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REPORT FROM THE CHAIR OF THE ADVISORY BOARD

During the period 2002-2003, the Centre for Evolutionary Biology & Biodiversity has become fully operational. Although difficult to assess in many ways, there is clear evidence that CEBB has achieved significant synergy among its members and has undertaken a number of successful strategic initiatives that undoubtedly would not have come about without the impetus of the Centre. Most important of these is a successful ARC LIEF grant that has re-equipped the joint University/SA Museum molecular ecology and evolution laboratories.

Although largely dictated by individual successes, the number of new research grants, including an ARC Senior Research Fellowship to Dr Mike Lee, and prestigious awards bestowed on several members of the Centre, point to a sustained and impressive research performance that will provide a solid basis for future activities in the Centre.

The report that follows outlines activities undertaken within CEBB over a two-year period. Importantly, the Centre has continued to develop its communications program and foster an environment of research excellence and collaboration among its members and with numerous outside researchers, nationally and internationally. There is an identifiable air of friendliness, dedication and excitement in the Centre that, among other benefits, is providing an ideal atmosphere for motivating and training postgraduate students.

CEBB is becoming a formidable, even preeminent, player in evolutionary and biodiversity studies in Australia, and if only a few of its planned initiatives for the future are successful, it will have exceeded its originally aims and expectations.

As the Chair of the Advisory Board, I wish CEBB every success and look forward to watching its programs expand and develop in the years to come.



Professor Steve Hopper
University of Western Australia

REPORT FROM THE DIRECTOR

Introduction

The Centre for Evolutionary Biology & Biodiversity (CEBB) is a University designated research centre that brings together expertise in these areas from two key organisations: The University of Adelaide, and the South Australian Museum. In addition, a number of other groups are involved in CEBB, including the Plant Biodiversity Centre of the Department of Environment & Heritage. The Centre started in October 2000 and spent its first 15 months developing its management structure, governance, research programs, website, and seminar series.

The mission of the CEBB is to be a leading national and international centre for research and training in evolutionary biology and biodiversity studies, with an emphasis on the fauna and flora of Australia. As such it aims to 1) provide a focus and recognition for the high-calibre research already being undertaken by researchers in Adelaide, 2) provide more secure funding and first-class infrastructure through collaboration among its members and with colleagues externally, 3) to attract high-quality postgraduates, 4) to attract national and international visitors, and 5) to foster communication and ideas among members through seminars, discussion groups, workshops and conferences.

This report covers the activities of the Centre during 2002 and 2003, which have largely focused on the five aims above. As Director, it is my firm view that the CEBB has made substantial progress in developing its programs during this period, and the Centre is rapidly becoming recognised for its research success both within The University of Adelaide community and across Australia. If the Centre has encountered any problems during 2002-03, they have been associated with diminishing internal funding and lack of administrative support. These issues are discussed elsewhere in this report.

Progress and Highlights

The second and third years of the Centre has been a period of consolidation, and are noteworthy based on a very high rate of successful grant applications, awards, publications and the further development of a close relationship with the South Australian Museum. Importantly, this relationship has seen a number of major initiatives that will have significant long-term benefits for the Centre, and herald a shift from a reliance on individual research grants to larger collaborative programs. In this respect, CEBB has emerged as an ideal vehicle for the discussion and initiation of large collaborative research grants. These will serve to increase synergies among its staff and research programs, and develop stronger links with researchers around Australia and overseas. Also of substantial significance during the 2002-03 period, has been the relocation of Professor Austin's research group from the Waite Campus to North Terrace, and their co-location into the Darling Building with the molecular evolution group, which comprises Drs Cooper and Donnellan and associated staff, from the South Australian Museum. In conjunction CEBB staff already at North Terrace, these moves have created what is arguably the largest and best concentration of researchers in Australia working in the area of evolutionary biology.

Some of the major activities in the Centre during 2002 and 2003 were:

- A successful ARC LIEF grant to develop the *South Australian Regional Facility for Molecular Evolution and Ecology*
- Award of a ARC Senior Fellowship to Dr Mike Lee
- Award of a large ARC Linkage grant to develop a collaborative initiative on the diversity, distribution and uniqueness of stygofauna in central western Australia
- Discussion and planning for an ARC Network grant

- Discussion and planning with Dr Allan Cooper (Oxford University) for an Australian Federation Fellowship application
- Continued success with large research grants, publications postgraduate students
- A significant number of prizes and awards to Centre staff, notably the Clarke and Nancy Burbidge Medals to Professor Bob Hill, the Fenner Medal to Dr Sandy Orgeig, and the Young Tall Poppy Award to Drs Mike Lee and Sandy Orgeig
- Continued success of the CEBB seminar series as a major scientific forum in the University.

Acknowledgements

On behalf of the members of the Centre, I would like to thank the following people for their support, encouragement and help in developing the CEBB: Professor Edwina Cornish (Deputy Vice-Chancellor, Research), Professor Tim Flannery (Director, South Australian Museum), Professor Peter Rathjen (Executive Dean, Faculty of Sciences), the late Professor Russell Baudinette (Head, Department of Environmental Biology in 2002), Ms Janet Dibb-Smith (Director, Research, Policy & Support, Adelaide University), the two external members of the Advisory Board, Dr Steve Hopper (CEO, Botanic Gardens & Parks Authority, Perth) and Dr Steve Morton (Chief, CSIRO Sustainable Ecosystems), Ms Gail Edwards and Mary Odlum for administrative and financial support, and Dr John Jennings and Mr Nick Stevens for editorial assistance with compiling this report.

A handwritten signature in black ink, appearing to read 'A.D. Austin', with a long, sweeping horizontal stroke extending to the right.

Professor A.D. Austin

Director, CEBB

MEMBERS OF THE CENTRE

The membership of the Centre dropped slightly during 2002 and 2003, with a number of staff leaving for various reasons. Dr Christophel resigned in February 2002 to take up a position in the USA; Dr Reeson resigned his postdoctoral position in Professor Austin's group to take up a position in Queensland Primary Industries in March 2002; Mr Mark Adams (South Australian Museum) resigned his position in CEBB in November 2002 due to other work commitments; Dr Muhammad Iqbal resigned his postdoctoral position in Professor Austin's group to take up a position with ABRS in November 2002; while four staff have been dropped from the Centre due to lack of involvement.

Following discussions with the CEBB Advisory Board, a decision was made to expand the Management Committee and in the second half of 2003 Dr Ian Whittington was invited and agreed to join the Committee.

The key personnel in and Management Committee for the Centre are:

Professor Andrew Austin, Dep't of Environmental Biology (EB) (Director)

Dr Steven Donnellan, Evolutionary Biology Unit, South Australian Museum (SAM) (affiliate lecturer, jointly in EB and the Dep't of Molecular Biosciences)

Professor Robert Hill, Dep't of Environmental Biology (EB) (Deputy Director)

Dr Ian Whittington, joint appointment between the South Australian Museum and Environmental Biology

Other staff in the Centre during 2002 and 2003 were:

Mr Mark Adams (SAM)

Dr Bill Barker (Plant Biodiversity Centre, DEH)

Dr William Breed (Anatomical Sciences)

Dr John Conran (EB)

Dr Steven Cooper (SAM) (affiliate lecturer, EB and Molecular Biosciences)

Dr Chris Daniels (EB)

Dr Kerrie Davies (Applied & Molecular Ecology, AME)

Dr Margaret Davies (EB)

Dr Rory Hope (Molecular Biosciences)

Dr Mark Hutchinson (SAM) (affiliate lecturer, EB)

Dr John Jennings (AME)

Dr Mike Lee (SAM/EB)

Dr Sandy Orgeig (EB)

Dr Greg Rouse (SAM/EB)

Dr Gary Taylor (AME)

Dr Ian Whittington (SAM)

Postdoctoral Fellows/Research Associates/Research Officers

Dr Leslie Chisholm (EB/SAM)

Dr Mark Downton (AME)

Dr Muhammad Iqbal (AME)

Dr Remko Leijds (SAM)

Ms Rosemary Paull (EB/SAM)

Dr Andrew Reeson (AME)

Mr Nick Stevens (EB)

ADVISORY BOARD & ADMINISTRATION

The Advisory Board forms an important part of the overall management structure of the Centre. It comprises the three members of the Centre's Management Committee (Austin, Hill and Donnellan), the Deputy Vice-Chancellor, Research (Professor Edwina Cornish), the Director of the South Australian Museum (Professor Tim Flannery), and two external members, Dr Steve Hopper (CEO, Botanic Gardens & Parks Authority, Perth) and Dr Steve Morton (Chief, CSIRO Sustainable Ecosystems). The Advisory Board met twice in Adelaide during the period covered by this report on 30th May 2002 and 7th May 2003. At the Board meeting in 2003, a decision was made to expand its external membership, and Dr Allan Holmes, Chief Executive of the Department of Environment and Planning, South Australia, was invited and accepted a position on the Board.

