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The Pilargidae (Annelida: Polychaeta) of the Pacific Coast of Costa Rica

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Abstract: Thirteen species of Pilargidae (Annelida: Polychaeta) from the subtidal and intertidal Pacific Coast of Costa Rica are reported. A new species, *Sigambra vargasi* n. sp., is described and an as yet undescribed species, *Sigambra* sp. A, is also reported. The occurrence of *Sigambra tentaculata* (Treadwell), *Loandalia riojai* Salazar-Vallejo, *Pilargis berkeleyi* Monro, *Ancistrosyllis hamata* Hartman and *Ancistrosyllis jonesei* Pettibone are range extensions for these species. The occurrence of *Sigambra pettiboneae* Hartmann-Schröder, *Parandalia tricuspis* (Müller), *Cabira incerta* Webster, *Ancistrosyllis papillosa* Jones and *Ancistrosyllis hartmanae* Pettibone are new records of these species for the eastern Pacific Ocean. *Synelmis* cf. *albini* (Langerhans) is also reported. A taxonomic key to these species is included.

Key words: Polychaeta, Pilargidae, Pacific coast, Costa Rica.

The Pilargidae are a family of polychaetes reported in sediments from the intertidal to abyssal depths. Since these organisms are usually quite small and present in low densities there is very little information regarding their ecology (Fauchald & Jumars 1979). They do not build a tube and have a muscular eversible pharynx which is presumed to be used in the capture of prey or perhaps intake of detritus and microalgae (Day 1967).

The systematics of the Pilargidae is also poorly known. Historically, species have been assigned to the Orbiniidae (Müller 1858), the Syllidae (McIntosh 1879, Webster 1879), and quite often the Hesionidae (Ehlers 1908; Fauvel 1920, 1923, Augener 1927, Monro 1933, Berkeley & Berkeley 1941, and Treadwell 1941). Eventually Hartman (1947) and Pettibone (1966) united a disparate group of genera into the family Pilargidae characterized mainly by the presence of emergent notopodial spines or hooks, two pairs of tentacular cirri and entirely simple neurosetae. More recent results of cladistic analysis by Licher and Westheide (1994) have indicated that the Pilargidae might be more appropriately included within the family Hesionidae and, in their review of the genus *Sigambra* (Licher & Westheide 1997), regarded the Pilargidae as a "subtaxon" of the Hesionidae. Further study may support this view, however, until such time the family Pilargidae is herein retained (see Fauchald & Rouse 1997).

Relationships of the genera within the Pilargidae have always been difficult due to the wide range of character states. Salazar-Vallejo (1987(1986)) divided the Pilargidae into two subfamilies, the Synelminae with cylindrical body and emergent notopodial spines, and the Pilarginae (=Sigambrinae) with a dorsoven-

trally depressed body and either emergent notopodial hooks or emergent notopodial setae lacking. These subfamilies are not supported by the results of cladistic analysis based on gross brain morphology by Fitzhugh and Wolf (1990) or the analysis of Licher and Westheide (1994) based on 28 morphological characters. Licher and Westheide (1994) identified several clades or groups of genera characterized by such characters as presence of a papillated integument or gross morphology of the hind brain and indicated that the Pilargidae may not be a monophyletic group.

Despite the confusion regarding phylogenetic relationships, the species within the Pilargidae have been well characterized, especially in the eastern Pacific Ocean. Two species have been recorded from the region between Alaska and Washington State (USA) by Monro (1933) and Banse & Hobson (1974). The pilargids of the California coast (USA) have been well sampled and nine species recorded by Hartman (1947, 1968) and Emerson & Fauchald (1971). Salazar-Vallejo (1987 (1986), 1990) and León-González (1991) have sampled extensively along the Pacific coast of Mexico and published several keys and species lists which include 18 species from this region. Hartmann-Schröder (1959) recorded two species of Pilargidae from the mangroves of El Salvador. *Synelmis albini* (Langerhans) was also included in collections by Westheide (1974) from the Galapagos Islands and Fauchald (1977) from the Pacific side of Panama. In preliminary lists of polychaetes from the Gulf of Nicoya and Golfo Dulce, Costa Rica, Dean (1996a,b) reported 10 species belonging to the family Pilargidae.

This paper reviews 13 species of Pilargidae collected from the Pacific Coast of Costa Rica. Four species are added to the lists of Dean (1996a, b) while specimens originally identified as *Sigambra bassi* are herein described as a new species, *S. vargasi* n. sp. Another species included in the list of Pilargidae by Dean (1996a), *Synelmis klatti* Friedrich, has been moved to the family Hesionidae and redescribed by Licher (1994). Specimens identified as *S. klatti* from Costa Rica (Dean 1996a) have been described as a new species of *Glyphohesione* in the family Hesionidae (Dean 1998).

MATERIALS AND METHODS

Subtidal material from the Gulf of Nicoya was collected during a cooperative research effort between the University of Costa Rica and the University of Delaware (USA)(see Maurer & Vargas (1984), and Vargas (1995) for locations and review). Intertidal material from the Punta Morales region of the Gulf of Nicoya was collected by the author during a series of collecting trips supported by the University of Costa Rica's Centro de Investigación en Ciencias del Mar y Limnología (CIMAR). Subtidal material from Golfo Dulce was collected by the *R. V. Victor Hensen* Costa Rican expedition (1993/1994) and material from that cruise provided by J. Vargas and R. León (CIMAR). Specimens from the intertidal of Golfito Bay, Golfo Dulce were collected by J. Vargas (CIMAR). Voucher specimens of most of the listed species have been deposited in the Museo de Zoología, Universidad de Costa Rica. The remainder of the material is deposited in the Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA.

