

Australian Museum Lizard Island Research Station
Newsletter 2006



nature culture **discover**



LIZARD ISLAND
RESEARCH STATION

Supported by the Lizard Island Reef Research Foundation
Published April 2007

AUSTRALIAN MUSEUM LIZARD ISLAND RESEARCH STATION



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AUSTRALIAN MUSEUM

DIRECTOR'S REPORT



Photo Carl Bento

In my time as Director of the Australian Museum I have had very few, if any, prouder moments than standing on Lizard Island outside the newly refurbished and rebuilt research station complex, for the launch of the Ian Potter Centre for Tropical Marine Research and associated facilities. The Museum now has one of the world's finest tropical marine research stations.

At the same time as we were launching the upgrade of the Research Station we were finalising the Museum's Science Research Strategy which comprehensively outlines the science research priorities for the Museum for the next five years. Importantly, the strategy shows clearly how the Australian Museum Lizard Island Research Station is a key part of the Museum's science research effort.

There are several key programs in the Research Strategy (which is available on the Museum's website at www.australianmuseum.net.au/research/strategy.pdf) which relate specifically to the type of research to be encouraged at Lizard, and they are:

- Addressing knowledge gaps and problems in understanding the biota in Australian marine environments.
- Increasing our understanding of the genetic variation in key taxa (species) of the Australian and Indo-Pacific biota.
- Origin, evolution and biogeography of the biota of the Indo-Pacific Australasian Region.
- Understanding human impacts on the Australian biota.

The latter program, addressing human impacts, is illustrative of the importance of the Lizard Island Research Station. Not only does the research done there give us basic information about the Great Barrier Reef and its inhabitants, but it allows us to monitor the effects of human activity on the Reef. In this area, collaboration is absolutely vital and we work closely with the other research stations and marine research groups.

One of the slightly unusual features of the Research Station is that the Museum's own scientists are only a small proportion of the users of the Station.

If we want to address any particular research issue or problem, then we need to be able to influence the kinds of research projects carried out at our research station. This is something we will approach very carefully as we don't want to discourage or disadvantage any traditional users of the Station. The areas we want to encourage relate to those programs listed above.

There is another key user group of the Station who are extremely important. That group is the visiting school groups. Through enabling school groups to visit a significant Great Barrier Reef island and its Research Station, the Museum can play a key part in inspiring kids to understand more about their environment, and the effect we have on it. As a result of their exposure to a place like Lizard Island, some of those kids will go on to become leading research scientists; all of them will have a better appreciation of the natural world.

The Australian Museum would not be able to do any of the things I have talked about without two key groups of people. First is our excellent staff team at Lizard Island, led by Dr Anne Hoggett and Dr Lyle Vail, the Station's Directors. Their dedication, inspiration and passion make the difference between having an ordinary research station and an excellent one.

The other key group is the Lizard Island Reef Research Foundation. It's the support of that Foundation, led by Ken Coles, that has enabled the Station to grow and develop physically, and has enabled the recent and very important round of upgrades to go ahead, culminating in the launch last year. The champion of the campaign to raise the necessary funds is Charlie Shuetrim and without the passion of Charlie and his wife Sandy we would not have the resources to do what we do. I and the Trustees of the Museum thank them for their tireless efforts.

If you get the chance, please visit our Lizard Island Research Station, and if you would like to know more about the Museum's Research Strategy and the way Lizard Island fits into it, please don't hesitate to contact me.

FRANK HOWARTH Director, Australian Museum

RESEARCH HIGHLIGHTS



Whitetip reef shark.



Coral with black band disease



Windward side of Lizard Island
Photo: Charlie Shuetrim

SHARKS SAVAGED

Populations of the two most abundant shark species on the Great Barrier Reef are collapsing, according to researchers from James Cook University. They provide strong evidence that overfishing is to blame and that “no-take” zones offer almost no protection to sharks.

“We find an order of magnitude fewer sharks on fished reefs compared to no-entry management zones ... Population viability models of whitetip and gray reef sharks project ongoing steep declines in abundance of 7% and 17% per annum, respectively.”

(ROBBINS ET AL., 2006).

Much of this work was conducted from Lizard Island Research Station. Information is still being collected through sightings of tagged whitetip reef sharks in the area.

See Publications (p. 18) for references to the papers cited in this section.

CORAL REEFS IN A CHANGING WORLD

Substantial work is underway at Lizard Island to investigate the effects on coral reefs of pollution and increasing temperature. James Cook University researchers are investigating coral diseases and how corals can be used to detect environmental change through time. At Lizard Island and elsewhere, they have amassed a huge amount of data that is telling a complex story.

“Black band disease is part of the natural ecology of coral assemblages of the Great Barrier Reef and its prevalence is relatively unaffected by terrestrial influences on the scales characteristic of cross-shelf gradients.”

(PAGE AND WILLIS, 2006).

“Changes in thickness of the tissue layer [of a colony of Porites coral] can be used as a broad-scale tool to identify habitats with sub-optimal or impacted environments.”

(TRUE, 2004).

Other JCU researchers are looking at how degradation of the reef structure affects mobile animals, such as fish. For example:

“Small-scale (within-reef) differences in prey availability can have significant effects on the physiological condition and subsequent fitness of coral reef fishes.”

(BERUMEN ET AL., 2005).

AGE OF LIZARD ISLAND REEFS ESTABLISHED

The windward reefs at Lizard Island began growing on a granite base about 6,700 years before present, shortly after sea levels rose, and reached their present level about 4,000 years ago according to researchers from the National Oceanography Centre (UK) and the Australian National University.

“Comparison [with other studies] suggests that reef initiation followed rapidly, within about 500 years, after flooding of the granite basement.”
(REES ET AL., 2006).

RESEARCH HIGHLIGHTS



Newly described blood fluke from the heart of a rabbitfish
(Nolan and Cribb, 2006)

NEW SPECIES

The coral reef environment is teeming with species that have not been described scientifically. In publications listed this year, taxonomists from numerous institutions have described at least 27 previously unknown species from the Lizard Island region, including trematode worms, ostracod and caprellid crustaceans, a protozoan, a brittle star, and a fish.

"We describe an unprecedented radiation of sanguinicolid blood flukes from [various fishes] from sites off Australia and Palau."

(NOLAN AND CRIBB, 2006).



Comatula rotularia

UNIQUE ASSEMBLAGE

A unique assemblage of feather stars (crinoids) lives on sand at 12 to 18 metres depth near Lizard Island. As documented by an international group of researchers, the crinoid community in this habitat comprises 12 species of which only five are also found on nearby reefs.

"The other seven appear to constitute a unique assemblage restricted to unconsolidated substrates, where most cling to algae or hide beneath rubble or sponges".

(MESSING ET AL., 2006).

MANAGEMENT OF REEF FISHERIES

Research at Lizard Island continues to provide the basic biological information that is needed to manage reef resources sustainably.