The Management Committee has served a crucial role in advising the Director on the day-to-day running of the Centre and has been responsible for developing its initial research programs and directions. Administrative support for the Centre is generously provided through the Department of Environmental Biology. Ms Gail Edwards acted as the administration officer, and Ms Mary Odlum as its financial officer.

RESEARCH PROGRAMS

The major research programs in the Centre during 2002 and 2003 were as follows:

Evolution and biodiversity of Australian terrestrial arthropods

(Professor A.D. Austin, Dr J.T. Jennings, Dr M. Dowton, Dr M. Iqbal, Dr K.A. Davies, Dr G.S. Taylor)

This program comprises a series of projects that deal with evolutionary and biodiversity aspects of terrestrial arthropods. These include:

- Evolutionary aspects of insect parasitoids, including the evolution of endoparasitism, polydnavirus associations, and host-parasitoid co-evolution
- Molecular phylogeny of the major groups of parasitic Hymenoptera using both sequence data and mitochondrial genome organisation
- Systematics of specific groups of parasitoids, including the Braconidae, Scelionidae, Gasteruptionidae and Aulacidae
- Evolution and systematics of the Australian lycosid spider fauna
- Community structure of terrestrial arthropods in sclerophyll forest, semi-arid deserts and guano cave systems
- Speciation and co-evolution of *Fergusonina* flies and *Fergusobia* nematodes associated with galls on myrtaceous plants.

These projects have a strong systematics basis that utilize traditional comparative morphological and molecular techniques, and they are underpinned by a comprehensive field program that supports a major insect collection, the Waite Insect and Nematode Collection. During 2002-03, the program had two postdoctoral fellows, six PhD and two honours students, and a research assistant.

Asexually reproducing reptiles are diverse in the Australian deserts

(Dr S. Donnellan)

Although, asexual reproduction is rare among vertebrates, arid Australia has a growing list of species that have exploited this rare form of reproduction including the skinks of the *Menetia greyii* complex. We have discovered as many as five species that are asexual reproducers in southern Australian deserts and that they are all closely related to sexually reproducing species,

many of which have also been recently discovered. Each asexual species was produced by hybridisation between separate sets of sexual species. Each asexual species has a wide geographic distribution and contains much genetic diversity, i.e. clones contradicting predictions that asexual species should be ephemeral due to the impact of constrained genetic diversity of adaptability in the face of environmental change over evolutionary time scales.

Evolution of the Australian Flora

(Professor R.S. Hill, Ms R. Paull)

Southern Australia is the best place in the world to study the effects of long term climate change on vegetation. This is because Australia has moved through approximately 20° of latitude since it separated from Antarctica about 35 million years ago, and during that time this movement has had a profound impact on the global and, more specifically, Australian climate. The study of the effect of this climate change on the vegetation is made possible by the excellent preservation of Cainozoic plant fossils in central and south-eastern Australia. This has been coupled with physiological research on the nearest living relatives of the fossils so that a reconstruction of the reasons behind plant evolution and/or distributional change can be attempted. This program utilises the fossil record and the living relatives of the fossils to document the impacts of lowering temperatures and reduced water availability on the vegetation of a large region. Such data are vital to our understanding of the potential impact of future, much shorter term, climate change.

Biology, systematics and evolution of marine parasites

(Dr Ian Whittington, Dr Leslie Chisholm)

The Marine Parasitology Laboratory at The University of Adelaide focuses on parasites of marine fishes. A special strength is the Monogenea, a class of wholly parasitic flatworms that typically infect skin, fins and gills of cartilaginous and bony fishes. The laboratory moved to Adelaide from Brisbane in early 2002, and the period of this report covers the transition phase to South Australia. In South Australia, expansion of finfish aquaculture in sea cages has stimulated some parasite problems on captive fish. PhD and honours students began to explore aspects of the biology, epidemiology and treatment of Monogenea on farmed kingfish, *Seriola lalandi*. We are also surveying wild kingfish close to and far from farming areas to determine natural levels of parasitism. Parasites in combination with host factors (genetics and otoliths) are being used to assess stocks of slimy mackerel, *Scomber australasicus*. The biology and systematics of a suite of Monogenea from the southern fiddler ray, *Trygonorrhina fasciata*, off Adelaide are also being investigated to address infection strategies of distantly related parasites infecting different sites on the same elasmobranch host.

On a regional and global basis, the parasite fauna of sharks and rays is being surveyed around Malaysian Borneo with an international multidisciplinary team of parasite and fish systematists, while studies are continuing on the identity of pathogenic Monogenea on fishes in Mexican aquaculture. Treatment of captive rays to eradicate worm infestations is also being investigated. Ultrastructural studies are examining the diversity of adhesives secreted by flatworm parasites of fishes. Importantly, all studies are synthesized to build a more complete picture about the evolution, associations and interactions between marine parasites and their fish hosts.

Systematics and evolution of marine invertebrates

(Dr Greg Rouse)

This program focusses on the systematics and reproduction in polychaetes annelids, which are investigated from both morphological and molecular perspectives at several scales ranging from a description of a new myzostome worm from South Australia to a broad study on the placement of the bizarre hydrothermal vent worms Alvinellidae. Several reviews on annelids and polychaetes were published in 2002-03. In 2002 a major new research direction began through opportunities with Monterey Bay Aquarium and Research Institute, particularly with Dr Bob Vrijenhoek. So far

this has involved studies on whalefall fauna. Data is accumulating for a study on the systematics of Crinoidea (Echinodermata) and this will result in the first large scale phylogeny of the group.

Diversity and evolution of stygofauna from the Yilgarn Region of central Western Australia
(Dr Steve Cooper, Professor Andy Austin, Dr Bill Humphreys - WA Museum, Dr Remko Leijts, Dr Chris Watts – South Australian Museum, Dr John Bradbury – University of Adelaide)

This project involves a large collaborative team of scientists who are studying the diversity and evolution of a recently discovered subterranean invertebrate fauna (stygofauna) found in numerous (>50) isolated calcrete aquifers in the Yilgarn region of central Western Australia. The fauna comprises largely unknown species in diverse invertebrate groups including diving beetles (Coleoptera), and crustaceans such as Syncarida, Isopoda, Amphipoda, Copepoda and Ostracoda. Our recent data from diving beetles suggest that stygofaunas within each aquifer may be highly endemic and we are exploring this possibility further using a combination of molecular genetic and morphological analyses of other components of the stygofauna, including amphipods and isopods (*Haloniscus*). As part of an ARC Linkage grant, we are also developing rigorous sampling methods and studying the environmental variability within aquifers, based at a newly established field station at the Sturt Meadows pastoral property. A further aim of this project is to investigate the population structure/dynamics of diving beetle species using microsatellite DNA markers. These investigations have important implications for the sustainable management of the aquifers and the stygofauna within them.

Evolution of the regulation of pulmonary surfactant development
(Assoc. Prof. Chris Daniels & Assoc. Prof. Sandra Orgeig)

Pulmonary surfactant is a mixture of lipids and proteins that is secreted by alveolar type II cells. It reduces alveolar surface tension and hence the work of breathing. Despite the tremendous diversity of lung structures amongst the vertebrates, the composition of surfactant is highly conserved. Conserved elements of the surfactant system amongst distantly related species are likely to be crucial factors for successful lung development. Understanding the mechanisms by which the surfactant system becomes operational in animals with dramatically different birthing strategies and in distantly related species will provide important information about the role of the surfactant system in the commencement of air breathing and the processes regulating surfactant maturation and secretion.

Using a range of vertebrate species, both oviparous and viviparous, we have examined the hypothesis that the control of surfactant production is dependent on glucocorticoids, thyroid hormones and autonomic neurotransmitters. We have also examined whether the overall intrinsic pattern of the control of surfactant maturation is conserved throughout the vertebrate radiation.

Although there are some differences between groups in the absolute amounts of surfactant present in the lung, the rates of cellular secretion of surfactant, the function of acetylcholine and the degree of agonist response, these variations are not dependent on phylogeny. It is likely that the differences in control of surfactant development are likely to be primarily related to metabolic activity and the duration of incubation (i.e. the "speed" of development). Moreover, the hormones examined appear important in promoting development, and therefore appear conserved within the amniotes. However, the autonomic neurotransmitters induced different responses in different species. Hence, some factors are crucial for the proper maturation of the surfactant system whereas others vary throughout evolution without being detrimental to the overall function of the system.

