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CALIFORNIA  
ASSOCIATION OF  
MARINE  
INVERTEBRATE  
TAXONOMISTS



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SCAMIT Newsletter

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*Munida tenella* Benedict 1902  
B'13 station 9073, 7 August 2013, 182 m  
Photo by N. Haring, CSD

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

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**SCAMIT OFFICER NEWS**

Two new officers take the helm with this newsletter, Laura Terriquez takes over as Treasurer for Cheryl Brantley, and Dean Pasko takes over as Secretary for Megan Lilly. SCAMIT would like to extend its gratitude to Cheryl and Megan who have served SCAMIT well for the past 11 and 15 years, respectfully. We appreciate the time and dedication of the many volunteer hours spent by these two long time and faithful SCAMIT members.

**UPCOMING MEETINGS**

Visit the SCAMIT website at: [www.scamit.org](http://www.scamit.org) for the latest upcoming meetings announcements.

**13 MAY 2013, MOLLUSCA, OCSO, KELVIN BARWICK**

**Attendees:** Larry Lovell, Bill Power, Terra Petri, Don Cadien (LACSD); Kelvin Barwick, Danny Tang, Michael Ventrassco (OCSO); Dot Norris (City of San Francisco); Dean Pasko (Private Consultant); Wendy Enright, Ron Velarde (City San Diego); Angela Eagleston (EcoAnalysts); Craig Campbell, Greg Lyon (CLAEMD); Sarah Briley, Kim Walker (CSU Fullerton, Zacherl lab), Emilia Gonzalez (Mexico, visiting NHMLAC).

**BUSINESS:**

The last of the Bight' 13 preparatory meetings will be June 15, and cover Arthropoda. Dean Pasko will lead the meeting.

**The SCAMIT Picnic** was held July 27, 2013 from 10 am – Sunset at Doheny State Beach Park. Those who attended enjoyed hot dogs, hamburgers, good snacks, good company and good conversation.

**The SCAMIT Species List Committee** met recently and is working on revisions for Ed 8. They are requesting that all members provide suggestions for corrections to the current list or new species to be added very soon. Comments may be sent to Don Cadien or Larry Lovell, or posted directly to the general list server ([general\\_topics@discussion.list.scamit.org](mailto:general_topics@discussion.list.scamit.org)).

**A meeting** of interest to members is the all American Malacological Conference which will be held in Mexico City, June 23-27, 2014. Paul Valentich-Scott of SBMNH is organizing it and will include most of the major Molluscan scientific organizations in the Western Hemisphere.

**SCAMIT's SCAS symposium** at the May meetings was very successful, and included talks from members of our sister organizations SAFIT (Southwestern Association of Freshwater Invertebrate Taxonomists) and SCAITE (Southern California Association of Ichthyological Taxonomists and Ecologists). The talks included presentations of data as well as how SCAMIT works. There was a request that SCAMIT participate again next year.

**It is membership time again** and the New Membership form will be available on the SCAMIT website. Please note the new mailing address as C/O Laura Terriquez, P.O. Box 50162, Long Beach, CA. 90815. U.S.A.

**SCAMIT Leadership:** SCAMIT hosted the Second contractual EPA CBRAT workshop at SCCWRP May 15-18. Expert panels provided information on distributions, abundance, and ecology of species of economic value. Specifically they addressed issues of global warming, sea-level rise, changes in CO2 concentrations, etc.



**The SCAMIT Newsletter** was discussed. There were requests that the Newsletter include Date of Publication in header, and be published bi-monthly. In addition, as a result of the Southern California Regional Monitoring Program requirement that participating taxonomists participate in SCAMIT, a list of attendees will be included in upcoming Newsletters, as it has in the past.

**Norma Emilia González**, a doctoral student, from El Colegio de la Frontera Sur Chetumal, Quintana Roo Mexico then spoke about her research on eulimid gastropods that live on echinoderms. All eulimids are non-obligate parasites, endo- and ecto-parasites. However, of the 850 species and 90 genera of eulimids known, only 33 species and 15 genera have a known association with echinoderms. In other words, there is a lot of work yet-to-be done on eulimid ecology and taxonomy. For example, two different species can inhabit different parts of the same sea star (arm and internal part of disc) and in some cases, the male lives on the female as a tiny parasite.

Norma summarized the knowledge of some of these relationships. There are 16 species of crinoid hosts that house nine genera of eulimids; 50 species of echinoids host 14 different eulimid genera; 25 species of asteroids accommodate eight different eulimid genera; and six species of ophiuroids host seven different eulimid genera.

When visiting museums, Norma realized that most eulimid species were difficult to identify on shell morphology alone. She hopes to use this trip to different museums in Southern California to develop a key. So far she has found it difficult to distinguishing genera, though there are many species described that are fairly distinguishable.

Some tidbits gleaned from the general discussion include that the apex and aperture of the shell can be useful because they are determined, in part, by the parasite nature of the species life-style. However, she also relies on internal characters, the radula and sex organs, as well as scars of inner whorl of the shell. Additionally, mantle color is not practical for distinguishing species, but can be used to distinguish certain genera, e.g., *Eulima* and *Melanella*

**Kelvin Barwick**, of the Orange County Sanitation District, then reviewed selected Mollusk Literature.

- Allcock et al (2011). Discussion of higher-level Cephalopod phylogeny, and generally good support for existing structure. For the first time it established support for monophyly of Teuthoidea. Analysis did not include any local species.
- Baez, et al (2011). Taxonomy and phylogeny of *Armina* spp.(Nudibranchia) via morphological methods, including some local species and using radula structure. Includes undescribed species
- McLean, J.H. (2011). Re-erected Subfamily Hemitominae (Fissurellidae) with descriptions of new genera based on shell and radula morphology. None of the local fauna are discussed. Differs from earlier workers using DNA.
- Bieler, R and R.E. Petit (2011). Catalogue of recent fossil Caenogastropoda “worm snails” covering Vermetidae, Siliquariidae, Turritellidae. Paper does cover some taxa found in the SCB, but mostly from hard bottom collections. No change to SCAMIT nomenclature.
- Brandt, A et al (2009). Discusses the bathymetric distribution of southern ocean species of Bivalvia, Gastropoda, Isopoda, Polychaeta, by depth and number of taxa, and provides depth distributions by class and family.