This year, the first of a series of papers by James Cook University researchers was published on the biology of the reef's gentle green giant, the Maori wrasse. A highly-prized table fish, the species has been severely impacted by fishing over much of its range, but until now the relationship between age, size and reproductive status was not known.



Maori wrasse

"... it is not wise to predict life history features on the basis of size alone. ... This study establishes the age-based demographic information that will provide a framework for understanding the capacity of this species to respond to fishing impacts and other disturbances."

(CHOAT ET AL., 2006)

A large grouper that is also subject to fishery pressure, the flowery cod, was the subject of another study at Lizard Island by James Cook University scientists. They found that:

"... current Queensland size regulations are poorly matched to the species' biology because they do not protect the reproductive elements of the population."

(PEARS ET AL., 2006).

DOCTORAL FELLOWSHIPS

FOUR NEW FELLOWSHIPS AWARDED FOR 2007

At least one 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 and it is currently worth \$6,000 per year (\$7,000 for overseas students). The fellowships program has been funded since its inception in 1984 by the Lizard Island Reef Research Foundation (LIRRF). The Ian Potter Foundation has provided funds that allow an additional new fellowship to be awarded in each of the years 2006, 2007 and 2008.

From 2008, the value of new Lizard Island Doctoral Fellowships will increase to \$7,000 per year for Australian students and to \$8,000 per year for students living overseas and working at an overseas university. Information about the 2008 fellowships will be available at www.australianmuseum.net.au by July 2007.

Preliminary applications for the 2007 Fellowships closed in October 2006. Of the 15 preliminary applications received from students at ten universities in four countries, eight applicants were invited to submit full proposals. Each full application was reviewed by two experts in the subject area of the proposal and selection was made by a panel of Australian Museum scientists. Due to the timing of completion by some earlier Doctoral Fellows, funds were available for four new Fellowships starting in 2007. The new Doctoral Fellows starting in 2007 are:



Adel Heenan (right) with Charlotte Johansson

ADEL HEENAN (UNIVERSITY OF EDINBURGH, UK)

Up to 70% of coral reef fish die as they change from open-water larvae to reef-dwelling adults. Early life history phase (ELHP) fisheries are attempting to exploit that natural bottleneck by targeting larval fish rather than adults. They aim to capture wild larvae, then rear them through aquaculture to provide table fish and fish for the aquarium trade. Adel will investigate sensory cues such as light, sound and smell that larval fishes may be using to locate reefs when it is time for them to "settle" after their open-water larval phase, contributing to the body of knowledge already discovered on this subject at Lizard Island. She will then see whether this information can be used to boost collection techniques for application in ELHP fisheries. Adel's project will use the information gained at Lizard Island over two years to assist in the management of developing ELHP fisheries in the Philippines.

ANDREW HOEY (JAMES COOK UNIVERSITY)

Coral reefs are subject to numerous impacts such as coral bleaching, crown-of-thorns starfish outbreaks, disease, terrestrial runoff and overfishing. In combination, these lead to a proliferation of large, fleshy macroalgae. Ultimately, the balance shifts from a habitat dominated by hard corals to one that is dominated by seaweed - this has already occurred in the Caribbean and East Africa. The loss of large herbivorous (plant-eating) fishes through overfishing has underpinned the demise of reefs in both ocean systems. Species of herbivorous fishes differ markedly in their diet, behaviour, abundance and distributions so it is likely that they will also differ in their abilities to prevent a shift to seaweed-dominated reefs, and to reverse a shift once it has occurred. Andy will use a combination of caging and transplant experiments to identify those species that are necessary to resist change in the face of increasing disturbances, and to regenerate after disturbances. Andy is the 2007 Ian Potter Doctoral Fellow and he will be working at Lizard Island for three years.



Andrew Hoey
Photo: David Bellwood

MICHAEL HOLCOMB (MASSACHUSETTS INSTITUTE OF TECHNOLOGY AND WOODS HOLE OCEANOGRAPHIC INSTITUTE, USA)

With increasing atmospheric carbon dioxide concentrations, oceans will become more acidic and this will reduce the rate at which corals can build their skeletons. The coral animal secretes microscopic crystals to form its skeleton. Like all crystals, coral skeletal crystals form at a nucleus and grow from there. In corals, nucleation is restricted to specific areas, and each coral species has a different pattern of nucleation. This gives rise to the myriad array of skeletal forms seen in corals. The rate of skeleton formation changes dramatically over the day/night cycle, but we know relatively little about how it is distributed between nucleation and growth over that same period. Michael will determine which portions of the skeleton are formed at different times of the day, and identify whether nucleation or growth is occurring. By understanding this timing, we will be able to link existing data on what happens within the living coral tissue to features in the skeleton on those same time scales. This will improve our understanding of the conditions under which nucleation and growth occur and allow us to make better predictions as to how corals will respond to ocean acidification. Michael will make a single long visit to Lizard Island to conduct this work in 2007.



Michael Holcomb

TOM HOLMES (JAMES COOK UNIVERSITY)

It is a widely held belief that larger size, higher body condition or increased performance will convey some form of advantage throughout life. Bigger is generally better. But is this always the case? In comparison to other habitats and systems, we currently know very little about predation within tropical reef fish communities. Tom is exploring the predator-prey interactions of coral reef fishes during the transitional period between larval and juvenile life stage. He aims to determine whether predation on these young fishes is selective with respect to a number of specific characteristics. Ecological theory suggests that certain body characteristics and abilities may influence a prey's ability to survive during a predatory encounter. Body size, weight, growth rate, overall condition, sensory development and escape speed have all been linked to influencing the outcome. Through a series of field and aquarium based studies at Lizard Island, Tom has begun to investigate how these factors may influence prey survival. Results so far show that prey body size, in particular, does have a major influence on an individual's chance of surviving a predatory encounter but the relationship differs according to the species of predator. It is only by understanding these dynamics that we can hope to predict how fish communities may respond to changing predator populations arising from human-induced pressures.



Tom Holmes (left) with Patrick Brading

30TH ANNIVERSARY DEVELOPMENT

Launched in 2003 by the Lizard Island Reef Research Foundation (LIRRF) and led by Charlie Shuetrim as Chairman of the 30th Anniversary Development committee, this project is close to achieving its fundraising target of \$4.5 million. Substantial funding was received this year through the LIRRF from:

The Ian Potter Foundation
The Thyne Reid Foundation
Kevin Kalkhoven
Raymond Kirby and The James N. Kirby Foundation
The Macquarie Bank Foundation
The Balnaves Foundation
Alison Hayward
Chris Joscelyne for Australian Projects Pty Ltd
LIRRF members

As well, agreements were signed for a loan to the Australian Museum from the Queensland Government's Smart State Research Facilities Fund. The Raymond E. Purves Foundation made an additional pledge of funds for laboratory equipment, and UK-based Friends of Conservation pledged funds for new seawater pumps through its Climate Change Challenge program.

Two years into the 6-year implementation phase, the project is on schedule. The following components were completed or initiated in 2006.

