



NEWSLETTER

ISSN 1834-4259

No. 168, FEBRUARY, 2019

A successful MSA Triennial Conference at Wellington, NZ

A great triennial MSA conference was held in early December 2018 at the Museum of New Zealand Te Papa Tongarewa in the beautiful city of Wellington. This was well attended with excellent plenary and concurrent sessions covering many interesting topics.

Keynote speakers at Molluscs 2018 were: **Dr. Phil Ross** (University of Waikato, New Zealand), a marine ecologist focussing on human impacts on the environment and sustainable use of natural resources. His talk looked at the endangered surf clam *Paphies ventricosa*, known as Toheroa, its distribution and cultural significance and the factors impeding its recovery from past overharvesting; **Dr. Serean Adams** (Cawthron Institute, New Zealand), an aquaculture scientist, spoke on the green-shell mussel *Perna canaliculus* and the Pacific Oyster *Crassostrea gigas*; **Associate Professor Amy Moran** (University of Hawaii) a malacologist and ecologist, discussed physiologic effects of temperature and oxygen availability on molluscan development by comparing Antarctic to temperate species (the former have increased growth through oxygen-rich colder water but with often extreme cold-related slowing of metabo-

lism) and the implications of climate change on these processes; **Dr. Satoshi Chiba** (Tohoku University, Japan), discussed direct and indirect effects of multiple invasive species on the extinction of native land snails in the Ogasawara Islands, Japan; **Professor Robert Cowie**, University of Hawaii, discussed the current biodiversity extinction phenomenon (differing from previous earth history extinction events by being caused solely by human activities) and how molluscs (being widespread and leaving behind lasting traces of their presence through their shells) have informed this study; and **Professor Pauline Ross**, University of Sydney, spoke on molluscan resilience to the environmental stressors of increasing temperatures and ocean acidification, using the Pacific Rock Oyster and the Sydney Rock Oyster as experimental models.

For reference purposes the final program is presented on pages 8-10. Thank you to everyone involved in putting together a wonderful conference. We all look forward to Molluscs 2021, which will be held in Perth, Western Australia!



Entrance to Museum of New Zealand Te Papa Tongarewa on Wellington's waterfront.
Photo: P. Vafiadis



The MSA's sister society is The Society for the Study of Molluscan Diversity (SSMD). Further information about SSMD can be found at: <http://marine1.bio.sci.toho-u.ac.jp/md/index-e.html>

Society information

President	Lisa Kirkendale
Vice President	Simon Hills
Treasurer	Carmel McDougall
Secretary	Priscila Salloum
Membership Secretary	Matt Nimbs
Journal Editor	Don Colgan
Website Administrator	Rachel Przeslawski
Newsletter Editor	Platon Vafiadis
Council Members	Kirsten Benkendorff Steve Smith Simon Grove Wayne O'Connor Bob Creese Felicity Masters Kerry Walton

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Victorian branch

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Meetings are held at the Melbourne Camera Club, corner of Dorcas and Ferrars Streets, South Melbourne, on the third **Tuesday** of the month. No meetings in April, June, July, September or December.

Membership fees 2019

Includes *Molluscan Research* (published four times per year), the MSA Newsletter (electronic-only publication since Number 158), and discounted registration at the triennial MSA conferences.

Ordinary members (worldwide)	\$AU 70
Institutional membership	\$AU 100
Student member/concession	\$AU 45

Membership fees can be paid (preferably) via the Society's website. Otherwise, send subscriptions via mail to: Malacological Society of Australasia, c/o Matt Nimbs, National Marine Science Centre, PO Box 4321, Coffs Harbour, NSW, Australia, 2450.

Newsletter

Editor: Platon Vafiadis

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The deadline for articles for the next issue of the Newsletter is Friday 24 May, 2019.

MSA website: <http://www.malsocaus.org>

Facebook: <http://www.facebook.com/groups/Malsocaus>

Note: This publication is not deemed to be valid for taxonomic purposes — see article 8.2 in the International Code of Zoological Nomenclature, 4th Edition. Also, opinions expressed within articles in this newsletter belong to the author(s) and are neither necessarily shared nor endorsed by the MSA.



***Stomatella impertusa* (Burrow, 1815) at Barwon Heads, Victoria, Saturday 11 January, 2009.**
(Photo: P. Vafiadis)

Spectacular *Stomatella*

Stomatella impertusa (Burrow, 1815) (Trochidae) is a beautiful gastropod found around Australia, but in the central Victorian littoral zone it is rarely encountered, either alive or as dead beach shells. Found under lower littoral stones, it is a rapid mover and has a long posterior foot that is incapable of retraction under the flattened shell, and upon which the animal can rear. When threatened, it is capable of autotomising the posterior foot (something I have not personally witnessed) and thus must be gently handled in the field. (The autotomised foot is subsequently regenerated). The shell and animal can be variably coloured and patterned. On a very exceptional day (26 March, 2007) at Inverloch Victoria, an amazing number were recorded—at least 20 living specimens.

