing is often also recommended as a natural method for reducing the nematode population. But please note: in many cases, problem weeds are among the strongest propagators of problematic nematode species. Experiments show considerable differences between fallowing and cultivation of catch crops, especially in combination with the mild winters in recent years. Use the option of directly impacting a specific pathogen and consistently pushing back the population by selecting the appropriate catch crop species.
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Stubby-root nematodes (*Trichodorids*)

As opposed to many other nematodes, stubby-root nematodes rank amongst the most mobile migratory organisms. Even without a host plant

their numbers decline only gradually. Under favourable conditions, they produce up to five generations every year. Direct infestation by this nematode can be observed in the form of poor emergence of the potato crop, although in many cases it plays a minor role. Moreover, in advanced stages of growth the potato plants become increasingly resistant to trichodorids. Significantly more problematic is the fact that trichodorids transmit the tobacco rattle virus (TRV). Selecting the right catch crop can have a major effect on the issue. Fodder radish can resist the TRV despite nematode infestation, breaking the infection chain.

Root-gall nematodes (*Meloidogyne chitwoodi*) (quarantine-requiring pest with mandatory reporting)

Root-gall nematodes can spread rapidly in a very short period of time. This is because they have a wide spectrum of host plants while also producing up to three propagation cycles per year. The nematode causes damage to the potato tuber quality, which becomes visible only towards the end of the cultivation period. The situation can be directly influenced by selecting the right catch crop. Cultivating resistant fodder radish varieties is particularly recommended. As part of the approval process, the Federal Plant Variety Office checks the varieties for resistance and identifies varieties with incidence rates of under 5%.

Attack strategies

of plant-parasitic nematodes in potato cultivation

