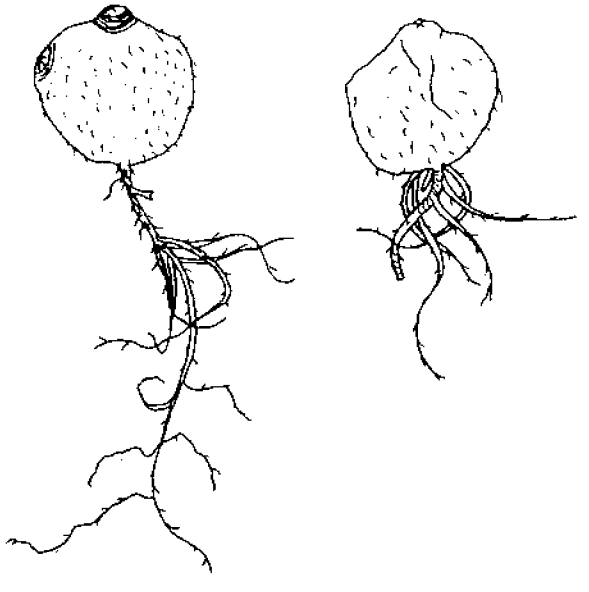
January, 1997 **SCAMIT Newsletter** Vol. 15, No.9

NEXT MEETING:	Biology 430, 1975-1996
GUEST SPEAKER:	Derek Ellis, University of Victoria, British Columbia
DATE:	**Tuesday**, February 18, 1997
TIME:	9:30 am - 3:30 pm
LOCATION:	Times Mirror Room, Natural History Museum 900 Exposition Blvd, Los Angeles



Molgula napiformis (from Lambert 1996)

FEBRUARY 18TH MEETING

The talk by Derek Ellis, subtitled ...from "Identification and Taxonomy" to "Taxonomy and Biodiversity" will cover over 20 years of Dr. Ellis' experiences teaching one of the few explicitly taxonomic courses in the world. His presence in our area is connected with the transfer of a very large and long term collection of marine invertebrates associated with environmental monitoring at the Island Copper Mine in British Columbia. He will discuss this in a presentation at the Natural History Museum of Los Angeles County on 13 February entitled "The Island Copper Mine/DHP Marine Benthos Collection from British Columbia - 1970-1998". Those of us involved in long-term monitoring programs will find this subject of considerable interest as well.

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NEW LITERATURE

Dr. Nancy Maciolek's 1983 thesis on spionid polychaetes is available for purchase. Her thesis is titled, "Systematics of Atlantic Spionidae (Annelida: Polychaeta) with Special Reference to Deep-Water Species". It is available from:

UMI Dissertation Services
300 N. Zeeb Road
Ann Arbor, Michigan 48106
1 (800) 521-0600

It's approximate cost is $38 and UMI does take a credit card.

As mentioned in the last newsletter, Vol. 14 of the Taxonomic Atlas series has been released. It was passed around at the meeting to allow any members present who had not yet received a copy a brief examination. Mention was made of the taxonomic changes introduced by Hendler (1996a) in ophiuroids, and Winchell (1996) in sipunculids.

No changes from existing SCAMIT practice were found in the chapters on brachiopods (Hochberg 1996), echiurans (Pilger 1996), crinoids (Hendler 1996b), asteroids (Lissner and Hart 1996a), echinoids (Lissner and Hart 1996b), holothuroids (Bergen 1996), or urochordates (Lambert 1996). Initial examination of the enteropneust chapter (Woodwick 1996) indicates we may be able to begin identification of our local species, at least to the generic level. While transverse section for examination of muscle arrangements may be necessary, Tony Phillips at Hyperion has tried it and found it workable with the aid of Woodwick's text and illustrations.

At the structural level a recent paper on dactylar morphology in phronimid amphipods (Zelickman and Por 1996) was circulated. The authors suggest some novel function for these structures, putting forward the hypothesis that the amphipods engage in external digestion and nutrient absorption of host tissues through their dactyls. Phronimids live as parasitoids on gelatinous zooplankters, and might be expected to have some novel adaptations as a result of this life style.

At the organism level Brown and Olivares (1996) describe a new member of the planar eastern Pacific *Crepidula* group (gastropod mollusks) from Chile. Three species within this group occur in California; the native *C. nummaria*, *C. perforans*, and the introduced *C. nivea*. These are all discussed in the paper, and characters separating them from the new species are listed.

