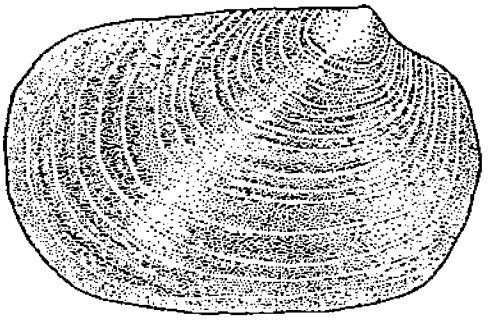
October, 1995 SCAMIT Newsletter Vol. 14, No.6

NEXT MEETING:	Update of Master Species List
GUEST SPEAKER:	none
DATE:	November 13, 1995
TIME:	9:30am - 3:30pm
LOCATION:	SCCWRP 7171 Fenwick Lane Westminster

NOVEMBER 13th MEETING

This meeting will be to finish updating the SCAMIT Taxonomic List of Macroinvertebrates. Members should bring any additions or emendations for the list with them to the meeting along with appropriate documentation to support these changes. Also, at this meeting voucher sheets of provisionals that are to be included in the Taxa List should be complete and turned in to Don Cadien for inclusion in the newsletter. The second edition of the List should not have any provisionals included that do not have substantial documentation to support them or documentation that has not been widely distributed to SCAMIT members by means of the newsletter.



Mysella sp B (drawing by Laurie Marx [SBMNH]- from voucher sheet by Dr.Paul Scott in SCAMIT Newsletter 7(2)

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This includes all provisionals from the SCBPP. If they are going to be included in the second edition of the Taxonomic List then the voucher sheets or descriptions need to be distributed to the membership. Also, we will review specimens with questionable species level identifications on both the SCBPP list and Edition 1 Taxa List. SCAMIT members that have these specimens should bring them for examination by the membership. The meeting will be held at SCCWRP. Anyone needing a map or directions may contact the SCAMIT secretary.

NEW BROCHURES

New SCAMIT brochures have been completed by treasurer, Ann Dalkey. The text and graphic images in the brochures has remained the same, but the layout has changed and so has the paper stock. It is now an attractive pale gray with a navy blue border. Most importantly, though, since Ann created these brochures on her computer using WordPerfect 6.0 for Windows they can be printed out whenever SCAMIT runs out. We all owe Ann our appreciation for a job well done.

CHRISTMAS PARTY

The SCAMIT Christmas Party has been scheduled for December 2nd at Cabrillo Marine Aquarium. It will be a potluck with SCAMIT providing the main entree and drinks. Please contact Vice President, Don Cadien if you and your family will be able to attend. The more the merrier!

CHAETOZONE

Subscribers of the electronic newsletter *Chaetozone* recently received some important news from editor Dr.Geoff Read. It seems that *Chaetozone* is being given the opportunity of moving as a group to the BIONET system of newsgroups and mailing lists for professional biologists. It is planned that there will be an automatic mailing list called *Annelida* that will run from net.bio.net in the USA. After 6 months *Annelida* will be voted on as a proposed USENET newsgroup, tentatively called bionet.organisms. annelida. USENET readers will be able to read it in the much more convenient newsgroup format. It only needs 80 "yes" votes to become a USENET newsgroup and mailing list. If it should fail to get this many votes then the mailing list will cease. After issue 9 of *Chaetozone* is complete it will be put on hold to see how *Annelida* performs. However, Dr. Read will continue to compile the *Polychaete Researcher Online* editions and updates. More information on this will be in upcoming newsletters.

INTERNET NEWS

U.S. Fish and Wildlife service has 2 new servers on Internet that may be of interest to SCAMIT members. Coastal ecosystems may be accessed thru http://www.fws.gov/~ceplcepcode.html and wildlife laws thru http://www.fws.gov/~pullenl/wildlaw/fdigest.html.

NEW LITERATURE

Although not directly concerning taxonomy, a recently received publication on polychaete life history should be of interest to the membership. This article, "Sex economy in benthic polychaetes" (Premoli, M.C., and G. Sella. 1995 -Ethology, Ecology & Evolution 7:27-48), discusses sexual lability in sequential hermaphrodites, and its basis in energetics. In one dorvilleid, for instance, "male reproductive success declines with increasing size because females prefer to mate with small males to avoid a costly conflict over sex. Moreover both partners of a pair can simultaneously change sex several times after some spawnings." Life do get complicated, don't it?

MOLLUSK WORKSHOP

A mollusk workshop has been tentatively scheduled for 18-19 November at the Seattle Aquarium. This workshop, held under the auspices of NAMIT - our sister organization to the north - has sessions devoted to cephalopods, gastropods, nudibranch gastropods, scaphopods, chitons, and bivalves on its tentative agenda. More information, and confirmation or modification of the dates should be available from Roberto Llansó, NAMIT secretary/treasurer @ (360)407-6992, or rlla461@ecy.wa.gov . The agenda and a membership application for NAMIT are attached.

MINUTES FROM OCTOBER 16

This meeting began with the members present creating a table of staining pattern use for various species of polychaetes. This table has been included in this newsletter. The table is organized by family and includes only those species or families that have been stained, whether it has been successful or not. The table includes the particular lab or individual SCAMIT member and which stain they have used in polychaete taxonomy. The purpose of staining is included in the table because often the reason for staining a specimen is not for a diagnostic pattern, but to highlight small structures that are sometimes hard to see, but are important to the diagnosis. These may include dorsal and interramal cirri, papillae, branchial scars, setal fascicles, etc. Also, sometimes a stain pattern may not be species specific, but indicative of a generic group or complex of species. We have also tried to note this in the table. The table also provides a place where an illustration or description of the stain pattern may be found, whether it is in a SCAMIT voucher sheet or an individuals personal illustration.

After this table was created we discussed the various stains and staining techniques used by the members present. There are basically 4 major stains used by SCAMIT members. A brief description of their use is given below.

Alcian Blue

Also called Ingrain Blue. This is a permanent stain and does not wash out. It is used mainly to highlight small structures for ease in viewing by the City of San Diego's lab. To use this stain a saturated solution in 70% ethanol should be prepared. A specimen only needs to be placed in the stain for a few seconds to absorb the pigment and then rinsed in 70% ethanol. If another non-permanent stain (like methyl green) is going to be used on the specimen it should probably be used first so that this permanent blue pigment won't interfere with a diagnostic pattern. This stain may be obtained from EM Science under the name Alcian or Ingrain Blue 8GX. The colormetric index to request is 74240. It is believed that this number is similar to a dye lot # and, therefore, might make a difference in the consistency of the stain color.

Methyl or Methylene Green

This is not a permanent stain, it will eventually fade out completely. It has been the most widely used stain by SCAMIT members. There are many polychaete species that seem to exhibit a diagnostic pattern using this stain. Please refer to the table on methyl green staining techniques in this Newsletter to see how this stain is used. This stain may be obtained by Eastman Kodak or Fisher Scientific. The colormetric index is 42590.

Methyl or Methylene Blue

This also is not a permanent stain and will fade out completely. It has just recently been used by Tom Parker (CSDLAC). Please refer to Tom's attached handout entitled, "A Colorful Primer" for the specifics on this stain. Two of the advantages of this stain are the quick uptake (less than 1 minute) of the pigment by the specimen and the two different color hues that are exhibited by

some species. The colormetric index is 52015 and J.T. Baker Chemical Co. is the manufacturer.

Rose Bengal

This is a permanent pink stain, which has generally been used by taxonomists as a visual aide to help sort animals from debris in samples. This has been found especially useful for deep sea samples where the specimens are so small. The City of San Francisco's lab uses a dilute solution of this stain when fixing their samples. This especially helps them in the sorting of their 0.5 mm screen samples. They have found that a dilute solution of rose bengal that is rinsed out throughly before preservation in alcohol does not significantly interfere with the use of other stains, such as methyl green. They also found that rose bengal leaves a particular pattern that helps them identify specimens of *Magelona sacculata*. This diagnostic pattern is not exhibited when these specimens are exposed to methyl green.

In the afternoon we had a round table discussion of the various staining techniques we all used. A table was created and is included in this newsletter. This table is merely for the use of methyl green, since this stain is used most frequently by SCAMIT members. From looking at the table it is apparent that the techniques are similar, but with some notable exceptions. Until this time no member had any particular formula for making a stain solution. No one knew how many grams of stain powder were mixed in how many milliliters of ethanol. The standard practice has been to mix enough stain powder in alcohol to obtain a saturated solution. Another difference in techniques is the length of time a specimen is stained. This seems to be dependent on how many specimens are being stained at one time and whether or not the taxonomist has time to wait for the stain to penetrate or must concentrate on other work in the interim. For example, the "2-day" notation refers to specimens that have been left in a stain bath over the weekend. This was not done because the pentration of the stain took that long, but was merely for the convenience of the taxonomist. Also, the longer a specimen is left in a stain bath the more excess stain there will be to rinse off (or de-stain) to allow the taxonomist to see the diagnostic pattern, if one exists. The time periods given in the table are approximations, since no one has ever timed their staining process before.

In the afternoon, Tom Parker (CSDLAC) showed members some of the specimens that he had stained with methylene blue. This gave members a chance to see for themselves that, not only was the stain uptake faster than methyl green, but the metachromatic reaction of the methylene blue produced stain patterns with two colors. The two colors were a blue or greenish-blue and a purple or purplish-blue. Please see Tom's informal observations in his "A Colorful Primer" for the species that have been tested with this stain so far.

We next examined the stain pattern for *Magelona sacculata* that has been seen by the City of San Francisco's polychaete taxonomists. Kathy Langan brought to the meeting a few specimens of theirs with the rose bengal pattern. We put these specimens and some specimens from the City of San Diego's lab in methyl green but did not see this same pattern. The rose bengal pattern is bright pink spots that are exhibited dorsally on each setiger in a slight cresent shape at the anterior end. The methyl green stain did not produce any distinguishable pattern.

Larry Lovell also showed members the way methyl green stain will help distinguish between species of *Sabellides* and *Asabellides*. *Asabellides* exhibits a dark staining patch or area behind the branchiae anteriorly and *Sabellides* does not. This is especially useful for small or tiny animals.

The meeting concluded with Tom Parker giving all the members present some of his stock solution of methylene blue for them to experiment with. We concluded that this topic of staining patterns in polychaetes will definitely be ongoing. We anticipate publishing more on this topic in future newsletters, especially the results of the methylene

blue stain after more research has been done.

Members who were not able to participate in the staining workshop are encouraged to review these materials and comment by letter or e-mail to the editor for inclusion in future Newsletters. The editor's (Don Cadien's) e-mail address is: **mblcsdla@netcom.com.**

The table on polychaete staining pattern use will be updated periodically with input from its members so please feel free to send any additions or changes to the editor. The experiences of all members can contruibute to the continuing dialogue on use of this important tool.

