

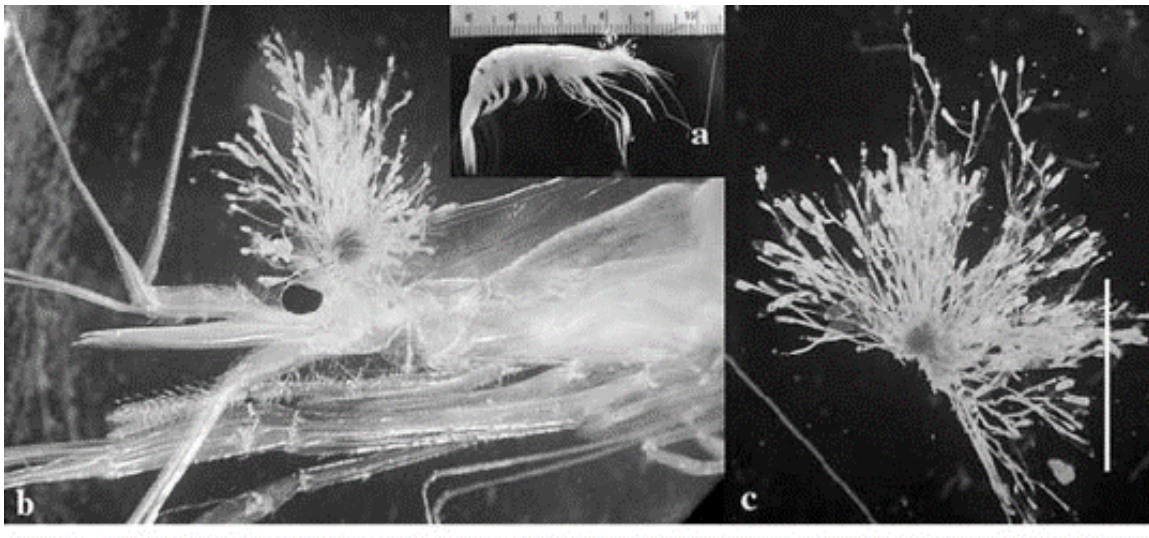
SOUTHERN CALIFORNIA ASSOCIATION OF MARINE INVERTEBRATE TAXONOMISTS



May–August 2023

SCAMIT Newsletter

Vol. 42 No. 1-2



Pasiphaea pacifica Rathbun 1902, with a hydroid toupé (from Widmer et al 2009)

This Issue

1 MAY 2023 POLYCHAETE PROVISIONALS & TOOLBOX REVIEW, PART IV, ZOOM	2
12 JUNE 2023, DISCO IDS, NHMLAC	3
JULY/AUGUST 2023 – NO MEETINGS DUE TO BIGHT ‘23	4
ARTHROPOD PERSONALS CONTINUED	4
NEP OVULIDS	4
SCAMIT OFFICERS	5

The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes

Publication Date: August 2024

1 MAY 2023 POLYCHAETE PROVISIONALS & TOOLBOX REVIEW, PART IV, ZOOM

Attendance: Brent Haggin, LACSD; Ricardo Martinez-Lara, Veronica Rodriguez-Villanueva, Maiko Kasuya, Adam Webb, CSD; Leslie Harris, NHMLAC; Erin Oderlin, Greg Lyon, Jennifer Smolenski, Danielle Ayala, CLAEMD; Ernie Ruckman, Rob Gamber, OCSO; Erica Keppel, Smithsonian; Kelvin Barwick, DCE; Chip Barrett, EcoAnalyst; Tom Biksey, Retired – Formerly of Don Reish Lab, CSULB.

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the most current meetings announcements.

Kelvin continued his review of the polychaete toolbox files that can be found on <https://www.scamit.org>.

This meeting completed the review of toolbox files and covered the families Pectinariidae, Terebellidae, Trichobranchidae, Capitellidae, Orbiniidae, Paraonidae, Opheliidae, Scalibregmatidae, Traviidae, Maldanidae, and Cossuridae. Leslie Harris recommended that the ID sheets for *Pectinaria granulata* (now *Cistenides granulata* (Linnaeus, 1767)) be removed from the toolbox as it is not found locally. The voucher sheet for *Lanice conchilega* (Pallas, 1776) will be updated to *Lanice* sp A SCAMIT, 2023 § as *L. conchilega* has had its range restricted to the sandflats of Europe.

A brief discussion on local *Pista* provisional species was had.

- It was decided that *Pista* sp beta Lovell, 2006 § should still be considered a valid local provisional species. It has a unique stain pattern and is from shallow water.
- *Pista wui* was described from Vancouver Island, British Columbia, Canada, and it is likely that true *Pista wui* is not found locally. The local species referred to as *Pista wui* is sampled in deeper water stations.
- *Pista* sp E Harris, 2013 § is also still a valid local provisional species and is part of the local *Pista brevibranchiata* complex.

Brent will work on getting some image sheets for these species on to the SCAMIT provisional species website.

Numerous other voucher and ID sheets will be combined into single files to help reduce the toolbox clutter.

Leslie provided a URL for NMBAQC.org. This website is for the NE Atlantic Marine Biological Analytical Quality Control scheme and the organization provides a similar role as SCAMIT in the British Isles. The website has links to many taxonomic keys created by the group. While the keys are targeted for the British fauna, the keys and site also contain valuable morphological information on the families.

<https://www.nmbaqcs.org/scheme-components/invertebrates/literature-and-taxonomic-keys/>



12 JUNE 2023, DISCO IDs, NHMLAC

Attendance: Brent Haggin, Norbert Lee, LACSD; Leslie Harris, NHMLAC; Joanne Linnenbrink, Nicholas Galliani, CLAEMD; Dean Pasko, Tony Phillips, Kelvin Barwick, DCE.

A reminder was made to those in attendance that there will not be a meeting in July or August due to the Bight '23 field season. The next meeting will be in September and will cover the polychaete family Capitellidae, hosted by Brent Haggin. Brent will attempt to host a hybrid meeting at the LACSD facility.

The Discovery Initiative for the Southern California Ocean (DISCO) is a research initiative of the Natural History Museum of Los Angeles County. Its aim is to greatly enhance the ability to discover and document biodiversity in the marine environment by applying modern genetic technology (<https://research.nhm.org/disco/>). The Los Angeles Urban Ocean Expedition was a two-week long collection expedition focused on the Palos Verdes peninsula and the Ports of Los Angeles and Long Beach. The expedition was conducted between August 19 and September 2, 2019, with initial sorting and identification of live organisms conducted at AltaSea at the Port of Los Angeles. Taxonomists from across the United States, including many SCAMIT members from local agencies, participated in the initial collection and taxonomic efforts. This was a very enjoyable experience, as attempting to identify a worm that not only still has pigment, but was trying to escape the forceps, is far more entertaining than the stiff, colorless versions we normally get to encounter.

Thank you to SCAMIT members who were able to assist in the initial taxonomic efforts: Cody Larsen, Greg Lyon, Erin Oderlin, Jennifer Smolenski (CLAEMD); Tony Phillips (DCE); Christine Boren, Don Cadien, Bill Furlong, Brent Haggin, Norbert Lee, Bill Power (LACSD); Leslie Harris, Austin Hendy, Kathy Omura, Regina Wetzter (NHMLAC); Kimo Morris (Santa Ana College); Marie Nydam (Soka University), Tom Turner (UCSB).