The remaining papers examined at the meeting dealt with either aut- or synecology of marine organisms. The potential impacts of burying behavior in benthic cephalopods are discussed by Boletzky (1996). Most of the bioturbative activities of benthic squids are shallow and temporary, serving only for the concealment of the animal. Some *Octopus*, however, construct either temporary or permanent burrows as habitations, excavating up to 10cm deep into the sediments.

Results of an experimental study of amphipod species turnover were discussed by Costello and Myers (1996). They found that species composition stabilized after about 4 months of exposure of colonization pads, except for a continuing stream of transient species. These transients, which represented about one third of the species total on average, appeared to be visitors from other adjacent habitats in which they were resident. Inclusion of such non-resident aliens tends to inflate biodiversity values for a habitat. Failure to recognize the distinction between resident and non-resident can skew perception of the habitat, and complicate evaluation of community health and stability.

In a related examination of non-resident species Carlton (1996) provides an overview of the process of biological invasion searching for patterns that will allow development of predictive models of the process. While some patterns are relatively clear, in most cases we still do not

know why one species successfully invades new habitats, while others fail. We cannot yet look at lists of species from potential donor regions and pick out those species likely to become invaders. This paper is one of several derived from a symposium on invasion biology held at University of California, Davis in 1994. Interested parties may want to look up the entire issue of Biological Conservation in which this paper appears to examine other related articles resulting from the 1994 symposium.

Power et al (1996) reexamine another concept central to conservation biology and biodiversity evaluation - the keystone species. They point out that there are many subtly differing definitions of "keystone" and attempt to redefine the concept explicitly. It is increasingly apparent that organisms may only be keystone within a certain context. Under other circumstances they may not function in a keystone role. Thus Paines classic nomination of *Pisaster ochraceus* as a keystone species in wave exposed intertidal area does not hold true in protected areas, where sand accumulation inundates starfish prey populations. This and other aspects of the keystone concept are well presented in this overview paper - a group statement resulting from a Keystone Species Workshop held in Hawaii in 1995.

In a paper mentioned, but not discussed, at the meeting Child (1996) finishes his review of the species of pycnogonids described by William Hilton. Child's first commentary on Hilton's species (1975) dealt only with the family Phoxichilidiidae. Subsequently individual species have been redescribed or discussed as parts of other papers. Species which have not been discussed in the intervening 20 years were addressed in the present paper.

INTRODUCTIONS ON THE NET

A Sea Grant Nonindigenous Species Site has been created on the world wide web to serve as an information transfer focus for introduced species. Information on access is provided on the attached sheet.

BALLOTS

Once again it is time to elect new officers for SCAMIT's 1997-98 year, which officially begins in April. At the January meeting nominations were taken with all current officers being re-nominated. Ballots and biographies of the candidates are included in this newsletter. The ballots are due by the end of March. There is still time for write-in nominations. While the rewards of officership may seem small the experience itself more than makes up for this. Participating as an officer is a great place to get your feet wet in the wonderful world of invertebrate taxonomy. So, if anyone is remotely considering running for office please don't hesitate to speak up.

MMS ATLAS CORRECTION

In volume 6 of the MMS Atlas on page 98 there is a mistake in the *Scolelepis* key. *Scolelepis occidentalis*, which keys out at line 3B, following line 2B which states "notosetae absent on setiger 1" is incorrect. *S. occidentalis* does have notosetae present on the first setiger based on Hartman's (1961) original description and Maciolek's (1987) table. The rest of couplet 2B is correct for *S. occidentalis*. Branchiae and dorsal notopodial lamellae are fused for most of their length, but free at the tips and hooded hooks have 1-2 apical teeth. To correct this the key will need to be restructured not just appended. Until that time members may want to use SCAMIT's 1994 spionid key (newsletter vol.13 no.8).

MINUTES FROM JANUARY 14 MEETING

This meeting was held at the Worm Lab of the Natural History Museum. Our guest speaker was Dr. Fredrik Pleijel from the Swedish Museum of

Natural History in Stockholm. He is currently on a year-long sabatical collecting polychaetes, especially hesionids, from various locations in the U.S., such as so. Calif., Puget Sound and Florida. These collections will form the nucleus of a large-scale revision of the Hesionidae currently in progress. Where possible literature descriptions are being checked by examination of newly collected material, live examination, and ultimately SEM examination. He is being supported in this both by his home institution, and by a Visiting Investigator grant from the Smithsonian.

The week before the meeting Dr. Pleijel was out benthic sampling with the City of Los Angeles and brought to the meeting some of the live polychaetes he had collected. We opened the meeting examining these by dissecting microscope. Also available for examination were lots of syllids from a kelp holdfast off San Diego.

