

Professor John Lucas

Professor John Lucas from University was awarded AMSA's most prestigious prize at AMSA2003 - AMSA's annual meeting, held in Brisbane in July 2003.

I express my gratitude to AMSA for this Award. It is a great honour to be included among the previous recipients of the Silver Jubilee Medal. The following are some details of my career and some historic memories. They are in the mode of 'I' and 'my', but many colleagues and students have shared the 'journey' with me and made great contributions.



My undergraduate record could only be described as poor. Today, I wouldn't even be considered for Honours studies. However, I was let in and proved to have a flair for research, which resulted in a First and a scholarship to do PhD studies. I joined AMSA in 1963 (40 years ago!) during the first year of my PhD studies at University of WA. The studies were with a patriarchal marine scientist, Ernest (Hodge) Hodgkin, who supervised a number of postgraduates who went on to prominence in Australian marine science. My PhD thesis was entitled "The biology of the Australian species of the genus *Halicarcinus* White (Crustacea, Brachyura)". These crabs are members of the Hymenosomatidae, a family of tiny to small spider crabs.

An early memory of AMSA was a joint meeting between the WA branch and mathematicians from UWA to explore the role of statistics in marine ecology. It was a standoff, with the mathematicians talking about 100s of replicates and the biologists considering this unachievable.

I attended the 1967 national AMSA conference, which was held at Geelong Grammar School. We slept on narrow beds in the long dormitories. Giving a presentation from my thesis studies, I won the first AMSA prize for a student presentation at a Conference. (It is a fine development that there are now many more student presentations, posters and prizes at AMSA Conferences.) With my prize money (\$20?), it would be appropriate to say that it was spent in benefiting my studies, but I was recently married to Helen and blew the money on a plane flight home to Perth, instead of the long train trip. A strong memory of this Conference is of a very long speech after the formal dinner. The speaker continued untroubled as empty wine bottles started to roll under the tables. At the end of the speech, a prominent CSIRO scientist leapt up and raced for the dining room doors to reach a toilet. He couldn't get the large doors open quickly enough and howled in agony at the doors.

Before the 1970s, planktologists had described the wonderful array of invertebrate larvae that were found in plankton samples. They speculated about the environmental influences on these larvae and suggested that very few survived to settlement and metamorphosis. Quantifying the affects of environmental factors on survival of these larvae and subsequent early life-history stages, through experimental studies, has been a major theme of my research. Another major aspect has been the ecophysiology of adult invertebrates. These two aspects have carried on from my PhD studies.

I learnt several lessons along the way. One was the advantage of timely research on important animals or topics: it is not just what you do and how well you do it, but what you do it on. Another was that one must be prepared for unexpected findings and pursue them. The other was that one

can't map out one's research areas and career: I went from crustaceans to starfish to bivalves to general aquaculture without deliberate decisions in advance.

My post-PhD career began with an appointment as Lecturer at the then University College of Townsville (later JCU) in 1968. This was when Cyril Burdon-Jones was appointed with the intention of building a major centre of Marine Biology. Arriving in Townsville, I intended to 'research the Great Barrier Reef'. These intentions were quickly dashed. There were rare day trips to the GBR off Townsville, organised by a shell-collecting club on days of extreme low tides during winter! Furthermore, the coral reef community was breathtaking, but overwhelmingly complex. I couldn't identify any component to undertake my kind of experimental research. I turned to mangrove crabs as being more manageable.

The solution to GBR studies came with a villain: the Crown-of-thorns starfish (*Acanthaster planci*) during its 1970s plaguing on the GBR. Bob Endean (UQ), in particular, raised public awareness of this potential threat to the GBR, which led to government funding for research. A grant allowed me to undertake a research program that involved regularly collecting live starfish from Lodestone reef using a hired speedboat, and undertaking experimental work in aquarium and laboratory studies. I had a specific component of the reef community to research and a hypothesis to test - that great variations in adult populations resulted from magnitudes of difference in survival rates of the tens of millions of eggs and larvae released by each female. This hypothesis was in contrast to suggestions that COTS outbreaks resulted from removing predators of adult starfish, such as tritons. Of the tested environment factors that may affect survival of early development stages, phytoplankton levels were found to be most important. COTS larvae are typically food-limited in GBR waters and their survival should be profoundly influenced by factors affecting phytoplankton abundance. In one of those unexpected findings, I discovered that there was a short-spined relative of COTS (*Acanthaster brevispinus*) which inhabits soft substrates and feeds on bivalves. The two species are readily crossed *in vitro*, resulting in hybrids that are intermediate in morphology and behaviour. This led to a marvellous cover of Nature with adults of both species and their reciprocal hybrids.

