

SOUTHERN
CALIFORNIA
ASSOCIATION OF
MARINE
INVERTEBRATE
TAXONOMISTS



May-June/July-August, 2012

SCAMIT Newsletter

Vol. 31, No. 1&2



Brada villosa
(Rathke 1843)

Dorsal view

Dorsal view

SBOO I33-1
 08 Jan 09 29m
 Veronica Rodriguez
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The SCAMIT newsletter is not deemed to be a valid publication for formal taxonomic purposes.

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14 MAY 2012, B'08 SYLLIDAE PART DUEX, CSD

Larry Lovell opened the meeting with rounds of introductions by all present.

Upcoming meetings were then announced:

11 June 2012 – NHMLAC, *Brada / Travia* discussion of species reported and resources used to identify. Additional polychaete review topic TBD.

July – no meeting due to POTW field activities.

27 August 2012 – NHMLAC, Vasily Radashevsky will present on his recent polychaete studies. Specimens need to be sent to Leslie ahead of time or given to her at the June meeting. Vasily will be reviewing So Cal material he has received in the past.

September – no topic as of yet.

October date TBD – NHMLAC, Dave Elgin will present on a sponge topic. He is the second author with Welton Lee on *The Sponges of California*. He is currently working on *The Sponges of Oregon*. If possible he will demo his interactive website at the meeting.

5 or 22 November 2012 – OCSD, Kelvin will review *Lirobittium* and *Tellina*.

10 December 2012 – CSD, Megan will review amphiuroids, trawl *Parastichopus* spp and Phyllophoridae provisionals.

Other announcements:

May is membership month. Please renew your membership.

The Species Review Committee is in action again and Don Cadien is the committee chair. The committee will review a list of emendations to Ed 6. Approved emendations will be implemented and added to Ed 7 to be released 1 July 2012. Emendations under consideration are of four types; spelling and orthography corrections to the current list, name changes (generic, synonymies, familial and ordinal changes) from the published literature, species reported since the last list, and addition of new, vetted and approved, provisional species. New to Ed 7 will be ecto-parasites!

The Taxonomic Database Committee met 24 April 2012 at CSD. There was a demo of BIOMAP by Dawn Olson (CSD). Shelly Moore (SCCWRP) provided progress updates on database structure, additional content, and new resource links. Additionally, SCAMIT has hired Crissy Attardo as an intern to find voucher sheets etc not already on the website. Crissy has been visiting labs for several months mining notebooks for voucher sheets and other taxonomic tools not currently residing in the taxonomic toolbox. To date she has given Dean Pentcheff approximately 500 files and there is more work to be done.

The SCAS meeting was in early May and SCAMIT was present with an information and membership table. Three members renewed. Larry was introduced to SCAS President Dr. Jonathan Baskin by Ann Dalkey. Dr. Baskin asked if SCAMIT would be interested in hosting a symposium at one of the annual meetings. Larry replied that SCAMIT and its members have not been active in presenting at meetings the past few years and that we should consider his suggestion. Some topics that SCAMIT should entertain as possible presentations are; the history of SCAMIT, the taxonomic database project, taxonomic barcoding, and Morphbank.

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the latest upcoming meetings announcements.



Kelvin then reminded those present that the upcoming WSM meeting will be June 24-27 at UCSC, and one of the main symposia topics is Opisthobranchs led by Terry Gosliner.

With that the taxonomic portion of the meeting started. Ron Velarde began with a review of the first Syllid meeting (Nov 2011, SCAMIT NL Vol 30 no. 3&4). There was a Syllidae subfamily review with discussion. Leslie provided many comments with pictures of live specimens, especially the subfamily Autolytinae. The materials Ron presented will be available on the website.

The afternoon was spent reviewing and identifying 18 unlabeled syllid species (lab practical format) prepared by Ron with a review of correct answers at the end of the day. It was a full day of Syllidae!!

11 JUNE 2012, POLYCHAETES, NHMLAC

Larry Lovell opened the meeting with introductions.

Next was a review of upcoming meetings. Additions since the last set of upcoming meeting announcements are as follows: The date for the November mollusk meeting was set for Monday Nov 5th and will be lead by Kelvin Barwick at OCS D. December 1st will be the annual SCAMIT Christmas party.

Other announcements:

Leslie will give her presentation on the importance of taxonomy (given last year in Vladivostok) at the upcoming WSM meeting June 24-27 at UCSC.

It was then time for polychaete taxonomy. First up was Ron Velarde who shared images of local *Brada* and *Travisia* species.

Tony Phillips then presented on *Ophelina* sp A SCAMIT (from Hyperion samples), and passed out a voucher sheet.

Larry then lead a further discussion on the topics of the day: *Brada*, *Travisia*, and *Arcteobia* cf. *anticostiensis*. He handed out a character table and key to local *Travisia*. Additionally he provided background discussion on *Arcteobia* and notosetal characters defining it, and their similarity with *Malmgreniella* and *Harmothoe*. There are historical changes in name usage leading to confusion when updating old keys and with interpretation/meaning regarding the presence of two types of genera-defining notosetae.

Following lunch, the group examined specimens of *Brada pluribranchiata* and *B. pilosa* noting the external papillations. *B. pluribranchiata* possesses large papillae with a secondary elongate papilla, while *B. pilosa* lacks large papillae and possesses only smaller filiform papillae.

We then moved on to examination of members of the genus *Travisia*; *T. gigas*, *T. pupa*, and *T. brevis*. Nephridial pores are not as described for *T. brevis* (setigers 3-14, not 7-25). The nephridial pore distribution is the same for all three local species and seems to be a generic character. The posterior parapodial lobes and degree of postulation on the middle annulation (tri-annulate) of anterior and posterior segments is different between *T. brevis* and *T. pupa*. It was noted that *T. granulata* Moore 1923 has not been reported by any SCAMIT members. It is reported in Hartman 1969 as collected in shelf depths in coarse sand and rocks, and hard packed sand. Those are difficult habitats to sample.



27 AUGUST 2012, SPIONIDAE, NHMLAC, GUEST SPEAKER VASILY RADASHEVSKY

Larry Lovell opened the meeting with the usual round of introductions.

There were some additions and changes to the latest round of upcoming meeting announcements and they are as follows:

6 September 2012 - SCCWRP, taxonomic database meeting.

10 September 2012 - NHMLAC, Gary Poore will talk about the Western Australia species inventory project and the Galatheids of the coral coast.

18-20 September 2012 - SCCWRP, an EPA CBRAT database update meeting.

22 October 2012 - NHMLAC, sponge meeting with Dave Elvin.

1 December 2012 - there was some discussion that the Christmas party will probably not happen due to a lack of possible attendees

14 January 2013 - OCSD, Tony Phillips will be discussing the flatworms of the SCB.

Other announcements:

Kelvin Barwick reported that this year's WSM meeting at UCSC was interesting and well attended. Wendy Enright was elected as the next President and the 2013 meeting will be held somewhere in San Diego. Paul V. Scott was elected President for 2014 and is starting to plan an "All-Americas" meeting in Mexico for that year.

There was further discussion of the idea for a SCAMIT symposium at the next SCAS meeting with member talks on taxonomy, ecology, QA/QC, and intercalibration.

The taxonomy portion of the day started with Vasily giving his presentation, "Updates on the Taxonomy of Spionidae (Annelida) from the Pacific Coast of the U.S.". His Spionidae British Isles paper is in review and it covers both morphology and biology. He discussed that further work on taxonomy is hampered by a lack of funding and competent workers. The "powers that be" think that work on taxonomy is complete and does not need funding, but there are many issues in species level identification which still exist, and resolution is difficult. A generic key to European spionids was produced by Vasily, which will apply to CA/NEP fauna. It includes 20 genera and provides a head to pygidium review of characters and SEM images to illustrate those characters. Definitions of character states are also provided.

Vasily then spoke about specific characters:

Swimming chaetae in larvae are shed upon settling. Most juveniles don't have chaetae on setiger one, and it takes time to develop adult chaetal patterns, so one must be careful making identifications. Vasily noted that species-specific characters develop later than generic characters. Branchiae have cilia on one or both margins (inner and outer). Nuchal organs increase in length to a maximum that is species specific. He likes to refer to the "behavior of structures in ontogenetics of species" as a way to describe larval vs adult differences.

Nuchal organs are a useful character. Metameric (segmental in a certain number of segments, the first one is usually different) and non-metameric (parallel lines or U-shaped). They are underlined by the nuchal nerve as discussed in Söderström's classic paper on Spionidae anatomy (Söderström 1920).

He then discussed the term "snout"; he uses it to distinguish origins of pointed anterior ends of some spionids. Through observing larvae and documenting development, pointed anterior ends may develop from prostomial tissue or peristomial tissue. For example, in *Dispio*, the prostomium



elongates after larval settlement, forming the point. In contrast, in *Scoelepis* the peristome elongates and forms the anterior point; Vasily refers to this as a snout.

Dorsal crests in *Prionospio* species are a good character, but proper preservation is important. Crest vs folds is a problem with this character. Notopodial postchaetal lamellae can almost meet in the middle, but not completely so they are not considered a complete fold/crest.

Chaetae – there are many different kinds and arrangements. There are three groups of chaetae: In the anterior, there are inferior/superior notochaetae, anterior/posterior notochaetae, and anterior/posterior neurochaetae. In the posterior, the anterior row is replaced by hooks (Radashevsky & Fauchald 2000, Brazil conference proceedings).

In the polydorines, the modified setiger 5 arrangement of chaetae and hooks is highly variable for the different genera. Companion setae can be associated with the spines.

The start position of lateral pouches can vary with age.

Pygidial cirri can have an equal number of dorsal and ventral lobes. Or, they can have a single mid dorsal disc-like lobe; incised or with a smooth margin and a pad-like fleshy structure.

Many spionids have lateral glands used for muco-polysaccharide secretion in tube construction. *Spiophanes* species have specific patterns of glands on setigers 5-8, changing to slits thereafter (Meissner et al 2012). Terms describing the different types were confusing to Vasily so he has devised a new framework with 6 main pattern types.

Heart bodies are part of the vascular system at higher levels.

Vasily studies specimens under glycerin (high magnification) with a small amount of methylene green stain to thin the glycerin and increase the contrast.

No world-wide key to the genera exists, so Vasily is currently working on this project.

Next, Vasily had comments on specific species:

Streblospio gynobranchiata Rice & Levin 1998 - apodus, achaetous chaetiger one (see illustration in the paper).

Scoelepis spp - the snout is actually the peristomium from the larval stage which gets enveloped by the prostomium as the larvae mature into adults. There are basal sheaths on the palps which can be present/absent/reduced/fused.

Paraprionospio alata - there is a sheath on the palps and lamellae on the branchiae; the shapes are used for speciation in the Yokoyama Indian paper (Yokoyama & Sukumaran 2012). Tony Phillips raised an observation that many SCAMIT members have noticed; there are two morphs of *P. alata*; the shallow water form has foliose lamellae, and the deep water form has thin lamellae.

Polydora narica Light 1969 - the illustration of the modified chaetae is precise and is considered to be accurate. Vasily has determined that the spine was incorrectly interpreted (angle of view). Spines have a depressed distal end with a lateral flange that can break and look like a tooth. Earlier mis-identified as *P. limicola* by Olga Hartman, *P. narica* has black bands on its palps. *P. limicola* can be found in the SCB but is rare (*P. aggregata* by Blake is the same) and is found in harbor fouling communities, but never in bottom sediments.



Prionospio multibranchiata E. Berkeley 1927 vs. *P. lighti* Maciolek 1985. These two species can be confused and both can occur in the SCB. *P. multibranchiata* may be a good species in the NWP, Sea of Japan, however, the NEP is the type locality. The median pair of eyes is large in this species. In *P. lighti* the median pair of eyes is small and it is a local species.

P. maciolekae Dagli & Çinar 2011 - occurs in Turkey.

Pygospio elegans Claparede 1863 vs. *P. californica* Hartman 1936 vs. *P. sp. nov.* from Oregon. *P. elegans* has distinct pigment bands even when preserved and the hooks are all bidentate. The other two species have spoon-like hooks.