We also examined some live specimens that Don Cadien had brought back with him from his recent collecting trip to Mexico. Don had managed to keep alive an especially nice large *Eunice* from El Anclote, which is northwest of Puerto Vallarto. It had a very striking brown pigment pattern and it seemed to fit the description of *Eunice sonorae*, which is originally described from Puerto Penasco, Sonora, Mexico by Fauchald (1970). The specimen was so large that it was easy to observe the branchiae and parapods in motion. Since most of our time as taxonomists is spent examining dead specimens it is always a treat to be able to view live material, especially to observe the beautiful color patterns, which fade so quickly in alcohol.

Dr. Pleijel spoke to our group about one of his current studies on *Ophiodromus*. He and a graduate student have discovered two groups of the hesionid, *Ophiodromus flexuosus* which Dr. Pleijel believes may represent two different species. These two groups occur in very different locations and habitats and exhibit different lifestyles. One group is found in shallow water in Northern Norway free living in muddy sediments. The other group comes from the Mediterranean in shallow water and occurs as a commensal on large *Astropecten*, where the worms attain greater size than their northern free-living counterparts. This large sea star does not occur in Norway, but other smaller *Astropecten* do. Dr. Pleijel conducted some preliminary tests to see if fish would eat these hesionids. The fish spit out the hesionids and found them distasteful or unattractive on several attempts. It is unclear exactly what the fish find unpleasant about the worms.

Ophiodromus flexuosus was originally described from the Mediterranean and seems to fit both of these groups of hesionids in several characters. First, the hesionids fit the genus *Ophiodromus* due to their brown coloration, palpostyles that are similar in shape to the median antenna, and a proboscis that lacks a ring of terminal papilae in the adult. Juveniles will have approximately 10 papillae at the terminal end of the proboscis. The process by which these papillae disappear with growth is unclear. However, this character may help the taxonomist distinguish between a juvenile *Ophiodromus* and a sexually mature adult, something that has been a problem for some authors that have described juveniles by mistake. *O. flexuosus* has characteristic white stripes crossing the dorsum on segments 9,13,18,22,26...., which define it at the species level. Both the Mediterranean and Norwegian groups have these white stripes. One of the curious aspects of this particular case is that the stripes seem to function as aposematic coloration, advertising the distasteful nature of the animal to potential predators. The retention of such aposematic coloration in an organism which lives as a commensal is rather unusual.

Dr. Pleijel is using cladistics to determine if these two groups are different enough to actually be two species (or two separate "things"- see last paragraph) based on morphometric features, electrophoresis, and DNA sequencing. At the meeting Dr. Pleijel showed us slides of various

cladograms to illustrate where *Ophiodromus flexuosus* fits in relation to other groups. As a hesionid it is closely related to the Pilargidae, Nereididae, and Chrysopetalidae. Dr. Pleijel believes that *Ophiodromus flexuosus* fits under a new taxon (at the level of tribe), currently undescribed but to be called "Ophiodromini", based on the anterior insertion of the median antenna (for now, and probably other characters later).

Dr. Pleijel recognizes that some experimental manipulations of the two groups of *O. flexuosus* would help clarify their position. For instance, reciprocal transplants should be performed, with the Norwegian group brought to the Mediterranean and put on *Astropecten*, and Mediterranean animals should be placed in northern waters as free-living worms.

The above *Ophiodromus* case was used as an illustrative example of the difficulty of relating cladistic analytical "tree-thinking" to more traditional Linnean heirarchical taxonomy. During his talk Dr. Pleijel introduced an interesting viewpoint on the concept of species. The term species is generally defined as a group of animals that are able to interbreed with one another or have a distinct separate lineage and share a common ancestor (are monophyletic). However, species which are not most closely related as postioned in a cladogram may be able to interbreed.

An example of this phenomenon based on work with fishes by another researcher was presented at the meeting. In that case several of the most closely related species level taxa were unable to interbreed, while two somewhat more distant forms (based on cladogram position) could. The apparent explanation of this was that the autapomorphies which defined the non-interbreeding species prevented interbreeding, while the autapomorphies defining the interbreeding taxa did not concern reproduction. Because of complicated situations like this Dr. Pleijel would like to see the term "species" defined without using reproduction or the process of breeding in the definition, preferring to anchor the concept in membership in a single lineage. Instead of referring to these groups as "species" he currently refers to them as "things" or taxa.

