Triphoridae in northern New South Wales – diversity and new records.

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The coastline of northern New South Wales possesses a high diversity of molluscs and was an apt venue for the MALSOC conference in Nov-Dec 2015. The faunal composition of the area is largely a mix of three groups: 1). temperate Australian species at or near their northern end of range; 2). incursive tropical species, and 3). eastern seaboard endemics. North of Coffs Harbour the fauna is quite different from that seen even around Sydney, with, as one might expect, a much higher diversity and proportion of tropical species present.

Emblematic of this is the family Triphoridae, a group of generally sinistral gastropods which feed on sponges. Temperate Australian species were reviewed by Marshall (1983), who imaged most using SEM. A very useful guide was published more recently by Beechey (2015), which contains the first published colour images for many named taxa. Apart from those references, additional sources of information on south-eastern Australian species include Wilson (1993), Stephens & Vafiadis (2015) and Stephens (2015).

Between 2008 and 2015 I was fortunate to spend several months on the northern NSW coast and was able to collect and analyse some fairly extensive samples of shellgrit. Upon the publication of Beechey (2015), I realised that several identified species had not been previously recorded from NSW, and/or not illustrated by Beechey. A few short notes on these and other species are provided below, including 8 new records for NSW. The presence of unrecognised Triphoridae in the north of the state is no surprise; nevertheless, this information may be of benefit to anyone sampling or surveying in the area. Hopefully the present article can function as an adjunct to, and extension of, the work of Beechey (2015).

Northern New South Wales Triphoridae, Plate 1. A. Monophorus monachus (Hervier, 1898), Minnie Water (LSC-4074); B. Obesula turricula? (Hervier, 1897), Minnie Water (LSC-4070); C. Cautotriphora herrieri (Kosuge, 1962), Minnie Water (LSC-2651); D. Costatotriphora iniqua (Jousseaume, 1884), Minnie Water (LSC-2975); E. Coriophora ustulata (Hervier, 1898), Mullaway (LSC-3166); F. Mastonia millepunctata (Kosuge, 1962), Minnie Water (LSC-3337); G. Subulophora rutilans (Hervier, 1898), Minnie Water (LSC-4068); H. Mastonia vulpina Hinds, 1843, Mullaway (LSC-3271). Scale bars: 1 mm. (All photos by Lynton Stephens).
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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.)

Communal egg laying in a temperate Australian buccinid snail.

Cominella lineolata (Lamarck, 1816) is a variably patterned, common and widely distributed temperate Australian gastropod. In summer it has been observed to lay egg capsules communally in significant numbers under littoral rocks, forming an impressive sight. The flask-shaped, 5-6 mm long capsules each contain 6-14 yellow eggs which all develop (“although some may feed on others”) and emerge as crawling juveniles; in addition to rocks, capsules may also be attached to each other or to algae (Smith, Black & Shepherd, 1989).


Text & photo: P. Vafiadis

Cominella lineolata with egg capsules in the rocky littoral zone. San Remo, Victoria, 5 November, 1998
Barry Wilson passed away on the 12 June 2017. Our MSA records indicate Barry was one of the longest-standing members of the society with over 60 years of involvement. Volume 1 of the journal (September 1957) has an alphabetical list of members - the last name on the list is Mr. Barry Wilson, 199 Hensman Road, Subiaco, Western Australia (WA).

Barry was a truly brilliant scientific pioneer in a frontier region of the world. Born in the southwest of WA near Busselton, he collected and sold seashells to put himself through school. He received his PhD from University of Western Australia (UWA) in 1965 and spent a year (1964-65) as a Fulbright Scholar and Research Fellow at the School of Evolutionary Biology, Harvard University, USA. He then returned to Australia and was appointed Curator of Molluscs at the Western Australian Museum (WAM), later becoming Head of Science in 1967. Barry began to develop the mollusc collection, with WA Naturalist material forming the basis for the first major collection at the WAM. He was responsible for organising important WAM expeditions around the coasts of WA, including deep dredging off Rottnest (Bluefin 1962, 1965) and the southwest (Diamantina 1963, 1972, 1976), expeditions to Abrolhos (1963) and later the Crown of Thorns Survey in the Dampier Archipelago (1970s). He was involved in other significant expeditions further afield including the Mariel King expeditions to northern WA and Indonesia, as well as trips to Puerto Rico and Eastern Polynesia (Marquesas, Tuamotus and Pitcairn). There are thousands of lots in the WAM mollusc collections attributed to Barry, but also across other taxonomic groups, attesting to the numerous team efforts that he was instrumental in galvanizing in the region.