METHYL GREEN STAINING TECHNIQUES

Agency	Conc. of stain	Length of stain	Length of de-stain
LAC	2g./100 ml.in 70% ethanol	15 min.- 2 days	15 min.- 40 min.
HYP	sat. solution in 70% etoh.	15 min. - 2 hrs.	Brief
SD	sat. solution in 70% etoh.	10 min. - 2 days	5 min. - 15 min.
SD*	sat. solution in 70% etoh.	30 min. - 2 hrs.	15 min.
L. Lovell (MEC)	sat. solution in 70% etoh.	15 min. - 2 days	1 min. - 15 min.
MBC	sat. sol'n in 70% isopropanol	10 min. - 2 hrs.	5 min. - 30 min.
SF	sat. solution in 70% etoh.	5 seconds	rinse

* Rick Rowe at the City of San Diego's lab prefers this technique of staining. He lets the organisms sit in the stain bath until most of the alcohol has evaporated in the small petri dish. He feels this provides a more intense stain pattern. Other members of the lab do not use this technique.

LITERATURE CITED

BANSE, KARL. 1972. Redescription of Some Species of Chone Kroyer and Euchone Malmgren, and Three New Species (Sabellidae, Polychaeta). Fishery Bulletin 70(2):459-495.

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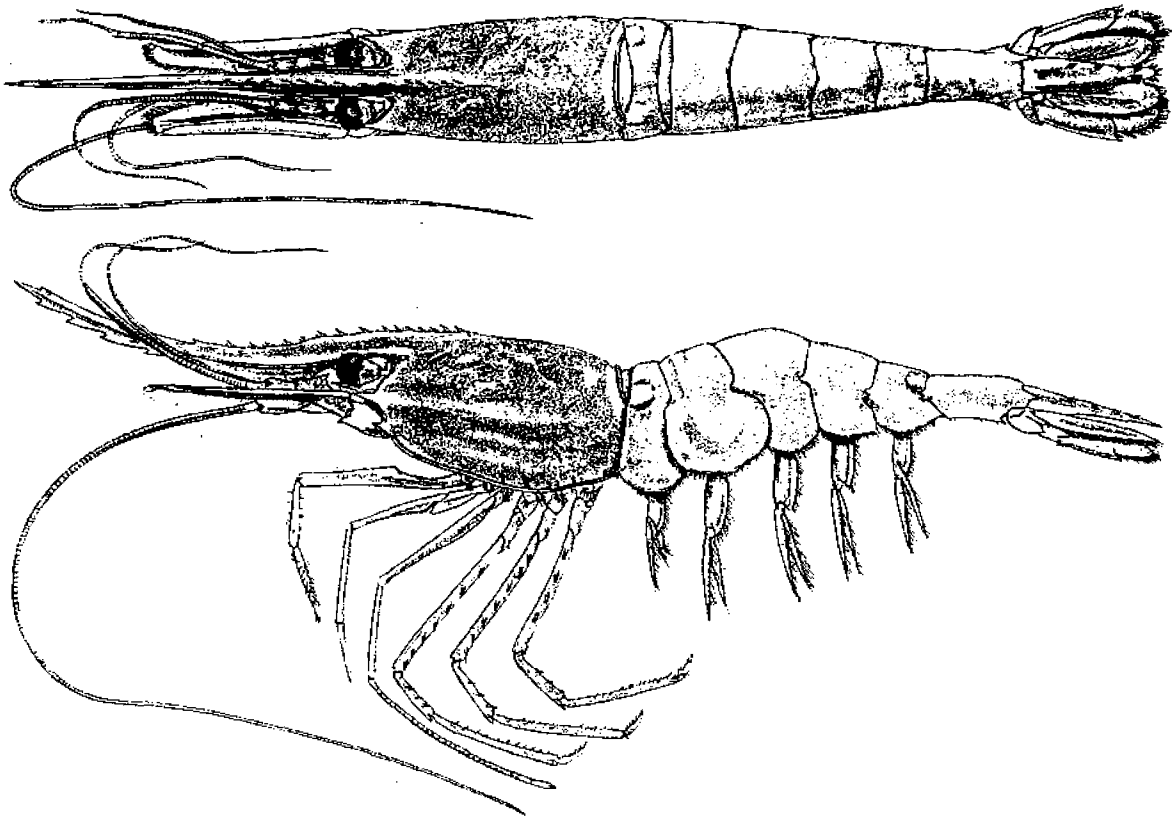
—. 1980. Terebellidae (Polychaeta) from the Northeast Pacific Ocean. Canadian Journal of Fisheries and Aquatic Sciences 37(1)

WILLIAMS, SUSAN J. 1984. The Status of Terebellides stroemi (Polychaeta; Trichobrancidae) as a Cosmopolitan Species Based on a Worldwide Survey Including Descriptions of New Species. Pp.118- 142. Proceedings of the First International Polychaete Conference.



Top and side views of *Pandalus platyceros* - the spot prawn, from Butler 1980 (Shrimps of the Pacific Coast of Canada. Canadian Bulletin of Fisheries and Aquatic Sciences 202)

SCAMIT OFFICERS:
If you need any other information concerning SCAMIT please feel free to contact any of the officers.

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Volumes 1 - 4 (compilation).....$ 30.00
Volumes 5 - 7 (compilation).....$ 15.00
Volumes 8 - 13 .....$ 20.00/vol.

Single back issues are also available at cost.

POLYCHAETE STAINING PATTERN USE

Species Name	Type of Stain [1]	Lab or Person [2]	Purpose [3]	Illustration/ Documentation [4]
Family Orbiniidae				
Leitoscoloplos panamensis	MG	LAC	Highlight	none
Leitoscoloplos pugettensis	MG	L. Lovell	Highlight	none
Scoloplos acmeceps	MG	L. Lovell	Highlight	none
Scoloplos acmeceps profundus	MG	L. Lovell	Highlight	none
Scoloplos "armiger"	AB/MG	SD	Highlight	none
Family Paraonidae	AB	SD	Highlight	none
Family Cossuridae				
Cossura brunnea	MG	L. Harris	Diagnostic	Illustration of type
Cossura candida	MG	All	Diagnostic	R. Rowe has illust./L. Harris has illust. of type
Cossura delta	MG	L. Harris	Diagnostic	Illustration of type
Cossura modica	MG	L. Harris	Diagnostic	Illustration of type
Cossura pygodactylata	MG	L. Harris	Diagnostic	Illustration of type
Cossura rostrata	MG	L. Harris	Diagnostic	Illustration of type
Cossura sp. A	MG	All	Diagnostic	R. Rowe has illustration
Family Spionidae	AB	SD	Highlight	none
Apoprionspio pygmaea	MG	L. Harris	Diagnostic	Illustration
Dispio uncinata	MG	L. Harris	Diagnostic	Illustration of type
Laonice appelloefi	MG	L. Harris	Diagnostic	Illustration
Laonice cirrata	MG	L. Harris	Diagnostic	Illustration
Paraprionospio pinnata	MG	L. Harris	Diagnostic	Illustration
Prionospio lighti	MG	L. Harris	Diagnostic	Illustration
Prionospio sp. A	MG	L. Harris	Diagnostic	Illustration
Prionospio sp. B	MG	L. Harris	Diagnostic	Illustration
Rhynchospio glutaea	MG	L. Harris	Diagnostic	Illustration
Spiophanes anoculata	MG	L. Harris	Diagnostic	Illustration of type
Spiophanes anoculata	AB	SF	Highlight nuchal ridges	none
Spiophanes berkeleyorum	MG	All	Diagnostic	SCAMIT Vol. 7 (11)
Spiophanes bombyx	MG	L. Harris	Diagnostic	Illustration
Spiophanes fimbriata	MG	All	Diagnostic	SCAMIT Vol. 7 (11)
Spiophanes kroyeri	MG	L. Harris	Diagnostic	Illustration
Spiophanes missionensis	MG	All	Diagnostic	SCAMIT Vol. 7(11)/ L. Harris has illust. of type
Spiophanes wigleyi	MG	L. Harris	Diagnostic	Illustration
Family Magelonidae				
Magelona berkeleyi	MG	SD/L. Harris	Diagnostic	SD illustration/ L. Harris illust.
Magelona californica	MG	L. Harris	Diagnostic	Illustration of type
Magelona hartmanae	MG	L. Harris	Diagnostic	Illustration of type
Magelona pitelkai	MG	L. Harris	Diagnostic	Illustration of type
Magelona pitelkai	RB	L. Lovell	Diagnostic	none
Magelona sacculata	MG	SD/L. Harris	Diagnostic	SD illust./ L. Harris has illust. of type
Magelona sacculata	RB	SF	Diagnostic	Kathy Langan has illustration
Magelona sp. A	MG	SD	Diagnostic	SD in-house voucher sheet
Family Poecilochaetidae	AB	SD	Highlight	none
Family Heterspionidae				
Heterospio catalinensis	MG	L. Harris	Diagnostic	Illustration of type
Family Chaetopteridae	MG	SD	unsuccessful	