PURSUIT OF POLYCHAETES

After the SCAMIT meeting Fred Pleijel stayed with Don Cadien for a few days while he came out on the Ocean Sentinel with the CSDLAC staff for benthic sampling. As he had with the Hyperion crew the previous week, Fred sought hesionids with single minded devotion to duty. He is currently involved in a reassessment of the family, and is attempting to locate representatives of all the described genera (and as many of the species as possible) in the tribe containing *Podarke* and *Ophiodromus*. Since collection of material was for detailed investigation with SEM, and since hesionids have the unfortunate habit of casting off delicate body parts during handling and preservation, Fred went after them alive.

His method was to take benthic samples, suspend them in seawater and then gently screen them. If he saw anything interesting on the screen he transferred the retained material to a clean jar of seawater for later microscope examination. Since going through such materials is very time consuming he restricted himself to only 4-6 samples per day.

In the evening he busied himself at Don's microscope, finding (and showing him) specimens of numerous hesionids including *Podarke pugettensis*, several undescribed species of *Gyptis*, *Gyptis brunnea*, *Amphidurous pacificus*, *Podarkeopsis glabrus*, and an undescribed *Podarkeopsis*. Even a non-worm person like Don found these animals quite attractive, agile, and engaging. Fred had quite good luck with the benthic samples, but working on them was much harder than the collecting we did at the Cabrillo Marine Aquarium after the January SCAMIT meeting. With the assistance of Chief Aquarist

Jeff Landesman we collected many specimens of *Podarke pugettensis* from a tank full of *Asterina miniata* at the Aquarium. Not only did we collect many fine specimens nearly effortlessly, we also got to consider whether the starfish felt better or worse as their commensals were removed.

Collected specimens were selectively examined to determine which were best for SEM. Once the cream of the crop were picked out they were relaxed in magnesium chloride solution, carefully cleaned, and osmium fixed. The remaining specimens were formalin fixed as comparative material. The actual SEM examinations will take place back at the Smithsonian, where Fred will spend several months later this year.

Prior to a return to the east coast, however, there is more field work here in the west. On the 24th of January Fred headed to Vancouver to meet with Andrew Mackie and continue his quest for hesionids in Puget Sound. Leslie Harris is going along too, so we should get a full report from her on their activities in the Pacific Northwest.

SOUTHERN EXPOSURES

Don Cadien and his son Jeff, in the company of nudibranch maven Jim Lance, recently returned from a trip to western mainland Mexico. This was the fourth trip to the area for Don, probably the 20th for Jim, and a first for Jeff. The main purpose was intertidal collection of and macrophotography of nudibranch mollusks. In past trips the animals have been maintained in sea-water and returned back to the U.S. for photography here. In the process some more delicate specimens have been lost, and all have grown less vigorous with separation from food substrates and local conditions. It also continued a series of collections in the rocky intertidal area just north of Puerto Vallarta, Jalisco. The area in question is along the north shore of Bahia Banderas, at Sayulita about 20km further north, and at several rocky sites along the shores of Matenchen Bay near San Blas, all in the state of Nayarit. Over the past two decades coastal development of resorts to attract both local and foreign tourism has diminished the available rock reef habitat in which nudibranchs thrive. On a trip in the spring of 1995 we found that one cherished area in northern Matenchen Bay, type locality for several unique new mollusk species, was completely gone. All the rocky substrate had been removed to build foundations and walls of developments. At another site, Aticama in central Matenchen Bay, we found ourselves in the midst of this process, with burly workmen removing intertidal rocks by hand while we peered under others.

This time we discovered another casualty, Punta de Mita. Located at the tip of the peninsula which defines the northern shore of Bahia Banderas, Punta de Mita was a unique environment of coral reef, reef flat and lagoon which hosted numerous indigenous rarities. It also served as a landing site for teleplanic larvae of Indo-Pacific species, providing a coral reef for reef associated organisms making landfall in the Americas. On a previous trip, for instance, we found the aeolid nudibranch *Spurilla alba* at Punta de Mita, a species originally described from the reefs of New Caledonia, and known widely in the tropical Indo-Pacific. Peracarid crustaceans, and most crustaceans in general are not so widely dispersed, so loss of these habitats is more critical to their continued existence. In consequence I have been making collections of alga-associated peracarids from the sparse algal cover of the tropic intertidal zone. Many new species (read "much undocumented diversity") are evident in just a cursory examination.

In theory, Punta de Mita, while closed to public access during the period we were in the area, will reopen within 2-3 years sporting a new golf course and recreational center to encourage tourism and the further development of the adjacent coastal area. Fortunately some collections already exist from which the fauna of Punta de Mita can be described. Case in point is the paper by Alvarez et al (1996) in the last issue

of the Proceedings of the Biological Society of Washington. They describe a new species of shrimp, *Prionalpheus nayaritae*, whose type locality is Punta de Mita based on collections made there in 1992-1993. These collections are now housed in the Coleccion Nacional de Crustaceos, and hopefully document the diversity so evident in the field at Punta de Mita. Ideally both development and maintenance of intertidal communities can be sustained along the mainland coast of Mexico, since the people in the area might benefit from well managed coastal development. Removal of rocky intertidal substrate is a habitat loss as final as the cutting of old growth forest, however, and must be curtailed.