APPOINTMENTS & DISTINCTIONS

- Andy Austin was promoted to full **Professor** in 2002
- Dr Bill Breed received the Best Poster Prize in Sessions 1–3 at the 9th International Symposium on Spermatology, Cape Town, 2003
- Dr Steve Cooper was promoted to **Senior Scientist** at the South Australian Museum.
- Dr Chris Daniels received the Mentor Appreciation Certificate (2003) as part of the ‘*Preparing Future Faculty Program*’ at Arizona State University, USA.
- Dr Daniels was made a Honorary Research Associate of the Royal Zoological Society of South Australia
- Professor Bob Hill was awarded the **Clarke Medal** by the Royal Society of New South Wales in 2002
- Professor Hill. Was awarded the **Nancy Burbidge Medal** by the Australian Systematic Botany Society in 2002
- Professor Hill was appointed Head of the School of Earth and Environmental Sciences, University of Adelaide in 2003
- Dr John Jennings was appointed Convenor of the Waite Insect and Nematode Collection Management Committee in 2002
- Dr Jennings was elected Chairman of Council of Heads of Australian Entomological Collections in 2002
- Dr Jennings was appointed Chair of the Editorial Board of the Transactions of The Royal Society of South Australia in 2002.
- Dr Mike Lee received a **Young Tall Poppy Award** from the State Government of South Australia for distinguished research by a young scientist.
- Dr Sandy Orgeig was awarded the **Fenner Medal** (Australian Academy of Science)
- Dr Orgeig was also promoted to **Australian Senior Research Fellow**
- Dr Orgeig was invited and attended the **High Fliers Priorities Workshop**, organised by the Australian Academy of Science on 8 August 2002, to nominate potential thematic research priorities to the Department of Education, Science & Technology Taskforce charged with setting National Research Priorities for Australia.
- Dr Orgeig received a **Young Tall Poppy Award** from the State Government of South Australia for distinguished research by a young scientist
- Dr Orgeig became a Member of the Organising Committee and Speaker for the Inaugural Symposium on *Frontiers of Science*, Shine Dome, Australian Academy of Science, Canberra in July/August 2003
- Dr Orgeig received a Mentor Appreciation Certificate as part of the ‘*Preparing Future Faculty Program*’ at Arizona State University, USA.
- Dr Orgeig was made a Honorary Research Associate of the Royal Zoological Society of South Australia
- Dr Ian Whittington became a members of the Extended Executive of the South Australian Museum in 2003
- Dr Whittington became a member of the International Committee of the *International Symposium on Fish Parasites* in 2003
- Dr Whittington became a member of the International Committee of the *Fifth International Symposium on Monogenea* to be held in Guangzhou Province, China in August 2005
- Dr Whittington became Councillor (State Representative) of the *Australian Society for Parasitology Inc.* in 2002.

STUDENTS

The following students undertook research projects in the Centre during 2002 and 2003.

Honours Students

- Jenny Barker, Project Title: Wood identification of Aboriginal artifacts from central Australia (supervisors: R. Hill & Philip Clarke).
- Helen Blacker, Project Title: The control of pulmonary surfactant development in the chicken *Gallus gallus* (supervisors: C. Daniels and S. Orgieg).
- Tom Campbell, Project Title: Biology of Mound Springs isopods (supervisor: A.D. Austin).
- Megan Collins, Project Title: A study of lactation and milk composition in Australian marsupials and rodents (supervisors: W.G. Breed, D. Taggart & G. Shimmin).
- Benjamin Divett, Project Title: Medium-chain fatty acids: a natural remedy for farmed yellowtail kingfish infested with monogenean parasites? (supervisors: I. Ernst & I. Whittington).
- Vanessa Glennon, Project Title: Taxonomy, biology and host invasion strategies of three monogenean parasite species from the southern fiddler ray, *Trygonorrhina fasciata*. (supervisors: I. Whittington & L. Chisholm).
- Greg Guerin, Project Title: Systematics of some Lamiaceae (supervisor: R. Hill and W. Barker)
- Virginia Holt, Project Title Effect of bridle creeper litter on soil micro-invertebrates at Mt Billy Conservation Park (supervisor: A.D. Austin).
- Deborah Hong, Biological Sciences, Flinders University. Project Title: Molecular markers for determining sex in reptiles (supervisors -. A. Goodman & S. Donnellan).
- Lauren Johnston, Project Title: Systematics and larval development in *Aporometra* (Crinoidea, Echinodermata) (supervisor: G.W. Rouse).
- Karin Kassahn, Project Title: Systematics and phylogeography of the giant Australian cuttlefish. (supervisors: S. Donnellan & A. Fowler, SARDI Aquatic Sciences).
- Karin Kasshan, Project Title: Molecular and morphological analyses of the cuttlefish *Sepia apama* indicates a complex population structure (supervisor: S. Donnellan).
- Caroline McDonald, Project Title The effect of gonadotrophins on wombat ovarian morphology and oocyte maturation (supervisors: W.G. Breed & D. Taggart).
- Robert Marlow, Project Title: Non-target effects of fungicides on vineyard arthropods (supervisor: A.D. Austin).
- Sally Maxwell, Project Title: Patchyness in grassland habitats and its effect on the arthropod communities (supervisors: J. Facelli & A.D. Austin)..
- Rebecca Morgan, Project Title The zona pellucida structure and chemical composition of the possum (supervisor: W.G. Breed).
- Kate Muirhead, Project Title: Diversity and structure of parasitoid-host communities on a Murray River Floodplain (supervisors: A.D. Austin & K. Walker).
- Adam Skinner, Project Title: Evolution and limb reduction in the diverse lizard genus *Lerista*. (supervisors: M. Lee & M. Hutchinson).
- Natasha Speight, Project Title: What is the significance of the highly divergent morphology of the cervix on sperm transport and the development of artificial insemination in a native rodent species (supervisor: W.G. Breed).
- Cath Tait, Project Title: Changes in species assemblages within the city of Adelaide, South Australia, from 1836 to 2002. An urban ecological study. (supervisors: C. Daniels & R.S. Hill).
- Caroline Wilson, Project Title: Population and reproduction of *Patiriella parvivipara* (Asteroidea, Echinodermata) (supervisor: G. Rouse).
- Zeng Qi Zhao, Project Title: Biology and systematics of nematodes associated with conifers in Australia. (supervisors: I. Riley, Dr K.A. Davies & J. Nobbs, SARDI).

Postgraduate Students

- Jenny Barker, Project Title: Identifying the wood used in Aboriginal artifacts (supervisors: R. Hill & Phillip Clarke).
- Melissa Bauer, Project Title: Sperm pleiomorphism in Australian native rodents (supervisors: W. Breed, M Ricci & E. Peirce)
- Jamie Chapman, Project Title: The structure and function of the zona pellucida in marsupials (supervisors: W.G. Breed & O. Wiebkin).
- Sylvia Clarke, Project Title: Impact of management practices on invertebrate biodiversity in the Flinders Ranges, South Australia (supervisors: A.D. Austin & J. Facelli).
- Sonia Dewdney, Project Title: Species limits in Australian megafauna (supervisors: T. Flannery & R. Hill).
- Wetjens Dimlich, Project Title: Spawning in pilchards (supervisors: W.G. Breed, T. Ward, SARDI Aquatic Sciences & M. Geddes).
- Travis Gotch, Project Title: Population and conservation biology of Mound Springs spiders in South Australia (supervisors: A.D. Austin & M. Keller).
- Greg Guerin, Project Title: Revision of the *Hemigenia/Microcorys* group (Labiatae) (supervisors: R. Hill & W. Barker)
- Nilanaga Gunawardn, Project Title: Impact of DNA degradation on the reliability of DNA fingerprinting (supervisors: M. Henneberg & S. Donnellan).
- Magda Halt, Project Title: Phylogeny of Cirratuliformia (Polychaeta) and assessment of the Barcode of Life program (supervisor G. Rouse).
- Elise Head, Project Title: Biology of gall-forming *Fergusonina-Fergusobia* (Diptera, Nematoda) on eucalypt trees (supervisors: I. Riley, K. Davies, G. Taylor & A.D. Austin).
- Kate Hutson, Project Title: Parasite interactions of wild and farmed kingfish (*Seriola lalandi*) in Spencer Gulf, South Australia (supervisors: I. Ernst & I. Whittington).
- Marta Kasper, Project Title The ecology of European wasp in South Australia (supervisors: A.D. Austin, S. Cooper & D. Mackay).
- Caroline McDonald, Project Title: The effect of gonadotrophins on ovarian follicular development and oocyte maturation in wombats (supervisors: W. Breed & D. Taggart).
- Dani Maver, Project Title: Steroid hormones in peripheral blood and the control of oestrous cycle length in the long-nosed potoroo (supervisors: W.G. Breed, D. Taggart & R. Baudinette).
- Mansour Mohamadian, Project Title: Stomatal wax plugs and desiccation avoidance (supervisors: J. Watling & R. Hill).
- Ben Moretti, Project Title: Bioinformatic and software architecture design for the databasing of biological collections (supervisors: A.D. Austin & R. Hill).
- Rebecca Morgan, Project Title: Antibody production of the zona pellucida proteins in the marsupial *Trichosurus vulpecula* (supervisor: W.G. Breed).
- Tim Moulds, Project Title: Ecology and conservation of a unique guanophilic invertebrate community (supervisors: A.D. Austin & J.T. Jennings).
- Kate Muirhead, Project Title: Biosystematics and biology of the *Cotesia falvipes* complex of wasps (supervisors: A.D. Austin & S. Donnellan).
- Michael O'Callaghan, Project Title: Studies on the systematics of the cestodes infecting the emu, *Dromaius novaehollandiae* (Latham, 1790) (supervisors: I. Whittington & M. Davies).
- Cate Paull, Project Title: Beneficial arthropods in Coonawarra vineyards (supervisors A.D. Austin & N. Schellhorn).
- Rosemary Paull, Project Title The plant macrofossils from the Miocene of Kiandra, N.S.W. (supervisors: R. Hill & Jenny Watling).
- Allan Mooney, Project Title: Biology of *Zeuxapta seriolae* from gills of *Seriola lalandi* (Carangidae) (supervisors: I. Ernst & I. Whittington)
- Mario Ricci, Project Title: The structure and function of the sperm cytoskeleton in marsupial mammals (supervisor: W.G. Breed).
- David Schmarr, Project Title: Stock assessment of slimy mackerel (*Scomber australasicus*) in southern Australia using parasites, genetics and otoliths (supervisors: I. Whittington & T. Ward, SARDI).