POLYCHAETE STAINING PATTERN USE

Species Name	Type of Stain [1]	Lab or Person [2]	Purpose [3]	Illustration/ Documentation [4]
Family Cirratulidae				
Aphelochaeta marioni	MG	All	Diagnostic	SCAMIT Vol. 14 (1)
Aphelochaeta monilaris	MG	All	Diagnostic	SCAMIT Vol. 14 (1)
Aphelochaeta multifilis (Type II Blake)	MG	All	Diagnostic	T. Phillips has voucher sheet
Aphelochaeta sp. 1	MG	All	Diagnostic	SCAMIT Vol. 14 (1)
Aphelochaeta sp. C	MG	All	Diagnostic	SCAMIT Vol. 14(1)
Monticellina dorsobranchialis	MG	All	Diagnostic	T. Phillips has voucher sheet
Monticellina tesselata	MG	All	Diagnostic	T. Phillips has voucher sheet
Monticellina sp. HYP 1	MG	All	Diagnostic	T. Phillips has voucher sheet
Monticellina sp. HYP 2	MG	All	Diagnostic	T. Phillips has voucher sheet
Monticellina sp. 1 (Lovell & Phillips)	MG	Lovell/Phillips	Diagnostic	voucher sheet
Protocirrineris sp. A	MG	All	Diagnostic	SCAMIT Vol. 14 (1)
Protocirrineris sp. B	MG	All	Diagnostic	SCAMIT Vol. 14 (1)
Family Capitellidae				
Decamastus gracilis	MG	SD/L. Lovell	Diagnostic	SD illustration
Decamastus gracilis	MG	L. Harris	Diagnostic	Illustration of type
Dodecaseta oraria	MG	L. Harris	Diagnostic	Illustration of type
Heteromastus filiformis	MG	SD/L. Harris	Diagnostic	SCAMIT Vol. 3 (11)
Heteromastus filobranchus	MG	SD/L. Harris	Diagnostic	SCAMIT Vol. 3 (11)
Mediomastus acutus	MG	L. Harris	Diagnostic	Illustration of type
Mediomastus ambisetus	MG	L. Harris	Diagnostic	Illustration of type
Mediomastus californiensis	MG	L. Harris	Diagnostic	Illustration of type
Notomastus latericeus	MG	SD/HYP/Harris	Diagnostic	SD in-house voucher sheet & T. Phillips & L. Harris have illustrations
Notomastus lineatus	MG	HYP/Harris/Lovell	Diagnostic	T. Phillips & L. Harris have illustrations
Notomastus magnus	MG	SD/L. Harris	Diagnostic	SD in-house voucher sheet & L. Harris has illustration of type
Notomastus tenuis	MG	All	Diagnostic for generic separation	SCAMIT Vol. 3 (11) & L. Harris has illust. of type
Family Maldanidae				
Axiothella rubrocincta	MG	L. Harris	Diagnostic	Illustration of type
Axiothella rubrocincta	MG	All	Diagnostic	SCAMIT Vol. 6 (5)
Clymenella complanata	MG	All	Diagnostic	R. Rowe has illust./L. Harris has illust. of type
Clymenella sp. A	MG	All	Diagnostic	L. Harris has illustration
Clymenopsis californiensis	MG	L. Harris	Diagnostic	Illustration of type
Clymenura gracilis	MG	All	Diagnostic	L. Harris has illust. of type/SD illust.
Clymenura gracilis	MB	T. Parker	same as MG pattern	none
Euclymene campanula	MG	L. Harris	Diagnostic	Illustration of type
Euclymene delineata	MG	L. Harris	Diagnostic	Illustration of type
"Euclymene grossa newporti"	MG	All	Diagnostic	L. Harris has illust. of type/SD illust.
Euclymeninae sp. A	MG	All	Diagnostic	SCAMIT Vol. 6 (5)
Euclymeninae sp. A	MB	T. Parker	same as MG pattern	none
Isocirrus longiceps	MG	L. Harris	Diagnostic	Illustration of type
Maldane sarsi	MG	L. Lovell	Highlight	none
Notoproctus pacificus	MG	L. Harris	Diagnostic	Illustration
Praxillella gracilis	MG	L. Harris	Diagnostic	see table in SCAMIT Vol. 13 (10)
Praxillella pacifica	MG	L. Harris	Diagnostic	see table in SCAMIT Vol. 13 (10)
Praxillella pacifica	MB	T. Parker	Diagnostic	written observations
Rhodine bitorquata	MG	R. Rowe	Diagnostic	R. Rowe has illustration
Family Opheliidae	MG	SD	unsuccessful	
Family Phyllodocidae	MG/AB	All	Highlights structures for small animals	none

POLYCHAETE STAINING PATTERN USE

Species Name	Type of Stain [1]	Lab or Person [2]	Purpose [3]	Illustration/ Documentation [4]
Family Hesionidae	MG/AB	All	Highlights structures for small animals	none
Family Syllidae				
Exogone spp.	AB/MG	All	Highlight	none
Sphaerosyllis spp.	AB/MG	All	Highlight	none
Family Glyceridae	AB	SD	Highlight	none
Family Nephtyidae	MG	All	Highlights brain and small animals	none
	AB	SD	Highlight interramal cirri also	none
Family Sphaerodoridae	AB	SD	Highlight	none
Family Onuphidae				
Diopatra ornata	MG	L. Harris	Diagnostic	Illustration
Diopatra splendidissima	MG	L. Harris	Diagnostic	Illustration
Diopatra tridentata	MG	L. Harris	Diagnostic	Illustration
Family Dorvilleidae	AB	SD	Highlight prostomial structures	none
Family Owenidae				
Owenia collaris	MG	L. Harris	Diagnostic	Illustration of type
Family Ampharetidae	MG/AB	All	Highlight especially small animals	none
Amage anops	MG	L. Harris	Diagnostic	Illustration
Ampharete acutifrons	MG	All	Highlight	none
Ampharete acutifrons	MG	L. Harris	Diagnostic	Illustration
Ampharete arctica	MG	All	Highlight	none
Ampharete arctica	MG	L. Harris	Diagnostic	Illustration
Ampharete labrops	MG	All	Highlight	none
Ampharete labrops	MG	L. Harris	Diagnostic	Illustration of type
Ampharetidae sp. SD 1	MG	SD	Highlight	none
Amphicteis glabra	MG	All	Highlight	none
Amphicteis mucronata	MG	All	Highlight	none
Amphicteis scaphobranchiata	MG	All	Highlight	none
Anobothrus gracilis	AB/MG	SD/LAC/Lovell	Highlight	none
Anobothrus gracilis	MG	L. Harris	Diagnostic	Illustration
Asabellides lineata	MG	L. Harris	Diagnostic	Illustration
Eclysippe trilobatus	MG	L. Harris	Diagnostic	Illustration of type
Lysippe sp. A	MG	All	Diagnostic	SCAMIT Vol. 4 (8)
Lysippe sp. B	MG	All	Diagnostic	SCAMIT Vol. 4 (8)
Melinna heterodonta	MG	L. Harris	Diagnostic	Illustration
Melinna oculata	MG	L. Harris	Diagnostic	Illustration of type
Mooresamytha bioculata	MG	L. Harris	Diagnostic	Illustration
Sabellides sp.	MG	L. Lovell	Diagnostic	none
Samytha californiensis	MG	L. Harris	Diagnostic	Illustration
Schistocomus hiltoni	MG	All	Diagnostic	SCAMIT Vol. 6 (5)
Schistocomus sp. A	MG	All	Diagnostic	SCAMIT Vol. 6 (5)
Sosane occidentalis	MG	L. Harris	Diagnostic	Illustration of type
Sosanopsis sp. A	MG	L. Harris	Diagnostic	Illustration

POLYCHAETE STAINING PATTERN USE

Species Name	Type of Stain [1]	Lab or Person [2]	Purpose [3]	Illustration/ Documentation [4]
Family Terebellidae				
Eupolymnia heterobranchia	MG	SD/Lovell	Diagnostic	SD illustration
Lanassa gracilis	MG	SD/Harris/Lovell	Diagnostic	SD illust./L. Harris illust.
Lanassa venustavenusta	MG	SD/Harris/Lovell	Diagnostic	SD illust./L. Harris illust.
Lanassa sp. D	MG	SD/Harris/Lovell	Diagnostic	SD illust./L. Harris illust.
Lanice conchilega	MG	SD/Harris/Lovell	Diagnostic	SD illust./L. Harris illust.
Pista alata	MG	All	Diagnostic	SCAMIT Vol. 4 (11) & L. Harris has illust. of type
Pista brevibranchiata	MG	L. Harris	Diagnostic	Illustration of type
Pista elongata	MG	L. Harris	Diagnostic	Illustration of type
Pista fasciata	MG	All	Diagnostic	as P. disjuncta in SCAMIT Vol. 4 (11)
Pista moorei	MG	All	Diagnostic	SD description
Pista sp. B	MG	All	Diagnostic	SCAMIT Vol. 4 (11)
Polycirrus californicus	MG	All	Diagnostic	SCAMIT Vol. 14 (1)
Polycirrus sp. I	MG	All	Diagnostic	SCAMIT Vol. 13 (12) also R. Rowe illust.
Polycirrus sp. III	MG	All	Diagnostic	Banse 1980
Polycirrus sp. V	MG	All	Diagnostic	SCAMIT Vol. 13 (12) also R. Rowe illust.
Polycirrus sp. A	MG	All	Diagnostic	SCAMIT Vol. 13 (12)
Proclea sp. A	MG	SD	Diagnostic	SD illustration
Spinosphaera oculata	MG	L. Harris	Diagnostic	Illustration
Streblosoma crassibranchia	MG	All	Diagnostic	SCAMIT Vol. 4 (11) & L. Harris has illustration
Streblosoma sp. B	MG	All	Diagnostic	SCAMIT Vol. 4 (11) & L. Harris has illustration
Family Trichobranchidae				
Artacamella hancocki	MG	L. Harris	Diagnostic	Illustration of type
Terebellides spp.	MG	All	Not diagnostic for species level ident.	Williams 1984
Family Sabellidae				
Bispira spp.	MG	L. Harris	Diagnostic	Illustration
Chone albocincta	MG	All	Diagnostic	SCAMIT Vol. 5 (3)/Banse 1972 & L. Harris has illust. of type
Chone minuta	MG	All	Diagnostic	SCAMIT Vol. 5 (3)/Banse 1972 & L. Harris has illust. of type
Chone mollis	MG	All	Diagnostic	Banse 1972/ L. Harris has illust.
Chone veleronis	MG	All	Diagnostic	SCAMIT Vol. 5 (3)/Banse 1972 & L. Harris has illust. of type
Chone sp. B	MG	All	Diagnostic	SD illust./ L. Harris has illust.
Chone sp. C	MG	All	Diagnostic	SD illust./ L. Harris has illust.
Euchone arenae	MG	SD/ L. Harris	Diagnostic	SD illustration/Banse 1970 & L. Harris has illust. of type
Euchone hancocki	MG	SD/ L. Harris	Diagnostic	SD illustration/Banse 1970 & L. Harris has illust. of type
Euchone incolor	MG	SD/ L. Harris	Diagnostic	SD illustration/Banse 1970 & L. Harris has illust. of type
Euchone limnicola	MG	All	Highlight	L. Harris has illustration
Euchone velifera	MG	All	Diagnostic	Banse 1972/ L. Harris has illust. of type
Fabrisabella sp. A	MG	All	Diagnostic	as Jasmineira sp. A in SCAMIT Vol. 5 (6)
Jasmineira sp. B	MG	All	Diagnostic	L. Harris has illustration
Megalomma pigmentum	MG	D. Vilas/L. Harris	Diagnostic	L. Harris has illustration

POLYCHAETE STAINING PATTERN USE

Species Name	Type of Stain [1]	Lab or Person [2]	Purpose [3]	Illustration/ Documentation [4]
Family Sabellidae (con't)				
Megalomma splendida	MG	L. Harris	Diagnostic	Illustration
Potamethus sp. A	MG	All	Diagnostic	SCAMIT Vol. 5 (6)/L. Harris has illustration
Pseudopotamilla occelata	MG	L. Harris	Diagnostic	Illustration
Pseudopotamilla socialis	MG	L. Harris	Diagnostic	Illustration of type
Pseudopotamilla sp. 1	MG/MB	T. Phillips	Diagnostic	see T. Phillips
Class Oligochaeta	BC	T. Parker	Highlights internal organs	see T. Parker

1. AB– Alcian Blue
   BC– Borax Carmine
   MG– Methylene Green
   MB– Methylene Blue
   RB– Rose Bengal

2. This column refers to the individual lab or person that has used this particular stain on this species.
   The term "All" refers to a regular use by many SCAMIT members.
   HYP– Hyperion, LAC– LA County, SD– City of San Diego, SF– City of San Francisco

3. This column refers to the purpose of the stain; to highlight body structures for ease in viewing or as a diagnostic pattern.