Key to the Pilargidae of the Pacific coast of Costa Rica

1. Integument smooth.....2
1a. Integument papillate.....8

2. Antennae and tentacular cirri present.....3
2a. Antennae and tentacular cirri absent.....7

3. Three weakly developed antennae, furcate neuropodial spines present. (Fig. 1) ....*Synelmis cf. albini* (Langerhans)
3a. Three well developed antennae present, dorsal parapodial cirri of setiger 1 longer that those of other setigers.....4

4. Emergent notopodial hooks from setiger 4. (Fig. 2)... *Sigambra tentaculata* (Treadwell)
4a. Emergent notopodial hooks begin posterior to setiger 4.....5

5. Emergent notopodial hooks from setigers 8-9. (Fig. 3).....*Sigambra pettiboneae* Hartmann-Schröder
5a. Emergent notopodial hooks begin posterior to setiger 10.....6

6. Emergent notopodial hooks from setiger 12. (Fig 4).....*Sigambra* sp A
6a. Emergent notopodial hooks from setigers 14-15. (Fig. 5-12)...*Sigambra vargasi* n. sp.

7. Ventrolateral branchiae present. (Fig. 13)... .....*Loandalia riojai* Salazar-Vallejo
7a. Ventrolateral branchiae absent. (Fig. 14)... .....*Parandalia tricuspis* (Müller)

8. Parapodia weakly developed, proboscis with denticles. (Fig. 15 & 16)..... .....*Cabira incerta* Webster
8a. Pharynx not cuticularized, parapodia well developed 9

9. Emergent notopodial spines or hooks absent (Fig. 17) ..... *Pilargis berkeleyi* Monro
9a. Emergent dorsal hooks present. Genus *Ancistrosyllis*..... 10

10. Two antennae present 11
10a. Three antennae present 12

11. Emergent notopodial hooks from setigers 4-7, dorsal parapodial cirri with small papillae. (Fig. 18)..... .....*Ancistrosyllis hamata* Hartman
11a. Emergent notopodial hooks from setiger 3, dorsal parapodial cirri with prominent elongated papillae. (Fig. 19)..... .....*Ancistrosyllis papillosa* Jones

12. Emergent notopodial hooks from setiger 6. (Fig. 20)..... *Ancistrosyllis jonesi* Pettibone
12a. Emergent notopodial hooks from setiger 3, flexed anterior region of the digestive tract. (Fig. 21)..... .....*Ancistrosyllis hartmanae* Pettibone

Species Descriptions

Family Pilargidae

Genus *Synelmis* Chamberlin 1919

Fitzhugh & Wolf (1990) separated this genus into "complex A" species with two furcate neurosetae and "complex B" species lacking furcate neurosetae. Based upon their cladistic analysis Licher & Westheide (1994) united the "complex B" species with the genus *Litacorsa* leaving only 2 species *S. albini* (Langerhans) and *S. simplex* Chamberlin in the genus with the synapomorphy of two furcate neurosetae.

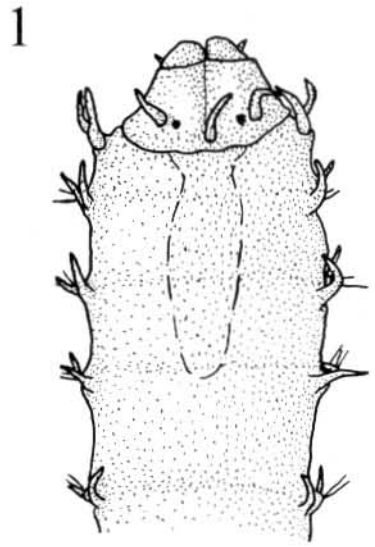
Synelmis cf. albini (Langerhans 1881)
(Fig. 1)

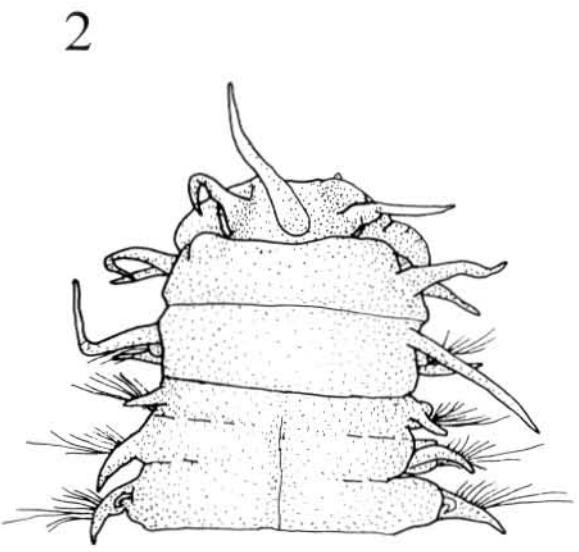
Synelmis albini (Langerhans). Pettibone 1996: 191, Fauchald 1977:17, Westheide 1974, Salazar-Vallejo 1987 (1986): 205, Maurer & Vargas 1984:101 (in part), Maurer *et al.* 1988:48 (in part), Dean 1996a:74.