On June 12, 2023, after almost four years of postponements due to COVID, members of SCAMIT were finally able to descend upon the Natural History Museum of Los Angeles County to put IDs to some of the organisms collected as part of the DISCO project. Brent, Norbert and Nicholas joined Leslie to look at Polychaetes while Joanne, Tony, Dean and Kelvin joined Regina to look at Molluscs and Arthropods.

Brent and Norbert reviewed 22 individuals, with 11 species from 6 locations. Three of the individuals were either juvenile or an anterior fragment and were identified only to the genus, *Notomastus* sp., and 2 individuals were determined to be a new provisional species and given the name *Notomastus* sp LA3 Haggin, 2023 § (Capitellidae). Details of this provisional species are provided during the September 2023 polychaete meeting on the Family Capitellidae. Other species identified were *Phyllochaetopterus prolifica* Potts, 1914 (Chaetopteridae); *Euphrosine aurantiaca* Johnson, 1897 {4 individuals} (Euphrosinidae); *Poecilochaetus martini* Brantley, 2009 {4 individuals} (Poecilochaetidae); *Harmothoe* sp C Harris, 2018 § {2 individuals} (Polynoidae); *Dipolydora bidentata* (Zachs, 1933) and *Spiophanes duplex* (Chamberlin, 1919) (Spionidae); *Polycirrus* sp OC1 Phillips & Lovell, 1999 § and *Polycirrus* sp A SCAMIT, 1995 § (Terebellidae).

An individual of *Goniada* sp A SCAMIT, 2023 § was identified from the Port of Los Angeles that lacked the distinctive pigment pattern described in the voucher sheet. The holotype of *Goniada acicula* Hartman, 1940 from Angel de la Guardia Island, Mexico was also reviewed. Both



Goniada acicula and *Goniada* sp A lack capillary notochaetae in the posterior notopodia but it was confirmed that *Goniada acicula* has two prechaetal lobes on chaetiger 5 while *Goniada* sp A only has one prechaetal lobe on chaetiger 5.

11 individuals that matched the description of *Streblospio benedicti* Webster, 1879 from Coos Bay, Oregon were reviewed as well. The individuals had a dorsal ridge on chaetiger 2 and 1 pair of branchiae. This species was originally described from the Atlantic Ocean near New Jersey but WoRMS shows it as being an introduced alien species along the U.S. west coast from Canada to Mexico.

Dean put IDs to 5 species of arthropods across 22 individuals. His IDs included *Neotrypaea gigas* (Dana, 1852) (Callinassidae); *Ianiropsis tridens* Menzies, 1952 {15 individuals} (Janiridae); *Pontogeneia rostrata* Gurjanova, 1938 {2 individuals} (Pontogeneidae); *Exosphaeroma inornata* Dow, 1958 (Sphaeromatidae); and *Joeropsis dubia paucispinis* Menzies, 1951 {2 individuals} (Joeropsididae).

After the IDs were concluded, Dean Pentcheff gave us a tour of the collections room and showed us the museum's Label Digitization project. This will allow for easy searching of the museum's collections when complete.

JULY/AUGUST 2023 – NO MEETINGS DUE TO BIGHT '23

ARTHROPOD PERSONALS CONTINUED

Attached you will find a continuation of Don Cadien's series discussing the wonderful world of arthropods.

NEP OVULIDS

Attached is an in-depth review by our fearless Don Cadien of the North Eastern Pacific Ovulidae.



Please visit the SCAMIT Website at: www.scamit.org

SCAMIT OFFICERS

If you need any other information concerning SCAMIT please feel free to contact any of the officers at their e-mail addresses:

President	Brent Haggin	(562)908-4288 x 5672	bhaggin@lacsds.org
Vice-President	Leslie Harris	(213)763-3234	lharris@nhm.org
Secretary	Megan Lilly	(619)758-2336	mlilly@sandiego.gov
Treasurer	Erin Oderlin	(310)648-5477	erin.oderlin@lacity.org

SCAMIT is a 501(c)(3) charity. The newsletter is published every two months and is distributed freely to members in good standing. Membership is \$20 for an electronic copy of the newsletter, available via the web site at www.scamit.org, and \$35 to receive a printed copy via USPS. Institutional membership, which includes a mailed printed copy, is \$65. All correspondences can be sent to the Secretary at the email address above or to:

SCAMIT
PO Box 50162
Long Beach, CA 90815

Arthropod Personals-Seeking companion?

Part 2 – ‘That toupé is ALIVE!’ -dbcadien, WWRF, Los Angeles County Sanitation Districts 27Nov23

Relationships between different organisms are spread across a spectrum of types, but all deal with symbiosis (aka commensalism): the interrelationship of two different species. These are rarely neutral, infrequently of mutual benefit, and usually detrimental to one of the partners. Such is the relationship between the ectoparasite *Thalassomyces* and the pasiphaeid shrimp *Pasiphaea pacifica* within the SCB. We see them frequently in our trawls, but they don't enter our trawl data as they are holoplanktonic (like salps or medusae) and so not invertebrates to report in a bottom trawl. Pasiphaeid shrimp are on the SCAMIT listing however, represented by two species *Pasiphaea tarda* and *P. pacifica*. Of the two *tarda* is much less frequently taken, living deeper mostly beyond our sampling range, and bright red. Our typical 'glass shrimp' is *P. pacifica*. Other species also are reported from off California, but at deeper depths than even *P. tarda*. The parasite *Thalassomyces* is found on top of the head of the shrimp, as a tuft of branching structures that is difficult to interpret. It looks like a very bad toupé, or more accurately a Don King fright wig, and is unattractive.



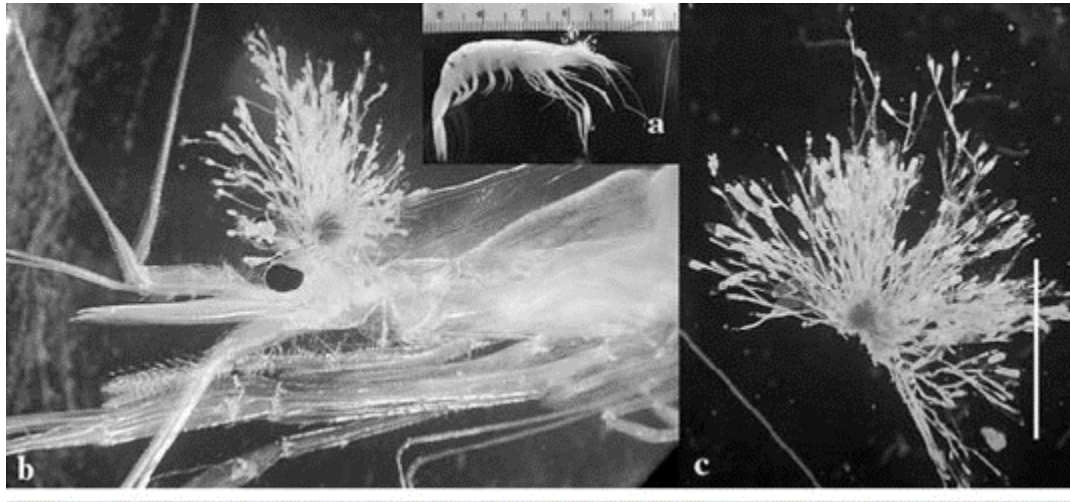
An euphausiid shrimp bearing a different but related parasite (from Hoffman and Yancey 1966)

