Cross-Institute Programme for Sustainable Soil Function

SoilCIP

Newsletter for November 2006

Institute Career Path Fellowships Scheme

Dr Julian Dawson, currently a postdoc in Ken Killham's department at Aberdeen, is our SoilCIP ICPF candidate. His proposal focuses on the role of carbon, particularly dissolved organic carbon, in driving nutrient cycling in soils and so fits well with SoilCIP Science Objective 2.

Doctoral Training Grant (DTG)

Six PhD proposals are being advertised to attract candidates to the two DTG grants that are currently available, one that can start as soon as we have a candidate and one that will begin in October 2007. It is vitally important that we find good candidates, so please take every opportunity to talk to colleagues at universities and colleges to see if they have a good student that would be interested in one of our PhDs. The proposals can be viewed via:

http://www.sustainablesoilcip.org.uk/studship.htm

New Staff

Debbie Holtham has joined the research team on the new BBSRC grant 'Understanding Soil Quality and Resilience: Effects of Perturbations and Natural Variations on Nitrous Oxide Emission, Water Retention and Structure', with Nigel Bird, David Scholefield, Iain Young at Abertay and Peter Mathews of Plymouth University have. She will be based at North Wyke.

Equipment

Over 2006-7 and 2007-8 we have been awarded funds to equip the new Soil Physics labs at Rothamsted. The soil physicists are being as thrifty as possible and will move a lot of equipment from Wrest Park, but we will be buying at least £60,000 worth of soil physics equipment, some of it shared with other divisions.

New grant proposals

Keith Goulding, Penny Hirsch and Prof Alastair Fitter (University of York) are writing a grant proposal to NERC on the fungal diversity of the Park Grass experiment. Keith Goulding, David Scholefield, Laura Cardenas and Prof Nancy Dise (Manchester Metropolitan University) are writing a grant proposal to NERC on the factors controlling nitrous oxide fluxes in riparian zones. Andy Whitmore is involved with others at Rothamsted and the University of Nottingham in a 'Systems Biology' bid to

BBSRC. Steve McGrath has submitted an outline proposal on arsenic to the BBSRC-DFID 'Sustainable Agriculture for International Development' initiative.

Soils Research Advisory Committee workshop
The papers from the recent 'Horizons in Soils Research' workshop are on the SRAC website at:

http://www.iger.bbsrc.ac.uk/SRACWorkshop/

Cross-Institute visits and links
Steve McGrath attended the launch of a new, Defra-funded 'Ecosystems Approaches' initiative between ADAS and Nottingham and Reading Universities. See project web sites:
http://www.ecosystemservices.org.uk/
http://www.catchmentfutures.org.uk/

Phil Haygarth is joint UK rep (with Louise Heathwaite, Lancaster Environment Centre) in an EU COST Action 869, the mitigation of diffuse pollution, which runs from November 2006 until 2011:
http://www.cost869.alterra.nl

Richard Brazier, joint PhD supervisor of Gary Bilotta with Phil Haygarth, has moved to Exeter Geography Department from Sheffield, giving the SoilCIP a stronger link with one of its closest universities.

Phil Haygarth, Murray Lark and Helen Ougham will be visiting Andrew Fowler at Oxford University to discuss collaborative opportunities in Maths and Geoscience research.

SoilCIP website
There is very little on the pages for Posters and Presentations. We must have some material that could be publicized in this way. Any offers?

International collaborations

China – soils research contributing to agriculture and environmental protection

In September 2006 three of us from Rothamsted Research (David Powlson, Paul Poulton and Andy Macdonald) spent 2 weeks in China. The trip was multipurpose and the programme packed – though we did have a little time for eating Beijing duck and visiting the Great Wall. We lost count of the number of lectures we gave!

First, we spent time with scientists running a national network of fertilizer experiments at eight sites, in contrasting climatic regions across China. The experiments have a range of inorganic fertiliser and manure treatments, common across the sites, but with crop rotations appropriate for the different environments. They have been running for 15 years so are becoming long-term! We have been working with the

network co-ordinator, Professor Zhao Bingqiang, and the site scientists to analyse trends in crop yields and soil fertility. Simulations of trends in soil organic carbon by the Rothamsted Carbon Model (RothC) are being compared with measured data in order to test the model in diverse environments. Papers are in preparation.

Second, we visited China Agricultural University (CAU) in Beijing to discuss current and planned research with staff and students in the College of Agricultural Resources and Environmental Science led by Professor Zhang Fusuo. Evidence of the rapid pace of industrial and urban development within China, and its potentially damaging environmental impacts, were apparent everywhere. Some of the CAU projects were direct responses to these pressures. One matter of current concern is the pressure on water resources in, mainly resulting from urban and industrial uses. In the Beijing area the depth of the water table has fallen by 10m over the last few decades. In the short term this means using irrigation water more efficiently. But, in the longer term, there is a need to plan crop rotations requiring less water, but still producing sufficient grain. At CAU work is starting to identify cropping systems that will meet these requirements. Another major issue is the over-use of nitrogen fertiliser by farmers in many regions of China, causing water pollution, gaseous emissions and waste. Professor Zhang leads a large government initiative to provide unbiased advice on N fertiliser use, an endeavour that is leading to many new fertilizer experiments across the country and production of communication materials for farmers. Results from UK research on N management were of particular interest to Chinese colleagues.

After a week in Beijing we travelled to Shaanxi Province in north-west China, home to 37 million people - and thousands of 'Terracotta Warriors'. At the North-West SciTech University of Agriculture and Forestry, in Yangling, we discussed with Professor Tong Yanan research in the region showing how N fertilizer application rates can be greatly decreased with no loss of yield but greatly decreased N pollution. We also examined in detail the long-term experiment in the national network run by Professor Yang Xueyun at the University. We made some very long (and bumpy!) car journeys to visit field sites to see the impacts of a major scheme to rehabilitate degraded soil in the loess plateau. The deep loess soil is highly prone to erosion if left bare of vegetation. Over the last decade there have been schemes in which farmers are compensated if they abandon annual crops on the most sloping and fragile soils and replace them with semi-natural vegetation (trees or shrubs) to give protection against soil erosion, and also sequester carbon. In others areas terraces have been constructed as an erosion control measure and perennial crops such as fruit trees are grown. Apples trees are particularly prominent and China now accounts for over 40% of world apple production, much of it in this region. Much research on soil conservation and landscape rehabilitation has been conducted by scientists at the Institute of Soil and Water Conservation of the Chinese Academy of Sciences - a good example of applied soil science. Overall, the improvements in the loess plateau were encouraging, but they left us in no doubt of the scale of the future challenges faced by China if it is to successfully reconcile competing demands for industrial development whilst protecting the environment and producing sufficient food. Clearly the environmental impact of future development in China is an issue of global significance.

Keith Goulding, 30th November 2006