Further reading: Wilson B (1993). *Australian Marine Shells Volume 1*. Odyssey Publishing, Kallaroo, Western Australia (see Subfamily Stomatellinae, p. 73-74).

P. Vafiadis



President's Report – Annual General Meeting, 5 December 2018

Over the past year this council has supported early career researchers and students with the provision of seven travel grants, recognized a pillar of the malacological community with a Lifetime Achievement Award, and organized the triennial conference in New Zealand.

Details of key notable accomplishments include:

- Organization and planning for ~70 attendees, ~45 of these new members at our triennial conference, Molluscs 2018, in Wellington New Zealand at Museum of New Zealand Te Papa Tongarewa;
- Seven travel grants to assist aspiring scholars Kara Layton, University of Western Australia, Daniel Ramos Gonzalez, University of Nottingham, United Kingdom, Kate Ballard, University of the Sunshine Coast, Queensland, Australia, Sherry Lyn Sayco, University of the Philippines, Priscila Salloum, The University of Auckland, New Zealand, Olga Aksenova, Northern Federal University, Russia, and Felicity Masters, University of the Sunshine Coast, Queensland, Australia to attend our conference;
- One Lifetime Achievement Award appointed in 2018 to Dr. Bruce Marshall Museum of New Zealand Te Papa Tongarewa for this contribution to taxonomy and systematics of the New Zealand malacofauna;
- As of 27 November 2018, 665 members on Facebook, almost 100 more people interested in MSA compared to just one year ago (572);
- Transitioning to Griffith Teleconferencing system for council meetings
- Attempting to tackle an update to our constitution, still a work in progress;
- Did I already say organizing the first international conference for MSA?

The main focus of this year has been to plan, organize and execute Molluscs 2018 and support the local organizing committee led by MSA Vice President Simon Hills in doing so. Some key figures associated with the conference include attracting six exciting keynotes, with almost 70 attendees and 45 new members. The scientific output totals 49 talks and 9 posters, with 2 mini-workshops, a field trip and a non-model Genomics Workshop to round out the program. We focussed our funding opportunities on Molluscs 2018, with many more travel grants than usual to offset costs of students joining us in Wellington and sharing their research and this has been wonderful. I would very much like to thank the local

organizing committee: Simon Hills, Hamish Spencer, Nicole Phillips, Carmel McDougall, Kerry Walton and Bruce Marshall, as well as event coordinator Julie Burton from Southern Cross Conference and Event Management Pty Ltd. We also thank our host city/country Wellington NZ and the Museum of New Zealand Te Papa Tongarewa for welcoming us all.

Thank you to the MSA Council members who volunteer their time to ensure the Society continues to help people explore and experience the world of molluscs. The Society exists because of the passion of dedicated people and without this commitment the MSA would simply not survive. Platon Vafiadis is instrumental in herding us to realize our informative quarterly newsletters, while Don Colgan keeps Molluscan Research as a viable research outlet for science on molluscs with diverse and worldwide content. Rachel Przeslawski, our Website Administrator, has continued to ensure our website reflects our activities. Carmel McDougall, our Treasurer, has kept on top of our books, seamlessly moved the Society through audits and watched our finances through our first international conference with care and attention. Carmel has also been an instrumental of the local organizing committee and worked tirelessly in this regard on the many details, so easy to overlook. Matt Nimbs has kept our membership informed and happy, with growing numbers this year, while Kara Layton has matured in her role as Secretary to really embrace the Society (and run our meetings!).

We hope in 2019 to revisit our vision statement - a group dedicated to the appreciation, study, and sustainable use of molluscs and realize some new engagement initiatives to assist people to fall in love with molluscs (or fall in love again for some of us!). I would like to see more of our Facebook followers become members, so we are working hard to tempt interested parties to join the Society. Yes, there are new incentives coming, so watch this space!

As always, next year will see the Society transition to a new council as people depart and new faces join in. A wonderful blend of old and new is expected and vital to a dynamic Society, we expect this and want to thank all council for their time, commitment, ideas and zest.

Sincerely,

Lisa Kirkendale, MSA President

MSA council update, and conference moments

Lisa Kirkendale

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Happy New Year and welcome to back to the MSA for 2019. It is wonderful to begin the year after reconnecting with so many lovely people in New Zealand for our triennial conference just a couple of months ago. It was a very interesting and productive meeting and I think everyone came away amazed at our host city, country and institution but also full of energy for molluscan research, with collaborations in hand. During the course of the meeting there was a lot of planning that occurred. We held our AGM and it was highly constructive to hear diverse viewpoints from many of our long standing society members about the future of the society.

During the AGM we farewelled three council members, **Peter Hunt** from South Australia, **David Rudd** from New South Wales and **Kara Layton** from Western Australia - we thank all of you for your contributions. Our globetrotting Secretary Kara Layton returns home to take up a 'cool' postdoc in eastern Canada (she will be telling us more about her past and present work in an upcoming article, so I won't spill the beans). We welcome returning members to council as well as three new members for 2019, two being from New Zealand. We are thrilled to announce **Felicity Masters** (University of the Sunshine Coast, Queensland), **Kerry Walton** (Museum of New Zealand Te Papa Tongarewa and Department of Zoology, University of Otago, and also a member of the planning committee for the MSA NZ

triennial conference) and **Priscila Salloum** (School of Biological Sciences, the University of Auckland, New Zealand) as our new Secretary. We look forward to getting to know you better over the year. Page 2 lists the current MSA council.