Aside from our frustration over continued habitat destruction we had a wonderful time, and a successful trip, about 45 species of opisthobranch mollusks were observed, and about 20 of these photographed. Incidental collections were made of polychaete worms and a few other things, including a 1m+ specimen of *Baseodiscus mexicanus*, a strikingly colored large nemertean well-illustrated in Coe (1940). Knowing the fragile nature of nemerteans I did not want to preserve it in the field, so I brought it back alive,out of water, in a small baggie. The animal survived with little evidence of stress for over four days completely out of water. It was finally refrigerated, then frozen, and so far has shown no evidence of fragmentation.

Three species of polychaete worms were also returned alive for examination during the January SCAMIT meeting. One was a large specimen of the amphinomid *Eurythoe complanata*, a second was tentatively identified as the polynoid *Lepidonotus spiculus*, and the third seemed to be a large specimen of *Eunice sonorae*. If the two latter identifications hold, both are southern range extensions; from southern California for the *Lepidonotus* and from the state of Sinaloa for the *Eunice*. Because of this long-scheduled trip we were not able to attend the meeting in La Paz, but several SCAMIT members were in attendance, and we should have reports by the next Newsletter of activities there.

CHAETOZONE VOUCHER SHEETS

Included with this newsletter are voucher sheets from Rick Rowe (CSDMWWD) on the two commonly occurring *Chaetozone* "setosa" types from so. California. Also included is a table of *Chaetozone* characters that Rick has put together based on Blake's Cirratulidae chapter from the MMS Atlas (1996). He has also constructed a blank table for taxonomists to write in their own findings.

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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)692-4903	rgv@sddpc.sannet.gov
Vice-President	Don Cadien	(310)830-2400 ext. 403	mblcsdla@netcom.com
Secretary	Cheryl Brantley	(310)830-2400 ext. 403	mblcsdla@netcom.com
Treasurer	Ann Dalkey	(310)648-5544	cam@san.ci.la.ca.us

Back issues of the newsletter are available. Prices are as follows:

Volumes 1 - 4 (compilation)..... $ 30.00
Volumes 5 - 7 (compilation)..... $ 15.00
Volumes 8 - 14 ..... $ 20.00/vol.

Single back issues are also available at cost.

CANDIDATE BIOGRAPHIES

PRESIDENT

Ron Velarde

Ron is the current President of SCAMIT and a past Vice-President; he has been a Marine Biologist with the City of San Diego since 1983 and currently is the supervisor of Benthic Taxonomy for the Ocean Monitoring Program. His taxonomic interests include most groups, especially polychaetes and nudibranch mollusks. He earned his B.S. degree in Marine Biology from California State University, Long Beach, in 1976, and did post-graduate research on the systematics and ecology of autolytid polychaetes.

VICE-PRESIDENT

Don Cadien

Charter member of SCAMIT. Studied invertebrate taxonomy and biology at California State University, Long Beach, under Dr. D. J. Reish. Worked at Cabrillo Marine Museum, then at the L.A. County Museum of Natural History under Dr. J. H. McLean in Malacology. Spent 15 years at M.B.C. Applied Environmental Sciences as a taxonomist and later also Project Manager, leaving in 1989 as a Senior Marine Biologist to join the L.A. County Sanitation Districts' Marine Biology Lab. Specialties in taxonomy and biology of mollusks (particularly nudibranchs) and peracarid crustaceans. Currently a Research Associate in the Crustacea Section of the L.A. County Museum of Natural History.

SECRETARY

Cheryl Brantley

Cheryl is the current Secretary of SCAMIT and a marine biologist for the County Sanitation Districts of Los Angeles

County. She has worked for the Districts since graduation with her B.A. degree in Aquatic Biology from the University of California, Santa Barbara in 1985. As a taxonomist in the Districts' Marine Biology Laboratory, Cheryl has specialized in polychaetes with emphasis on the Spionida, Eunicida and the Aphroditiformia.