Thalassomyces is an ellobiopsid parasite (family Ellobiopsidae, subphylum Dinozoa, phylum Myzozoa, kingdom Chromista), which is usually referred to as a parasitic dinoflagellate (see Shields 1994). It is worth noting that members of the other subphylum of Myzozoa, Apicomplexa, include both the organisms causing malaria and *Toxoplasma gondii*, a human brain parasite (Thomas et al 2012) often contracted from cats (see Bachvaroff et al 2014). As such it is neither animal, fungal nor plant, and is not listed in the SCAMIT listing. It is related to other damage and disease causing dinoflagellates, including that causing the 'bitter crab' disease that adversely affects the snow crab fishery in Alaska (see Meyers et al 1987). Little is known of the effects the parasite has on the shrimp, although, as a neuroparasite, it probably affects behavior and survival of the host. There is also some evidence that, like parasitic barnacles, thalassomysids suppress reproduction in the host. WoRMS lists only seven valid taxa of *Thalassomyces* (WoRMS 2023), missing several of the taxa that Shields 1994 lists:

https://www.vims.edu/research/units/programs/crustacean/research/parasitic_dinoflagellates/index.php.

As the missing species are neither discussed, nor placed into synonymy, the current WoRMS listing appears incomplete. Based on the listed connections between host and parasite in Shields 1994, the species we see on *P. pacifica* is *T. capillosus* (Fage, 1938). This is the host-parasite pair presented by Butler 1980 in his Shrimps of the Pacific Coast of Canada. He also illustrates the association as being immediately behind and above the rostrum of the host, rather than at the posterior margin of the head as in the euphausiid above. Butler discusses a number of shrimp parasites, but all the rest are other arthropods. Most arthropod personals are seeking other arthropods, keeping it close to home. Ellobiopsid parasites are often host specific, although a number, such as *T. capillosus*, are known to occur on multiple hosts. Where that is the case the hosts are ecologically similar and typically have overlapping bathymetric and geographic ranges. Some species of *Thalassomyces* occur only on mysids or euphausiids, but most appear to be found on holopelagic hosts; only a few frequenting benthopelagic forms. Several are known from amphipods, where they occur as brood parasites (Vader and Berge 2004). Their developmental cycle begins with host ingestion of a spore, which then leaves the gut and migrates to the surface of the host. There it transforms into a "fixation organ", a cuticularized anchor for the colony-to-be. This puts out rootlets into the surrounding tissue, through which it derives nutrients. The fixation

organ puts forth trophosomes during ecdysis, which push out through the soft carapace into the surrounding medium. There they grow and eventually produce gonosomes, which produce spores and complete the cycle. Just to add some spice to this situation, it appears that not all toupés are the same. At least in Monterey Bay, *P. pacifica* occurs both with *Thalassomyces capillosus* and with the hydroid of *Earleria corachloae* in the same position on the carapace, and in the same trawl hauls (see Widmer et al 2009). We do not have this hydroid on the SCAMIT list, as



Pasiphaea pacifica with hydroid instead of dinoflagellate on head (from Widmer et al 2009)

it has, as yet, not been reported from our area (nor has any Mitrocomid species). It may occur here, and, as the only known habitat for the hydroid stage of the species is on the heads of pasiphaeid shrimp, we need to keep on the lookout for it in our catches. Fortunately the nature of branching of the hydroid, and its more slender hydrocaulus, separate it from the less branched and thicker trophosomes of *Thalassomyces* if one examines the growth with a loupe in the field.

Can this be just coincidence? The hydroid is almost certainly only a passenger rather than a parasite of the shrimp. Why did it localize in the same position as the parasite? Did it initially settle from the plankton onto the parasitic dinoflagellate trophosome, later overgrowing it and leading to its demise? Is there something about the structure of the pasiphaeid head that makes it hydrodynamically desirable for larval settlement? Widmer et al (2009) discuss the issue of epibiosis on macrofauna by hydroids, but suggest no concrete rationale or mechanism. Many questions remain unanswered about the relationship between these shrimp and their associates.

Heads have been scratched over thalassomyces before. For many years their placement was in dispute, and it is only in fairly recent history that molecular data has placed them in their current position (Gómez et al 2009). While they have also been considered as relatives of flagellates or fungi, their most frequent placement has been with the dinoflagellates. Most members of the group are biflagellate, as are dinoflagellates. There are, however, the odd species bearing only one which muddies the phylogenetic waters. Strange bedfellows for any arthropod, but involved in numerous parasitic relationships with various members of the phylum: copepods, nebaliceans, amphipods, euphausiids, mysids, crabs and shrimp.

Literature Cited:

- Bachvaroff, T. R., S. G. Gornik, G. T. Concepcion, R. F. Waller, G. S. Mendez, J. C. Lippmeier and C. F. Delwiche (2014). "Dinoflagellate phylogeny revisited: using ribosomal proteins to resolve deep branching dinoflagellate clades." *Molecular Phylogenetics and Evolution* **70**: 314-322.
- Butler, T. H. (1980). "Shrimps of the Pacific coast of Canada." *Canadian Bulletin of Fisheries and Aquatic Sciences* (202): 1-280.
- Fage, L. 1938. A propos d'un nouvel Ellobiopsidè *Amallocystis capillosus* n. sp. parasite de *Pasiphaea tarda* Krøyer (Crust. Decap.). *Trav. Sta. Zool. Wimereux* 13: 287-291.
- Gómez, F., P. López-García, A. Nowaczyk and D. Moreira (2009). "The crustacean parasites *Ellobiopsis* Caullery 1910 and *Thalassomyces* Niezabitowski, 1913 form a monophyletic divergent clade within the Alveolata." *Systematic Parasitology* **74**: 65-74.

- Hoffman, E. G. and R. M. Yancey (1966). "Ellobiopsidae of Alaskan coastal waters." Pacific Science **20**: 70-78.
- Meyers, T. R., T. M. Koeneman, C. Botelho and S. Short (1987). "Bitter crab disease: a fatal dinoflagellate infection and marketing problem for Alaskan Tanner crabs *Chionoecetes bairdi*." Diseases of Aquatic Organisms **3**: 195-216.
- Shields, J. D. (1994). "The parasitic dinoflagellates of marine crustaceans." Annual Review of Fish Diseases **4**: 241-271.
- Thomas, F., K. D. Lafferty, J. Brodeur, E. Elguero, M. Gauthier-Clerc and D. Missé (2012). "Incidence of adult brain cancers is higher in countries where the protozoan parasite *Toxoplasma gondii* is common." Biology Letters **8**: 101-103.
- Vader, W. and J. Berge (2004). "First record of the ellobiopsid parasite *Thalassomyces marsupii* Kane, 1965, in a stegocephalid host, with a review of previous records." Biofar Proceedings: 167-174.
- Widmer, C. L., G. Cailliet and J. Geller (2010). "The life cycle of *Earleria corachloae* n. sp. (Cnidaria: Hydrozoa) with epibiotic hydroids on mid-water shrimp." Marine Biology **157**(1): 49-58.
- WoRMS Editorial Board (2023). World Register of Marine Species. Available from <https://www.marinespecies.org> at VLIZ. Accessed 2023-11-27. doi:10.14284/170

A status review of the North Eastern Pacific Ovulidae for POTW Biologists
dbcadien, WWRF Marine Biology Lab, 22Mar24

Introduction

There is continuing uncertainty as to the species of ovulids that we take in our monitoring. In order to facilitate a reset and assist members in reaching a conclusion regarding their own material, and the collective need, a review of current nomenclature seems in order. Perhaps we can curtail the field identification of these animals as Ovulidae unidentified or *Simnia* sp, and begin to generate more precise data.