My abrupt mid-80s change in research focus from starfish to giant clams and mariculture came via some strong encouragement from Cyril Burdon-Jones (Head of School). It was a great decision. Giant clams are magnificent creatures in many ways other than their size. They have been heavily overfished, particularly for their meat and shells. The Australian Centre for International Agricultural Research project on clams was directed at supplying these demands and providing for restocking. As Project Coordinator, I worked with a research team that included biologists, fisheries staff and graduate students from Pacific nations. Ten plus years after the project, there are 15 nations with giant clam mariculture activities and interest from a further three Pacific nations. It isn't a large industry yet. Clam culture represents a transition from fisheries to mariculture for a number of Pacific nations and much of the mariculture is directed at restocking. The giant clam project led to an ACIAR project (1990s) on cultured black pearls, with the particular aim of establishing pearl oyster culture in the Pacific nation of Kiribati (Kir-i-bass). Pearl culture is one of the few options for export earnings for this tiny, isolated nation of scattered coral atolls.

Surprising recognition as being a fully-fledged aquaculturist came when I was invited to be Section Editor for Husbandry and Management for the journal *Aquaculture*. This was also recognition of aquaculture in Australia; not for Australia's contribution to world aquaculture production (a meagre 0.1%), but for its quality of research. There were 180 new manuscripts per year in my Section, but I enjoyed the honorary task and edited from 1998 until my retirement from JCU in 2000. Moving south to Brisbane to live quietly, I was, however, received into membership of the Centre for Marine Studies, UQ, as an Adjunct Professor. This gave me the time and facilities to complete, with Paul Southgate, a long-overdue textbook, *Aquaculture: Farming Aquatic Animals and Plants*, to be published by Blackwell Science, Oxford, in August. Copies will be available soon at all good bookshops!

Going back to my academic career at JCU, I progressed steadily through the ranks from Lecturer to Associate Professor. Initially I taught invertebrate zoology and physiology, and later

ecophysiology and aquaculture. I supervised or co-supervised 20 Honours, 3 Grad.Dipl., 9 MSc and 18 PhD students. Only one of these 50 students did not submit a thesis and obtain his degree - an overseas student who returned home for family reasons. A highlight came with being awarded a Personal Chair in 1994 for research achievements. In the latter years of my time at JCU, I was Head of Aquaculture and was involved in developing a major teaching program in this discipline.

Remaining at the same institution for 33 years (1968-2000) seems remarkably dull, but, as indicated, I worked on successive invertebrate groups and projects over this period. I hadn't anticipated staying in Townsville for so long, but as it increasingly became the focus of marine research, teaching and conservation, where else did one need to go? Furthermore, apart from much travel in the Pacific region with ACIAR projects, my career was punctuated with periods of study leave at Duke University Marine Laboratory, North Carolina; CSIRO Marine Laboratory, Western Australia; University of the Ryukyus, Okinawa; Scripps Institute of Oceanography, California; Fisheries, Tonga; Shellfish Culture Ltd, Tasmania; and Plymouth Marine Laboratory, UK.

I am not a committee person, but have not been totally delinquent in this aspect of science. I was a member of the Great Barrier Reef Marine Park Authority Crown-of-thorns Starfish Advisory Committees (including COTSAC and COTSARC). With Nigel Forteach, I was responsible for developing a submission for a national Cooperative Research Centre for Aquaculture and acted as interim joint Director. Subsequently, I became Project Leader of the CRC's Education Program. I have been a member of the Ministerial Advisory Committee on Aquaculture (Queensland).

With the exception of pearl oysters (which Paul Southgate and I are working on), my five main areas of research resulted in major publications in their fields. The PhD studies led to a monograph on hymenosomatid crabs; the COTS research to a CRC handbook; the giant clams research to a Conference Proceedings, handbooks and review; and general aquaculture interests to a textbook. I, at least, was satisfied with my endeavours in these areas, but, as noted above, I learned something about what to work on. To say that the crab monograph hit the scientific community by storm is an overstatement. Perhaps the only tangible result is that a carcinologist named a minute crab that lives in total darkness in recognition of me. However, the research on COTS, giant clams and aquaculture was very timely. I received considerably more credit for working on them.

Some advice to younger members of AMSA would be to recognise that you are privileged to be studying or working in Australia in an exciting and significant discipline. Privilege brings responsibilities, such as the interrelated qualities of commitment, perseverance and enthusiasm.