4. This column provides a reference(s) for the stain pattern. This may be either a literature citation, SCAMIT voucher sheet (in which case, the SCAMIT newsletter volume is given), or it may be a member's personal illustration or observation.

A COLORFUL PRIMER

The process of imparting color to preserved tissues is founded upon a large body of chemical research. A number of factors have been shown to influence the results of staining. The short review below includes some of these factors. Recommendations are offered to aid in standardization of staining practice. Use of repeatable methods should increase the value of staining in identification and taxonomy, both within and between laboratories.

A stain or dye creates differences in light wavelengths coming from an object. A dye's molecule must both attach to and impart color to biological tissue. It is the protein components of the tissue and cells that react with the dye. Staining during polychaete identification is used to highlight delicate surface structures such as cilia bands, papillae, branchial scars, parapodial lobes, nuchal organs, and other morphological features. Some species exhibit discreetly staining body regions termed "patterns". These patterns are either on tissue appearing as typical dermal tissue or on "glandular" tissue. Such patterns are sometimes afforded taxonomic significance. SCAMIT Newsletter, May 1995, provides a table of recent literature where staining is reported and also the author's opinion about the taxonomic utility of their staining results. Considerable difference exists between these author's opinions.

Most of the staining by local workers has been done without any standardized written procedures. No specific formulations, treatments, etc. have been followed. Factors known to influence dye/tissue interactions are not addressed within this practice. Each worker has developed their own general guidelines for staining polychaetes. Consequently results from staining will vary. Methylene blue, methyl green, and alcian blue are reported locally as stains of choice. The rationale for choosing these stains seems based upon the dye's convenient availability in the laboratory, its ease of use, or recommendation(e.g."I use methylene blue mixed in ETOH"). Alcian blue was apparently chosen because it remains fairly permanent in tissues of preserved material. Other stains have not been investigated.

Most histological dyes are classified as basic or acidic. A basic dye will stain tissues containing acidic proteins, while acidic dyes will stain tissues with basic proteins. Basic dyes typically stain cytoplasmic components and include the dyes crystal violet, malachite green, methyl green, methylene blue, and thionine. Acidic dyes typically stain nuclear components and include the dyes aniline blue, congo red, methyl blue, orange g, and phloxine. Some dyes are also classified as metachromatic. These have the property of staining different tissues in ranges of colors or hues different from the dye itself. These dyes include basic fuschin, crystal violet, methylene blue, and thionine. The effects of alcohol solutions on metachromatic dyes are complex. In some conditions mucopolysaccharides and nucleic acids may produce metachromatic responses with alcohol solutions; while in other conditions, such response may be suppressed with alcohol.

Some chemicals act as mordants that show affinity both for the dye molecule and the tissue and thus improve stain uptake or retention. Additionally, some substances are chemically

unlike mordants and are classified as accentuators. Accentuators do not combine with the dyed tissue, but enhance the dye coloration of tissue. Basic accentuators include bicarbonate, sodium borate(commonly used as a formaldehyde fixative buffer), and sodium hydroxide. Acid accentuators are phenol, sulfuric acid, and acetic acid.

Staining may be done regressively or progressively. Regressive staining involves over-staining tissue followed by destaining. Progressive staining methods contain no destaining step and dye uptake is due only to selective affinity of the dye for different tissues. This typically involves weak dye solutions or short staining times. Regressive staining is commonly used in polychaete staining, though progressive staining has been used when the most delicate surface features are inspected.

The pH of a dye solution controls the interactions between tissues and dyes. A basic dye's binding is inhibited at lower solution pH levels. Acidic dyes bind to tissues best at low pH but are prevented from binding at higher pH levels. Such chemical curves for pH modulated staining can be created for specific stains and tissue components within a range of pH values. At some pH levels protein will not stain although dye concentrations are high and immersion times are long. The optimal dye uptake of methylene blue occurs at pH 7.0-8.0. Acidic dyes such as aniline blue reach optimal uptake at pH 2.0-3.0. Please note that the acid/base relationship between tissues and dyes is a separate reaction influenced by pH levels of the dye solution.

A dose/response relationship is generally assumed in which high concentrations of dye solution will stain tissues darker, more deeply, and quicker than low concentrations. This is, however, limited by availability of tissue sites for dye binding. Surface tissue protein sites fill to capacity in the presence of dye surplus. Subsequent staining in other sites and tissues is greatly influenced by the time available for further penetration. This penetration occurs at a greatly reduced rate. Influences to this rate of staining vary between tissue regions based on the density of charges in each region. Other mechanical and chemical factors have been shown to influence the rate of staining.

There are several less recognized factors acting upon dye uptake. Fixation method influences dye uptake. Formaldehyde fixation greatly increases basic dye uptake. Ionic or dissolved salt concentrations will also affect dye interactions. Increasing ionic strength of the solution will decrease staining in both basic and acid dyes. Dyes will diffuse into tissues at different rates under differing temperatures. Typically staining rate increases with temperature. Dye powders with the same product name are often various chemical formulations of dye. These differences are rarely represented on the manufacturer's bottle. Dyes named polychrome methylene blue, methylene blue, or alcian blue 8GX, alcian blue 7GX, and alcian blue GS are all different dyes. Failure to control the numerous staining conditions will result in a variety of dye uptake results.

Polychaete body function is based upon segmentation. Some body segments are dedicated to specific functions(e.g. branchia formation, tentacle growth, specialized setae). Some of these functions require specialized organization of the nervous system or other physiological components. However all such specialization is not a permanent feature of

life history (e.g. gonad formation and reproduction are temporary events). Differential stain affinity in polychaete tissue is a reflection of a segment's specialized tissues. Examples of strong dye uptake by branchia, nephridia, or the margins of parapodia are commonly assumed to represent such organization. Other staining patterns however, seem to have no easily discerned underlying structural component. "Racing stripes" on maldanids, dye affinity for margins of segments, and fine discrete speckling on many dermal surfaces (often in their own delicate patterns) are not currently known to be associated with a particular segment function or tissue organization. Standardization of staining methods must be relied upon to control variability. This will reduce confusion from differences between observable morphology and staining patterns.

RECOMMENDATIONS

Establish a standardized and written protocol for staining methods

Include dye formulation, stain solution formulation, method of application, length of uptake and destain steps. This should be written in a format and style that will allow any worker to reliably duplicate these methods at some later date. Any specific time horizons for mixing, staining, destaining should be specified. The use of a single dye and formulation for all workers will help reduce differences in stain results. If this is not possible, document each dye's stain reaction.

Document your results

Detailed written, drawn, or photographed representations of stain patterns, intensity, speckling, fading, etc. should be made for each taxa stained and identified. Make special note to determine if there are any variations in stain within a species from the same sample, as opposed to differences between individuals of one species in different samples. Please note that stain intensity and color may be influenced by physical or chemical conditions and metachromatic dye properties (e.g. methylene blue).

Use stains

to contrast and highlight important anatomical features that are referenced in the literature. Branchial counts, parapodial shape, buccal lips, cirri form, tentacle insertion, and segmental lines, and nuchal organs are all examples of structures enhanced by the use of stains. Dye uptake by polychaete tissue has been casually described as typical of glandular tissue or mucopolysaccharides. Dye affinity for specific glands or glandular tissue is not well documented in polychaetes. Specific affinity for mucopolysaccharides or some other proteinaceous material has not been demonstrated in polychaetes. Changes in a dye's affinity for tissues modified during ontogenic or reproductive events have not been widely investigated and reported. Consequently the formation of stain patterns on polychaete body walls may not represent species level taxonomic characters.

Cautiously use

observed new or unpublished staining patterns to confirm a species concept. This caution is due in part to the currently non-standardized techniques in use. Detailed descriptions of staining patterns for only a few species have been published. This makes it more difficult to tie-in stain results to the known taxonomic record. Until staining procedures are standardized and detailed documentation of results are distributed, workers should realize that results will be highly subjective and potentially inconsistent.

Do not identify

new taxa based fundamentally upon staining patterns. An understanding of stain/tissue interaction based on control of procedural variables, reproducible results, comparison to taxonomic type material, and cross comparison to related species has not been established.

PRACTICAL CONSIDERATIONS

Recommended dye: methylene blue

Formulation: methylene blue (C. I. 52015)_____3.0 g
(see Humason) absolute ETOH_____30.0 ml
KOH, 0.01% aqueous_____100.0 ml (best for pH 5.5-8.0)

Storage: stoppered, room temperature

Applications: Regressive staining: Record timed steps of staining and destaining.
Progressive staining: Record time of stain step

Specimen fixation: Buffered formaldehyde

I have tested this formulation upon *Chone* and euclymenid polychaetes. It is a very concentrated solution which imparts dark blue and purplish stain to the dermis of the specimens in the first 1-5 seconds. Immediate rinsing in 70% ETOH reveals a delicate and discrete series of stain dots that highlight the surface and associated structures. Staining of *Chone* for 10-20 seconds over stains the animal and leaves a nearly blackened specimen with little differentiation except at the segmental lines and setal fascicles. Destaining progresses most rapidly in the briefly stained specimen. I have also used this stain solution as a stock to make a more dilute working solution. It is based on the formulation:

10 ml stock dye solution
30 ml DI water
10 ml ETOH(abs)
Mix and store stoppered.

INFORMAL OBSERVATIONS:
This solution produces delicate and light stains on the surface when dipped for a few seconds. These stains become very dark when left in solution for up to 1 minute.

....*Chone:*

This stain seemed to rapidly penetrate *Chone* branchial structures and show the internal compartment membranes clearly. Stain patterns typical for *Chone mollis* are seen with this formulation

....*Sosane:*

Quick dipping of *Sosane* specimens revealed delicate surface structures, while longer immersion (20 seconds) produced deeply stained patterns of tissue on the ventrum.

....*Mediomastus:*

Staining less than 5 seconds for *Mediomastus* produced a metachromatic purplish dot pattern on the posterior thoracic segments and discrete blue speckles on other segments. Staining this specimen for 1 minute produced an intense dark blue body pigmentation. Destaining over 3-5 minutes produced a light background in the abdomen and dark thoracic stains most intense on setigers 6-9.