- Tasha Speight, Project Title: Female reproductive tract anatomy and sperm transport in the hopping mouse (supervisor: W. Breed).
- Claire Stephens, Project Title: The impact of weeds invasions on insect diversity and associated community structure and processes (supervisors: A.D. Austin & J Facelli).
- Nicholas Stevens, Project Title: Systematics of Australian agathidine wasps (Insecta: Hymenoptera: Braconidae); solitary endo-parasitoids of lepidopteran leaf-rolling larvae (supervisors: A.D. Austin & J.T. Jennings)
- Christine Swann, Project Title: The evolution and function of the zona pellucida in Australian rodents (supervisors: W. Breed, S. Cooper & R. Hope)
- Duncan Taylor, Biological Sciences, Flinders University. Project Title: Population structure and molecular evolution in pythons (supervisor: A. Goodman & S. Donnellan)
- Fraser Vickery, Project Title: The effect of fire on narrow leaf mallee (*Eucalyptus cneorifolia*) ecosystems on Kangaroo Island using ants as bio-indicators (supervisors: S. Taylor & J.T. Jennings).
- Rissa Williams, Project Title: Novel treatments for Monogenea infecting commercially important finfish species in aquaculture (supervisors: I. Ernst & I. Whittington).
- Pakawadee Worawittayawong, Project Title: Spermatogenesis and sperm form in the Asian bandicoot rat (*Bandicota indica*). (supervisors: W.G. Breed & P Sretarugsa - Mahidol University, Thailand)

COMMUNICATION

Website

The CEBB website (<http://www.waite.adelaide.edu.au/cebb/>) provided an excellent portal into the activities of the Centre during 2001 and 2003, and included information on staff, students, research programs, funding, conferences and useful links to other sites. During this period, it attracted the attention of numerous prospective postgraduate students and had a large number of hits from colleagues around Australia and Internationally. However, due to the restructuring of the Faculty of Sciences in 2003 and policy changes within the University to do with IT Services, and the loss of administrative support for CEBB, previously provided by the Department of Environmental Biology, the CEBB website has become dated. A complete rebuilding of the site will be undertaken in 2004-05, following a restructuring of the School's webpages and restoration of administrative support to CEBB.

Seminar Series

- 6 February 2002 **Dr Mark Dowton** (Department of Biology, Wollongong University) "Mitochondrial gene rearrangements and evolution of the Hymenoptera"
- 24 April 2002 **Dr Scott O'Neil** (Department of Zoology & Entomology, University of Queensland) "*Wolbachia*"
- 29 May 2002 **Dr Tom Chapman** (School of Biological Sciences, Flinders University) "The evolution of an altruistic soldier caste in the gall-forming thrips of Australia"
- 23 January 2003 **Dr Jim Whitfield** (Department of Entomology, University of Illinois) "Co-phylogeny between bracoviruses and microgastroid parasitic wasps"
- 7 May 2003 **Dr Steve Morton** (CSIRO, Environment and Natural Resources) "Biodiversity and politics: some experiences between these two worlds"
- 6 August 2003 **Dr John LaSalle** (CSIRO, Entomology, Australian National Insect Collection) "Biodiversity, biological control, and invasive leafminers"
- 20 October 2003 **Dr Alan Andersen** (CSIRO, Sustainable ecosystems, Tropical Ecosystem Research Centre, Winnellie, N.T.) "Fire ecology and management in northern Australia"
- 6 November 2003 **Dr Mark Harvey** (Western Australian Museum) "Short-range endemism in the Australian fauna: tiny domains with gigantic problems"
- 8 December 2003 **Dr Nick Murphy** (Deakin University) "All at sea with freshwater prawns: using nucleotide data to investigate the evolutionary history of *Macrobrachium*"

Conference Presentations (CEBB members underlined)

- Adams, M. & S.C. Donnellan (2002) Evolution of parthenogenesis in Australian skinklizards. *Genetics Society of Australia*.
- Adams, M., S. Donnellan, R. Foster & K. Ottewell (2002) Diversity and origins of asexual lineages *Menetia* (Reptilia: Scincidae). *Genetics Society of Australia, Sydney*.
- Anderson T.K., L.A. Chisholm & I.D. Whittington (2003) Ecology and community structure of monogenean gill parasites from the Shovelnose Ray, *Rhinobatos typus*. *First Annual Northeast Ecology & Evolution Conference (NEEC), April 11-13, Rutgers University, New Brunswick, New Jersey, U.S.A.*

- Anderson T.K., L.A. Chisholm & I.D. Whittington (2003) Seasonal patterns and microhabitat selection of monogenean gill parasites of the Giant Shovelnose ray, *Rhinobatos typus* from Heron Island on the Great Barrier Reef, Australia. *78th Annual Meeting of the American Society of Parasitologists, August 1-5, 2003, Halifax, Nova Scotia, Canada.*
- Austin, A.D. (2002) Horny wasps: the systematics and evolution of parasitic wasps. Presidential Address, *33rd Annual Conference of the Australian Entomological Society, Perth.*
- Austin, A.D. (2002) Phylogeny and evolution of host relationships among scelionid and platygastriid wasps. *Entomological Society of America Annual Meeting, Fort Lauderdale.*
- Austin, A.D., M. Kasper & A. Reeson (2002) The status of *Vespula germanica* as an urban pest in Australasia. *14th International Congress of IUSSI, Sapporo.*
- Bauer, M., C. Leigh & W. Breed (2003) Causes and consequences of variation in the morphology of the sperm nucleus in the spinifex hopping mouse, *Notomys alexis*. *49th Australian Mammal Society Meeting, Sydney.*
- Bauer, M., C. Leigh & W.G. Breed (2002) Structure and possible functional significance of the acrosomal matrix in the sperm head of the koala. *17th Australian Conference on Electron Microscopy.*
- Berger, T., C. Leigh & W. Breed (2002) Sperm ligands for the marsupial zona pellucida. *9th International Symposium Spermatology, Cape Town.*
- Breed, W.G. (2002) Plenary Lecture. *12th Annual Conference of the Electron Microscopy Society of Thailand.*
- Breed, W.G. (2002) Sperm form in rats and mice-its inter- and intraspecific variability-(Is there any rhyme or reason). Invited Lecture. *9th International Symposium Spermatology.*
- Breed, W.G. (2003). Interspecific variation in litter size and gestation length in the Old World Rats and Mice (Subfamily: Muridae). *2nd International Conference on Rodent Biology and Management.*
- Breed, W.G., C.M. Leigh, G.N. Bronner & C. Chimimba (2002) What determines the unique sperm head shape in the southern African Tete Veld Rat, *Aethomys ineptus*? *9th International Symposium Spermatology, Cape Town.*
- Breed, W.G. (2003) Interspecific variation in sperm morphology in rats and mice (Subfamily: Muridae). *International Conference on Rodent Biology and Management.*
- Chapman, J.A. & W.G. Breed (2003) The oviduct of the brushtail possum *Trichosurus vulpecula*: the glycoconjugate environment at ovulation and its probable contribution to the postovulatory zona pellucida. *Australian & New Zealand Society of Electron Microscopy Conference.*
- Chapman, J.A., O.W. Wiebkin, & W.G. Breed (2002) Structure and function of the zona pellucida of a marsupial, the Brushtail Possum following ovulation and egg activation. *17th Australian Conference on Electron Microscopy, Adelaide.*
- Chisholm L.A. & I.D. Whittington (2003) Monogenean (platyhelminth) parasites from elasmobranchs off Malaysian Borneo. *6th International Symposium on Fish Parasites, September 22-26, University of the Free State, Bloemfontein, South Africa.*
- Chisholm L.A. & I.D. Whittington (2003) Monogenean parasites from sharks and rays off Malaysian Borneo. *Annual Scientific Meeting of the Australian Society for Parasitology Inc., July 6-10, Darwin, Northern Territory, Australia.*
- Chisholm L.A. & I.D. Whittington (2003) Problematic monocotylid monogeneans in public aquaria: *Dendromonocotyle* from the skin of stingrays. *6th International Symposium on Fish Parasites, September 22-26, University of the Free State, Bloemfontein, South Africa.*
- Chisholm, L., B. Cribb, R. Gould & I.D. Whittington (2002) Morphology, ultrastructure and function of ciliated sensory structures on developmental stages of *Merizocotyle icopae* (Monogenea: Monocotylidae). *Annual Scientific Meeting of the Australian Society for Parasitology Inc., September 29 to October 3, Hobart, Tasmania.*
- Chisholm, L.A. & I.D. Whittington (2002) Efficacy of Praziquantel bath treatments for monocotylid monogenean infections of the shovelnose ray, *Rhinobatos typus*. *Annual Scientific Meeting of the Australian Society for Parasitology Inc., September 29 to October 3, Hobart, Tasmania, Australia*