One thing that Platon has asked me to reveal is the origin of the coveted mollusc hat that circulated at the conference dinner. Well, Ikea was where I purchased the cap with my children, however, there is more to the story than the shop where I bought it! This little beauty gets pulled out on fieldtrips for very special finds. For example, Kara was honoured on a trip to WA when she found a bivalve lurking in a sea cucumber (*Entovalva* sp.). So many people helped make the NZ conference a success that I thought it deserved to be worn by all and so many donned the 'mantle' of honour. Please enjoy the snapshots of a few below and join me in saying farewell to our leavers and welcome to our new council members for 2019.



Some of the bearers of the mollusc hat at the conference dinner. From left to right, beginning at top row: Kirsten with Andy, Bryce, Simon, Carmel, Platon, Janet with Joan and Kirsten, Kara and Fred. (Photo credits: inset in text: C. McDougall; top row at left: K. Benkendorff; lower row, 2nd & 3rd photos: P. Vafiadis; the rest: L. Kirkendale).



Molluscs 2018 – Best Student Presentations

Carmel McDougall

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The standard of student presentations was exceptional at the 2018 conference – several long-term attendees were overheard making this observation! This certainly gave our much-appreciated judges a bit of a headache, but in the end there were two joint winners:

Kara Layton (The University of Western Australia), for her presentation ‘Using exon capture to tease apart recently radiated mimetic sea slugs’, and

Priscila Salloum (The University of Auckland), for her talk entitled ‘Understanding local adaptation of *Onithochiton neglectus* (Polyplacophora: Chitonidae) across an environmental gradient based on genetic, genomic and morphological data’.

An honourable mention was also given to **Regan Fairlie (Manaaki Te Awanui)** for his presentation on ‘The environmental history of Tauranga Moana’, with the judges commenting on his excellent presentation style.

Congratulations to all of our student presenters!



Above: Priscila Salloum (at left) and Kara Layton following their award. (Photo: Carmel McDougall)
Left: Regan Fairlie during his presentation at Molluscs 2018 (Photo: P. Vafiadis, with apologies for the background glare).

Recognition of Dr. Bruce Marshall

Lisa Kirkendale (lisa.kirkendale@museum.wa.gov.au) and Kerry Walton (walton.kerry@gmail.com)

Dr. Bruce Marshall was recognized during a special presentation on the final day of the MSA conference. He was presented with the inaugural MSA Lifetime Achievement Award for his significant contributions to the field of malacology by President of the MSA, Dr. Lisa Kirkendale.

Bruce has dedicated his life to molluscan taxonomy and through work at the NMNZ since 1974 and has realized enormous accomplishments of benefit to the fields of systematics and diversity. Over the course of the last half-century, Bruce has named at least 564 taxa and published >150 papers, humbly noting those numbers to be low “...because when I started out I spent most of my time building up the collection”. He has named more species than anyone in the history of Te Papa or its predecessors. He is also the leading world expert in many molluscan groups, including some notoriously difficult and speciose groups such as cerithiopsids and triphorids, not to mention faunas from unusual deep-sea substrates such as organic falls. His work on monoplacophorans is especially important, however of equal magnitude is work documenting the Cenozoic marine molluscan fossil record in NZ, published in *Science*.

Because of these many significant contributions, others have honoured him by naming 33 taxa after him and, in 2012, he was awarded a Doctor of Science (DSc) by Victoria University of Wellington. He has also generously shared his knowledge, mentoring students and instilling the value of taxonomy and systematics to the next generation.



Bruce Marshall (right), with MSA Vice President Simon Hills, after receiving his recognition award.
Photo: Carmel McDougall.

Malacological research grants

Applications for the 2019 MSA Malacological research grants are currently being accepted. The deadline for applications is 30th June, 2019. There are no restrictions on who may apply, but the committee granting the awards will generally give preference to candidates who are not employed as professional malacologists. Up to \$2000 is available to assist with costs associated with field trips or research consumables.

Further details can be found at http://www.malsocaus.org/?page_id=27

Financial support to attend the World Congress of Malacology 2019

The MSA will also support two members (one student, one ordinary member) to attend WCM 2019, at California, in August this year.

For details of the conference, see <https://www.calacademy.org/world-congress-of-malacology-2019>. Early-bird registration for the conference closes on the 15th of April, and the abstract submission deadline is April 30.

Details for applications for MSA support can be found at http://www.malsocaus.org/?page_id=27. Applications are due March 25.

