



Lizard Island Research Station

Newsletter 2005

Published March 2006

Sponsored by the
Lizard Island Reef
Research Foundation

Lizard Island Research Station

A Facility of the Australian Museum
2005



Lizard Island Research Station Newsletter 2005

A faculty of the Australian Museum.
Published April 2006.

Directors

Dr Anne Hoggett and Dr Lyle Vail

Lizard Island Research Station

PMB 37

Cairns QLD 4871

Australia

Phone: + 61 (0)7 4060-3977

Fax: + 61 (0)7 4060-3055

E-mail: lizard@austmus.gov.au

<http://www.lizardisland.net.au>

All photographs by Lyle Vail or Anne Hoggett unless
otherwise indicated.

Australian Museum Director's Report

As I was reading through some of the information about the Australian Museum's upgrade program for the Lizard Island Research Station (funded generously by the Lizard Island Reef Research Foundation!) I began wondering about how sea level rises, as a result of global warming, might impact on the Research Station. I became sufficiently concerned to ring Anne and Lyle to discuss the impact of sea level rises. Although there are risks from sea level rise with developing infrastructure at Lizard Island, as there are with developments on all research stations on the Great Barrier Reef, and the risk of such a rise occurring illustrates the importance of climate change, it is obvious that the benefits resulting from research done over the next several decades outweigh these risks.

In another aspect of its role, the Museum is strengthening its ties with Pacific Island nations, the material culture which of is represented extremely well in the Australian Museum's collections. We have established a program called the Pacific Virtual Museum aimed at building the knowledge that surrounds those objects in our collection and giving (virtual) access to the collections to Pacific Islanders. There are several Pacific nations which are likely to be substantially impacted by sea level rise, as a result of global warming. In fact, the impact may be so great that some nations, such as Palau, may become uninhabitable. Perhaps we will have a role in documenting the culture of those disappearing nations, but only if the citizens of those nations want that.

The Museum's work in the broader Pacific, including taxonomic research in New Caledonia, Lord Howe Island and the Solomons, as well as the Pacific Virtual Museum, illustrates the Australian Museum's wide range of roles in the Pacific. Lizard Island is part of our Pacific sphere of influence too. Through operating the Research Station we are able to facilitate research on the Great Barrier Reef, a key part of the South Pacific basin.

At the time of writing this article we are mid-way through a review of the Australian Museum's strategic research priorities. How do we best use the Lizard Island Research Station to facilitate research that fits in with the Museum's research priorities (if it's our scientists doing the research) and provide the best facilities for other researchers to use?

My own view is that the Research Station has the potential to address a wider range of research of issues than we have traditionally used the Research Station for. The challenge for us over the next couple of years will be to consult more widely with current and potential users of the Station and with organisations such as the Great Barrier Reef Marine Park Authority, and the newly created Marine and Tropical Sciences Research Facility. Through doing this I hope that we can contribute to some of the big issues like a better understanding of the impacts of climate change, while meeting our existing priorities for taxonomic work and fish behavioural studies.

Frank Howarth
Director, Australian Museum

Photo Carl Bento



Editorial



Coral reefs are easy to love. They are beautiful and exciting and they strike a deep chord with many people. For many, this is reason enough to consider them valuable and worthy of conservation. But there are many other good reasons to conserve them. The Great Barrier Reef alone contributes more than \$5 billion per annum to the Australian economy – it is visited by more than 2 million people per year and it provides more than 60,000 jobs. In developing nations, reefs provide an important food source for millions of people and valuable income from tourism. As well, coral reefs protect coastlines from storms and tsunamis by absorbing energy before waves strike the coast.

There is no doubt that the Lizard Island Research Station makes a valuable contribution to the knowledge of coral reefs. More than 950 scientific publications are based on work conducted at Lizard Island, including 51 this year. Research at Lizard Island has developed themes that are critical to the workings of coral reefs, such as the importance of plant-eating fishes to coral reef health, and the ways in which coral and fish populations are structured and maintained. Other projects discover the ways that species have evolved to cope with particular environments and ways of life – and these can be weird and wonderful! This year, 100 research projects were conducted at Lizard Island by teams led by researchers from seventeen countries. Each project is a brick in the wall of our knowledge.

But does all this research make any difference? Some hold a pessimistic view that the challenges facing coral reefs – overexploitation, nutrient and sediment pollution, global warming - are too great to be managed effectively and that researchers are studying an ecosystem that is in an inexorable decline. Others find cause for optimism in the observation that some reefs can recover quite quickly from severe damage, despite other reefs showing no signs of recovery even after many years. Research is revealing the characteristics of resilient reefs - plenty of animals that eat plants, low nutrients, low sediment load – and it is showing how we can manage our activities to promote them. It will not be easy but it is possible. Rezoning the Great Barrier Reef in 2004 to increase the protected proportion from 4% to 33% was an unprecedented, science-based initiative that is leading the way. This is a great achievement on the part of the Great Barrier Reef Marine Park Authority.

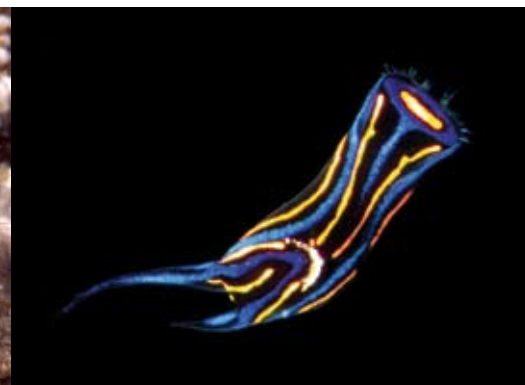
Lizard Island Research Station is entering an exciting phase of its development with many new and long-term supporters who share our view that research can make a difference to the future of coral reefs.

Anne Hoggett & Lyle Vail
Directors, Lizard Island Research Station



1

Coral reef pygmy goby.
Photo: Jack Randall.



2

Hermaphroditic sperm-trading sea slug.
Photo: Nils Anthes.

In their own words

- 1 *"Here we document the remarkable eight week lifespan of the coral reef pygmy goby Eviota sigillata: the shortest recorded lifespan for any vertebrate."*
- Martial Depczynski & David Bellwood (2005) in *Current Biology*, 15: R288-R289.
- 2 *"(W)e present the first unequivocal evidence for 'sperm trading', a mating strategy where sperm donation is conditional on sperm receipt."*
- Nils Anthes, Annika Putz and Nico Michiels (2005) referring to hermaphroditic sea slugs in *Current Biology*, 15: R792-R793.
- 3 *"(W)e have observed octopuses that do indeed walk. Individuals of Octopus marginatus (from Indonesia) and Octopus (Abdopus) aculeatus (from Australia) move bipedally [on two "legs"] along sand using a rolling gait."*
- Chrissy Huffard, Farnis Boneka and Robert Full (2005) referring to a form of locomotion that was previously thought to be impossible without a rigid skeleton in *Science*, 307: 1927.
- 4 *"[Some fish] larvae can use reef sounds to localize a sound source at night, providing evidence that sound emanating from reefs at night is a useable sensory cue for fish larvae trying to find a settlement habitat."*
- Jeff Leis and Matthew Lockett (2005) in *Bulletin of Marine Science*, 76: 715-724.
- 5 *"(O)utbreaks of [crown-of-thorns starfish] may arise independently of any sudden or substantial increase in rates of recruitment, such that any factor(s) responsible for the initial onset of outbreaks are likely to be very subtle and difficult to detect."*
- Morgan Pratchett (2005) in *Coral Reefs*, 24: 453-462.