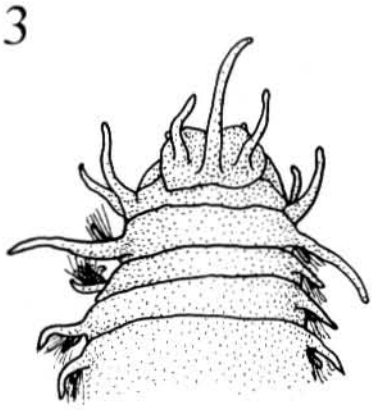
Material Examined.Gulf of Nicoya, *Sta. 1*, 9°57'30"N, 84°53'00"W, 46 m, mud, July 1980,(15) and (1)(USNM 079952). *Sta. 2*, 9° 55'28"N, 84°52'05"W, 18 m, muddy sand, July 1980,(2)(USNM 079973). *Sta. 3*, 9°52'00"N, 84°48'10"W, 33 m, sandy mud, July 1980, (1) (USNM 079953). *Sta. 4*, 9°53'40"N, 84°46' 10"W, 40 m, mud, July 1980,(1) (USNM 079954). *Sta. 13*, 9°52'30"N, 84°43'50"W, 26 m, July 1980,(3)(USNM 079955 & 079956). *Sta. 14*, 9°57'05"N, 84°45'30"W, 9 m, sandy mud, July 1980,(25)(USNM 079966 & 07996 7). *Sta. 15*, 9°57'40"N, 84°47'00"W, 15 m, sandy mud, July 1980, (71)(USNM 079974 & 079955). *Sta. 23*, 9°48'35"N, 84°43'50"W, 35 m, mud, July 1980,(1) (USNM 079959). *Sta. 24*, 9°49'25"N, 84°41'20"W, 11 m, sand, Oct 1980,(27); Jan 1981,(1); Apr 1981,(11); Aug 1981,(7). *Sta. 25*, 9°50'05"N, 84°52'00"W, 20 m, mud/sand, July 1980,(1)(USNM 079960). *Sta. 26*, 9°51'50"N, 84°53'20"W, 17 m, muddy sand, July 1980,(1)(USNM 079961). *Sta. 27*, 9°51'57"N, 84°50'50"W, 12 m, muddy sand, July 1980,(2) (USNM 079963 & 079963). *Sta. 28*, 9°52'16"N, 84°45'30"W, 26 m, mud, June 1981,(1). *Sta. 29*, 9°54'55"N, 84°45'15"W, 18 m, muddy sand, Oct 1980,(18); Jan 1981,(32); Apr 1981, (4); June 1981, (4); Aug 1981, (20); Apr 1982,(22). *Sta. 30*, 9°54'40"N, 84°45' 50"W, 18 m, muddy sand, Oct 1980,(11); Jan 1981,(6); Apr 1981,(51); June 1981,(4). *Sta. 31*, 9°44'00"N, 84°59'25"W, 20 m, mud/sand, July 1980,(51)(USNM 079947, 079948, 0799 50 & 079965). *Sta. 32*, 9°53'47"N, 84°49' 35"W, 24 m, mud/sand, July 1980,(2),(USNM 079971). *Sta. 34*, 9°55'30"N, 84°50'05"W, 24 m, sand, July 1980,(12)(USNM 079949 & 079951). *Sta. 35*, 9°55'42"N, 84°47'40"W, 13 m, sand, July 1980,(32)(USNM 079976 & 07-9977). *Sta. 37*, 9°57'38"N, 84°48'20"W, 14 m,

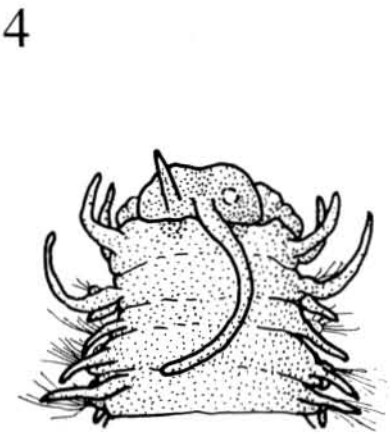
muddy sand, July 1980, (21) (USNM 079978 & 079979). *Punta Morales*, 10°N, 85°W, intertidal, coarse sand, Aug 1996;(12, UCR 109).

Remarks. Complete specimen 136 setigers, approximately 50 mm long and 0.7 mm wide. With two pigmented eyespots and a cylindrical pharynx (Fig. 1). Emergent notopodial spines beginning at setiger 11 accompanied by one or two thickened notacicula. Capillary neurosetae include one or two longer and two or three shorter setae as well as one or two furcate setae in a single fascicle.









Figs. 1-4. Fig. 1. *Synelmis cf. albini*, dorsal view of anterior. Fig. 2. *Sigambra tentaculata*, dorsal view of anterior. Fig. 3. *Sigambra pettiboneae*, dorsal view of anterior. Fig. 4. *Sigambra* sp. A. dorsal view of anterior. Scale bar = 1 mm.

