Southern California Association of
Marine Invertebrate Taxonomists

3720 Stephen White Drive
San Pedro, California 90731

September, 2001

SCAMIT Newsletter

Vol. 20, No. 5

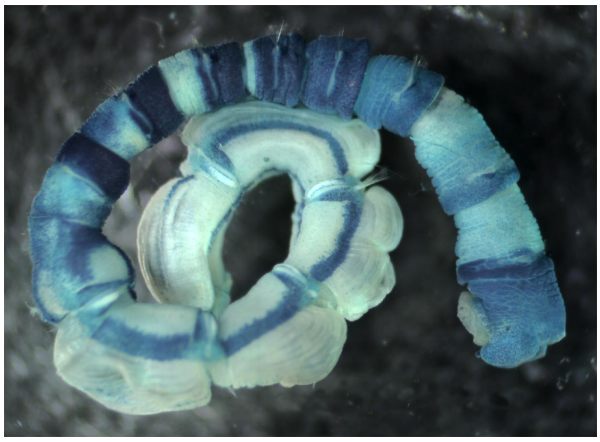
SUBJECT: No Meeting in December

GUEST SPEAKER:

DATE:

TIME: 9:30 a.m. to 3:30 p. m.

LOCATION:



Euclymeninae sp A
Lateral view, anterior end
B-10 rep.2 7July1997
Image R.Rowe 9/23/97

Next Meeting: There will be no SCAMIT meeting in December. The meeting initially to take place in December, Part II of our discussion of Taxonomic Databases, has been postponed until early next year.

NEW LITERATURE

Recovery from environmental disaster can be lengthy. Local areas heavily impacted by anthropogenic discharge in the 1950's and 1960's are still not back to pre-discharge conditions (although we are getting close in some areas). Kollmann & Stachowitsch (2001) use phototransect techniques to record the re-population of an area of the northern Adriatic largely defaunated by anoxia events in 1983. They report on monitoring which took place between 1985 and 1994. The community organization which was in place prior to the anoxic event has not re-emerged in the intervening years, so recovery has not yet been achieved. There have been signs of improvement, but nothing interpretable as a

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SCAMIT Newsletter is not deemed to be valid publication for formal taxonomic purposes.

restoration of pre-event conditions. Similar macroepifaunal data might be gathered offshore here in southern California using ROV video/still camera images.

Consideration of monitoring program design always raises interesting questions. Paiva (2001) revisits territory covered by earlier authors with an experiment in shallow (10m) coastal Brazilian waters. He carefully used a nested design and repeated sampling at frequent (2 month) intervals to examine both spatial and temporal variability. His experiment was designed to mimic the scales of variation which might be found in a sampling program using remote sampling, although his samples were collected by divers. The result is not unexpected; significant spatial variability at all examined scales. One problem here is the extrapolation to monitoring design as a whole, and with the basic issue of sample size not being dealt with by the author. Given the constraints of many samples (180 were incorporated into the overall design) a small sample size was chosen (0.008m2) this is not much larger than a Phleger corer. Samples of this size of marine macrobenthos are minimal at best, with each sample collecting only a relatively small fraction of the community at any given location. Personal experience in slightly deeper water with a slightly larger sampler (0.01m2) was that such small cores needed considerable replication to provide statistical power. Power analysis of the sampling referred to indicated that 17 cores would be required at each site to allow for detection of a 30% change in the mean between stations with 95% confidence. Since the shallower Brazilian stations are on fine sand bottom and do not support a particularly abundant fauna I suspect that even more of the smaller 0.008m2 cores would be required for adequate program sensitivity. This remains an interesting discussion, even if a power analysis would be likely to demonstrate that the significant variability witnessed was as much a result of inadequate sampling intensity as inherent spatial variability.

More and more investigations of wide-ranging species are adopting molecular techniques to augment morphology based taxonomy. Organisms such as scyphomedusae, which often offer few morphological details for consideration, represent particularly fertile ground for molecular examination. Dawson & Jacobs (2001) examined specimens of the jellyfish *Aurelia* from various parts of the world to test the idea that the two currently recognized taxa might hide additional diversity. They found that three named species were supportable on the DNA sequence evidence, and that among animals identified as *Aurelia aurita*, lay an additional 6 unrecognized sibling species in addition to the named form. On the west coast of North America the authors report two species; *Aurelia labiata* and *Aurelia* sp. 1. The authors indicate these species have morphological characters which differentiate them without recourse to collection of molecular data, but do not detail these characters in this paper.