- Benaim, N P, D.C. Paone Viegas, et al (2011). Review of the features of the hinge plate of *Yoldiella* spp vs shell morphology using several taxa from Brazil, including *Y. aff. jeffreysi* and sp 1 and sp 2. They were able to obtain about 75% species discrimination based on general shell morphology, while the use of hinge morphology achieved over 85% reliable distinction among taxa.
- Haga, T, and T. Kase (2013). Reviewed and confirmed the presence of dwarf males in deep sea wood borers (Bivalvia: Pholadoidea: *Xylophaga*) relative to life history and distribution, and found an increased prevalence of dwarf males in deeper water taxa. They were previously thought to be juvenile brood.
- Paalvast, Peter and Gerard van der Velde (2013). Reviewed the main food source of shipworms (*Teredo navalis*); suggesting that the main form of feeding is filter feeding, not the ship's wood.
- Oliver, P.G. and J. Lotzen (2011). Describes a new fluid feeding bivalve of Galeommatoidea, to which they assigned the appropriate name *Draculamyia porobranchiata*.
- Oliver, P.G. and J.D. Taylor (2012). Bacterial symbiosis in Nucinellidae (Bivalvia: Solemyida) is confirmed and includes a description of two new species. Includes a nice illustration of shell morphology for the newcomer to gastropod taxonomy, and differentiation between *Nucinella* and *Huxleyia*.
- Cyrus, A.Z et al (2012). Sensory ecology of swash-zone living predatory Olivoidea, *Agaronia propatula*, including discussion of predation response and interesting photos and discussion of predation on larger organisms. They rely heavily on physical encounters with prey items consuming anything they bump into. They take advantage of the swash zone to cover large areas.
- Harbo, R. et al. (2012). The feeding of *Evalea tenuisculpta* (*Odostomia*) on the feeding siphons of *Tresus capax*.

**Problem Taxa.** After lunch we discussed some of the difficult species that might create problems during Bight'13.

*Tellina*: *Tellina* sp B vs *T. cadieni*. The problem is that *Tellina* sp B is without voucher sheet documentation. OCS&D, as well as the other monitoring agencies, call all offshore individuals *Tellina* sp B; and all bay species *T. cadieni*. The question remains should we use location (offshore vs bay) to discriminate the two for Bight'13? Paul Scott, SBNHM, did not see a difference when Ron Velarde took specimens of the two taxa from the City of San Diego. One problem is that the description of *T. cadieni* is not very detailed. The other problems lie within the history of the usage and documentation within SCAMIT. The original voucher sheet for *T. carpenteri* is actually *Tellina* sp B; whereas the original voucher sheet for *Tellina* sp A (1995) turned out to be *T. carpenteri*. This issue is discussed in the last paragraph of the Comments section (page 2) of the *Tellina* sp A voucher sheet, which states that *Tellina* sp A (1995) became *T. carpenteri*, the "rose pink" specimen from the offshore becoming the undocumented *Tellina* sp B, but does not distinguish *T. cadieni*, a bay form described by Scott (2000).

The group reviewed pictures of *T. cadieni* fide T. Phillips SMB Station FB15, 7/18/12, which everyone determined to be *Tellina* sp B. The group then compared Phillip's picture to Scott's plate of *T. cadieni* but that provided little resolution of the problem. After much discussion, everyone decided that absent a review of *Tellina* sp B and creation of a voucher sheet, offshore specimens should be referred to *Tellina* sp B and specimens from true bays and harbors should be referred to



*Tellina cadieni*. The noted exception being Santa Monica Bay, which is generally considered open coast.

Pyramadellids were next on the hit list, particularly *Turbonilla* sp SD1 vs. described species *Turbonilla santarosana*. See SCAMIT NL Volume 29, No. 3&4. Discussion about whether or not they one in the same, and what is the correct name to be used ensued. Generally the usage among the agencies is *Turbonilla* sp; however, two primary people are using the described names, including Tony Phillips and Carol Paquette, both of which were absent from the day's meeting. Notes describing the history of these problematic taxa can be found in SCAMIT NL Vol. 29, No 3&4. There was some discussion of leaving these identifications at the generic level (e.g., *Turbonilla* sp and *Odostomia* sp) since both are ectoparasites that do not have direct ecological implications for Bight benthic work. In the end, the group decided to allow each lab and taxonomist to proceed with usage of the taxa listed on SCAMIT Ed 8 as capable, as long as everyone remains committed to using the list-server to ensure that all other Bight molluscan taxonomists are informed if any new taxa are "found" in samples.

*Cadulus* and *Lirobittium* were discussed briefly and everyone was reminded to check the prior meeting minutes during which characteristics to distinguish *L. attenuatum* and *L. purpureum* were outlined. Kelvin volunteered to create voucher sheets for these (*Lirobittium* and *Cadulus*) ahead of the formal publication of the minutes for the meeting.