Dipolydora brachycephala (Hartman 1936) Bodega Lagoon, CA. This species has a long caruncle that extends to setigers 5-8, except for smaller individuals. The length of the caruncle for *D. caulleryi* (Mesnil 1897) is shorter (<setiger 4). Both species may occur here. Specimens examined at the California Academy of Sciences seemed to be *D. caulleryi* as large individuals displayed a caruncle extending to setiger 4.

Dipolydora socialis (Schmarda 1861) Chile. Type may be lost or in Germany. Caruncle extends to end of setiger 5; gizzard plates are made of chiton and are present except in some large adults which may shed them. Found living in tubes on the bottom.

Dipolydora magna (E. Berkeley 1929) Vancouver Island, Canada. Caruncle longer, to setigers 9-10. Found living in tubes on the bottom.

Dipolydora neocardalia (Hartman 1961) from LA. May be valid, Vasily has seen specimens. Length of caruncle to setigers 7-8.

Dipolydora carunculata. Sea of Japan. Vasily species. Boring or tubes on the bottom. May be the same as *D. magna*.

Rhynchospio glutea (Ehlers 1897) vs *R. arenicola* Hartman 1936. Vasily now has good genetic material to compare both species.

Polydora californica Treadwell 1914 vs *Boccardia proboscidea* Hartman 1940. Name conserved in Radashevsky & Harris 2010.

Lastly was a review of specimens brought by members:

CSD - *Polydora narica*, *P. cornuta*, (small black pigment spots laterally starting on setiger 7), a larval polydorine, and *P. akaina* (branchiae and dorsal lamellae fused but not noted in Blake's description).



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

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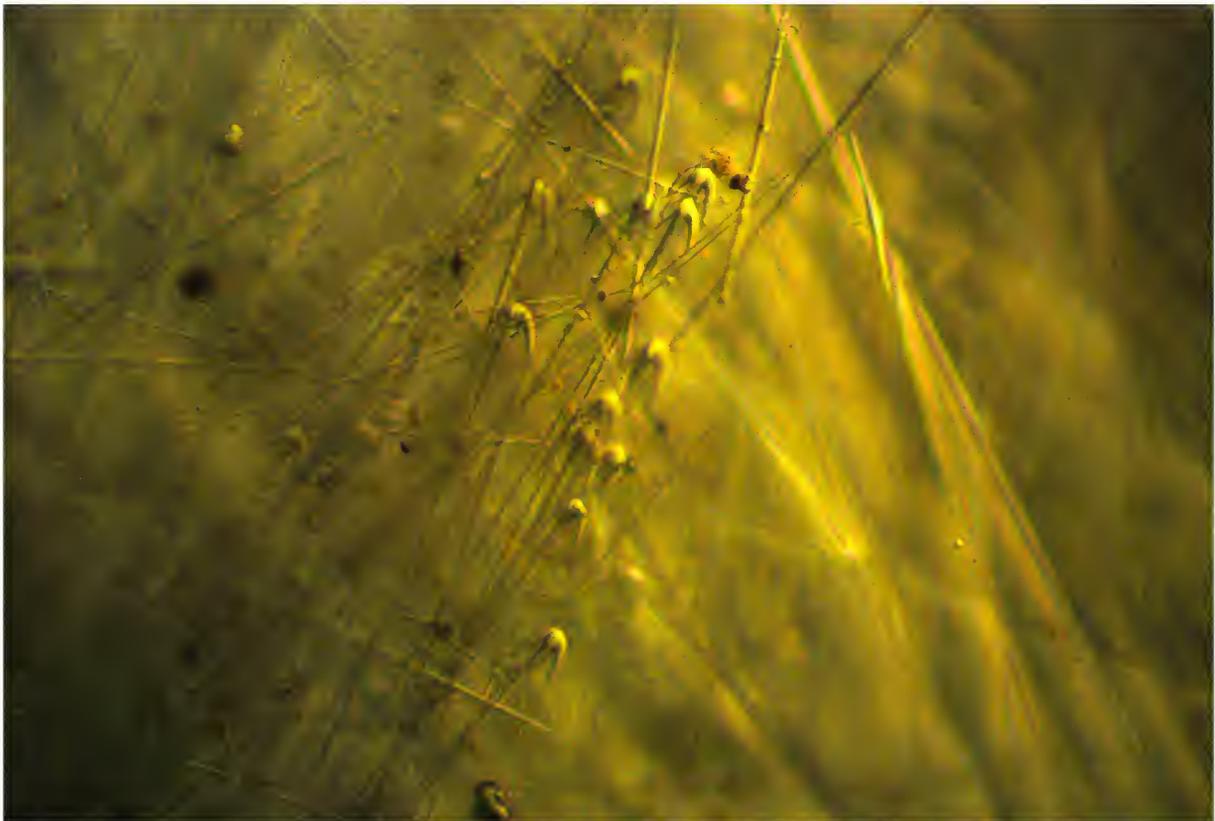
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Anatriaenes from a Tetillid sponge; Mission Bay, San Diego, CA, 2008, 2m. Photo by M. Lilly

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**10 SEPTEMBER 2012, CRUSTACEANS – GUEST SPEAKER DR. GARY POORE,
NHMLAC**

Attendance: Dr. Gary Poore, Museum Victoria, Australia; Ron Velarde, Katie Beauchamp, Tim Stebbins, CSD; Don Cadien, Larry Lovell, LACSD; Michael Vendrasco, OCSD; Dean Pasko, consultant; Tony Phillips, consultant; Carol Paquette, MBC; Leslie Harris, Adam Wall, Mark LeBlanc, Maria Peltekova, Phyllis Sun, Giovani Zelada, Dean Pentcheff, NHMLAC

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the latest upcoming meetings announcements.

The meeting was opened by President Larry Lovell and began with a round of introductions since we had many new faces in attendance. Larry then covered upcoming meetings and shortly thereafter Dr. Gary Poore was introduced. Dr. Poore has been a curator of crustacea at the Museum Victoria for 30 years. His research has covered Port Phillip Bay, as well as shallower and deeper waters. There are no extensive minutes from this meeting, but below are a few of the questions Gary addressed in his presentation.

He started with a question concerning estimating crustacean biodiversity: are we there yet? How do we get there? The Census of Marine Life Project is trying to answer the question of how many species are in the ocean. There are other and various good projects, but not much progress has been made on answering the question. There are multiple approaches to estimating biodiversity, but the methods rely on existing data, and are the data reliable?

22 OCTOBER 2012, SPONGES - GUEST SPEAKER DAVE ELVIN, NHMLAC

Attendance: Megan Lilly, CSD; Laura Terriquez, Ken Sakamoto, OCSD; Carol Paquette, MBC; Don Cadien, LACSD; Lisa Gilbane, Bureau of Ocean Energy Management; Greg Lyon, CLAEMD; Leslie Harris, NHMLAC; Dave Elvin, consultant; Dean Pasko, consultant

Leslie opened the meeting with business announcements. She started by discussing upcoming meetings. There will be no x-mas party this year and SCAMIT is planning a summer beach BBQ next year, probably in the Corona del Mar area. SCAMIT will have a symposium next year at the SCAS meetings in May and the listed speakers to date are: Tim Stebbins and Don Cadien, who will be speaking on the deep benthic study. Leslie Harris, who will be giving a talk on cooperation amongst taxonomists for invasive species and discussing error rates in taxonomy. Other topic suggestions were; the history of SCAMIT; the taxonomy database project; taxonomy and barcoding. Lastly, Don wanted to let everyone present know that all of the Hancock Pacific Expeditions publications are on-line for free at the Biodiversity Heritage Library.

With the business announcements complete Leslie introduced our guest speaker for the day, Dave Elvin. Dave started his marine biology career in the late 1950's as a volunteer at the California Academy of Sciences. He then did a stint in the army and after his military service, went on to work in the Yale Peabody invertebrate collections. From there he went on to graduate school at Oregon State at the Hatfield Marine station. After completing grad school he became a zoology department faculty at the University of Vermont. He eventually left academia and formed Vermont Information Systems – he works on a visual identification system for marine invertebrates. Some of this work was done at MBARI and was based on ROV studies. He has many other projects and is currently developing the Oregon Marine Porifera Project (OMPP).



Dave started out talking about the “Sponge Book”, as it is affectionately known (“The Sponges of California. A Guide and Key to the Marine Sponges of California”). It started out as an on-line database and then turned into a hard copy publication at the request of funders.

Next he went on to discuss the Oregon Marine Porifera Project. In Oregon, large logs loose from timber harvesting, travel down rivers to the ocean and end up smashing intertidal areas. In doing so, sponges, and other intertidal marine species have suffered. At the 8th world sponge conference in Spain it was decided that the sponge fauna of Oregon needed work/cataloguing; Dave was approached for a list of Oregon species. He set about listing specimens from museum collections that had Oregon listed as the collection locale. There were a little over 1000 bottles, with many specimens in a single bottle. Dave discovered an average of 4 species per bottle. Processing time just to Family level is 2-3 hours with 90% of the sponges in collections labeled as “unidentified”. Dave estimates 10,000 hours of time to examine specimens, make spicule preps, and input data. He feels the number of images to come out of the project will be close to 30,000. He needs to convince someone to put it on their server.

Next to be discussed were problems facing the OMPP. Collection methodology (trawls, etc) damages and contaminates sponges. Expertise on the west coast is limited and additionally there is high turn-over in project directors and technicians. Add to this a rapid change in taxonomic categories based on molecular and biochemical analysis. Much of the current research being funded emphasizes non-taxonomic characters such as biochemistry. The above mentioned issues have created a morass of difficulties for the sponge taxonomist.

Dave’s solution – build a visual archive and then create on-line training. It is difficult to use words to describe skeletal structure and images are much more effective. There is a need for a virtual component to collection specimens, and an on-line identification guide. This could help create a triage level of expertise; sorters-slide makers-experts. The larger question is whether or not this solution is financially sustainable. In an effort to make it so, Dave is creating a non-profit in Oregon.

For the OMPP Dave had to create rough boundaries as to what constitutes an “Oregon” sponge; He set the boundaries from Astoria canyon to Gorda Basin; the environment can be slope/banks/abyssal. A set of coordinates were developed and then it was off to museums to look for specimens within those coordinates.

Dave discussed a collection from Heceta Bank. Most of the specimens were collected via ROV dives and were therefore in good condition. They were collected from 80m-200m near methane seeps. The area is being looked at for potential future methane drilling. Oil platforms can act as artificial reefs and create more diversity. It is disappointing, however, that there is no marine sanctuary but there are marine preserves. Divers went into one of these preserves and took pictures of sponges first, then scraped, collected, and sent them in.

Next to be discussed were Oregon currents and water characters. The currents are bringing the 2011 Japanese tsunami flotsam to the Oregon coastline (among other areas in the Pacific Northwest); Some sponges from the Japanese dock that washed up are already being collected and sent in for study.

Based on PISCO studies, coastal upwelling could bring anoxic waters thereby affecting sponges.

Carbonate solubility is another issue facing sponges. In summer months the top layers of the



ocean become super-saturated and it used to be thought that sponges had to remain in the top 1000m due to this fact, but that has turned out not to be true and they extend down to 4000m.

Sponge shape will often be determined by habitat. For instance, in rocky habitats, sponges tend to be flat. In muddy areas they tend to be stalked. Cobble habitat is usually inhabited by foliose sponges while boulders and large cobbles often have shelf sponges. And, large rocks can support barrel shaped sponges. There is often confusion interpreting collection labels for e.g., barrel vs vase.

There is the potential for smaller species living on bigger species, with epizoic complexes being common. It is relatively easy to distinguish two sponge species growing on top of each other when they are alive and in the field, but once preserved and colorless, the task becomes much more difficult. Without knowing it, the taxonomist could be cutting through two species thereby finding confusing spicules when examining the slide prep.