The accumulating molecular data for cnidarians has allowed a new phylogenetic analysis of the Anthozoa (Won, Rho, & Song 2001). The authors performed a combined analysis using both molecular and morphological data. Both the morphological and combined analyses tell the same story, and both do not differ from previous morphologically based phylogenies. Within the anthozoans the major divisions shown in the analysis corresponded to Alcyonaria, Zoanthinaria, and Ceriantipatharia. Three hydrozoans were used as outgroups.

Arthropod relationships are a bit more involved than those of the anthozoans. Giribet et al (2001) revisit this territory, ground well trampled by previous visitants. Using a total evidence approach they combined information gleaned from a series of molecular sources with morphological data, to yield a large body of evidence. The data considered was comprehensive, and a novel computational approach using 256 parallel processors was

used to allow analysis of such a large amount of source data. The results strongly support Pancrustacea (Crustacea + Hexapoda), Myriapoda, and Chelicerata as monophyletic clades, with Pycnogonida as sister group. Onychophorans and tardigrades served as outgroups. More analyses using even larger samplings of the accumulating molecular data will probably follow.

Most discussions of introduced or non-indigenous species deal with all potential taxa. Rodrigues & Suarez (2001) focus their attention specifically on decapod crustaceans. They consider the mechanisms of transport, and treat a number of introductions which predate the current upsurge in transfer of organisms by man. Decapods in particular, were more likely to move between ecosystems as adults in the day of the wooden boat. More modern steel hulled vessels, while making the voyages more rapidly, also provide much less opportunity for adult hitch-hiking on the vessel exterior. The authors do bring up several interesting reports of transfer on towed oil rigs. One such event happened here in California, where the Japanese crab *Plagiusia dentata* was introduced on a towed rig which spent over two months in transit from the western to the eastern Pacific. When introductions are discussed parochial approaches are contraindicated. The fact that the main focus of this paper is on introductions to Argentina is irrelevant. Most, if not all of the organisms discussed may show up on our doorstep at one time or another.

SAMPLE SORTING TECHNIQUE

While we try not to think of it more than we have to, the subject of sample sorting is critical to examinations of the benthos. We generally do a good job of it based on the results of the QC examinations of sample sorting undertaken as part of both the SCPBB program in 1994, and the recent B'98 Benthic program. It is time consuming, however, and attempts are constantly being made to reduce the effort required to bring sediments, debris, and organisms to a parting of the ways.

In other areas, including both the Pacific Northwest and the Western Atlantic, use is frequently made of vital staining with rose bengal. This is often touted as being a major labor saving method, and it may well be for the sorter or contract administrator. It is often, however, a nightmare for the taxonomist who finds many taxonomic clues changed or eliminated by the practice. Most, if not all monitoring groups in the Southern California Bight have avoided using vital staining for their routine monitoring. There are other options which can both improve the quality of the specimens procured by remote samplers, and simplify the removal of organisms from benthic sediments.

Member Tom Parker forwarded the following hints from a posting on the Annelida Listserver. They originate with Roman Porras and obviously follow a pre-existing discussion thread. His comments are worth repeating, and we do so here:

"RE: Macrofauna separation technologies
As Mary Petersen, I usually use elutriation for separating macro and meiofauna from sediment. I put the sample or a fraction of it into a decantation funnel connected by its narrow opening to a tap. The water pass across the sample dragging the fauna, exits by the top of the funnel and it is conducted to a sieve in which the animals and debris are retained. If the sample is previously stained it is easy to see how the fauna leaves the sediment, after a few minutes, all animals and debris have been extracted while the sediment remains in the funnel. With the tap, you may regulate the flow at each moment in order to optimise the extraction."

The problem arises when molluscs are present in the sample since they are difficult to separate from sediment and it is necessary to extract them by hand. However, Robinson and Chandler (1993) describe a technique to separate molluscs:

"A method is presented which enables infaunal juvenile bivalves to be separated from associated sediment with a combination of elutriation and flotation techniques. Simple elutriation is used to remove less dense organic detritus and a relatively new, nontoxic compound (sodium polytungstate) is used to create a heavy liquid that sorts the bivalves from sediment by relative density. The technique was applicable to 12 species of molluscs of various sizes and was 98-100% effective in separating juvenile Mya arenaria, ranging from 0.5 to 24 mm in shell length, from surrounding sediment."

