

New Head for the CLR



Dr Mark Tibbett joined the Centre in 2003 and took over as Director in October. Dr Tibbett's research

interests include: early ecosystem succession and incipient soil development, the function of mycorrhizas in ecosystems, biogeochemical cycling (of nutrients and pollutants) in terrestrial ecosystems, microbial ecology and restoration ecology. He has a wide range of experience with different ecosystems, having worked in tropical, mediterranean, temperate and polar regions.

Dr Tibbett's vision for the Centre for Land Rehabilitation is to provide excellence in research and training, primarily concerned with land management and a broad range of issues focused on improving and restoring sustainable ecosystem function in degraded landscapes. By land degradation Dr Tibbett includes a wide range of conditions from chemical contamination, loss of biological fertility and salinity to post-mining landscapes. He sees the research of the Centre driven by overarching strategic questions such as:

What are the causes of landscape degradation?

What are the solutions for its repair?

How sustainable are reconstructed ecosystems?

Dr Tibbett envisages the strength of the CLR expanding in three core areas of business: contaminant remediation, sustainable management of agricultural soils and the rehabilitation of post-mining environments. He sees a multidisciplinary approach as vital to successful rehabilitation combining expertise in disciplines such as soil physics, hydrology, soil biology and biochemistry, geotechnical engineering, chemistry and plant sciences to which the centre has access.

Current projects in Dr Tibbett's eclectic portfolio include: geotechnical and biological means of embankment stabilization, investigating causes of *Eucalyptus dieback*, rejuvenating soil biological activity, hydrocarbon contaminant remediation and assessing the success of minesite rehabilitation.

Below are some recent publications from Dr. Tibbett:

Tibbett, M. & Diaz, A. (2004). Are sulfurous soil amendments an effective tool in the restoration of acidic grassland after phosphate fertilization? *Restoration Ecology*. In Press.

Smith, M & Tibbett, M. (2004). Nitrogen dynamics under *Lolium perenne* after a single application

of different sewage sludge types from the same treatment stream. *Bioresource Technology*. 91, 233-241.

Tibbett, M. (2002). Considerations on the use of the p-nitrophenyl phosphomonoesterase assay in the study of the phosphorus nutrition of soil borne fungi. *Microbiological Research*. 157, 221-231.

Tibbett, M. & Sanders, F. E. (2002). Ectomycorrhizal symbiosis can enhance plant nutrition through improved access to discrete organic nutrient patches of high resource quality. *Annals of Botany*. 89, 783-789.

Next newsletter: Success for CLR in competitive grants.

February workshop:

Maximising Benefit from your soil test

The Faculty of Natural and Agricultural Sciences student labs were filled to capacity when 45 people attended the Centre for Land Rehabilitation's first course for 2004, "Maximising benefit from your soil test" on February 20th. The one-day workshop aimed at exposing some of the science behind complex soil-testing methods and providing further understanding about applying the results for farm management decisions.

CLR Director Dr Mark Tibbett and UWA Agriculture graduate Wayne Pluske, of Nutrient Management Systems, initiated the theoretical and hands-on course for practitioners, advisors and farmers.

Professor Bob Gilkes, Dr Andrew Rate, Dr Christoph Hinz and Dr Dan Murphy, all of the CLR, presented a variety of sessions covering landscapes and soil profiles, soil chemical and physical tests and soil biological fertility.

Dr Bill Bowden of the Department of Agriculture Western Australia discussed the 'interpretation, application, integration, uses and abuses' of soil tests and chaired the lively open forum at the end of the day.



Dr Christoph Hinz (left) shows Wayne Pluske how the ability of the soil to drain water (hydraulic conductivity) is affected by sodium and electrolyte concentration. Severe soil pore clogging will occur under low electrolyte concentration and a soil solution high in sodium.

Environmental accolade for UWA

The School of Earth and Geographical Sciences and the Centre for Land Rehabilitation (CLR) have been recognised by the Department of Industry and Resources for their ground-breaking research with Barrick Gold and Outback Ecology, on the risk of heavy metals to mine site rehabilitation.

Barrick Gold of Australia was recently awarded a Golden Gecko Certificate of Merit to recognise their excellence and leadership after initiating the first

Pilbara soil survey

Soil sampling in the Pilbara was a memorable experience for CLR Research Officer Matthew Braimbridge recently. The 10 inches of rain that fell up to that time this year certainly made the trip a scenic one, but also made accessibility challenging in some areas.

Matt and UWA graduate, Russell Beazley, carried out the 5-day soil survey at Brockman Ridge, east of Newman. They were commissioned by environmental consultants, Ecologia, for BHP Billiton. Matt and Russell chose twenty-four sites within the proposed mine site area to examine soil profiles. Baseline flora and fauna surveys were also carried out by Ecologia.



-advancing knowledge for best -practice rehabilitation of metal-rich tailings in Australian conditions.

Left: David Tucker, General Manager Evaluations and Communications at Barrick Gold presents a framed copy of the Golden Gecko

award to Dr Mark Tibbett, Director of the CLR. From left, Harley Lacy (Outback Ecology), David Tucker, Mark Tibbett, David Jasper (Outback Ecology) and Bob Gilkes (CLR).

Environmental accolade for UWA...cont

baseline study of arsenic uptake by native plants growing on gold tailings in the Western Australian rangelands.

The Department of Industry and Resources initiated the Golden Gecko Awards, now in their 13th year. The awards are the highest environmental accolades achievable in the Western Australian mining and petroleum industries and symbolise the company or individual's commitment to working beyond basic compliance with regulations.

The innovative award-winning study has increased the knowledge and understanding of the risk of arsenic in the mining environment. It is anticipated the information collected during the study will form the basis of future research projects.

The specialist team from Barrick Gold, environmental consultants Outback Ecology and the CLR was assembled to devise a method for the safe containment and rehabilitation of the tailings at Barrick's Lawlers Gold Mine, approximately 360km north of Kalgoorlie. Detailed knowledge about arsenic, commonly found in association with many gold ores in the Western Australian goldfields, and the uptake of arsenic by plants was provided by UWA's Professor Zed Rengel, and PhD student Ms Mieke Quaghebeur.

The baseline studies were initiated by Barrick Gold, and conducted by Outback Ecology in association with UWA. Outback Ecology, including former CLR Director Associate Professor David Jasper, provided the experience of the goldfields region, the knowledge of where to find historically arsenic-rich field sites, and the technical skills to conduct the field and laboratory work. Lawlers Gold Mine provided the resources to investigate the issues.

The information obtained from these studies can now be used to minimise environmental impacts on native flora and fauna through:

-selection or consideration of the appropriate species - excluders vs accumulators

-being aware of risk in relation to revegetation of metal-rich tailings in arid areas

Proposed new CLR courses:

- "Maximise benefit from your soil test" - planned for the end of July
- Ecosystem Function Analysis Training - planned for the end of August

Further details will be sent out to all CLR maillists recipients and posted on the CLR website.

For further information about CLR staff, activities, publications and future events, please contact Ms Jen Slater, CLR Education and Administration Officer. Phone 6488 3827 or email clradmin@cyllene.uwa.edu.au. The CLR website is currently being updated and can be found at <http://www.clr.uwa.edu.au/>