SCAMIT currently has no provisionals in this family reported, although there are four species listed in Ed. 14, all described. These include *Phenacovolva bellamaris* in Subfamily Ovulinae, and *Simnia barbarensis*, *loebbeckeana*, and *vidleri* in Simniinae. This differs in a number of respects from what is reported in WoRMs, but there is confusion and multiple placement of several species there, so the WoRMS position appears to be still in flux.

The family was thoroughly reviewed by Cate 1973, who erected a number of new subfamilies, genera and species, as well as considering all those names proposed for species from our area. Since there is disagreement on just what is and what is not a synonym, and of what, perhaps we should start with a listing of the taxa that have been described from or reported from the SCB in the past:

Southern California Bight records

- *aequalis vidleri* – the name used for *Simnia vidleri* (G. B. Sowerby III 1881) in Cate 1973. He separated *a. vidleri* from *a. aequalis* on the basis of geography (outer coast vs Gulf of California) and more acute and orange tinted terminus points in *a. aequalis*.
- *arcuata* (Reeve 1865) – the name under which WoRMs has synonymized *aequalis vidleri*. *Simnia aequalis* is treated as a synonym of *Simnia avena* (G. B. Sowerby I 1833), and no indication by WoRMs as to why the law of priority is suspended to allow Reeve 1865 and G. B. Sowerby I 1833 to be valid while *aequalis* G. B. Sowerby II 1832 is placed in their synonymies. The source of the synonym is not listed on WoRMS for either of the two instances.
- *barbarensis* erected by Dall in Williamson, 1892 as a varietal name of *Ovula deflexa*, a Philippine species which had been recorded from Santa Barbara by Col. Jewett. Considered a valid species since it's establishment, based on a specimen from San Pedro held in the Monks collection. Dall provided a good illustration in association with the description, but the type is now lost. His description is limited, and a case can be made for consideration of this as a nomen inquirendum.
- *bellamaris* – erected by Berry 1946 (Journal of Conchology 22(8))
- *catalinensis* – erected by Berry 1916 an inflated thin species which has been synonymized with *barbarensis* by both Cate 1973 and in WoRMS
- *deflexa barbarensis* – see *barbarensis*
- *loebbeckeana* (Weinkauff 1881) – a narrower, heavier species than *barbarensis* with the anterior and posterior slopes concave rather than convex above and below the median inflation
- *vidleri tyrienthina* – a Berry subspecies now regarded as a synonym of *arcuata* as is *vidleri*.

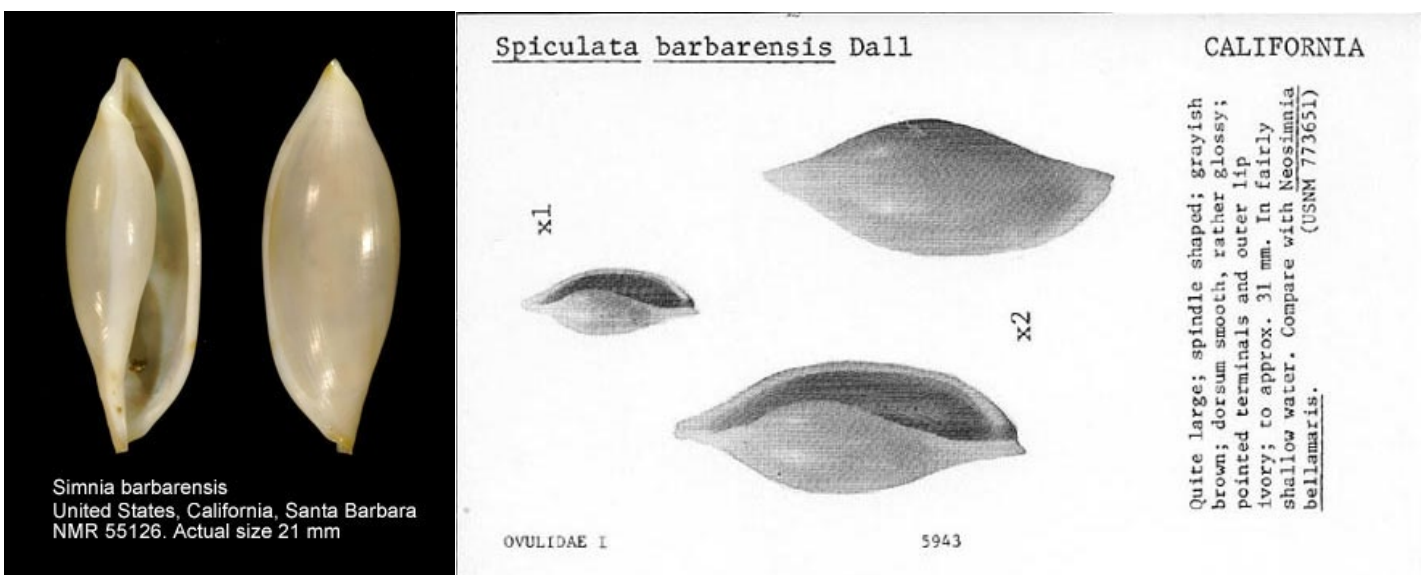
Locally we seem to have four taxa. McLean 1996 reported the same four in his Taxonomic Atlas coverage of the Gastropoda, but with some nomenclatural differences. The four currently listed taxa are discussed below.



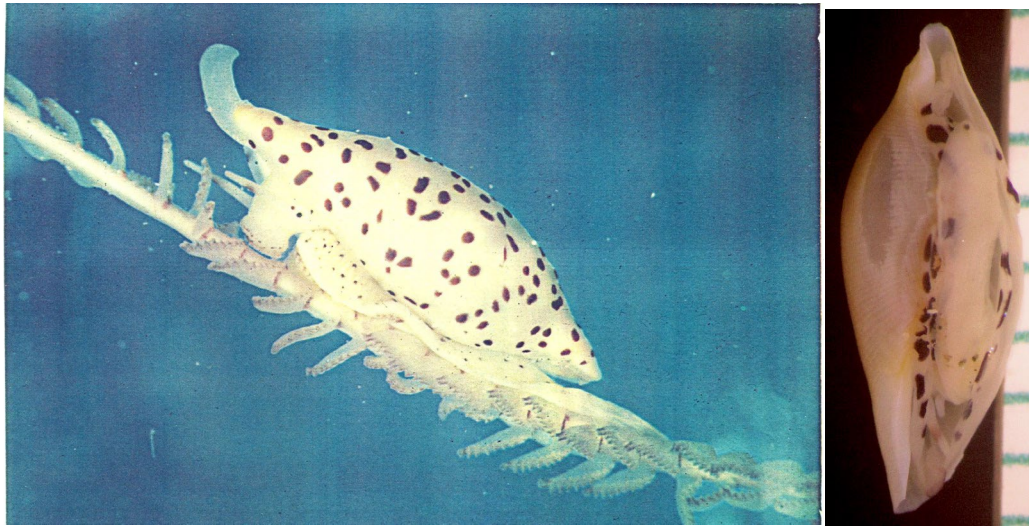
Images of *Simnia arcuata* (Reeve 1865) alive, and without animal

-arcuata, which is typically found on red gorgonians in shallow waters. This has a variably colored shell which can range from white to yellowish, orangish, or rose, and usually but not always has yellow termini. The mantle bears simple scattered papillae and a series of blotches and spots in red to black over a cream base. The foot is white with black spotting on its dorsal side. The mantle papillae are surrounded by areolae clear of blotching. While the shell pigmentation is variable, the mantle and foot pigmentation seems consistent, varying only in intensity and slightly in tint. There are iNaturalist photos of what does appear to be this species which are extremely intensely red colored, with larger mantle papillae placed in rows rather than haphazardly, and with both the mantle and foot pigmentation much darker and redder than in the normal condition. A photo of the live mantle pigmentation of *arcuata* is also provided. Just as a measure of how confused the current nomenclature is, the live photo is supposed to be of *S. barbarensis*, but is actually *S. arcuata*, and the shell photo is labeled *S. vidleri* rather than *S. arcuata*.