3



4



5

Walking octopus.
Photo: Chrissy Huffard.

Reefs are nosiy places.
Photo: Kate Winters.

Crown of thorns starfish.

30th Anniversary Development

Major upgrade underway

The 30th Anniversary Development is now well underway thanks to the generosity of donors and the tireless efforts of the Lizard Island Reef Research Foundation's fundraising committee led by Charlie Shuetrim.

More than \$2.4 million has been raised or pledged towards the estimated \$4.5 million cost of the planned infrastructure upgrade. As well, the Australian Museum has been offered funding of \$1.5 million from the Queensland government's Smart State Research Facilities Fund. If the loan is negotiated successfully, it will bring the total to almost \$4 million. Four substantial building projects were completed during winter 2005.

Talbot House

The Station's oldest visitor house was demolished and replaced with a larger one. It is named for Professor Frank Talbot who is a former Director of the Australian Museum, founder of the Research Station, and a Patron of the LIRRF. The new house commemorates his long association with the Station much more appropriately than the old one! Talbot House now accommodates up to eleven visitors in three bedrooms. There are two bathrooms, a commercially-fitted kitchen and a large verandah. Construction was completed in October 2005.

Contributors to the 30th Anniversary Development

The Ian Potter Foundation
The Balnaves Foundation
Captain Cook Cruises
Ken Coles and Rowena Danziger
Coral Reef and Marine Science Foundation
Alison Hayward
Trevor Haworth
John Villiers Trust
Chris Joscelyne

Lizard Island Reef Research Foundation
Macquarie Bank Foundation
Susan and Lynton Morgan
Trevor Pearson
Raymond E. Purves Foundation
Raymond Kirby and The James N. Kirby Foundation
Charlie and Sandy Shuetrim
Dick & Pip Smith
Voyages
Sarah Whyte



Talbot House



Storage shed

Storage shed

The Station finally has a decent shed for storing equipment belonging to returning researchers and for its own equipment. Alison Hayward, a trustee and long term supporters of the LIRRF, provided the funds for the galvanised 98 m² shed - she has an inordinate fondness for farm sheds! Construction was completed in September 2005 and extensive shelving has been installed since then by maintenance officer Lance Pearce and helpers.

Beach House

A large, open-sided pavilion was constructed near the beach between July and October. It will serve as the only classroom for student groups during the winter of 2006 when other construction works will leave no other meeting place available for them. It has a great view, a sand floor, and a small storage room on one side, the wall of which is used as a projector screen for presentations. The beach house has already proved popular as a venue for research seminars and rainy-night barbecues and it is a terrific asset for the future.

Workshop roof

A large section of the workshop roof, including some structural members, was replaced during winter 2005. The original structure dated from the early 1980s and had succumbed to salt spray.



Beach House

Future Plans



The Ian Potter Centre for Tropical Marine Research

In recognition of the very high level of support provided by The Ian Potter Foundation, the central research complex of the Station will be known as The Ian Potter Centre for Tropical Marine Research. This area will be upgraded in stages between 2006 and 2008. All construction will take place during winter so that the busy summer research season is not disrupted.

In 2006, the oldest laboratory building will be demolished and replaced with a larger L-shaped building. It will contain an education centre, a library, offices for staff and a meeting room, a computer room with broadband access for visitors, two new aquarium rooms, a dive gear storeroom, and a services area containing housekeeping, laundry and a goods receiving area. Some donors have contributed to particular parts of this building: Macquarie Bank to the education centre, the Kirby Foundation to the computer room, the Balnaves Foundation to the aquarium rooms and Chris Joscelyne to the computer equipment.

In 2007, a 55 m² extension to the Raymond E. Purves Laboratory will be constructed to provide additional, much-needed laboratory space. The Raymond E. Purves Foundation continues its sponsorship of this building by providing the funds for the extension. The new area will contain substantial bench space, a fume hood and an instrument room with a photomicroscope, balances and other equipment. At the same time, the building that currently houses the office, library and Griffin Laboratory will be fully refurbished to form three laboratories.

This will enable incompatible kinds of research to be separated: work that involves fixatives will be conducted in the Purves Lab, while work involving live organisms will be conducted in the refurbished Griffin Lab and the two new laboratory rooms.

In addition to the two new aquarium rooms to be constructed in 2006, the Sir John Proud Aquarium will be further upgraded during 2008. A new outdoor section will have a roof that can be adjusted to admit full spectrum sunlight or keep out rain as needed by researchers. New pumps and inlet/outlet lines will also be installed.



Photo Alex Yali



Environmental aspects of the upgrade

The Station has always sought to avoid damaging the environment. For example, houses are designed for passive airflow and are not air conditioned. Hot water is produced by solar systems and cooking is done with gas. Waste disposal is effective, involving recycling, composting, burning, and returning other things to Cairns for disposal. However, there is always room for improvement and this is an important part of the 30th Anniversary Development.

The following improvements are planned to be implemented in stages by 2010:

- The roof of the new building to be constructed in 2006 will act as a venturi to promote passive airflow and cooling throughout the whole central research complex, minimising the need for airconditioning.
- Petrol usage and emissions from outboard motors will be reduced by changing from two-stroke to four-stroke motors or other more environmentally-sensitive technology.
- Diesel usage and emissions will be reduced by supplementing diesel generators with renewable energy sources and by storing excess power for use at night.
- Water will be conserved by collecting rain from roofs to recharge the aquifer.

Other infrastructure

With the support of its donors, the Station plans to provide the following improved facilities for researchers and student groups as part of the 30th Anniversary Development between now and 2010:

- A second boat capable of accessing the mainland and the outer reefs
- New dinghies to replace ageing ones
- Boats that can carry up to 15 snorkellers within the Lizard Island group
- A better system for fuelling boats
- New laboratory equipment of the kinds needed to work with living animals and to prepare samples for transport to analytical facilities elsewhere
- Replace the tractor
- Replace dive compressors, install an air bank, and possibly introduce nitrox facilities
- Replace old windows and insect screens in Kirby and Suntory Houses, and provide screen doors
- Extend Loomis House to three bedrooms and two bathrooms and refurbish kitchen



Photo Kate Winters

Mark Meekan releases fish larvae onto an artificial reef.



Photo Kate Winters

Doctoral Fellowships

Two Fellowships for 2006

A Lizard Island Doctoral Fellowship is awarded by the Australian Museum each year to an outstanding PhD candidate to conduct field-intensive research at Lizard Island. Each Fellowship may run for up to three years. It is currently worth \$6,000 per year (\$7,000 for overseas students). Since the program began in 1984, it has been funded by the Lizard Island Reef Research Foundation (LIRRF). The Ian Potter Foundation has generously granted funds so that the Australian Museum can offer an additional Fellowship each year in 2006, 2007 and 2008.

Preliminary applications for the 2006 Fellowships closed in September 2005. A record of 21 preliminary applications was received from students at 11 universities in four countries. Eight applicants were invited to submit full proposals. As usual, each full application was reviewed by two experts in the subject area of the proposal who are outside the student's university, and a panel of Australian Museum scientists made the selection.

