

**S**OUTHERN  
**C**ALIFORNIA  
**A**SSOCIATION OF  
**M**ARINE  
**I**NVERTEBRATE  
**T**AXONOMISTS



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*Eulalia quadrioculata* (both specimens from Puget Sound, Washington)

*Eulalia* sp 12 Harris (rocky intertidal, So. Cal.)

*Eulalia californienis* (kelp holdfast, So. Cal.)

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### 8 MAY 2006. SCALEWORMS WITH DR. KRISTIAN FAUCHALD

Our guest lecturer for the May SCAMIT meeting was Dr. Kristian Fauchald from the Smithsonian. Years ago Marian Pettibone erected about 21 genera and subgenera of polynoidae. Kristian has recently reviewed the polynoid group and decided there are far fewer taxa. He found descriptions lacking and material in poor condition. He would like to review the type species of everything in the family. He commented that *Lepidonotus* and *Lepidasthenia* were valid, but *Harmothoe* and *Malmgreniella* need to be revised. *Malmgrenia* may be re-erected. Macellicephalids, which occur in deep water, are sometimes benthic and sometimes pelagic. Deep water polynoids erected by Pettibone which have very few segments and small heads will probably all fall into one genus.

Kristian discussed several characters and their taxonomic significance. They are listed below.

Lateral antennae placement is difficult to determine, but the cirratophores are easier to see and are fused underneath the lateral antennae. Kristian doesn't think we need to worry about the distal or subdistal position of antennae.

The facial tubercle is defined poorly or erroneously by most authors. When present, it develops between the palps and below the median antenna in the triangular space and is often very small. Fold back the eversible pharynx to see it easier. Kristian thinks this structure will be an important generic separator in polynoids. He would like to use this only as a phylogenetic character not a diagnostic one.

Jaws are also not used much except when working with deep water polynoids.

Notopodia are simple and sit side by side with the dorsal cirri. The ventral cirri are underneath. There are 2 kinds of notosetae: short, curved and long, erect. They are in short oblique rows behind acicula. A strong character to use is the difference in thickness between the notosetae and the neurosetae.

The pygidium can be terminal or pulled forward between the last two parapodia so that the last segments become V-shaped. This is linked to the placement of the last pair of elytra. The last pair may be muscularized to form a funnel-like structure. Elytra often have pockets to brood embryos. The first 12 pairs of elytra are similar and generally on the same segments on both sides of the body, but the last pair are often on different segments depending on the type of scaleworm. The first pair of elytra are often rounded in shape and some times calcified. If the rest of the

#### Upcoming Meetings

February 12 - Oedicerotids with Dean & Ron at CSD

\*March 12 - SCAMIT Invert List ed. 5 review, Polychaetes at LACSD

March 26 - SCAMIT Invert List ed. 5 review, Mollusks and Echinoderms at CSD

\*April 9 - SCAMIT Invert List ed. 5 review, Crustacea at LACSD

April 23 - SCAMIT Invert List ed. 5 review, Misc. Phyla at CSD

May 14 - TBA

June 11 - Cirratulids with Rick & Tony at TBA

\*There are two meetings planned for both March and April.



scales have spines then the 1<sup>st</sup> pair will just have bumps/papillae. When examining scaleworms you need to know which pair of elytra is being described by the author. Approximately half of the scaleworms described have elytra on 2, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 26, 29, and 32. However, those with many segments (32-50) have elytra that get complicated, often switching from odd segments to even. So don't use the elytra patterns on the posterior ends of these longer bodied scaleworms when making identifications.

Pettibone's style was not to update the material she used when she actually published her descriptions. She kept notebooks and files, and some of her notes were over 20 years old by the time she published them. Not all of the features were described for each species. Some of her illustrations didn't match nature. She often drew in what she expected to see rather than what was actually there. In some instances there were multiple species characters in one illustration. Setae are continuously being replaced. Polynoids actually use their parapods to "walk" so their setae get broken off and replaced quickly. Setae can't actually grow but they can be replaced much like shark's teeth.

*Halosydna johnsoni* and *Halosydna brevisetosa*-

There has been debate over these two species for many years. In the anterior end of these species there are bidentate setae. In some specimens, the bidentate setae are replaced by falcate setae. Some exceptions are smaller, tan, or brown specimens which have bidentate setae throughout the body. We need to look for sexually mature individuals and must use molecular genetics to solve this. Kristian suggested the following protocol: examine parapodium 25; if it has bidentate setae it is *Halosydna johnsoni*, and if it has falcate setae it is *Halosydna brevisetosa*. Ornamentation of elytra may be quite variable in species so this doesn't help in distinguishing them. Micropapillae help to stiffen the elytra and act like Velcro, especially as the worm takes in water posteriorly for circulating. Polygonal reticulation on elytra also helps to stiffen them. Make sure you are looking at the 3 dimensional structures, not just the polygonal reticulation in pigment, as that may describe a different species. Kristian will contact us if he needs to examine any of our local scaleworms.