For eulimids, everyone is directed to the SCAMIT Tools and the eulimid voucher sheet tables and plates. Plate 1 shows confirmed *Melanella rosa*. Plate 2 shows confirmed *Polygireulima rutila*. Plate 3 illustrates *Vitrolina columbiana* and *Vitreolina macra*, **however** *Vitreolina yod* is represented by juveniles which were considered too small to be placed in a particular species. Norma confirmed this latter determination based on her knowledge of the true size of *V. yod* and the few whorls represented by the Plate 3 picture. We also reviewed the original illustration of *V. yod* which showed some differences between the original and Kelvin's photos. Among the other voucher sheets available, Figure 1 showing *Balcis* sp A was confirmed, as were *Balcis* sp SD1 and *Balcis* sp SD2.

Kelvin then helped Sarah and Kim with specific specimens that they had brought to the meeting for resolution. The meeting ended at approximately 3:00 PM.

#### **6 JUNE 2013, POLYCHAETA, NHMLAC, SERGIO SALAZAR-VALLEJO AND LUIS CARRERA-PARRA**

**Attendees:** Larry Lovell, Cheryl Brantley (LACSD); Kelvin Barwick, Ernest Ruckman (OCSD); Kathy Langan, Ricardo Martinez-Lara, Veronica Rodriguez-Villanueva (City San Diego); Chip Barrett (EcoAnalysts); Leslie Harris (NHMLAC); Luis Carrera-Parra, Sergio Salazar-Vallejo (ECOSUR).

**Dr. Sergio Salazar-Vallejo, who works at ECOSUR in Mexico, began the polychaete review with a presentation entitled: *Sternaspids: "Wide distribution or widespread confusion?"***

The presentation is based on Sergio's recent publication with Kelly Sendall (Sendall and Salazar-Vallejo, 2013), which discusses the question of whether there's a single species of *Sternaspis* with worldwide distribution or multiple species.

Sergio began with a discussion on the history of sternaspids. The first recorded mention of a sternaspid was by Janus Plancus who thought it was a sea cucumber (Plancus, 1760). Ranzani



(1817) described *Sternaspisscutata* in the genus *Thalassema*. A few years later Otto (1821) established the genus *Sternaspis*. There was initially some confusion regarding the anterior and posterior ends; the shield is located on the posterior end. The current conundrum is whether or not Otto's 1821 description of *Sternaspis thalassemoides* represents a single cosmopolitan species or one genus encompassing about 15 species.

Sergio discussed shield morphology. The shield is a fan-shaped structure in the central posterior area that can be projected or truncate. The anterior, depressed margin of the shield is 3-dimensional which makes it difficult to illustrate the morphology in two dimensions. Careful brushing of sediment from the shield is necessary for examination and identification. Change in shield shape with growth can be a confounding issue. Sergio used analogies with variability in leaf shape in trees and shell shape in bivalves to explain this. Sternaspids employ phragmosis (the use of a body part to protect the opening to a burrow: many spiders and ants of the genus *Cephalotes* employ this strategy) to protect their tubes, using the anal shield.

In sternaspids, the branchiae filaments are associated with the anal shield; consequently, the orientation of the animal must be posterior end up to keep the branchiae near the sediment/water interface. Because of this feature, the anal shield has developed specific characteristics and has taxonomic value. In Sendall and Salazar-Vallejo (2013) three genera are established based on characteristics of the ventro-caudal shield, the introvert hooks, and number of abdominal segments.

- *Caulleryaspis* - this genus has a very soft shield with sediment embedded in it.
- *Petersenaspis* - this genus has 8 abdominal segments anterior to the shield.
- *Sternaspis* - this genus has 7 abdominal segments anterior to the shield.

Sergio showed an image with a growth series of eight specimens from the same sample. The shield is not well developed in juveniles. Chaetae along the margin start as 1 per bundle, but then additional chaetae are added to bundles as the animal grows. In addition, concentric lines develop with growth of the shield, then characteristics of the shield margin and striations.

Various types of chaetae were shown. The shape of the distal portion of the anterior hooks may be an important diagnostic character, but wear confounds the issue. Chaetae in the posterior region are thin, and of less taxonomic value.

Sergio also mentioned that the mouth papillae have patterns. Some are circular or U-shaped. In contrast, the genital papillae are not well known or defined.

Locally we get *Sternaspis affinis* in shallower water, down to about 350 m. There is new species of *Caulleryaspis* in deeper water (350+ m), then another species in much deeper water (2500–4000 m). There are possibly other species in shallow bays or intertidal mudflats not yet known. A question was asked about the composition of the shield. Sergio explained that it is not true chitin (modified polysaccharide). Rather, it is sclerotized tissue. The animal utilizes iron compounds to give stiffness and a reddish color to the shield.

Chip Barnett brought some specimens of Eastern Mediterranean sternaspids for examination. There were two vials of *Sternaspis scutata*. One contained juveniles with reddish, comma-shaped eyespots. He also brought two specimens of *Caulleryaspis* in another vial. All of Chip's material was examined.

Sergio will provide a pdf of his presentation for SCAMIT to post on the website.



**Dr. Luis Carrera-Parra, who also works at ECOSUR in Mexico, next led a discussion on Lumbrineridae.** Luis began with some cautionary notes on the identification of fragments and juvenile lumbrinerid specimens. Small, complete lumbrinerids should have at least 45 segments present in order to confidently identify them. He does not identify anterior fragments to species level. In situations where a taxonomist is very familiar with a particular area and the regional fauna it may be OK to identify anterior fragments. Ideally, it's best to have about 100 segments to observe full development of the posterior lobes.