Distribution. One of the most common polychaetes from the Punta Morales intertidal from a wide range of sediments. What has been identified as *Synelmis albini* (Langerhans) has been reported from the Galapagos Islands (Westheide 1974) and the Pacific side of Panama (Fauchald 1977). It is believed, however, that *S. albini* may be a complex of several species and awaits further systematic analysis (Wolf 1984).

Genus *Sigambra* Müller 1858

Members of this genus possess well developed lateral and median antennae, tentacular cirri, and dorsal parapodial cirri. Licher & Westheide (1994) regard all these features as pleisiomorphic indicating a high similarity between this genus and juvenile hesionids.

Sigambra tentaculata (Treadwell 1941)
(Fig. 2)

Sigambra tentaculata Treadwell 1941:1. Pettibone 1966:182.
Maurer & Vargas 1984:101 (in part). Wolf 1984:29.8.
Salazar-Vallejo 1987(1986):202. Maurer *et al.* 1988:48 (in part). Salazar-Vallejo *et al.* 1990:216. León-González 1991:314. Salazar-Vallejo & Orensanz 1991:275. Blake 1997: 275. Dean 1996a:74; 1996b:83.

Material Examined. Gulf of Nicoya, *Sta. 6*, 9°45'20"N, 84°46'25"W, 42 m, mud, July 1980,(1)(USNM 079936). *Sta. 22*, 9°48'25"N, 84°52'40"W, 22 m, muddy sand, July 1980,(1)(USNM 079937). *Sta. 24*, 9°49'25"N, 84°41'20"W, 11 m, sand, Oct 1980,(1); Apr 1981,(1); Jun 1981,(1); Aug 1981,(1). *Sta. 29*, 9°54'55"N, 84°45'15"W, 18 m, muddy sand, Jan 1981,(2). *Sta. 30*, 9°54'40"N, 84°45'50"W, 18 m, muddy sand, Jan 1981,(3). *Sta. 32*, 9°53'47"N, 84°49'35"W, 24 m, mud/sand, July 1980,(1)(USNM 079944). *Sta. 33*, 9°53'40"N, 84°53'20"W, 11 m, sandy mud, July 1980, (1)(USNM 079942). *Punta Morales*, 10°N, 85°W, intertidal, Aug 1996:(11), mud; (8), sandy mud; (11 + 3(UCR 11001)),coarse sand. **Golfo Dulce**, *Sta. GD12*, 8°21'N, 83°14'W, 200 m, mud, Dec 1993, (1).

Remarks. Complete specimen 57 setigers, 7.3 mm long, maximum width 0.8 mm (0.6 not including parapodia). Notopodial emergent hooks from setiger 4, ventral cirrus lacking on setiger 2, median antenna longer than lateral antennae, tips of neurosetae entire, notosetae absent. These specimens lack the row of peristomial papillae described by Katzmann *et al.*(1974) for material identified as *S. tentaculata* from the Mediterranean.

Distribution. Previously reported from New York, USA, to Argentina in the Atlantic Ocean and from California, USA, to Manzanillo, Col., Mexico, in the Pacific. The material identified as *S. tentaculata* by Katzmann *et al.* 1974 from the Mediterranean may be a different species. This extends the range of this species in the Eastern Pacific to Golfo Dulce, Costa Rica. *Sigambra tentaculata* has been reported from the intertidal to abyssal depths.

Sigambra pettiboneae Hartmann-Schröder 1979 (Fig. 3)

Sigambra pettiboneae Hartmann-Schröder 1979:84.
Material Examined. Golfo Dulce: *Golfito Bay*, 8°38'N, 83°10'W, intertidal, muddy sand 2 Km west of main dock, Sep 1986; (109 +7(UCR 108).

Remarks. Complete specimen 59 setigers, 5.8 mm long, 0.7 mm maximum width (0.5 mm without parapodia). Emergent notopodial hooks beginning at setigers 8-9, ventral cirri absent on setiger 2, and the median antenna extends to setigers 4-6. The neurosetae include short coarsely toothed and longer capillary setae.

Distribution. Type locality is intertidal sand with organic detritus from Broome in northwestern Australia. This is the first record of this species from the eastern Pacific and the first report of this species outside of the type locality.

Sigambra sp. A
(Fig. 4)

Material Examined. Golfo Dulce, *Golfito Bay*, 8°38'N, 83°10'W, intertidal, muddy sand 2 Km west of main dock, Sep 1986;(1).

Remarks. Complete specimen with 48 setigers, 3.9 mm in length and 0.5 mm in width anteriorly (0.35 mm without parapodia). Body wide anteriorly, tapering posteriorly; dorsoventrally flattened with deeply incised parapodia. Color in alcohol light tan.

Prostomium with indistinctly separated biarticulated palps; palpophores large, anteroventral palpostyles small, digitate. Median antenna arising from posterior of prostomium, extending to fifth setiger; lateral antennae arise slightly anterior to median antenna, extend to the first setiger. Proboscis with 14 conical distal papillae. Two pair subequal tentacular cirri from peristomium, cirri slightly longer than lateral antennae. Dorsal cirri of setiger 1 elongate, extending to the fifth setiger. Ventral cirri absent from setiger 2.

