

Workshop: Developing a Decision Support System for Growers



FARMING SMARTER

PCN Project – Developing a Decision Support System (DSS)

- Aim is to develop a decision-making tool to help potato growers in Scotland (and the rest of the UK) manage PCN infestations.
- Loss of nematicides will affect PCN management – particularly in ware crops
- New varieties with better tolerance and resistance scores are available.
- Other control measures are available (rotation length, groundkeeper control, trap crops, biofumigation, biological control) but their PCN control efficiency and economic benefits need to be understood to choose when to use them for best effect.

PCN Project – Existing Decision Support Systems

AHDB PCN Calculator

- Calculator results were not always directly applicable to any particular situation because of the complexity of factors influencing rate of decline
- But it was potentially a useful tool to understand PCN population changes over a rotation
- The PCN calculator predicted populations based on factors including soil type, initial PCN population, rotation length, variety and nematicide use.
- The AHDB PCN calculator wasn't heavily used by the industry.

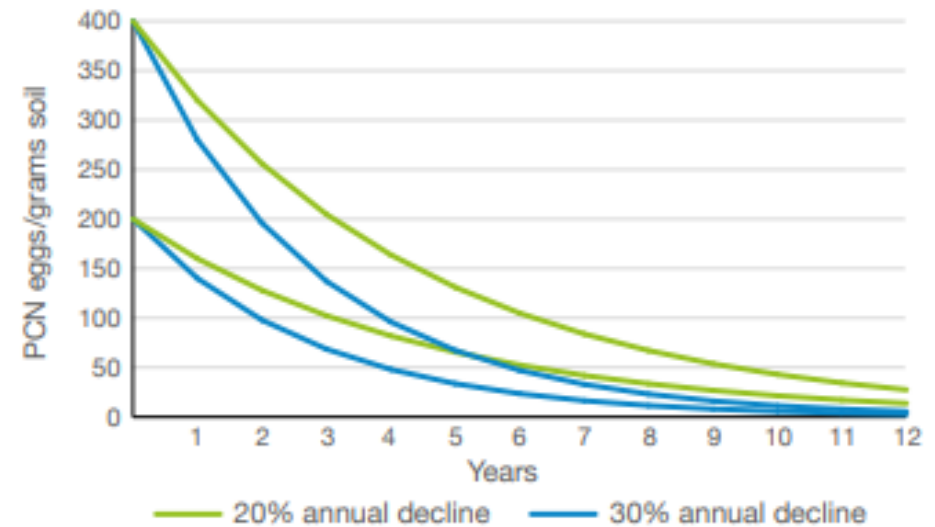
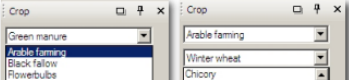
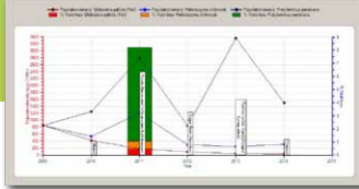



Figure 17. PCN decline curves

PCN Project – Existing Decision Support Systems

Dutch NEMADECIDE PCN Model

- The Dutch NEMADECIDE model has been extensively used for around 20 years and has contributed to improved PCN control measures in the Netherlands.
- Comprehensive DSS which allows different varieties and control measures to be compared
- Produces an economic assessment of the cost / benefit of different control scenarios
- Contains advice on nematodes other than PCN (root lesion, root knot)
- Has a significant purchase and annual maintenance cost.



NemaDecide Plus

Damage may also be caused by non-cyst forming nematodes and by combinations of various nematode species. NemaDecide Plus supports growers in controlling the potato cyst nematode, the Columbia root-knot nematode, *Meloidogyne chitwoodi*, and the root-lesion nematode *Pratylenchus penetrans*.

Providing good advice to farmers is complicated when several plant-parasitic nematode species occur together. In a simple and easily accessible way NemaDecide demonstrates the effect of cropping plan decisions on the population development of the various nematodes and the damage they cause in potato. NemaDecide enables the user to determine the optimum crop choice and optimum cultivar choice for a field, for the current cropping system as well as for several subsequent crop rotations. Plant protection products can be utilised more efficiently and with better justification.

Cropping options in NemaDecide.

NemaDecide PCN

Seed potatoes

For growers of propagation material, such as seed potatoes, NemaDecide answers important questions such as:

- how do I detect a possible PCN infestation at an early stage,
- which control measures should I use to avoid formal scheduling of my field,
- what is the effect of possible control measures.

Starch and ware potatoes

Potato cyst nematodes may also cause damage in starch and ware potato fields. NemaDecide provides comprehensive information about control measures that prevent damage and provides details of the costs/benefits of such measures.

For potato growing with a future

NemaDecide is a software-based nematode advisory system that is indispensable for all potato growers, whether they grow seed potatoes, starch potatoes or ware potatoes.

The program supports growers in controlling potato cyst nematodes, root-knot nematodes, and root-lesion nematodes. NemaDecide converts sampling results into informative field infestation levels. The effect of decisions regarding crop rotation and control measures on nematode development and yield loss are presented in a user-friendly manner.

NemaDecide contains extensive information about almost all potato cultivars grown in The Netherlands (over 400 cultivars). Selecting suitable cultivars, based on supplier and/or desired cultivar properties, can be done with ease.

DSS Discussion 1

What advice would you use from a PCN Decision Support System?

- a. Prediction of infestation level - Before and After control measures
- b. Prediction of infestation level - Before and after potato crop
- c. Economic - Costs of non control of PCN (Yield loss)
- d. Variety resistance / tolerance / and potential yield loss ?
- e. Any other comments?

DSS Discussion 2

Which information should the DSS require?

- a. Soil Sample results with PCN species (G. pallida and G. rostochiensis)
- b. Should the DSS be linked to SASA and display all previous soil tests
- c. Would you value a tool that displays the SASA PCN sampling history of your land?
- d. Any other comments?

DSS Discussion 3

Who should have access to the DSS information?

- a. Landlord
- b. Potato Growing tenant / potential tenant
- c. Agronomists
- d. Any other comments?

DSS Discussion 4

How should the DSS be paid for once it has been developed?

- a. Annual Subscription
- b. Area based
- c. What is the value off the DSS to you?
- d. Any other comments?

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