

# Can biological tests be developed to improve measurements of soil quality?

Harper Adams University

Current Postgraduate Research Note



## Extending soil testing

**Potential savings, associated with the environmental costs of synthetic fertilisers, could be obtained if organic wastes could be better utilised and their effects on soil quality better evaluated.**

Concerns about the over-reliance on synthetic fertilisers are leading to the search for alternative, more sustainable fertiliser sources. Although organic fertilisers from food and farm wastes, such as farm yard manure, have been used for centuries, other sources of waste, such as by-products from anaerobic digestion, have new potential. But, as yet, there are no well-established **biological tests** for measuring soil quality. The current **chemical tests** (such as analysis of nutrients) and **physical tests** (such as soil texture) are insufficient. Agronomists and farmers need **soil biology tests** to be included as **indicators of soil quality**, for example, by determining the desirable numbers of earthworms, springtails and/or nematodes.

## Study aim

Ana Natalio's PhD study aims to develop a biological test that can be used to inform the impacts of various organic wastes on soil quality.

## Methodology

A mix of field and glasshouse studies will be conducted. Ana is monitoring the chemical, physical and biological properties of soil, collected at different stages of the crop season. Biological testing involves measuring the number of earthworms, springtails and nematodes. Extraction methods are varied. **Tullgren funnels** (see photo, right) are used to extract springtails. Additionally, Ana is quantifying the carbon and nitrogen content of microbes in the soil, under different treatments (see photo, right panel). Treatments include: the application of farm yard manure; green manure (crop residues); chicken manure and digestate (a by-product from anaerobic digestion).



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## What next?

Ultimately, this study could provide a more comprehensive soil testing system, benefiting farmers, which includes soil biology alongside current measures of soil chemistry and physics.

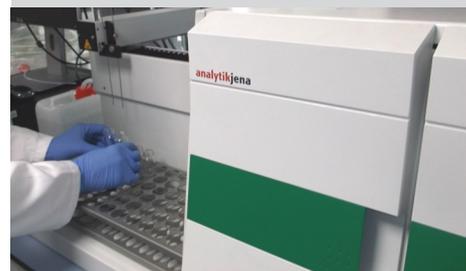
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## PhD programme

This research note outlines the initial work of a three-year PhD research programme by **Ana Natalio**, *Postgraduate Researcher*.

### Director of Studies:

Dr Simon Jeffery, *Senior Lecturer in Sustainable Technology*,  
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Biological, physical and chemical analyses are being conducted in the laboratories and other facilities at Harper Adams University, including use of the **TOC/TN analyser** to measure microbial carbon and nitrogen (see photo, above).

## Acknowledgements

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