After working at the WAM, Barry held positions as Director of the Museum of Victoria (now Museums Victoria) (1979-1984) and Director of Nature Conservation in the Department of Conservation and Land Management in WA (1985-1999). In 1994, Barry was responsible for “The Wilson Report” (A Representative Marine Reserve System for Western Australia, Report of the Marine Parks and Reserves Selection Working Group) when he was head of the Marine Parks and Reserves Authority. It has been suggested that this report provided the impetus for the creation of the Marine Parks in WA. Two of the State’s first marine parks, Ningaloo and Shark Bay, which were created under Barry’s term as Director of Nature Conservation, are now World Heritage listings. He once told me that “achieving World Heritage listing for these two very special places were the biggest achievements of my life (so far - who knows what comes next?)”. He was active in service. Besides his involvement with MSA, he was a Research Associate of the WAM and an Honorary Life Fellow of Museums Victoria, an Honorary Research Fellow at UWA, a Trustee of the Worldwide Fund for Nature, and a member of the IUCN Commission on National Parks and Protected Areas.

He leaves an impressive publication legacy, grounded in malacology, including seven books on Australian marine fauna and biogeography. These include early works, such as Australian Shells (with Gillett) first published in 1972, which inspired a generation of molluscan biologists in Australia. This later evolved into the two volume Australian Marine Shells (1993-4, cover of Vol. 1, 1993, pictured below), which was an enormous accomplishment in the then early days of guide books, with its beautiful images, salient biological information and distributional records—works still significant today. Later volumes bring together not only his faunal interests, which extended beyond molluscs, but also his vast experience and love of WA, which moved him to become active in conservation and the protection of significant areas. These include The Biogeography of the Australian Northwest Shelf (2013, pictured on p.4),
and his frank assessment of marine reserves in WA in *Big, Bold and Blue: Lessons from Australia’s Marine Protected Areas* (2016).

I feel lucky to have spent time with him recently at the WAM and at his home discussing molluscs, biogeography and ambitious workshop plans for the future. I was just getting to know Barry and I feel that I still had so much to learn from him when he passed away. It was not enough time, though truthfully, I would have needed many years. Barry was interested in all molluscs, including land snails, with early work in the Kimberley rainforests in the 70s. Later work concentrated on cowries, cardiids and volutes; however, he had a lifelong passion for mytilids. We were working together on the molecular systematics of *Lithophaga* and co-evolutionary potential with corals; this work will be dedicated to him once complete.

His contribution and support to the disciplines of malacology and nature conservation, both nationally and internationally, are truly impressive and Barry was well respected by all who worked with him. Over the last month, WAM staff have received condolence notes from around the world - his generosity, knowledge, ideas and plans were widely appreciated. However, it is his inscription in the copy of the monumental accomplishment *The Biogeography of the Australian Northwest Shelf* that he donated to the WAM library that best sums up the lovely and humble person I knew, simply, “For the use of all my friends in WAM. I hope it is useful”. He will be deeply missed.

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**Errata**

Thanks to Mr. Chris Rowley, Collection Manager at Museum Victoria, for pointing out that there is an error in the stated registration number of *Trivellona excelsa* in the article by Stephens (‘Unexpected live records of *Trivellona excelsa* Iredale, 1931 from off the Victorian coast’, MSA Newsletter 161, April 2017, p. 9). The registration number of the specimen illustrated should have read NMV F161091, not NMV F169435 as cited in the newsletter.

