



# Australian Centre for Biodiversity

July 2009 Newsletter

## VISION

'To engage as a community of biologists that develops tools, understanding and capacity for making sound decisions that will maintain and restore ecosystems now and in the future'

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## LATEST NEWS.....

A Linkage Grant was awarded in 2008 for commencement in 2009 to Dr RM Thompson; A/Prof J Beringer; Dr TR Cavagnaro; Prof R Mac Nally; Dr PJ Baker; Mr M Eigenraam; Mr L Metzeling . The project is titled "More bang for your carbon buck: carbon, biodiversity and water balance consequences of whole catchment carbon farming"

Carla Sgro wrote a submission on behalf of the ACB for the Victorian Department of Sustainability and Environment, White Paper on Land and Biodiversity under Climate Change which was submitted in 2007. Carla was asked to deliver the key messages from this submission to the DSE Biodiversity panel in October 2008 .

A submission to the Royal Bushfire Commission 2009 was written by Patrick Baker on behalf of the ACB. Carla Sgro has written a submission in response to Consultation Draft of Australia's Biodiversity Conservation Strategy 2010-2020 on behalf of the ACB and CESAR. Both of these submissions are located on the ACB website

## UPCOMING EVENTS

- Strategic Planning Meeting for the ACB 28th July
- Monthly Journal Club to start in August
- Talkfest November 27th 2009

# Australian Centre for Biodiversity

## Welcome to new members and update on the AGM

Greetings all

The 2009 AGM was a resounding success, with much owing to Kirsten's organizational efforts (many thanks to her). Almost every research and academic member attended.

The ACB has had a very good year (and continues to tick off items from the 2007-2010 Strategic Plan. The most significant achievements over the past year and a bit were:

- (1) appointment of the inaugural Advisory Committee (AC);
- (2) broadening of membership beyond SoBS;
- (3) success in the main aim of producing well-funded, highly relevant research that would not have arisen except for the existence of the ACB ("Carbon Farming" project, led by Ross Thompson).



Members of the AC Mr Graham Rooney of Melbourne Water and Mr Mick Murphy AOM, Chair of the Victorian Catchment Management Council attended the full session. Unfortunately, the 3rd member, A/P Rebekah Brown of GES, was unable to attend. Graham and Mick provided the incoming Exec Committee (EC) with some great advice in a post-AGM session and have signalled a strong willingness to continue to "coach" the ACB in striving to achieve its goals.

We welcomed new external members Mike Grace and Perran Cook (SoC), as well as Jenny Davis. We also farewelled Paul Reich (a servant of the EC), and inaugural Theme Leaders Dennis O'Dowd, and I believe about 70% of Sam Lake.

The EC had a significant change in composition, with Amber Clarke, Paul Reich, Jason Beringer, Patrick Baker and Carla Sgro moving aside for Megan Wong (Val Caron remains the 1<sup>o</sup> HDR rep.), Shaun Cunningham, Jenny Davis, Mike Grace and Ross Thompson. The "role offs" provided great service and we thank them for their efforts.

It was clear from the presentation of new projects (already funded) and proposed projects that the ACB is generating a coherent "flavour" of research activities ranging broadly from landscape and evolutionary genetics through to nutrient dynamics.

A final note is that the ACB is always willing to accept new members. HDR students whose supervisors may not be members are welcome. The only criterion for membership is a desire to contribute (in one of many diverse possible ways) to the primary goal of ACB - "the maintenance and restoration of Australia's landscapes, ecosystems and biota now and into the future."

There will be the annual HDR Talkfest in late November - all are welcome to this event of course.

Cheers Ralph

### Professor Jenny Davis

Jenny is new to the School of Biological Sciences and has recently been elected to be part of the ACB's executive committee. Jenny's interests include: wetland, river and estuarine ecology, conceptual modelling, biomonitoring, bioassessment and aquatic biodiversity research.

Most recently her research has investigated the impacts of multiple stressors (salinisation, eutrophication, acidification and hydrological change) on aquatic ecosystems. Jenny is currently the Chair of the Research Sub-Committee of the Australian Biological Resources Study (ABRS) Research Advisory Committee and a member of the Editorial Board of *Freshwater Biology*. Jenny was the non-government scientist on the WA Wetlands Coordinating Committee for over ten years and completed two terms (6 years) on the Conservation Commission (the advisory body to the Department of Conservation and Land Management in Western Australia).



If you would like further information on what Jenny does please contact Jenny, [Jennifer.Davis@sci.monash.edu.au](mailto:Jennifer.Davis@sci.monash.edu.au), or take a look at her recent publication list.