We spent the afternoon examining specimens that members had brought to the meeting and some that were available from the collections at LACMNH.

The first specimen we examined was *Harmothoe tenebricosa* which is a deep-water species described in Hartman's Atlas.

We then looked at a specimen of *Malmgreniella sanpedroensis* from Orange County (OCSD) that was found in the tube of the terebellid, *Polycirrus* sp. A. Several SCAMIT members have been noticing many of these scaleworms in *Polycirrus* tubes.

Leslie Harris dazzled us all with some of her digital photos of a tropical scaleworm, *Herminia verruculosa*. The first pair of elytra was unremarkable, but the rest of the elytra along the body resembled small buttons.

Kristian commented that generally scaleworms with complicated, ornamented elytra are free living, and those with elytra that are fairly smooth and have no frills likely live in deep water or are commensal.

We then examined a specimen of *Tenonia priops* from the City of LA provided by Tony Phillips. It had a distinct pigment pattern of spots along the body. The prostomium had squared off peaks.



The anterior pair of eyes sat in a ventral position. The elytra had tiny micropapillae. The median antenna pointed up instead of laterally.

Tony also shared a specimen of *Halosydna* from Ballona Creek at a depth of less than 2 meters. It was found amongst some *Ulva*. It was very tuberculated and had 18 pairs of elytra. He thought it might be *Harmothoe tuberculata* Chamberlin. The tips of the lateral antennae tapered sharply.

Kristian made a good suggestion for the digital photography of specimens; the translucent elastic material that physiologists use for holding down specimens using pins, works very well to position polychaetes for photographing.

Leslie then shared with the group a new species of *Harmothoe* with very inflated and hairy dorsal cirri found in LA Harbor and San Diego Bay. The elytra had different colored spines, some reddish and some brown-black. The edge of the elytra had multi-pronged spines on them.

Leslie also shared digital photographs of a commensal *Arctonoe* from Santa Barbara. This species was found on a *Parastichopus* and had dark circular pigment spots on the elytra. Another commensal, *Arctonoe vitata*, was found inside the mantle of the limpet *Diodora aspera*.

Leslie also had images of *Halosydna brevisetosa* from Santa Barbara. One was orange and had very small macrotubercles on the elytra, and the other had brown pigment with large macrotubercles.

We examined a *Lagisca extennata* with fine papillae all over the lateral antennae and cirri. Other papillae present were sausage-shaped. Kristian mentioned that this genus will most likely stay the same after his review.

LA County Sanitation brought a specimen of *Lepidonotus squamata* to the meeting from old trawl material. The specimen had its jaws extended, which for polynoids are dorso-ventral instead of sideways like other polychaetes. LACSD also had a *Halosydna latior* with very smooth elytra from a 60 meter trawl station.

The San Diego lab contrasted their specimen of *Lepidonotus squamata* which had a very red ventrum.

Kristian made the comment that eyes in scaleworms are sometimes regenerated or out of position. Also, in poorly preserved material the eyes will hardly be visible.

#### JUNE 12 2006 PHYLLODOCIDS

The meeting was hosted by Leslie Harris in the polychaete collection room at LACMNH. President Kelvin Barwick opened the meeting with a few brief announcements. The Vice-President, Leslie Harris, then announced the upcoming meeting schedule for the rest of the year. With business over, the meeting turned to the topic group of the day, Phyllodocidae, led by Leslie Harris.

Leslie opened the discussion on Phyllodocidae by reviewing some of the taxonomic characters used in their identification. Rick Rowe (CSD) provided a color-coded handout list of Phyllodocidae taxa reported by the City of San Diego with comments on aids to identification. Considerable time was spent discussing Rick's table, which included information on four provisional species. In particular the genus *Eulalia* generated much discussion. By the time we finished with a few of the local species the afternoon was pretty much over, leaving other genera



for a future meeting. For images of some of the species discussed see plates on following pages.