There is an error in the caption to Figure 2 (page 5) in the article ‘The genus *Eutriphora*—notes on four species of Triphoridae from south-eastern Australia’ by Stephens & Vafiadis (MSA Newsletter No. 153, January 2015). The caption states that Figures 2C and 2D, both showing *Eutriphora armillata*, depict the same animal, of shell length 11.0 mm, from Eagle’s Nest, near Inverloch, Victoria, under lower littoral rocks, 15 March, 2008.

This data actually applies only to Figure 2C, except for the shell length (which was 5 mm) and the station (it was sieved from silt underneath a lower littoral rock).

Figure 2D is *Eutriphora armillata*, shell length 11.0 mm, from Inverloch, Victoria, under a lower littoral rock, 26 March, 2007.

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**Scheduled release of Australian Land Snails (Vol. 2) in late 2017**

The long-awaited Volume 2 of *‘Australian Land Snails’* by Stanisic, Shea, Potter & Griffiths is due to be released in October-November, 2017. Volume 1 covered the eastern Australian fauna, and Volume 2 will cover the southern, central and western species.

See also Dr. John Stanisic’s website, [https://thesnailwhisperer.com](https://thesnailwhisperer.com) (from which the above image of the book’s front cover was taken) and also his blog at [https://factsaboutsnaills.com](https://factsaboutsnaills.com)
Cape Peron, some 30km south of Perth, Western Australia, is a limestone promontory that shelters the vast Cockburn Sound to the north from prevailing swell from the southwest. Numerous factors contribute to the continued erosion of the Cape’s soft limestone and this is aided by an abundance of boring urchins that continuously excavate vast sections of the intertidal reef. As a result, conditions suited to the formation of tidal pools are not favourable and in times of large swell and strong winds, as was the case on 23 March 2017, little calm water was available, a must when taking super-macro photographs in shallow water. Indeed, finding cryptic and diminutive sea slugs (which most are) by snorkel requires optimal conditions. Nevertheless, the topography of a small section of the cape, aided by an abundance of talus from a recent cliff collapse, provided a small area of calm water, albeit only one metre deep and only a few metres across, at the peak of the diel high tide.

On first inspection, the pool, glaringly white, appeared devoid of life, save for a few foraging fishes that had migrated with the rising tide. The presence of turnable rocks which so often promise success when looking for sea slugs, failed to support much sessile biota. However, the permanently submerged parts of the pool, in some places perhaps only 30 cm deep at low tide, did support small areas of algal turf and *Zonaria* sp.

The Sacoglossa (Mollusca: Heterobranchia) are a diverse order of sea slugs exhibiting a variety of body forms and shell structures. The order is united by the presence of a radula with a single row of teeth adapted to allow suckorial feeding of the cell contents of marine algae. In Western Australia (WA) there are dozens of species of Sacoglossa (Wells & Bryce, 1993), many of which are undescribed, although in Jensen & Wells (1990), only seven were reported from the south.

The genus *Elysia* Risso, 1818 is the most diverse group (Gosliner, Valdés, & Behrens, 2015) in the family Plakobranchidae, which itself is the largest family of the Sacoglossa (Jensen, 1996). As specialised herbivores, some *Elysia* are able to sequester photosynthetic chloroplasts...
from their dietary algae and incorporate these into their tissues, a process known as kleptoplasty (Maeda, Kajita, Maruyama & Hirano, 2010). The chloroplasts thereafter provide a source of nourishment (Greene, 1970).

The small quantities of algal turf with its complement of fine, thread like green algae in an apparently barren pool at Cape Peron was enough to sustain a community of sacoglossan sea slugs: three species in the family Plakobranchidae and one from the Limapontiidae. *Elysia thompsoni* Jensen, 1993 was reported to occur in Western Australian from Shark Bay to Rottnest Island (Jensen & Wells, 1990). With such a wide distribution, it was no surprise to see this 12 mm specimen (Figure 4) among its less common congeners at Cape Peron.