Inaugural Ian Potter Doctoral Fellowship at Lizard Island

We are pleased to announce that the inaugural Ian Potter Doctoral Fellowship at Lizard Island has been awarded to **Lynda Curtis** of the University of Queensland for her study on the impacts of blood parasites on coral reef fishes. Lynda requires funding for two years.

Blood parasites are common in aquatic environments with many marine and freshwater fish serving as hosts. However, little is known about the blood parasites of fish on the Great Barrier Reef. Lynda has conducted preliminary surveys at Lizard Island and determined that blood parasites are present in a wide variety of species. Her study will focus on a particular group of blood parasites called haemogregarines. These parasites are thought to spread between fish through the bites of blood-sucking gnathiid isopods, analogous to the spread of malaria between people by mosquitoes.

Lynda's study will provide the first quantitative investigation into the effect of blood parasites on the health of coral reef fishes. It will also provide insight into how environmental stressors, including temperature, influence the association between hosts and parasites. Coral reefs are under threat from climate change.

While the effect of increased sea temperature on corals is being studied intensively, there is currently little work on the impact of warming seas on coral reef fish and their associated parasitic fauna. Lynda's project will help to fill that gap.

2006 Lizard Island Doctoral Fellowship

We are also pleased to announce that **Nicole Patten** of Southern Cross University has been awarded the 2006 Lizard Island Doctoral Fellowship, funded by the LIRRF. Nicole's groundbreaking project will investigate the associations between viruses and corals. She requires only one year's funding to complete her PhD.

In marine environments, viruses are the most abundant biological agents – in just one millilitre of seawater there are more than 1 million viral particles. The hosts of these viruses range from bacteria to marine mammals. The roles of viruses associated with corals and their involvement in coral disease have largely been ignored, with disease most commonly attributed to bacteria.

The aim of Nicole's study is to investigate the association of viruses with reef-building corals on the Great Barrier Reef. It is known that viruses play key roles in other marine environments. In coral reefs they are likely to be very important in nutrient recycling processes, disease manifestation and organism responses to natural and anthropogenic stressors.

Nicole's research is the first investigation of viruses in reef-building corals on the Great Barrier Reef. Her work will help understand factors important in coral health by determining the significance of viruses and their potential roles as vectors and infectious disease causing agents. Results from this study will enable more informed management of natural and anthropogenic impacted coral reef environments because it will determine the influence viruses have in coral disease and coral bleaching processes.

Nicole Patten

Research by Fellows during 2005

Three Doctoral Fellows undertook field studies at Lizard Island in 2005: Cathie Page (2004 Fellow), Marian Wong (2005 Fellow) and Stefan Walker (2005 Fellow). Each of these students is enrolled at James Cook University.

Cathie Page is studying reefs in the vicinity of Lizard Island and Townsville to examine cross-shelf patterns in coral disease prevalence. She made three trips to Lizard Island in 2005 and plans another two trips in 2006 which should complete the field component of her PhD studies. In 2005, Cathie found a several cases of a third type of disease in species of *Acropora* at Lizard Island and North Direction Island. The effect of these tumors on coral growth and reproduction is now being investigated.

Marian Wong is studying the evolution of social and mating systems in a coral reef fish, the small coral-dwelling goby *Paragobiodon xanthosomus*. She undertook three field trips in 2005 and used the aquarium system extensively. She has a final trip planned for 2006. Marian seeks to better understand how group living evolves when asymmetries in competitive ability exist among group members and how these patterns of group living contribute to patterns of social organization such as a monogamous mating system and territoriality. Because social interactions often play a critical role in demographic processes (i.e., who reproduces, who disperses), Marian's study will make an important contribution to the on-going debate about the role of post-settlement factors and density dependence for fishes on coral reefs.



Stefan Walker is studying the sociobiology of life history transitions and lifetime fecundity in the sand perch, a polygamous reef fish. He made a single trip of three months' duration in 2005 and the final trip for his PhD is planned for May 2006. The sand perch, *Parapercis cylindrica*, lives in tight social groups with a strong dominance hierarchy, which is characteristic of many reef fish. Stefan has investigated the social, biological and environmental factors that determine growth and sexual ontogeny, the fecundity of individuals according to their age and size, and the reproductive output of populations. This data will be used to formulate density-dependent lifetime fecundity models, the first for any fish species.

2007 Doctoral Fellowships

Information about the 2007 Lizard Island Doctoral Fellowships will be available at www.lizardisland.net.au by July 2006. Two Fellowships will again be offered, with one being funded by The Ian Potter Foundation and the other by the LIRRF.



Cathie Page stains coral tips for growth studies.

Lizard Island Reef Research Foundation

FOUNDER

Sir John Proud[^]

PATRONS

Dr Des Griffin AM

Mr Raymond Kirby AO

Mr Henry Loomis and Mrs Jacqueline Loomis

Lady Proud

Mr Robert Purves

Prof Frank Talbot

Mr Charles Warman AM

TRUSTEES

Mr Kenneth Coles AM (Chairman)

Mr Andrew Green (Secretary and Treasurer)

Mr Charlie Shuetrim (Chairman, Appeal Committee)

Mr Frank Howarth (Director, Australian Museum)

Mr James Bildner

Dr Ronnie Harding

Mr Trevor Haworth AM

Mrs Alison Hayward

Mr Chris Joscelyne

Mr Vivian King

Mr Raymond Kirby AO

Mr Gordan Moffatt AM

Mr Bill Page-Hanify AM

Mrs Heather Power^{**}

Mr Robert Purves

Prof Stephan Schnierer

Mr David Shannon^{**}

Dr Charles Warman

[^] *deceased*

^{**} new Trustee in 2005

The Lizard Island Reef Research Foundation was established as an independent trust in 1978 to raise funds for the Lizard Island Research Station and to support research on the Great Barrier Reef. Its major commitments are to the Doctoral Fellowships program and to capital developments. Please see the inside back cover for Members, who donate \$1,000 or more, and Friends of the Foundation in 2005.

This is third year of fundraising for the 30th Anniversary Development. The initial goal was to raise \$1.2 million. This target has been surpassed and the Appeal Committee, headed by Charlie Shuetrim, is well on its way to raising the \$4.5 million required to fund the entire development plan. The tremendous success of this Committee is reported elsewhere. We sincerely thank the Appeal Committee - Charlie Shuetrim, Ken Coles and Andrew Green - for their efforts. In addition, a special thanks to Sandy Shuetrim who has so generously given of her time to this cause.

Foundation Members' Events

Each year, Chairman Ken Coles organizes a dinner in Sydney and a luncheon in Melbourne. These are not fund raising events. They are intended to thank existing supporters and to inform others of the Foundation's work.

The Wharf Restaurant on Sydney Harbour was the venue for the twelfth annual Members' dinner on 31 August 2005. Ken welcomed the one hundred people who attended and thanked them for their support. The guest speaker was Frank Howarth, Director of the Australian Museum, who outlined the Museum's role in the 21st century – to interpret the past, understand the present and explore the future – and how Lizard Island fits into that. Wine for the dinner was generously donated by Fesq & Company and Port Philip Estate by courtesy of John Cunnington.

The lunch for Victorian Members was held on 25 May 2005 at the Athenaeum Club with twenty seven people attending, including five Governors of The Ian Potter Foundation. Anne Hoggett was guest speaker and she outlined the exciting plans for the Research Station's 30th Anniversary Development.