Workshop summary: 'From shore to shelf'

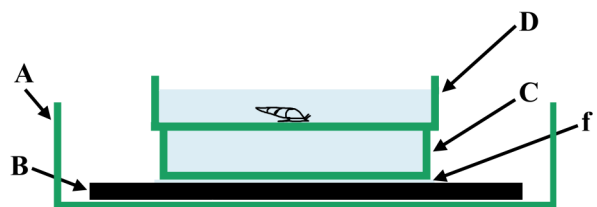
Lisa Kirkendale (lisa.kirkendale@museum.wa.gov.au), Kara Layton (kara.layton@museum.wa.gov.au) and Platon Vafiadis (newsletter@malsocaus.org)

This workshop at Molluscs 2018 looked at specimen collection, recording (including photography), preservation and curation.

Collection must always be preceded by the necessary permits. Collection may be done by hand or with the use of fine mesh and sieves for the smaller species. Molluscs can occupy a variety of habitats, including algae, rocks, films, sediments or other invertebrates in the case of parasitic species. Elutriation as a technique for collecting the interstitial species was also described. Notes should be taken of associations, habitat and behaviour.

Transport back to the laboratory or home for sorting and further observation should involve minimal stress to captive specimens. They must be kept cool and well oxygenated. Transport in as large as possible a volume of seawater will assist with both of these objectives. The container must also have a favourable surface area relative to volume to allow optimal oxygen exchange at the surface. To enable this exchange, containers must not be filled and sealed flush with water to the top.

Small specimens are best studied under a stereomicroscope in a petri dish of seawater. Observations should



A suggested petri-dish set up for lab-based macro photography of small, living specimens — see text on page 7 for explanation.

be recorded at the time and sketches made of important anatomical features or behaviours. After this process, they can then be photographed. Rapid advances in digital photography over the last 15-20 years offer a range of options for imaging, and larger specimens are well within the range of even basic cameras. Attention was thus given to photographing the smaller specimens (< 5mm in length). Workable images can often be obtained in the field with compact digital cameras that are both waterproof and also have good macro capabilities, and in the lab by holding up a compact digital camera up to a stereomicroscope eyepiece. However, detailed and better quality images require a bit more preparation.

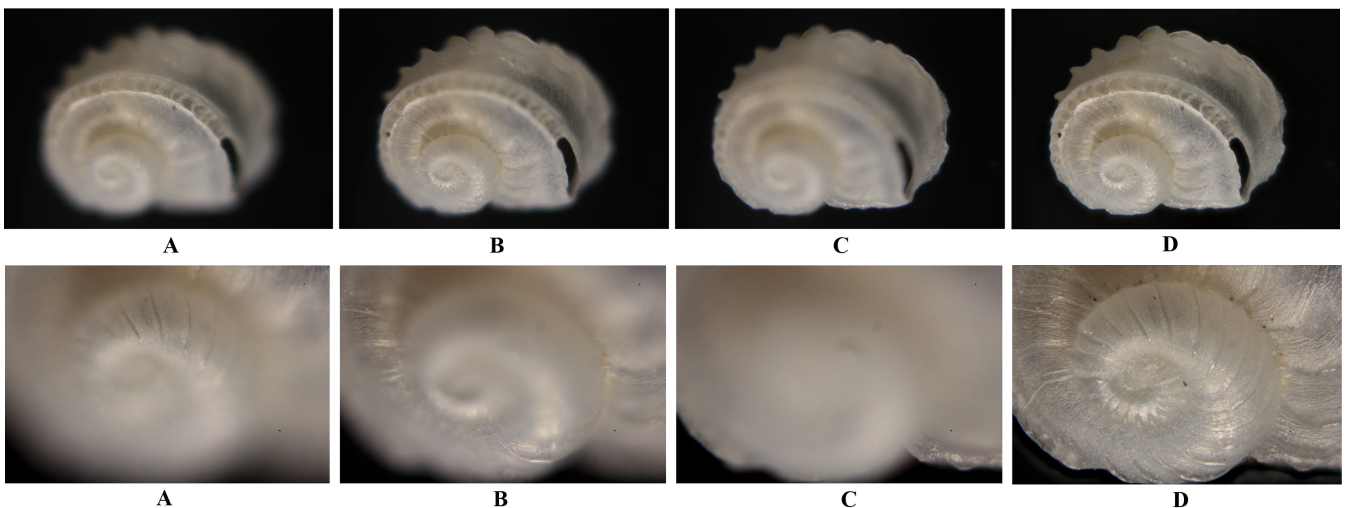
Macro-photography of moving specimens requires adequate lighting to allow fast shutter speeds that will prevent image blur. A photography set-up was described which used an SLR camera with macro lens and ring flash with shutter release button, mounted onto a copy stand and photographing vertically down onto a specimen in a petri dish against a black background (see figure on page 6). A large petri dish **A** has a sheet of matt-black plastic **B** put in the bottom. The inner dish **C** of a matching petri-dish set is placed on top of **B**, with a thin film of water **f** between them making the background blacker compared to if an air-interface separated them. The dish **C** is filled flush with water and the wider dish of the pair, **D**, is placed over the top, so that **C** is completely water-filled with no air bubbles present. Seawater is then placed into **D**, which also holds the specimen. When the specimen is photographed from above, the focal plane is just above the bottom of **D** and thus the black background **B** below will be out-of-focus, therefore none of its texture will be captured in the image and the background will be uniform and smooth.