Gravimetric separation for mollusks is a technique with a long history. While working for Dr. Jim McLean at NHMLAC in the 60's your editor often used it. In that application, however, mollusks were the only target. Samples were air-dried (too bad for all you worms and crustaceans!) then floated on carbon tetrachloride. While this offered the appropriate density for separating dried shelled mollusks, it was also highly toxic. The suggestion of using sodium polytungstate seems a great advance over the earlier technique. An even older technique was used by the 49ers' of the California gold rush which relies not on heavy fluids but on plain water. It still is a good technique in the hands of an experienced worker. Using a dish or bowl of the appropriate cross-section and swirling it with the proper motion, mollusks can be mobilized and swished onto a screen, leaving nearly all the coarse sediment behind. The resulting blend of a little sand/gravel and shell debris + living shelled mollusks can then be sorted in very little time. If the procedure is repeated until no more mollusks are removed in a wash (5 or 6 swishes generally suffice) a brief scan of the remaining sediments should verify that they are clear of animals. Using this technique on coarser mixed sediments from shallow high-energy environments can reduce processing time for a sample by over 80%, while providing good, repeatable removal of organisms. The technique can be used in conjunction with a previous elutriation, or the debris and floatable organisms (low density items like crustaceans and annelids) can be left in to be swish washed out with the mollusks.

24 September Meeting Minutes

The meeting was called to order by President Ron Velarde at 9:45. Vice-president Leslie Harris informed us about upcoming meetings. The October meeting is scheduled for two days, October 9th and 10th, at the Los Angeles County Museum of Natural History (LACMNH). On the first day, Don Cadien and Dean Pasko will make a presentation on Phoxocephalids. On the second day, John Chapman will make a presentation on Corophiids. Attendees are welcome to bring their unidentified amphipods. The November meeting will occur on the 5th , will also be held in Los Angeles and Angel Valdés will be the guest speaker with the topic being nudibranchs. There is no scheduled meeting for December. In January the meeting will be held at Dancing Coyote Ranch and the topic will be Edwarsiids. For the February meeting, we will exchange specimens of *Pista* for the round robin exercise that was discussed during last June's meeting. The results of the specimen exchange will be discussed at the March meeting. Discussions of several smaller groups will be presented at the February meeting. Megan Lilly will discuss a new holothuroid, a new ascidian and possibly somethng about Octopus... Kelvin Barwick will follow up on entoprocts, and Don Cadien will revisit the cumacean genus *Cyclaspis*.

A couple of ideas for future meetings were also mentioned. A meeting to further discuss taxonomic databases is pending. Phil Hoover, a new curatorial assistant at LACMNH, might be discussing an Amphipod paper at a future meeting.

The Western Society of Naturalists annual meeting will be held November 9-12 in Ventura, California. For more information, go to their website at:

www.wsn-online.org.

The guest speaker for the day was Larry Lovell, and the topic was Euclymeninae reported from the Bight '98 program. Larry provided handouts to those attending. A copy of those handouts edited to reflect the results of the meeting are at the end of the newsletter.

Larry discussed the results of his work on the Bight '98 Euclymeninae. Among the families (considering all taxa) recorded for the Bight '98 program, the Maldanidae ranked 8th in abundance. There were 4608 individuals. Euclymeninae accounted for 81.1% of the Maldanids (3770 individuals). Euclymeninae sp A was the most abundant euclymenid with 1201 individuals, and *Petaloclymene pacifica* was second with 996 individuals.

We then reviewed Larry's key to the subfamilies of Maldanidae from Southern California which follows the subfamily classification as presented in Fauchald (1977). We next looked at the key to the Euclymeninae of Southern California and reviewed it, couplet by couplet. Methyl green staining pattern is used as one of the main diagnostic characters in this key. Larry explained that in couplet 9, the phrase "better developed stain" means a more intense stain that is denser and broader (covering more surface area of the animal). The question was asked, "What tissue type uptakes methyl green stain?" Larry answered that the stain is picked up by mucoid/glandular areas. He referred us to Arwidsson 1907 for more details.

Larry also brought an assortment of older illustrations (mostly of methyl green staining patterns), voucher sheets, and reference material for people to browse through and copy if they did not already have one. Included among these were identification sheets for Maldanidae sp 1, Maldanidae sp 2, and *Petaloclymene pacifica*. These sheets included illustrations of methyl green staining patterns for each species. Larry noted that Maldanidae sp 1 may turn out to be a described species, because all the specimens collected have been relatively small.