The distribution of chaetae is important. Chaetae can change along the length of the animal. In the anterior of the worm, hoods are approximately the same size whereas in the posterior of the worm, the size of the hoods can vary by a factor of 2. The chaetiger where the dorsal chaetae end is also a significant character. The length to width ratio of the blades of composite hooks is important. A long chaeta is one where the length is about 11 times the width.

*Scoletoma* can be problematic and Luis recommends caution in identifying species in this genus.

Although aciculae “color” – some taxonomists use yellow and black and others use the terms light and dark – is often used in conjunction with other characters for species identification, some species' aciculae change color along the length of the body. Luis recommends looking at parapodia from three different regions of the body (e.g., anterior, median, and posterior).

We then examined specimens of *Abyssoninoe* that Chip brought from deep-water samples off the Eastern Mediterranean. These specimens had long blades with limbate hooks.

Little work has been done on lumbrinerid growth patterns. Larval development is poorly documented. In some species it occurs within a jelly mass. Small specimens (less than 30 – 40 segments) will not have composite chaetae. Luis does not like to use simple chaetae as a taxonomic character because they show a high degree of variability. He has noticed that they can have a long hood, short hood, or both long and short hoods within a fascicle.

Leslie mentioned that she has recently found the Caribbean species *Lumbrineris perkinsi* in San Diego harbor in fouling habitats.

There was some discussion about the need to check hooks and jaws to confidently distinguish between *Lumbrineris* sp E and *L. latreilli*.

There was also a brief discussion of a new Terebelliformia paper elevating several subfamilies to family status (Nogueira et al. 2013). Polycirrinae is not well supported according to Kirk. The group recommended that we wait before making this change to the SCAMIT species list.



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**10 JUNE, ARTHROPODS, CSD, DR. TIM STEBBINS AND DEAN PASKO**

**Attendees:** Larry Lovell, Don Cadien and Chase McDonald (LACSD); Ken Sakamoto and Danny Tang (OCSD); Ross Duggan (City and County of San Francisco); Tim Stebbins, Ron Velarde, Katie Beauchamp and Andy Davenport (City of San Diego); Matt Hill (EcoAnalysts); Craig Campbell and Greg Lyon (CLAEMD); Tony Phillips and Dean Pasko (Private Consultants).

**BUSINESS:**

We discussed upcoming meetings, most of which are available on the SCAMIT web-site ([www.scamit.org](http://www.scamit.org)). However, a special meeting was announced, Dr. Buz Wilson of the Australian Museum will hold an asellote isopod workshop on Monday, September 30<sup>th</sup> at the City of San Diego Marine Biology Laboratory.

On October 7<sup>th</sup>, SCAMIT's sister group for fishes, the Southern California Association of Ichthyological Taxonomists and Ecologists (SCAITE), will be holding a Trawled Fish FID (specimens for further identification) review meeting at the SCCWRP Laboratory. Plans for a separate meeting for invertebrate taxa is in the works. Please send a list of potential FIDs to Larry ([llovell@lacsds.org](mailto:llovell@lacsds.org)) or Don ([dcadien@lacsds.org](mailto:dcadien@lacsds.org)).

Finally, on November 8<sup>th</sup>, Dr. Pam Neubert and Don Cadien will host an Aplacophoran workshop at the City of San Diego laboratory.

Job openings were also announced at the City of Los Angeles (Water Biologist position) and the Orange County Sanitation District (Senior Environmental Specialist). Please see the SCAMIT web site for additional information.

**It is membership time again** and the New Membership form will be available on the SCAMIT website. Please note the new mailing address as C/O Laura Terriquez, PO Box 50162, Long Beach, CA 90815. USA.

**Dr. Tim Stebbins presented “Review of the Southern California Mysids.”** Tim recently started tackling the mysids when he ran into problems trying to identify specimens collected by the City of San Diego's benthic monitoring program. Briefly, he found himself using mostly “poor quality” copies (2<sup>nd</sup>, 3<sup>rd</sup>, 4<sup>th</sup>... generation) of specimen identification sheets that left some details inadequate for confident identifications. Many of these species' old ID sheets are available in the SCAMIT Taxonomic Toolbox. Consequently, he started gathering and compiling the necessary literature and information in order to produce new clean copies of these identification guides.

Tim also noted that although several keys or draft keys exist covering southern California species, none are current or complete. For example, Tim himself prepared a “Key to the Common Mysids off Point Loma” in 1991, but which included only 11 species. A more comprehensive draft “Key to the Mysid Species Reported from California” covering about 31 species was created by Ron Velarde and others in early 1992 following Ron's Mysid workshop (see SCAMIT NL Vol. 10, No. 9). Copies of both Tim's and Ron's keys are also available in the SCAMIT Toolbox (i.e., under Order Mysida, Family Mysidae, Other Useful Tools). Several other published keys are also available that SCAMIT members may find useful, including those by Daly & Holmquist (1986: Pacific Northwest mysids), Gerken et al. (1997: Santa Maria Basin mysids), and Modlin (2007: Central California to Oregon mysids).



Tim distributed a species listing and updated comprehensive list of mysid literature, along with a table of introduced species. Although he intended to create a new key, this effort did not get beyond the concept prior to the meeting. Instead, Tim presented a new set of figure pages for most species that he intends to make available to the SCAMIT membership.