With this chilling announcement regarding confusing species, Dave went on to give examples. On one sponge he found 7 other little species growing on it, all within 1 inch. Additionally, he found 7 or 8 species on one small 1/2 inch rock.

Dave admitted that currently he is doing 19th century biology – cutting things up and looking at spicules under a microscope.

And sponges are much more complex than just their spicules. Sponge larvae contain bacteria, collagen fibers, and a small packet of spicules from which to start. But as taxonomists we are only looking at spicules which is a limited aspect of the animal. There is a wide variety of “soft stuff” involved which we don’t examine. Studies have shown some indication that there are specific bacteria which are accepted at the surface of the sponge; bacteria live within the mesophyll in cells, in endocytes, all over the places. What is the symbiotic relationship between the bacteria and the sponge? There is some thought that the bacteria might control the shape of spicules. It has been found that in some sponges 2/3 of their biomass can be microorganisms.

Another interesting aspect of sponges is their biochemistry. There is now some work being done to try to use their specific biochemistry as taxonomic indicators. Predators of sponges have picked up on the biochemistry aspect. Dorids, for example, *Diaulula*, can chemically sense the specific sponge they need. The compound is water soluble and they can “sniff” them out. Research suggests that they are extremely specific and will not prey upon similar species even within the same genus.

The skeleton of sponges, with regards to size and shape, can be affected by environmental factors such as season and depth. Additionally levels of silicon in the environment can affect skeletal development as well, e.g., width of the spicules. So, short and thin spicules and short and fat spicules can exist in the same species depending on the time of the year. The same species can have multiple forms/morphology based on its location, time of year, ocean chemistry, predation, etc. At this point in the day, many wanna-be sponge taxonomists were shaking their heads in mild despair.

Dave feels that you need SEM images for proper spicule detail. Due to so many difficulties facing sponge taxonomists, he estimates it takes about \$100/specimen to get to Family. This number does not factor in SEM cost, collection time/effort, preservation, sorting, glass ware/labels, and final identification. People need to be trained on how to separate the multiple specimens



potentially growing on one another and it takes about 2 hrs per specimen to do slide work.

Many labs are now using sponges for all sorts of research and sponge farming might be the wave of future.

Dave threw out a last tidbit for us to ponder when considering the wonderful world of sponges - he suspects that sponges have unique relationships with the animals they might be growing on, such as tunicates, corals, etc.

With that we wrapped up the day. We were all very grateful to have a true sponge expert in our midst but we left the meeting a bit overwhelmed with our newfound understanding of just how difficult the task of identifying sponges really is.

5 NOVEMBER 2012, MOLLUSCS, OCSO

Attendance: Megan Lilly, Wendy Enright, CSD; Heather Peterson, SFPUC; Kelvin Barwick, Ken Sakomoto, Michael Vendrasco, Mike McCarthy, Laura Terriquez, Rob Gamber, OCSO; John Ljubenkov, DCE; Larry Lovell, Bill Power, Terra Petry, LACSD; Tony Phillips, consultant; N. Scott Rugh, BFSA; Angela Eagleston, EcoAnalysts Inc.; Emile Fesler, BioVeyda; Carol Paquette, MBC; Bryan White, CSUF/SCCWRP

President Larry Lovell opened the meeting with the usual round of introductions and upcoming meeting announcements. Additionally he announced the upcoming 2013 SCAMIT officer elections and the nomination of Laura Terriquez (OCSO) for Treasurer, as for the other positions, current officers were nominated for another term.

Tony Phillips then asked those present, if possible, to collect some enteropneust specimens in EtOH for genetic and ID work.

The science portion of the day started with a presentation by Bryan White who is a graduate student of Dr. Eernisse at CSUF and is also working with SCCWRP. His thesis project deals with coalescent DNA techniques and he gave an informative and concise presentation explaining how using these techniques might help us more easily separate and determine cryptic species. An overview of his presentation is below.

Coalescent-based species delimitation: A new method of delimiting species for use in DNA barcoding with applications in species identification, biomonitoring, and conservation

Bryan P. White

DNA barcoding is a rapidly growing field with applications in species identification, biomonitoring, and conservation, and typically focuses on the amplification of a single mitochondrial gene, cytochrome oxidase I (COI), and the delimitation of COI sequences into haplotype clusters. However, there is no widespread accepted standard method through which haplotype clusters are delimited into putative species. Many workers have suggested using strict genetic distance cutoffs within range of 1-3%, but strict cutoffs yield differing results depending on the data set and are based on the assumption that mutation rates are similar across all animal phyla. This study seeks to test a new method of species delimitation called coalescent-based species delimitation (CBSO). According to CBSO, species entities are delimited based on common coalescent points, the points at which all members of a population share a common ancestor, so that all individuals that share a common coalescent point originated from



the same species. In order to test this method of delimitation, three samples of benthic marine macroinvertebrates (300 individuals each) will be collected near the long outfall pipeline from the Orange County Sanitation District. Three-hundred individuals will be collected from each sample, sorted to individual, and sequenced for the 658 bp barcoding region of the COI gene. Obtained sequences will be delimited using the CBSD method and compared to morphological identifications and concordance between morphological and DNA barcoding will be measured. I expect that identifications obtained through DNA barcoding will closely match morphological identifications and clarify morphological identifications thought to be cryptic.

With Bryan's talk complete it was time to move on to Kelvin Barwick's mollusk presentation.

[Editor's Note: All Figures referenced in the mollusk minutes below can be found as an attachment at the end of the NL]

Kelvin began his presentation on *Lirobittium*, a genus which historically has not been treated with equal taxonomic effort by the various agencies. He began with a brief nomenclatural history of the group. The first large scale review of west coast *Bittium* was done by Bartsch in 1911. He relied entirely on shell characters from both extant and fossil material describing a number of species, genera, and subgenera. Houbriek (1977) synonymized 13 genera and subgenera under the genus *Bittium* placing it in the Subfamily Cerithiinae. In 1981 Hertz attempted to address 3 closely related species of *Bittium* from the Eastern Pacific, (*Bittium asperum*, *B. rugatum*, and *B. suplanatum*). He illustrated types and addressed some of the nomenclatural issues as well as proposing shell characters separating the three species in question. Next, in a follow up to his 1977 paper, Houbriek (1993) conducted a phylogenetic analysis of what had become Subfamily Bittinae using external soft tissue, radula, reproductive structures, and the shell. Based on the cladistics analysis he proposed 5 genera (Figure 1). He further warned against relying solely on shell morphology for identification. Houbriek noted that *Lirobittium* is the only genus known to have an egg mass that resembles "a group of small balloons with their strings attached together." Development is direct. Kelvin showed images of local specimens with these egg masses attached above the aperture (Figure 2). McLean (1978, 1996 and 2007) reviewed and illustrated the extant species recorded from near and offshore waters of California. All southern California species were placed in *Lirobittium*. He used shell characteristics alone. The take away message from previous work is that an emphasis solely on shell morphology leads to taxonomic confusion and difficulty as there is a large range of variability within a species. However, for many of us working in monitoring labs, the idea of grappling with soft tissue characters is problematic. In an attempt to look at the anatomy, Kelvin has found that the animal is so tightly enclosed within the shell in preservation that it is difficult to discern, conclusively, the characters outlined by Houbriek.

With this as a background Kelvin presented images of various taxa from specimens provided by most of the participating agencies, contractors and individuals. We worked as a group to try to reach a consensus. The presentation included numerous images of local specimens compared to published illustrations and is available on request (kbarwick@ocsd.com). The following SCAMIT (2012) taxa were considered: *Lirobittium attenuatum* (Carpenter 1864); *L. calenum* (Dall 1919); *L. larum* (Bartsch 1911); *L. paganicum* (Dall 1919); *L. quadrifilatum* (Carpenter 1864); *L. rugatum* (Carpenter 1864); *L. fetellum* (Bartsch 1911). Friendly arguments and bantering ensued but we finally agreed on the following: *L. larum*, *L. rugatum*, and *L. quadrifissatum* are considered to be too poorly understood and confused in the literature to be



separated by those present. It was decided that these three taxa would be joined under one name as a species complex. Kelvin agreed to produce a voucher sheet and choose a name. **[K. Barwick note June 24, 2016: To date this has not been done.]** The remaining SCAMIT 2012 taxa (*L. paganicum* and *L. fetellum*) were determined to be valid forms consistent with published literature and could be reliably separated by those present. *L. calenum* (a single record from B'08, 510m) was also retained despite the lack of any published images. Dall records that it was found off "San Luis Obispo Bay, in 252 fathoms". It was compared to an image provided by J. McLean (unpublished manuscript) of a deep water form (400m) from off Palos Verdes. In addition, the previously unreported taxon, *L. purpureum* (Carpenter, 1864), was proposed to be added to the next edition of the species list (Edition 8). This was agreed upon by all those present.

With that Kelvin moved on to scaphopods, specifically, deeper water Gadiliforms. In 2007, Kelvin acquired a copy of Pilsbry and Sharp (1897-1898) in electronic form. With this new to him information, he began to wonder if he had been confusing *Cadulus californicus* Pilsbry & Sharp 1898 and *Gadila tolmiei* (Dall 1897). This led to a more thorough investigation of the literature and later, a review of specimens provided by most of the participating agencies, contractors and individuals.

First the literature: Pilsbry and Sharp contains the original description of *Cadulus californicus* (Figure 3) as well as a re-description with figures for *Gadila tolmiei* (Figure 4). Also included is a description of *Cadulus (tolmiei var?) newcombei* (Figure 5) as a new variant, however Steiner and Kabat (2004) consider it a synonym of *G. tolmiei*. It appears that based on the reported relative lengths, Pilsbry and Sharp illustrated a different specimen of *G. tolmiei* than Dall (Figure 6) in his original description (type locality: "Near Victoria, Vancouver Island, 60 fms."). In their description of *C. californicus* they state that the apical aperture had "irregular breakage, but possibly two lateral nicks may be normally present." No such "nicks" were reported by either Dall (1897) or Pilsbry and Sharp (1897-1898). Furthermore, the latter authors state that *G. tolmiei* was less inflated than *C. californicus*. Burch (1945) suspected that these were the same species noting that "If the tip of a specimen of *Cadulus californicus* were broken off, it would answer the description of *Cadulus tolm[i]ei*". He acknowledged that there has been a lot of confusion around the identity of these two species. Shimek (1998) states that *C. tolmiei* is less inflated at its widest point than *C. californicus*. He describes *C. tolmiei* with an apical aperture possessing 2 to 7 lobes. He did not describe or illustrate his concept of *C. californicus*. And finally, SCAMIT (1996) reported that after reviewing NHMLAC lots of both species "it was apparent that what was being recorded as *C. californicus* by LA County was actually *G. tolmiei*." It was reported that *C. californicus* was "more slender" than *G. tolmiei*.

A review of specimens was conducted. Results presented at the meeting showed that most workers are consistent. In general, the wider specimens with or without (broken?) apical lobes were recorded as *C. tolmiei* and relatively narrower specimens with or without lobes were referred to *C. californicus*. This seems to indicate that the two species are being reversed when compared to their original descriptions as Kelvin suspected. However, it is his opinion that there remains enough confusion in literature that, until which time a more thorough investigation can be undertaken, no changes are warranted. **[K. Barwick note June 24, 2016: At the time of the meeting Kelvin stated that he would draft voucher sheets for these two species. Upon further reflection he believes this is premature, pending further study.]**



As a public service, here are a few minor corrections to figure origin citations for Burch, 1945 (Explanation of Plate I, page 17). Figure 36 is from Dall 1897 (plate 1, fig. 8) not Pilsbry and Sharp. Figure 37 is from Pilsbry and Sharp 1897-1898 (plate 34, fig. 3) not Dall, as Burch suspected.

To B or not to sp B?