- Collins, M., D. Taggart, G. Shimmin, A. Mann, W.G. Breed, & R.V. Baudinette (2002) Cross fostering and pouch isolation studies in the brush-tail bettong, *Bettongia penicillata*. *48th Annual Conference of the Australian Mammal Society*.
- Cooper, S., A. Labrinidis, K. Armstrong & S. Donnellan (2003) The impact of Pleistocene environmental changes on population subdivision of species in southern Australia. *European Society for Evolutionary Biologists Meeting, Leeds, England*.
- da Silva, J. (2003) Monte Carlo simulation of HIV-1 gp120 V3 within-patient evolution: immune selection and cell tropism phenotype. *HIV Dynamics & Evolution 10th International Workshop, Lake Arrowhead, CA, USA*.
- Daniels C.B. & S.Orgeig (2002) Embryonic development, fetal growth, and tail regeneration: similarities, differences and utility as models for understanding the evolution of developmental physiology. *Roundtable on Comparative Developmental Physiology, Glen Rose, Texas*.
- Daniels, C.B., B.C. Lewis, S.L. Munns, C. Tsopelas, S. Orgeig, M. Baldwin, S. Stacker, M. Achen, B. E. Chatterton & R. D. Cooter (2002) Reptilian VEGF-C and lymphangiogenesis: Wagging the tail of lymphoedema. *Royal Australasian College of Surgeons, Adelaide*.
- Daniels, C.B., S. Orgeig & L.C. Sullivan (2002) A phylogenetic perspective on the evolution of vertebrate surfactants. *The American Physiological Society - The Power of Comparative Physiology: Evolution, Integration and Application, August 2002, San Diego, California*.
- Donnellan, S.C. (2002) Pythons, Moles and Molecules – molecular approaches for conservation biology. *Australian Veterinary Association Conference, Adelaide*
- Ernst I., C. Chambers & I.D. Whittington (2003) Contrasting challenges for efficient management of monogenean parasites infecting *Seriola* spp. in Australia and Japan. *6th International Symposium on Fish Parasites, September 22-26, University of the Free State, Bloemfontein, South Africa*.
- Ernst I., C. Chambers & I.D. Whittington (2003) (Invited Paper) Efficient management of monogenean parasites of kingfish and yellowtail (*Seriola* spp.): contrasting challenges for established and emerging industries. *Annual Scientific Meeting of the Australian Society for Parasitology Inc., July 6-10, Darwin, Northern Territory*.
- Flannery, T. (2002) 'Determinants of life': an Australian perspective. Keynote speaker: *Prospects for Biodiversity in Salinising Landscapes International Conference, Albany WA*.
- Flannery, T. (2002) Australia's Deserts: a unique asset. Keynote speaker: *First International Desert Knowledge Symposium, Alice Springs*.
- Flannery, T. (2002) Invited address to the nation: The day, the land, the people. *Australia Day Committee Annual Australia Day Address, Sydney*.
- Flannery, T. (2002) Tourism and conservation: perspectives from the first and third worlds. Keynote speaker: *Ecotourism Association of Australia International Conference, Cairns*.
- Flannery, T. (2002) What Evolution did to us. Keynote speaker: *Records Management Association of Australia 19th National Convention, Adelaide*.
- Flannery, T. (2002) Writing about extinction. Invited Speaker: *Shanghai International Arts Festival, Shanghai*.
- Hill, R.S. (2002) Conifer evolution in Australia. *Australian Institute of Biology, Annual Symposium, Adelaide*.
- Hill, R.S. (2003) "Fire, Air, Water and Earth: an elemental prehistory of Australia" Nancy Burbidge Memorial Lecture, *Australian Systematic Botany Society Annual Symposium, Melbourne*.
- Iqbal, M. & J.T. Jennings (2002) An interactive LucID key to the families of Hymenoptera. *5th International Conference of Hymenopterists, Beijing*.
- Iqbal, M., S. Belokobilskij & A.D. Austin (2002) Diversity and evolution of Australasian doryctine wasps. *5th International Hymenopterist's Conference, Beijing*.
- Jennings, J.T. & A.D. Austin (2002) Systematics and distribution of hyptiogastrine wasps (Hymenoptera: Gasteruptionidae). *5th International Society of Hymenopterists Conference, Beijing*.
- Jennings, J.T., A.D. Austin & N.B. Stevens (2003) Aulacid wasps of Australia. *34th Australian Entomological Soc. Conf., Hobart*.

- Kasper, M., A.D. Austin, & A. Reeson (2002) Population ecology of an invasive wasp *Vespula germanica* in South Australia. *14th International Congress of IUSSI, Sapporo*.
- Lee, M.S.Y. (2002) Resolving reptile relationships. Invited talk, *The Tree of Life Conference, American Museum of Natural History, New York*.
- Leys, R., C. Watts, S. Cooper & W. Humphreys (2003) Islands in the desert: Evolution of subterranean waterbeetles in arid Australia. *34th Australian Entomological Society/6th Invertebrate Biodiversity & Conservation Combined Conference, Hobart 28 September - 3 October*.
- Leys, R., S.J.B. Cooper, C.H.S. Watts & W.F. Humphreys (2003) Islands in the desert: Evolution of subterranean water beetles in arid Australia. *9th Congress of the European Society for Evolutionary Biology, Leeds August*.
- Leys, R., S.J.B. Cooper, C.H.S. Watts & W.F. Humphreys (2002) Molecular systematics and evolutionary origins of subterranean waterbeetles (Coleoptera: Dytiscidae) from central Western Australia. *International Biospeliology conference, Verona, Italy*.
- Leys, R., S.J.B. Cooper, C.H.S. Watts & W.F. Humphreys (2002) Multiple independent origins of subterranean water beetles (Coleoptera: Dytiscidae) in the arid-zone of Australia. *Australian Society for Limnology Congress, Margaret River, WA*.
- McDonald, C.H., D.A. Taggart, W.G. Breed, G.V. Drury, G.R. Finlayson, G.A. Shimmin & M.J. Paris (2003) Effect of gonadotrophin on ovarian follicular development and oocyte maturation in southern hairy-nosed wombats. *34th Annual Conference of Society of Reproductive Biology, Melbourne*.
- Michniewicz, R.J., M. Bull & S. Cooper (2002) The effect of reduced competition on long term pair fidelity in the Australian sleepy lizard. *ISBE Montreal*.
- Orgeig, S. (2003) Evolutionary developmental physiology – how does individual developmental plasticity lead to heterochrony? *Conference of Australian Frontiers in Science, Australian Academy of Science, Canberra, 31 July to 1 August*.
- Ricci, M. & W.G. Breed (2002) Why are wombat sperm so different in morphology from those of most marsupials?-an ultrastructural study of their morphogenesis. *17th Australian Conference on Electron Microscopy, Adelaide*.
- Rouse, G.W. (2002) Evolution of annelid reproduction. *Morphology, Molecules, Evolution and Phylogeny in Polychaeta and Related Taxa, Osnabrück, Germany*.
- Setchell, B.P., C.M. Leigh, & W.G. Breed (2003) Reduced sensitivity of spermatogenesis to high temperatures in *Pseudomys australis*. *ANZSCP Conference*.
- Speight, N., C. Leigh & W. Breed (2003) Female reproductive tract morphology of the hopping mouse (*Notomys alexis*) and its influence on sperm transport. *49th Australian Mammal Society meeting, Sydney*.
- Stevens, N.B., A.D. Austin, & J.T. Jennings (2003) Investigating the systematics of Australian agathadine wasps (Insects: Hymenoptera: Braconidae); solitary endo-parasitoids of lepidopteran larvae. *34th Australian Entomological Soc. Conf., Hobart*.
- Swann, C.A., S. Cooper, R.M. Hope & W.G. Breed (2003) Evolution of the zona pellucida C glycoprotein in Australasian native rodents. *49th Australian Mammal Society meeting, Sydney*.
- Taylor, G.S. & K.A. Davies (2003) Tritrophic radiations: gall flies, nematodes and the Myrtaceae. *Proceedings of the 34th Australian Entomological Society and 6th Invertebrate Biodiversity & Conservation Combined Conference, Hobart*.
- Whittington, I.D. & L.A. Chisholm (2002) Monogenean diversity on Chondrichthyes: do Monogenea fear sharks? *Annual Scientific Meeting of the Australian Society for Parasitology Inc., September 29 to October 3, Hobart, Tasmania*.
- Whittington, I.D. (2003) (Invited Presentation) The Capsalidae (Monogenea): classification, phylogeny, identity and biology. *6th International Symposium on Fish Parasites, September 22-26, University of the Free State, Bloemfontein, South Africa*.
- Whittington, I.D. (2003) Will the real *Neobenedenia 'melleni'* (Monogenea: Capsalidae) please identify itself? *Annual Scientific Meeting of the Australian Society for Parasitology Inc., July 6-10, Darwin, Northern Territory, Australia*.
- Worawittayawong, P., C. Leigh, E. Peirce, P. Sretaruga & W. Breed (2003) Qualitative and

quantitative production of spermatozoa in the Asian bandicoot rat, *Bandicota indica*. *49th Australian Mammal Society Meeting, Sydney*.