(Additional information on types & other NEP species of *Eulalia*, from Leslie)

**- *Eulalia quadrioculata* Moore 1906 and *E. aviculiseta* Hartman 1936.**

Banse 1972 synonymized *E. quadrioculata* and *E. aviculiseta*, and Blake (MMS) 1994 followed that synonymy. Leslie previously retained both species because she observed years ago that the type of *E. quadrioculata* (USNM 5516) has what appears to be achaetous parapodial lobes on the second tentacular segment. This structure does not occur in the *E. aviculiseta* types (USNM 20341 & LACM-AHF 0113). Also, the original descriptions indicated that the two species have different pigmentation, something which experience has shown to be a reliable species-level character in other phyllodocids. Moore's 1906 original description reports the preserved type was overall dull olive brown throughout the body, dorsal cirri were brown with a diffuse black spot near the tip, there was a spot of black pigment by each eye, and a minute spot beneath each ventral ganglion. The cotype (ANSP 1982) had a faint dorsal transverse band on each segment. Hartman in 1936 described *E. aviculiseta* with dark to black pigment across the dorsal intersegmental grooves.

At the SCAMIT meeting Leslie showed images of the cotype of *E. quadrioculata* which has faded but definitely has pigment bands across the dorsum midsegmentally and also intersegmentally which are equally dark. Unfortunately, the ventral cirri of those cotype images do not match those of the holotype so the cotype is likely to be another species. The holotype's ventral cirri are asymmetrically conical with a laterally pointed apex; those of the cotype are evenly rounded without an apex. Moore's 1906 figures were of the type and included the parapodium. At the meeting we examined a syntype\* of *E. aviculiseta*. The ventral cirri have a rounded margin but with a clear apex directed laterally (triangular), and they match the drawings from the original description by Hartman.

Leslie has noticed in live specimens she attributed to *E. quadrioculata* (complete with lateral pigment spots by the eyes) the intersegmental bands are in the middle third of the dorsum at first and completely span the segment after about setiger 12-15. The intersegmental bands in live specimens with the *E. aviculiseta* pattern completely spanned each segment starting in the tentacular region. Many *Eulalia* specimens from California (Mendocino to Point Loma) collected for the CDFG Introduced Species Survey (ISS) were identified by Leslie and Rick Rowe. These preserved specimens appeared otherwise identical but the pigmentation varied from dorsal transverse midsegmental bands to intersegmental bands to bands in both positions. They possessed lanceolate dorsal cirri (midbody), tentacular cirri, and ventral cirri (triangular) as described for *E. quadrioculata* (and *E. aviculiseta*). After much consideration, all ISS specimens were recorded as *E. quadrioculata*.

**- *Eulalia levicornuta* Moore 1909**

Leslie feels that this species has always been well defined. A small, narrow species, it has rounded dorsal cirri and relatively large symmetrical ventral cirri. It is usually tan with small scattered darker brown spots on the dorsum and cirri; all or just outer margins of the cirri are dark brown. Recently Blake (MMS volume 4, 1994) provided a very nice illustration. Unfortunately, like

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\* The accompanying image is incorrectly labeled as holotype. Hartman (1936) stated that the holotype was in the USNM. The lot she deposited has 2 specimens which are listed as "type" in the USNM catalogue as is LACM-AHF 113 in her personal catalogue. In the absence of evidence showing which specimen she intended to be the holotype the LACM worm section considers all of these to be syntypes.





*E. quadrioculata*, the holotype (USNM 17288) and one of the cotypes seem to be different species. Leslie examined the type back in 1987 and more recently reviewed the cotypes. That cotype (ANSP 2869) possesses short, triangular dorsal cirri with rounded tips and small, narrowly triangular ventral cirri. A second cotype (ANSP 2870) does match the type.

Other species seem to have been confused with *E. levicornuta*. Several problematic taxa have been noted by LACSD and CSD in recent years. Tom Parker erected the provisional taxa, *Eulalia* sp LA1, during Bight '98 for animals that did not have any dorsal pigment spots. Additional specimens since then have shown additional variability in dorsal pigment patterning and expression. Larry Lovell, now at LACSD, reviewed a large number of *Eulalia* sp LA1 for the meeting and could not establish a clear pattern for dorsal pigmentation. Three specimens of *Eulalia* sp LA1 from different stations were pulled, photographed, and projected for the group to see. The first specimen (LACSD 0701-10B) possessed a middorsal pigment spot anterior to the intersegmental groove, a smaller lighter pigment spot is on the dorsal midsegmental area, the dorsal cirri have central darker pigment, and there is a ventral spot of pigment at the base of the ventral cirri. Dorsal cirri and ventral cirri are similar to *E. levicornuta sensu stricto* in mid-body regions but elongate posteriorly. Ventral cirri of the holotype elongate in the median region then decrease in the posterior. Leslie commented that it was neither *E. levicornuta* nor one of her provisionals and should be described as a SCAMIT provisional. The second and third specimens (LACSD 9401-1A and 0794-7B) possessed light lateral triangles of pigment on the dorsum of each segment and a darker spot of pigment middorsally just anterior to the intersegmental grooves and the dorsal cirri had spots; there were no ventral spots at parapodial bases. Leslie commented that these specimens matched her *Eulalia* sp NAMIT 4 from the Puget Sound area. Leslie and Larry will be re-examining these specimens in the future.