- **NEW WING:** The Kalkhoven Wing was constructed between May and September 2006 on the site of an old laboratory building, now demolished. It is the "main" building of the Research Station and of the new Ian Potter Centre for Tropical Marine Research. The Kalkhoven Wing contains the following facilities: Shuetrim Library, Kirby Computer Room, Macquarie Bank Foundation Seminar Room, Balnaves Aquarium Rooms, offices and service areas. PAC Architects and Max Bryant Constructions are to be congratulated, respectively, for careful and inspired planning and for the high quality of construction. We also acknowledge with thanks the important pro-bono contribution by Albert Hoggett Architects in the early planning stages. Staff members Bob and Tania Lamb are also to be thanked for their large effort in keeping the Station operational during the busy construction phase.

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1

Courtyard
Photo: Charlie Shuetrim



2

The Kalkhoven Wing, entrance to The Ian Potter Centre for Tropical Marine Research
Photo: Charlie Shuetrim



3

Some of the building team, led by Aaro Raappana (standing, centre).

- **TRACTOR:** A new tractor was purchased in late 2006 with funds provided by The Thyne Reid Foundation. It is slightly larger and can lift heavier loads than the eight-year-old tractor it replaced.
- **DINGHY:** A new dinghy was purchased in late 2006 with funds from The Thyne Reid Foundation. Built to our specifications in Cairns, the new dinghy is named *Freya* as suggested by Ian Reid.
- **OUTBOARD MOTOR UPGRADE:** Changeover from two-stroke to four-stroke motors commenced during the year. These motors use less fuel and produce fewer emissions than the older technology. The full changeover will take several years to accomplish.
- **STORAGE SHED:** Extensive shelving was installed by staff and volunteers into *Alison*, the shed constructed in 2005 with funding provided by Alison Hayward. Lance Pearce is to be congratulated for his design and use of recycled timber for the project and Marianne Pearce is to be congratulated for the massive cull involved in moving into the new shed. *Alison* is now fully functional with separate areas for storage of gear owned by different user groups.

In 2007, the following construction works are planned.

- **THE THYNE REID WING** is the 1980s block building that formerly contained the office, library and Griffin Laboratory. In 2007, these rooms will all be refurbished as laboratories. These labs will be kept free of fixative chemicals so that they can be used with living organisms in association with the aquarium system. This work is being funded by The Thyne Reid Foundation.
- **THE PURVES LABORATORY** will be extended in 2007 with the addition of a large air-conditioned room and a microscope room. Use of fixatives will be confined to the Purves Laboratory, thus separating incompatible types of research. This work is being funded by The Raymond E. Purves Foundation.



4

Sandy and Charlie Shuetrim outside the Shuetrim Library



5

Part of the Kalkhoven Wing
Photo: Charlie Shuetrim



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New tractor

THE IAN POTTER CENTRE FOR TROPICAL MARINE RESEARCH

The 30th Anniversary Development Project achieved a major milestone in 2006 with the opening of the new Ian Potter Centre for Tropical Marine Research. The Centre encompasses the main research complex, including the new Kalkhoven Wing, the Thyne Reid Wing, the Raymond E. Purves Laboratory and the Sir John Proud Aquarium. It was opened on 26 October by Lady Potter AC, Life Governor of The Ian Potter Foundation.

About 40 people participated in the opening ceremony and other activities over a four-day visit to Lizard Island. They are donors and representatives of organisations that have brought this achievement to fruition.

The Lizard Island Reef Research Foundation has been pivotal in making this development possible through its central fundraising role. Chairman Ken Coles played a key part in the festivities, as did Charlie Shuetrim, Chairman of the 30th Anniversary Committee, and his wife Sandy. Other donors, trustees and members who attended the opening were Ray and Deirdre Kirby, Rob Purves and guests, Neil and Diane Balnaves, Alison and Kate Hayward, David and Daniela Shannon, Heather and Tony Power, and Bill and Barbara Page-Hanify. Kevin Kalkhoven, Chris Joscelyne and Rowena Danziger had all planned to attend but, regrettably, were unable to do so.



Professor Peter Andrews (left), Lady Potter, Ken Coles and Frank Howarth (front) at the opening ceremony.



Guests arrive from the resort for the opening ceremony
Photo: Charlie Shuetrim

The Ian Potter Foundation is providing \$1.5 million towards the development. The Ian Potter Foundation was represented at the opening by Governor John Gough and his wife Rosemary, as well as Lady Potter. Another Foundation Governor, Tom Healy, had also intended to be present with his wife Bev. All who know them were disappointed that they were not able to be part of the celebrations.

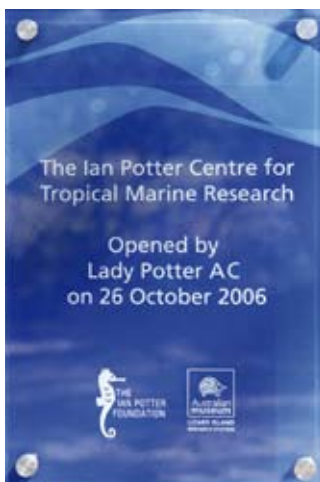
The Queensland Government is providing a loan of \$1.5 million through its Smart State Research Facilities Fund for the development. Peter Andrews, Queensland's Chief Scientist, represented the government at the opening ceremony with his wife Heather.

The Australian Museum was represented by Trustee Michael Seyffer and his wife Karina, Director Frank Howarth, Assistant Director of Research and Collections Les Christidis, and by Lizard Island Research Station Directors Lyle Vail and Anne Hoggett and staff Lance and Marianne Pearce.



Guests at the opening ceremony

Other guests at the opening ceremony were: former directors of the Australian Museum who had established and nurtured the Station during their tenures, Frank Talbot and Des Griffin; Executive Director of the Great Barrier Reef Marine Park Authority, John Tanzer; and researchers Mark McCormick (James Cook University) and Mark Meekan (Australian Institute of Marine Science) with their students and assistants Tom Holmes, Jessica Maddams, Corinna von Kuerthy and Patrick Brading.

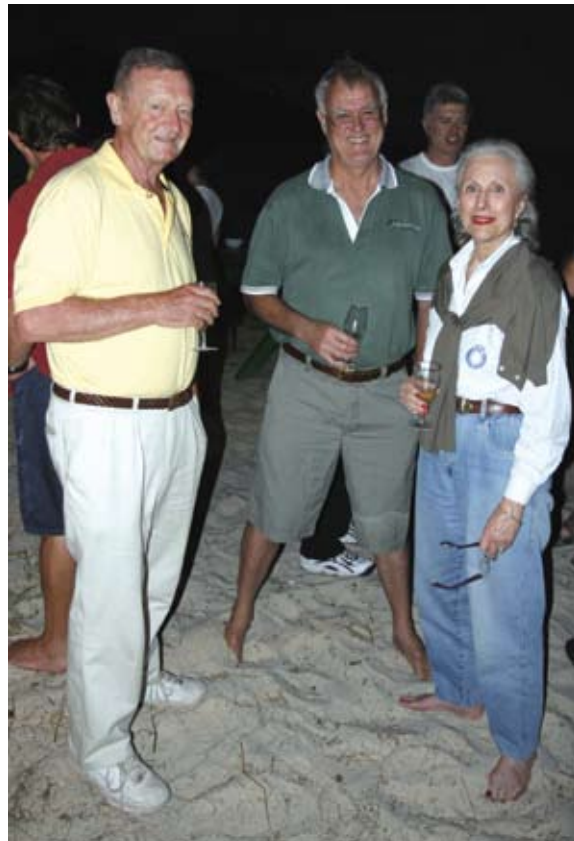


Plaque unveiled by Lady Potter at the opening ceremony.

