

Neill Smith – How I manage PCN



Neill Smith of Barnyards Farm near Forfar grows 400 acres of ware potatoes for Albert Bartletts. 60 acres is planted in ground he owns, and the remaining 340 acres is rented land. He first suspected potato cyst nematodes (PCN) when yields were stagnating or declining. The land has been used for potato production for over 50 years. Neill, a third-generation potato grower, reckons the PCN population has been building up slowly over this time and mentions the shorter rotations used in the past, some as short as 4 years back in the 70s, being a contributing factor to the PCN problem he now has.

Neill aims to bring the population under control on his own land through an **integrated pest management (IPM) approach** with the aim to grow seed at Barnyards one day. On rented land the situation is more difficult. Landowners could help minimise PCN multiplication by controlling groundkeepers and considering rotation length. Granular nematicides have an uncertain future and land with high levels of PCN may be unsuitable for potato production.



Figure 1: Neill Smith, a potato grower who is growing oil seed radish as part of his IPM approach to PCN.

PCN Soil Sampling: Neill knows that more of his potato ground is infested with *Globodera pallida* than with *Globodera rostochiensis*. This knowledge was gained through soil sampling the land for PCN, initially the year before growing potatoes. He then changed to soil sampling 2 years before potatoes so if needed, he could plant a cover crop (oilseed radish) to reduce the PCN population in a field. He now has the soil sampled straight after lifting the potato crop. This gives him more time to plan his rotation before the area of land is planted with potatoes again, depending on how much PCN are in the soil. He currently has a 1 in 6-year rotation for potatoes.

It is important to have your soil tested so you know whether there is PCN present or not. The test results can then help you make decisions about management techniques and future potato crops to protect the yield and quality.

Resistant Varieties: To reduce the levels of *G. pallida* and increase his yields, Neill is growing some Amanda and Elland, two varieties which score highly (8 and 9) for resistance to *Globodera pallida*. He agrees with the many different sources that suggest resistant varieties are the best way to control PCN, however he is concerned that *G. pallida* resistant varieties are yet to be fully embraced by the market. Potatoes are an expensive crop to grow and the risk of having little to no market for these newer varieties is too high for many growers. Neill is balancing the two resistant varieties with Osprey, Rooster, Maris Piper, and Kingsman this year, which are not resistant to *G. pallida*, but he has a reliable market for them.

A resistant variety limits the multiplication of PCN. It stimulates nematode eggs to hatch (just as a susceptible variety does), but the juvenile nematodes cannot form a feeding site on the roots (a syncytium). With no syncytium, the nematodes do not reach the adult stage, so their lifecycle is cut short, and the population decreases.



Figure 2: Neill is growing Elland this year, which is resistant to *Globodera pallida*.

Nematicides: Neill uses Nemathorin (fosthiazate) to protect his yields from PCN. The recent loss of Vydate which he used previously, and the potential loss of granular nematicides in future, is one of the reasons Neill is using an IPM system for PCN.

Cover Crops: As part of his IPM strategy, Neill uses oilseed radish (*Raphanus sativus*) as a cover crop. It is often grown as a biofumigant where it is macerated, incorporated, and sealed in the soil however Neill normally sows this in the spring and tops it in early summer (10 – 11 weeks after planting). The crop is then allowed to regrow before being sprayed off and ploughed in prior to the next crop. Growing oilseed radish this way means Neill forfeits a year of spring barley to grow the cover crop.

Oilseed radish can benefit other crops in the rotation as it produces large amounts of organic matter and deep roots which improves soil structure.

“I am convinced that this system gives me good control of Free-Living Nematodes (FLN), and recent data shows it to be reducing PCN numbers. It’s a real investment in the future of the farm and nematode pests are a bigger worry to me than the short-term cost of missing a year’s cropping”.

Groundkeeper Control: As part of his rotation, he likes to put winter wheat in after potatoes as there is more opportunity to control groundkeepers (volunteer potatoes) than in spring barley. Neill applies Fazor (maleic hydrazide) to the growing potato crop for groundkeeper control in following crops. Fazor is a sprout suppressant therefore it can prevent the tubers left in the soil from developing into plants in the years after potatoes. Groundkeepers will maintain or increase PCN numbers by acting as a host to the pest between potato crops. The control of groundkeepers is being investigated within this project, as is chitinous soil amendment, which Neil also expressed an interest in.

Chitinous soil amendment is comprised of shells from shellfish and wood chips. Applying chitin can shift the microbial balance in the soil in favour of organisms that naturally suppress chitinous pests. PCN cysts, which protect the nematode eggs, are chitinous therefore an increase in soil micro-organisms which feed on chitin will reduce the population of PCN.



Figure 3: Trials for PCN research are being held on Neill’s land.