Notopodia with a single acicula, accompanied by a stout emergent notopodial hook beginning at setiger 12, a capillary seta may also occur in posterior notopodia. Neuropodial lobe conical with numerous capillaries, shorter capillaries with fine denticulations, and short pectinate setae. Dorsal cirri extend beyond setal lobe; ventral cirri subequal in length to setal lobe. Pygidium with pair of long anal cirri.

This species most closely resembles a recently described species *Sigambra phuketensis* Licher & Westheide 1997 in that they both have ventral cirri on the second setiger, 14 distal papillae on the pharynx lack emergent spines, have a longer median than lateral antennae and possess pectinate neurosetae. While *S. phuketensis* is described as having emergent notopodial hooks beginning at setiger 3-23, *S.* sp A has notopodial hooks from setiger 12. The median antenna of *S.* sp A is much longer than the lateral antennae extending posteriorly to the 5th setiger (4-5 times the length of the laterals) while the lateral antennae are shorter relative to the body width than those reported for *S. phuketensis*. Additionally, the dorsal cirri of *S. puketensis* are approximately 2/3 the body width in median and posterior setigers while those of *S.* sp A are much shorter than that. It would be premature to formally describe this species based upon a single specimen especially in the light of the disregard by Licher & Westheide (1997) for the significance of the first appearance of notopodial hooks in their review of the genus.

Sigambra vargasi, n. sp.
(Fig. 5-12)

Material Examined. Gulf of Nicoya, *Sta. 1*, 9°57'30"N, 84°53'00"W, 46 m, mud, July 1980,(2)(USNM 079935). *Sta. 15*, 9°57'40"N, 84°47'00"W, 15 m, sandy mud, July 1980, (1)(USNM 079946). *Sta. 23*, 9°48'35"N, 84° 43'50"W, 35 m, mud, July 1980,(1)(USNM 079938). *Sta. 24*, 9°49'25"N, 84°41'20"W, 11 m, sand, Oct 1980,(1) ; Jan 1981,(5) ; Apr 1981, (5); June 1981,(10); Aug 1981,(16). *Sta. 25*, 9°50'05"N, 84°52'00"W, 25m, mud/sand, July 1980, (4)(USNM 079939). *Sta. 26*, 9°51' 50"N, 84°53'20"W, 17 m, sandy mud, July 1980,(1)(USNM 079940). *Sta. 27*, 9°51'57"N, 84°50'50"W, 12 m, muddy sand, July 1980, (1) (USNM 079941). *Sta. 28*, 9°52'16"N, 84° 45'30"W, 26 m, mud, July 1980,(18); Oct 1980, (18) (MCZ 20019) ; Jan 1981,(4) ; Apr 1981, (1 + 5(UCR 1602)); June 1981,(12); Aug 1981,(17). *Sta. 29*, 9°54'55"N, 84°45' 5"W, 18 m, muddy sand, Jan 1981,(1); Aug 1981,(21); Apr 1982,(6). *Sta. 30*, 9°54'40"N, 84°45'50"W, 18 m, muddy sand, July 1980, (1)(USNM 079943); Oct 1980,(2); Jan 1981, (6); Apr 1981,(6); June 1981,(4); Aug 1981, (1+1(HOLOTYPE MCZ 20017)+2 (PARATYPES MCZ 20018). *Sta. 32*, 9°53'47"N, 84°49'35"W, 24 m, mud/sand, July 1980,(6) (USNM 079944). *Sta. 36*, 9°55'32"N, 84°45' 20"W, 18 m, sandy mud, July 1980,(2) (US NM 079945).

Species description. Holotype (MCZ 20017) 5.2 mm long, 1.0 mm wide (0.5 mm not including parapodia) with 60 setigers. Paratype (UCR 160-2) 9.7 mm long, 0.8 mm wide (0.5 mm not including parapodia), with 54 setigers. Paratype MCZ (20019) 18.4 mm long, 0.5 mm wide (0.3 mm not including parapodia), with 136 setigers. Body white to light brown in ethanol. First four segments cylindrical, 3 times as wide as long, middle and posterior setigers dorsoventrally flattened, deeply incised, 4 times as wide as long (Fig. 5).

Prostomium two rounded lobes; two biarticulate palps indistinctly separate from the prostomium, palpophores large with small

anteroventral palpostyles (Fig. 5). Median antenna extending to seventh setiger ($\bar{x}$ = 6.9, SD = 1.29, n = 10); paired lateral antennae attached slightly anterior to and approximately 1/3 the length of median antenna. Eversible proboscis with 8 distal papillae. Peristomium with 2 pair tentacular cirri, dorsal slightly longer than ventral, 2/3 length of lateral antennae.

First setiger with elongate dorsal cirrus 4-5 setigers in length (Fig. 9). Setiger 2 with short dorsal cirrus, ventral cirrus lacking (Fig. 10). Setigers 3-5 with subequal dorsal and ventral cirri extending beyond the parapodial lobe (Fig. 11). Remaining setigers with dorsal cirrus approximately twice as long as ventral cirrus, ventral cirrus subequal in length to parapodial lobes (Fig. 12).