Next Rick Rowe, CSD, pulled specimens of two CSD *Eulalia* provisionals. *Eulalia* sp SD1 (SBOO-I23 rep 1, 14JUL05, 20 m) possessed a weak mid-dorsal spot in a few anterior segments and was diffusely pigmented otherwise. Leslie commented that she would call it *E. cf. levicornuta*. *Eulalia* sp SD3 (regional station 2038 rep 1, 06JUL05, 53 m) was a small greenish specimen with eyes and a heavily mottled dorsum. Leslie commented that this was different and should stand as a separate provisional.

With images of *Eulalia* dancing in our heads, the group broke for lunch.

When we returned from lunch the group was in for more fun. Further illustrating the problems with *Eulalia*, Leslie discussed several provisional species that she has encountered in the Pacific Northwest. She has 15 provisional taxa that she has been tracking for several years. Her *Eulalia* sp 11 and *E. sp* 12 are just two of the species that have been mis-identified as *E. bilineata* along this coast. In her review of North American "*E. bilineata*" specimens from British Columbia to Mexico she found six species, only one of which was described. None were *E. bilineata*. The sole described species was *Eulalia californiensis* (Hartman 1936) which has three dark lines running down the body. The median line is variable in intensity and may disappear completely when the animal is preserved leading to confusion with *E. bilineata*, which as the name suggests, has two dark midlateral lines running down the body. Leslie then wowed us with live color images of these & other phyllodocids from various parts of the world for the rest of the afternoon.



Please visit the SCAMIT Website at: [www.scamit.org](http://www.scamit.org)

**SCAMIT OFFICERS**

If you need any other information concerning SCAMIT please feel free to contact any of the officers at their e-mail addresses:

President	Kelvin Barwick (619)758-2337	<a href="mailto:kbarwick@san Diego.gov">kbarwick@san Diego.gov</a>
Vice-President	Leslie Harris (213)763-3234	<a href="mailto:lharris@nhm.org">lharris@nhm.org</a>
Secretary	Megan Lilly (619)758-2336	<a href="mailto:mlilly@san Diego.gov">mlilly@san Diego.gov</a>
Treasurer	Cheryl Brantley (310)830-2400x5605	<a href="mailto:cbrantley@lacs d.org">cbrantley@lacs d.org</a>

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SCAMIT  
 C/O The Natural History Museum, Invertebrate Zoology  
 attn: Leslie Harris  
 900 Exposition Boulevard  
 Los Angeles, California, 90007



Eulalia quadrioculata

cotype ANSP 1982



anterior-  
median parapodia

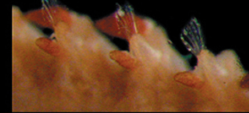
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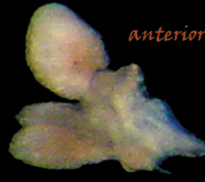
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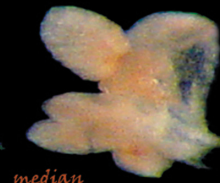
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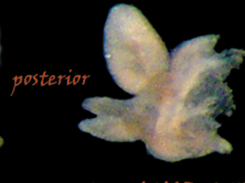
median



anterior



median

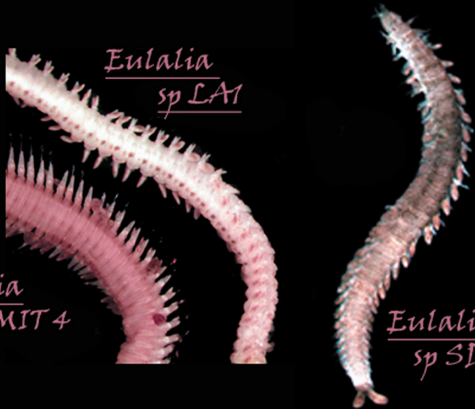


posterior

© Leslie Harris

cotype ANSP 2870

Eulalia levicornuta



Eulalia sp LA1

Eulalia sp NAMIT 4

Eulalia sp SD3



Eulalia sp NAMIT 4 Harris

Eulalia levicornuta

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Eulalia aviculiseta  
Holotype LACM