-barbarensis, which is typically found on pennatulids in shallow to mid-shelf depths. McLean 1996 reports it associated with gorgonians as well as *Ptilosarcus*, but when encountered by local POTWs it is usually associated with virgulariid pennatulids. *S. catalinensis* Berry 1916 has moved from subjective to objective synonym with the designation of the type specimen of *catalinensis* as neotype of *S. barbarensis*, to replace the lost Monks type of *barbarensis* by Cate (1973). The shell is unpigmented or white, ranging to light greyish tan or yellow, although Keep (1904) refers to the species as the Pink Egg-shell, indicating at least some specimens are pink.



Photos of *Simnia barbarensis* from WoRMS, and the Kaicher shell catalogue

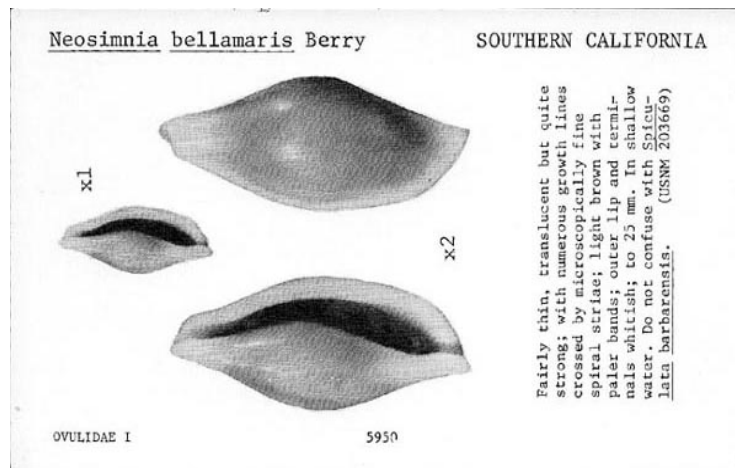


Simnia barbarensis on *Acanthoptilum gracile* (from Main 1980) and a retracted OCSD specimen (T. Phillips)

The masters thesis by Main (1980) provided information on *Simnia barbarensis* not found elsewhere. He recorded it feeding on *Acanthoptilum gracile*. This association seems well founded since only after feeding had stripped the pennatulid flesh from the hard axis of the colony, did the snail proceed to attach egg capsules to the hard surface. The author also made the interesting observation about *S. avena* (as *aequale*) that they did not actually seem to consume the host tissues, as the host, after feeding passes by the snail, remained intact. He suggested that it, as reported by Patton 1972 for *S. uniplicata* in the Caribbean, feeds on a shed mucous sheath produced by the octocoral rather than its tissues. McLean 1996 reported *S. barbarensis* taken on gorgonians and on *Ptilosarcus gurneyi*, but this requires confirmation. He makes no mention of the species occurring on other pennatulids, such as *Acanthoptilum*, and the source labeling may have been based on a misunderstanding of the host. The photos provided by Main 1980, and the feeding and reproductive behaviors he describes, document the occurrence of *S. barbarensis* on *Acanthoptilum*, casting other anecdotally recorded hosts into doubt. None of the many images of *Ptilosarcus* on the web show an associated ovulid. There are few images of *Acanthoptilum* on the web, and they also fail to document an ovulid associate. The only other images of *S. barbarensis* on *Acanthoptilum* are those in Tuskes and Kelly 2008, based on materials taken not far from those used by Main. They provided additional information on reproduction, the feeding of the snail on the octocoral, and the attempted escape of the sea-pen when under attack. Hertz had earlier (1984) reported finding a single specimen of the species among eel-grass in Mission Bay as a novelty, and so was probably unaware of Main's thesis. During a monitoring effort in Mission Bay I also had seen specimens of this species, and misidentified them as *S. bellamaris*. Four were taken on a single large *Renilla*. I do not know if they were only clinging there, or if they actually sought out the *Renilla*, but I noted no other pennatulids in the vicinity. This was in an area of dense eel-grass growth. One of the more interesting observations made by Tuskes and Kelly was that there was slight sexual dimorphism in *S. barbarensis*, with the males being a bit smaller and somewhat more vividly pigmented. They also were able to observe the actual attack of a snail on a sea-pen, and document the escape response. They provide a series of images showing the snail approaching, then contacting the sea-pen. Shortly after the head of the snail touches the rachis of the sea-pen, the inflated peduncle which holds it in the sediments deflates, allowing currents to begin to carry it away. During their observations the snail had difficulty maintaining hold on the pen, and was usually dislodged.

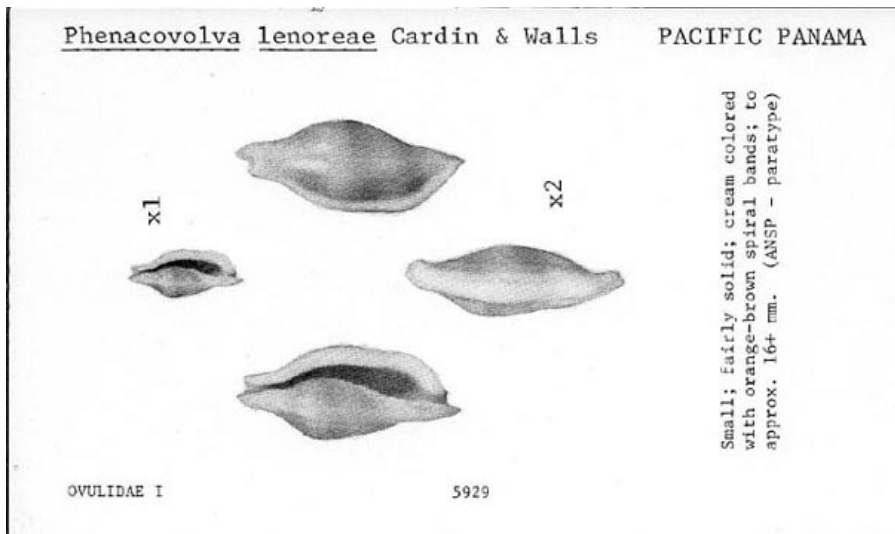
-bellamaris – a species little taken, with few extant specimens. WoRMS is of several minds on this taxon. As *Subsimnia bellamaris*, as it is listed in Cate 1973, WoRMS lists it as a synonym of *Simnia loebbeckeana*. As *Neosimnia bellamaris* (as Berry described it in 1946), it is listed as a synonym of *Phenacovolva lenoreae* of Cardin and Walls 1980. The current SCAMIT list follows this latter placement, although it is difficult to reconcile the structure of *bellamaris* with what is typically found in *Phenacovolva*. While photos of the holotype (Cate 1973 fig 161 and 161a) share the reflexed outer lip