The presentation began with an introduction to the mysids and overview of their primary characteristics. His preliminary list included 35 species representing 28 genera, 8 subfamilies, and 2 families in the Southern California Bight (SCB), although some of these may eventually be excluded as being non-marine. This was followed by drafts of the various new mysid figure pages. The presentation was in draft form and not for general distribution, so Tim did not provide an electronic copy for posting at this time.

**Don Cadien then reviewed the Tanaidacea literature.** Most of the literature was not pertinent to SCB taxonomic issues, although he cited one very interesting publication on tanaid diversity and radiation within the world's oceans (Blazewicz-Paszkowycz, et al, 2012).

Absent other relevant issues, the session quickly deteriorated to a discussion of *Leptochelia* and the issue of *L. dubia* complex. Adding to this discussion (and confusion) are several publications by Bamber. Bamber and Costa (2009) describes *L. caldera* and revisits the confusion over *L. savignyi*. Bamber (2010) re-describes *L. savignyi* from topotype material and Bamber et al (2009) describes *L. tanykeraia*, a species very similar to *L. dubia* in number and relative length of the uropodal articles. In addition, Edgar (2012) discusses the difficulty of *Leptochelia* identification as a result of ontological variability.

Don Cadien then initiated a discussion of the preliminary phylogenetic results from 12 California *L. dubia* samples analyzed with *Leptochelia* Genbank sequences from the Western Atlantic and West Africa. Katie Beauchamp, Don Cadien, Ross Duggan, and Erik Pilgrim are working on a project using a combination of molecular techniques and traditional taxonomic procedures to explore the systematic relationships of species in the genus *Leptochelia* and related taxa. Katie provided a brief summary of phylogenetic results from Tanaidomorpha taxa sequenced thus far using the mitochondrial COI gene (mt COI). These results included 12 specimens sequenced from the Southern California Bight. When compared with Genbank sequences from the Atlantic Ocean, 11 of the California *L. dubia* specimens grouped together with strong statistical support. However, one OCS D *L. dubia* specimen (Specimen #599, collected for the SCCWRP barcoding project) was outside the California clade and linked more closely with *Hargeria rapax*, and *L. dubia* from Florida. Additional mt COI and nuclear gene sequences from morphologically identified *Leptochelia* species and other taxa in the family Leptocheliidae should help clarify these preliminary findings.

Dean noted that he had also been looking into this issue, particularly focusing on the *L. dubia* – *L. savignyi* question. Dean has seen *L. savignyi* reported from northern California, specifically in Humboldt Bay. Looking at the literature, the two notable differences between the two taxa were that *L. savignyi* is reported to have a uropod with 6 articles on the ramus (excluding basis) versus *L. dubia*, which only has 5. Additionally, *L. savignyi* is reported to have 4 strong setae on the maxilliped basis, whereas *L. dubia* has 5. He confirmed the characters of *L. dubia* from several specimens from the OCS D monitoring program. [However, in subsequently looking at a larger population of specimens, Dean found quite a bit of variability in number of setae on the maxilliped basis, but a very consistent number of articles (5) on the uropod.]



Discussion then moved on to *Araphura* sp SD1. This provisional species found in the shallow waters at the head of La Jolla Canyon is very much like *A. brevaria*. It differs from *A. brevaria* in the presence of a line of granules on the ventral margin of the propodus of the chela. Ron mentioned trying to find (or create) a voucher sheet for the species.

Dean also cautioned everyone about the problems or confusion that he has experienced with members of the genus *Zeuxo* and *Synaptotanis*. He has had difficulty applying the characters used by Sieg and Winn (1981) to distinguish the genera. The issue came to a head in the Bight 2008 work. Fortunately, a true *Synaptotanis notabilis* was collected from a station in the Channel Islands (B'08 Station 7553) that confirmed the differences in the length of the uropod articles between *Zeuxo* and *Synaptotanis*; however, there was never equally clear resolution of *Zeuxo* spp. Don mentioned that he has recorded *Z. paranormani* almost exclusively. Dean agreed, but has also used *Z. normani*, and recently reported *Z. coralensis* from stations near the Sweetwater River in San Diego Bay, the latter having only 3 articles on the uropodal endopod. Don suggested that Dean contact Peter Slattery to discuss *Zeuxo*.

Somehow an isopod entered this conversation. The topic of *Boreosignum* sp A came up and Dean and Tony discussed the OCS D specimen that was a *Boreosignum* sp A look alike. They noted differences in the presence (or absence) of setae along the pleotelson margin, but couldn't remember if there were other differences. Notes on this were left at the OCS D laboratory upon Dean's retirement, and Ken Sakamoto volunteered to look for them.

**Tony Phillips conducted the Cumacea literature review.** Tony cautioned everyone to be careful when using the SCAMIT taxonomic tool box for information on Cumacea. There are several old voucher sheets listed with the old names, and some incorrectly listed. When looking at the tool box and specifically *Cumella* sp B (now *Cumella morion*), what is listed as *Cumella* sp B male is actually *Cumella* sp E Phillips 1995 male. He noted that Don's information on families and the included keys are very helpful. Of the many publications dealing with cumaceans, Tony mentioned the following as of potential interest to the group.

- Akiyama and Gerken (2012) deals with the Pseudocumatidae group, particularly *Petalosarsia*, noting the SCAMIT provisional *Petalosarsia* sp A Diener 1982.
- Alberico and Roccatagliata (2013) deals with the genus *Diastylis* and contains an excellent comments section at the conclusion of the paper.
- Gerken and Watling (1998) also provide a valuable review of *Diastylis* spp.
- Shalla (2011) Identification guide to the British Cumacea is an excellent overview of the cumaceans. It includes wonderful illustrations and explanations of morphological character states and useful keys to families and genera.
- Donath-Hernandez (2011) has two publications dealing with cumaceans from Baja California, Mexico.
- Pilar Haye (2007) is an excellent review of the systematics of Bodotriidae.