Getting maximum magnification on small specimens means that the camera lens will be very close to dish **D** when focussed, and so back-reflection from the ring flash will not be a problem because the area of focus is so narrow and well within the perimeter of the flash. It is also best to place some seawater within the base of dish **A** in case specimens crawl out of **D**. A fast shutter speed (1/100 second or faster) is important to minimise motion blur (which is enhanced by magnification) and depth of field issues are minimised by using as small an aperture (ie. as high an f-setting) as possible (remember the physics of the pinhole camera). Taller specimens

will have greater depth-of-field issues, and in such cases, zooming back a little may help, or else using a higher ISO setting to ‘buy’ some additional aperture narrowing. Although image quality decreases at higher iso settings, ISOs of up to 400 (or sometimes higher) still produce very good results.

Very small dead specimens pose no problems of motion-blur and can thus be photographed in much greater detail through a compound microscope, where shutter speeds can be as slow as required. SLR cameras (minus their lenses) can be coupled to compound microscopes using T-tube extensions and ring-adapters, with incident lighting provided by a strong LED light. The most satisfying specimens to image with such apparatus are highly sculptured microgastropods such as scissurellids. The great magnifications obtained, however, and the inability to control aperture size means that the depth-of-field is very narrow. A variety of software packages are available, however, that will allow multiple images taken at different focal planes to be ‘stacked’, and these produce very good results. An example is provided below of the scissurellid *Sinezona beddomei*. The process of taking multiple images at slightly different focal planes can be automated by using electronic focussing rails, which can also allow the precise distance between each focal plane to be controlled, but turning the fine-focus dial on the microscope by 1/16 of a turn (or less, especially at higher magnifications) between each image is generally quite good enough—this latter technique was used to generate the images for stacking that are shown below.

After study, note-taking and photography comes the need to preserve the specimen. The method chosen



***Sinezona beddomei* (Petterd, 1884)** found in shell sand, San Remo Back beach, Victoria, 25 Aug. 2016. This was imaged with an SLR camera attached to a compound microscope and images stacked using the computer program Helicon Focus. **Upper row:** Whole shell views. Thirty images were taken at incremental focal planes, beginning with **A** (focused on uppermost aspects) and ending in **C** (focussed on lowermost aspects). **B** is image 15, focussed roughly mid-way between that of **A** and **C**. The finalised, 30-stack image is shown in **D**. (Microscope objective x4, microscope eyepiece x10, width of frame 1.564 mm). **Lower row:** Protoconch region to greater detail. Here, 24 images were taken at incremental focal planes beginning at **A** and ending in **C**, with **B** (image 12) being roughly between that of **A** and **C**. The finalised, 24-stack image is shown in **D**. (Microscope objective x10, microscope eyepiece x10, width of frame = 0.623 mm). (Shell & images: P. Vafiadis).

depends on how the specimen is to be used. If needed for histology, specimens should be relaxed by adding magnesium chloride to the water in small amounts and then fixing in buffered 4% formalin. If DNA studies are required, the animal or part of the animal can be fixed in 96%-100% ethanol. 70% ethanol will preserve soft tissues without hardening them (via drawing water out) and thus may allow easier subsequent dissection, but for DNA analysis, many prefer the higher ethanol concentrations. Preserving in glutaraldehyde is used for photosymbiotic studies. RNA studies (transcriptome analysis) use the preserving fluid 'RNA later' — a small piece of foot is taken with a clean blade or scissors (and subsequently cut into finer slices to ensure penetration of the 'RNA later'); the sample in 'RNA later' is then

slowly cooled to 4 degrees celcius over 24 hours and then frozen to -80 degrees celcius.

Labelling and databasing of specimens is all-important prior to lodging. Labels must specify the full specimen, habitat and locality data including latitude and longitude, the preservative, method of relaxation, and whether the specimen has been photographed alive.

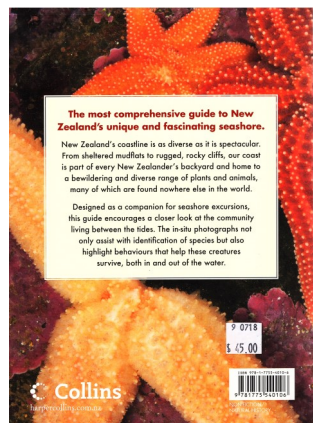
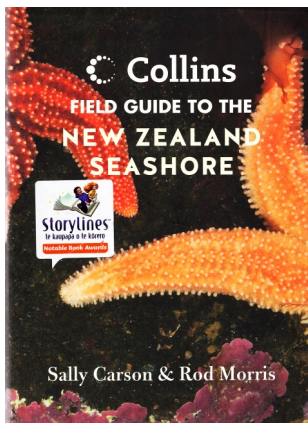
Further reading: Geiger DL (2006). Chapter 7: Applied film photography in systematic malacology (p. 73-100) *in*. Sturm CF, Pearce TA & Valdés A (eds). (2006). *The mollusks: A guide to their study, collection and preservation*. American Malacological Society, Boca Raton, Florida.