Next to the *Elysia australis*, crawling amongst the sand and turf, was a 10 mm *Elysia* sp. with tiny black speckles and sparse, vivid, sly-blue spots (Figure 5).
Originally described from the Mediterranean, the limapontiid sacoglossan *Placida cremoniana* (Trinchese, 1893) has since been found to have a circumtropical distribution (SURG, 2014). Whilst global distribution records are patchy, there are numerous observations on the east Australian coast (ALA, 2015; Nimbs & Smith, 2017). Its presence in the eastern Indian Ocean is poorly known, however a recent, first observation from Singapore confirms its presence there (Toh, 2016). Known to consume filamentous algae, and occasionally seen in large numbers where conditions and food sources are suitable (pers. obs. in northern N.S.W.), the fresh algal growth at Cape Peron was conducive to the settlement and development of this species there.

Although *Placida cremoniana* is mentioned in Coleman (2015) as occurring in the state, there are no location details. A 9 mm specimen was the only specimen in the pool and exhibits the characteristic external features (Figure 6, page 8). This is one of the few observations of *P. cremoniana* from WA; the earliest observation may be of a single specimen at Woodman Point Jetty by Chandy De Wit in July, 2013 (pers. comm.).

**References**


Even in the cool waters of Victoria, the Triphoridae are a prolific group, with up to 18 species found at a single locality (San Remo). However, the numbers observed in northern NSW are higher still. The most diverse site sampled (Minnie Water) yielded 35 species (27 identified and 8 unidentified). Based on my own collecting and the records of Marshall (1983), the coastline between Yamba and Coffs Harbour possesses at least 50 species (35 identified and at least 15 unidentified). Further intensive sampling in various habitats (shoreline gravel assemblages, inshore reefs, offshore islands and continental shelf) would undoubtedly extend these numbers further. Additional unidentified and unnamed specimens likely exist in museum collections.

Moving north into truly tropical waters, the family Triphoridae becomes prodigiously diverse. Marshall (1983: 1) noted at least 80 species from a single subtidal sample taken at Euston Reef, Queensland. A megasampling project at Koumac in New Caledonia revealed 174 species from a 294 km² site (Bouchet et al. 2002), with a similar survey at Espiritu Santo, Vanuatu yielding a massive 259 species from 450 km² (Albano et al., 2011). The tally for a 2004 survey of a 150 km² site at Panglao, Philippines, has not yet been finalised, but is likely to be enormous since over 6000 mollusc species were sampled in total (de Forges et al., 2009).

Species notes:

**Aclophora xystica** (Jousseaume, 1884) (fig. I): A widespread tropical species, for which Marshall (1983) reported one specimen from NSW waters, the type of *Notosinister grandiosa* Laseron, 1954 (synonymised), collected from Woolgoolga. It was not featured by Beechey (2015). A second NSW specimen was found at Angourie (fig. I). The species has been figured by Hasegawa (2000) and Poppe (2008).

**Cotiophora ustulata** (Hervier, 1898) (fig. E): This species is a new record for NSW. A distinctively-pigmented and widespread tropical species. The brown nodules on spirals 4 and 5 of the final whorl, plus the characters of the apex, render it easy to recognise. It has been figured by Cernohorsky (1978), Hasegawa (2000) and Poppe (2008). An image of a syntype (from Lifou) is available at WORMS. At least 8 specimens were found (3 intact) from Minnie Water and Mullaway.

**Cautotriphora hervieri** (Kosuge, 1962) (fig. C): This species is also newly recorded from NSW. Very distinctive on account of the orange and lavender pigmentation and the twin spiral threads on the protoconch. The teleoconch surface has numerous fine interstitial spiral threads. The species has been figured by Cernohorsky (1978), Hasegawa (2000) (in the genus *Monophorus*) and Poppe (2008). A living specimen was photographed at Brunswick River, NSW (see Rick 2013a, left-hand shell in the uppermost image). At least 8 specimens were collected, one well preserved, all from Minnie Water.

**Costatotriphora iniqua** (Jousseaume, 1884) (fig. D): This species has already been reported from NSW by Marshall (1983) (in the genus *Tetraphora*, 3 specimens between Angourie and Sydney), and Beechey (2015). According to Marshall (1983), there are two separate colour forms (*kawamurai* and *iniqua*). Beechey (2016) illustrated a form in which the brown pigmentation is restricted to 4 fine, interstitial lines bordering spirals 1 and 5. I found the species to be not rare in northern NSW (5 intact or nearly intact specimens collected, plus...
other fragments). All specimens exhibited solid pigmentation across spirals 1, 4 and 5, matching the shell figured by Hasegawa (2000).

