

## **EUPHRESCO PhD studentship: Free living nematode detection using next generation sequencing technology**

Supervisors: Dr Melanie Sapp, Thomas Prior (both Food and Environment Research Agency, UK), Dr Matthew Back (Harper Adams University, UK) and Prof Dr Gerrit Karsson (Plant Protection Services, the Netherlands)

Limited capacity in molecular nematology exists in Europe. Currently experts are focussing on the specific detection of plant pathogens leaving a gap in detection of free living soil communities and potential threats therein. Effects of agricultural management on the diversity of free living soil nematodes is not assessed, although the identification of these organisms is critical for the application of effective phytosanitary measures and to ensure evidence-based policy on new and emerging plant pests and diseases. The development of faster and more comprehensive tools will close a significant knowledge gap so that the efficacy of new management technologies can be assessed against wider impacts on soil nematode communities. Since current morphological methods for identification have limitations in providing species detection for all nematode groups, molecular techniques can be used to complement existing tools. The aim of this project is to deliver a solution to this limitation thus providing a novel tool for wide application in nematology.

During this project the PhD student will gain expertise in classical nematode taxonomy and applied research which will be facilitated by links between the Food and Environment Research Agency (Fera), Harper Adams University and the Dutch Plant Protection Services (PPS). The major objective is the development and application of molecular tools for non-targeted nematode community profiling based on existing work in the field of eukaryote barcoding.

Training will encompass classical morphological techniques for detection of quarantine, regulated and native nematode species combined with molecular biology and bioinformatics. The applicability of the developed methodology will be demonstrated by assessing the efficacy of new soil management technologies. More specifically, the PhD candidate will spend time at Fera and PPS in the first year to get experience in classical nematology and barcoding. Furthermore, non-targeted molecular tools will be developed for nematode community profiling. During the second year of the programme, the successful applicant will spend time at Harper Adams University where field and glasshouse based experiments will be undertaken to evaluate the performance of crop protection strategies such as biofumigation against free living nematodes. Experiments will be repeated at different sites to allow for contrasting soil conditions and populations of nematodes. Successive soil samples will be collected for the assessment of free living nematode species in the final year using molecular profiling techniques developed.