Worawittayawong, P., P. Sretarugsa, C.M. Leigh, & W.G. Breed (2002) Is the highly divergent sperm nuclear shape in Bandicoot rats due to an unusual process of chromatin condensation? *Annual Conference of Electron Microscopy Society of Thailand, Chiang Mai, Thailand*.

NATIONAL and INTERNATIONAL COLLABORATIONS

Members of the Centre have very strong links with research groups around Australia and internationally. These have resulted in several new initiatives, as well as numerous joint grant applications and co-authored publications during 2002-03. Some of the major linkages with members of the Centre over this period are:

Professor Andy Austin

- Dr Mark Downton, University of Wollongong, Project: *The molecular evolution and phylogeny of the parasitoid Hymenoptera.*
- Dr Mark Harvey, Western Australian Museum, Project: *The systematics and phylogeny of Australian lycosid spiders.*
- Dr Bill Humphries, Western Australian Museum, Project: *The evolution and diversity of stygofauna associated with calcretes in the Yulgan region of Western Australia.*
- Dr Norman Johnson, Ohio State University, Project: *Phylogeny and higher-level classification of platygastroid wasps.*
- Dr Bob Wharton, Texas A & M University, College Station, Project "Systematics of gall-forming mesostoinae wasps endemic to Australia".
- Dr Jim Whitfield, University of Illinois, Project: *Phylogeny of microgastroid braconid wasps.*

Associate Professor Bill Breed

- Prof. J.M. Bedford, Percy & Harold Uris Professor of Reproductive Biology, Cornell University Medical College, New York, Project: *A study of sperm form in Madagascan rodents.*
- Prof. T. Berger, Head of Gamete Biology Laboratory, University of California at Davis, Project: *A study of sperm surface proteins involved in sperm-egg binding and interaction.*
- Dr R. Oko, Department of Anatomy & Cell Biology, Queen's University, Kingston, Ontario, Project: *A study of cytoskeletal proteins in the sperm head of mammals.*

Dr Steve Cooper

- Professor Roger Butlin, University of Leeds, Project: *Population genetics of the morabine grasshoppers on Kangaroo Island.*
- Dr Bill Humphries, Western Australian Museum, Project: *The evolution and diversity of stygofauna associated with calcretes in the Yulgan region of Western Australia.*

Professor Bob Hill

- Dr Sung Soo Whang, Chonbuk National University, South Korea, Project: *Conifer morphology.*
- Dr Tim Brodribb, Harvard University, Project: *Conifer ecophysiology.*

Dr John Jennings

- Andy Deans, Department of Entomology, University of Illinois, Urbana, Project: *Revision of Australian hatchet wasps (Hymenoptera: Evaniidae), and Tree of Life program on Evanioidea*
- Dr Nathan Schiff, USDA Forest Service, Center for Bottomland Hardwoods Research, Stoneville, MS. Project: *Revision of the Australasian wood-boring sawflies (Hymenoptera: Xiphydriidae).*
- Plant Health Australia. Project: *Australian Plant Pest Database.*

Associate Professor Mike Lee

- Mieczyslaw Wolsan, Polish Academy of Sciences, Warsaw, Project: *Species concepts.*
- Mike Caldwell, University of Alberta, Edmonton, Project: *Early snake evolution.*

- Lindell Bromham, University of Sussex, Brighton, Project: *Molecular clocks*.
- Garth Underwood, British Museum of Natural History, London, Project: *Snake systematics*.
- Tod Reeder, San Diego State University, San Diego, Project: *Lizard evolution and molecular genetics*.

Dr Remko Leys

- Lindell Bromham, University of Sussex, Project: *The effect of eusociality and population size on the rate of molecular evolution*.

Dr Sandy Orgeig

- Dr Stuart Hooper, Department of Human Physiology, Monash University, Project: *Genetic and phenotypic interactions on the development of the pulmonary surfactant system*.
- Dr Rodney Cooter, Department of Plastic and Reconstructive Surgery, Royal Adelaide Hospital, Project: *Control of lymphangiogenesis in regenerating lizard tails*.
- Dr Steven Stacker and Dr Marc Achen, Ludwig Institute for Cancer Research, Melbourne, Project: The role of vascular endothelial growth factors C & D (VEGF-C & D) in lymphangiogenesis in regenerating gecko tails.
- Dr Chris Tsopelas and Dr Barry Chatterton, Department of Nuclear Medicine, Royal Adelaide Hospital, Project: The functional development of the lymphatic system in regenerating gecko tails.
- Dr Simon Koblar, School of Molecular and Biomedical Sciences, University of Adelaide, Project: *Possibility that Eph/ephrin signalling is important in regulating VEGF-C/D dependent lymphangiogenesis*.
- Prof. Sam Schürch, University of Calgary, Prof. Fred Possmayer, University of Western Ontario, Dr Kaushik Nag, Memorial University, Newfoundland, Canada, Project: *Effects of temperature on the biophysical function of pulmonary surfactant*.
- Prof. Dan Costa, University of California, Santa Cruz, Dr Greg Johnston, Adelaide Zoo, Dr Cath Kemper, SA Museum, Dr Jennifer Burns, University of Alaska, Anchorage, Project: *Surfactant biology of diving mammals*.
- Prof. Bill Milsom, University of British Columbia, Vancouver, Project: *Autonomic control of surfactant secretion during low body temperatures*.
- Dr Tony Postle, University of Southampton, UK, Project: *Analysis of the molecular composition of surfactant samples of model species, to determine the effect of temperature on surfactant composition*.

Dr Greg Rouse

- Igor Eeckhaut, Laboratory of Marine Biology University of Mons, Project: *Systematics of Myzostomida*.
- Gonzalo Giribet, Museum of Comparative Zoology, Harvard University, Project: *Phylogeny of Metazoa*.
- Shana Goffredi, Monterey Bay Aquarium Research Institute Project: *Taxonomy of whalefall organisms*.
- Fredrik Pleijel, Muséum national d'Histoire naturelle, Project: *Polychaete phylogeny*.
- Mark Siddall, American Museum of Natural History, Project: *Polychaete phylogeny*.
- Gonzalo Giribet, Harvard University, Project: *Development of Tree of Life research program on Protostomes*.
- Bob Vrijenhoek, Monterey Bay Aquarium Research Institute, Project: *Deep sea organisms*.

Dr Gary Taylor

- Assoc. Prof. Robin Giblin-Davis, University of Florida, Dr Sonya Scheffer, Systematic Entomology Laboratory, USDA, Beltsville Agricultural Research Service, Washington, D.C. Project: *Speciation and co-evolution of Fergusonina flies, Fergusonobia nematodes and their myrtaceous hosts.*
- Dr Diana Percy, Leverhulme Trust Fund, and CSIRO Entomology, Canberra, Project: *Sound production and mate recognition in relation to diversification of Australian trioizid psyllids (Hemiptera; Psylloidea).*
- Dr Anna Maryanska-Nadachowska, Department of Experimental Zoology, Institute of Systematics and Evolution of Animals, Polish Academy of Sciences, Krakow, and Dr Valentina Kuznetsova, Russian Academy of Sciences, St Petersburg, Project: *Karyotypes of Australian Psylloidea.*
- Dr John Goolsby, USDA, Australian Biological Control Laboratory, Brisbane, Project: *Insect fauna associated with Casuarinaceae in Australia.*

Dr Ian Whittington

- Dr Roxana Inohuye Rivera and Juan Calos Pérez Urbiola, Centro de Investigaciones Biológicas del Noroeste (CIBNOR), La Paz, Mexico, Project: *Complexities in the systematics of Neobenedenia 'species' that are known to occur on other marine fishes in the region.*
- Dr Emma Fajer-Avila, Centro de Investigación en Alimentación y Desarrollo (CIAD), Unidad de Investigación en Acuicultura y Manejo Ambiental de CIAD, Mazatlán, Mexico, Project: *Neobenedenia 'melleni' on cultured pufferfish, Sphoeroides annulatus.*

Dr Ian Whittington and Dr Leslie Chisholm

- Professor Janine Caira, University of Connecticut, Dr Kirsten Jensen, University of Kansas, Dr Gavin Naylor, Florida State University, Drs Peter Last and John Stevens, CSIRO Marine Research, Hobart, Project: *Collections of parasites from sharks and rays from Sarawak and Sabah, Malaysian Borneo.*

BUDGET

Following an initial set-up grant from the University of Adelaide through the participating Faculties and Departments, and from the South Australian Museum, CEBB has maintained an adequate budget to cover its core functions. It has received no further funding from the University and its only income for the period 2002-03 was from profits of the *Invertebrate Biodiversity & Conservation Conference* held in 2001. Major expenses incurred by CEBB over this period were for travel and living expenses for invited speakers and members of the Advisory Board, a once-off grant to assist with the launch of an allied University Research Centre, *BioCity: Centre for Urban Ecology*, awards and prizes, and a once-off payment to fund the production of the Proceedings volume of the *Invertebrate Biodiversity & Conservation Conference*.