....*Aphelochaeta marioni*:

was stained for 45 seconds and developed a dark blue stain. When regressively stained, it revealed the typical ventral staining pattern in less than 30 minutes. Some experimentation with dye solution concentration, stain time, and destaining may greatly reduce the effort needed to process large numbers of cirratulid specimens.

....*Clymenura gracilis*:

specimens revealed several hues of stain. On anterior segments #4-8, the segments were partially stained with a generalized light green diffuse color overlaid with small discrete spots of dark blue; the other portion of these segments were differentiated by a speckling of reddish-purple pigment spots. The darkly stained shield on setiger 8 was clearly stained with a purplish blue collection of delicate dots.

....*Myriochele* :

specimens stained in this solution bore discrete speckling on the lateral thorax and lower margin of the buccal region.

....*Praxillella pacifica:*

specimens reveal a metachromatic response on setigers 4-7. The general background coloration is a greenish blue, while setigers 4-7 have a purplish blue tone.

....*Lanice conchilega*:

blue and bright purple stain patterns were apparent in *Lanice*. There was a purple stain pattern along the thoracic parapodia resulting in a stripe.

.... *Euclymeninae sp. A*:

the racing stripes seen on the abdomen of *Euclymeninae sp. A* were apparent when stained with this solution, but appeared as an accumulation of discrete dots lined up as stripes down the body wall.

Though metachromatic stain reactions are not currently afforded taxonomic significance, they do provide another level of visual differentiation for the observer. It may be that metachromatic reactions are associated with specific tissue structures or functions different from surrounding tissues. Given that this methylene blue formulation produces color with both diffused coloration and delicate discrete spots, and that metachromatic responses are organized in localized patterns, I recommend this stain solution as a superior technique for observing whole body polychaetes for routine identification and associated taxonomic work. The appearance of specimens stained in this dye is superior to the features seen for similar specimens stained in various 70% ETOH solutions of methylene green powder.

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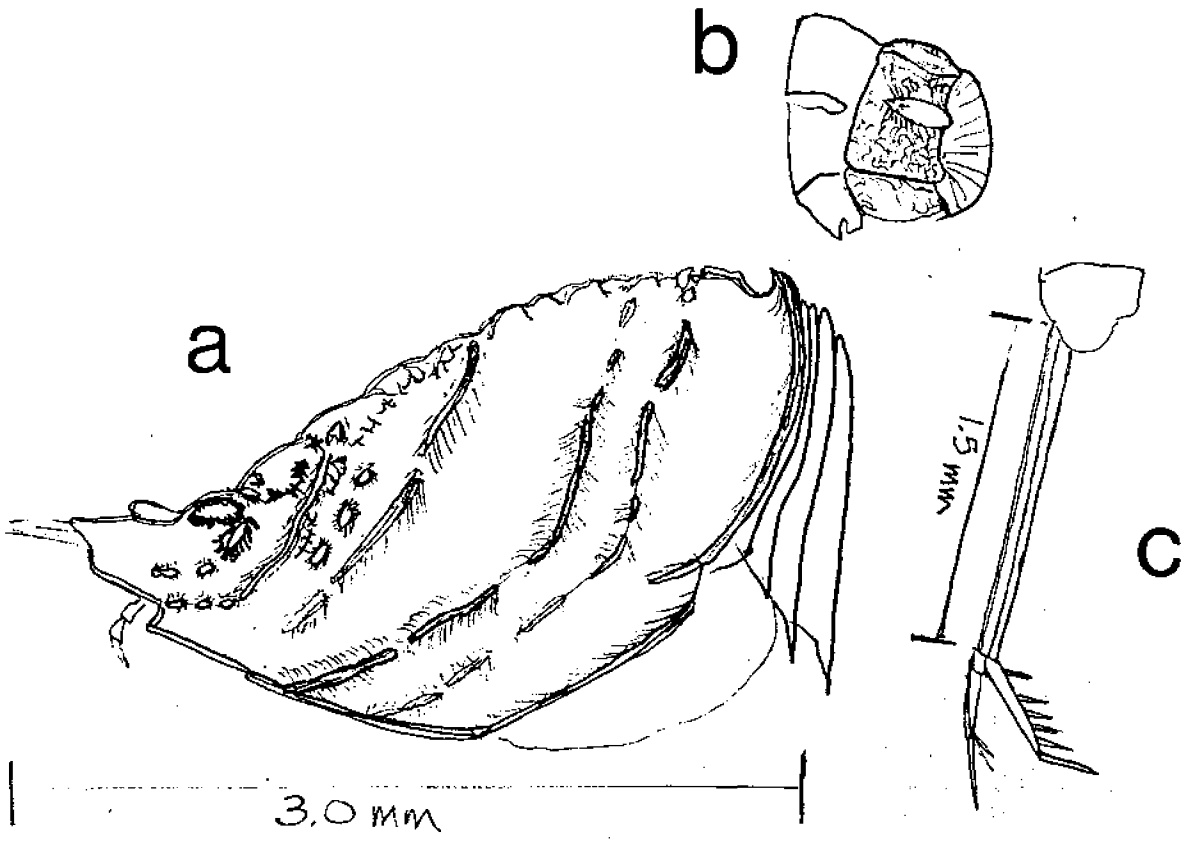
DEPTH RANGE: 150 - 307 m

DISTRIBUTION: San Pedro Sea Shelf, off Los Angeles County

COMMENTS: This species is usually found in relict red sands and/or coarse shelf break sediments. It's characteristic red-orange pigmentation may derive from the ferrous minerals which are found there. There are dark-purplish pigment spots on the anterodorsal portion of the carapace in mature specimens. The peculiar square uropodal peduncles are immediately diagnostic for this species, even in smaller individuals. The pattern of fragmentation of the ridges is individual, each specimen having different breaks and separations into ridge segments and pustules.



Campylaspis sp A a) carapace of adult female, b) last abdominal segment of adult female showing positions and relative size of the teeth, c) uropod of adult female (specimen from 307m, Station BD2-4-III, 7 March 1984; LA2 Dump Site off Los Angeles Harbor)

4. Differs from *Diaphana californica* in lacking a prominent globose nuclear whorl, in having a broadly open aperture, in having a globose rather than barrel-like shell, and in having a minute rather than prominent umbilicus

5. Differs from *Parvaplustrum sp A* in being globose, not pyriform; and in lacking a spoutlike posterior carina circling an involute spire

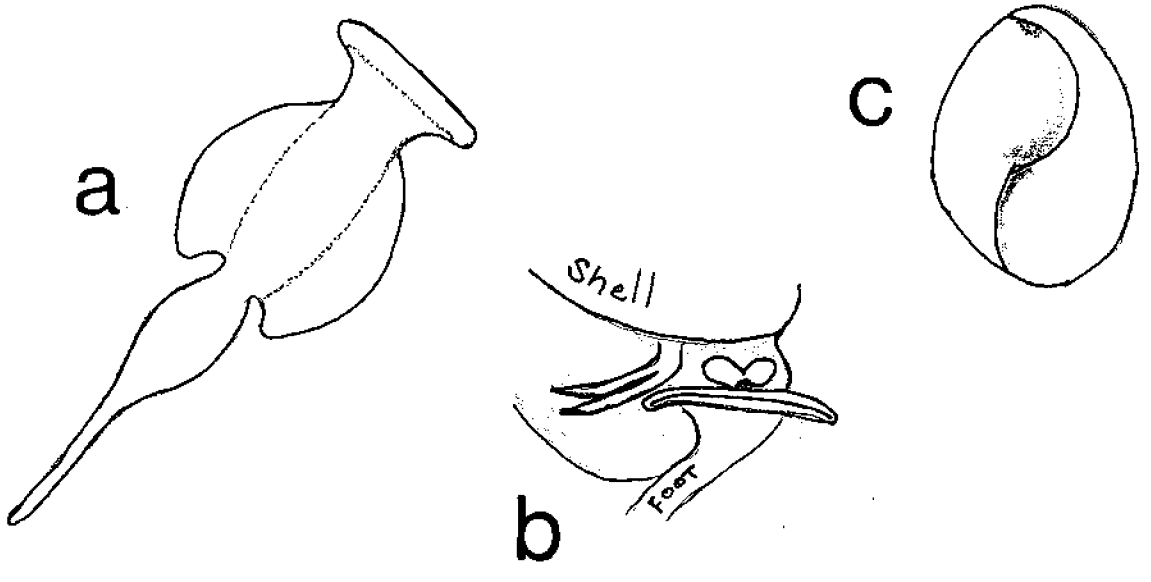
6. Differs from Bullomorpha sp A in being globose rather than barrel-like, in having only a minute spire perforation rather than a sunken pit; and in having a thin transparent shell rather than a thicker opaque white shell (small thinner Bullomorpha sp A show a black mantle ocellus lacking in *Meloscaphander sp A*)

7. Differs from *Woodbridgea polystrigma* in lacking spiral lines of punctae on the shell, and in being more globose

DEPTH RANGE: 30 - 605m

DISTRIBUTION: San Diego to Goleta

COMMENTS: Generic placement of the present taxon is open to question. The genus *Meloscaphander*, while similar in external morphology to the present species, contains only species from the Banda Sea (Schepman 1913) or from the abyssal North Atlantic (Bouchet 1975). Until a thorough investigation of the internal anatomy of the present species is completed placement in *Meloscaphander* is tentative. The bifid tentacles of this species are similar to those of *Parvaplustrum sp A*, and it is possible that this taxon also belongs in *Parvaplustrum*.



Meloscaphander sp A a) ventral view of foot and parapodia; b) anterior oblique view of animal showing auriform oral tentacles, bilabiate anterior foot margin, and bifid tentacles; 3) apertural view of shell (drawn from a 3mm long specimen taken in 305m off Palos Verdes [Station 1A - January 1991]).