There was a question about distinguishing the species in couplet 11. In "*Clymenura" gracilis*, the glandular area on setiger 8 forms a complete band, and lateral notches are absent on the prostomium. In *C. columbiana*, however, the glandular area on setiger 8 is a ventral, spade-shaped region, and lateral notches are present on the prostomium.

Larry commented that he made identifications of all specimens based on the anterior portions. The posterior ends of Euclymenids were sorted into the fragment vials which Larry did not receive. Identifications can be problematic unless a minimum of eight or nine setigers were present. Larry said he can identify *Clymenella* species with a minimum of four segments.

After a 10 minute break, we began to look at specimens. There was a question regarding a size limitation for methyl green stain. According to Larry, there is a less developed and less intense stain in juveniles. Within a size series, one can see the progression of stain patterns. Under the microscope first was a stained specimen of *Axiothella*. The specimen we looked at was collected from station 2491 at a depth of 95 m. On setiger 8, the presetal area did not stain, and the postsetal area stained dark. On setigers 4 through 8, the pre-setal area stained light green, and the post-setal area stained dark green. This specimen was similar to *A. rubrocincta*, but Leslie pointed out that *A.*

rubrocincta has a dark presetal stain on setigers 4 through 8. We concluded that this is an undescribed species of *Axiothella*. Leslie said that she has notes on several undescribed species of *Axiothella* and that this is one of them. Therefore, all references to *A. rubrocincta* in Larry's handouts should be changed to *Axiothella* sp. We examined a smaller specimen which had the same staining pattern. It was collected at station 2522 (Santa Cruz Island) at a depth of 80 m. Larry next looked at a small specimen of *Axiothella rubrocincta* collected from an International Treatment Plant station sampled by the City of San Diego. From a ventral view, there was dark solid stain on the anterior areas of setigers 5 through 8. The posterior areas of setigers 5 through 8 stained a darker but diffuse green. Most of the participants agreed they would mis-identify this specimen as *A. rubrocincta*. It was pointed out that the staining pattern illustrated in one of Leslie's handouts had been copied very darkly for effect and unfortunately, did not represent the true staining pattern. Leslie added a cautionary note not to identify specimens based solely on staining pattern. Taxonomists should look at other characters, because she has noted that more than one species can have the same staining pattern. Checking for other characters can be particularly important when identifying juveniles of *Axiothella* because the rostrate setae in setigers 1 through 3 may not be fully formed.

Next up was a specimen of *Clymenella complanata*. We located the lateral notch on the 4th setiger which is a unique character for this species. It was suggested that you can slip the tip of your forcep under this notch to help in locating it. *C. complanata* had a deep transverse groove and nuchal organs on the cephalic plaque. This specimen was collected at station 2209, off Orange County, at a depth of 65 m.

The next specimen we examined was *Clymenella* sp A of Harris 1985. There was a handout for this species prepared by Leslie. Larry stated that *Clymenella* sp A was recorded in samples from Marine Ecological Consultants (MEC) only and was not recorded from other laboratories participating in Bight '98. We had a close-up view of the cephalic plaque. There were primary and secondary transverse grooves, and the nuchal organs were perpendicular to these grooves.

We next examined a specimen of "*Clymenura*" *gracilis*. Larry put the genus in quotes, because it is suspected that this may not be the correct genus in that it does not follow the pattern of a ventral glandular area as do other species of *Clymenura*. In "*Clymenura*" *gracilis*, the glandular girdle extends all the way around the 8th setiger.

The next worm we examined was *Clymenura columbiana*. All the specimens that Larry recorded were quite small, about .5 mm wide. On the ventrum of setiger 8, there was a spade-shaped, glandular area. This area stained green but the dark stain did not extend all the way around the setiger. On the dorsum of setiger 8, there was a thin band of light speckling. This worm was collected from station 2491, San Miguel Island, at a depth of 95 m. This station had course sediment.

After lunch, we got back to work and looked at *Euclymene campanula*. Larry believes that specimens of *E. campanula* orient themselves anterior end down in the sediment resulting in the collection of mostly posterior ends. Larry pointed out that this is an example of a situation where it would be useful to count a posterior fragment as an individual. The posterior end of *E. campanula* was distinguished by 7 asetigerous segments, each with a pronounced ridge (or flanges) on the posterior part of the segment. The pygidium had a ring of short anal cirri. In this species, the number of anal cirri varies with size of the animal, but they are uniformly short in length.