Photo: Charlie Shuetrim

SEMINAR

The numerous challenges facing coral reefs - and the research directions needed to address them - were the subject of a seminar following the opening ceremony. Speakers were Frank Howarth, Peter Andrews, Mark McCormick and Anne Hoggett; other participants contributed during a general discussion session. There was much consensus on both the challenges and the research needs. Fundamental knowledge - coral reef biodiversity, biology and ecology of reef organisms, and biotic and abiotic processes - was acknowledged by all as extremely important, because without it reef managers have to guess how the system works. Research into the likely effects of climate change on reefs was singled out as the most important direction that new, targeted research should take.



John Gough, Peter Andrews and Lady Potter

Photo: Charlie Shuetrim

LIZARD ISLAND REEF



Yvonne Grzybowski (left), Kristina Stemmer and Professor Heike Wagele discovered the new sea slugs.

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
Dr Charles Warman AM

TRUSTEES

Mr Kenneth Coles AM
(Chairman)
Mr Andrew Green
(Secretary and Treasurer)
Mr Charlie Shuetrim
(Chairman, Appeal Committee)
Dr Penny Berents
Mr James Bildner
Dr Ronnie Harding
Mr Trevor Haworth AM
Mrs Alison Hayward *
Mr Frank Howarth
Mr Chris Joscelyne
Mr Vivian King
Mr Raymond Kirby AO
Mr Bill Page-Hanify AM
Mrs Fiona Playfair **
Mrs Heather Power
Mr Robert Purves
Prof Stephan Schnierer *
Mr David Shannon
Dr Charles Warman AM

[^] deceased

* ceased to be a Trustee in December 2006

** new Trustee in November 2006

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 current Members and Friends of the Foundation.



Ken Coles (left) and Neil Balnaves at the opening ceremony

SEA SLUG NAMING HONOUR

Long-time Lizard Island researcher Heike Wägele (University of Bonn, Germany) and co-workers recently found two new species of sea slug associated with algae near the Station. To express their appreciation for the facilities available to them at Lizard Island, one will be named after LIRRF chairman Ken Coles and the other will be named after LIRS directors Anne Hoggett and Lyle Vail. Ken was surprised and honoured by the news that he had a namesake when he was presented with a framed photo of the animal at the opening of The Ian Potter Centre for Tropical Marine Research in October. Anne and Lyle were also honoured, but they were in on the surprise. The species descriptions will be published in 2007 by Heike and her students.

RESEARCH FOUNDATION

New species of *Ercolania* to be named after Ken Coles
Photo: Heike Wagele

ARTWORK DONATED

Raymond and Deirdre Kirby donated a magnificent painting by Aboriginal artist R.D. Savage to mark the opening of the Kalkhoven Wing. It looks fantastic in the new reception area.



Ray and Deirdre Kirby with the painting (photomontage)

FOUNDATION MEMBERS' EVENTS

Chairman Ken Coles is to be congratulated for the continuing success of the two functions he organises each year for Members and others interested in supporting the Foundation.

The lunch in Melbourne was held on 10 May 2006 at the Athenaeum Club with 22 people attending. The guest speaker was Professor Tom Healy from the University of Melbourne, who is a governor of The Ian Potter Foundation. Tom gave an excellent address about the unique position of the Lizard Island Research Station in global research on coral reefs and why coral reefs are so important.

The dinner in Sydney was held at the harbourside Wharf Restaurant on 19 September 2006 with a group of 80 people. Ken welcomed the guests and thanked them for their support. Tom Healy was the guest speaker here as well, where he gave a similar address to that in Melbourne. Wine for the dinner was generously donated by Mark Fesq from Fesq & Company and by John Cunnington from Port Phillip Estate and Cooyong Estate.

MEMBERS PRIZES

Each year, all Members of the Foundation are entered into a draw for two great 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 2006, Philip and Sylvia Hartog won the resort trip and Alan and Lynn Rydge won the cruise.

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 2006:

- Visitors who attended the opening ceremony are listed on page 8
- Charlie and Sandy Shuetrim hosted a visit by Ian Reid (of The Thyne Reid Foundation) and Jill Potts
- Mike and Lou Hamshere
- Philip and Sylvia Hartog
- Rod and Margaret MacDonald
- Robert and Susie Maple-Brown
- Geoff and Liz Haddy
- Adrienne Clark and Debbie Delmar
- Michael Batten visited with his family in December to fulfill the wishes of his late stepfather and founder of the Foundation, Sir John Proud, by scattering some of Sir John's ashes at Lizard Island.

FOR THE RECORD

CYCLONES

In late March, category 5 Cyclone Larry made international news when it demolished the town of Innisfail, south of Cairns. This cyclone did not affect Lizard Island directly but it caused a shortage of building materials and a run on barge services which impacted the Kalkhoven Wing building program.

Long-time staff members Lance and Marianne Pearce have a tropical fruit orchard near Innisfail where they live and work during the winter months. They had only just returned to the farm from Lizard when the cyclone struck. There was no major damage to buildings on the property but many of their 18-year-old trees - that had only recently reached full production of fruit - were destroyed or badly damaged.

Shortly afterwards, the Station batted down for Cyclone Monica as it threatened the island on 18 April at category 2. It disrupted flight and barge schedules but passed to the north the following day with no major impacts on the island.

The late wet season that followed these cyclones was welcome as it filled the island's aquifers to overflowing for the first time in several years.