seen in *loebbeckeana*, they differ in several other respects, particularly the degree of central inflation of the shell body whorl. The areas before the termini are also not so clearly concave as in *loebbeckeana*. That synonymy seems inappropriate to me, although the ranges are not discordant (*bellamaris* San Diego area, *loebbeckeana* Monterey to Magdalena Bay, outer Baja California [as redefined in Cate 1973]). I don't believe the synonymy is appropriate based on comparison of figures of the shells of these animals. No information is available on the appearance of the living members of either species as far as I can locate. The issue with *Phenacovolva lenoreae* is more difficult, particularly as I can find no description of that species. WoRMS has *bellamaris* (1946) listed as a synonym of *lenoreae* (1980), a wrenching misapplication of the law of priority in the absence of some explanatory comment (totally lacking on WoRMS) or in available literature. We reversed that obvious issue when listing *Phenacovolva bellamaris* in Ed. 13, with *P. lenoreae* as junior synonym. However, images of both are provided in the Kaicher shell catalogue, and there appear to be differences between the two, particularly in the formation of the anterior terminus. The two also differ in range: *P. lenoreae* being a Pacific Panamic form, while *S. bellamaris* is known only from shelf depths off San Diego. Both share an ill-defined pattern of shell pigmentation (transverse brownish bands over a lighter brown base), but the shell structure is strongly divergent. Berry's *bellamaris* does not seem to belong in *Phenacovolva*, being in the subfamily Simniidae not in the subfamily Ovulinae, where *Phenacovolva* is placed. This reflects what Cate (1973) reported, although not going so far as to erect a new genus for the species (*Subsimnia*), a taxon now viewed as a synonym of *Simnia* in WoRMS. So, as neither the proposed synonym of *bellamaris* with *loebbeckeana* nor that with *lenoreae* appear to be workable, it seems that for now *bellamaris* should remain valid based on shell morphology alone. Should verifiable molecular information become available, that could easily change. More information on *P. lenoreae* recently became available.



A paper by Jerry Walls, one of the co-authors, was located and digested (Walls 2017). It removes much of the mystery concerning why information was so sparse, and the original description could not be found. First off the name was privately published in a self-produced journal, *The Pariah*, which Walls was using to describe new cone species as he worked on his world compendium of cones (Walls 1979). The original description is cited below, but I still have been unable to locate the paper to actually read it. Self-publication is not all that rare, especially with mollusks, and can be done within the requirements of the International Code so that names so published are valid and available for taxonomic use. We are familiar locally with *Amphipacifica*, a journal created and largely filled by E. L. Bousfield to publish large monographs otherwise difficult to get into print, and S. S. Berry's series of Leaflets in Malacology as examples of such valid publication. As I can find no trace of *The Pariah* anywhere, I don't know for sure if it meets the publication requirements of the Code. The fact that WoRMS lists *P. lenoreae* as a valid taxon suggests that it did, but I remain not fully convinced. Walls (2017) also provided very fine images of *P. lenoreae*, and discussed the situation with *S. bellamaris*, indicating that Lorenz and Fehse (2009) declared *bellamaris* a nomen dubium calling it 'unrecognizable' according to Walls. As Cate had earlier provided very good description and illustration of Berry's species, I'm not sure just why they found it so. The fact that WoRMS carries *bellamaris* as a synonym of two different taxa in two different subfamilies follows in part the action of Dolin and Ledon 2002, who proposed synonymy with *S. loebbeckeana* based on fossil material. The second synonymy, with *P. lenoreae* seems fairly inexplicable: even Walls (2017) comments on the disparity in the type localities for the two, while noting the similarity in pigmentation and patterning. He also noted that

morphological characters distinguishing the many ovulid genera are seldom adequately established, although molecular data clearly place *Phenacovolva* and *Simnia* in differing clades (Schiaparelli et al 2005). While researching this issue it became apparent that the large globose species I thought *S. bellamaris* which I had taken on *Renilla* in Mission Bay was actually the same as Berry's *catalinensis*, now synonymized (since Cate 1973) with *S. barbarentis*.

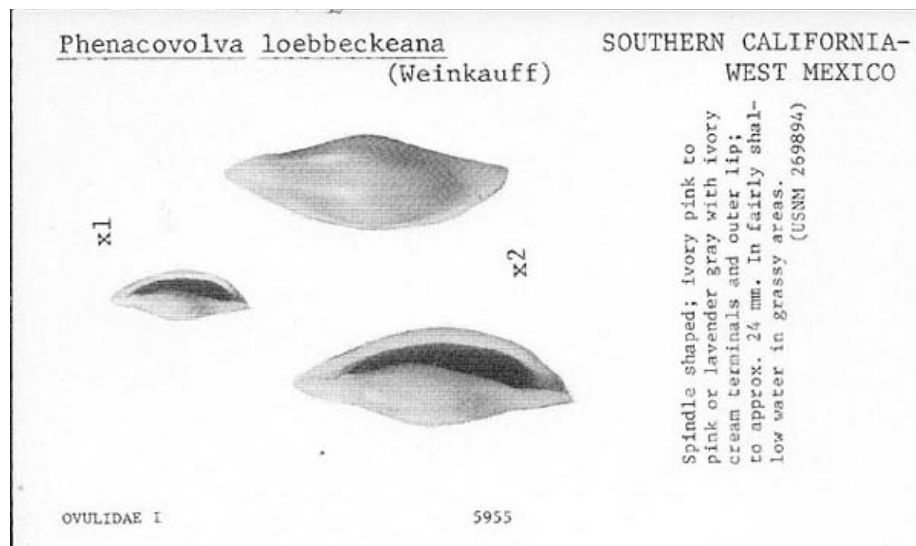


Kaicher card of *Phenacovolva lenoreae*



Phenacovolva lenoreae (from Walls 2017)

-loebbeckeana (Weinkauff 1881) – McLean (1996) treated this, along with *barbarensis*, illustrating both in his Taxonomic Atlas volume. Unfortunately, his brief key to them was awful and misleading. The photos however are of value. They show *loebbeckeana* as a smaller, more compact form with a strongly reflexed outer lip, and concave sides leading to the termini. His photo of *barbarensis* shows a larger, thinner, more globose species, with a much thinner outer lip, and no concavity in the lateral profile. While both are wider in the middle of the shell, the taper on *loebbeckeana* towards the termini commences more rapidly and more strongly, leading to a very different overall profile to the shell. The two species overlap in range as reported by McLean, with *loebbeckeana* known from Monterey to Magdalena Bay, Outer Baja California, and *barbarensis* from Ft. Bragg Northern California to Isla Cedros, Baja California. The shell is described as white or translucent, unpigmented.