Larry stained the specimen; the first 4 setigers stained green. The anterior portions of setigers 5 through 8 stained green, giving a banded appearance. The ridges (or flanges) in the posterior end also stained green.

A specimen of *Isocirrus longiceps* was up next. The posterior rim of the cephalic plaque came together to form a "V". The cephalic plaque had multiple transverse grooves. There was a collar on the anterior end of setiger 4, .

We then viewed a specimen of *Petaloclymene pacifica*. The methyl green stain on setiger 8 extended both pre-tori and post-tori. There was a darker, green oval patch on the ventrum of setiger 8 on both sides of the tori. We located the dorsal pores on setigers 7-9 which is a character that distinguishes *P. pacifica* from other local fauna.

Next, Larry brought out a specimen of *Euclymene* ? *grossa newporti*. We referred to Leslie's older handout from 1985 with illustrations of the stain patterns. There was a dark green stain on presetal and postsetal areas on setiger 8. The staining pattern of this specimen did not exactly match the staining pattern of the illustration. There was a question about the identification, and Leslie suggested the type specimen should be examined and compared to this specimen.

The next worm under the microscope was a specimen of *Praxillella pacifica*. The methyl green stain extends to the tori on setiger 8, but it does not extend beyond that. On segment 2, there was a lightly-stained, oval-shaped area. We referred to this as the "collar area".

Then we examined a specimen of *Praxillella gracilis*. There was a long, thin anterior palpode on the prostomium. The methyl green stain did not extend past the tori on setiger 8.

A distinguishing feature on the next specimen, *Maldanella robusta*, was the absence of neurosetae on setiger one. The two nuchal organs on the cephalic plaque were V-shaped and anteriorly placed. The cephalic rim was fairly smooth. The pygidium of this worm had a scalloped edge. There was some discussion as to whether this specimen was *M. harai*, but we concurred the identification should remain as *M. robusta*.

Larry then showed us a large specimen of Maldanidae sp 2 of Lovell and Phillips 1995 provided by Tony Phillips for the meeting. Larry commented that all specimens he had previously seen had been much smaller. The m.g. staining pattern was like that of *Euclymene campanula*. Leslie confirmed the identification.

The last species up for discussion that day was Maldanidae sp 1 of Lovell and Phillips 1995. Only small specimens of this species have been found. The cephalic rim was low and not well developed. There were single rostrate uncini on the first 3 setigers. Methyl green stain revealed a slight anterior band on the first setiger and well defined anterior bands on setigers 2 through 7. There was no stain after setiger 7 except around the uncini on setigers 8 and 9. The pygidium had one long cirrus and about 20 short cirri. Leslie looked at the specimens and said she believed these are juvenile Euclymeninae sp A SCAMIT 1987 commenting that the juveniles lack the double staining stripes that are seen in adults. She felt confident of the m.g. staining growth pattern she has seen from juvenile to adult.

JOBS

The San Francisco Estuary Institute is seeking a Program Manager for the Regional Monitoring Program. For more information, please see the attachment at the end of the newsletter (paper version) or visit their website at:

www.sfei.org

SIDE NOTE

The email addresses for both Ron Velarde and Megan Lilly have changed. Please notice the new addresses in the informatin box. - M. Lilly

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SCAMIT OFFICERS:

If you need any other information concerning SCAMIT please feel free to contact any of the officers e-mail address

President	Ron Velarde	(619)758-2331	rvelarde@sandiego.gov
Vice-President	Leslie Harris	(213)763-3234	lhharris@bcf.usc.edu
Secretary	Megan Lilly	(619)758-2336	mlilly@sandiego.gov
Treasurer	Ann Dalkey	(310)648-5544	cam@san.ci.la.ca.us

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Volumes 1 - 4 (compilation)	$ 30.00
Volumes 5 - 7 (compilation)	$ 15.00
Volumes 8 - 15	$ 20.00/vol.

Single back issues are also available at cost.

Euclymeninae Reported from the Bight '98 Program

Lawrence L. Lovell

The author identified all specimens of Euclymeninae from the Bight '98 project. This workshop presents the taxonomic characters and techniques used to identify those specimens. Dependable morphological characters and methyl green staining patterns were used to identify material to species level.