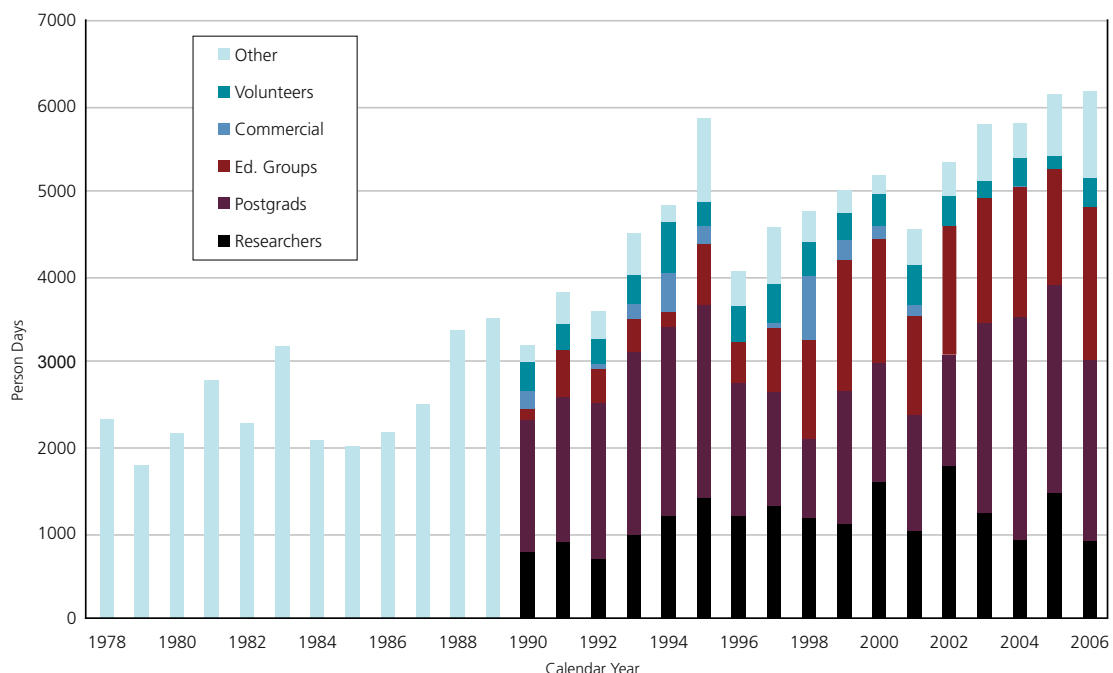
Dr Andy Lewis and students from Haileybury College at a lecture in the Beach House.

USAGE

Total usage during 2006 was a record 6,178 person nights. Core users (researchers, postgraduate students and student groups) accounted for 4,817 person nights. This was a good result given the scale of the construction works that took place during the year.

The Beach House, constructed as part of the 30th Anniversary Development in 2005, was critical to enabling "normal" operations of the Station during construction of the Kalkhoven Wing. With no other classroom space available, it was used by student groups for that purpose.

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The Ascham team

BENCH FEES

| Per person per night, including GST | 2006 | 2007 |
|-------------------------------------|----------|----------|
| Researcher | \$103.00 | \$108.00 |
| Researcher's assistant | \$90.50 | \$95.00 |
| Postgrad. student (own project) | \$39.00 | \$41.00 |
| Postgrad's assistant | \$35.00 | \$37.00 |
| School or university group | \$64.00 | \$67.00 |
| Commercial | \$191.00 | \$202.00 |

STAFF

Anne Hoggett and Lyle Vail completed their 16th year as Directors in 2006. The two permanent maintenance positions continue to be shared by two couples. Lance and Marianne Pearce (September to March) completed their 18th year at LIRS during 2006 while Bob and Tania Lamb (March to September) have now worked at LIRS for nine years.



First aid training by instructor Charlie Mackray (back) and "victim" Julie Armour for LIRS staff (left to right) Marianne Pearce, Anne Hoggett, Bob Lamb, Lance Pearce and Tania Lamb

As part of the 30th Anniversary Development project, a temporary assistant is employed during the busiest periods. Jennifer Thompson filled that position from November 2005 to March 2006, and Tessa Richardson took the job from November 2006 to February 2007.

TOURS

Tours were cancelled from April to November 2006 due to safety issues associated with the building works. This is the only long period that the Station has ever been closed to day visitors.

Apart from that hiatus, tours of the Station for Resort guests are conducted on Mondays and Fridays from 9.30 to 11 am. A tour for other island visitors, mainly campers and yachties, is conducted between May 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 courtyard displays.

VOLUNTEERS

The help of volunteers is essential for running the Research Station effectively. This year our thanks go to: Snow Amos, Curtis Bentley, Madeleine Brunsdon, Terry Ford, Stephanie Glover, Renie Hood, Charlotte Johansson, Adrienne Leith, Ben Pickles, Sara Piddlesden, Alexia Pool, Allan Ross, Bill Quinlan, Tessa Richardson, Martin Sommerville, Jennifer Thompson, Lois Wilson, Helen Wodetzki and Peter Wodetzki. See the web site for details of the volunteer program.

RESEARCH PROJECTS AND PARTICIPANTS

Projects for 2006 are listed in order of arrival at the Station. Repeat visits for the same project are listed only once, for the first trip of the year. Leaders who are postgraduate students are indicated with an asterisk (*).

Does the cleaner shrimp/fish mutualism fit a biological market? Ecological significance of cleaner shrimp

*Justine Becker (University of Queensland; October 2005 to January)

Selectivity of predation on juvenile tropical reef fish

*Tom Holmes (James Cook University; October 2005 to January, October to January 2007)

Female benefits of multiple matings in simultaneous hermaphroditic sea slugs

*Dennis Sprenger (University of Tübingen, Germany; November 2005 to February, November to February 2007)

Sexual conflict in the simultaneous hermaphrodite *Chelidonura hirudina*

*Anja Smykowski (University of Tübingen, Germany; November 2005 to January)

Antagonism in the expression of male and female traits in two-way sex changing fish, *Pseudochromis cyanotaenia*

*Caya Sievers (University of Tübingen, Germany; November 2005 to February)

The function and maintenance of aggressive mimics

Dr Karen Cheney (University Queensland; December 2005 to January, November/December)

Habitat choice and hypoxia tolerance in coral reef fish

Prof Göran Nilsson (University of Oslo, Norway; December 2005 to January)

Growth patterns & life history of damselfish at tropical & warm temperate environmental gradients

*Thea Brolund (University of Technology Sydney; December 2005 to January)

Identification of haemogregarine blood parasites in coral reef fishes and their effect on host fish physiology

*Lynda Curtis (University of Queensland; January, May, August/September, November to January 2007)

Influence of cortisol on development trajectories of a damselfish

Dr Mark McCormick (James Cook University; January)

Egg predation at spawning aggregation sites: trade-offs for fitness

*Matthew Fraser (James Cook University; January)

Effect of parasites on juvenile reef fish

Bronwyn Cameron as field leader for Dr Lexa Grutter (University of Queensland; January, May, November/December)

Solar powered animals: sacoglossans with functional chloroplasts

Dr Geir Johnsen and *Jussi Evertsen (Norwegian University of Science & Technology; January)

Individual recognition in *Pomacentrus amboinensis*

Dr Uli Siebeck (University of Queensland; January, December)

Virtual ambon damselfish

*Rainer Obergrussberger (University of Queensland; January)

Habitat selection by cardinal fish

*Naomi Gardiner (James Cook University; January/February, October)

Home ranges and territories of coral reef fish

*Melissa Cowlshaw (James Cook University; January/February, October, December/January 2007)

Foraging strategies of gnathiid parasites

*Laura Nagel (University of Queensland; January)