Kaicher card for *Simnia loebbeckeana* (Weinkauff 1881)



An image listed as *Simnia* cf. *loebbeckeana* on line. This apparently came from the Gulf of California, no images from locally collected material were available. The identify must remain tentative, although the sparse orange spotting on a white ground is clearly unlike that of other species in the region. The host was identified as a gorgonian, but differs from any discussed by Horvath 2019a,b,c

Adjacent Panamic species

The Panamic component of the EP Ovulidae remains unaddressed. This includes forms not yet recorded from our or adjacent waters, but which could potentially range into them as the climate changes. As summarized by Bertsch and Bibbey (1982) these include (although usually under different generic placements):

Simnia avena (G. B. Sowerby I 1833), with which *Ovulum aequale* G. B. Sowerby I 1832 has been synonymized. Sanchez et al (2016) cite this synonymy as coming from Lorenz and Fehse (2009). No rationale is evident for this reversal of priority, but *avena* does have page priority over *inaequale* in the Conchological Illustrations. Sanchez et al report this species as associated with various *Pacifigorgia*, *Leptogorgia* and *Eugorgia* species in Costa Rica. An MS thesis by Main (1980) illustrated *Simnia aequalis* feeding on *Leptogorgia* “*rigida*”, but whether that is accurate or not I am not sure. If correctly identified the proper name is *Leptogorgia rigida* Verrill 1864. The live appearance of his animals matches that shown above for the Californian *S. arcuata*: while Main’s specimens came from the Gulf of California .

Simnialena rufa (G. B. Sowerby I 1833), listed as the valid name of *Ovulum inflexum* G. B. Sowerby I 1832. This synonym apparently stems from both Cate 1973 and Lorenz and Fehse 2009 (Sanchez et al 2016). It could be based on page priority, as *rufum* occurs the page before *inflexum* in the Conchological Illustrations. However, Lorenz and Fehse do not qualify as first revisers by any stretch of the imagination. There is no mystery about either the publication dates or authorship (Cate treated it as G. B. Sowerby II), such things having been made meticulously clear by Petit 2009. Plenty of reason to be confused though, as the cover page of the Conchological Illustrations lists the authorship as of G. B. Sowerby, Jr.(II) Petit concluded in his examination of the works of all three G. B. Sowerbys, that G. B. I had let G. B. Jr. take the authorship, although he had done the work of description. This ovulid was reported to be associated with *Pacifigorgia* cf. *curta* and *P. cairnsi* in Costa Rica (Sanchez et al 2016). All four of these ovulids were described together as new species, first in 1832 in the Conchological Illustrations and then again in 1833 in the Proceedings of the Committee of Science and correspondence of the Zoological Society of London for 1832. The part in which the ovulids

were included was not published until January 1833, thus the modified date. The descriptions are identical in the two, except those in the Conchological Illustrations are in English, those in the Proceedings in Latin. The choice in WoRMS to embrace the latter date as the date of establishment of the taxon seems inexplicable in the absence of other information. Petit lists all four taxa as of G. B. Sowerby I 1832 in the Conchological Illustrations.

Cyphoma emarginatum (G. B. Sowerby I 1830) - distributed from Ecuador north to near the head of the Gulf of California. Associated with red gorgonians.

Xandarovula hammesi Bertsch and Bibby (1982) known from off Pacific Panama at about 330m, taken by shrimp boats, so without host association.

They also listed several members of the related family Pediculariidae (*Jenneria pustulata*, *Pedicularia californica*, and *Pseudocypraea adamsonii*) as well as several additional species now synonymized with those listed above.

Discussion

Morphological variability in shell and mantle, as well as color variability in both has made the taxonomy of ovulids both messy and contentious. There is a prevailing perception that the group is over-described, partly because of a legacy of attention and description by early workers who utilized characters now viewed as variable as discriminatory.

Rosenberg (1992), in an introduction to the group, opined “Almost 400 names have been given to living species of ovulids, but I consider only about 160 to 170 of these to be valid.” Many additional names have been proposed since 1990, so this ratio may have shifted. Aside from the variability of the adult appearance, a basic aspect of ovulid biology has been ignored: their reproduction. With but a few exceptions the group has teleplanic larvae capable of broad geographic dispersion (Scheltema 1971). They have been treated as though they were poorly dispersed narrow-range endemics however, and over-described in the process.

As molecular evidence has begun to accumulate, discordance between genome and appearance has proven evident, if not pervasive (see Wu et al 2022, Reijnen et al 2019, Reijnen et al 2017). The entire family is related through predation to octocorals (Nocella et al 2024), and in consequence has adopted characteristics of shape, body texture and color to allow it to be either cryptic (Batesian mimicry) or conspicuous (aposematic) on the host. For most ovulid taxa mimicry is the chosen path, while aposematism is limited to a few taxa having developed chemical anti-feedants produced by glands in their mantle. These strive to be as glaringly obvious on their hosts as possible, promoting a strategy of learned avoidance in predators who sample them, find them distasteful, and spit them out. Such species are otherwise modified to survive such unsuccessful predation, and so are able to pass on their genes to new generations. The most familiar example of this is the genus *Cyphoma*, which have very robust shells for ovulids. Reijnen et al 2017 found, however, that when four highly visible phenotypes of the genus (all viewed as different species) were investigated molecularly, the phenotypes were distributed almost randomly throughout the molecular-based tree. At first sight this would seem to prove that pigmentation and mantle configuration have no relationship to genetics. Keep in mind, however, that this is an aposematic situation in which the snail is under no evolutionary pressure to adopt a particular appearance as long as what it does adopt contrasts strongly with the host. In the much larger proportion of the family pursuing a strategy of Batesian mimicry, there is strong pressure for the snail predator to comply with a particular appearance: that of the host. If there is strong host specificity between the predatory snail and its prey, coloration is likely to be closely tuned to the variability of the prey itself, as is the morphology of the mantle (Sanchez 2013). This is likely to lead to limited variability in snail morphology. There is evidence for both host specificity and the



Mantle papillae of *Simnia avena* closely mimic zooids of its host *Pacifigorgia* cf. *cairnsi* (Sanchez 2013)

use of a variety of hosts by ovulid species (Reijnen et al 2010, Reijnen 2015), and those that frequent hosts of variable appearance are likely to be more variable themselves in consequence. So the potential reliability of shell and mantle characteristics in the separation of co-occurring ovulids should vary on a case-by-case basis. No generalization of its applicability or inapplicability seems possible given the competing forces determining the extent of variability ecologically required of a given species. That being said, such characters are among the few available to us, and information on them should be systematically gathered along with additional genetic data.

Recommendations:

- 1) Accept the synonymy of *S. vidleri* with *S. arcuata* and begin to adopt that name in our data
- 2) Remove *Phenacovolva bellamaris* and the subfamily Ovulinae from the SCAMIT listing. Its inclusion was based on a misidentification, and no authenticated specimens taken by SCAMIT members are known.
- 3) Begin to identify trawled specimens of *Simnia* in the field based on the photographic evidence provided here, and make additional efforts to relate ovulid occurrence and host presence and identity. To assist with field identification we should standardize use of a recovery period (in the shade or under refrigeration) where the snails can be allowed to re-expand and reveal their mantle coloration. Once they do, this should be documented photographically to connect the field appearance with any collected vouchers. That should also give more opportunity to fully process the catch, revealing any potential gorgonian or pennatulid hosts it might contain. These should be mentioned, as should a host directly associated with the specimen(s), but potential and observed host relationships should be noted separately in data. Tissue for DNA analysis should also be gathered.