And last, but certainly not least, we revisited the *Tellina* spp conundrum. Mike McCarthy created a test, of sorts, with dishes holding various combinations of *Tellina* spp. The dishes were not labeled and at least one representative from each agency present examined the dishes and recorded their identifications. The results were tabulated and for the most part everyone was on the same page, with the biggest difference being in the name usage. All the agencies, except CSD, consider *Tellina cadieni* Valentich Scott & Coan 2000 a separate and distinct species found in very shallow water and bay habitats. The off-shore “pinkish” *Tellina* is identified by this group as *Tellina* sp B SCAMIT 1995. However, CSD identifies the off-shore pink form as *T. cadieni* based on conversations with Paul Valentich-Scott and Gene Coan at the May 14, 2001, SCAMIT meeting [K. Barwick note: this conversation did not make it into the official meeting minutes]. At this meeting both men examined specimens of the offshore species and thought that they were probably the same as the *T. cadieni* they described from the bay. CSD does not sample in shallower water and/or bays and so has yet to see an example of what some of the other agencies would call the true *T. cadieni*, which they maintain, despite the input from Paul and Gene, is **not** the same as the offshore species. They felt that Paul and Gene did not see enough examples of the bay form and the offshore form side by side, and if they had, they would agree they are two distinct species.

At this point in the discussion, Kelvin brought up the fact that there is no formal voucher sheet for *T. sp B* to compare to *T. cadieni* which was described in Coan, et al., 2000. Kelvin, who does not have a clear concept of *T. sp B*, called for a volunteer to create, at the very least, an ID sheet for *T. sp B*. Amongst deafening silence, Megan Lilly volunteered to create a sheet showing images of both the *T. cadieni* from Paul Scott, and *T. sp B* (the off-shore form). She will be sending the sheet to Tony Phillips and John Ljubenkov for input [**M. Lilly note June 24, 2016: this was never done, largely due to the fact that she has no specimens of the *T. sp B* of other agencies from which to create a sheet**]. To date, Tony and John are the only two taxonomists present to have recorded *T. cadieni* as part of their work in the bay. [**K.Barwick note June 24, 2016: The SCAMIT Newsletter (May, 2001; Vol. 20(1)) sheds some much needed light on this problem of attribution and description of *Tellina* sp B. In the minutes for the May 14 meeting there is an explanation and justification for erecting this provisional. Some of the confusion stems from the fact that the correct year should be 2001 (based on the May newsletter) not 1995 as was codified beginning with Edition 4 of the Species list published in 2001. This was not known or mentioned by those present at the time of the 2012 meeting.**]

10 DECEMBER 2012, PRE-B'13 ECHINODERM REVIEW, OCSD

Attendance: Megan Lilly, Robin Gartman, Wendy Enright, CSD; Dean Pasko, consultant; Tony Phillips, consultant; Don Cadien, LACSD; Laura Terriquez, Kelvin Barwick, OCSD; Larry Lovell, Cheryl Brantley, Fred Stern, LACSD; Craig Campbell, Greg Lyon, CLAEMD; Carol Paquette, MBC

There are no business minutes from the December meeting, but following is a summary of the echinoderm presentation by Megan Lilly.



The purpose of the meeting was to review echinoderm species which had either caused some taxonomic difficulty in the past, could potentially be new occurrences for some of the agencies, or had not experienced standardized taxonomic treatment among the SCB taxonomists. This was all in preparation for the upcoming B'13 project.

Megan started by discussing *Ophiura luetkenii* and its historical pattern of occasionally showing up in large numbers in some of the POTW's trawling programs. 2012 was one of those years and the summer sampling by CSD and LACSD collected record abundances of this species. She looked at historical data from the City of San Diego and noted that high abundances (> 100 individuals per trawl) of *O. luetkenii* had occurred previously in 1989, but had not reached the numbers that were seen starting in 2011 and peaking in 2012 (close to 3k individuals in one trawl for CSD and over 14k in one of the LACSD trawls). With regards to both agencies, the high



Andy Davenport, CSD, holds up a handful of *Ophiura luetkenii*
17 July 2012.

abundances seemed to center around 60-m stations with the exception of one CSD 32-m station (SD-17) in the spring of 2011.

Cheryl Brantley, then gave a presentation on LACSD's record-breaking abundances of *Ophiura luetkenii*. She had ROV footage which showed massive mounds of the species, numbering in the thousands and piling up and appearing as a moving mountain. There was some speculation on this bizarre sight and many thought it might be a reproductive behavior.

As for how to handle large catches of this species, it was decided that an aliquot technique made the most sense. Since the animals are relatively light, determining the number of individuals in .5kg was settled upon as the proper aliquot.

After discussing some life history of the genus, Megan next went on to discuss the 3 species that could possibly be encountered during the B'13 project; *Ophiura luetkenii*, *O. leptoctenia*, and *O. sarsi*. For separating *O. luetkenii* from *O. leptoctenia* see Hendler's treatment of the species in the MMS Atlas Vol 14. The primary distinguishing feature is arm comb morphology. In the Southern California region, *O. leptoctenia* is seen in deeper habitats. As for *O. sarsi*, again arm comb morphology is going to be a key character, see Clark 1911 for further details on this species. It



appears to be mostly seen north of Pt. Conception although Maluf (1988) has the range listed as Alaska to Cortez Bank. **[M. Lilly update June 24, 2016: Since this NL is being written years late, the B'13 project has come and gone during which there was 1 individual of *O. sarsi* collected].**

Next we went on to discuss taxonomic convention for the treatment of juvenile ophiuroids. For instance, with juvenile individuals in the family Amphiuridae, Megan does not set a strict size limit, but rather prefers to look at the development of the oral papillae to ascertain an ID. A juvenile animal with a well-developed pair of infradental papillae but with no other oral papillae present is left at the family level ID of Amphiuridae.

Some species can be identified down to extremely small sizes regardless of oral papillae development, or lack thereof. Megan discussed two examples of this – *Ophiuroconis bispinosa* and *Amphichondrius granulatus*. *O. bispinosa* has a distinctive looking jaw that even at small sizes is recognizable and granules will be present on the oral frame and disc cap on small juveniles. As for *A. granulatus*, again even at small sizes, the elongate 3rd oral papillae can be seen and the “minute angular granules” will be present on the oral aspect of the disc cap.

Next on the agenda was to review the protocols for dealing with echinoids, specifically, *Brisaster* and how to separate the two species – *townsendi* and *latifrons*. Please visit the Taxonomic Tool section on the SCAMIT website for documentation of the protocols. Additionally see SCAMIT NL's Vol 23 no 5 and Vol 26 no 2 for a more detailed discussion of this subject.

At deeper stations (200m+) large trawls of *Brisaster* have occurred. In the event of such a trawl it was recommended that a subset of 30 animals be brought back to the lab for ID and the subsequently determined ratio of species be applied to the estimated total catch.

Megan then reviewed the distribution data of *Brisaster townsendi* and *B. latifrons* from the B'08 project. During the project, the majority of *B. townsendi* sampled in the southern region of the Bight were from 400m or deeper. As the stations moved north they were sampled usually between 200-300m. As for *B. latifrons*, they were sampled primarily between 100-200m. She said she'd be curious to see if the pattern “held” during the B'13 project.

Staying on the subject of Spatangoids, Megan next discussed the unusual and rare *Brissopsis* sp LA1, first found during the B'03 project. This animal, to date, has only been found at depths below 300m, and CSD has only seen it below 400m. See SCAMIT NL Vol 26 no 2 and the Taxonomic Tool section of the SCAMIT website for further discussion of this species. Whether or not it is a hybrid between *Brissopsis* and *Brisaster* (making it a hybrid between 2 different Families), an ecophenotype of *Brissopsis pacifica*, or an as of yet undescribed species of *Brissopsis*, still remains to be determined.

A general slide showing a few species of heart urchins of the CSD monitoring program was then reviewed. It contained images of *Lovenia cordiformis*, *Nacospatangus laevis*, and a growth series of *Spatangus californicus*. At juvenile sizes, these species can be difficult to separate. However, habitat/depth can be used as an indicator of which species you may be dealing with, i.e., *S. californicus* is usually found at 60+m, whereas *L. cordiformis* and *N. laevis* are found in 30m or shallower. Additionally presence/absence of an anterior ambulacral notch and fascioles are characters to assist in identification.

Sand dollars were reviewed and fairly straight forward, but everyone was reminded that two species of *Dendraster* exist in the SCB - *D. excentricus* and *D. terminalis*. *D. excentricus* is

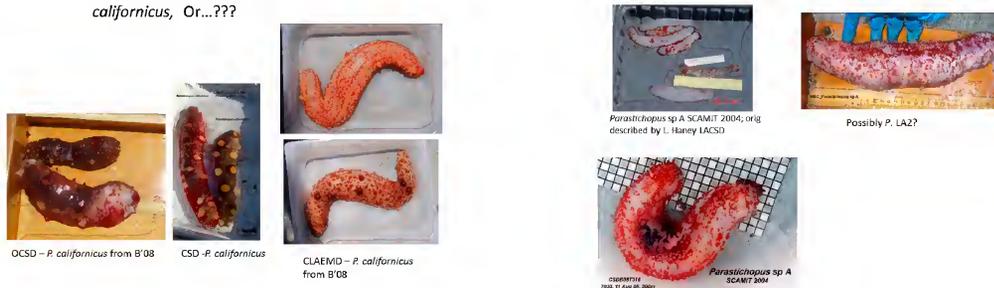


found in shallow, high energy habitats, either at the mouths of bays or in subtidal sandy beaches, whereas *D. terminalis* is also usually collected in sandy habitats but in at least 20m of water, outside the area of stronger wave action. This difference in habitat preference is evident in their morphology, with *D. excentricus* have a thicker more robust test and spines and *D. terminalis* having a thinner test and more delicate spines. Due to its delicate nature and pale coloration, *D. terminalis* was initially thought to be a “dead” test of *D. excentricus* by some So Cal taxonomists, but luckily work by Dr. Mooi cleared up the confusion. See Mooi 1997 for a thorough discussion of *Dendraster*.

Holothuroids were the next Class to be discussed. Megan briefly covered protocols for dealing with juveniles. An animal needs to be at least 1 cm in order for an ossicle mount to be effective in determining species level identification. In smaller animals the calcareous ring can be used for Family level ID’s assuming the animal is large enough for a proper dissection. If the animal is too small for successful dissection and/or ossicle mounts, assuming it is a “tube foot” variety, an ID of Dendrochirotida is used.

Next was the primary conundrum facing SCB echinoderm taxonomists – *Parastichopus* spp. During previous surveys a few unusual looking *Parastichopus* had come to the attention of the LACSD taxonomists, and one was given the provisional species name of *Parastichopus* sp A. Going in to the B’08 project, field taxonomists were on the look out for 4 species in the genus *Parastichopus* – *luekothele*, *californicus*, *parvimensis* and sp A. Prior to B’08 trawls, the species were reviewed at a SCAMIT meeting and everyone thought they had a handle on it. However,

The problem: Natural variability within *Parastichopus californicus*, Or...???



upon review of B’08 voucher specimens of *P. californicus* and *P. sp A* from various agencies, it was soon evident that a greater problem was present than previously thought. The variety amongst the animals being identified as *P. californicus* and *P. sp A* was soon obvious.

Megan took some time comparing ossicle mounts from different vouchers for both species, and came to no conclusion other than “we have a problem”. She strongly feels that there is possibly more than one undescribed species of *Parastichopus* existing in the SCB and more work needs to be done. However, it is a project for a grad student more so than a POTW monitoring program taxonomist with limited resources and time. Not only do morphometrics and ossicle morphology need to be studied more thoroughly, but DNA work would also be conducive to teasing out an answer concerning this mystery.

She asked her fellow taxonomists at the meeting for their thoughts and opinions and was met mostly with resounding silence.....

To continue in the theme of confounding holothuroids, Megan then went on to review the three species of “unknown Phyllophorids” from the B’08 project; Phyllophoridae sp SD2, SD3, and



SD4. All three of the species were sampled at B'08 Channel Island station 7527. Unfortunately, all the specimens were juveniles with the max size of those considered large enough to identify, being 1.5cm. There was some discussion of the ossicle mounts and external appearance but no identification for any of the three provisional species was achieved. Megan was hoping that more, larger, specimens would be sampled during the B'13 project, allowing her to continue her efforts at identification.