Variability in physiology of corals under bleaching conditions

*Karin Ulstrup (University of Technology Sydney; January/February)

Morphological & molecular phylogeny with odontological investigations of family Dorvilleidae (Annelida: Polychaeta)

*Martin Macnaughton (University of Copenhagen, Denmark; January/February)

Phylogenetic relationships of Naticidae (Gastropoda: Caelogastropoda)

*Thomas Hülsken (Ruhruniversität Bochum, Germany; February/March)

Ecosystem effects of herbivory: fish/algae/sediment interactions

Dr Christopher Fulton (James Cook University; February)

Ecology of cryptobenthic reef fish assemblages in the Great Barrier Reef

*Alonso Gonzalez Cabello (James Cook University; February, May)



Swimming ability, refuging behaviour and habitat use by coral reef fishes

*Jacob Johansen (James Cook University; February)

Systematics of Great Barrier Reef Oligochaeta (Family Tubificidae)

Dr Christer Erseus (Göteborg University, Sweden; February)

Systematics of Great Barrier Reef Oligochaeta (Genus *Grania*, Family Enchytraeidae)

*Pierre De Wit (Göteborg University, Sweden; February)

Systematics of Great Barrier Reef Oligochaeta (Genus *Marionina*, Family Enchytraeidae)

*Lisa Matamoros (Göteborg University, Sweden; February)

Molecular genetics of biocalcification in coralline sponges

Prof Dr Gert Wörheide and Dr Daniel Jackson (University of Göttingen, Germany; February)

Phylogeny of calcareous sponges: diversity of Placozoa

*Oliver Voigt (University of Göttingen, Germany; February)

Prevalence and impact of coral disease

*Cathie Page (James Cook University; March, July)

Ontogenetic development of *Pomacentrus amboinensis* facial patterns

Dr Uli Siebeck (University of Queensland; March)

Eye movements of stomatopods

Dr Sonja Kleinlogel (University of Queensland; March)

Polarisation signals in fish and stomatopods

Prof Justin Marshall (University of Queensland; March)

A cost and benefit analysis for the mutualism of a coral, a crab and a goby

*Bryan Murphy (James Cook University; March/April, May)

Morphological diversity of retinal ganglion cells in marine teleosts

Prof David Vaney (University of Queensland; March)

Mitogenomic approaches to evolution of the parasitic Platyhelminthes

Dr Thomas Cribb (University of Queensland; April), Dr Rod Bray and Dr Tim Littlewood (The Natural History Museum, UK; April)

Taxonomy and evolution of Transversotrematidae, Lepocreadiidae and Acanthocolpidae (Platyhelminthes: Trematoda)

Dr Thomas Cribb and Dr Matthew Nolan (University of Queensland; April) and Dr Rod Bray (The Natural History Museum, UK; April)

Myxosporean parasites of teleost fish: diversity, phylogenetics and pathogenicity

Dr Rob Adlard (Queensland Museum; April)

Order Multivalvulida (Myxozoa) - patterns of infection and relatedness from teleost hosts

*Mieke Burger (University of Queensland; April)

Trophic transmission of helminths (trematodes) via ingestion of fishes

*Abigail Downie (University of Queensland; April)

Helminth parasites of synodontid fishes and mytilid bivalves

*Geoffrey Dodds (University of Queensland; April)

Cryptogonimid nematodes from lutjanid species in the tropical Indo-Pacific

*Terrence Miller (University of Queensland; April)

Hormones mediating bi-directional sex change in coral reef fishes

Dr Phil Munday (James Cook University; April, May) and Dr Fredereike Kroon (CSIRO; April)

Biophysical thresholds in benthic communities

Dr Christopher Fulton (James Cook University; May)

The sociobiology of life history transitions and lifetime fecundity in harem reef fish

*Stefan Walker (James Cook University; May)

Diversity of zooxanthellae in scleractinian corals

Dr William Loh (University of Queensland; May)

Sedimentary processes on coral reefs

*Murray Ford (University of Auckland, New Zealand; May/June)

Coral-associated viruses in the Great Barrier Reef

*Nicole Patten (Southern Cross University; May, August/September)

Stomatopod signals

Prof Roy Caldwell (University of California Berkeley, USA; June)

Properties of natural polarized light fields in air and water

Dr Tom Cronin (University of Maryland Baltimore County, USA; June)

Behavioural and ecological relevance of colour vision in mantis shrimp

Dr Alex Cheroske (Moorpark College, USA; June)

Prey capture behaviour of *Lysiosquillina maculata*

*Maya de Vries (University of California Berkeley, USA; June)



Conor Jones studies the effect of predatory and parasitic isopods on larval and newly-settled fish

Visual physiology of marine crustaceans: molecular evolution of stomatopod visual pigments

*Megan Porter (University of Maryland Baltimore County, USA; June)

Key characters of Sacoglossa, focusing on photosynthetic activity

*Yvonne Grzybowski (Rheinische Friedrich-Wilhelm Universität Bonn, Germany; June/August)

Evolution and ecology of solar-powered Opisthobranchia

Prof Dr Heike Waegele (Rheinische Friedrich-Wilhelm Universität Bonn, Germany; June) and *Ingo Burghardt (University of Bochum, Germany; July)

Social dilemma in fish: how do reef fish deal with a sabretooth blenny?

Dr Redouan Bshary and *Andrea Hohner (University of Neuchâtel, Switzerland; August)

Investigation of cleaner fish functions and mutualism on host fish and fish parasite populations

Bronwyn Cameron as field leader for Dr Lexa Grutter (University of Queensland; August/September)

Habitat specialisation in coral reef fishes and its influence on patch composition and local species diversity

Valeriya Komyakova (James Cook University; (September, November to January 2007)

Queensland islands Lapita pottery project

Dr Matthew Felgate (University of Auckland, New Zealand; September)

Influence of topography on selective mortality at settlement

Dr Mark McCormick (James Cook University; October, November/December)

Influence of early life history traits on survival of coral reef fish

Dr Mark McCormick (James Cook University; October, November/December, December)

Factors influencing female reproductive output and larval quality in *Pomacentrus amboinensis*

*Jessica Maddams (James Cook University; October/December)

Correlates of predation risk: behaviour vs growth rate

*Corinna von Kuerthy (University of Kiel, Germany) and Dr Mark Meekan (Australian Institute of Marine Science; October, November/December, December)

Coral health effects on damselfish recruitment and condition

*James Moore (James Cook University; October/December)

Evaluation of plankton sampling methods and its application to collecting *Symbiodinium*

*Raechel Littman (James Cook University; November)

Olfactory behaviour and response to coloured light of larval fishes

Dr Steve Simpson and *Adel Heenan (University of Edinburgh, UK; November/December)

Fish/algal interactions: the role of herbivory in structuring algal communities across an exposure gradient

*Andrew Hoey (James Cook University; November)

The role of predatory and parasitic isopods on coral reef fish recruitment

*Conor Jones (University of Queensland; November/December)