Patron's support of the environment

LIRRF Patron Robert Purves is to be congratulated for encouraging and enabling, through his Environment Foundation, author and scientist Dr Tim Flannery to publish a recent book on climate change titled: *The Weather Makers*. This is an important book that all people interested in coral reefs are encouraged to read, given the impacts occurring to coral reefs and other ecosystems worldwide due to climate change.

Member's prizes

Each year, all Members of the Foundation are entered into a draw for two terrific prizes. One is a four-night stay for two at the Lizard Island Resort with return air fares to Lizard Island from within Australia and the other is a four-night cruise for two to Lizard Island aboard the Captain Cook Cruise ship *Reef Endeavour* with return air fares to Cairns from within Australia. These prizes are generously sponsored by Voyages and Captain Cook Cruises, respectively.

In 2005, the winner of the stay at the Resort was the Macquarie Bank Foundation and the winners of the cruise to Lizard Island on the *Reef Endeavour* were long term Members Susan and Lynton Morgan.

Foundation visitors

Foundation Members and Trustees are always welcome to visit the Station to see how the Station works and how their donations are spent. The following people associated with the Foundation visited during 2005:

- Grant Hunt (CEO of Voyages) and family
- Stephen Ainsworth with Chris & Yvonne Gorman
- Dick and Pip Smith
- Ken Coles and Rowena Danziger
- Vivian and Wendy King
- Rod and Margaret MacDonald
- Susan and Lynton Morgan
- Kevin Kalkhoven and guests



Patron Rob Purves with a maori wrasse.

For the record...

Australian Museum Trustees Visit

Some Trustees and senior management of our parent organisation, the Australian Museum, visited the Research Station from 17 to 20 July 2005. This was the first visit for most and an ideal opportunity to see first hand how the Station operates and to discuss the proposed new developments. Those who visited were:

- Brian Sherman, Trust President, and Dr Gene Sherman
- Prof Ronnie Harding, Trustee, and Prof Derek Anderson
- Michael Seyffer, Trustee, with Karina, Brendan and Claudia Seyffer
- Dr Cindy Pan, Trustee, with Andrew Cassin and Anton Pan-Cassin
- Ken Coles, LIRRF Chairman and Rowena Danziger
- Frank Howarth, Director
- Dr Les Christidis, Assistant Director & Head of Research & Collections
- Roger Muller, Executive Officer



Cyclone Ingrid caused coral damage.

Category 5 Cyclone Ingrid

This severe cyclone threatened the island during early March 2005. Winds above 40 knots were experienced over several days and maximum wind speed was estimated at about 60 knots. Fortunately, the cyclone veered north on 9 March with no serious damage sustained on land. However, many corals were dislodged and broken on the reef front on the southeastern side of the Lizard Island Group.



Australian Museum Trustees Michael Seyffer, Cindy Pan, Brian Sherman (President), Ronnie Harding and Australian Museum Director Frank Howarth.

Temporary staff member Jennifer Thompson.

Photo Bronwyn Cameron



Usage

Total usage during 2005 was a record 6,146 person nights of which core users (researchers, postgraduate students and student groups) accounted for a record 5,269 person nights. The highest-ever monthly occupancy also occurred during 2005 with 844 person nights in November. This level of usage was an especially good result given the construction works that took place during the year.

Bench fees

Per person per night, including GST	2005	2006
Researcher	\$100.00	\$103.00
Researcher's assistant	\$88.00	\$90.50
Postgrad. student (own project)	\$38.00	\$39.00
School or university group	\$62.00	\$64.00
Commercial	\$185.00	\$191.00

Staff

Anne Hoggett and Lyle Vail completed their 15th year as Directors in 2005. The two permanent maintenance positions continue to be shared by two couples. Lance and Marianne Pearce completed their 17th year at LIRS during 2005 while Bob and Tania Lamb have worked during winters since April 1998.

A temporary staff member, Jennifer Thompson, was employed from November 2005 for about 4 months to assist with maintenance. This allowed Marianne to assist with office duties which allowed Lyle and Anne to plan and manage the upgrade projects. Short-term extra help on a periodic basis is part of the Station's development plan.

Noel Smith, Col Smith and Alex Vail were employed for short periods as casuals to assist with the building projects.

Tours

Tours of the Station for Resort guests are conducted on Monday and Fridays from 9.30 to 11 am. A tour for other island visitors, mainly campers and yachties, is conducted between April and October from 11 am to 12.30 pm on Mondays only. At other times, visitors are welcome to call into the Research Station and view the Sir John Proud Aquarium and verandah displays. Please note that there will be no tours from April to October 2006 due to construction works.

Special tours were given during the year to two groups of children and elders from the aboriginal community of Hopevale. Some of the participants are traditional owners of Lizard Island. They traveled to Lizard Island and other localities in the region on a chartered sailing vessel. The trip's primary aim was to re-connect traditional owners with their country.

Volunteers

We sincerely thank the following volunteers who assisted with maintenance during 2005: Snow Amos,

Susan Baggs
Dainie Blackburn
Ian Blackburn
David Bramley
Adam Fargher
Terry Ford
Renie Hood
Jenny Oates
Bill Quinlan
Sara Piddlesden
Lois Wilson
Helen Wodetzki
Peter Wodetzki.

Without their help the Station would not be the great place it is. *See the Station's web site for details of the volunteer program.*

Photo Uli Siedeck



Lyle Vail, Anne Hoggett, Tania and Bob Lamb, Marianne and Lance Pearce.

Research projects and participants

Project leaders who are postgraduate students are indicated with an asterisk (*).

Adaptations to large cell size in the bacterium *Epulopiscium* (March)

Associate Professor Esther Angert, *Joe Flint, *Rebekah Ward and David Raubenheimer (Cornell University, USA), Professor Howard Choat and *Will Robbins (James Cook University) and Dr Kendall Clements (University of Auckland)

Distributional patterns of Myxosporea in teleost tissues, taxa and localities (May/ June)

*Mieke Burger (University of Queensland)

Primary productivity studies of genetically distinct zooxanthellae (July/ August)

*Karin Ulstrup (University of Technology Sydney) assisted by Steven Hornabrook

Large-scale patterns of coral demography on the Great Barrier Reef (January)

Dr Andrew Baird (James Cook University) assisted by Naomi Gardiner

Neutral community dynamics on coral reefs (January/ February)

*Maria Dornelas (James Cook University) assisted by Marie Kospartov, Ailsa Kerswell, Dr Alex Kerr, Mia Hoogenboom, Dr Andrew Baird, Naomi Gardiner, Maria Rodrigues and Dr Sean Connolly

Prevalence and impact of coral disease (December 2004/ January, May, August/ September, November)

*Cathie Page (James Cook University) assisted by Stephen Neale, Lewis Anderson, Clare Omodei, Kate Winters and Kelly Stull

Ecological significance of coral disease on the Great Barrier Reef (December 2004/ January)

Associate Professor Bette Willis (James Cook University) assisted by Cathie Page and accompanied by Rick, Reanna and Shannon Willis

Helminths of Great Barrier Reef fishes (May/ June)

Dr Thomas Cribb (University of Queensland), Dr Rob Adlard (Queensland Museum), Dr Rod Bray and Dr Tim Littlewood (Natural History Museum London, UK)

***Podocotyloides stenometra* from chaetodontid fishes (May/ June)**

*Abigail Downey (University of Queensland)