Lastly Megan went over a series of slides showing interesting trawl caught echinoderms from past Bight projects. Focusing mainly on those species that occur outside standard monitoring program depth ranges. Since the Bight projects tend to sample different habitats, unusual/not often seen species are frequently encountered.

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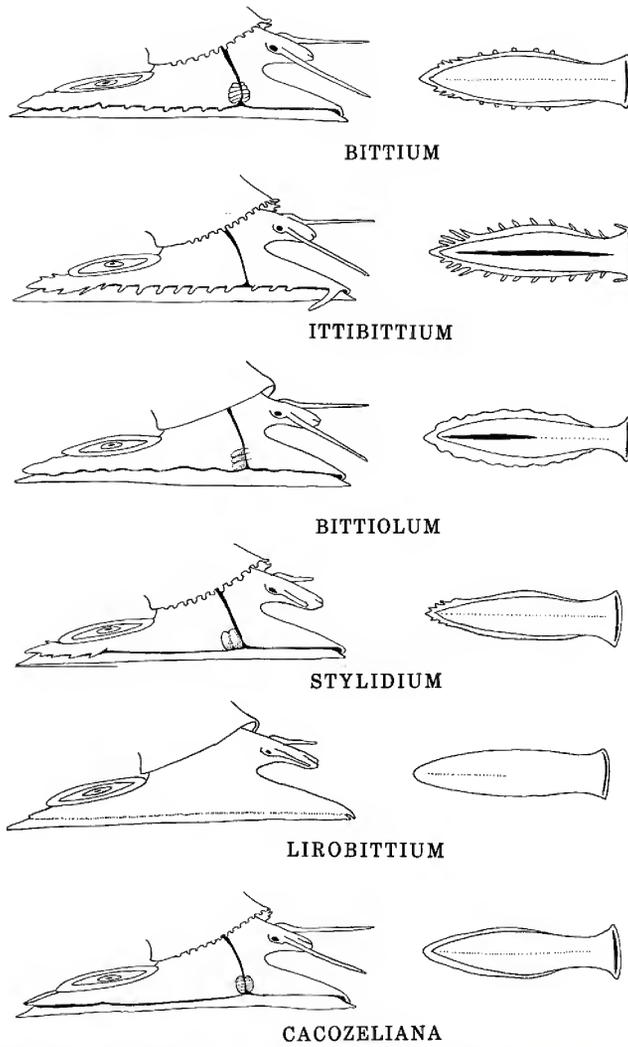


Figure 1 Genera proposed by Houbrick (modified from Houbrick 1993)

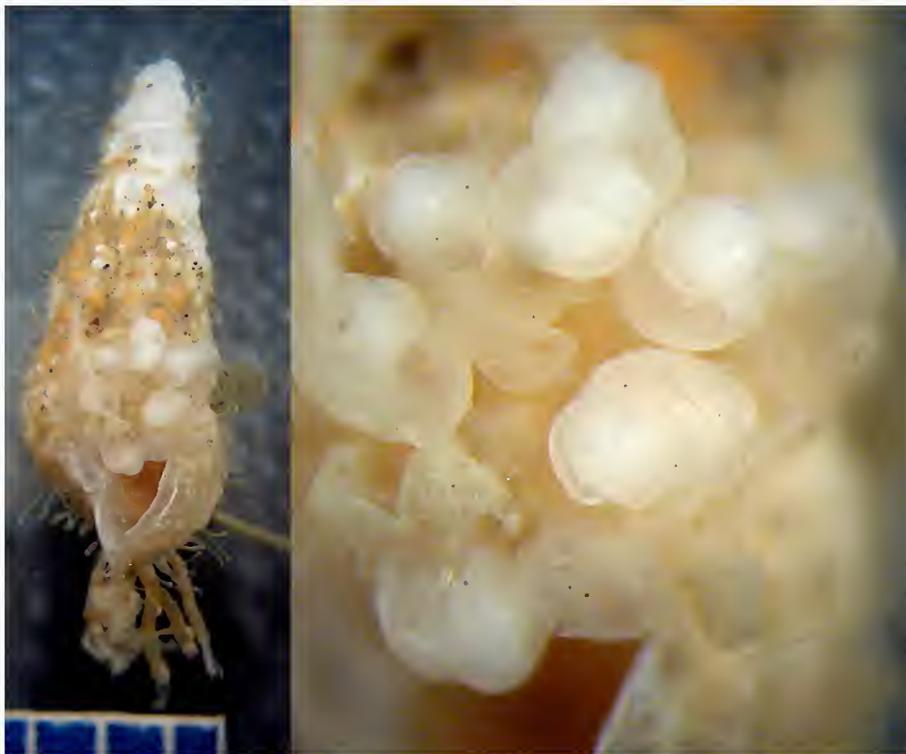


Figure 2 *Lirobittium* sp with attached egg mass. (Image by K. Barwick.)

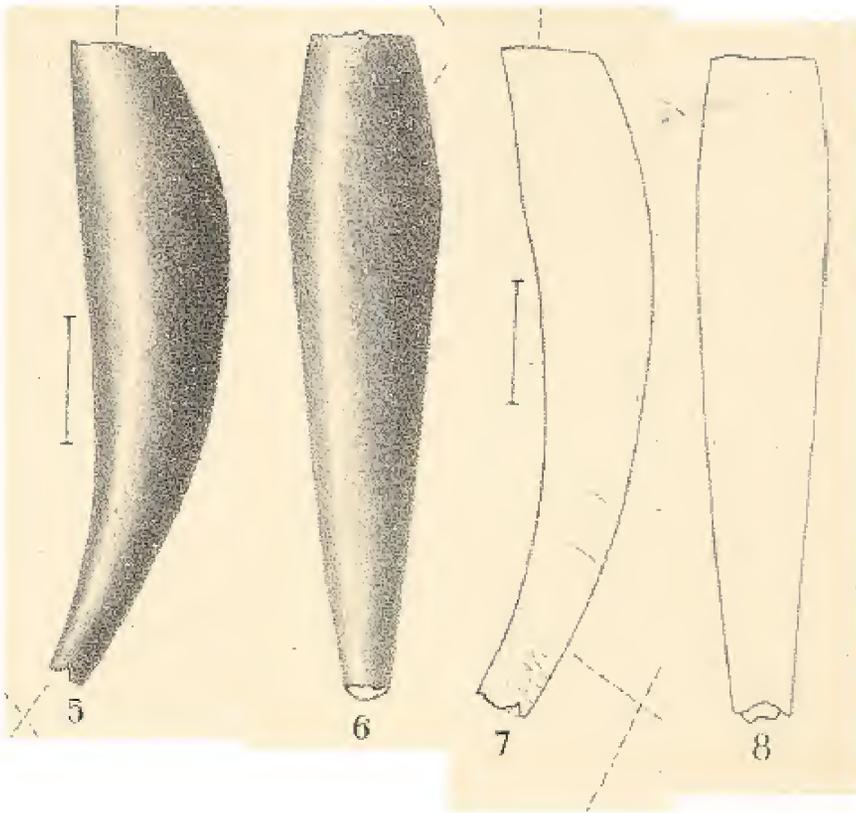


Figure 3 *Cadulus californicus* Pilsbry & Sharp 1898; 2 individuals each in different viewing pairs: 5 and 6 are the type specimen, length is 14.3 mm; 7 and 8 length is 14.6 mm (modified from Pilsbry & Sharp 1897-1898)

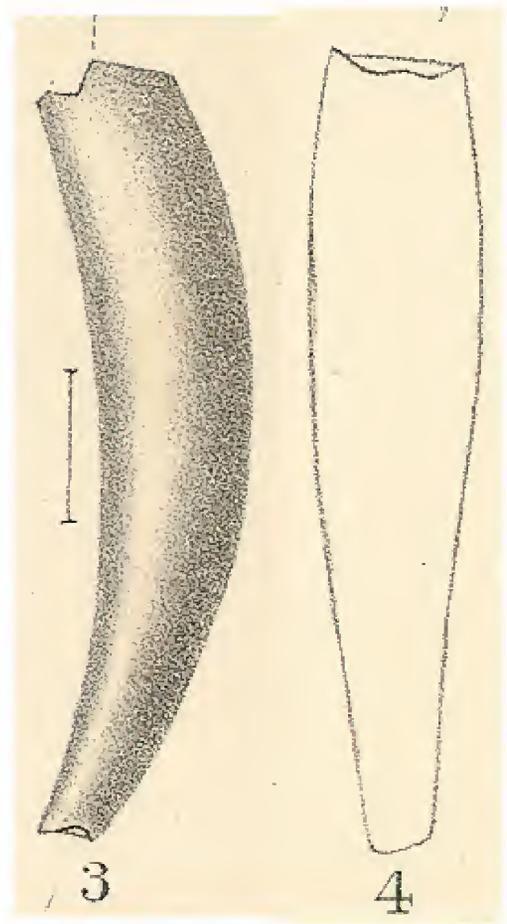


Figure 4 *Gadila tolmiei* (Dall 1897); 10.7 mm (modified from Pilsbry & Sharp 1897-1898)

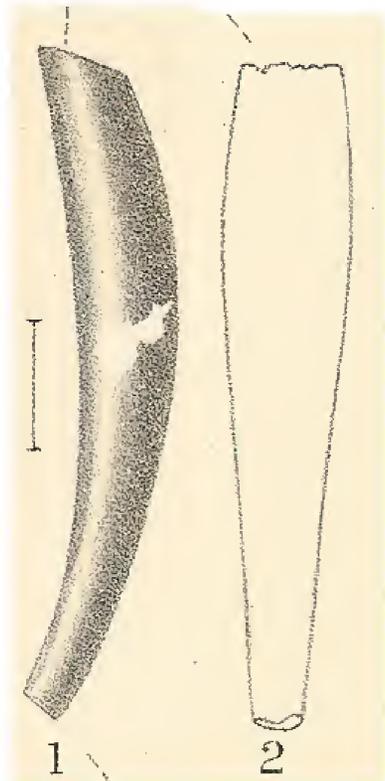


Figure 5 *Cadulus (tolmiei var.?) newcombei* Pilsbry & Sharp 1898; 11.0 mm (modified from Pilsbry & Sharp 1897-1898)

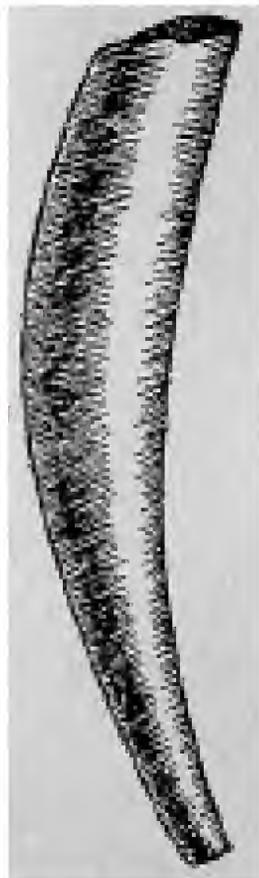


Figure 6 *Gadila tolmiei* (Dall 1897); 12 mm; type? (modified from Dall 1897)