Malmgren erected the family Maldanidae in 1867. Arwidsson (1907) subsequently divided the family into five subfamilies; Euclymeninae, Lumbriclymeninae, Maldaninae, Nicomachinae, and Rhodininae. Three additional subfamilies have recently been proposed. Clymenurinae by Imajima and Shiraki (1982a), Notoproctinae by Detinova (1985), and Boguinae by Wolf (1983) in moving the family Boguidae (Hartman and Fauchald 1971) into the Maldanidae. Important taxonomic publications on the family are by Arwidsson (1907), Day (1967), Fauchald (1977), Imajima and Shiraki (1982a, 1982b), and Rouse (2000). For the purposes of this project the subfamilies presented in Fauchald (1977) are followed retaining the later proposed Clymenurinae within the subfamily Euclymeninae.

The Euclymeninae are characterized by having both anterior and posterior ends with plaques and the anus terminally oriented. A cephalic rim, keel, and nuchal slits are present on the prostomium. The margin of the posterior plaque may be smooth, crenulate, or bordered by anal cirri and the anal cone may be projecting beyond the rim or low and not projecting beyond the rim. Some taxa have segmental collars or well-defined glandular areas in the thorax. Notosetae are capillary. Anterior neurosetae can be either acicular spines or rostrate uncini. It is thought that some species may drop their rostrate uncini and add acicular spines as they get older. These traditional characters have not been wholly adequate to identify specimens encountered in regional monitoring programs.

The Euclymeninae are well-represented in southern California coastal shelf sediments. However, the tendency for them to fragment when collected has been a problem for taxonomists attaining species level identifications. Some particularly large specimens of certain taxa may have only their rear ends collected due to their large size and vertical head-down orientation in the sediments. When this occurs, programs that do not count these posterior fragments will miss the opportunity to add information on rarely or incompletely sampled taxa to their database.

Attaining complete specimens for taxonomic analysis begins in the field. Gentle screening of sediment samples or use of a float table in the field will help keep fragmentation to a minimum. The amount of fragmentation is directly related to water pressure and rough handling. Use of a relaxant prior to fixation is recommended to further prevent fragmentation when the animals are exposed to Formalin. Subsequent handling by sorters and technicians performing biomass measurements are another possible cause of fragmentation. If the object is to have specimens that can be identified, then care must be taken prior to the taxonomy to provide material in good condition. As the old saying goes "Garbage in, garbage out!" or in this case "fragments in, no species IDs out"! Your database will be much cleaner and analyses more meaningful when a higher percentage of animals can be identified to species.

Methyl green staining procedures follow those generally discussed by SCAMIT members at numerous meetings. A working solution dark enough to stain in a reasonable amount of time (10-15 minutes), but weak enough to see animals through the solution to pull them out, was used. As the solution becomes weaker

through use and uptake by animals, additional stock solution of darkly mixed stain is added to bring the working solution back to working strength. There are no methyl green solution formulas suggested and each taxonomist must decide what works best for them in their particular working conditions to achieve workable staining of adequate strength. In any case, there is usually some destaining that will need to take place before some staining patterns will be discernable. Just as morphological character states develop and change with size and maturity, so do methyl green staining patterns. Juvenile patterns will look different or incomplete until placed in context with the overall development of the adult pattern.

Bight '98 Euclymeninae

By Lawrence L. Lovell

Axiothella rubrocincta (Johnson 1901)

Axiothella sp.

Clymenella complanata Hartman 1969

Clymenella sp. A of Harris 1985

Clymenura columbiana (E. Berkeley 1929)

"*Clymenura" gracilis* Hartman 1969

Euclymene campanula Hartman 1969

Euclymene ? *grossa newporti* Berkeley and Berkeley 1941

Euclymeninae sp. A SCAMIT 1987

Isocirrus longiceps (Moore 1923)

Maldanella robusta Moore 1906

Petaloclymene pacifica Green 1997

Praxillella gracilis (M. Sars 1861)

Praxillella pacifica E. Berkeley 1929

Axiothella sp., *Clymenura columbiana*, *Euclymene* ? *grossa newporti*, and *Maldanella robusta* have not been previously reported by POTW monitoring agencies and are not in Edition 3 of the Taxonomic Listing of Soft-Bottom Macro- and Megainvertebrates from Infaunal and Epibenthic Monitoring Programs in the Southern California Bight. Of the Euclymeninae taxa listed in Edition 3, only *Euclymene delineata* was not reported for the Bight '98 project. Further discussion with the original POTW's reporting *E. delineata* (LACSD and Hyperion) indicate that these were misidentified specimens from the 70's and the labs no longer include that name in their species lists.