TREASURER

Ann Dalkey

Ann is presently the Treasurer for SCAMIT and has held this position since SCAMIT was founded. Ann is a member of the water biology staff at the Hyperion Treatment Plant where she specializes in the identification of polychaetes and amphipod crustaceans. Prior to working at Hyperion, Ann was a member of the laboratory staff at the County Sanitation Districts of Orange County. She worked there for nearly 10 years, reaching a position of senior laboratory and research analyst. She received her B.S. from California State University Long Beach in Marine Biology in 1974 and her M.S. from the same university in 1982. Her thesis research pertained to polychaete bioassay.

BALLOT FOR SCAMIT OFFICERS 1997-98

Vote for one (1) nominee for each office. Please mail or return completed ballot to Don Cadien by March 31, 1997. You may return it to the Secretary or other attending officer at the March meeting. The address to mail it to is:

Don Cadien
Marine Biology Laboratory
County Sanitation Districts
of Los Angeles County
24501 S. Figueroa Street
Carson, CA 90745

President - The president presides at all meetings and represents SCAMIT in external business affairs.

_____ Ron Velarde

_____ Write-in:_____

Vice-President - The Vice-President chairs ad hoc committees, supervises the specimen exchange, tabulates election ballots, edits the newsletter, and fills in for the President as necessary.

_____ Don Cadien

_____ Write-in:_____

Secretary - The Secretary keeps minutes of the meetings, is responsible for the newsletter, and preparation of the ballots.

_____ Cheryl Brantley

_____ Write-in:_____

Treasurer - The Treasurer collects dues, makes disbursements, keeps financial records, and makes an annual statement of the financial status of SCAMIT.

_____ Ann Dalkey

_____ Write-in:_____

1996-97 SCAMIT Meeting Topics - Please suggest any topics you deem worthy of a SCAMIT meeting.

_____

_____

Chaetozone Malmgren, 1867

(Tabular summary of Blake, 1996)

Diagnosis: Prostomium with a conical, blunt or acute anterior margin. Peristomium elongate to short. Dorsal tentacles from peristome or anterior setiger. Body segmentation short, broad, crowded to longer than wide, or moniliform. Unidentate acicular spines present in neuropodia and usually in notopodia. Bidentate spines present with unidentate spines in some juveniles or far posterior setigers of some adults. (Diagnosis modified slightly from Blake, 1996)

SPECIES	Neuro-podial spines start on setiger # (Noto-podial spines)	Arrange-ment of spines of posterior segments (see** bottom page 1)	Structure of posterior spines	max. # of acicular spines per side (posterior neuro+ noto-fascicles)	Dorsal tentacle insertion	Branchiae insertion (first pair of branchiae)	Eyes	Pygidial structure	Prostomium structure & stain pattern (methyl green)	Peristome structure & stain pattern (methyl green)	Thoracic stain (methyl green)	Abdominal stain (methyl green)	Distribution station data
C. acuta Banse & Hobson, 1968	18-40 (55-60)	(b) with lateral gap	blunt with sheath on convex side	7-12, less posteriorly with caps.	last peristomial annulation	postlateral to dorsal tentacles	pres. may fade	simple lobe ventral lip	long, conical nonstaining	1 large+1small annulations/ stains pale	diffuse pale	diffuse pale	Puget Sound 15-35 m.
C. armata Hartman, 1963	1 (?16-25)	(a) one noto- & one neurospine	curved	2 with 0-2 capillaries	nr. middorsal midperistm.	just post. to dorsal tentacles	pres. 1 pair	simple blunt lobe	long, with blunt unstained tip/ rest stains	2 annulations/ stains	ant. parapodia + interseg. furrows stain dark	diffuse pale	S. Calif. 27-180 m.
C. bansei Blake, 1996	28-29 (~80)	(b) no lateral gap	blunt slight curve	7-9 alternate with caps.	dorsomedian immed.post. of prolonged prostomium (setiger 4-7)	far ant. to dorsal tent. on last peristomial annulation	absent	simple ring with ventral lobe	long, tapering to ant. point- extends post. as ridge to set. 4-7/ tip of prost. intense stain, rest unstained	intense stain on both annulations onto following setigers	long, V-shaped area of stain on dorsum for 5-6 setigers encircling bands on each segment (first 1/3 of body)	none reported	off San Francisco, 10-33 m. subtidal, sandy sediments
C. columbiana Blake, 1996	105-120 (120-135)	(b) with lateral gaps & wide dorsal & ventral gaps	blunt, curved, slight constrict. at base/ ventral & dorsalmost with pointed tip	11-12 alternate with caps.	middorsal at post. of peristomium	lateral to dorsal tentacles	absent	short lobe with short terminal filament	long, acutely pointed tip unstained, rest intense stain	3+ annulations intense stain	10-15 ant. podial lobes with intense stain/ dorsum of first 25-30 setigers light speckled bands, setigers 35-40 bands encircle body	none reported	Oregon/ Washington shallow subtidal
C. commonalis Blake, 1996	38-40 (43-47)	(c) narrow lateral and dorsal gaps broad ventral gap	long, pointed bent-over tip	21-23 alternate with caps.	dorsomedian middle of last peristomial annulation	postlateral to dorsal tentacles on first setiger	absent	flat, saucerlike lobe	conical, pointed, tip directed dorsally/ no stain	thickened, 3 distinct annulations retaining little stain	retaining little stain	none reported	Central Calif. shelf