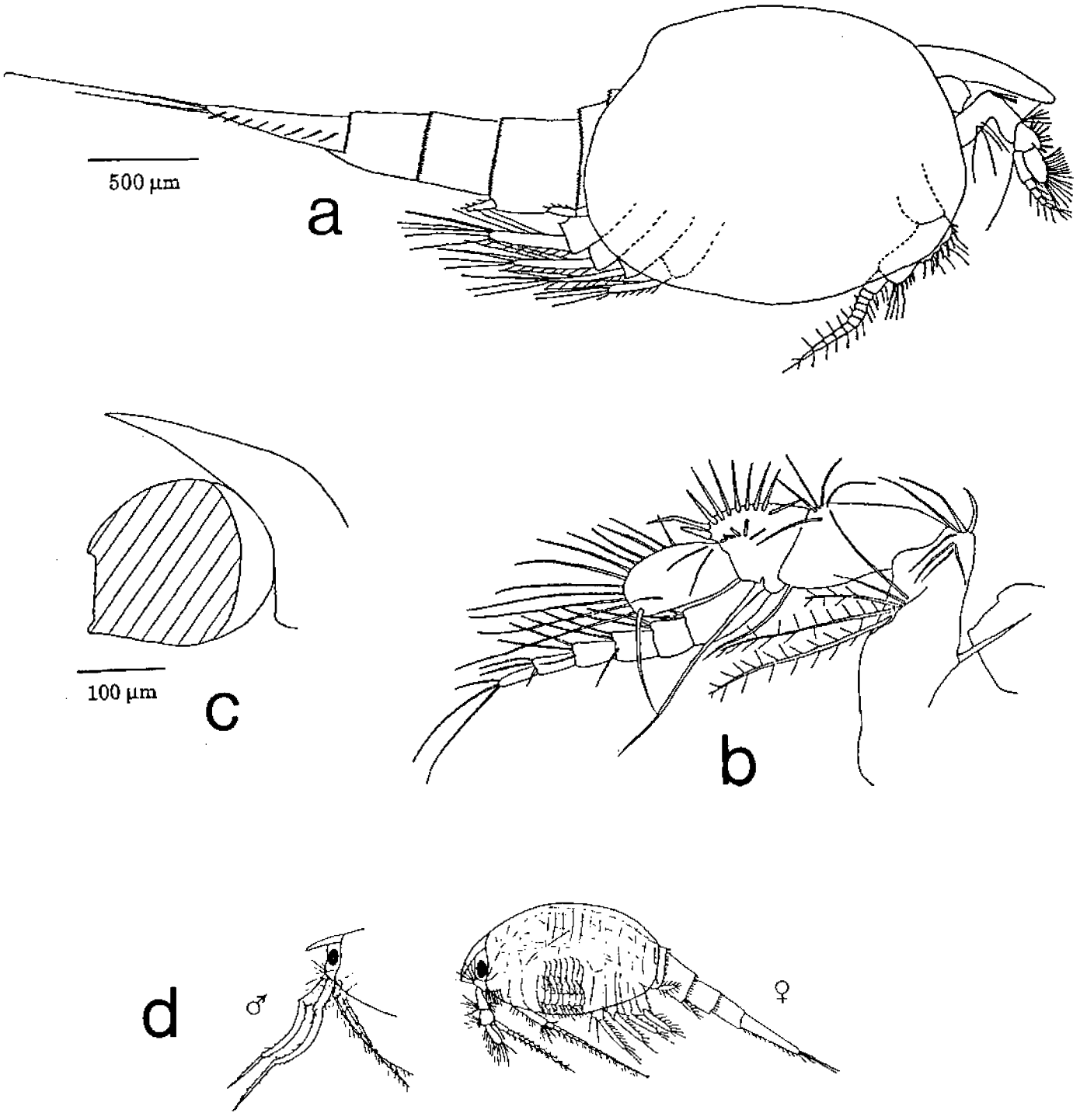


Figure 1a.) *Nebalia sp A*: lateral view of a ♀; 1b.) Antennule of *Nebalia sp A* ♀ (scale as in 1c.); 1c.) eyestalk and supraocular scale of *Nebalia sp A* ♀; 1d.) ♂ and ♀ of *Nebalia cf. pugettensis* (Note geniculate antennular peduncle of ♂ and multiarticulate antennular peduncle of ♀). (1a,b,c from Vetter MS, 1D from Smith and Carlton 1975 [Light's Manual])

COMMENTS: This animal was recently described in greater detail by Wilson (MS) in a draft report on investigations in the Santa Maria Basin in Central California. He was the first to distinguish this species as more than just a form of *Pleurogonium californiense*. Records of *P. californiense* prior to 1992 require reexamination for *P. sp A* as the two co-occur in mixed populations in Central California. *Pleurogonium rubicundum* has also been reported to range into the Southern California Bight, but *P. inerme* has not yet been recorded south of Prince William Sound in the Northeast Pacific. Wilson (MS) indicated that this species may exhibit (at least in some populations) protogynous hermaphroditism.

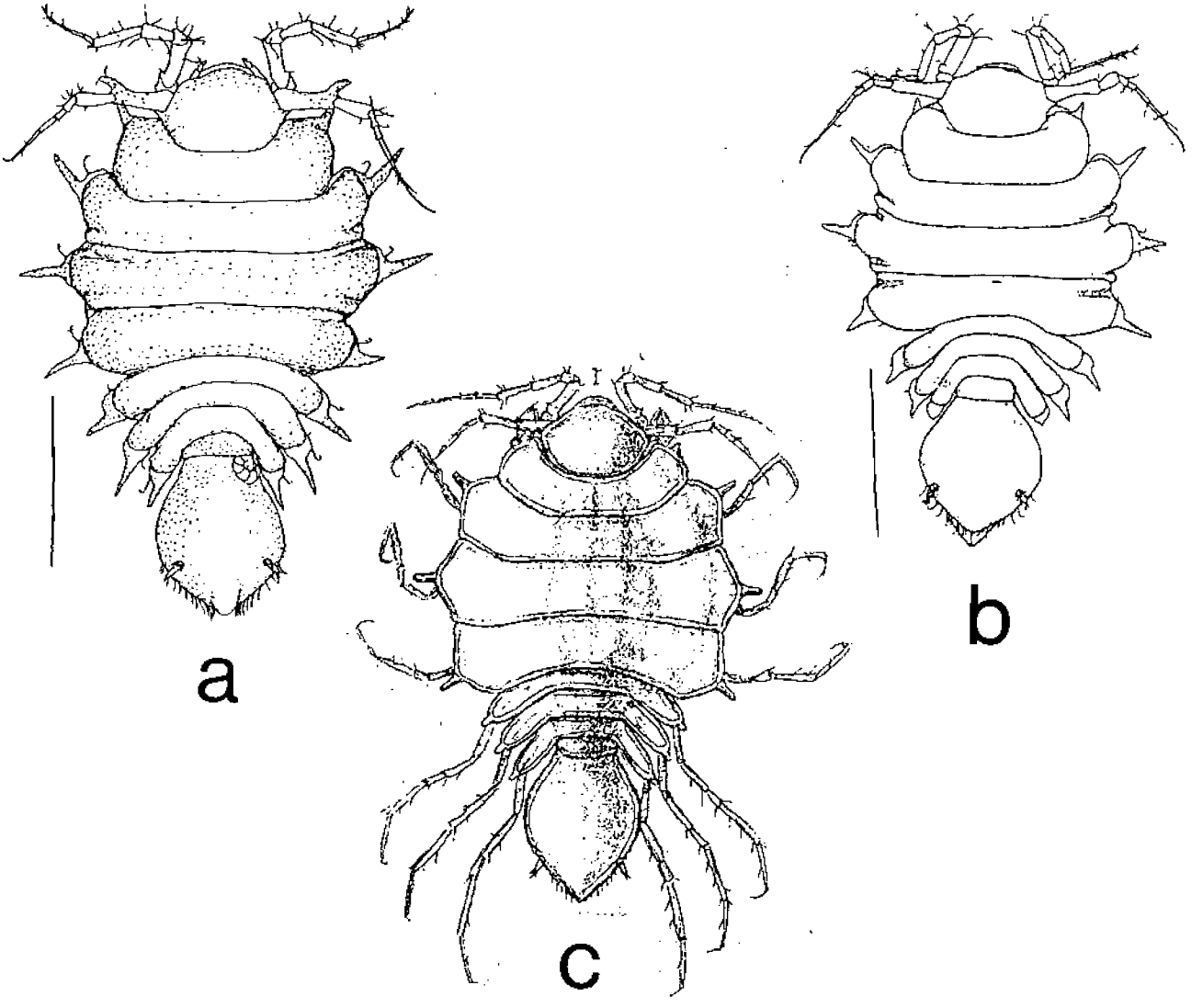


Figure 1. Species of *Pleurogonium* reported from California; A) *Pleurogonium sp A*, B) *Pleurogonium californiense* Menzies 1951, C) *Pleurogonium rubicundum* (Sars 1863)[Figures 1A and 1B from Wilson MS, Figure 1C from Sars 1897][scale bar = 0.5mm]

the involute spire; and in being pyriform not evenly ovate

5. Differs from both *Meloscaphander sp A* and *Bullomorpha sp A* in being pyriform not globose; and in having the posterior carina circling the spire

6. Differs from *Diaphana californica* in having an involute spire, in lacking a large globose nuclear whorl, and in posession of a posterior carina framing a spout-like posterior aperture

DEPTH RANGE: 8 - 200m

DISTRIBUTION: at least San Diego to Puget Sound based on examined material

COMMENTS: Despite their small size, specimens above 1mm in length are reproductively mature. Sectioning has shown both sperm and mature ova in specimens of 1.1 and 1.2mm length. Most specimens are less than 1 mm long, and are lost through a 1mm screen. The shells are very fragile, and often will be completely crushed and lost during collection and processing. The shape of the animal is so distinctively pear-like that even after shell loss identification is easy. The animals are most frequent in areas of fine silt to coarse clay sediments in bays and offshore. The species was allocated to *Parvaplustrum* by Dr Terry Gosliner (Cal. Acad. Sciences). The genus was previously known only from deep water in the south Atlantic (Marcus & Marcus 1969). While provisionally placed in the Hydatinidae, a new family for this genus will almost certainly be required (Gosliner, pers. comm. 1994). Radulae have been recovered, but were lost before they could be mounted. Superficial observations before loss indicated a radular formula of 1-1-1, but this requires verification.