Literature Cited: [those with an asterisk not examined]

- Berry, S. S. (1916). "A new *Ovula* from California." *The Nautilus* **30**(2): 21-22.
- Berry, S. S. (1946). "A new Californian *Neosimnia*." *Journal of Conchology* **22**(8).
- Bertsch, H. and L. J. Bibbey (1982). "A new tropical Eastern Pacific Ovulidae (Gastropoda): *Xandarovula hammesi*." *The Nautilus* **96**(2): 42-45.
- Cate, C. N. (1973). "A systematic revision of the recent cypraeid family Ovulidae (Mollusca: Gastropoda)." *Veliger* **15**(Supplement): 1-116.
- *Cordin, C. and J. G. Walls (1980) "A new false cowry from Pacific Panama (Ovulinae, Simniinae). *The Pariah* 8:1-2.
- Dolin, L. and D. Ledon (2002). "Nouveaux taxons et discussion de la systématique des genres correspondants d'Ovulidae (Mollusca, Caenogastropoda) de l'Eocène inférieur de Gan (France)." *Geodiversitas* **24**(2): 329-347.
- Hertz, C. M. (1984). "Finding *Simnia barbarensis* (Dall, 1892) in San Diego." *The Festivus* **15**(4): 41-43.
- Horvath, E. A. (2019a). "A review of gorgonian coral species (Cnidaria, Octocorallia, Alcyonacea) held in the Santa Barbara Museum of Natural History research collection: focus on species from Scleraxonia, Holaxonia, and Calcaxonia - Part I: Introduction, species of Scleraxonia and Holaxonia (Family Acanthogorgiidae)." *ZooKeys*(860): 1-66.
- Horvath, E. A. (2019b). "A review of gorgonian coral species (Cnidaria, Octocorallia, Alcyonacea) held in the Santa Barbara Museum of Natural History research collection: focus on species from Scleraxonia, Holaxonia, Calcaxonia - Part II: species of Holaxonia, families Gorgoniidae and Plexaurida." *ZooKeys*(860): 67-182.
- Horvath, E. A. (2019c). "A review of gorgonian coral species (Cnidaria, Octocorallia, Alcyonacea) held in the Santa Barbara Museum of Natural History research collection: focus on species from Scleraxonia, Holaxonia, calcaxonia - Part III: Suborder Holaxonia continued, and suborder Calcaxonia." *ZooKeys*(860): 183-306.
- Keep, J. (1904). *West American Shells*. San Francisco, California, USA, The Whitaker & Ray Company.
- *Lorenz, F. and D. Fehse (2009). "*The Living Ovulidae: a manual of the families of allied cowries: Ovulidae, Pediculariidae, and Eocypraeidae*". ConchBooks, Hackenheim, Germany.
- Main, K. L. (1980). The external morphology, anatomy and larval development of *Simnia equalis* and of *Simnia barbarensis* (Gastropoda: Prosobranchia). *Biology*. Northridge, California, California State University, Northridge. **M. Sc.:** 77pp.
- McLean, J. H. (1996). *The Prosobranchia*. Santa Barbara, California, U.S.A., Santa Barbara Museum of Natural History. 1-159.
- Nocella, E., S. S. Zvonareva, G. Fassio, D. Pica, B. Buge, R. Villa, N. Puillandre, M. V. Modica and M. Olivario (2024). "Spicy food for the egg-cowries: the evolution of corallivory in the Ovulidae (Gastropoda: Cypraeoidea)." *Frontiers in Marine Science* **10**(1323156): 21pp.
- Patton, W. K. (1972). "Studies on the animal symbionts of the gorgonian coral, *Leptogorgia virgulata* (Lamarck)." *Bulletin of Marine Science* **22**(2): 419-431.
- Petit, R. E. (2009). "George Brettingham Sowerby, I, II & III: their conchological publications and Molluscan taxa." *Zootaxa* (2189): 1-218.
- Reijnen, B. T. (2015). "Molecular data for *Crenavolva* species (Gastropoda, Ovulidae) reveals the synonymy of *C. chiapponii*." *ZooKeys*(501): 15-26.
- Reijnen, B. T., B. W. Hoeksema and E. Gittenberger (2010). "Host specificity and phylogenetic relationships among Atlantic Ovulidae (Mollusca: Gastropoda)." *Contributions to Zoology* **79**(2): 69-78.
- Reijnen, B. T. and S. E. T. van der Meij (2017). "Coat of many colours - DNA reveals polymorphism of mantle patterns and colouration in Caribbean *Cyphoma* Röding, 1798 (Gastropoda, Ovulidae)." *PeerJ* **5**(e3018): 20pp.
- Reijnen, B. T. and S. E. T. Van der Meij (2019). "Systematics of the subfamily Aclyvolvinae (Caenogastropoda: Ovulidae) based on molecular and morphometric analyses." *Journal of Molluscan Studies* **85**: 336-347.
- Rosenberg, G. C. (1992). "An Introduction to the Ovulidae (Gastropoda: Cypraeacea)." *American Conchologist* **20**(1): 4-7.
- Sánchez, J. A. (2013). "Remarkable specialization in Eastern Pacific sea fan ectoparasites (*Neosimnia*)." *Coral Reefs* **32**: 891.
- Sánchez, J. A., A. P. Fuentes-Pardo, I. M. Alhain, N. E. Ardila-Espitia, J. Cantera-Kintz and M. Forero-Shelton. (2016). "The masquerade game: marine mimicry adaptation between egg-cowries and octocorals." *PeerJ* **4**(e2051): 18pp.
- Scheltema, R. S. (1971). "Larval dispersal as a means of genetic exchange between geographically separated populations of shallow-water benthic marine gastropods." *Biological Bulletin* **140**: 284-322.
- Schiaparelli, S., M. Barucca, E. Olmo, M. Boyer and A. Canapa (2005). "Phylogenetic relationships within Ovulidae (Gastropoda: Cypraeidae) based on molecular data from the 16S rRNA gene." *Marine Biology* **147**: 414-420.
- Sowerby, G. B. I (1832). *The conchological illustrations or, Coloured figures of all the hitherto unfigured recent shells*. London
- Sowerby, G. B. I. (1833). Descriptions of new species of shells from the collection formed by Mr. Cuming on the western coast of South America, and among the islands of the southern Pacific Ocean.]. *Proceedings of the Committee of Science and correspondence of the Zoological Society of London*. Part II for 1832: 173-179
- Tuskes, P. M. and J. A. Kelly (2008). "Observations and biology of *Neosimnia barbarensis* and its sea pen host in Mission Bay, San Diego, California." *The Festivus* **40**(10): 117-120.
- *Walls, J. G. (1979) "*Cone Shells*". TFH Publications, Neptune, New Jersey.
- Walls, J. G. (2017). "The history of a shell: *Phenacovolva lenoreae*." *American Conchologist* **45**(1): 8-11.
- Weinkauff, Heinrich Conrad 1881. Die Gattungen *Cypraea* und *Ovula*. In: Martini & Chemnitz, Systematisches Conchylien Cabinet, 2d

ed., 5(3): 167-215; pits. 44 – 53.

Williamson, M. M. B. (1892). "An annotated list of the shells of San Pedro Bay and vicinity (with a description of two new species by W. H. Dall)." Proceedings of the United States National Museum **15**(898): 179-219.

Wu, Q., B.-P. Xing, M. Lin, G.-C. Chen and C.-G. Wang (2022). "Molecular phylogeny suggests synonymy of *Sandalia bridgesi* Lorenz, 2009 with *S. tritica* (Lamarck, 1810) (Gastropoda, Ovulidae)." ZooKeys(1096): 189-206.