**Dean Pasko** then conducted the remainder of the review meeting. We began with a quick discussion of other pertinent literature.

- Takeuchi, I. and A. Oyamada (2012). Revisit the descriptions of *Caprella californica* Stimpson, 1857 with material from California, particularly in comparison to Japanese material. They elevate *C. scauroides* Mayer, 1903 to species level for the Japanese material and provide detailed comparative descriptions and illustrations of the two taxa.



- Wicksten, M. K. (2012). Mary has updated her 2008 decapod publication with much improved figures and images, and, from what I can tell from my initial use, re-edited and updated keys. I highly recommend that this be your starting place for most decapods.
- De-la-Ossa-Carrtero, et al (2012). This paper discusses amphipod sensitivity to sewage. It employs AMBI categories to investigate amphipod sensitivity to sewage pollution, showing a general decrease in abundance and diversity in stations close to outfalls. Some of the affected species showed some differences in level of sensitivity related to their burrowing and feeding behavior. For example, suspension and surface deposit feeders and tube builders showed less sensitivity to sewage disposal than others, and are thus even able to increase in abundance. The publication should be of interest to all of the discharging agencies as they wrestle to interpret their monitoring data.
- Lowry and Myers (2013). Provide a follow-up to their review of caprellids and corophioids, creating a new suborder of Gammaridean amphipod: Senticaudata, for those amphipods with embedded spines terminally on uropods.
- Lowry and Stoddard also produced two other 2012 publications on Lysianassids (Conicostomatinae and Pachynidae) that include family and species keys. Each includes useful keys involving local species.

Dean briefly called attention to the problems experienced with caprellid amphipods during the last Bight project, particularly *Caprella scaura*, *C. californica*, *C. simia*, and *Caprella* sp WS1. Each of these species has similarly shaped (and variable) head spines, and few other distinguishing characters. Differences used to distinguish them include the presence/absence and number of dorsal processes on several of the pereonites, although the size of these vary with size of the individual. The problem is especially keen when dealing with specimens from embayments. Dean recommended that everyone be cautious because there seem to be mixed lots, sometimes tens of specimens at varying stages of development and gender, and, of course, varied maturity of the differentiating character states. A single key representing all the possible taxa does not exist and Dean recommended using a combination of keys: Light's Manual (Watling and Carlton 2007), Laubitz (1970), and Watling (1995). A voucher sheet for *Caprella* sp WS1 has been drafted, but not finalized for distribution. Dean plans to complete and distribute the voucher sheet in time for taxonomic analysis of these samples.

Callianassids, in particular *Neotrypaea californiensis* and *N. gigas* (See Pernet et al 2010) were discussed. Although the issue was thoroughly reviewed in a previous SCAMIT meeting (SCAMIT NL Vol. 27 No. 3/4), Dean thought that revisiting the distinction between these two taxa was important with regional Bight sampling and the large number of samples collected in the various embayments. The simplest distinction between the two taxa lies in the eyestalks (See Figure 2, Pernet et al 2010):

- *N. californiensis* has short, blunt eyestalks that reach to or just beyond the article 2 of the first antenna
- *N. gigas* has long, tapered, laterally concave eyestalks that extend well beyond the article 2 of the first antenna

The key in Wicksten (2012) distinguishes these two species as well as *N. biffari*, which has an unproduced, short, blunt eyestalk.

We also discussed the leuconid cumacea *Nippoleucon hinumensis* vs. *Leucon subnasica*. The two genera are distinguished by the presence or absence (respectively) of pleopods in the male, and



the females look sufficiently similar to have caused problems in the past...at least for Dean. *N. hinumensis*, an introduced species from Japan that occurs in embayments, differs from *Leucon* by the absence of pleopods in the male; a trait that offers little comfort when faced with a sample including only females. Consequently, Dean noted the following differences in females that are useful to distinguish the two taxa:

- The anteroventral corner of the antennal notch of *N. hinumensis* is blunt, whereas it is upturned and more acute in *L. subnasica*;
- In *N. hinumensis* the ischium + merus of pereopod 1 is notably longer than the propodus, whereas the two (i + m) are notably shorter than the propodus in *L. subnasica*;
- In *N. hinumensis* the basis is much more setose than in *L. subnasica* (~6 long plumose setae vs. 2-3);
- In *N. hinumensis*, the uropodal endopod is notably shorter than the exopod, but sub-equal in *L. subnasica*;
- The pattern of dorsal crest teeth is also different, but it is difficult to describe and one should compare the illustrations for this character.

Next on the list were cylindroleberid ostracods. Dean provided a mini-training on several of the characters typically used to distinguish the genera and recognized species common to the SCB. The primary characters include:

- Antenna 1 – length of sensory bristle, and presence/absence of an accessory filament;
- Mandible – the size of the exopodite, pattern of primary and secondary bristles along the anterior margin of article 2 of the endopodite, and the number and pattern of triaenid and spinose bristles on the endite;
- Sixth limb – the number and general pattern of spinose bristles along the ventral margin.