Phylogeny of cirratuliform polychaetes (October/ November)

*Magdalena Halt (University of Adelaide) assisted by Dr Greg Rouse

Serpulidae (Annelida, Polychaeta) from Lizard Island (October/ November)

Dr Elena Kupriyanova (University of Adelaide) assisted by Dr Greg Rouse

Cryptogonimid nematodes from lutjanid species in the tropical Indo-Pacific (May/ June)

*Terrence Miller (University of Queensland)

Bucephalids of fishes and bivalves (May/ June)

*Matthew Nolan (University of Queensland)

The polychaete family Nerillidae (October/ November)

Dr Katrine Worsaae (South Australian Museum) assisted by Dr Greg Rouse

Dissecting pain pathways using conopeptides (October/ November)

Professor Paul Alewood (University of Queensland) assisted by Dianne Alewood and Dr Marion Loughnan

Evolutionary dynamics of hermaphrodite mating systems (January/ February)

*Nils Anthes (University of Tübingen, Germany) assisted by Professor Nico Michiels

Evolution and ecology of solar-powered Opisthobranchia (June/ July)

*Ingo Burghardt (University of Bochum, Germany)

Phylogenetic relationships of Naticidae and Conidae (Mollusca) (January/ February)

*Thomas Hülsken (University of Bochum, Germany)

Locomotion and prey capture of *Octopus (Abdopus) aculeatus* (August)

*Christine Huffard (University of California Berkeley, USA)

Long-term monitoring of giant clam populations (December 2004/ January)

Dr David Phillips (Independent researcher, France) assisted by Jackie Robinson and accompanied by Matthew Phillips and Jacki Macrae

Sexual conflict in the simultaneous hermaphrodite *Chelidonura hirudina* (November to January 2006)

*Anja Smykowski (University of Tübingen, Germany) assisted by Nils Anthes, Caya Sievers and Dennis Sprenger

Female benefits of multiple matings in simultaneous hermaphroditic sea slugs (November to February 2006)

*Dennis Sprenger (University of Tübingen, Germany) assisted by Nils Anthes, Caya Sievers and Anja Smykowski



Solar powered sea slugs (February/ March)

*Kristina Stemmer (University of Bochum, Germany)

The biogeography of the giant clams and their algal symbionts (August)

*Michelle Weber (University of California Berkeley, USA)

Speciation in marine broadcast spawning invertebrates

Dr Suzanne Williams (Natural History Museum London, UK)

Predator/prey interactions of blue-ringed octopuses and mantis shrimp (August)

*Becky Williams (University of California Berkeley, USA)

Polarized signaling of stomatopods (September)

*Tsy-Huei Chiou (University of Maryland Baltimore County, USA)

Sensory studies on stomatopods (September)

*Mary Kaminski (University of Maryland Baltimore County, USA)

Survey of Lepidoptera (March/ April)

Rob Lachlan (Australian Museum) accompanied by Debbie, Emma and Tiffany Lachlan

Amphipod workshop (February/ March)

Led by Dr Jim Lowry (Australian Museum): Dr Penny Berents, Roger Springthorpe and *Michelle Yerman (Australian Museum), Dr Oliver Coleman (Zoological Museum Berlin, Germany), *Lauren Hughes (National Marine Science Centre, Australia), Dr Jean Just (Museum of Tropical Queensland), Dr Rachel King (Marine Resources Research Institute, Charleston, USA), Kristine Klebba (Nova Southeast University, USA), Dr Traudl Krapp-Schickel (Zoologisches Forschungsinstitut und Museum Alexander Koenig, Germany), Dr Sara Le Croy (University of Southern Mississippi, USA), Dr Alan Myers (National University of Ireland), Dr Cris Serejo (Universidade Federal do Rio de Janeiro, Brazil) and Ichiro Takeuchi (Ehime University, Japan), assisted by Lisa Atkins, Chet Rakocinski and Anne Just

A cost and benefit analysis for the mutualism of a coral, a crab and a goby (March/ April, June, November/ December)

*Bryan Murphy (James Cook University) assisted by Roger Beeden

Foraging strategies of gnathiid parasites (October/ November)

*Laura Nagel (University of Queensland)

Taxonomy of gnathiid isopods (November/ December)

Dr Nico Smit and *Maryke Coetzee (University of Johannesburg, South Africa)

Evolution of Asterinidae (October)

Associate Professor Maria Byrne (University of Sydney), Dr Tim O'Hara and Dr Paula Cisternas (Museum of Victoria) and Dr Jerome Mallefet (Université Catholique de Louvain, Belgium), accompanied by Ronan Kelly, Deborah Sykes and Declan O'Hara

Ophiuroid colour change and bioluminescence (October)

Associate Professor Maria Byrne (University of Sydney), Dr Tim O'Hara and Dr Paula Cisternas (Museum of Victoria) and Dr Jerome Mallefet (Université Catholique de Louvain, Belgium)

Evolution of development in ophiuroids (October)

Dr Paula Cisternas (Museum of Victoria)

Antifouling defences of starfish (March/ April, October)

*Jana Guenther (James Cook University) assisted by Andrew Scardino, Steve Whalan, Cameron Crothers, Clare Omodei, Raymond Bannister and Alicia Crawley

Ecology and systematics of tropical shallow-water Crinoidea (October)

Dr Charles Messing (Nova Southeastern University, USA)

Phylogeny and taxonomy of commercial sea cucumbers (October)

Dr Tim O'Hara (Museum of Victoria), Associate Professor Maria Byrne (University of Sydney) and Dr Jerome Mallefet (Université Catholique de Louvain, Belgium)

Effect of cortisol level levels on embryonic development of *Pomacentrus amboinensis* (November)

*Monica Gagliano (James Cook University) assisted by Martial Depczynski and James Moore

Mother-offspring link: protection from solar radiation and survival of *Pomacentrus amboinensis* (November)

*Monica Gagliano (James Cook University) assisted by Martial Depczynski and James Moore

Effect of parasites on juvenile reef fish (October to December)

Dr Alexandra Grutter (University of Queensland) assisted by Bronwyn Cameron, Rachel Fogelman and Gay Marsden

Selectivity of predation on juvenile tropical reef fish (October to January 2006)

*Tom Holmes (James Cook University) assisted by Jessica Scannell, Ainsley Walsh and Matt Knott

Larval fish behaviour (November/ December)

Dr Jeff Leis (Australian Museum) assisted by Amanda Hay, Dr Tom Trnski, Klaus Hübner and Marcus Gregson



Lauren Hughes collects amphipods using artificial habitats

Pilot studies (January)

Dr Mark McCormick (James Cook University) and Dr Mark Meekan (Australian Institute of Marine Science)

Influence of early life history traits on survival of coral reef fish (October to December)

Dr Mark McCormick (James Cook University) and Dr Mark Meekan (Australian Institute of Marine Science) assisted by Kate Winters and Marten Wolter

Social facilitation influences selective mortality of a coral reef fish (October to December)

Dr Mark McCormick (James Cook University) and Dr Mark Meekan (Australian Institute of Marine Science) assisted by Kate Winters, Marten Wolter and James Moore

Influence of cortisol on development trajectories of a damselfish (January)

Dr Mark McCormick (James Cook University) and Dr Mark Meekan (Australian Institute of Marine Science) accompanied by Donna Larcom, Monty McCormick, Rochelle Ninio, Sam Meekan and Ariel Meekan