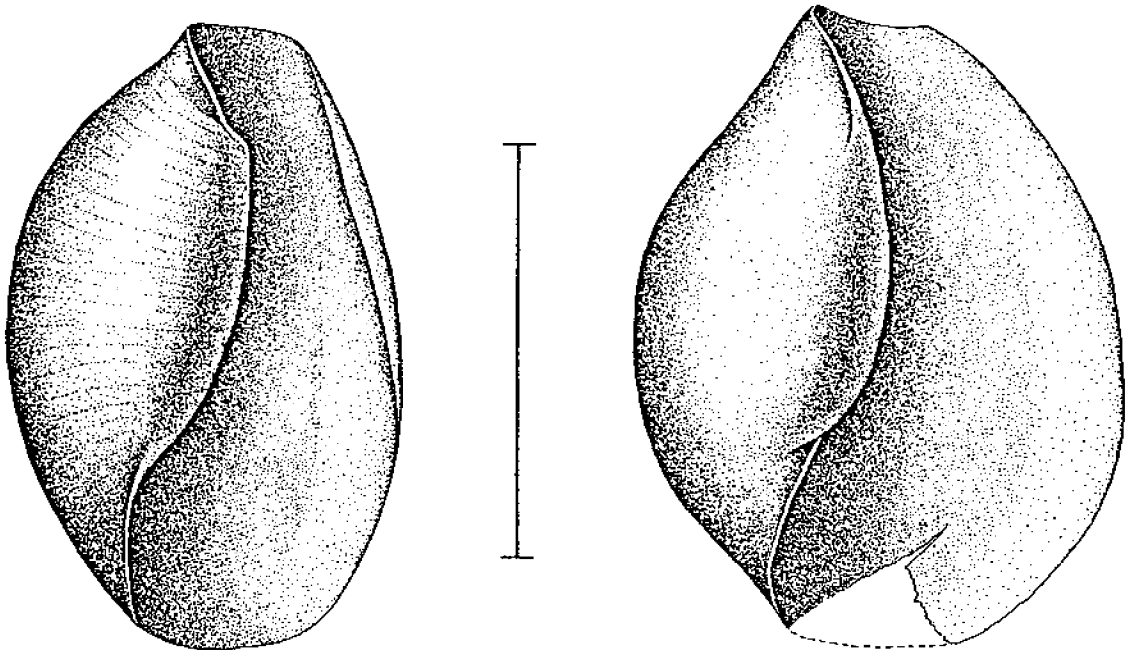


Figure 1. Apertural views of "normal" (showing the rare punctate lines) and "obese" individuals of *Parvaplustrum sp A* (scale bar = 1mm)

COMMENTS: Of the local species of *Cyclaspis* this is most similar to *C. nubila*, resembling it in size, general body shape, and surface texture. Both *Cyclaspis sp B* and *Cyclaspis sp C* are smaller at maturity (about ½ the size). The dentition of the dorsal carapace carina which characterizes this species is unfortunately not invariate. Carinal teeth may be difficult to see on decalcified or recently moulted specimens. During the terminal ♂ moult all dorsal teeth may be lost, and the carina tends to have fewer teeth in larger ♂s. The number of dorsal carinal teeth also varies in ♀s, but even the largest ♀s always have at least one tooth. The species is most common between 11-20m, frequenting fine sand bottoms with or without gravel or shell debris.

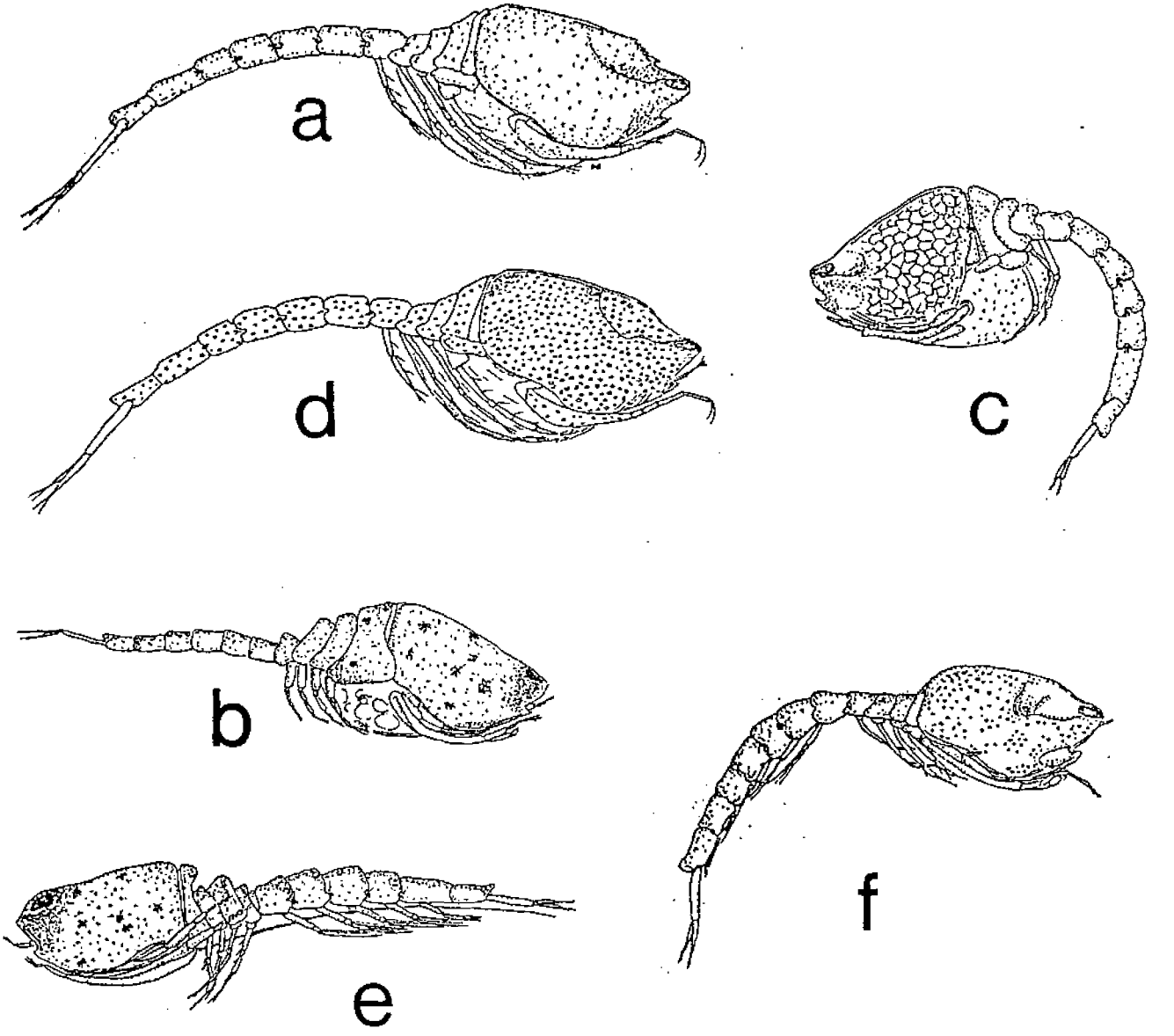


Figure 1 - Lateral views of *Cyclaspis* species from Southern California A) ♀ *C. sp A*, B) ♀ *C. sp B*, C) ♀ *C. sp C*, D) ♀ *C. nubila*, E) ♂ *C. sp B*, F) ♂ *C. sp C*

DEPTH RANGE: 20 - 30m

DISTRIBUTION: off Church Rock, Catalina Island to Palos Verdes Point, Palos Verdes Peninsula

COMMENTS: This was reported from Catalina Island as *A. dolichognatha* by Wicksten 1984. Her specimen lacked legs, and most other characters fell within the bounds of variation of the pantropical *A. dolichognatha* (Banner & Banner 1973). The lack of propodial spinules on the third pereopod of the Palos Verdes specimen separated it immediately from *A. dolichognatha* (Chace 1988). Comparison with *A. dolichognatha* specimens from Mexican waters (Allan Hancock Foundation Collections, identified by Mary Wicksten) showed both Catalina Channel specimens differed in details of the stylocerite, 3rd maxilliped, and telsonic armature from southern specimens. The Catalina and Palos Verdes specimens proved conspecific despite lack of legs on one. The only other species in the genus reported from waters of Baja California which might range into our area during ENSO events (*A. rugosa*) differs considerably in ornamentation of the chelae. The Palos Verdes specimen was translucent cantalope orange throughout the body when alive. Aside from the scarlet/apricot egg mass, the only other color was in two bright scarlet eyespots on top of the carapace. These spots were in roughly the position where eyes would lie in the genus *Alpheus*.

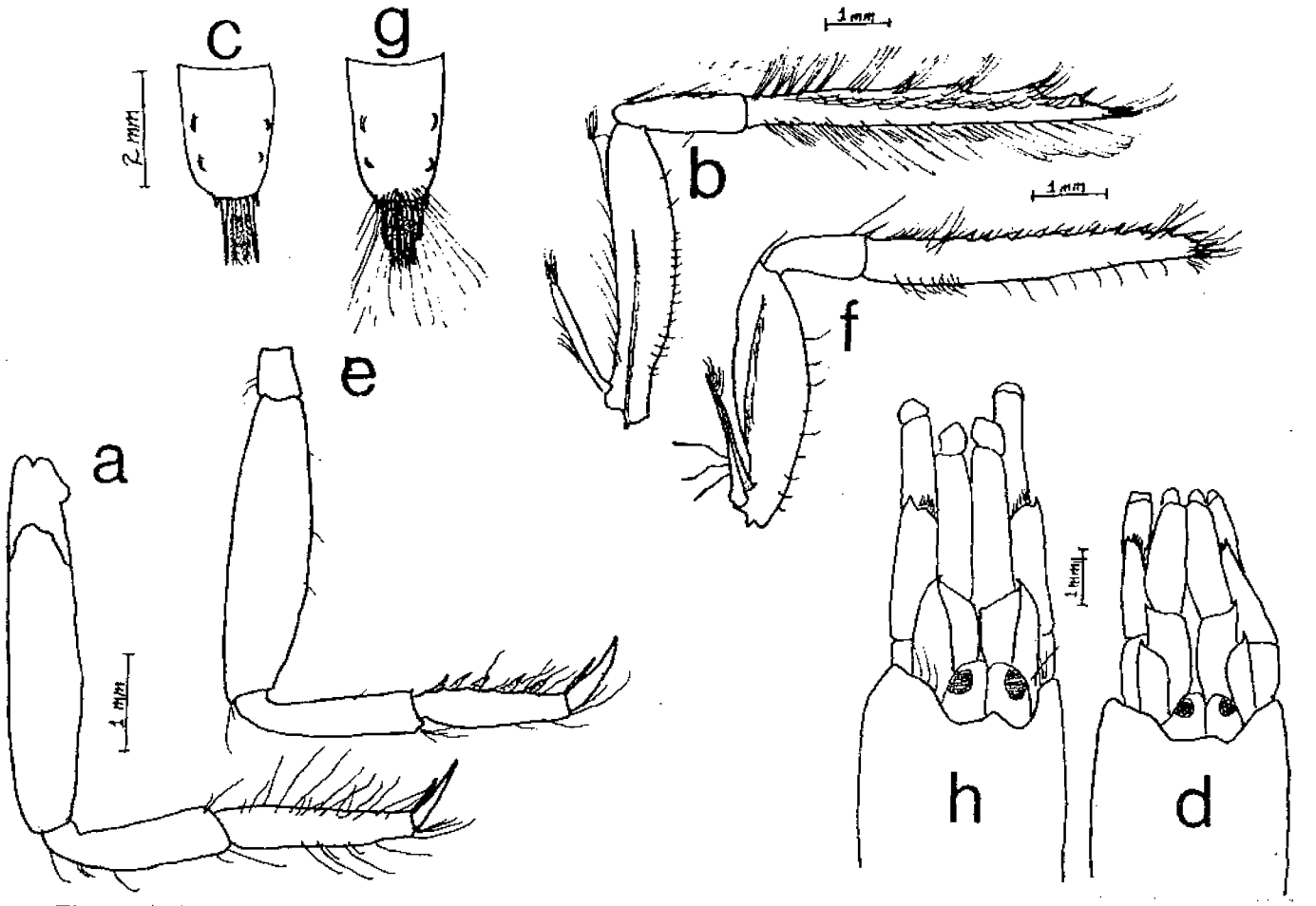


Figure 1)*Automate sp A* a. 3rd leg, b. 3rd maxilliped, c. telson, d. anterior carapace; *Automate dolichognatha* e. 3rd leg, f. 3rd maxilliped, g. telson, h. anterior carapace (a-d 7.3mm CL ♀♀ from Palos Verdes; e, g-h 7.2mm CL ♀♀ from El Bajo Seamount, Gulf of California, Mexico; f 5.2mm CL ♀♀ from Clarion Island, Mexico)