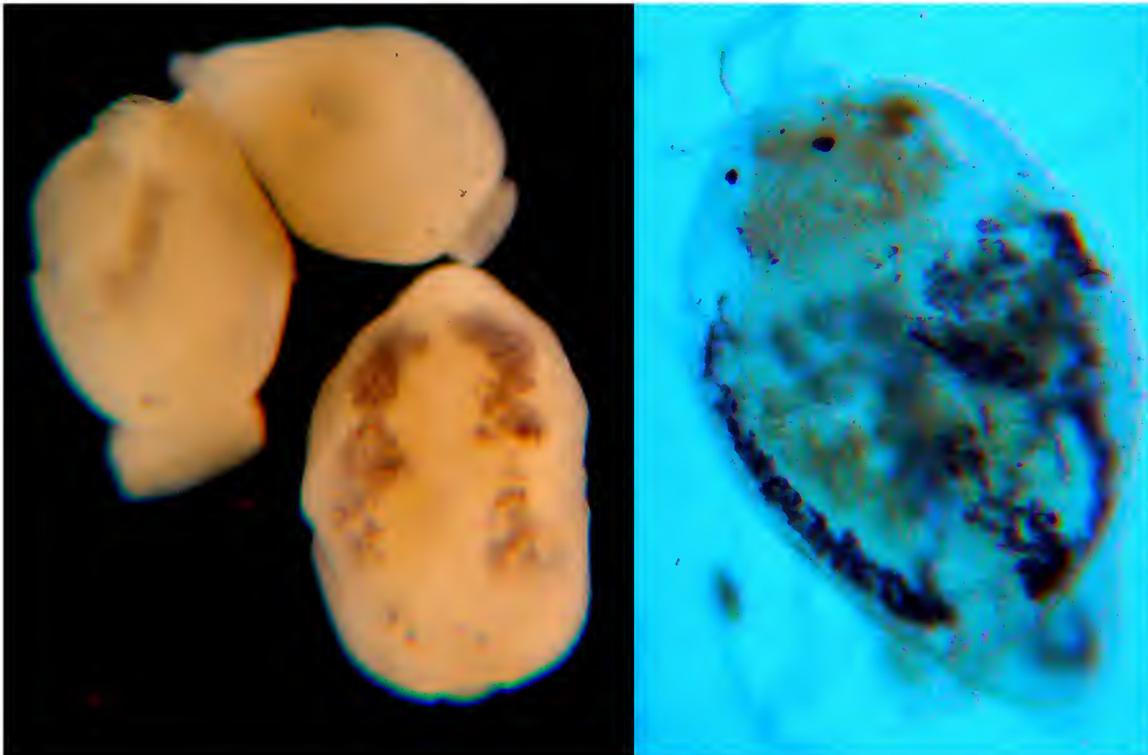
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January-April, 2013

SCAMIT Newsletter

Vol. 31 Nos. 5-6



Unidentified Turbellaria from Marina del Rey in 1m of water (B'03 station 4213), July 2003.
 The animal on the right has been cleared with methyl salicylate.
 Photos by M. Lilly, CSD.

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

Publication Date: 28 July 2016

14 JANUARY 2013, POLYCLADIDA, OCSO

President Larry Lovell opened the meeting with introductions and announcing upcoming meetings. Literature review meetings have been suggested for February, March, April, May, and June in preparation for the upcoming Bight '13 project.

Other announcements: SCAS 2013 will be May 3-4 at CSULB. SCAMIT will be hosting a symposium with member talks on taxonomy, ecology, QA/QC, and intercalibration. To date there are eight talks scheduled.

Larry reminded us again that 2013

Officer Elections are looming. He

repeated that Laura Terriquez had been nominated for Treasurer along with the current suite of officers being nominated to serve another term.

Don Cadien briefly took the floor to remind the Species Review Committee that they are "on notice" and the July 1st deadline for the next edition of the Species List is fast approaching.

Kelvin Barwick then announced that OCSO will be seeking an RFP for Crustacea taxonomy training.

UPCOMING MEETINGS

Visit the SCAMIT website at: www.scamit.org for the latest upcoming meetings announcements.

With the business complete it was time for Tony Phillips to take the floor and lead the meeting on Polycladida. Tony started by thanking Kelvin and OCSO for hosting the meeting, and he thanked Dean for help with formatting species pages.

Tony touched on his preferred literature when dealing with flatworms. Following is a listing:

- Newman 2003, Marine Flatworms: The World of the Polyclads; this book has good family descriptions and pictures
- Hyman 1953, The Polyclad Flatworms of the Pacific Coast of North America
- Hyman 1955, The Polyclad Flatworms of the Pacific Coast of North America: Additions and Corrections
- Hyman 1959, Some Turbellaria from the Coast of California
- Heath and McGregor 1912, New Polyclads from Monterey Bay
- Faubel, 1983 and 1984, two publications dealing with the Cotylea and Acotylea
- Prudhoe, 1985, a Monograph on Polyclad Turbellaria
- Freeman, 1930 and 1933, Polyclads of Pt. Furmin and the San Juan Region
- Boone 1929, Polyclads of the California coast

One of the guides used by Tony is John Holleman's key (Key to the Polyclads of the Pacific Coast of North and Central America (<https://flatwormsrock.wordpress.com/>)). Tony noted that it is important to be able to ascertain pharynx type in order to proceed with the most generalized ID.

He distributed handouts of his presentation and files, as well as his latest key - Polycladida of the Southern California Bight; see the Tools section of the SCAMIT website. The species names used in Tony's key are based on WoRMS (<http://www.marinespecies.org/>). For each species that he addresses, he also lists depth and geographic distribution when possible.



He also discussed preservation effects, and touched on the differences in techniques employed by research/academia-based experts vs local morphological-based taxonomists.

Tony mentioned that in researching for this presentation he saw several new and additional specimens at MBC that Carol Paquette had in her collection.

He started by discussing the two Suborders of Polycladida - the Cotyleans which have ventral suckers and head tentacles, although there are some species without head tentacles. Additionally they have a ruffled pharynx anteriorly, or a tubular pharynx.

In contrast, the Acotyleans have a ruffled pharynx mid-body to posterior, except in the Superfamily of Enantiidea, which have a tubular pharynx and spines on the dorsum.

After his overview he lead a species by species review of the two major groups and it is summarized below.

Acotylea

Enantiidae sp A - cuticular spines present along margin and dorsum of body, tubular pharynx, tentacles absent. This is the first record of the family from the west coast of North America. It has only been found on the legs of the offshore oil platforms Edith (Huntington Beach) and Grace (Ventura). Specimens have been sent to John Holleman for description.

Koinostylochus burchami - large animal; note the gap between the cerebral and tentacular eyes which are deep within the tissue; has elongate, rounded nuchal tentacles; eyes not present within nuchal tentacles; tentacular eyes form dense ring around base of nuchal tentacles; cerebral eyes between nuchal tentacles in two rows with distinct gap in center; differs from *Paraplanocera* in its large, robust size.

Paraplanocera oligoglana - very thin species; has elongate, rounded nuchal tentacles; eyes not present within nuchal tentacles; tentacular eyes in loose groupings around base of nuchal tentacles, with eyes spreading out from bases; cerebral eyes between nuchal tentacles in two elongate rows, no gap in middle.

Latoplana levis – large, thick species; has a large fan of frontal eyes; marginal eyes encircle body, thickest anteriorly; inter-tidal, sub-tidal, and rocky substrate.

Latocestidae sp A - single row of minute eyes along one-quarter to one-half of the anterior margin; frontal eyes present in four elongate lines that form a “W” pattern.

Diplehnia caeca (see synonymies) – eyes few to absent; if present, are in two loose cerebral clusters composed of 10-25 very small eyes.

Stylochus atentaculatus - anomalous species which grows up to 60 mm; nuchal tentacles in specimens to 13 mm, but they are lost afterwards; marginal eyes are densely packed anteriorly, thinning posteriorly; cerebral eyes in broad, poorly separated groups; dorsum buff to light brown, with dark brown spots; not usually collected in Van-Veen grab samples.

Stylochus exiguus - some specimens are without spots on the dorsum, although most do have a maculated pigment pattern; tentacular eyes present within tentacles; note 2 pairs of paired eyes (4 pairs, 8 total) anterior to the cerebral tentacles; these are of particular use when viewing specimens without spots; also of note are the marginal eyes that encircle the entire body.



Stylochus franciscanus - note more cerebral eye pairs than *S. exiguus* and marginal eyes only about 1/3 to 1/2 way along the body (just to or slightly beyond cerebral tentacles); tentacular eyes within tentacles; this species is much thicker than *Stylochus exiguus*.

Stylochus insolitus - easy to ID by color pattern; brown spots and longitudinal bars in mid and posterior sections and transverse bar across anterior region (tentacles).

Stylochus tripartitus - thin species, note thin line of cerebral eyes between tentacles; tentacular eyes within tentacles.

Cryptocelis occidentalis - common in the infaunal community; note cerebral eyes in two, unstructured longitudinal rows between tentacles, reaching anterior and posterior to tentacles.

Hylocelis californica - very thick animal; see voucher sheet for difference between *Interplana* and *Hylocelis*, the latter having more eyes.

Interplana sandiegensis – nuchal tentacles nipple-like; tentacular eyes loosely scattered and extending only posteriorly from base of nuchal tentacles; cerebral eyes start sparsely at base of tentacles, extending forward into a broad group; shallow bays/harbors but also shallow off-shore.

Hoploplana californica - can be heavily pigmented (red to purple); dorsum with dense papillae, occasionally with surface papillae absent (removed via sieving); tentacular eyes in ring at base of tentacles, not within tentacles; cerebral eyes medial and anterior to tentacles.

Hoploplana sp A – only specimens seen are ivory white and with dense, elongate dorsal papillae; tentacular eyes in ring at base of tentacles, not within tentacles; cerebral eyes in linear row between tentacles.

Parviplana hymani - no nuchal tentacles; can be without pigment and/or spotting or will have reddish-brown body coloration with some spotting; cerebral and tentacular eye clusters few in number, tentacular eyes larger (previously referred to as *P. californica* by SCAMIT).

Leptoplanidae sp A – two cerebral rows of three eyes (3 pairs). **NOTE** - voucher sheet shows set of spots posterior to eyes, not actual eyes, but debris artifact.

Notocomplana acticola - common in the ISS (Introduced Species Survey); reddish-brown dorsum, except where cerebral and tentacular eyes are located; this area (eye location) is opaque, appears like headlights; tends to be a thick species.

Notocomplana rupicola - Van Veen grab species; four distinct, separate cerebral and tentacular eye clusters; deeper water (>100 meters).

Pleioplana inquieta – body beige to light tan, with distinctive brown spots covering the dorsum; more prevalent in bays and harbors but rarely present offshore.

Armatoplana reishi - not elongated; cerebral eyes starting anterior to tentacles and extending posteriorly between tentacles; picture shows ruffled pharynx and ovaries.

Emprostopharynx gracilis (was as *Stylochoplana*) - “cuneate” form (anteriorly broad, posteriorly narrowed); pharynx ruffled; tentacular sets of eyes widely separated.

Phaenoplana longipenis – tentacular and cerebral eye clusters form a continuous band, tentacular eyes much larger; body elongate, thin, opaque to light brown.



Stylochoplana chloranota - (used to be called *Leptoplana*) tentacular eyes in large, dense clusters; cerebral eye clusters start posterior and inside of tentacular eye clusters, extending almost half-way to anterior margin; thick species, tan to brownish dorsum.

Stylochoplana sp A - deepest sampled was 25m near oil rigs off Huntington Beach; very thick; see picture showing unpigmented “spot” in head area continuing as white line running posteriorly.

Stylochoplana sp B – body wafer thin, can see eye pattern without clearing.

Cotylea

Characters:

- frontal tentacles present or absent
- ventral sucker
- diagnostic pigmentation patterns
- if ruffled pharynx present, will be in anterior third of body (rather than posterior half as found in Acotyleans)
- if tubular pharynx present, will be in anterior third of body
- frontal = marginal = nuchal tentacles (all reference the same structure)

Pseudoceros montereyensis - ruffled pharynx anteriorly; dark brown frontal tentacles (Euryleptids similar but with reddish-orange frontal tentacles); cerebral eye cluster in anterior 1/3 of body; marginal eyes along anterior margin to either side of median line; body white with blackish-brown mid-dorsal stripe; outer margin white, with thin black line inside of white margin; small blackish-brown spots scattered across dorsum.

Pseudoceros mexicanus – ruffled pharynx anteriorly; cerebral eye cluster in anterior 1/3 of body; marginal eyes along anterior margin and along anterior of frontal tentacles; very thin, lacy margins; dorsum colored brown with white spots.

Acerotisa californica - tubular pharynx anteriorly; without frontal tentacles; hard to see very small ventral sucker; white body is typical, but can be pigmented; one pair large cerebral eyes accompanied by 1-4 small eyes; widely separated groups (2-3 pairs) of marginal eyes at mid-point of anterior margin.

