

# Strategies for Quantifying and Controlling Free Living Nematode Populations and Consequent Damage by Tobacco Rattle Virus to Improve Potato Yield and Quality.

Roy Neilson, SCRI, Invergowrie, Dundee DD2 5DA.



## Free-Living Nematodes (FLN)

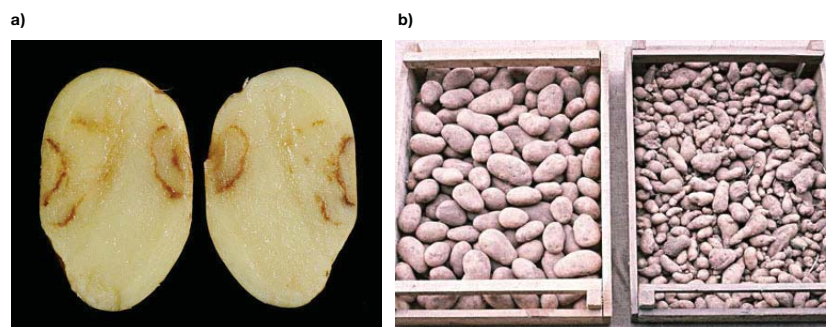
FLN are microscopic (Figure 1) soil borne organisms that can be pathogenic to a range of important economic crops e.g. potato. Identifying pathogenic FLN from beneficial FLN is problematic due to minute differences in their taxonomy and an ever decreasing skill-base of taxonomists.



**Figure 1** Comparison between FLN and a pin head demonstrating their microscopic size.

## FLN and Potato

Free Living Nematodes (FLN) are a major problem for UK potato industry, in the short term due to removal of approved nematicides and in the long-term by expected population increases due to climate change. FLN cause direct damage by feeding on potato roots reducing yields and quality, and indirectly by some species which transmit Tobacco Rattle Virus (TRV)(Figure 2)



**Figure 2a)** Classic internal tuber marking due to TRV infection; **b)** Comparison of healthy (left hand box) and TRV infected tubers (right hand box) on yield and tuber size.

## The way forward

TSB and AHDB-Potato Council has funded a 5 year multi-disciplinary collaborative research project led by Cygnet PB which includes 9 industrial and 2 academic (SAC and SCRI) partners. The research is across three integrated work packages namely Diagnostics, Field Trials and TRV resistance with the aim to achieve the following 4 major objectives:

- i) Develop and validate an “industry standard” molecular diagnostic for FLN nematodes pathogenic to potato. Industry feedback suggests variability in the results of currently available diagnostics;
- ii) Determine robust damage threshold values for FLN in potato crops which are currently lacking;
- iii) Evaluate alternative FLN control strategies to address the removal of current nematicides;
- iv) Identify molecular markers for TRV resistance to enhance downstream breeding of TRV-resistant cultivars for enhanced future sustainable agriculture.