The conference proceedings aside, the current annual cost of running CEBB is approximately \$6-7,000 and this is without the inclusion of any new initiatives, currently being discussed by the Management Committee. At this rate, without an ongoing commitment from the University and its other partners, CEBB's current funds will be expired in less than two and a half years.

CEBB 2002 Financial Report

Opening Balance:		\$18,333.31
Income from 5th Invertebrate Biodiversity & Conservation Conference		\$17,622.88
Expenditure		
<u>Account</u>	<u>Description</u>	
3202	Donation by CEBB to establish the Centre for Urban Ecology	\$1,500.00
3202	Transfer to correct account	\$699.20
2311	Academic visiting scholars fees	\$131.58
2361	Non-academic professional development	\$450.00
2403	Prizes and awards	\$1,031.82
2781	Accommodation and meals	\$238.35
2783	Airfares	\$32.75
2785	Taxis	\$22.73
2786	Meal FBT employees	\$31.60
2789	Entertainment non-FBT clients	\$84.64
2792	Private vehicle km reimbursement	\$203.30
2795	Credit card clearing-dept	\$1,724.69
3014	Printing and office supplies	\$223.64
3015	Other expense recharges	\$200.00
	Total	\$6,574.30
Closing Balance 2002		\$29,381.89

CEBB 2003 Financial Report

Opening Balance		\$29,381.89
Income		\$0.00
Expenditure		
<u>Account</u>	<u>Description</u>	
3202	Transfer transactions to correct cost centre	\$3,500.00
2403	Prizes and awards	-\$1,103.99
2567	Conference proceedings	\$6,500.00
2746	Leasing - Operating	\$38.19
2781	Accommodation and meals	\$544.24
2783	Airfares	\$2,494.15
2789	Entertainment non-FBT clients	\$89.49
3014	Printing and office supplies	\$28.50
	Total	\$12,090.58
Closing Balance 2003		\$17,291.31

PUBLICATIONS (2002 - 2003)
(members of CEBB are underlined)

Refereed Journals

- Adams, M.A., R. Foster, M.H. Hutchinson, R.G. Hutchinson, S.C. Donnellan (2003) The first unisexual scincid lizard, *Menetia greyii* (Reptilia, Scincidae). *Evolution* 57: 2619-2627.
- Austin, A.D., D.A. Mackay & S.J.B. Cooper (2003) Invertebrate biodiversity and conservation - an introduction. *Records of the South Australian Museum Monograph Series* 7:1-2.
- Austin, A.D., M. Iqbal, J.T. Jennings & N. Stevens (2002) Families of Australian Hymenoptera. *BioEd: An Interactive Training Tool for Taxonomy*. University of Queensland, Brisbane.
- Bellati, J. A.D. Austin & N.B. Stevens (2003) Arthropod diversity of a guano and non-guano cave at the Naracoorte Caves World Heritage Area, South Australia. *Records of the South Australian Museum Monograph Series* 7: 257-265.
- Belokobylskij, S.A., M. Iqbal & A.D. Austin (2003) First record of the subfamily Dirrhopinae (Hymenoptera: Braconidae) from the Australian region, with a discussion of relationships and biology. *Australian Journal of Entomology* 42: 260-265.
- Breed, W.G. (2003) The diversity of sperm form in Old World Rats and Mice - as revealed by electron microscopy Plenary Lecture. *Journal of Electron Microscopy of Thailand* 17: 15-23.
- Breed, W.G., R.M. Hope, O.W. Wiebkin, S.C. Spargo & J.A. Chapman (2002) Structural organisation and evolution of the marsupial zona pellucida. *Reproduction* 123: 13-21
- Brodribb, T.J. & R.S. Hill (2003) Implications for leaf and shoot physiology in Podocarpaceae. *Acta Horticulturae* 615: 173-174.
- Bromham, L., M. Woolfit, M.S.Y. Lee & R. Rambaut (2002) Testing the relationship between morphological and molecular rates of change along phylogenies. *Evolution* 56: 1921-1930.
- Bull N J., M.P. Schwarz & S.J.B. Cooper (2003) Phylogenetic divergence of the Australian allodapine bees. *Molecular Phylogenetics & Evolution* 27: 212-222.
- Burke da Silva, K., C. Mahan, & J. da Silva. (2002) The trill of the chase: Demographic and contextual effects on the occurrence of escape calls in eastern chipmunks, *Tamias striatus*. *Journal of Mammalogy* 83: 546-552.
- Castro, L.R., A.D. Austin & M. Dowton (2002) Contrasting rates of mitochondrial molecular evolution in parasitic Diptera and Hymenoptera. *Molecular Biology & Evolution* 19: 1100-1113.
- Chisholm, L.A. & I.D. Whittington (2003) Invasion of the shovelnose ray (*Rhinobatos typus*) by *Neoheterocotyle rhinobatidis* and *Merizocotyle icopae* (Monogenea: Monocotylidae). *Parasitology* 127: 561-570.
- Chisholm, L.A. & I.D. Whittington (2002) Effectiveness of praziquantel bath treatments for monogenean infections of the *Rhinobatos typus*. *Journal of Aquatic Animal Health* 14: 230-234.
- Clarke, S.G., A.D. Austin & J. Facelli (2003) Potential bioindicators of the impact of kangaroo grazing in native grassland in the Flinders Ranges, South Australia - order level arthropod diversity, ant species diversity and ant functional group composition. *Records of the South Australian Museum Monograph Series* 7:93-100.
- Codd, J.R., S. Orgeig, C.B. Daniels & S. Schürch (2003) Alterations in surface activity of pulmonary surfactant in Gould's wattled bat during rapid arousal from torpor. *Biochem. Biophys. Res. Comm.* 308: 463-468.
- Codd, J.R., S. Schürch, C.B. Daniels & S. Orgeig (2002) Torpor-associated fluctuations in surface activity in Gould's Wattled Bat. *Biochim. Biophys. Acta* 1580: 57-66.
- Cooper, S.J.B., S. Hinze, R. Leys, C.H.S. Watts & W.F. Humphreys (2002) Islands under the desert: molecular systematics and evolutionary origins of stygobitic water beetles (Coleoptera: Dytiscidae) from central Western Australia. *Invertebrate Systematics* 16:589-598.

- Cribb, B.W., L.A. Chisholm, R. Gould & I.D. Whittington (2003) Morphology, ultrastructure and implied function of ciliated sensory structures on the developmental stages of *Merizocotyle icopae* (Monogenea: Monocotylidae). *Microscopy Research & Technique* 62: 267-276.
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RESEARCH GRANT FUNDING – 2002/2003
(members of CEBB in bold)

Date	Investigators	Sponsor	Amount	Project Title
02	A.D. Austin	ARC Large	69,034	Mitochondrial gene rearrangements as indicators of shared ancestry within the insects
02	A.D. Austin	ARC Large	37,405	Evolution of host utilization among scelionid and platygastriid wasps.
02	A.D. Austin	ABRS Contract	25,000	A checklist to the Australian Hymenoptera-Platygastroidea, minor chysidoid families and the Braconidae for the Australian Biodiversity Information Facility
02	A.D. Austin, S. Donnellan & M. Havey (WA Museum)	Adelaide University Small Grant	18,000	Evolution & biogeography of Australia lycosid spiders
02	A.D. Austin & T. Gotch	Wildlife Conservation Fund, SADEH	4,200	Population genetics and the conservation of Mound Springs spiders
02	A.D. Austin & J.T. Jennings	ARC Linkage APAI	23,500	Ecology and conservation of a unique threatened guanophilic invertebrate community
02-05	A.D. Austin & N.A. Schellhorn (SARDI)	ARC Linkage APAI	71,000	Beneficial arthropods in Coonawarra vineyards and sustainable grape production
02-03	A.D. Austin & J.B. Whitfield (University Illinois)	ARC Linkage International	14,000	Evolution of host relationships among the parasitic wasps inferred from morphology, DNA sequences and mitochondrial genome organization
02-05	A.D. Austin & N.A. Schellhorn	ARC Linkage APAI	71,000	Beneficial arthropods in Coonawarra vineyards and sustainable grape production
02-05	A.D. Austin & J.T. Jennings	ARC Linkage APAI	71,000	Ecology and conservation of a unique threatened guanophilic invertebrate community
02-05	M.S.Harvey & A.D. Austin	ABRS	150,000	Systematics of Australian wolf spiders (Araneae: Lycosidae)
03	A.D. Austin, S. Donnellan & M. Schwarz (Flinders University)	ARC Linkage Infrastructure	300,000	South Australian regional facility for molecular evolution and ecology