Acerotisa langi (= sp 43 of Ljubenkov) - tubular pharynx anteriorly; two large bands (20-25) of “outer cerebral” eyes and pair of inner cerebrals; no tentacular or marginal eyes.

Eurylepta aurantiaca - tentacular eyes within frontal tentacles; tubular pharynx; body beige to orange brown, covered in small orange to brown spots, with darker midline and tentacles.

Eurylepta leoparda – body crème to white, tentacles are orange-red, spotting is reddish brown and large (relative to *P. montereyensis*).

Euryleptodes insularis - frontal tentacles rounded (not pointed) or tapering; distinctive pigment pattern of large dark spots on beige to light brown dorsum; cerebral eye mass of numerous eyes and tentacular eyes, which extend outward to anterior margin between the tentacles.

Praestheceraeus bellostriatus - diagnostic color pattern of stripes and dark frontal tentacles.



Stylostomum lentum - small, short frontal tentacles (more knob-like) with tentacular eyes; large tubular pharynx in anterior third of body; cluster of cerebral eyes; color beige to bright red.

Enchiridium punctatum - beige with tiny black spots; no frontal tentacles; anterior tubular pharynx; marginal eyes multiple layers anteriorly, thinning to one layer posteriorly; marginal eyes visible ventrally rather than from dorsal aspect.

Prosthiostomum latocelis - frontal eyes extending broadly posteriorly and laterally to cerebral eye region but anterior to pharynx.

Prosthiostomum multiceles – found more often from scrapings, etc.; marginal eyes more tightly bound (than *P. latocelis*) to anterior margin, extending only to 1/3 of body; cerebral eyes present; tubular pharynx.

Turbellaria sp A (= sp 27 of Ljubenkov) - note size of cerebral eyes relative to *A. langi*.

Turbellaria sp B - bays and estuaries towards fresh water; 1 pair of large eyes with 2-3 pairs of smaller cerebral eyes; fairly thick animal, frequently w/ curled margins.

Turbellaria sp C (= Leptoplanidae sp SD2 Lilly-Pasko); elongate, thin species, up to 15 mm long, with two pairs of round eyes situated anteriorly, the first slightly larger than the second.

GENERAL COMMENT - eyes develop differentially with age, so smaller specimens have fewer (or absent) cerebral eyes. It is important to distinguish between two types of anterior eyes: cerebral and frontal. Frontal eyes reach the anterior margin of the head and are typically anterior to tentacles; whereas cerebral eyes are more clumped and can extend posteriorly in a loosely structured group. Tony also noted that eye patterns may be (likely are) inconsistent between species within a Family because Family-Generic distinctions are made by internal morphology, not external (generally).

11 FEBRUARY 2013, POLYCHAETES, NHMLAC

Attendance: Ron Velarde, Peter Vroom, Kathy Langan, Veronica Rodriguez-Villanueva, Ricardo Martinez, Matthew Nelson, CSD; Kelvin Barwick, Rob Gamber, OCSD; Leslie Harris, NHMLAC; Tony Phillips, consultant; Chip Barrett, EcoAnalysts; Larry Lovell, Cheryl Brantley, Bill Furlong, LACSD; Dot Norris, CCSF/PUC; Greg Lyon, CLAEMD.

Larry Lovell opened the meeting with introductions. Next was a discussion of upcoming meetings. Literature review, and shallow and deep water species review, prior to Bight '13 were suggested topics. The following dates, subjects, and locations have been scheduled: March 11, Echinoderms at CSD, Megan Lilly meeting lead; April 15, Misc Phyla at Dancing Coyote Ranch, John Ljubenkov meeting lead; May 13, Mollusks at OCSD, Kelvin Barwick meeting lead; June 10 Arthropoda at CSD, Dean Pasko meeting lead; Polychaete meeting in June TBD.

The polychaete meeting was a Bight '13 preparation led by Leslie Harris and others. The taxonomy portion of the meeting started with a review of papers distributed electronically by Leslie. There were many newly published papers she had gathered for sharing and discussion. Leslie next led a discussion of her provisional species recently reported in the SCB.

Mediomastus sp 6 Harris – staining difference, larger species. Leslie only sees them as larger individuals. There is a staining patch on the head. It is reported from South SD Bay and Hyperion SMB samples. Copies of her drawings were distributed.



Mediomastus sp 5 Harris –has banding in abdomen. Copies of her drawings were distributed.

Notomastus sp D Harris – reported from Hyperion LAREST LB Harbor station, Washington State, Channel Islands, and Marina Del Rey. Staining pattern is unique, with eyespots, uniform width. Copies of her drawings were distributed.

Next Dot Norris shared some provisional species from the SF Bay region:

Sigambra sp SF1 (Bay) and *S.* sp SF2 (offshore) – there was some discussion and voucher sheets were handed out. Issues with the true identity of our commonly reported *Sigambra tentaculata* were discussed. *Sigambra setosa* was mentioned as a possible correct name, but some are not convinced that is correct and are leaning towards erecting a provisional species. A lack of specimens with the proboscis fully everted revealing a recently defined character in the genus hinders resolution of this problem.

Amaeana sp A from SF Bay has a striped thorax, 10 thoracic notosetae segments. Methyl Green stained dark lower lip.

Larry led a discussion on the different *Onuphis* spp reported in the SCB. There are problems and reluctance by many present to identify immature or juvenile individuals to species. A key character - on which anterior setiger the branchiae begin, is ontogenetically influenced. In particular the discussion centered around ongoing issues between *O. iridescens*, with branchiae beginning on setiger 1, and *O.* sp A, with branchiae beginning on setiger 1 in adults but setigers 2-5 on immature specimens. And, further complicating matters is *O. geophiliformis* with branchiae beginning on setiger 5 (setiger 3-6 (Hilbig, 1995)). The presence of brown dorsal banding is inconsistent both in the literature and members' reports. Both *O. iridescens* and *O.* sp A are commonly reported, but *O. geophiliformis* is rarer and generally collected in deeper waters, likely Bight habitat. Several ideas on how to standardize the way juveniles should be handled were discussed but no consensus was reached.

Next we had a *Dipolydora* discussion. Methyl Green staining differences between *D. socialis* and *D. bidentata* have been noted by Bill Furlong at LACSD. An unstained third species was questioned as possibly being *D. cardalia* or *D. neocardalia*. Vasily has ID'ed CSD material as *D. neocardalia* and has other Spionid names for older Bight sample material provided by CSD that are not reported in Ed 7.

Larry next led a discussion of *Arcteobia* cf *anticostiensis* stating there are two forms with different types of stout notosetae. To further illustrate the notochaetal cusping in *Arcteobia* Larry showed everyone his new provisional species *Arcteobia* sp LA1. It possesses *Harmothoe*-like notochaetal cusping, is without prostomial peaks, and the ventrum is without pigment; while *Arcteobia* cf *anticostiensis* has *Malmgreniella*-like notochaetal cusping, has peristomial peaks, and has ventral pigment. Both possess capillary notochaetae, are commensal in the tubes of *Streblosoma crassibranchia*, and can co-occur in samples.



25 MARCH 2013, ECHINODERMS, CSD

Attendance: Megan Lilly, Robin Gartman, CSD; Fred Stern, Don Cadien, Larry Lovell, Cheryl Brantley, LACSD; Laura Terriquez, Michael Vendrasco, OCSD; Greg Lyon, Craig Campbell, CLAEMD; Tony Phillips, consultant; Dean Pasko, consultant.

Larry opened the meeting with introductions and then went right in to announcing upcoming meetings. The next meeting will be Monday April 15 at SCCWRP, and will be a Species List Review Committee meeting. The SCAMIT symposium at SCAS 2013 (May 3-4 CSULB) has been scheduled. So far 7 talks are lined up and the symposium is Friday afternoon from 1:20 – 5:00. Larry reminded everyone that the 2013 Officer Elections ballots are due to Leslie March 29. The next Crustacean Society Meeting will be July 7-11 in San Jose, Costa Rica. Larry also announced that the SCAMIT Picnic will be held at Doheny State Beach in late July. Volunteers are needed to help with the set-up and clean-up.

The question of Bight' 13 specialty taxa was raised. What taxa are in need of special assignment or study? With John Ljubenkov's untimely departure there may be a need to have Cnidaria repeated as a specialty group; otherwise, everyone will be on their own to figure out these difficult taxa.

With that it was time to start the echinoderm portion of the meeting. Don Cadien started the meeting by providing a short review of certain echinoderm literature. Don will make the list of new echinoderm literature available, although he warned that most of it does NOT relate to west coast taxonomy. Some articles relate to west coast echinoderm ecology, particularly of the threat to the local asteroid *Pisaster* resulting from warm water intrusion. Some papers out of Alaska include species reviews and systematic rearrangement; but none of these impact us. One paper discussed the fact that *Leptasterias* is no longer *L. hexactus*, based on microstructural differences, but the taxon needs to be reviewed and renamed. This topic will be researched by Dr. Doug Ernisee.

Holothurian-related literature also included nothing related to west coast taxonomy, but included an interesting article on Antarctic tanaids that burrow into the dermis of holothurians as parasites/parasitoids.

There was also an interesting paper discussing oceanic acidification impacts on larval echinoderms. Larval echinoderms, it turns out, have to utilize additional resources (energy) to overcome the sparse availability of calcium necessary to create their skeleton. This is putting stress on their survival.

Echinoderm phylogeny was somewhat upset by the deep sea *Xyloplax*, a pedomorphic echinoderm that was previously unrecognized as a member of this phyla.

Don finished up his literature overview and Megan Lilly then began a review of some problematic holothuroids. She started out with some basic limitations to holothuroid identification. First, specimens need to be at least 1 cm in total length in order for ossicle development to be determinate. The ossicles of smaller specimens may not be fully developed, which could result in a mis-identification. Some deep sea taxa may be exempt from this rule because several of those taxa have a limited maximum size. Second, when performing ossicle mounts, you need to mount tissue from both the tube feet and the body wall. Even the "common" *Pentamera* needs to be dissected because there are a minimum of five to six possible species represented in the



Southern California Bight (SCB). Third, one needs to place high value on the **predominant** style of ossicles, although not to the exclusivity of the other forms present. The two best references include Philip Lambert's Sea Cucumber book *Sea Cucumbers of British Columbia, Southeast Alaska and Puget Sound* (1997) and his 1998 paper describing *P. rigida* and *P. pediparva* from the west coast of North America which elucidates problems with the MMS Atlas illustrations.

Megan then began discussing various issues concerning the identification of holothuroids based upon her experience from the City of San Diego (CSD) sampling program, as well as past Regional Bight programs. She had prepared a talk showing examples of the species discussed below.

Pentamera populifera has supporting tables with medium spires (i.e., not short!) and multiple teeth, along with cross bars near their top. Specimens from our area are typically white with a caudus (tail). The body is typically plump in middle with numerous tube feet giving the animal the appearance of having a "mohawk."

P. rigida (= *Pentamera* sp A "probably undescribed species" in Lambert 1997) has a more generally streamlined body form, with a long caudus, and a relatively short, indistinct mohawk of tube feet. The more rigid body, relative to *P. populifera*, is due to the more dense ossicles. The body wall tables are irregular, round or star-shaped and there can be some lozenge-shaped plates present as well (but the predominant type will be irregular tables) with supporting tables that have small/short spires with multiple teeth. *P. rigida* is found in CSD's South Bay Ocean Outfall samples among fine sands.

P. lissoplaca has little to no tail, beige pigment (not white), and some speckling, with long tube feet all over, giving the animal a "furry" appearance. The body is soft, not strong or rigid with ossicles. It is typically found among coarse sand, but has also been found in fine sand. Lozenge-shaped plates (i.e., without spire) predominate, and irregular body wall tables are also present. The supporting tables are not too distinctive, and have fewer teeth than in *P. populifera*, although the spire is of good size.