Colour & pattern discrimination in reef fish

Dr Uli Siebeck and Dr Mischa Vorobyev (University of Queensland; December)

Sunscreen in coral reef fish

*Maxi Eckes (University of Queensland; December)



STUDENT GROUPS

World Learning, School for International Training, USA

Led by Dr Tony Cummings and Dr Andrew Lewis (March and October)

University of Texas, USA

Led by Dr Mary Poteet and Dr Andrew Lewis (May/June)

University of New Mexico, USA

Led by Dr Ursula Shepherd, Dr Joshua Leffler and Ingo Burghardt (June/July)

Arcadia University, USA

Led by Dr Andrew Lewis (July)

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Led by Paul Bigford, Laurie Tomczyk and Peter Brennan (July)

University of Maryland, USA

Led by Dr Bill Higgins, Dr Reid Compton, Marcia Shofner and Wendy Higgins (August)

Haileybury College, Australia

Led by Dr Andrew Lewis, Phil Maroney and Jessica Luth (August)

Ascham School, Australia

Led by Edward Sze-Tu, Kristy Spagnolo and Andrew Ferch (September)

Barker College, Australia

Led by Tim Robards, Ciel Stronarch and Rob Schulz (October)

Queenwood School, Australia

Led by Merylyn Lean, Marie Towns and Dr Penny Berents (Australian Museum) (October)

OTHER VISITORS

Microscope service

Allan Ross (April)

Queensland Parks and Wildlife Service - park management

Alan Clackson and others (May, July)

Construction works

Max Bryant Constructions: Aaro Raappana, Dan Lee, Chris Bryant, Keith Kammerhofer and many others (May to September)

Reconnaissance visit

Dr Chang-feng Dai, National Taiwan University (August)

First aid training

Charlie Makray and Julie Armour (September)



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 1,000 publications.

Allen, J. and R. Podolsky, 2006. Uncommon diversity in developmental mode and larval form in the genus *Macrophiothrix* (Echinodermata: Ophiuroidea). *Marine Biology*, 151: 85-97.

Anthes, N., 2006. Mating conflicts and their evolution in simultaneously hermaphroditic sea slugs. PhD thesis, Eberhard Karls Universität Tübingen, Germany.

Anthes, N., A. Putz and N.K. Michiels, 2006. Hermaphroditic sex role preferences: the role of partner body size, mating history and female fitness in the sea slug *Chelidonura sandrana*. *Behavioural Ecology and Sociobiology*, 60: 359-367.

Barnett, A. and D.R. Bellwood, 2005. Sexual dimorphism in the buccal cavity of paternal mouthbrooding cardinalfishes (Pisces: Apogonidae). *Marine Biology*, 148: 205-212.

Barnett, A., D.R. Bellwood and A.S. Hoey, 2006. Trophic ecomorphology of cardinalfish. *Marine Ecology Progress Series*, 322: 249-257.

Bay, L.K., 2005. The population genetic structure of coral reef fishes on the Great Barrier Reef. PhD thesis, James Cook University.

Bay, L.K., K. Büchler, M. Gagliano and M.J. Caley, 2006. Intraspecific variation in the pelagic larval duration of tropical reef fishes. *Journal of Fish Biology*, 68: 1206-1214.

Bay, L.K., R.H. Crozier and M.J. Caley, 2006. The relationship between population genetic structure and pelagic larval duration in coral reef fishes on the Great Barrier Reef. *Marine Biology*, 149: 1247-1256.

Becker, J.H.A., 2006. Interactions between cleaner shrimp and their client fishes on coral reefs. PhD thesis, University of Queensland.

Berumen, M.L., 2005. The importance of juveniles in modelling growth: butterflyfish at Lizard Island. *Environmental Biology of Fishes*, 72: 409-413.

Berumen, M.L., 2006. Influence of resource availability on life-history traits in coral-feeding butterflyfishes (Pisces: Chaetodontidae). PhD thesis, James Cook University, Australia.

Berumen, M.L. and M.S. Pratchett, 2006. Effects of resource availability on the competitive behaviour of butterflyfishes. *Proceedings of the 10th International Coral Reef Symposium*, 644-650.

Berumen, M.L., M.S. Pratchett and M.I. McCormick, 2005. Within-reef differences in diet and body condition of coral-feeding butterflyfishes (Chaetodontidae). *Marine Ecology Progress Series*, 287: 217-227.

Bott, N. J. and T.H. Cribb, 2005. *Grammatorcynicola* n. g. (Bucephalidae: Dolichoenterinae) from *Grammatorcynus* spp. (Scombridae) from the Great Barrier Reef, Australia. *Systematic Parasitology*, 61: 93-98.

Boyett, H.V., 2006. The ecology and microbiology of black band disease and brown band syndrome on the Great Barrier Reef. MSc thesis, James Cook University.

Bray, R. A. and T.H. Cribb, 1996. The Australian species of *Lobatocreadium* Madhavi, 1972, *Hypocreadium* Ozaki, 1936 and *Dermadena* Manter, 1945 (Digenea: Lepocreadiidae), parasites of marine tetraodontiform fishes. *Systematic Parasitology*, 35: 217-236.

Bray, R.A., B.L. Webster, P. Bartoli and D.T.J. Littlewood, 2005. Relationships within the Acanthocolpidae Luehe, 1906 and their place among the Digenea. *Acta Parasitologica*, 50: 281-291.

Büchler, K., 2005. An evaluation of geographic variation in the life history and behaviour of anemonefishes: a common-garden approach. PhD thesis, James Cook University.

Chambers, C.B. and T.H. Cribb, 2006. Phylogeny, evolution and biogeography of the Quadrifolioviriinae Yamaguti, 1965 (Digenea: Lecithasteridae). *Systematic Parasitology*, 63: 61-82.

Choat, J.H., C.R. Davies, J.L. Ackerman and B.D. Mapstone, 2006. Age structure and growth in a large teleost, *Cheilinus undulatus*, with a review of size distribution in labrid fishes. *Marine Ecology Progress Series*, 318: 237-246.

Coetzee, M.L., 2006. The taxonomy and phylogeny of three gnathiid isopod species parasitising elasmobranchs from the Great Barrier Reef, Australia. M.Sc. Thesis, University of Johannesburg, South Africa.

Cribb, T. H., G.R. Anderson, R.D. Adlard and R.A. Bray, 1998. A DNA-based demonstration of a three-host life-cycle for the Bivesiculidae (Platyhelminthes: Digenea). *International Journal for Parasitology*, 28: 1791-1795.

Cribb, T. H., R.A. Bray, D.T.J. Littlewood, S. Pichelin and E.A. Herniou, 2001. The Digenea. In: *Interrelationships of the Platyhelminthes*. D.T.J. Littlewood and R. A. Bray. London, Taylor & Francis: 168-185.

Cribb, T. H., Wright, T. and Bray, R. A., 1999. The genus *Deretrema* Linton, 1910 (Digenea: Zoogonidae) from southern Great Barrier Reef fishes, with a description of *Deretrema woolcockae* n. sp. *Systematic Parasitology*, 44: 139-144.

