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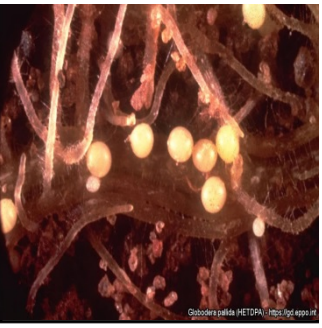
## Population diversity of potato cyst nematode

Potato cyst nematodes (or PCN) are soil dwelling roundworms that feed on the roots of potato plants. PCN can affect the growth of the plant and at high enough densities causes extensive root damage and even death.



Across Europe yield loss due to PCN runs into hundreds of millions of Euros per annum. There are two species of PCN, *Globodera pallida* and *G. rostochiensis* and there are numerous molecular diagnostic methods for species identification as this information is of great importance to farmers. Many modern potato varieties have been bred for resistance to *G. rostochiensis* however there is little or no such resistance to *G. pallida*. Some varieties are 'less susceptible' but some populations of *G. pallida* are 'more pathogenic' than others.

**The aims of this project are twofold. First, to develop a molecular method that can differentiate between populations of *G. pallida* collected across Europe. Second, to assess the pathogenicity of these populations by assessing their ability to overcome the resistance available in commercial potato varieties.**

When a potato cyst nematode initiates a feeding site in the root of a potato plant a cascade of events occur. In simple terms a battle commences between the nematode and the plant with the latter trying to prevent invasion by the nematode. Each side has its own suite of chemical warfare and one of these is a protein the nematode 'injects' into the plant cell to help combat the plants defence response. This protein Gp-RBP-1 has also been shown to contain a number of single nucleotide polymorphisms (SNPs). We have developed several diagnostic assays to determine the proportions of these SNP markers within the gene and are using these data in an attempt to differentiate populations of PCN. So far we are concentrating on population from Scottish and English soils but will include populations collected across Europe at a later date. The pathogenicity of each population is being assessed in pot trials with commercial varieties of varying resistances against *G. pallida*.

Project ID: Use of novel molecular methods to understand population diversity and its implications on disease management through the use of resistant potato varieties (Potato Cyst Nematode).