Geiger DL, Marshall BA, Ponder WF, Sasaki T, Warén A (2007). Techniques for collecting, handling, preparing storing and examining small molluscan specimens. *Molluscan Research* 27(1): 1-50.

Book review: S. Carson & R. Morris (2017). *Collins Field Guide to the New Zealand Seashore*. Harper Collins Publishers, Auckland.

Platon Vafiadis

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Whilst recently in New Zealand for the Molluscs 2018 conference, I stumbled across this publication in a commercial bookshop. As I leafed through, it didn't take too long to conclude that I had to buy it! I also wanted to know about the background of the authors but curiously the book does not provide any details for either of them. On checking the internet, Sally Carson is the Director of the New Zealand Marine Studies Centre at the University of Otago, and Rod Morris is a wildlife photographer and documentary-maker.

This book, of A5 size and comprising 416 pages, provides an informative overview of the New Zealand intertidal zone and its inhabitants. Its emphasis on ecology and the inter-connectedness of organisms has pleasingly led to a wide coverage of topics. The introductory section discusses the intertidal zone, tides, different intertidal habitats, shore safety and coastal habitat care. Subsequent sections deal with key groups of organisms, with chapters on sponges, anemones and their relatives, worms, crustaceans, coastal insects and spiders, molluscs, brachiopods, bryozoans, sea stars and their relatives, ascidians, fish, seaweeds and coastal plants.

Introductory sections preface each chapter, giving an overview of the biology of the groups and setting the scene for a look at the commonly encountered species within that group. These are not only represented with excellent descriptions and photographs, usually of living specimens, but also with notes on the ecology of the species. The significance of the species to the Maori people are emphasised, and the Maori names of the various organisms are also provided.

The book is dotted with very interesting 'special feature' articles such as: 'Drift-line jellies', 'Acorn worms', 'Intertidal invaders', 'Red tide, white tide, smelly tide', 'Nature's super-strength glue', 'Rasping radula', 'Paua - Taonga of the sea', 'Seashore spinning tops', 'Beachcombing', 'Siphons, smells and science experiments', 'Slugs of the sea', 'Sea slug sex', 'Mussel anchor-lines', 'Oysters: filtering machines', 'Bivalves that burrow', 'Evidence of growth', 'Birth and death of an octopus', 'Kina as kaimoana', 'Our invertebrate relatives', 'Nest builders', 'Mermaids' purses', 'Coastal café - birds, bills and bivalves', 'Shoreline slumbers - big and furry', 'Seaweed gardens', 'Green bubbles', 'Seaweed sex', 'Incredible, edible seaweed', 'Microscopic algae', 'Harvesting karengo', 'Algal turf - watch your step!', and 'Pressing seaweed'.

The concluding section reflects upon the pressures facing the coastal fauna in light of climate change and coastal pollution and development, and encourages individuals and groups to learn about, monitor, care for, and, most of all, enjoy, the treasure that is the coastline and all of its inhabitants. A very good additional reading and internet reference list is provided. I highly recommend it.

Molluscs 2018 Program - Sunday 2nd December, 2018

16:15	Registration opens (Rangimarie Rooms, Te Huinga Centre, Te Papa)
17:00-18:00	Welcome Function – Te Papa (Rangimarie Room 2)

