Profile No. 163 December 2010: Branch Reports

VICTORIA: Jessie Horton, Branch Treasurer

19th Professor GW Leeper Memorial Lecture

The ASSSI Victorian Branch and the University of Melbourne's School of Land and Environment jointly hosted the 19th Professor GW Leeper Memorial Lecture on Friday 26 November 2010. The lecture was attended by approximately 100 people, over 30 of these being ASSSI members.
Dr Ian Sargeant, an honorary life member of ASSSI, was the introductory speaker who gave an account of Professor Geoffrey Leeper. Ian provided his recollections of Professor Leeper and his influence on Ian's career.

Professor Richard Roush, Dean at the School of Land and Environment at Melbourne University, introduced Professor Iain Young as the guest speaker for the 19th Annual Leeper Memorial Lecture. Iain is Professor of Environmental Biophysics and Head of School at the University of New England's School of Environmental and Rural Sciences.

Iain Young's principal research interests are in biophysics of soil ecosystems, architecture and function of biomaterials, X-ray tomography, sensory ecology of organisms, global change and land use management and biophysics of sports turf. The focus of Iain's lecture was to provide an overview of his work associated with the 'biophysics of life in earth'.

Iain Young presents Leeper Lecture Photographer: Mark Imhof

Iain noted that it is often mentioned that the world is running out of oil and natural gas, but what is not often mentioned is that the world is running out of fertile soil. 'Soils are the most important natural resource in the world' Iain

proclaimed. Yet there is a large disconnect between soils and people. This is surprising considering that 99.8% of the calories we consume come from the land. A handful of soil contains more bugs than the total number of humans that have ever lived. This biological component of the soil is dominated by the physical structure of the soil and vice versa. Iain has been studying the effect of roots, fungi and bacteria on the structure of soil and showed some of the detailed 3D images he has been able to develop.

The interaction between the biology and physics of soils were also demonstrated at a larger scale as shown by Iain's work conducted at the Palace Leas site. The levels of glomalin and ergosteral, which influence water infiltration, were affected by management practices such as cultivation, thereby highlighting that physical properties dominate the biology in these soils.

Iain showed micro-scale images of soil and described the spatial-temporal heterogeneity found in soils at this scale. Short videos were shown of the release of cap cells on the tips of roots when they are immersed in water, and how nematodes act as a 'taxi service' - moving DNA/RNA throughout the soil. Iain suggests that we need to learn a lot more about soils at this level.

Other components of Iain's work highlighted during the lecture were related to how roots adapt to the soil physical conditions by releasing chemicals to extract more water and nutrients. Also, how bacteria can change surface tension and how fungi can 'paint' the surface of soil pores with hydrophobic substances. Iain also touched on identifying carbon in soil and showed images of the internal structure of biochar and charcoal.

Iain also discussed his work related to moisture release curves, which are critical to ecological processes in soils, that are controlled by pore-scale structure and 'key-rate' processes. Iain's final consideration was that 'if we disappear the bugs will not, if bugs disappear then we will disappear'.

Mark Imhof thanked both Iain and Ian for their presentations and presented the inaugural 'Honorary Membership' of the Victorian Branch to Dr Ken Rowe for services to the Branch over 50 years. An appreciation award was also made to Linda Bennison for her contributions to the Victorian Branch.

After the lecture the attendees gathered for nibbles and beverages, and some later moved on to University House for the Leeper Lecture dinner.

Field Trip

The 19th Professor GW Leeper Memorial Lecture included a field trip to the Tarago catchment on Saturday, 27 November. The field trip involved a bus tour aimed to educate the 20 participants about soils and associated management issues in this water supply catchment. Mark Imhof *CPSS-3*, Ian Sargeant and Jess Horton were our hosts for the day.

At the first site near Neerim South, we stopped at a lookout which provided a view of the Tarago Catchment. Overview presentations about the Tarago Catchment Sustainable Farms Project were provided by Nicole Driessen (Melbourne Water) and Barrie Bradshaw (DPI). Ian Sargeant provided an overview of the soils in the region.

The discussion at the first site provided a great opportunity to link the properties of the soils in the area to land management issues. These issues are of particular interest when the catchment is used as a potable water supply. The interaction between Melbourne Water and DPI with the landholders in the catchment generated a lot of interest.

At the second site at Neerim South, we stopped at the McPhee's property to discuss the three different soil types found on their property. Ian Sargeant and Mark Imhof discussed the soils developed on the Tertiary volcanics, Devonian granites and surrounding alluvial sediments.

Ian Sargeant discusses a Red Ferrosol soil profile on the field trip Photographer: Mark Imhof