Key to the Subfamilies* of Maldanidae from Southern California

By Lawrence L. Lovell

1. Both cephalic and anal plaques absent **2**
1. At least an anal plaque present **3**

2. Rostrate uncini in double rows, posterior segments with encircling collars ..... **Rhodininae**
2. Rostrate uncini in single rows, posterior segments not collared ..... **Lumbriclymeninae**

3. Cephalic plaque absent, anal plaque present ..... **Nichomachinae**
3. Both cephalic and anal plaques present **4**

4. Anus dorsal ..... **Maldaninae**
4. Anus terminal ..... **Euclymeninae**

*This key follows the subfamily classification as presented in Fauchald (1977).

Key to the Euclymeninae of Southern California

By Lawrence L. Lovell

1. Neurosetae absent on setiger one ....***Maldanella robusta***

1. Neurosetae present on setiger one **2**

2. Setiger four with deep encircling collar **3**

2. Setiger four without collar **4**

3. Acicular spine count for setigers 1-3:1, 1, 1; 4-5 transverse folds on cephalic plaque; lateral edges meet in V-shape at rear of prostomium..... ***Isocirrus longiceps***

3. Acicular spine count for setigers 1-3: 1, 1 / 2, 1 / 2; single transverse fold on cephalic plaque; lateral edges rounded at rear of prostomium .... ***Clymenella complanata***

3. Acicular spine count for setigers 1-3: 2, 2 / 3, 3 / 4; two transverse folds on cephalic plaque; lateral edges rounded at rear of prostomium..... ***Clymenella*** **sp. A of Harris 1985**

4. Methyl green stain on setigers 4-7 is well developed on both pre and post setal areas **5**

4. Methyl green stain on setigers 4-7 is well developed on the pre setal area only **8**

5. Methyl green stain on setiger 8 on both pre and postsetal areas **6**

5. Methyl green stain on setiger 8 on presetal area only **7**

6. Neurosetae of setigers 1-3 with 4-8 neurosetae; dorsal pores absent, ventral pores on setigers 7-9..... ***Axiothella*** **sp.**

6. Neurosetae of setigers 1-3 with single neurosetae; dorsal pores absent, ventral pores on setigers 6-9 .....***Euclymene ? grossa newporti***

6. Neurosetae of setigers 1-3 with 2-4 neurosetae, dorsal pores on setigers 7-9, ventral pores on setigers 7-9 .....***Petaloclymene pacifica***

7. Prostomium with long thin anterior palpode ..... ***Praxillella gracilis***

7. Prostomium with short rounded anterior palpode ..... ***P. pacifica***

8. Methyl green stain after setiger 8 with racing stripes ..... **Euclymeninae sp. A SCAMIT 1987**

8. Methyl green stain after setiger 8 without racing stripes **9**

9. Methyl green staining area better developed in early thoracic setigers, with lateral unstained line in segments 1-4, thickened presetal flanges develop in posterior segments ..... ***Euclymene campanula***

9. Methyl green staining area better developed in later thoracic setigers, lateral unstained line absent, presetal flanges absent in posterior segments **10**

10. Glandular band on setiger 8 a complete band of similar size to previous segments, slight lateral notches present on prostomium ..... ***Axiothella rubrocincta***

10. Glandular area on setiger 8 a complete band, better developed ventrally than on previous segments; lateral notches absent on prostomium ..... ***Clymenura gracilis***

10. Glandular area on setiger 8 ventral, spade-shaped; lateral notches present on prostomium ..... ***Clymenura columbiana***

Bight '98 Taxa Ranking by Family Levels

1.	Spionidae	29287	Polychaeta
2.	Sabellidae	9792	Polychaeta
3.	Capitellidae	9281	Polychaeta
4.	Amphiuridae	7841	Ophiuroidea
5.	Lumbrineridae	6572	Polychaeta
6.	Terebellidae	5783	Polychaeta
7.	Mytilidae	5353	Bivalvia
8.	Maldanidae	4608	Polychaeta
	(Euclymeninae	**3770**	**81.8 % of Maldanidae)**
9.	Cirratulidae	4593	Polychaeta
10.	Ampharetidae	4039	Polychaeta