

Cover crop – Oil Radish

Research summarised below has been carried out as part of the Scottish Government-funded Potato Cyst Nematodes (PCN) project, in collaboration between Scottish Agronomy and SRUC.

Oil Radish for use against PCN

Oil Radish and other brassicas contain high levels of secondary metabolites called glucosinolates. Upon growth and damage, brassicas release glucosinolates which are digested by myrosinase enzymes to produce isothiocyanates. Isothiocyanates are toxic to pests e.g. PCN. Therefore, high glucosinolate production by some varieties of oil radish allow the plants to be used as an effective cover crop, reducing PCN populations.

Glucosinolates are found in varying levels across different oil radish varieties so biofumigation efficiency can vary. As part of the 2024 PCN trials hosted at Barnyards farm there are 9 varieties of oil radish being trialled which are expected to reduce the viability of the PCN present.



Figure 1 – Image of oil radish trial at Barnyards 2024, image courtesy of Neill Smith.

A case study in planting oil radish

Neill Smith at Barnyards farm has been using Bento oil radish as a cover crop for multiple years as it is competitive and quick growing with deep tap roots.

In previous seasons Neill has found that planting at a rate of 18 kg/ha (12.5 cm spacing, 25 mm deep) gives him the best output. Ideally planting in mid-April, however, with a variable climate, Neill has seen good growth planting up to late May. The field is then rolled and fertilised. Adequate N and S nutrition (e.g. 40-50 kg/ha N and SO_3) is important to maximise high glucosinolate biomass.

The crop is topped approximately 11 weeks after planting to prevent any seed pods forming. Additional fertiliser can be applied to encourage secondary growth. Depending on the season, the crop may be topped again. If flailing is not required, the crop is chopped and ploughed into the soil the following spring. Incorporation potentially improves soil structure, increases nutrient availability, water holding capacity and stimulation of beneficial microbial communities. It is also safe for sheep to graze over winter.

Anecdotally Neill has seen a reduction in PCN viability in fields with oil radish in the rotation.

The number and viability of PCN cysts present pre-planting of oil radish and after crop termination will be tested in the 2024 field trial to assess the effectiveness of a range of oil radish varieties as an integrated pest management practice. In addition, comparative analysis of the soil microbiome communities will provide valuable insights into soil ecological interactions.

Cover crops

Broadly speaking a cover crop is defined as being planted to cover the soil without the intention of harvesting the crop at the end. Some cover crops are introduced to improve soil health and structure between cash crops, while others can have an effect against pests and diseases (e.g. biofumigants).

Trap crops

These are planted to attract pests and disease away from host plant species. In terms of PCN a trap crop stimulates egg hatching but does not allow the nematodes to multiply as they cannot successfully initiate a feeding site in the roots. This reduces PCN populations as they are unable to complete their life cycle.