P. pseudopopulifera, the dark almost chocolate-colored holothurian, whose color intensifies with age was also discussed. Megan had not prepared a slide on *P. pseudopopulifera* as she was focusing only on those species she thought might give taxonomists some difficulty; however, she warned that small juveniles will only be lightly pigmented. It has a predominance of round to irregular body wall tables and the supporting tables have tall spires with large, symmetrical teeth.

Pentamera pseudocalcigera was discussed next. The tube feet of *P. pseudocalcigera* are different from other *Pentamera* species in being conical rather than cylindrical. In addition the body wall ossicles are distinctive irregular or triangular plates, and the supporting tables have large complex spires that cause the tube feet to have a "hairy" appearance as these spires actually stick out through the skin. The body tapers towards the posterior and is stiff as a result of the density and style of the ossicles.

Megan then discussed *Pentamera* sp C of Haney, a deep water species from 300m, and its similarities and differences from *P. pseudocalcigera*. *P. sp C* has similar body wall plates, but differences in the supporting tables as well as over-all gestalt distinguish the two taxa. Although there was some discussion on the validity of *P. sp C*, it was decided that for the time being it should still be considered a distinct species and identified as such during Bight'13. The voucher sheet for *P. sp C* is available on the SCAMIT website in the Tools Section.



Caudina arenicola is a sand encrusted, plump species that is “peanut-worm” shaped with a small tail. The species has very delicate ossicles and tables that almost appear to be “disintegrating” according to notes from several small (1 cm or so) specimens. The tables have large holes in the plate portion of the ossicle. Don Cadien mentioned that specimens from LACSD are typically larger and not covered by fine sand. Since CSD only sees small, juvenile specimens (usually 1 cm or less) the identification of CSD specimens is tentative.

Phyllophoridae sp A Lilly. See the SCAMIT voucher sheet in the Tools section of the SCAMIT website. The apparently undescribed species has a complete lack of ossicles in the tube feet, and delicate tables in the body wall. The body is white with widely distributed delicate tube feet that show no distinctive pattern. It is found in 30–45m depth among relict red sands and coarse sediments.

Megan then moved on to discuss members of *Parastichopus* (Stichopodidae). Based on Bight’08 results there seems to be wide-ranging variability in both *P. californicus* and *P. sp A*. Megan showed a series of field photos from Bight’08 that showed a range of morphologies for both species. She worries there might be undescribed species of *Parastichopus* in the So Cal Bight. As a result, Megan proposed putting together a set of photos of “acceptable” *P. californicus* and “acceptable” *P.sp A*, which people can take in to the field for the upcoming Bight’13 project. Specimens that do not fit within these pre-ordained ranges of variability should be recorded as “*Parastichopus sp.*” These specimens should be photographed live (including size scale within photo) and clipped for body and tube feet tissue.

The problem with ossicle mounts of *Parastichopus* specimens is that they rely on micro-measurements of ossicles to determine species identifications. See Lambert (1986) which describes one new species of *Parastichopus* and includes a review of common taxa. Lambert uses ossicle sizes to distinguish taxa. This genus would be a good candidate for DNA work.

For Bight’13, Megan volunteered to create one field sheet per agency prior to the July trawl surveys.

We then moved on to ophiuroids and their associated SCB taxa. Megan strongly urged everyone to dry specimens of *Amphiodia urtica*, *A. digitata*, *A. psara*, and *Amphiodia sp A* and use side-lighting (to create contrast/depth of field) to view the scale patterns and hyaline forks of the disc, oral papillae, dorsal arm plates, etc.

Amphiodia psara is pigmented on both the disc and the arm plates, which can be helpful but not relied upon since other taxa are also pigmented. *A. psara* has blunt, round-tipped arm spines vs. the tapered, sharp-tipped arm spines of *A. urtica* and *A. digitata*. The dorsal arm plates are rectangular with corners touching. The primary plates are evident as a rosette.

Amphiodia digitata has large scales on the dorsal disc cap, and there is a **single** row of hyaline forks that runs along the dorso-lateral edge of the cap. Ophiuroid specimens with multiple, crowded rows of hyaline “spines” can occur but they should not be called *A. digitata*. Each hyaline “fork” can have two or more spires. The dorsal arm plates are rectangular and adjacent plates touch along their front-to-rear edges. You need all three characters present (large dorsal disc cap scales, single row of hyaline forks, and rectangular dorsal arm plates) to call a specimen *A. digitata*; if you don’t have all three characters, an ID of *Amphiodia sp* is suggested. *A. digitata* is typically found in coarse sediments.



Amphiodia urtica has small, numerous scales on the disc cap and can have some hyaline forks or spines that are limited in location to the area around the genital slits. The dorsal arm plates are rhomboid-shaped, so that corners of the plates are separated/not touching, thereby showing underlying arm tissue. Examples of possible hybridization (between *A. urtica* and *A. digitata*, or...?) are referred to *A. urtica* in the CSD Lab when there is question as to the proper identification.

Amphioplus strongyloplax is found in deeper water in the SCB, but in shallow depths in northern waters. *A. strongyloplax* do not have hyaline cross-bars (T-shaped) on the tips of the proximal to medial arm spines, distinguishing it from *Amphioplus* sp A which does have them. Large radial shields also distinguish it from *Amphioplus* sp A. Megan made a special note for *Amphioplus* specimens from deep water (>200m): disc diameters need to be ≥ 3 mm before a specific identification should be attempted, as the hyaline cross-bars of *Amphioplus* sp A aren't always developed on small juveniles.

Amphiura arcystata is usually clearly distinguished from most taxa, but could be confused with juvenile *Amphioplus*. Consequently, if the buccal scales remain appressed to the jaw, then back-off to Amphiuridae. The oral papillae pattern of *A. arcystata* consists of a single pair of infradental papillae and the buccal scales that are well separated from the jaw (at angle to jaw). In contrast, *Amphioplus* will develop one or two additional pairs of oral papillae (two or three total) distal to the buccal scale if the specimen is developed to where the buccal scale is separated from jaw.

We paused the species review here to discuss the general limitations on the use of color patterns because specimens from San Diego (and other areas) do not always show the same depth and richness of color as specimens from some of the northern communities (e.g., Santa Monica Bay, Goleta, etc).

Amphipholis pugetana vs. *A. squamata* – In *A. pugetana* the median arm spines are like large paddles (thickened and distally flattened, flaring at the tip) and longer than the dorsal and ventral spines which is in contrast to the relatively narrow, evenly tapered and subequal arm spines of *A. squamata*. Again, as with most ophiuroids, growth stage is a factor in the development of these distinctive character states.

Ophiopsila californica has pigment on the disc as well as pigmented arm plates. It has round, blunt arm spines, and extremely long tentacle scales which are so large that they can be mistaken for tube feet or ventral arm spines. As adults *O. californica* has oral teeth (not papillae), but as juveniles, it appears to have an oral papillae pattern similar to *Amphiura arcystata* or an *Amphioplus*. Closer inspection reveals this not to be the case, but caution must be used with juveniles. Based on feedback from other agencies (Don Cadien, LACSD) the species is typically associated with hard bottom, or rubble having been dislodged from reef material and therefore is rarely seen, at least in CSD samples.

Several species of *Ophiura* are possible: *O. luetkenii*, *O. leptoctenia*, and *O. sarsi*. The MMS Atlas Volume 14 (1996) distinguishes *O. luetkenii* and *O. leptoctenia*; however, it omits *O. sarsi*. *O. sarsi* is separated from the other two by the nature of the spines in the arm comb. Megan feels that we probably do not see *O. sarsi* this far south as it is mostly recorded from the Bering Sea and Japan, but she suggested taxonomists use caution when looking at *Ophiura* from unusual locales and depths (see Clark 1911, D'Yakonov 1954, and Lambert 2007 for further discussion of *Ophiura*). **[M. Lilly update July 2016: 1 specimen of *O. sarsi* was recorded from B'13 sampling].**



We briefly touched on separating *Dougaloplus* from *Amphioplus* sp A. Both have hyaline cross-bars on the tips of the arm spines and so cannot be confidently identified without the disc cap intact. If an animal is regenerating or missing the disc cap, one should back-off to the family Amphiuroidae because the primary differences between the genera/species are restricted to characteristics of the disc.

The presentation portion of the meeting concluded with a general discussion of size limitations. However, along the way, the group discussed the need (or desire) to ask all agencies to supply a copy of their identification conventions for consolidation and comparison.

Megan suggested the following guidelines for limiting specific identification by size:

Ophiuroids should have a disc diameter greater than 2 mm.

Astropecten greater than 5 mm arm-to-arm can be identified to species; but those between 3–5 mm should be left at genus (*Astropecten*); and those less than 3 mm should be left at class (Asteroidea).

Brisaster specimens should have a test length >30 mm before they can be confidently identified to species.

Dendraster species are typically depth dependent. Specimens from samples >30 m depth should be *D. terminalis*; while those from <30 m depth should be *D. excentricus*. Samples coming from 30m depth could become an issue and may require a size limitation. [M. Lilly update July 2016: specimens of *D. terminalis* have been collected in 20m of water, but were sampled outside of “high energy” zones].

We then adjourned to review specimens of interest.

Juvenile *Ophiura* – This was an odd specimen for review of size limitations, but was determined to be *Ophiura luetkenii*.

We reviewed a specimen of *Pentamera rigida* from Hyperion, which was confirmed by tissue dissection. The specimen came from Los Angeles Harbor at 14m depth.

We also reviewed specimens of *Amphiodia* from LACSD. The lot included good specimens of *A. digitata* and *A. urtica*, and others thought to be *A. digitata*. But after some review and discussion of the hyaline forks, the latter specimens were determined to be *A. urtica*.

Amphiodia sp A LACSD was also examined. This species has long arms that typically do not fall from the body, but remain intact. In EtOH the arms disentangle easily. There is some pigment on the dorsal arm plates, but use color with caution. *A.* sp A are typically found in shallow and coarse sandy sediments. A distributed voucher sheet does exist, but is not included in the SCAMIT toolbox.

Several specimens of *Ophiopsila californica* were reviewed. Dorsal arm plates are “balloon-shaped” and the tentacle scales are nearly as long as arm spines.



15 APRIL 2013, SCAMIT SPECIES LIST REVIEW COMMITTEE AND TWO PRESENTATIONS: LESLIE HARRIS – HITCHHIKING ALIENS, AND ERIC STEIN - MOLECULAR METHODS FOR INVASIVE SPECIES MONITORING, SCCWRP

Attendance: Ron Velarde, Megan Lilly, Wendy Enright, Katie Beauchamp, Kathy Langan, CSD; Leslie Harris, NHMLAC; Kelvin Barwick, Danny Tang, OCSD; Victoria Gray, Endemic Environmental Services; Larry Lovell, Don Cadien, Cheryl Brantley, LACSD; Tony Phillips, consultant; David Gillett, SCCWRP.

The business portion of the meeting was opened by Larry Lovell. Introductions were conducted and upcoming meetings were covered. There was a sad discussion concerning the passing of John Ljubenkov and what it will mean to our local cnidarian taxonomy. All agreed it will mean a huge loss. Tony Phillips proposed a meeting for cnidarian taxonomists consisting of people bringing all their respective literature and trying to standardize our approach to this often difficult group. Leslie suggested there should be a scanner present at the meeting so that any literature that needs to be duplicated and distributed can be dealt with in the present moment. Don Cadien also suggested that we compare our notebooks against what is already posted in the Tools section of the SCAMIT website. Kelvin offered to host the meeting at OCSD.

Larry announced that he would be gathering John's notes, files, and specimen collections which will then be accessioned at the NHMLAC.

John's upcoming memorial services were discussed. There will be two, one on May 18th at Dancing Coyote Ranch which will be a small event for family and close friends only; a second event will be held at the Cabrillo Marine Aquarium in June and this will be a larger celebration. It will be held in the evening after 5 p.m. and will consist of a potluck dinner and a slide show of John's life (running in the auditorium). This will be open to the SCAMIT "crowd" who knew John.

There are no notes from either of the presentations that day, but both were informative and entertaining and appreciated by all present.



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