#### Recent Publications

Sim, L.L., Davis, J.A. & Chambers, J.M. (2009). Development of conceptual models for ecological regime change in temporary Australian wetlands. pp 259-279. in *New models for ecosystem dynamics and restoration*. Hobbs, R.J. & Suding, K. (eds). Island Press. SERI, Washington.

Stewart, B., Strehlow, K. & Davis, J.A. (2009) Impacts of deep open drains on water quality and biodiversity of receiving waterways in the wheatbelt of Western Australia. *Hydrobiologia* 619:103-118.

Likens G.E., Walker, K.F., Davies, P.E., Brookes, J. Olley, J, Young, W.J., Thoms, M.C., Lake, P.S., Gawne, Davis, J.A., Arthington, A.H., Thompson, R. and Oliver, R.L. (2009) Ecosystem science: toward a new paradigm for managing Australia's inland aquatic ecosystems. *Marine and Freshwater Research* 60: 271-279.

Bonada, N., Rievadevall, M., Dallas, H., Davis, J., Day, J., Figueroa, Resh, V. & Prat, N. (2008). Multiscale assessment of macroinvertebrate richness and composition in Mediterranean-climate rivers. *Freshwater Biology* 53:772-788

Brim Box, J., Duguid, A., Read, R.E., Kimber R.G., Knapton, A., Davis J.A., & Bowland, A.E. (2008) Central Australian waterbodies: the importance of permanence in a desert landscape. *Journal of Arid Environments* 72: 1395-1413.

Davis, J.A. and Brock, M. (2008) Detecting unacceptable change in the ecological character of Ramsar wetlands. *Ecological Management and Restoration*. 9:26-32.

Giles, J.C. Kuchling, G. & Davis, J.A. (2008) Populations of the Snake-necked Turtle *Chelodina oblonga* in three suburban lakes of Perth, Western Australia. *Herpetological Conservation* 3:275-284



# Australian Centre for Biodiversity

## A message from your 2008/09 student representative Amber Clarke.

Since the last newsletter, the students of the ACB were once again involved in the Annual ACB Talkfest which is a one-day conference highlighting research being undertaken by PhD candidates associated with the ACB. The 4th Annual Talkfest was held on 28th November at Monash University and was opened with a keynote address from Dr Jane Doolan from the Department of Sustainability and Environment on "The role of science in management and policy". This was followed by 14 student talks that showcased work not only from the School of Biological Sciences but also the Water Studies Centre (School of Chemistry) and the School of Geography and Environmental Science. We finished up the day with beer and a BBQ which provided the perfect forum to congratulate our Talkfest Award winners for 2008:



1st Prize – John Morrongiello

2nd Prize – Giselle Perdomo

3rd Prize - Susie Ho

Congratulations to our winners and thank you to all the students who spoke at the Talkfest. I'd also like to thank members of the organising committee who helped make the day a success: Valerie Caron, Narelle Weston and Kirsten Shelly.

It has been a great experience working with the executive committee and I wish them all the best for the future. I am now handing over the reins to Valerie Caron who will be a fantastic postgraduate representative.

Amber

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## A message from your 2009/10 student representative Valerie Caron.

I am very excited by my new role as the ACB student representative. I first would like to thank Amber for all her efforts in the past year. She did a great job. I would also like to welcome Megan Wong who will be the alternate rep this year. My main role this year will be to represent students during the executive committee meetings, but more importantly to communicate effectively with all postgraduate student members of the ACB. I will do my best to keep you updated on what the ACB is up to and on how to become more involved. Similarly, if you have an ideas to make the ACB better for students or if you have any concerns, don't hesitate to contact me, I will make sure to carry all issues forward.



One of the most interesting opportunities provided by the ACB is the yearly Talkfest which allows students to present their research to ACB members and partners. The 2009 ACB Talkfest will be happening this spring and should be another great event. If you would like to be part of the organizing committee, let me know!

Val

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### Agroecology: the role of mycorrhizas in sustainable tomato production.

Ash Martin and Tim Cavagnaro.

*This project, funded by DAFF through the Caring for our Country program seeks to investigate the role of arbuscular mycorrhizas in nutrient interception in an intensive vegetable cropping system.*

The majority (~80%) of terrestrial plant species form arbuscular mycorrhizas (AM). AM play an important role in plant nutrition by providing access to soil-derived nutrients from sources not necessarily otherwise accessible to roots. The fungi receive a supply of C in return. The formation of AM can improve plant uptake of (especially) P, and a range of other nutrients including Zn, NH<sub>4</sub><sup>+</sup>, NO<sub>3</sub><sup>-</sup>, Cu and K.