Genetic selection on coral reef fish (October to December)

Dr Mark McCormick (James Cook University) and Dr Mark Meekan (Australian Institute of Marine Science) assisted by Kate Winters, Marten Wolter, James Moore and accompanied by Donna Larcom and Monty McCormick

Ontogeny of sensory abilities marine fish larvae (November/ December)

*Kelly Wright (University of New South Wales)

Effects of line fishing - visual surveys of coral trout (November)

Dr Tony Ayling (Consultant to CRC Reef) assisted by Dr Avril Ayling and Gabriel Codina

Interactions between cleaner shrimp and fishes: is this mutualism? (October to January 2006)

*Justine Becker (University of Queensland) assisted by Lynda Curtis, Karen Cheney, Dr Jill Zamzow, Viviana Gamboa, Bronwyn Cameron, Rob Jacob, Dr Sara Östlund-Nilsson, Gay Marsden, Sarah Pausina, Carlos Vargas, Angela Crean, Rose Penfold, Rachel Fogelman, and Conor Jones

The link between cooperation and cognitive abilities in reef fishes (July to September)

Dr Ralph Bergmüller (University of Neuchâtel, Switzerland) assisted by Andrea Hohner

Predator- prey relationships (October/ November)

*Mary Bonin (James Cook University) assisted by Dr Craig Syms

Blood parasites of reef fish (January)

Dr Alexandra Grutter and Dr Robert Lester (University of Queensland) accompanied by Jude Lester

Growth patterns & life history of damselfish at tropical & warm temperate environmental gradients (December/ January 2006)

*Thea Brolund (University of Technology Sydney) assisted by Anders Tychsen

The function and maintenance of aggressive mimics (December/ January 2006)

Dr Karen Cheney (University Queensland) accompanied by Barry Smith

The role of colour in communication between cleaner fish and clients (June/ July)

Dr Karen Cheney (University Queensland) assisted by Jenny Oates

Home ranges & territories for coral reef fish (January/ February, June)

*Melissa Cowlshaw (James Cook University) assisted by Miles Wise, Rebecca Silcock and Adam Mills

Testing chromatic and achromatic vision of fishes using behaviour (September)

*Fallon Evans (University of Queensland)

The effect of gnathiid isopods on larval reef fish condition (January, March/ April, October to December)

*Angela Crean (University of Queensland) assisted by Lynda Curtis, Shaun Corrie and Bronwyn Cameron

Identification of haemogregarine blood parasites in coral reef fishes and their effect on host fish physiology (March/ April, June/ July, October to December)

*Lynda Curtis (University of Queensland) assisted by Rose Penfold, Justine Becker, Shaun Corrie, Bronwyn Cameron, Viviana Gamboa, and Dr Angela Davies accompanied by Alan Russell

Sunscreen in coral reef fish (June/ July)

*Maxie Eckes (University of Queensland) assisted by Marnie Horton, James Foster and Dr Alexandra Grutter

The role of selective mortality in the early life history traits of coral reef fishes (October 2004 to January)

*Monica Gagliano (James Cook University)

Latitudinal variation in the diet and physiology of juvenile butterflyfishes (Pisces: Chaetodontidae) (December)

*Marcus Gregson (University of Technology Sydney)

Ecological role of parasites in fish larvae (January)

Dr Alexandra Grutter (University of Queensland) and Dr Mark McCormick (James Cook University) assisted by Lynda Curtis, Angela Crean and Inga De Vries



Vision in sharks and other fishes (September)

Dr Nathan Hart (University of Queensland)

Social dilemma in fish: how do reef fish deal with a sabretooth blenny? (July to September)

*Andrea Hohner (University of Neuchâtel, Switzerland) assisted by Dr Redouan Bshary, Dr Ralph Bergmüller and Jenny Oates, and accompanied by Johanna Hohner and Angelina Denk

The role of predatory and parasitic isopods on coral reef fish recruitment (October to December)

*Conor Jones (University of Queensland) assisted by Carlos Vargas, Bronwyn Cameron and Sarah Pausina

Coral reef fish phylogeography and molecular adaptation (December 2004/ January)

*Karin Kassahn (James Cook University) assisted by Lewis Anderson

Behavioural, anatomical and physiological investigation of double cone-type photoreceptors (September)

Professor Justin Marshall (University of Queensland) assisted by Kylie MacPherson and Alan Goldizen

Colour vision in fish (January)

Professor Justin Marshall (University of Queensland) assisted by Kylie MacPherson and Alan Goldizen

Proximate mechanisms of sex change in coral dwelling fishes (November/ December)

Dr Phil Munday (James Cook University) and Dr Sara Östlund-Nilsson (University of Oslo, Norway)

Body colour attraction in reef fishes (November/ December)

Dr Phil Munday (James Cook University) and Dr Sara Östlund-Nilsson (University of Oslo, Norway)

Habitat choice and hypoxia tolerance in coral reef fish (December 2004/ January, December/ January 2006)

Professor Göran Nilsson (University of Oslo, Norway) assisted by Dr Sara Östlund-Nilsson

Virtual ambon damselfish (November)

*Rainer Obergrussberger (University of Queensland) assisted by Dr Uli Siebeck

Effect of parental care on the parasites of juvenile *Acanthochromis polyacanthus* (October to December)

*Rose Penfold (University of Queensland) assisted by Dr Lexa Grutter, Justine Becker and Lynda Curtis

Substrate preferences of juvenile labrid and pomacentrid fishes (April)

Dr Tom Reimchen (University of Victoria, Canada) assisted by Sheila Douglas

Growth demography and stock structure of north Queensland reef sharks (March/ April)

*Will Robbins (James Cook University) assisted by Rachel Green

Sex specific growth trajectories in several species of labrids with respect to sex change and social structure (November)

*Chris Ryen (James Cook University) assisted by Stefan Walker

Individual recognition and colour perception in *Pomacentrus amboinensis* (March, November)

Dr Uli Siebeck (University of Queensland) assisted by assisted by Dr Guy Wallis and Lenore Litherland

Object recognition in *Dischistodus perspicillatus* and *Pomacentrus amboinensis* (March)

Dr Uli Siebeck (University of Queensland) assisted by Dr Guy Wallis and Lenore Litherland

Effect of coral bleaching on fish settlement (September, November)

Dr Uli Siebeck (University of Queensland) assisted by Kylie McPherson and Fallon Evans

Light environment in damselfish habitats (March)

Dr Uli Siebeck (University of Queensland) assisted by Dr Guy Wallis and Lenore Litherland

Antagonism in the expression of male and female traits in two-way sex changing fish (*Pseudochromis cyanotaenia*) (November to February 2006)

*Caya Sievers (University of Tübingen, Germany) assisted by Nils Anthes, Anja Smykowski and Dennis Sprenger

Respiration in resting and swimming fish exposed to hypoxia (January/ February)

Professor John Fleng Steffensen (University of Copenhagen, Denmark) assisted by Elsebeth Madsen and Kirstine Fleng Steffenson

Monitoring fishes (October/ November)

Dr Craig Syms (James Cook University) assisted by Mary Bonin

Distribution and abundance of triggerfishes (November)

*Maggie Voth (World Learning, USA)

The sociobiology of life history transitions and lifetime fecundity in harem reef fish (September to November)

*Stefan Walker (James Cook University) assisted by Chris Ryen, Chadd Chustz, Melanie Shaw and accompanied by Cheryl Chustz