Dean also briefly described a potentially new cylindroleberid collected from the OCS monitoring program. This taxon is represented by two specimens collected from 50 m off Orange County, and has the following characters: the sensory bristle of antenna 1 has an accessory filament and extends well beyond the tip of antenna 1; exopodite of the mandible is about one-half the length of the endopodite; there are two bristles proximal to the *a*-bristle and one between the *a*- and *b*-bristles of the mandible endopod, article 2; the endite of the mandible has 1 triaenid and 4 spinose bristles (although this character seems to vary slightly); and the 6<sup>th</sup> limb has 14 bristles along the ventral margin.

Dean distributed an updated tabular key to the Cylindroleberididae from the SCB [older versions can be found in the SCAMIT Taxonomic Toolbox]. He plans to review and update the table for greater distribution and posting.

We also discussed the differences among several similar looking corophiid amphipods, the males of which have a carpochele gnathopod 1 (*Acuminodeutopus*, *Rudilemboides*, and *Paramicrodeutopus*), and distinguishing between females *Rudilemboides* sp A vs. *R. stenopropodus*. Dean first reminded everyone not to rely on color to distinguish these species, particularly *Rudilemboides* sp A and *R. stenopropodus*. *Acuminodeutopus heteruropus* is easily distinguished from the others by the shortened outer ramus of uropod 3. In contrast, both *Paramicrodeutopus schmitti* and *Rudilemboides* have two well-developed rami on uropod 3. *P. schmitti* is easily distinguished from *Rudilemboides* by the rounded eye lobe, which is acute in *Rudilemboides*. Female *Rudilemboides* sp A can be separated from *R. stenopropodus* by the



presence of spines on the anterior margin of the gnathopod 2 basis instead of setae. The males are distinguished by the presence of large teeth on the gnathopod 1 propodus and carpus in *Rudilembooides* sp A, which are absent in *R. stenopropodus*. These differences are discussed in the SCAMIT voucher sheet available in the tools section of the SCAMIT website.

Dean then moved on to another Corophioid group, the genus *Aoroides* (Aoridae), which creates some difficulty, particularly because correct identification requires examination of the teeth on the outer plate of the maxilliped. Basically, he reiterated that the key to the species of *Aoroides* in Conlan and Bousfield (1982b) works well. He relies heavily on the presence/absence of the seta on article 2 of the mandibular palp and cusps on the outer plate of the maxilliped, especially when dealing with female specimens (see Table 2 of Conlan & Bousfield 1982b). He again reminded everyone not to rely solely on color because he has noticed differences in definition of the color patterns according to location (e.g., north, central, and southern areas of the SCB). He showed several slides depicting several of the character states.

The Photids, a perplexing group that everyone loves to hate, was next on the agenda. Dean [again] emphasized the use of the particular character states used in his 1999 key to the *Photis* and not color alone. Color patterns on certain species (e.g., a stripe of color in the antenna 1 of *Photis californica*) can be a useful tool to sort specimens into species groups; but they should not be used as *the* identifying character. Over the years, Dean and others have found mixed lots of *P. brevipes* and *P. californica* where all the specimens had this “characteristic line of pigment” in the antenna and female *P. brevipes* will sometimes have pigment distally on antenna 1 peduncular articles. Photids overall do show some differentiating pigment pattern that can be used to sort the specimens into groups, and may be helpful when identifying groups of specimens from one narrow region, but these color patterns may not (and probably do not) translate across regions and therefore should not be used for species-level identification.

Dean also acknowledged the problems with his key and the difficulty some have had interpreting the character states (e.g., relative length of the anterior and posterior margins of the carpus on gnathopod 1), and indicated that he hoped to re-write and simplify the key later this year. Until then, he noted that the common taxa found within the SCB are not impossible to deal with. First, there are several taxa where the males and females are very distinctive (i.e., *Photis* sp A, *Photis* sp B, *Photis* sp C, and *P. lacia*). Second, size makes a difference when distinguishing among certain species (e.g., *P. brevipes*, *P. californica*, *Photis* sp OC1), and Dean provided a table that listed the reported sizes of SCAMIT Ed 7 species (Table 1). He suggested that a combination of the shape of gnathopods 1 and 2, along with certain other specific characters (setation on the coxae, or bend in antenna 2), can be employed fairly reliably with size to identify many specimens. For example, *P. brevipes* grow to 8 mm in length whereas *P. californica* mature at 4.5 mm. Males of the two are distinguished by the presence (*P. brevipes*) or absence (*P. californica*) of a tooth on the male dactyl. Immature (3–5 mm) specimens of *P. brevipes* will develop a noticeable bump on the gnathopod 2 dactyl where similarly sized specimens of *P. californica* will not. Similar comparisons can be made for the development of the concavity along the palm of gnathopod 1, or the development of the palmar tooth on gnathopod 2, etc. to distinguish other similar taxa (e.g., *P. parvidons* vs. *P. californica*). Dean then provided a slide show of several of these distinguishing characters and character states used in his key.



Table 1. Reported sizes for *Photis* spp listed in SCAMIT Ed 7. All sizes from Conlan (1983) unless noted by an “\*”, in which case they are from Barnard (1962). Bolded taxa are >5.0 mm in size.