**(a) Not in obvious cinctures or inconspicuous among capillaries (b) In partial cinctures with obvious dorsal and ventral gaps (c) In complete cinctures with no or only narrow gaps

SPECIES	Neuro-podial spines start on setiger # (Noto-podial spines)	Arrange-ment of spines of posterior segments (see** bottom page 1)	Structure of posterior spines	max. # of acicular spines per side (posterior neuro+ noto-fascicles)	Dorsal tentacle insertion	Branchiae insertion (first pair of branchiae)	Eyes	Pygidial structure	Prostomium structure & stain pattern (methyl green)	Peristome structure & stain pattern (methyl green)	Thoracic stain (methyl green)	Abdominal stain (methyl green)	Distribution station data
C. corona Berkeley & Berkeley, 1941	1 (8-9)	(b) with lateral gaps	blunt, slight curve	11-13 with 17-20 caps.	in furrow between set.1 & peristomium	postmedian to dorsal tentacles	pres.	blunt lobe	long, narrow, blunt tip unstained/ rest stains intense	dorsally inflated/ large ant. annulation + 2 short post. annulations/ stains intense	none reported	none reported	S. Calif. W. Mexico Gulf of Calif. 24-119 m.
C. gracilis (Moore, 1923)	13 (last prepygidial segment only)	(a) obvious lateral, dorsal, and ventral gaps between fascicles	blunt, slight curve	6-7 neuropodial only except last prepygidial segment with two notospines alternating with caps.	anterior border of last peristomial annulation	postlateral to dorsal tentacles on posterior border of last peristomial annulation	none re-ported	multi lobed, small	conical, bluntly pointed some stain	large & domed/ overlays the prostomium & divided by indistinct transverse furrow/ extends posteriorly some stain	uniform green	?uniform greeen	single record (see Blake, 1996 pg.290) off Catalina Island 4016 m.
C. hartmanae Blake, 1996 (formerly *Cauleriella gracilis* of SCAMIT)	~33 (posterior segments)	(a-b) obvious lateral, dorsal, and ventral gaps between fascicles	neuro thicker, recurved, thick, blunt tip with crest of serrations, noto longer & thinner	8-10 each fascicle with about 3-4 alternating capillaries	posterior edge of peristomium	on setiger 1 medial to notosetae	absent	ventrally directed triangular lobe	elongated, pointed pale, uniform stain	1 distinct annulation and 2-3 weak annulations pale, uniform stain	pale, uniform except each parapodium with band of speckles on ant. & post. edge. extending to encircle ventrum dorsum unstained	not reported	S. Calif. shelf and slopes fine sand 542-914 m.
C. hedgpethi Blake, 1996	70-115 depending on size of specimen (100-145)	(b) narrow lateral, large dorsal & ventral gaps	curved, constricted at base	~14 with alternating capillaries	first annulation of peristomium	second annulation of peristomium posterior to dorsal tentacles	absent	small, slender, ventral lobe	elongate, pear-shaped, tapering to long, narrow anterior end with rounded tip/ continues posteriorly as inflated dorsal crest/ tip unstained, rest with intense stain	with 2 distinct annulations intense stain except dorsum	parapodia with stain extending as weak stripes across dorsum ventrum less distinctly stained intersegmental grooves not stained	not reported	northern Calif. intertidal to shallow subtidal in embayments
C. lunula Blake, 1996	35-40 (43-45)	(c) no lateral, narrow dorsal and ventral gaps	somewhat sigmoid, thickened border, occasional ventral-most bifid spine	11-12 with alternating capillaries	dorsomedian on posterior annulation of peristomium at level of first setiger	lateral to dorsal tentacles	pres. or absent	short heavily glandular ventral disc with long, tapering anal cirrus	elongate, conical, tapering, bluntly rounded anterior end no stain	with 2 distinct annulations posterior one extending posterior over first setiger no stain	transverse streaks or bands on posterior margin of ant. & middle setigers broad, dorsal, intense stain from ~setigers 25-35	not reported	central Calif. shelf 77-190 m.