Notopodia reduced, notacicula present at base of dorsal cirrus, accompanied by a short capillary notoseta beginning at setiger 4. Emergent notopodial hooks from setiger 15-17 ($\bar{x}$ = 15.2, SD = 0.48, n = 31), accompanied by a single notacicula and occasionally one or two short capillary setae. In median and posterior setigers notopodial hooks may be replaced by a short capillary seta.

Neuropodia with fascicle of maximally 17-18 simple neurosetae. Neurosetae include longer serrate bladelike setae (Fig. 6), shorter pectinate setae with smooth distal tip (Fig. 7), and short pectinate setae with fine teeth extending to distal tip (Fig. 8); neuropodia of posterior setigers with one or two smooth capillary setae (Fig. 12).

Pygidium with two long, thin, cirriform anal cirri.

Remarks. *Sigambra vargasi* n. sp. is similar to *S. ocellata* (Hartmann-Schröder 1959), *S. bidentata* Britaev & Saphronova 1981, and *S. qingdaoensis* Licher & Westheide 1997 in the possession of 8 distal papillae on the pahrynx and the absence of a ventral cirris on setiger 2. It is unlike *S. ocellata* in the absence of eyespots and the greater length of the dorsal relative to the ventral cirris. *S. vargasi* n. sp. lacks the bidentate neurosetae seen in *S. bidentata*. *S. vargasi* n. sp. is similar to *S. qindaoensis* in that these are the only two species in the genus with anterior setigers possessing a capillary notoseta unaccompanied by emergent hooks. *S. vargasi* n. sp. differs from *S. qingdaoensis* in the first occurrence of notopodial hooks at setiger 15-17 rather than setigers 3-8, the much greater length of the median antenna and the greater length of the anal cirri.

Distribution. From 11 to 46 m in muddy to sandy sediments.

Etimology. This species is named for Prof. José A. Vargas (CIMAR) for his many years of work furthering benthic studies in Costa Rica.

Loandalia, Parandalia & Talehsapia Group

This group of pilargids, identified by the phylogenetic analysis of Licher & Westheide (1994), is characterized by the absence of antennae, tentacular cirri, and dorsal parapodial cirri, the possession of capillary notosetae in addition to the emergent spine, and a lack of notacicula. Members of this group are included within the Pilargidae based mainly on the presence of emergent notopodial spines. These genera may be considered highly derived or possibly be unrelated to the other pilargids (Licher & Westheide 1994).

Genus *Loandalia* Monro 1936

This is the only genus in the Pilargidae with branchiae.

Loandalia riojai Salazar-Vallejo 1987(1986) (Fig. 13)

Loandalia riojai Salazar-Vallejo 1987(1986): 202. Salazar-Vallejo *et al.* 1990:216. León-González, 1991:314

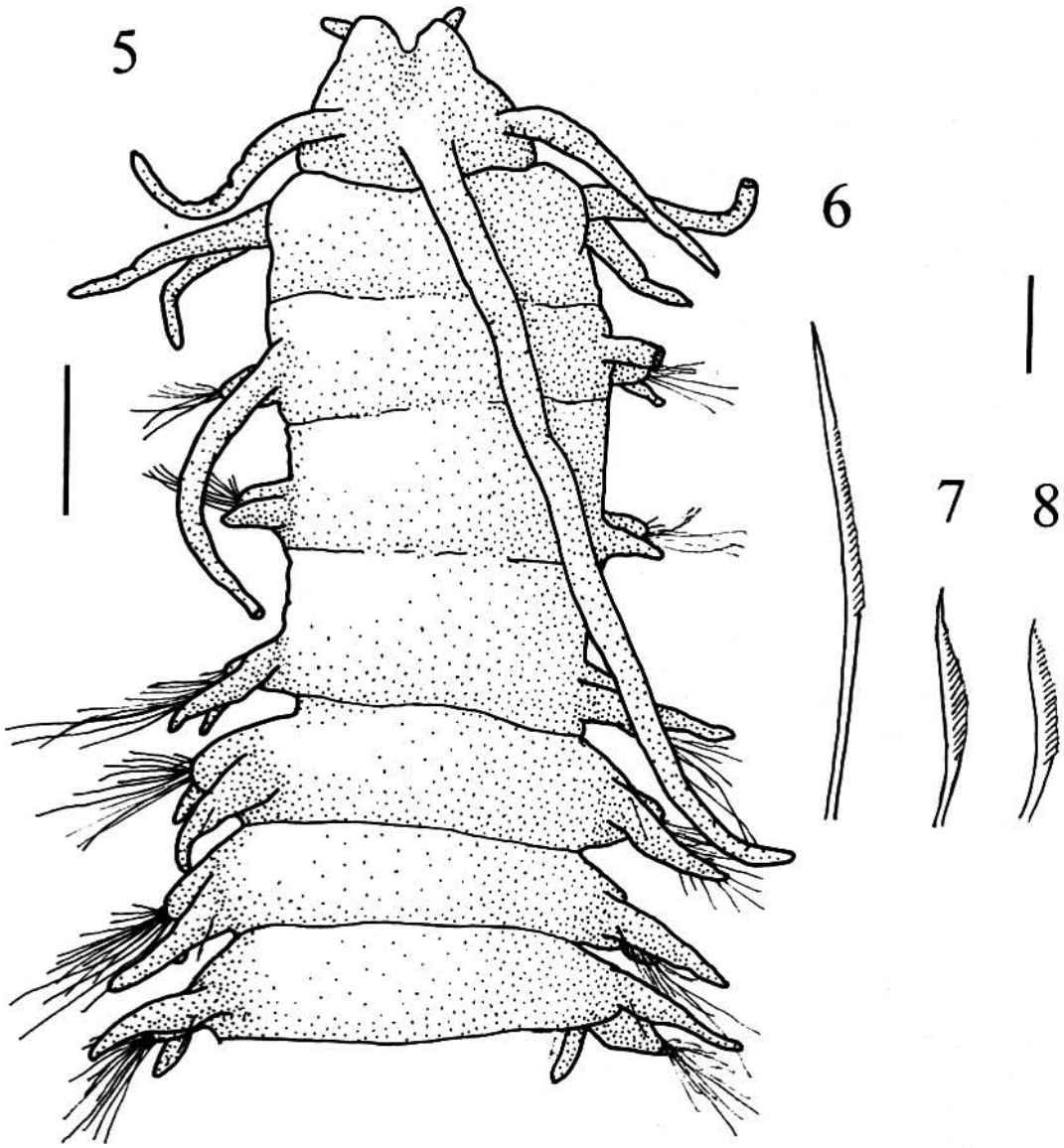
Material Examined. Gulf of Nicoya, *Sta. 29*,9°54'55'N, 84°45'15'W, 18 m, muddy sand, Apr 1982 (1, UCR 2003).