Species	Male	Female
<i>P. bifurcata</i>	to 4.0 mm (Holotype 2.75 mm*)	to 3.5 mm
<b><i>P. brevipes</i></b>	<b>to 8.0mm*</b>	<b>to 6.0 mm</b>
<i>P. californica</i>	4.5 mm*	
<i>P. chiconola</i>	<b>Holotype 5.0 mm*</b>	to 4.5 mm*
<b><i>P. conchicola</i></b>	<b>to 5.5 mm</b>	to 3.2 mm*
<i>P. lacia</i>	to 3.0 mm	to 3.3 mm
<i>P. lineramanus</i>	3.4 mm	
<i>P. macinerneyi</i>	to 4.3 mm	to 4.0 mm
<i>P. macrotica</i>	to 3.3 mm*	
<b><i>P. parvidons</i></b>	<b>to 5.0 mm</b>	<b>to 6.0 mm</b>
<b><i>P. viuda</i></b>	<b>Holotype 5.0 mm*</b>	
<i>Photis</i> sp A	<3.0 mm	2.8 mm
<i>Photis</i> sp B	2.5 mm	2.5 mm
<i>Photis</i> sp C	3.0 mm	3.5 mm
<i>Photis</i> sp E		3.25 mm
<i>Photis</i> sp OC1		4.0 mm

Members of the family Corophiidae, specifically *Grandidierella* and *Monocorophium*, are common in bay and harbor samples. Dean recommended the key in Light’s Manual (Chapman 2007) for this group. This key is extremely useful and easy to follow, but noted that it takes a little bit of careful examination to understand and apply the description of the spines along the base of the antenna. He also noted that couplet 20 requires some caution. *Monocorophium insidiosum* is listed as having a “medial protrusion” (basically a triangular medial process: Plate 270, Figure V) emanating from just below the dorsal margin of the antenna 1 peduncle, article 1; however, *M. uenoi* has a similar, though smaller, medial bulge emanating from the mid-point of the antennal peduncle (i.e., distinctly below the flattened dorsal margin), which is not illustrated. *M. insidiosum* is by far the more common of the two, but the both have very similar color patterns, so one must be careful to examine the placement of the medial tooth when applying the characters of couplet 20. Dean and Tony Phillips related stories of mixed lots being very common, especially within embayment and river mouth samples; therefore ALL specimens need to be examined with immature or damaged specimens listed as “sp.” Dean had one story from a Bight sample with >10,000 individual *Monocorophium* that he figured contained a single taxon. Unfortunately, at a count of about 5,000 individuals he discovered a second species with the same color pattern of the primary species, forcing him to review the entire lot to obtain an accurate count.



*Ampithoe* (Ampithoidae) is another corophioid that can create problems, particularly because there is no single key that includes all potential species. For example, the excellent keys in Chapman (2007) and Conlan and Bousfield (1982a) exclude two fairly common species (*A. longimana* and *A. polex*). In addition, females are particularly difficult (if not impossible) to reliably distinguish, even when mature. So all identifications should be verified against descriptions and illustrations carefully.

Pleustids (Pleustidae) are another difficult group to identify with confidence in part because of their small size and reliance on the mouthpart morphology. Dean has been particularly vexed by this group, and has found the key in Light's Manual difficult to apply, particularly with regards to several fairly common taxa within subfamily Parapleustinae: *Chromopleustes oculatus* (Holmes 1908), *Gnathopleustes den* (J.L. Barnard 1969), *G. pugettensis* (Dana 1852), and *Incisocalliope newportensis* (J.L. Barnard in J.L. Barnard & Reish 1959). Readers are referred to Don Cadien's thorough review of the group during a prior SCAMIT meeting (See SCAMIT NL Vol. 15, No 8). The cautionary message: Approach this group carefully!

Although SCAMIT Ed 7 lists only a few hyalid amphipods (four species), they are common enough in embayment samples to warrant a brief discussion. Dean has found that the characters in Light's manual (Chapman 2007) for distinguishing the species of *Protohyale* and *Apoxyale* difficult to apply. For example, the length of maxillipedal palp article 4 relative to article 3 is used to distinguish members of *Protohyale*, but Dean has found variability in this character between males and females in the samples that he has processed. The same was true for the length of the gnathopod 2 palm relative to the posterior edge of the propodus for *Apoxyale*. Consequently, one should be cautious when applying specific identifications for this group.

Lastly, Dean introduced a modified version of John Chapman's Key to the Families and Superfamilies of gammarid amphipods found in Light's Manual (Chapman 2007). With John's permission, Dean modified the key in an attempt to incorporate all of the families listed in SCAMIT Ed 7 [Edition 8 wasn't out at the time]. Most of the character states used in the various couplets were left intact, with the original figure references maintained. The specific couplets that required major revisions to incorporate the new families were reviewed. Draft versions of the key were distributed for comment with a request that it not be distributed further since it is still in draft form. Several insignificant editorial errors were pointed out almost immediately, and any other comments are welcomed.

Dean has the following corrections to the distributed key: Couplet 1 – Change “Caprellidae” to “Caprellida”; Couplet 2 – Change “Ingolfiellidea” to “Ingolfiellidea” (delete extra “l”); Couplet 16 both dichotomies – Change “lessor” to “lesser”; Couplet 17 first dichotomy – add “examine carefully” after “(plate 263M)” and delete “with” after “pereopods 5–7”; Couplet 19 – Change “Unicolidae” to “Unciolidae”; Couplet 32 second dichotomy – change “pereopods 2 and 3 dactyls shorter...” to “pereopods 3 and 4 dactyls shorter...”; Couplet 44 first dichotomy – add “posterior margin of coxa 4 not excavate; uropod 3 rami and telson never lined with robust spines”; Couplet 44 second dichotomy – add “coxa 4 often different size, excavate posteriorly, or lobed; if not excavate or lobed, then uropod 3 rami and telson often lined with robust spines (as in members of the Melitidae and Maeridae)”; Couplet 45 first dichotomy – add “although incisor may be prominent” after “Mandible lacking molar”; Couplet 51 second dichotomy – change “lower lip” to “upper lip”; Bottom of page 7, Footnote 2 – change “her” to “here”.



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