Program - Monday 3rd December, 2018

8:30-9:00	Welcome introduction by Lisa Kirkendale and Simon Hills (Rangimarie 1)	
9:00-9:45	Keynote presentation – Phil Ross , University of Waikato Ancient aquaculture and the mystery of the disappearing surf clams	
9:45-10:30	Keynote presentation – Serean Adams (Cawthron Institute) Growing, enabling and securing New Zealand's mollusc aquaculture industry - a research perspective	
10:30-11:00	Morning Tea (Rangimarie 2)	
	Symposium: Systematics, taxonomy and biogeography (Rangimarie 1) Chair: Hamish Spencer	
11:00-11:20	Lisa Kirkendale (Western Australian Museum) – The world in a shell: Aspects of cockle taxonomy, biogeography, phylogenetics and evolution reviewed	
11:20-11:40	Kerry Walton (University of Otago) – Biodiversity, biogeography and vulnerability of hydrothermal vents: a case study using bathymodioline mussels	
11:40-12:00	Martyn Kennedy (University of Otago) – The speed of semi-slug formation: Limacization of <i>Schizoglossa</i> (Mollusca: Pulmonata: Rhytididae)	
12:00-12:20	Isabel Hyman (Australian Museum) – Widespread convergence in body form in Australian Helicarionidae (Pulmonata, Stylommatophora)	
12:20-13:30	Lunch (Rangimarie 2)	
	AFTERNOON PARALLEL SESSIONS	
	Symposium: Systematics, taxonomy and biogeography (Rangimarie 1) Chair: Kerry Walton	Symposium: Aquaculture, fisheries and human uses of mol- luscs (Rangimarie 3) Chair: Andrea Alfaro
13:30-13:50	Andy Davis (University of Wollongong) – Biogeo- graphic conundrum: why so many freshwater gastro- pod taxa in Fiji compared to Australia?	Sara Masoomi Dezfouli (Auckland University of Technology) – Encapsulated Feed for Increased Growth of Farmed Paua and Reduced Feed Wastage
13:50-14:10	Olga Aksenova (Northern Arctic Federal University) – Diversity, Molecular Taxonomy, Biogeography and Ecology of the Radicine Pond Snails (Gastropoda: Lymnaeidae) in the Palearctic (* Session cancelled)	Andrea Alfaro (Auckland University of Technology) Novel health assessment tools for shellfish aquaculture
14:10-14:30	Kirsten Donald (University of Otago) – Using both barcoding and next generation sequencing to elucidate the complex New Zealand <i>Maurea</i> (Mollusca: Gastropo- da: Calliostomatidae: <i>Calliostoma</i>) phylogeny	Paul South (Cawthron Institute) – The retention of juvenile <i>Perna canaliculus</i> in aquaculture
14:30-14:50	Katherine Lockton (University of Otago) – Phylogeography of <i>Lasaea hinemoa</i>	Leonardo Zamora (Cawthron Institute) – Green-lipped mussel <i>Perna canaliculus</i> ' ability to cope with low seawater tempera- tures: Implications for survival, aerial exposure and heart rate
14:50-15:10	Ruthela Payawal (Polytechnic University of the Philip- pines) – Molecular identification of Conidae (Gastropoda) at Verde island, Batangas, Philippines using mitochondrial gene markers cytochrome oxidase 1 and 16s rRNA	Matt Miller (Cawthron Institute) – Musseling-up program: Greenshell mussel and role in inflam- mation management and joint health
15:10-15:40	Afternoon Tea (Rangimarie 2)	
	Symposium: Systematics, taxonomy and biogeography (Rangimarie 1) Chair: Kara Layton	Symposium: Community engagement and citizen science (Rangimarie 3) Chair: Kirsten Benkendorff
15:40-16:00	Daniel Ramos Gonzalez (University of Nottingham) – Evolutionary phenotype variation of <i>Cepaea nemoralis</i> in the Pyrenees	Caine Taiapa (Manaaki Te Awanui) – Activating Kaitiakitanga (environmental custodianship) through pipi relocation "What are we Enhancing".
16:00-16:20	Priscila Salloum (The University of Auckland) – Understanding local adaptation of <i>Onithochiton neglec- tus</i> (Polyplacophora:Chitonidae) across an environ- mental gradient based on genetic, genomic and mor- phological data.	Rodrigo Salvador (Museum of New Zealand Te Papa Tong- arewa) – The creepy, the slimy and the ugly: how scientists communicate science with invertebrates
16:20-16:40	Mathieu Quenu (Massey University) – Snail shell shape and size suggests hybridisation of two species: a comparison of supervised and unsupervised learning algorithms with geometric morphometric data for spe- cies identification	Yuta Morii (Massey University) – Activity of invasive slug <i>Limax maximus</i> in relation to climate conditions based on citizen's observations
16:40-17:00	Hamish Spencer (University of Otago) – Contrasting Phylogeography of Two Limpet Genera in the Southern Ocean	

Posters:

Carmel McDougall (Griffith University) – Ependymins in molluscs - expansions of a multifunctional protein family
Amber McEwan (Victoria University of Wellington) – Comparing indigenous and western methods of kākahi translocation: implications for ecological restoration.
Kao Akiyama (Tohoku University, Japan) – The effect of environment to species composition and phylogenetic study of micro snails in New Zealand
Phuong-Thao Ho (Ewha Womans University) – Adaptive evolution of mud-tidal gastropod (genus *Batillaria*) to the salt stress
Rodrigo Salvador (Museum of New Zealand Te Papa Tongarewa) – The role of video game molluscs in science communication and animal conservation
Kara Layton (University of Western Australia) – Exploring an undocumented diversification of endoparasitic gastropods in Antarctica
Natalí Delorme (Cawthron Institute) – Development of stress and health biomarkers in the Green-lipped mussel *Perna canaliculus*
Simon Hills (Massey University) – Identifying evolutionary lineages of marine snails
Mary Morgan-Richards (Massey University) – Do New Zealand Olive Shells (*Amalda* spp.) support Punctuated Equilibria?