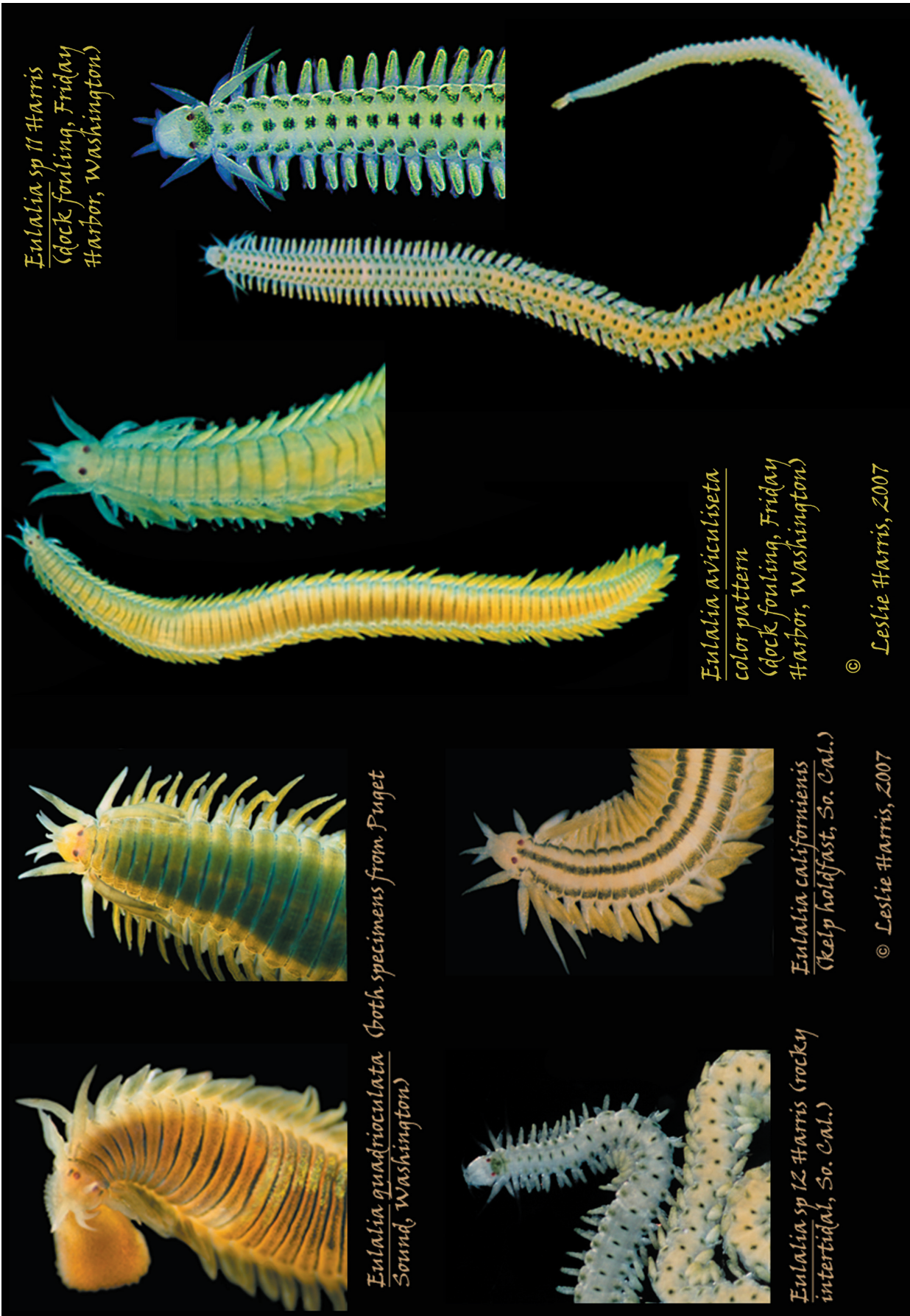


Eulalia aviculiseta  
holotype

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*Eulalia* sp 11 Harris  
(dock fouling, Friday Harbor, Washington)

*Eulalia* *aviculariseta*  
color pattern  
(dock fouling, Friday Harbor, Washington)

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*Eulalia* *quadriloculata*  
Sound, Washington) (both specimens from Puget

*Eulalia* *californiensis*  
(kelp holdfast, So. Cal.)

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*Eulalia* sp 12 Harris (rocky intertidal, So. Cal.)