SPECIES	Neuro-podial spines start on setiger # (Noto-podial spines)	Arrange-ment of spines of posterior segments (see** bottom page 1)	Structure of posterior spines	max. # of acicular spines per side (posterior neuro+ noto-fascicles)	Dorsal tentacle insertion	Branchiae insertion (first pair of branchiae)	Eyes	Pygidial structure	Prostomium structure & stain pattern (methyl green)	Peristome structure & stain pattern (methyl green)	Thoracic stain (methyl green)	Abdominal stain (methyl green)	Distribution station data
C. senticosa Blake, 1996	65-80 (80-115)	(b) almost no lateral gap broad ventral and dorsal gaps	sigmoid to sickle-shaped constricted at base	8-9 with alternating capillaries	on narrow annulation of peristomium	postlateral to dorsal tentacles on anterior of large setiger 1 + 2nd pr.above 1st setae	not re-ported	triangular blunt lobe	narrow anteriorly pointed fused with peristomium no stain	reduced to narrow annulation fused to prostomium distinct from set.1 no stain	entire body uniformly stains with concentrations in intersegmental furrows	not reported	central & northern Calif. shallow embayments 5-10 m.
C. setosa Malmgren,1867	20-30 (40-45)	(c) no lateral gap	15-17 alternate with caps.	3rd peristomial annulation	lateral to dorsal tentacles	small "tongue-like"	long, narrow ,	inflated anteriorly 3	ventrum + podial lobes intense	none reported	?species reported cosmopolitan	slight curve	
C. spinosa Moore, 1903	21-25 (Calif.) (notosetae become spinous on more posterior setigers)	(b) narrow lateral gap/ dorsal & ventral gaps broad	neuro blunt (noto retain sharp tips until far posterior setigers)	~7 neuropodial +~9 sharp notopodial spines in Blake's figure	dorsomedian between "cordate head" and first setiger	lateral to dorsal tentacles on ant. of enlarged first setiger + 2nd pr. above 1st setae	not re-ported	cupped ventral lobe	fused to peristome forming large, cordate "head" set off distinctly from setiger 1 band of encircling stain on tip only	fused to prostomium stains only on dorsal tentacle scars	no stain	not reported	Japan 280 m. Calif. 2623-2955 m.

Chaetozone Malmgren, 1867

City of San Diego Provisional Species

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SPECIES	Neuro-podial spines start on setiger # {Noto-podial spines}	Arrange-ment of spines of posterior segments (see ** below)	Structure of posterior spines	max. # of acicular spines per side (posterior neuro+ noto-fascicles)	Dorsal tentacle insertion	Branchiae insertion (first pair of branchiae)	Eyes	Pygidial structure	Prostomium structure & stain pattern (methyl green)	Peristome structure & stain pattern (methyl green)	Thoracic stain (methyl green)	Abdominal stain (methyl green)	Distribution station data
C. sp SD 1 Rowe, 1996	~30 {~65}	(b) no lateral, narrow dorsal, broad ventral gaps	blunt, curved slightly constricted basally	12-14 alternate with capillaries	last annulation of peristome	posterior & slightly lateral to dorsal tentacles	absent	triangular ventral lobe	triangular, blunt with unstained tip, rest with pale stain	three annulations/ pale and rapidly fading stain	stain between setal fascicles and pale on ventrum of setigers 28-38 (some only)	behind spines on dorsum posteriorly	ITP 1-2rep.1 July, 1996 108 ft. S. Calif./ No. Mexico
C. sp SD 2 Rowe, 1996	70-95 {~140}	(b) narrow lateral, broad dorsal and ventral gaps	blunt, slightly curved/last few setigers with terminally hooked setae	10-12 alternate with capillaries	last annulation of peristome	lateral to dorsal tentacles	absent	rounded, scoop-shaped ventral lobe	pointed, elongate triangular/ stains intensely except anterior tip	three weak and one distinct annulations/ no stain	setal fascicle region and midventral furrough with pale stain	no stain	ITP 1-2 rep.2 1-3 rep.1 1-16 rep.1 July 1996 85-108 ft. S. Calif./ No. Mexico

(a) Not in obvious cinctures or inconspicuous among capillaries **(b) In partial cinctures with obvious dorsal and ventral gaps **(c)** In complete cinctures with no or only narrow gaps

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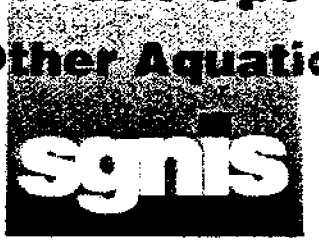

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