Daly, M., 2005. Wave energy and shoreline response on a fringing reef complex, Lizard Island, Qld, Australia. Honours thesis, University of New South Wales.

Doving, K.B., O.B. Stabell, S. Östlund-Nilsson and R. Fisher, 2006. Site fidelity and homing in tropical coral reef cardinalfish: are they using olfactory cues? *Chemical Senses*, 31: 265-272.



- Fraser, T.H. and G.R. Allen, 2006.** A new species of *Neamia* (Perciformes: Apogonidae) from the West Pacific Ocean. *Memoirs of Museum Victoria*, 63: 1-5.
- Game, E.T. and M.J. Caley, 2006.** The stability of P in coral reef fishes. *Evolution*, 60: 814-823.
- Guerra-Garcia, J., 2006.** Caprellidae (Crustacea: Amphipoda) from the Great Barrier Reef and adjacent localities. *Records of the Australian Museum*, 58: 417-458.
- Hall, K.A. and T.H. Cribb, 2004.** *Ptychogyliuchen*, a new genus of Gyliuchenidae (Platyhelminthes: Digenea) from siganid fishes of the Indo-West Pacific. *Invertebrate Systematics*, 18: 607-625.
- Hall, K.A. and T.H. Cribb, 2004.** Revision of *Affecauda* Hall & Chambers, 1999 (Digenea, Gyliuchenidae Fukui, 1929), including description of two new species from fishes of the Indo-West Pacific. *Zootaxa*, 778: 1-12.
- Hoggett, A.K., 2006.** A new species of *Macrophiothrix* (Ophiuroidea: Ophiotrichidae) common in northern Australia. *Zootaxa*, 1326: 17-24.
- Holmes, T.H. and M.I. McCormick, 2006.** Location influences size-selective predation on newly settled reef fish. *Marine Ecology Progress Series*, 317: 203-209.
- Jones, C.M. and A.S. Grutter, 2006.** Variation in emergence of parasitic and predatory isopods among habitats at Lizard Island, Great Barrier Reef. *Marine Biology*, 150: 919-927.
- Konow, N., 2005.** Feeding ecomorphology in angelfishes, f. Pomacanthidae: the implications of functional innovations on prey-dislodgement in biting reef fishes. PhD thesis, James Cook University.
- Lachlan, R.B., 2006.** New records of hawk moths and butterflies (Lepidoptera) from Lizard Island, northern Queensland. *Australian Entomologist*, 33: 133-135.
- Lee, J.J., 2006.** Algal symbiosis in larger foraminifera. *Symbiosis*, 42: 63-75.
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- Marriott, R.J., 2005.** Population biology, dynamics and their implications for management of red bass: a large, long-lived fish. MSc(Qual) thesis, James Cook University.
- McCormick, M.I. and T.H. Holmes, 2006.** Prey experience of predation influences mortality rates at settlement in a coral reef fish, *Pomacentrus amboinensis*. *Journal of Fish Biology*, 68: 969-974.
- Messing, C.G., D.L. Meyer, U.E. Siebeck, L.S. Jermiin, D.I. Vaney and G.W. Rouse, 2006.** A modern soft-bottom, shallow-water crinoid fauna (Echinodermata) from the Great Barrier Reef, Australia. *Coral Reefs*, 25: 164-168.
- Miller, T.L. and T.H. Cribb, 2005.** A new genus and species of cryptogonimid from *Lutjanus* spp. (Pisces: Lutjanidae) on the Great Barrier Reef and New Caledonia. *Journal of Parasitology*, 91: 922-924.
- Muñoz, G. and T.H. Cribb, 2006.** Parasite communities and diet of *Coris batuensis* (Pisces: Labridae) from Lizard Island, Great Barrier Reef. *Memoirs of the Queensland Museum*, 52: 191-198.
- Nolan, M.J., 2005.** Sanguinicolidae von Graff, 1907 (Platyhelminthes : Digenea) of Indo-West Pacific fishes. PhD thesis, University of Queensland.
- Nolan, M.J. and T.H. Cribb, 2004.** Two new blood flukes (Digenea: Sanguinicolidae) from Epinephelinae (Perciformes: Serranidae) of the Pacific Ocean. *Parasitology International*, 53: 327-335.
- Nolan, M.J. and T.H. Cribb, 2006.** *Cardicola* Short, 1953 and *Braya* n.gen. (Digenea: Sanguinicolidae) from five families of tropical Indo-Pacific fishes. *Zootaxa*, 1265: 1-80.
- Nolan, M.J. and T.H. Cribb, 2006.** An exceptionally rich complex of Sanguinicolidae von Graff, 1907 (Platyhelminthes: Trematoda) from Siganidae, Labridae and Mullidae (Teleostei: Perciformes) from the Indo-west Pacific region. *Zootaxa*, 1218: 3-80.
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- Podolsky, R.D. and J.S. McAlister, 2005.** Developmental plasticity in *Macrophiothrix* brittlestars: are morphologically convergent larvae also convergently plastic? *Biological Bulletin*, 209: 127-138.
- Puglisi, M., 2001.** Ecological clues as a strategy for finding novel biomedical leads from Pacific gorgonian corals. PhD thesis, University of Mississippi, USA.
- Rees, S.A., B.N. Opdyke, P.A. Wilson, L.K. Fifield and V. Levchenko, 2006.** Holocene evolution of the granite based Lizard Island and MacGillivray Reef systems, Northern Great Barrier Reef. *Coral Reefs*, 25: 555-568.
- Robbins, W.D., 2006.** Abundance, demography and population structure of the grey reef shark (*Carcharinus amblyrhynchos*) and the whitetip reef shark (*Triaenodon obesus*) (Family Carcharhinidae). PhD thesis, James Cook University, Australia.

Robbins, W.D., M. Hisano, S.R. Connolly and J.H. Choat, 2006. Ongoing collapse of coral-reef shark populations. *Current Biology*, 16: 2314-2319.

Sapolu, T., 2005. Age-based demography and reproductive ontogeny of angelfishes belonging to the family Pomacanthidae. MSc thesis, James Cook University.

Smit, N.J., A.S. Grutter, R.D. Adlard and A.J. Davies, 2006. Hematozoa of teleosts from Lizard Island, Australia, with some comments on their possible mode of transmission and the description of a new hemogregarine species. *Journal of Parasitology*, 92: 778-788.

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True, J.D., 2004. Massive *Porites* corals as indicators of environmental change. PhD thesis, James Cook University.

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The parasite team from University of Queensland and The Natural History Museum London



Potato cod

Supporters

The following individuals and organisations have donated funds or made in-kind gifts to the Lizard Island Reef Research Foundation during 2006. Members contributed \$1,000 or more while Friends contributed smaller amounts. Those who made special contributions to the 30th Anniversary Development are indicated with an asterisk (*) and those who made gifts in kind are indicated with a plus sign (+).

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