The role of ontogenetic colour change in social interaction in damselfish (February/ March)

*Samantha Waller (University of Queensland) assisted by Dr Tom Lisney

Social behaviour in coral gobies (February/ March, May, November/ December)

*Marian Wong (James Cook University) assisted by Bryan Murphy, Adrian Cardoni and Jennifer Donelson

UV protecting sunscreens in coral reef fish mucus: their chemistry, source and biological role (January, April)

Dr Alexandra Grutter and Dr Uli Siebeck (University of Queensland) assisted by Lynda Curtis and Angela Crean

Effects of ultraviolet radiation on cleaner fish (November/ December)

Dr Jill Zamzow (University of Queensland)

Wholemount immunostaining for multiple placode detection in wild-caught fishes; a pilot study in the evolution of development (September)

Dr Kathryn Kavanagh (University of Helsinki, Finland)

Sleeping parrotfish: fact or fiction? (August)

Dr Tony Farrell (University of British Columbia, Canada) accompanied by Miriam and Natalie Farrell

Marine organism sources of airbourne particles (July)

Dr Keith Bigg (Independent researcher, Australia) assisted by Rilda Mossop

Hydrodynamics of fringing reef systems (May)

Dr Rob Brander (University of New South Wales) and Dr Paul Kench (University of Auckland, New Zealand) accompanied by Roz, Briar, Joshua and Jacob Kench

Properties of natural polarized light fields in air and water (September)

Dr Tom Cronin (University of Maryland Baltimore County, USA) with Terence Lyons and William Nace

Morphodynamics of fringing reefs (May)

*Michael Daly (University of New South Wales)

Sedimentary processes on coral reefs (August/ September)

*Murray Ford (University of Auckland, New Zealand) assisted by Craig Francis and Joni Ying

Australian Museum Trust visit (July)

Frank Howarth, Dr Ronnie Harding, Michael Seyffer, Dr Cindy Pan, Dr Les Christidis and Roger Muller, accompanied by Dr Derek Anderson, Karina, Brendan and Claudia Seyffer, Andrew Cassin and Anton Pan-Cassin. AM Trust President Brian Sherman and Dr Gene Sherman stayed at the Lizard Island Resort.

Marine resilience workshop (August)

Professor Terry Hughes (James Cook University), Professor Carl Folke and Dr Per Olsson (Stockholm University, Sweden), Dr Lance Gunderson (Emory University, USA), Dr Tim Lynam (CSIRO Sustainable Ecosystems), accompanied by Peder Folke and Amy and Sophia Olsson.

University group (March)

Students of World Learning (USA) led by Dr Tony Cummings, Dr Andrew Lewis and Russell Butler

University group (October)

Students of World Learning led by Dr Tony Cummings, Dr Andrew Lewis and Carla Groombridge

University group (July)

Students of Arcadia University (USA) led by Dr Andrew Lewis

University group (May/ June)

Students of University of Texas Austin (USA) led by Dr Mary Poteet and Dr Andrew Lewis

School group (July)

Geelong College Preparatory School (Geelong) led by Stuart McCallum, Chris Mitchell and Carli Rooke

School group (August)

Haileybury College (Melbourne) led by Dr Andrew Lewis, Kirsten Geppert, Anthony Smith, Peter Hopwood and Dave Williamson

School group (September/ October)

Barker College (Sydney) led by Tim Binet, Miriam Broadhurst and David Gilltrap

School group (October)

SCECGS Redlands (Sydney) led by John Barclay and Charlotte Berkeley

Construction works (July to September)

Max Bryant Constructions: Aaro Raappana, Dan Lee and many others Garage World: Gurbe Jager and others

Other visitors

Janet Carding (Assistant Director, Australian Museum; December) Charlie Makray and Julie Armour (First aid training, September)

Marten Wolter and Mark Meekan rig a light above an artificial patch reef to enhance recruitment of settling fish.



Photo Kate Winters

Publications

The following publications based on work carried out at the Research Station were received into the Station's collection during the year. The collection now stands at over 950 publications.

Ackerman, J., 2004. Geographic variation in size at age of the coral reef fish, *Thalassoma lunare* (Family Labridae): a contribution to life history theory. PhD thesis, James Cook University.

Alder, J. & R.D. Braley, 1988. Mass mortalities of giant clams on the Great Barrier Reef (abstract only). *ACIAR Monograph Series*, 9: 230.

Allen, J.D., 2005. Life-history evolution and the costs of small egg size in echinoderms. PhD thesis, University of North Carolina at Chapel Hill, USA.

Anthes, N. and N.K. Michiels, 2005. Do 'sperm trading' simultaneous hermaphrodites always trade sperm. *Behavioural Ecology*, 16: 188-195.

Anthes, N., A. Putz and N. Michiels, 2005. Gender trading in a hermaphrodite. *Current Biology*, 15: R792-R793 + supplemental data.

Barnett, A., 2004. The trophic and reproductive implications of mouthbrooding in apogonid fishes. Honours thesis, James Cook University.

Bott, N.J. and T.H. Cribb, 2005. *Prosorhynchoides lamprelli* n. sp. (Digenea: Bucephalidae) from the brassy trevally, *Caranx papuensis* (Teleostei: Carangidae), from off Lizard Island on the Great Barrier Reef, Australia. *Zootaxa*, 1059: 33-38.

Bott, N.J., J.M. Healy and T.H. Cribb, 2005. Patterns of digenean parasitism of bivalves from the Great Barrier Reef and associated waters. *Marine and Freshwater Research*, 56: 387-394.

Bray, R.A. and T.H. Cribb, 2005. *Gorgocephalus yaaji* n. sp. (Digenea: Gorgocephalidae) from the brassy chub *Kyphosus vaigiensis* (Perciformes: Kyphosidae) off Lizard Island, northern Great Barrier Reef and further records of *G. kyphosi*. *Zootaxa*, 1068: 39-46.

Burghardt, I., J. Evertsen, G. Johnsen and H. Wägele, 2005. Solar powered sea slugs - mutualistic symbiosis of aeolid Nudibranchia (Mollusca, Gastropoda, Opisthobranchia) with *Symbiodinium*. *Symbiosis*, 38: 227-250.

Cheroske, A.G. and T.W. Cronin, 2005. Variation in stomatopod (*Gonodactylus smithii*) color signal design associated with organismal condition and depth. *Brain, Behavior and Evolution*, 66: 99-113.

Crossman, D.J., J.H. Choat and K.D. Clements, 2005. Nutritional ecology of nominally herbivorous fishes on coral reefs. *Marine Ecology Progress Series*, 296: 129-142.

Depczynski, M. and D.R. Bellwood, 2005. Shortest recorded vertebrate lifespan found in a coral reef fish. *Current Biology*, 15: R288-R289.

Depczynski, M. and D.R. Bellwood, 2005. Wave energy and spatial variability in community structure of small cryptic coral reef fishes. *Marine Ecology Progress Series*, 303: 283-293.

Fisher, R., J.M. Leis, D.L. Clark and S.K. Wilson, 2005. Critical swimming speeds of late-stage coral reef fish larvae: variation within species, among species and between locations. *Marine Biology*, 147: 1202-1212.

Fulton, C.J., 2005. Wave energy and the role of swimming in reef fish ecology. PhD thesis, James Cook University.