Date	Investigators	Sponsor	Amount	Project Title
03-06	A.D. Austin & S. Donnellan	ARC Linkage APAI	71,000	Genetic variation in the <i>Cotesia flavipes</i> complex of parasitic wasps: towards the effective biological control of stem-borer pests
03-06	A.D. Austin, S.J. Cooper & W.F. Humphreys (WA Museum)	ARC Linkage	228,000	Assessment of the diversity, distribution and uniqueness of subterranean animals from calcrete aquifers in central western Australia
02	W.G. Breed, R.M. Hope & O. Wiebkin	ARC Small Grant	9,086	Egg coat glycoproteins: their structural and molecular organisation in a marsupial model
02	W.G. Breed & Taggart	ARC-SPIRIT	43,000	Development and application of a cross-fostering model in marsupials
02	W.G. Breed & O. Wiebkin	Adelaide University Small Grant	9,100	Egg coat glycoproteins: their structural and molecular organisation in a marsupial model
03-04	W. G. Breed, R.M. Hope & O. Wiebkin	Faculty of Health Sciences, Small Grant	10,000	The structural organisation of egg coat glycoproteins"
03	M. Brown, S. Carthew and S. Cooper	Australian Geographic	4,500	The conservation and taxonomic status of fragmented populations of yellow-bellied gliders (<i>Petaurus australis</i>).
02	M. Bull & S. Donnellan	Flinders University Small Grant	19,000	Mating systems in White's skink.
03-04	M. Bull & S. Donnellan	ARC Discovery	126,000	Lizard social behaviour and the influence of parasites.
02-04	S. Cooper, W. Humphries & J. Bradbury	ABRS	150,000	Taxonomy and distribution of subterranean amphipods from calcrete aquifers in central Western Australia
02-03	R. Cooter, S. Orgeig, C. Daniels, C. Tsopelas, B. Chatterton	Breast Cancer Research Association.	65,000	Testing novel growth factors for lymphangiogenic activity to aid in the treatment of lymphoedema
03-05	C. Daniels, S. Orgeig, S. Schürch, S. Hooper	ARC Discovery	300,000	Environmental control of genetic/phenotypic interactions in lung development: An evolutionary perspective
03-05	C. Daniels	Adelaide City Council	300,000	BioCity - Centre for Urban Ecology

Date	Investigators	Sponsor	Amount	Project Title
03-04	S. Donnellan	Seaworld Research & Rescue Foundation	20,000	Database for the fishes – a molecular tool for fish identification.
03-05	I. Ernst, C.B. Chambers, B.M. Gillanders & I.D. Whittington	PIRSA	70,000	Wild kingfish populations in Spencer Gulf: seasonal migration and potential for parasite interactions with farmed fish.
03-06	I. Ernst, I.D. Whittington , B.M. Gillanders, K. Hutson & C.B. Chambers	FRDC	136,650	Wild kingfish populations in Spencer Gulf: potential for parasite interactions with farmed fish, discrimination of farmed and wild fish and assessment of migratory behaviour.
03	A. Goodman & S. Donnellan	Flinders University Small Grant.	10,000	The development of molecular markers for systematics and forensic biology of the Australian goannas – microsatellite evolution in the spiny-tailed and freckled goannas.
02-04	A. Goodman & S. Donnellan	Australia & Pacific Science Foundation	25,000	DNA fingerprinting for management of trade in reptiles.
02	R. Hill	ARC Discovery	90,000	Adaptation in the Australian flora: macrofossil evidence for convergence in response to climate change
02	R. Hill & J. Conran	ARC Discovery	38,500	Evolution in Podocarpus
02	R. Hill & J. Watling	Adelaide University Small Grants	15,216	A comparative study of the ecophysiological role of extra-stomatal structures in <i>Banksia marginata</i> and <i>Musgravea heterophylla</i> .
03	R. Hill, A.D. Austin, S.C. Donnellan et al.	ARC Network Seed Funding	40,000	Understanding the Australian ecosystem: integrating contemporary and historical perspectives on the evolution, ecology and management of Australia's living resources.
03-04	R. Hill , J.R. Watling, G.D. Farquhar, G.J. Jordan, J.G. Conran , T.F. Flannery & P.J. Franks	ARC Discovery	125,356	Why our biota is unique: ecophysiological response, adaptive radiation and changing.
01-02	J.T. Jennings & A.D. Austin	ABRS	28,000	Evanioid wasps of Australia (Insecta: Hymenoptera): taxonomy, distribution and host relationships

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02	J.T. Jennings & F. Vickery	Native Vegetation Research Fund	2,500	Ant diversity in remnant patches of native vegetation on Kangaroo Island
02-04	J.T. Jennings	APPD Contract	112,000	Databasing the WINC collection
03-04	J.T. Jennings & F. Vickery	Native Vegetation Research Fund	2,500	The effect of fire on <i>Eucalyptus cneorifolia</i> communities on Kangaroo Island (using ants as bio-indicators).
02	M. Lee & S. Donnellan	ARC Large	83,000	The evolutionary radiation of Australasian venomous snakes
02	M. Lee	ARC QEII Fellowship	104,000	The origin and early evolution of snakes
03-07	M. Lee & M. Hutchinson	ARC Professorial Fellowship	625,000	Major evolutionary events in reptiles.
03	R. Leys	Wild Life Conservation Research Grant	8,944	Habitat fragmentation and Conservation of the green carpenter bee <i>Xylocopa (Lestis) aeratus</i> on Kangaroo Island.
03-05	R. Leys	ARC Discovery	246,000	Regressive evolution of eyelessness in subterranean diving beetles.
03-05	D. Mackay, A.D. Austin & S. Carthew	ARC Linkage APAI	71,000	Conservation biology of butterflies in South Australia
02	S. Orgeig, C. Daniels & R.D. Cooter	Dept of Plastic Surgery Grant	25,000	Lymphangiogenesis in the regenerating tail of the gecko <i>Christina marmoratus</i>
02	S. Orgeig	ARC Small grants	9,000	The effect of hibernation on the pulmonary surfactant system, lung cell membranes and receptors of ground squirrels
02	G. Rouse	ARC QEII Fellowship	108,000	Methods in biogeography and coevolution
02	G. Rouse & L. Jermiin (Sydney University)	ARC Large	35,000	Evolution of the Articulata (Crinoidea: Echinodermata)
03	G. Rouse & C. Messing (Nova Southeastern University, Oceanographic Center Florida)	ABRS	57, 000	Crinoidea (Echinodermata) of Australia: Taxonomy, 'species' and illustrated guides
03-05	M. Schwarz (Flinders Univ.) S. Cooper , B. J. Crespi (Simon Fraser Univ.) & T. Chapman (Flinders Univ.)	ARC Discovery	360,000	Co-evolution of sociality and sex allocation: phylogenetic comparative approaches using insects

Date	Investigators	Sponsor	Amount	Project Title
03	L Selwood & W.G. Breed	ARC Discovery	60,000	Fertilization in vivo and in vitro in Australian marsupials
02	J. Watling & R. Hill	Adelaide University Small Grant	15,216	A comparative study of the ecophysiological roles of extra-stomatal structures in <i>Banksia marginata</i> and <i>Musgravea heterophylla</i>
02	I.D. Whittington	Australian Academy of Science	6,000	Pathogenic flatworms parasitic on cultivated fin-fish: identification, management & control of Monogenea in Mexican aquaculture
02	I.D. Whittington	ARC Discovery	230,000.00	Ecology and biology of marine flatworm (platyhelminth) parasites from an elasmobranch: field data and laboratory experiments
02	I.D. Whittington & W.B. Cribb (UQ)	ARC Discovery	126,000.00	Novel anterior biodhesion by parasitic flatworms (Platyhelminthes: Monogenea): morphology, function and evolution
02	I.D. Whittington & I. Ernst	ARC Linkage	187,000	Integrated management of pathogenic monogenean (flatworm) parasite infections in warm water finfish aquaculture
02-05	I.D. Whittington & I. Ernst	ARC Linkage	474,559	Integrated management of pathogenic monogenean (flatworm) parasite infections in warm water finfish aquaculture