*Mastonia funebris* Jousseaume, 1884 (fig. M): A single example was found at Minnie Water on 14 September 2013 (LSC-4069), comprising a new record for NSW. Fortunately the shell is also in superb condition. The species was described from New Caledonia and an image of a high quality syntype is available on WORMS.

*Mastonia millepunctata* (Kosuge, 1962) (fig. F): At least 9 specimens were found at Angourie, Minnie Water & Mullaway, representing first records for NSW. The species is figured by Hasegawa (2000) and Poppe (2008). *Mastonia maenader* Jousseaume, 1898, described from the Red Sea, appears to be similar, if not conspecific (a syntype is figured by WORMS).

*Monophorus monachus* (Hervier, 1898) (fig. A): A new record for NSW, although it is rather common, with many dozens collected from localities as far south as Mullaway. A decollate syntype is figured on WORMS. It is also figured by Hasegawa (2000) and Poppe (2008). Distinctive characteristics include twin spiral ribs on the protoconch, a slightly darker hue on spiral 2 and pale whorls on the upper teleoconch. Superficially similar to *Adolphopsis xystica* (Jousseaume, 1884) and *Monophorus angasi* (Crosse & Fischer, 1865), but should be easily distinguishable.

*Mastonia rubra* (Hinds, 1843) (not figured): This species, which exhibits a vivid lavender teleoconch, is a tentative new record for NSW based on 2 slightly degraded specimens from Minnie Water and a living specimen photographed at Hastings Point by Rick (2013b, uppermost shell in the right hand column). See also Hasegawa (2000) and Poppe (2008).

*Obesula turricula*? (Hervier, 1897) (fig. B): Several fragments of this species were obtained from north of Coff’s Harbour, plus an intact specimen (fig. B, LSC-4070) from Minnie Water. A decollate syntype is figured on WORMS, whilst intact specimens have been figured by Cernohorsky (1978) and Hasegawa (2000). The latter reference notes that “Placement of the species in this genus is tentative.” There is a strong superficial resemblance to the temperate Australian species *Adolphopsis festiva* (A. Adams, 1851), which was reported as far north as Gabo Island by Marshall (1983). *Adolphopsis mcmichaeli* (Kosuge, 1962) is also a very similar species; indeed, I am not entirely clear on how to distinguish between this and *O. turricula*. *A. mcmichaeli* is figured in Cernohorsky (1978) (as *Cautor mcmichaeli*) and Hasegawa (2000). The figure of *Cautor maculosa mcmichaeli* by Poppe (2008) appears extremely similar to *O. turricula*, and the protoconch characters do not seem a particularly good match for the figure of *A. mcmichaeli* by Hasegawa (2000).

*Subulaphora rutlans* (Hervier, 1897) (fig. G): A synonym of this species, *Notosinister stramentia* Laseron, 1954, was described from Port Stephens, however no other NSW specimens were cited by Marshall (1983) and the species was not figured by Beechey (2015). Several damaged specimens were found north of Coff’s Harbour, between Angourie and Mullaway, plus one well-preserved, intact specimen from Minnie Water (fig. G). The species has been figured by Marshall (1983), Wilson (1993), Poppe (2008) and Hasegawa (2000).

*Viriola vulpina* (Hinds, 1843) (fig. H): This is another widespread Indo-Pacific species, figured by Hasegawa (2000), which is a new record for NSW. Several specimens were found at Mullaway and Minnie Water, including one almost intact (fig. H).

Others: *Obesula tribulationis* (Hedley, 1909) and *Euthymella kosugei* Marshall, 1983 were recorded from the Solitary Islands, NSW, by Marshall (1983), but are absent from Beechey (2015).

All material studied and illustrated is held in the author’s collection, with database numbers given in the captions (LSC = L. Stephens collection).

References:


