

## A EUNICID POLYCHAETE FROM A WHITE SMOKER

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*Abstract.*—*Eunice pulvinopalpata*, a new species of eunicid polychaete is described from the geothermal rift-area at 21°N off western Mexico. A brief review of eunicids described from slope and abyssal depths is given.

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During ALVIN Dive 1214 to the East Pacific Rise geothermal vent area at 21°N in the Pacific Ocean off western Mexico four specimens of a large eunicid polychaete were collected at the base of a white smoker. The material was sent to me for identification and it proves to belong to a previously undescribed species. This paper is OASIS Expedition Contribution #3.

*Eunice pulvinopalpata*, new species

Fig. 1

*Material examined.*—Pacific Ocean off western Mexico, 20°50'N, 109°06'W, 2633 m, ALVIN dive 1214, sample #7, 20 April 1982, at base of white smoker (Holotype, USNM 74304, 1 paratype USNM 74305, 1 paratype, British Museum (Natural History), 1 paratype, Allan Hancock Foundation, Los Angeles, Poly 1377).

*Description.*—The holotype is an incomplete specimen with 348 setigers that is 450 mm long and 12 mm wide including parapodia. A complete paratype (USNM 74305) has 353 setigers, but is shorter at 320 mm; the posterior end is regenerating. All specimens are white as preserved in alcohol; eyes are absent. The body is cylindrical; it is abruptly tapering anteriorly and slowly tapering posteriorly. The dorsal side is arched; the ventral surface is flattened. The parapodia are attached at the junction between the two surfaces. The pygidium of the complete paratype (USNM 74305) is a flattened pad attached obliquely over the posterior end with the anus opening on the sloping dorsal side. One pair of short dorsolateral and one pair of long ventrolateral anal cirri are present.

The prostomium (Fig. 1a-b) is a short transverse lobe with a pair of very large, somewhat flattened pillow-shaped palps attached along the anterior edge. The cleft between the 2 palps is shallow. The 5 occipital antennae taper from the base. The inner lateral and median antennae are similar in length and reach the middle of the setiger 2. The outer lateral antennae are about half as long as the other antennae. All antennae are irregularly articulated; the median and inner lateral antennae have up to 19 articles of which the basal articles make up about  $\frac{1}{3}$  of the total length of the antennae. The outer lateral antennae have 11 or 12 articles.

The peristomium (Fig. 1a) is clearly divided into 2 rings ventrally and dorsally; laterally the separation between the 2 rings is indistinct. The total length of the peristomium is about the same as the length of the 3 first setigers combined; the first ring makes up about  $\frac{3}{4}$  of the total length of the peristomium. A pair of peristomial cirri is attached dorsolaterally on the second ring. They reach nearly to the tip of the palps. Each cirrus is slender and tapering and has about 12 irregular articles.

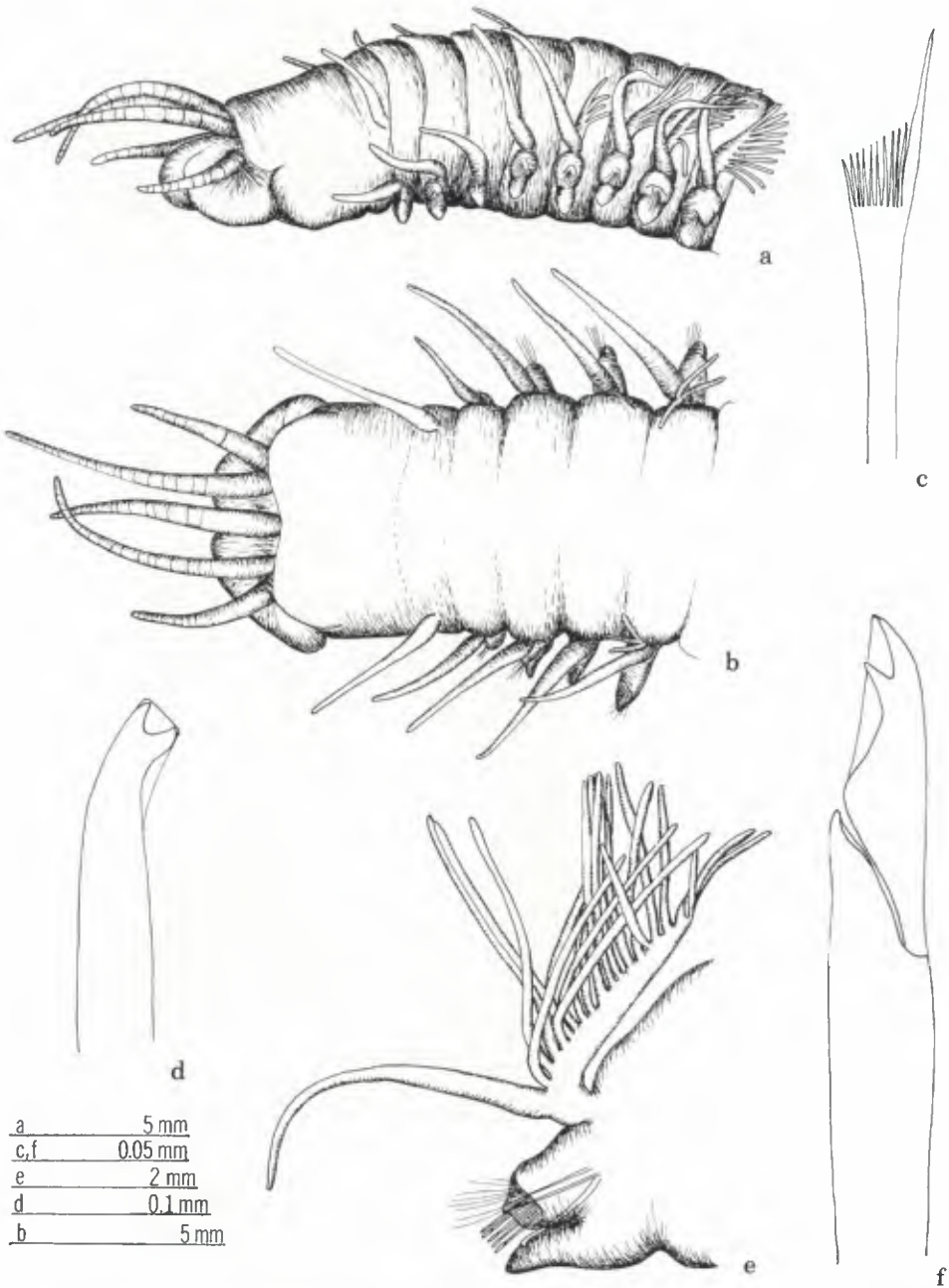


Fig. 1. *Eunice pulvinopalpata*, holotype. a, Anterior end, lateral view; b, Anterior end, dorsal view; c, Pectinate seta, parapodium 100; d, Subacicular hook, parapodium 100; e, Parapodium 100, anterior view; f, Compound hook, parapodium 100.

Branchiae (Fig. 1e) are present from setiger 3 or 4 to near the end of the specimens. The first branchia is a short, slender filament; all other branchiae are pectinate. The second branchia has 3 filaments; the number of filaments increases rapidly over the next several segments so that by setiger 20 about 23 branchial

filaments are present. The maximum number of filaments is 25 and this number is maintained in most setigers back to about setiger 275, after which the number of filaments is reduced to about 15. The filaments are arranged on one side of a distinct, rather thick branchial axis, but the branchiae are flaccid and are usually folded down over the dorsum. Where the branchiae are best developed the pairs meet at the dorsal midline.

All parapodia are similar. The acicular lobe (Fig. 1e) is distally rounded with the acicula, usually 3 in number, emerging on the dorsal side. Pre- and postacicular lobes are transverse folds covering the bases of the setae. The ventral cirri are thick, and somewhat inflated basally, especially in median setigers, in both anterior and posterior setigers they are digitiform. Dorsal cirri are very long, especially in the anterior  $\frac{1}{2}$  of the body, where they are considerably longer than the branchiae and reach across the body. Each cirrus is smooth, slender, and tapers from its base.

Setae include compound hooded hooks, slender limbate setae, pectinate setae, subacicular hooks, and acicula. The acicula are dark brown or black and taper to bluntly pointed tips. Limbate setae are present in thick, supra-acicular fascicles in all setigers; each seta is slender and has a very narrow limbation and a superficial resemblance to a true capillary seta. Pectinate setae are present in thick fascicles just superior to the limbate setae. Each pectinate seta (Fig. 1c) is distally asymmetrical with a very thick marginal spine on one side. The tips of the 10–11 distal teeth form an oblique line running from the marginal spine down toward the other side of the seta; the bases of the teeth are all at the same level, so those closest to the marginal spine are the longest. All pectinate setae are flat. Compound hooks are present in thick fascicles inferior to the acicula. Each hook (Fig. 1f) has a short, bidentate appendage in which both teeth are of roughly the same size; the hoods are short and blunt. The shaft is only slightly expanded near the tip and is smooth. Subacicular hooks are first present from setiger 68 in the holotype (from 62–72 in the paratypes). Each hook (Fig. 1d), which emerges on the anteroventral side of the parapodium, in front of the ventral cirrus, is basally dark brown or black, tapering to a translucent, nearly clear tip. The 2 teeth both point distally and the proximal tooth is thicker than the distal one. The hood is short and truncate.

The maxillary apparatus (dissected in a paratype, USNM 74305) is extremely well sclerotized and completely black, except for very narrow clear margins along the cutting edges. All teeth are very small and even. The maxillary formula is 1+1, 17+17, 18+0, 12+12 and 1+1. Each maxilla V is a sharply pointed fang.

*Eunice pulvinopalpata* belongs to group B2 as groups within the genus *Eunice* were defined by Fauchald (1970:203,205). Other species in this group with well developed branchiae include *E. aphroditois* (Pallas, 1788:229; see also Fauchald 1970:24), *E. aphroditois djiboutensis* Gravier (1900:224–229), *E. argentinensis* (Treadwell, 1929:3), *E. coccinea* Grube (1878:153–155), *E. contingens* (Chamberlin, 1919:260–263), *E. flavofasciata* Grube (1878:155–156), *E. flavopicta* Izuka (1912:121–123), *E. franklini* Monro (1924:56–58), *E. guttata* Baird (1869:350), *E. investigatoris* Fauvel (1932:137–138), *E. macrobranchia* Schmarda (1861:130; see also Augener 1918:310–312), *E. multipectinata* Moore (1911:248–251), *E. nesioties* (Chamberlin, 1919:253–256), *E. reducta* Fauchald (1970:39–43), *E. torquata* Quatrefages (1865:312; see also Grube 1870:293, and Fauvel 1923:401–402), *E. scombrinis* Quatrefages (1865:319–320; see also Grube 1870:296–297) and *E. sebastiani*

Table 1.—Species of *Eunice* with black, bidentate subacicular hooks and pectinate branchiae with 10 or more branchial filaments where the branchiae are best developed. The columns are 1: Branchiae first present from setiger #: 2: Branchiae last present ( $\frac{1}{2}$  = branchiae missing in second half of body, E = branchiae present to end of complete specimen); 3: Maximal number of branchial filaments; 4: Subacicular hooks first present from setiger #: 5: Remarks.

Species	1	2	3	4	5
<i>argentinensis</i>	3	?	10	19	
<i>torquata</i>	3	E	6-8	?	<i>sensu</i> Fauvel (1923)
<i>torquata</i>	3	E	14	?	<i>sensu</i> Grube (1870)
<i>pulvinopalpata</i>	3-4	E	25	62-72	
<i>reducta</i>	4	$\frac{1}{2}$	20-21	34-49	
<i>aphroditois djiboutensis</i>	5	?	20+	71	hooks tridentate?
<i>aphroditois</i>	5-7	E	37	15-54	<i>sensu</i> Fauchald (1970)
<i>coccinea</i>	5	$\frac{1}{2}$	9-10	33	
<i>flavofasciata</i>	5	E	12-14	15	
<i>franklini</i>	6	?	27	30-40	
<i>guttata</i>	6	?	10	?	
<i>investigatoris</i>	6	E	18-20	44-45	
<i>flavopicta</i>	7	?	19	?	
<i>nesiotes</i>	7	?	14	34	type examined
<i>scombrinus</i>	7	E	17	?	<i>sensu</i> Grube (1870)
<i>contingens</i>	7	E	18-19	30	type examined
<i>multipectinata</i>	7	E	12	25	
<i>sebastiani</i>	7	?	30	7-8	
<i>macrobranchia</i>	7-8	E	15-17	?	<i>sensu</i> Augener (1918)

Nonato (1965:133-139). Other taxa in this group are listed by Fauchald (1970:205).

The taxa listed above are reviewed in Table 1 where the major morphological features used to separate species in this group are indicated. The taxa are arranged in order of the first occurrence of branchiae. Clearly *E. pulvinopalpata*, while separable from all other species in the group, is not remarkably different from them. Morphologically it most closely resembles *E. reducta*, from which it can be separated on the greater numbers of setigers with branchiae and by the considerably later start of the subacicular hooks. The types of both species are similar in size and numbers of setigers.

*Etymology*.—The specific name *pulvinopalpata*, derived from Latin, meaning pillow-palped, refers to the shape of the palps.

*Remarks*.—Most species of the genus *Eunice* have been described from shallow water. In addition to *E. pulvinopalpata*, 15 taxa have been described from slope and abyssal depths; and of these taxa, two appear to be referable to other, previously described taxa, but the following 14 appear valid: *E. arcturi* (Treadwell, 1928:475), *E. halfouriana* (McIntosh, 1885:301-303), *E. collini* Augener (1906:133-135), *E. hawaiiensis* Treadwell (1906:1166; see also Hartman 1966:216), *E. manihine* Longbottom (1972:339-344), *E. magellanica* McIntosh (1885:265-267), *E. megabranhia* Fauchald (1970:33-36), *E. pauroneurata* (Chamberlin, 1919:249-253), *E. prognatha* McIntosh (1885:268-270), *E. rosaurae* Monro (1939:351-352), *E. segregata* (Chamberlin, 1919:237-240), *E. semisegregata* Fauchald (1969:8-10) and *E. validobranhiata* Monro (1937:288-289). Major morphological features and basic distributional data for the types of these taxa based on information

Table 2.—Species of *Eunice* described from slope and abyssal depths. The columns are: 1. Branchiae first present from setiger #; 2. Branchiae last present to body-region indicated ( $\frac{1}{3}$  = first third of body,  $\frac{2}{3}$  = second third of body,  $\frac{3}{4}$  = three-quarter of the body and E = near end of body); 3: Maximum number of branchial filaments; 4: Color of subacicular hooks (b = black, y = yellow); 5: Number of teeth in subacicular hooks; 6: Subacicular hooks first present from setiger #; 7: Condition of tip of hoods of compound hooks (bl = blunt, p = pointed); 8: Depth of type locality; 9: Area of origin (ECPac = East Central Pacific, SCPac = South Central Pacific, WCAtl = West Central Atlantic, CCPac = Central Central Pacific, WInd = Western Indian, NInd = Northern Indian, NWAtl = Northwest Atlantic); 10: Remarks.

Species	1	2	3	4	5	6	7	8	9	10
<i>arcturi</i>	6-7	$\frac{1}{2}$	14	y	bi	?	bl	1152	NWAtl	
<i>balfouriana</i>	—	—	—	b	bi	?	?	946	SCPac	
<i>collini</i>	9	$\frac{1}{3}$	1	b	bi	?	?	637	WCAtl	
<i>hawaiiensis</i>	2	$\frac{1}{2}$	30	y	bi	29	p	500	CCPac	type examined
<i>manihine</i>	8	$\frac{1}{3}$	3	y	bi	27-28	bl	421	WInd	
<i>magellanica</i>	6	E	9	b	bi	?	bl	380	SWAtl	
<i>megabranchia</i>	3	$\frac{2}{3}$	47	y	bi	35	p	894	ECPac	
<i>paunoneurata</i>	8	E	4	b	bi	28	bl	718	ECPac	type examined
<i>prognatha</i>	10	?	5	b	bi	?	bl	764	WCAtl	
<i>pulvinopalpata</i>	3	E	25	b	bi	62-72	bl	2633	ECPac	
<i>rosaurae</i>	3	$\frac{1}{3}$	1	b	bi	32	bl	760	WCAtl	
<i>segregata</i>	3	$\frac{1}{3}$	12-15	y	bi	36	bl	970	ECPac	
<i>semisegregata</i>	3	$\frac{2}{3}$	34-38	y	bi	51	bl	897	ECPac	
<i>validobranchiata</i>	3	$\frac{1}{3}$	45	y	bi	?	p	1046	NInd	

in the original descriptions and on revisions of type material, are indicated in Table 2. Seven species in this list belong to the *flavus-bidentatus* group, seven belong to the *fuscus-bidentatus* group. Thus, two different groups have been equally successful in adapting to life in slope and abyssal depths. A number of these species originally described from relatively shallow slope areas (200-750 m) have poorly developed branchiae with only a few branchial filaments. Only a single species among them, *E. hawaiiensis*, has more than 10 branchial filaments where the branchiae are best developed. All species from waters deeper than about 800 m have more than 10 branchial filaments except the abbranchiate *E. balfouriana*. All species with more than 20 branchial filaments are from areas of known seafloor spreading or from other geologically extremely active areas, including *E. hawaiiensis*, alluded to above. Since the species belong to two rather different groups of the genus, it appears likely that the strong development of branchiae in these taxa in some fashion relates to the specific environmental conditions in the areas in which they occur.

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