Remarks. Complete specimen 65 setigers, 40 mm long, maximum width 1.6 mm (1.1 mm without parapodia). First occurrence of emergent notopodial spines is on setiger 7, dorsolateral fields of proboscoid organs present.

Pigmented eyespots were not observed for this specimen. Salazar-Vallejo (1987(1986)) reported branchiae beginning on setigers 21 to 24 and branchiae first appeared on setiger 24 in this specimen. León-González (1991) reported branchiae from setiger 31-39 in two specimens of *L. riojai* from Baja California Sur.

Distribution. Previously reported from Bahía de Manzanillo, Mexico, to the west coast of Baja California. This record extends the range of *L. riojai* to the Gulf of Nicoya, Costa Rica. Subtidal from 18 to 140 meters.

Genus *Parandalia* Emerson & Fauchald 1971



Figs. 5-8. Fig. 5. *Sigambra vargasi*, n. sp. (Holotype MCZ 20017). Dorsal view of anterior. Figs. 6-8.*Sigambra vargasi* (paratype MCZ 20018). Fig. 6. Long serrate neuroseta. Fig. 7. Short pectinate neuroseta with smooth distal tip. Fig8. Short pectinate neuroseta with finely toothed distal tip. Scale bar Fig. 5 = 100 µm, Figs. 6-8 = 20 µm.

This genus resembles *Loandalia* but lacks branchiae. The other genus in this subgroup, *Talehsapia*, differs from *Parandalia* in the possession of jawlike structures.

Parandalia tricuspis (Müller 1858)
(Fig. 14)

Parandalia tricuspis (Müller) Salazar-Vallejo 1990:512, Salazar-Vallejo & Orensanz 1991: 268, Dean 1996a:74.

Parandalia sp. A. Wolf 1984:29.30.

Parandalia sp. Maurer *et al.* 1988:48.

Material Examined.Gulf of Nicoya, *Sta. 23*, 9°48'35"N,. 84°43'50"W, 35 m, mud, July 1980,(1) (USNM 079934). *Sta. 24*, 9°49'25"N, 84°41'20"W, 11 m, sand, Jan 1980,(1)(USNM 080033); Oct 1980, (3 + 1, UCR 2302); June 1981,(1)(USNM 080032); Aug 1981,(1).

Remarks. Complete specimen 48 setigers, 6.4 mm long,, anterior 7 setigers 0.8 mm wide, remaining setigers maximum width 0.7 mm (0.5 without parapodia). These specimens agree with the new combination by Salazar-Vallejo (1990). Ventral parapodial cirri first appear on setiger four and emergent notopodial spines lacking a hood on setiger 7. Eyespots were weakly pigmented, one specimen with only a single eyespot on the right side. Posterior neurosetae in two series with approximately 10 neurosetae per parapodia. All parapodia biramous.

Distribution. Previously known from the upper Gulf of Mexico to Argentina in the Atlantic Ocean. This is the first record of this species in the eastern Pacific. *P. tricuspis* has been collected from the intertidal to 55 meters depth.

***Ancistrosyllis* group**

The genera *Ancistrosyllis*, *Pilargis*, *Cabira*, and *Paracabira* are considered a monophyletic group by Licher & Westheide (1994) due to the papillated integument.

Genus *Cabira* Webster 1879

The presence of denticles on the pharynx are synapomorphic for this genus.

Cabira incerta Webster 1879
Fig. (16 & 17).

Cabira incerta Webster 1879:267. Pettibone 1966:178. Wolf 1984:29.5. Salazar-Vallejo & Orensanz 1991:272.
Ancistrosyllis sp. (in part) Maurer *et al.* 1988:48.
Cabira sp. A. Dean 1996a:74.