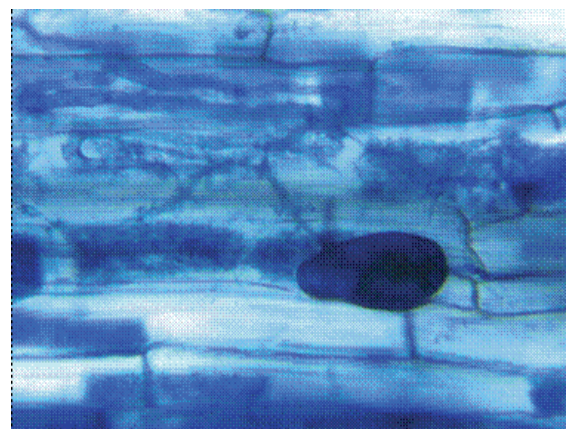


With increasing pressures of farming systems to reduce their reliance on nutrient inputs, there is considerable interest in the potential of using AM to improve plant nutrition. As a first step in this process we have been investigating the occurrence of AM in tomato farms in southeastern Australia. This past summer, Ash Martin collected soil and roots from 30 sites from across northern Victoria, the main processing tomato growing region in Australia. The levels of AM colonisation of roots were very low and are likely related to high levels of nutrients in the soil and use of soil fumigants and fungicides. Early indications are that by more careful management of these beneficial soil microbes, nutrient inputs could be significantly decreased without a yield penalty. This will have multiple benefits, including economic and environmental.

As part of this project we are preparing cultures of AM fungi in the glasshouse which will be used to pre-inoculate plants prior to field planting. This will allow us to more carefully study the ecology of AM in an on-farm setting. We are also actively seeking a PhD student to work on this project.



1. Tomatoes



2. AM fungi in roots.

### THE CARBON PROJECT

Shaun Cunningham, Jim Thomson, Ross Thompson, Jason Beringer, Tim Cavagnaro, Ralph Mac Nally, Patrick Baker, Mark Eigenraam and Leon Metzeling

Reforestation is important for reducing atmospheric carbon and potentially mitigating climate change. Competing demands for water yields, agricultural productivity, carbon storage and biodiversity must be balanced to create sustainable catchments under a drying climate in southern Australia. 'The Carbon Project' aims to develop a robust modelling platform for carbon and water fluxes of a range of land use practices at a scale that is relevant to land management – the whole Goulburn-Broken catchment!

This project assembles an expert team including the ACB's combined strengths of micrometeorology (Beringer), forest ecology (Baker), soil processes (Cavagnaro), terrestrial ecology, landscape modelling (Mac Nally), freshwater ecology (Thompson), external expertise in landscape economics (Eigenraam, DSE Victoria) and freshwater biodiversity (Metzeling, EPA Victoria), and two research fellows that have experience across these areas (Cunningham & Thomson). This research is funded by an ARC Linkage grant with substantial contributions from the Victorian Department of Sustainability and Environment (Economics Unit, River Health Division), Catchment Management Authorities (Goulburn Broken, North Central), EPA Victoria and the investment company Kilter.

To predict the effect of increasing reforestation on the Goulburn Broken catchment, we need to quantify the water use, carbon storage and biodiversity value of different land uses. We will begin with a review of the current understanding of how tree cover affects carbon and water fluxes, and biodiversity in southern Australia. This will involve a compiling existing datasets into a spatial database, which will build on the Environmental Systems Modelling Platform (EnSym) developed by DSE Victoria, and producing a detailed land use map of the catchment. This process will reveal knowledge gaps to be addressed by field surveys, and potential sites for intensive measurements and broad surveys of the catchment.

We will measure carbon and water fluxes across the soil-water-plant-atmosphere continuum and biodiversity values intensively at ten core sites. These sites will be situated within the agricultural zone that is most likely to be converted to carbon farming. Core sites will be selected within major land uses: dryland agriculture, reforestation (of a range of ages) and mature forest. Broad surveys of key indicators of carbon and water fluxes, and biodiversity will be used to strengthen the representativeness of our understanding at the catchment scale.

Changes to whole catchment carbon, water and biodiversity budgets under future scenarios will be estimated by scaling up relationships determined from core measurement sites and broad surveys across the range of land uses. The approach used will be based on populating existing large-scale models developed by EnSym. We will use these models to explore (1) how governmental or market-based incentives might be used to influence uptake by landholders of biodiverse carbon farming practices, (2) how the interaction of future climates will affect the productivity of carbon farming and (3) how the interaction of future climates and pricing scenarios will drive establishment of carbon farming across the Goulburn Broken catchment.

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The publication featured on the ACB website by Shaun Cunningham and co-authors titled "A robust technique for mapping vegetation condition across a major river system" recently featured in the Monash Magazine in May 2009. You will find both the paper and the magazine article at <http://www.biolsci.monash.edu.au/research/acb/index.html>

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