Program - Tuesday 4th December, 2018

8:55-9:00	Announcements (Rangimarie 1)		
9:00-9:45	Keynote presentation - Amy Moran (University of Hawaii): Physiological effects of temperature and oxygen availability on molluscan development: lessons from the Antarctic		
9:45-10:30	Keynote presentation – Satoshi Chiba (Tohoku University): Lessons from the ongoing mass extinction of land snails in Ogasawara: direct and indirect effects of multiple invasive species		
10:30-11:40	Morning Tea and Poster Session (Rangimarie 2)		
	Symposium: Paleontology/ Genomics and molecular biology (Rangimarie 1) Chair: Simon Hills		
11:40-12:00	Tom Womack (Victoria University of Wellington) – Resolving the Cenozoic mollusc fossil record of New Zealand: unravelling macroevolution		
12:00-12.20	Frank Koehler (Australian Museum) – Land snails (1) : dinosaurs (0) – phylogenomics resolves Late Mesozoic diversification of helicoid land snails		
12:20-13.30	Lunch (Rangimarie 2) Molluscan Research Editors' meeting – (Rangimarie 3)		
	AFTERNOON PARALLEL SESSIONS		
	Symposium: Paleontology (Rangimarie 1) Chair: Lisa Kirkendale	Symposium: Genomics and molecular biology (Rangimarie 3) Chair: Scott Cummins	
13:30-13:50	Alan Beu (GNS Science) – New Zealand Cenozoic fossil Turbinidae: Indo-Pacific elements in southern New Zealand Oligocene–Miocene rocks	Carmel McDougall (Griffith University) – A genomic approach to developing tropical oyster aquaculture	
13:50-14:10	Mary Morgan-Richards (Massey University) – Morphological Stasis	Kara Layton (The University of Western Australia) – Using exon capture to tease apart recently radiated mimetic sea slugs	
14:10-14:30	Rodrigo Salvador (Museum of New Zealand Te Papa Tongarewa) – The importance of terrestrial and freshwater molluscs for palaeoecological studies: examples from the German Miocene	Felicity Masters (University Sunshine Coast) – Stress in Pearl oysters: Transcriptional investigation of responses to extreme temperature and salinity.	
14:30-14:50	Bryce Peebles (University of Otago) – Resolving a Quandary: The Preservation of Chiton Valves	Scott Cummins (University Sunshine Coast) – How investigation into secreted snail proteins can have massive health and economic implications	
14:50-15:10	Afternoon Tea (Rangimarie 2)		
15:10-17:30	Mini-Workshop: Major challenges in molluscan aquaculture (Rangimarie 1) Chair: Carmel McDougall	Mini-Workshop: Photography of molluscs and collection management (Rangimarie 3) Chair: Lisa Kirkendale, Platon Vafiadis & Kara Layton	Field Trip: Victoria University of Wellington marine lab and Taputeranga Marine Reserve
18:00	Conference dinner (Foxglove)		

Wednesday 5th December, 2018

8:55-9:00	Announcements (Rangimarie 1)		
9:00-9:45	Keynote presentation - Robert Cowie (University of Hawaii): Denying the Sixth Extinction: a counterpoint		
9:45-10:30	Keynote presentation - Pauline Ross (University of Sydney): Resilience of Molluscs to a Changing Ocean		
10:30-11:00	Morning Tea (Rangimarie 2)		
	PARALLEL SESSIONS		
	Symposium: Ecology, conservation and environmental restoration (Rangimarie 1) Chair: Don Colgan	Symposium: Climate Change (Rangimarie 3) Chair: Pauline Ross	
11:00-11:20	Bob Creese (Southern Cross University) – Brooding in Australasian chitons: are there any patterns?	Abby Smith (University of Otago)–Skeletal carbonate mineralogy of abalone, especially <i>Haliotis iris</i> Gmelin, 1791.	
11:20-11:40	Regan Fairlie (University of Waikato) – The Environmental History of Tauranga Moana	Sherry Sayco (University of the Philippines Diliman) – Behavioural response of juvenile <i>T. gigas</i> exposed to low salinity or elevated seawater temperature	
11:40-12:00	Kath Walker (Department of Conservation) – Diversity within and conservation of New Zealand's large land snail <i>Powelliphanta</i>	Le Ma (Murdoch University) – Tolerance to acute and gradual increases in salinity in a freshwater mussel	
12:00-12.20			
12:20-13.50	Lunch (Rangimarie 2) MSA AGM (Rangimarie 1)		
	Symposium: Ecology, conservation and environmental restoration (Rangimarie 1) Chair: Nicole Phillips	Symposium: Biochemistry and Physiology (Rangimarie 3) Chair: Carmel McDougall	
13:50-14:10	Fred Wells (Curtin University) – Growth rates of potamidid snails in mangroves in northern Australia	Kirsten Benkendorff (Southern Cross University) – Risks associated with neonicotinid pesticide exposure in Sydney Rock Oyster	
14:10-14:30	Matthew Bennion (University of Waikato) – Gas bubble disease and rickettsiosis in New Zealand surf clams	Kate Ballard (University of the Sunshine Coast) – Molecular components of the trail mucus in the Common Garden Snail, <i>Cornu aspersum</i>	
14:30-14:50	Corey Whisson (Western Australian Museum/ Murdoch University) – Un-earthing the true diversity of the Australian land snail genus <i>Bothriembryon</i> (Gastropoda, Orthaloidea)		
14:50-15:10	Alison Duncan (Victoria University of Wellington) – Gastropod Communities of Seagrass Meadows in a central New Zealand estuary		
15:10-15:40	Afternoon Tea (Rangimarie 2)		
15:40-16:00	Closing session: student prizes and concluding address by the MSA president (Rangimarie 1)		