SCAMIT CODE: MBC 17

Date Examined: January 1993
Voucher By: Don Cadien

SYNONYMY: (?) *Procampylaspis sp* Zimmer 1936
Procampylaspis sp A Given 1970
Procampylaspis sp A SCAMIT 1983

LITERATURE: **Given, R. R. 1970.** The Cumacea (Crustacea, Peracarida) of California: systematics, ecology and distribution. Ph.D. Dissertation, Biology, University of Southern California 185pp.
Zimmer, C. 1936. California Crustacea of the order Cumacea. Proceedings of the United States National Museum 83(2992):423-439

DIAGNOSTIC CHARACTERS:

1. entire surface covered by dense adherant brown sandy crust (removable only with difficulty)
2. ventrolateral portion of carapace bearing shallow sulcus on the anterior 2/3
3. ventral pereonite margins bearing flanges ending in fingerlike projections (less evident in ♀)
4. ♂ with row of tubelike spines running parallel to the lower edge of the lateral sulcus; pairs of similar spines dorsally on pereonites 2-5; these spines lacking in ♀ which bears a series of low tubercles above and below the lateral sulcus

RELATED SPECIES AND CHARACTER DIFFERENCES:

Presence of large teeth forming a rake on the dactyl of the second maxilliped serves to separate *Procampylaspis* from *Campylaspis*. Only a single *Procampylaspis* is known from the north east Pacific, so examination for the second maxilliped rake can reliably separate this species from the many co-occurring *Campylaspis* species. This is also the only cumacean known from California which bears an adherant brown sandy crust. Although this crust is occasionally lacking, it's presence will serve to identify well over 95% of *Procampylaspis sp A* specimens.

DEPTH RANGE: 13 - 611m

DISTRIBUTION: Point Loma to at least Point Conception

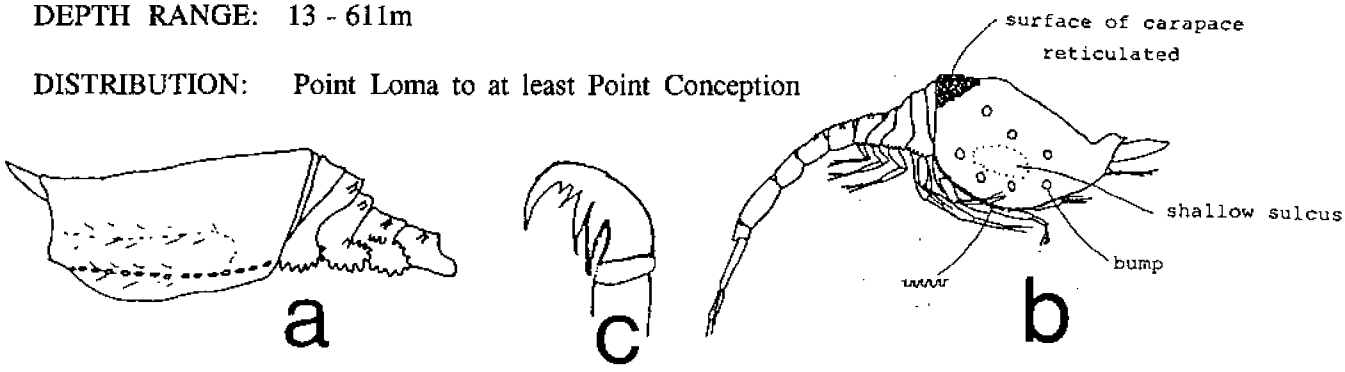


Figure 1. Lateral views of A) ♂, and B) ♀ *Procampylaspis sp A*, C) mxpd 2 dactylar rake
[Figure 1A by C. L. Paquette, Figure 1B by C. A. Phillips, Figure 1C by D. Diener]

SCAMIT CODE: None

Date Examined: January 1993
Voucher By: Don Cadien

SYNONYMY: *Tellina sp A* Ljubenkov 1992
Tellina sp A SCAMIT 1993

LITERATURE: **Carpenter, P. P. 1864**. Supplementary report on the present state of our knowledge with regard to the Mollusca of the West Coast of North America. Report to the British Association for the Advancement of Science for 1863; 517-686
Coan, E. V. 1971. The northwest American Tellinidae. The Veliger 14(Supplement):1-63
Dall, W. H. 1900. Synopsis of the family Tellinidae and of the North American species. Proceedings of the United States National Museum 23(1210):285-326
Palmer, K. v.W. 1958. Type specimens of marine Mollusca described by P. P. Carpenter from the west coast (San Diego to British Columbia). Geological Society of America, Memoir 76:1-376

DIAGNOSTIC CHARACTERS:

1. pronounced sculpture consisting of fine raised concentric ridges, regular and close in juveniles, becoming more widely spaced and fading with growth; nearly or completely lacking in adult (while retained near umbos)

2. shell color variegated pink and yellow in conspicuous and consistant pattern of mid-valve pink wedge surrounded by inverted yellow v

3. internal strengthening rib present, but poorly defined

RELATED SPECIES AND CHARACTER DIFFERENCES:

1. Differs from *Tellina carpenteri* in having fine raised concentric sculpture on the early part of the shell, and in having a central pink wedge/inverted yellow V color pattern instead of a uniform translucent rose color with two thin anterior white rays

2. Differs from *Tellina modesta* in having fine raised concentric sculpture on the early part of the shell which fades with growth, rather than wide flat concentric ridges which become stronger with growth; in being strongly colored rather than transparent to translucent white, in having a much weaker strengthening rib internally; and in having a greater ratio of height to length

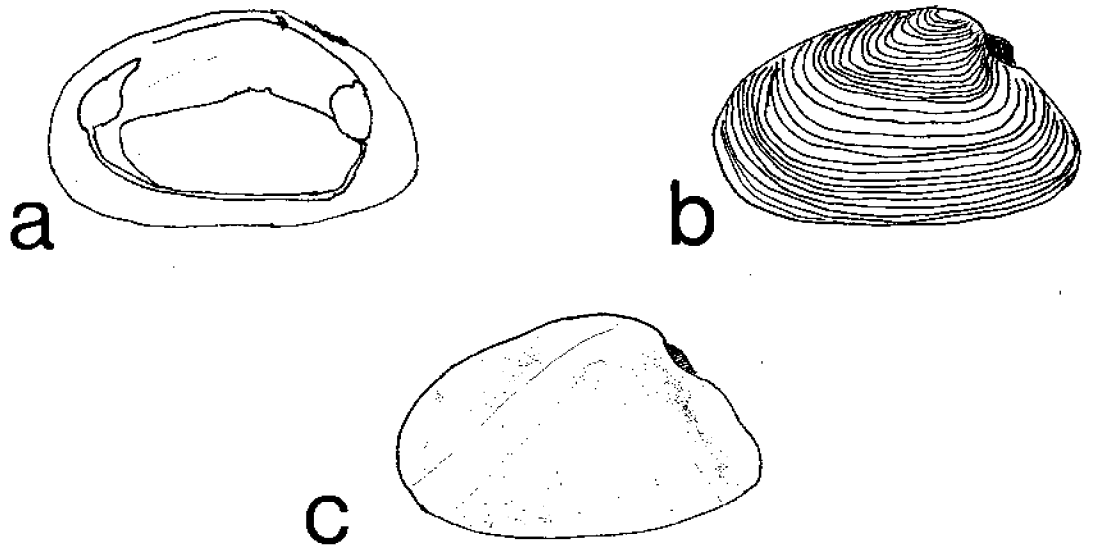
DEPTH RANGE: 60 - 305m (probably also deeper [Coan's 441m for *T. carpenteri*])

DISTRIBUTION: at least Point Loma to Santa Monica Bay, maybe Alaska to Panama since previous records of *T. carpenteri* and *T. sp A* are intermixed

COMMENTS: The history of use of the name *Tellina carpenteri* is clouded. It was originally proposed by Dall (1900) as a replacement name for the preoccupied *Tellina variegata* of Carpenter (1864). It is unclear if reference is being made to the variegated form upon which Carpenter based his 1864 description, or to the solid rose pink form to which it is usually applied in our area. The two often occur together, and it is possible that Carpenter's syntype lot is a mixture of the two forms. Coan (1971) mentions two forms he regards as *T. carpenteri*, one of which I believe to be *T. sp A*. His "large, flat, light-colored offshore one" seems to correspond to the present species, and his "smaller, more inflated, more brightly colored one in bays" is what we call *T. carpenteri*.

Based on bathymetric data collected off Palos Verdes in February 1992 the center of the *T. sp A* population lies deeper than that of *T. carpenteri*. The species occurred at 82% of the stations at 305m, with 72% of the population at this depth. At 150m the species was taken at 55% of the sampled sites, but only 18% of the population occurred at this depth. Declines continued inshore with occurrence at 27% of the 61m sites, where 9% of the population was located. The species was absent at 30m. *Tellina carpenteri* occurred at 64% of the 305m stations, all 150m and 61m stations, and 27% of the 30m stations. Only 5% of the population was located at 305m, with 60% at 150m, 32% at 61m, and 3% at 30m.

Examination of the *Tellina variegata* syntypes may require a reversal of the current usage, with what we currently call *T. sp A* being the true *T. carpenteri*, and the rose pink "carpenteri" requiring a new name. For the moment we will continue with the names as fixed by Ljubenkov in the SCAMIT Newsletter in July 1992.



Tellina sp A a) interior of right valve; b) exterior of left valve;
c) color pattern: inverted V pale yellow, other areas orangish pink