Fulton, C.J., and D.R. Bellwood, 2005. Wave-induced water motion and the functional implications for coral reef fish assemblages. *Limnology and Oceanography*, 50: 255-264.

Fulton, C.J., D.R. Bellwood and P.C. Wainwright, 2005. Wave energy and swimming performance shape coral reef fish assemblages. *Proceedings of the Royal Society B*, 272: 827-832.

Hall, K.A. and T.H. Cribb, 2005. Revision of *Telotrema* Ozaki, 1933 (Digenea: Gyliauchenidae Fukui, 1929), including the description of a new species from an acanthurid fish from the Great Barrier Reef, Queensland, Australia. *Zootaxa*, 1071: 1-18.

Harrington, L.M., 2004. Ecology of crustose coralline algae; interactions with scleractinian corals and responses to environmental conditions. PhD thesis, James Cook University.

Hart, M.W. and R.D. Podolsky, 2005. Mitochondrial DNA phylogeny and rates of larval evolution in *Macrophiothrix* brittlestars. *Molecular Phylogenetics and Evolution*, 34: 438-447.

Holmes, T.H., 2004. Selectivity of predation on a newly settled tropical reef fish, *Pomacentrus ambionensis* (Pomacentridae). Honours thesis, James Cook University.

Huffard, C., 2005. The behavioral ecology and locomotion of *Abdopus aculeatus* (d'Orbigny, 1834). PhD thesis, University of California, Berkeley, USA.

Huffard, C.L., F. Boneka and R.J. Full, 2005. Underwater bipedal locomotion by octopuses in disguise. *Science*, 307: 1927-s

Jones, C.M. and A.S. Grutter, 2005. Parasitic isopods (*Gnathia* sp.) reduce haematocrit in captive blackeye thicklip (Labridae) on the Great Barrier Reef. *Journal of Fish Biology*, 66: 860-864.

Jones, C.M., A.S. Grutter and T.H. Cribb, 2004. Cleaner fish become hosts: a novel form of parasite transmission. *Coral Reefs*, 23: 521-529.

Kroon, F.J., P.L. Munday, D.A. Westcott, J.-P.A. Hobbs and N.R. Liley, 2005. Aromatase pathways mediates sex change in each direction. *Proceedings of the Royal Society B*, 272: 1399-1405.

Lee, J.L., B. Burnham and M.E. Cevasco, 2004. A new modern soritid foraminifer, *Amphisaurus saurensis* n. sp., from the Lizard Island Group (Great Barrier Reef, Australia). *Micropaleontology*, 50: 357-368.

Leis, J.M. and D.L. Clark, 2005. Feeding greatly enhances swimming endurance of settlement-stage reef-fish larvae of damselfishes (Pomacentridae). *Ichthyological Research*, 52: 185-188.

Leis, J.M. and M.M. Lockett, 2005. Localization of reef sounds by settlement-stage larvae of coral-reef fishes (Pomacentridae). *Bulletin of Marine Science*, 76: 715-724.

Madin, J.S., 2004. A mechanistic approach to understanding and predicting hydrodynamic disturbance on coral reefs. PhD thesis, James Cook University.



- Madin, J.S., 2005.** Mechanical limitations of reef corals during hydrodynamic disturbances. *Coral Reefs*, 24: 630-635.
- McCormick, M.I. and S. Smith, 2004.** Efficacy of passive integrated transponder tags to determine spawning site visitations by tropical fish. *Coral Reefs*, 23: 570-577.
- Messmer, V., G.P. Jones, L. van Herwerden and P.L. Munday, 2005.** Genetic and ecological characterisation of colour dimorphism in a coral reef fish. *Environmental Biology of Fishes*, 74: 175-183.
- Messmer, V., L. van Herwerden, P.L. Munday and G.P. Jones, 2005.** Phylogeography of colour polymorphism in the coral reef fish *Pseudochromis fuscus*, from Papua New Guinea and the Great Barrier Reef. *Coral Reefs*, 24: 392-402.
- Motomura, H. and G. Shinohara, 2005.** Assessment of taxonomic characters of *Scorpaenopsis obtusa* and *S. gibbosa* (Scorpaenidae), with first records of *S. obtusa* from Japan and Australia and comments on the synonymy of *S. gibbosa*. *Cybium*, 29: 295-301.
- Munoz, G., A.S. Grutter and T.H. Cribb, 2005.** Endoparasite communities of five fish species (Labridae: Cheiliniinae) from Lizard Island: how important is the ecology and phylogeny of the hosts? *Parasitology*, doi:10.1017/S0031182005009133, 12 pp.
- Östlund-Nilsson, S., L. Curtis, G. Nilsson and A.S. Grutter, 2005.** Parasitic isopod *Anilocra apogonae*, a drag for the cardinal fish *Cheilodipterus quinquelineatus*. *Marine Ecology Progress Series*, 287: 209-216.
- Patterson, H.M. and M.J. Kingsford, 2005.** Elemental signatures of *Acanthochromis polyacanthus* otoliths from the Great Barrier Reef have significant temporal, spatial and between-brood variation. *Coral Reefs*, 24: 360-369.
- Patterson, H.M., M.J. Kingsford and M.T. McCulloch, 2005.** Resolution of the early life history of a reef fish using otolith chemistry. *Coral Reefs*, 24: 222-229.
- Pratchett, M., 2005.** Dynamics of an outbreak population of *Acanthaster planci* at Lizard Island, northern Great Barrier Reef. *Coral Reefs*, 24: 453-462.
- Pratchett, M., 2005.** Dietary overlap among coral-feeding butterflyfishes (*Chaetodontidae*) at Lizard Island, northern Great Barrier Reef. *Marine Biology*, 148: 373-382.
- Rudman, W.B., 1991.** Further studies on the taxonomy and biology of the octocoral-feeding genus *Phylloidesmium* Ehrenberg, 1831 (Nudibranchia, Aeolidioidea). *Journal of Molluscan Studies*, 57: 167-203.
- Simpson, S.D., M. Meekan, J. Montgomery, R. McCauley and A. Jeffs, 2005.** Homeward bound. *Science*, 308: 221.
- Smith-Vaniz, W.F., 2004.** Descriptions of six new species of jawfishes (Opistognathidae: Opistognathus) from Australia. *Records of the Australian Museum*, 56: 209 - 224.
- Tribollet, A. and S. Golubic, 2005.** Cross-shelf differences in the pattern and pace of bioerosion of experimental carbonate substrates exposed for 3 years on the northern Great Barrier Reef, Australia. *Coral Reefs*, 24: 422-434.
- Waller, S., 2005.** Ontogenetic colour change and visual ecology of reef fish. PhD thesis, University of Queensland.
- Wilson, S.K., 2004.** Growth, mortality and turnover rates of a small detritivorous fish. *Marine Ecology Progress Series*, 284: 253-259.
- Wörheide, G., 2005.** Low variation in partial cytochrome oxidase subunit I (COI) mitochondrial sequences in the coralline demosponge *Astroclera willeyana* across the Indo-Pacific. *Marine Biology*, DOI 10.1007/s00227-005-0134-y.
- Wright, K., D.M. Higgs, A.J. Belanger and J.M. Leis, 2005.** Auditory and olfactory abilities of pre-settlement larvae and post-settlement juveniles of a coral reef damselfish (Pisces: Pomacentridae). *Marine Biology*, 147: 1425-1434.

