Development of COMMERCIAL MOLECULAR BIOLOGICAL ASSAYS FOR IMPROVED SUGARCANE SOIL HEALTH AND PRODUCTIVITY

SRA project code:
2018/009

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SRA

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Chief investigator:
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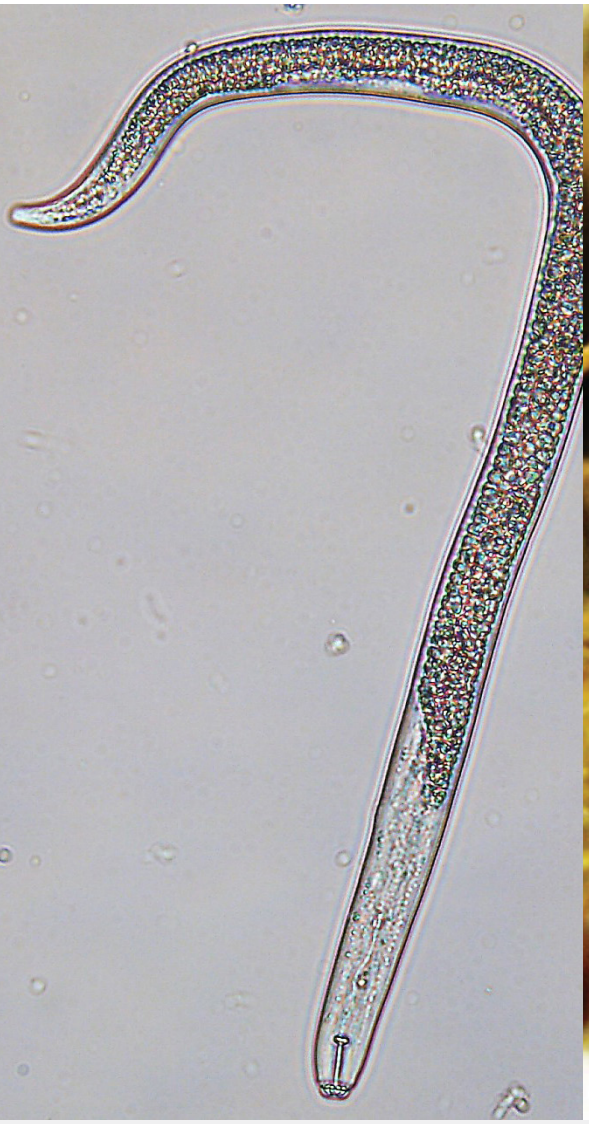
Project collaborators:
South Australian Research and Development Institute, CSIRO, Productivity services organisations, Biological Crop Protection

ABOUT THIS PROJECT

Your soil is home to a range of organisms – some of which help produce a healthy, productive crop and others that reduce productivity. Some of the major pathogens of sugarcane are Pachymetra root rot (*Pachymetra chaunorhiza*), root lesion nematode (*Pratylenchus zeae*) and root knot nematode (*Meloidogyne species*). Yield losses for Pachymetra can be as high as 40 percent in susceptible varieties, while nematodes have been estimated to cost the industry around $80 million each year.

The project takes previous research outcomes (the development of reliable DNA-based tests for Pachymetra root rot, root lesion and root knot nematodes) and seeks to apply the tests to the Australian sugarcane industry.

This investment, and linkages to other projects within the SRA Soil Health Program, will enable rapid, bulk soil assays to be undertaken. The results of these tests provide critical information on pathogen populations and, therefore, can act as indicators of how cropping and farming systems affect soil health. There is scope within the project to develop one or two additional DNA-based assays for other organisms of relevance to soil and root health – be they biologicals that lead to poor root growth or those that are normally considered beneficial. A decision will be made on which organisms to choose as the project progresses. The project will determine variation in the resistance or tolerance of varieties in the plant improvement program through the rapid assay of soils collected under clones in Final Assessment Trials (FATs) in the far north, and in the central district. This work is strongly linking with other projects within the Soil Health Program.



Surveys for these soil pathogens or parasites can now be more rapidly completed.

WHAT ARE OUTCOMES FOR THE GROWERS?

Growers currently have the opportunity to send soil samples from their fields to the Tully soil assay laboratory for manual counts for Pachymetra root rot and parasitic nematodes. For a small number of samples, the assay laboratory is able to provide rapid turnaround times with minimal assay cost. The outcome is a recommendation on what is needed to manage these pests or diseases. Large sampling numbers have, until now, been more difficult to handle by the laboratory.

The advantage of the DNA-based tests is the rapid assay of a large numbers of samples, with a quick turnaround time. This will be especially beneficial to Productivity Service groups or SRA programs that may have large sampling numbers. The South Australian Research and Development Institute (SARDI), a key partner of this project, has high level capability through the use of robots and bulk soil assays in their Adelaide based laboratories. District or regional surveys for these soil pathogens or parasites can now be much more rapidly completed at this high-tech facility. While growers will be able to access information on root health issues facing their local district crops, it is always recommended to send soil samples to the Tully assay lab for more specific information on the soil health condition of individual farm blocks.

WHAT IS THE RESEARCH SHOWING SO FAR?

The current project has recently started. Already soils from several soil health projects have been sent to the SARDI lab for assay. Two FAT trials have been sampled (192 soils in each trial) and soils (nearly 400) sent for assay at SARDI. When the results are received, an assessment of the possible resistance of these clones to Pachymetra, root lesion and root knot nematodes will be made providing valuable information on the resistance potential of new varieties coming through the plant breeding system. Significant further information for growers will be obtained and extended to growers as the project progresses.

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sugarcane SOIL

MORE INFORMATION

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