Material Examined. Gulf of Nicoya, *Sta. 24*, 9°49'25"N, 84°41'20"W, 11 m, sand, Apr 1981,(2); Aug 1981,(1 + 1, UCR 6802)). *Sta. 28*, 9°52'16"N, 84°45'30"W, 26 m, mud, July 1980, (1)(USNM 079930); Aug 1981,(1). *Sta. 30*, 9°54'40"N, 84°45'50"W, 18 m, muddy sand, Apr 1981,(3). *Punta Morales*, 10°N, 85°W, intertidal, coarse sand, Aug 1996; (3).

Remarks. Complete specimen 35 setigers, 6.9 mm long, 0.6 mm maximum width. Variable number (6-17) of swollen anterior segments, emergent dorsal hooks from setiger 7, and 24 smooth capillary neurosetae. Wolf (1984) reported neurosetae with a minutely bidentate tip but this was not true of these specimens. Salazar-Vallejo & Orensanz (1991) reported ventral parapodial cirri on all setigers for specimens from Rio La Plata, Uraguay-Argentina, but ventral parapodial cirri begin on setiger 3 in the Costa Rican specimens as was previously described for *C. incerta* by Pettibone (1966) and Wolf (1984).

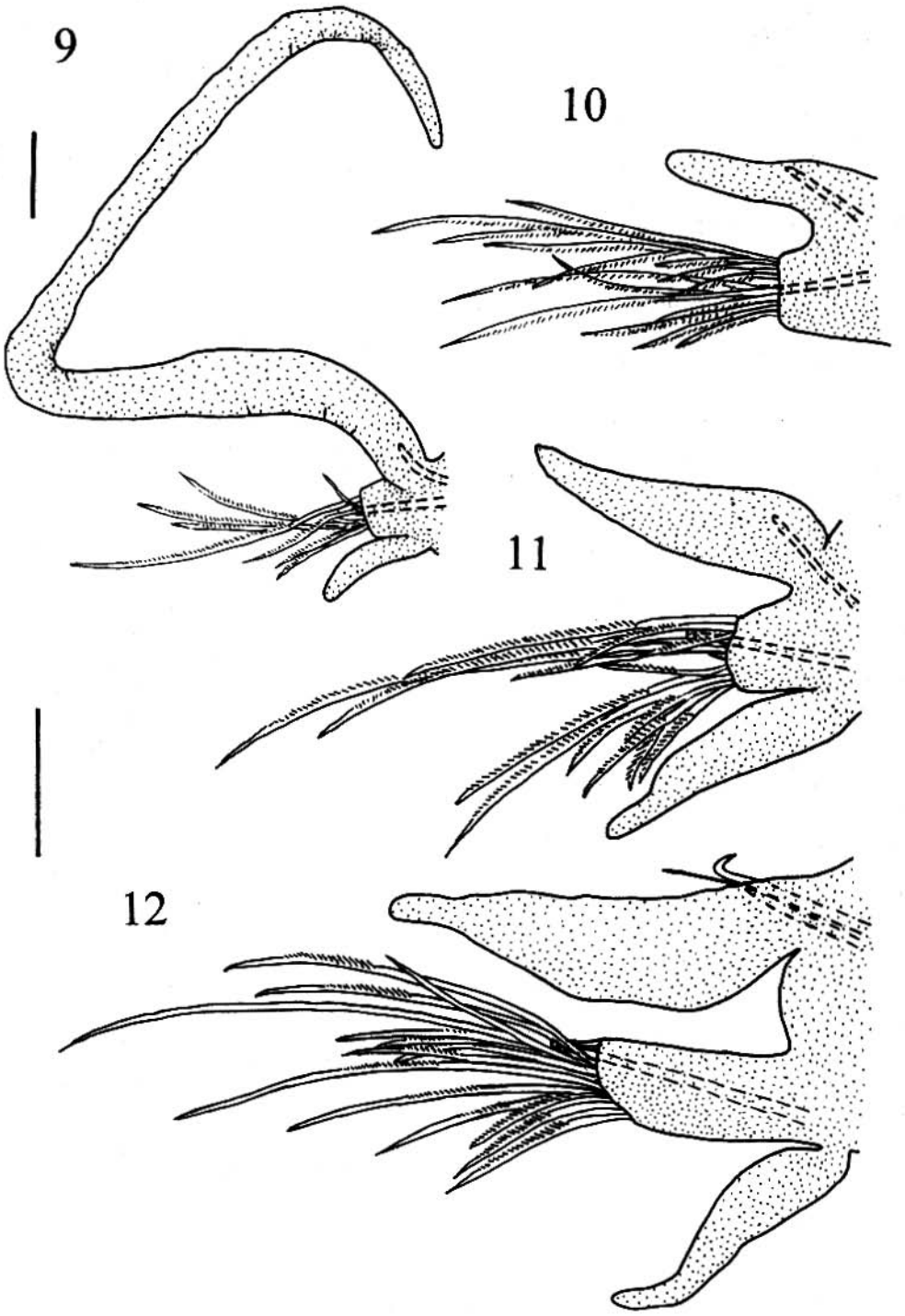
Distribution. Previously reported from Chesapeake Bay, USA to Rio La Plata, Uruguay-Argentina in the Atlantic Ocean. This is the first record of this species in the Eastern Pacific. Known from the intertidal to 80 meters depth.

Genus *Pilargis* Saint-Joseph 1899

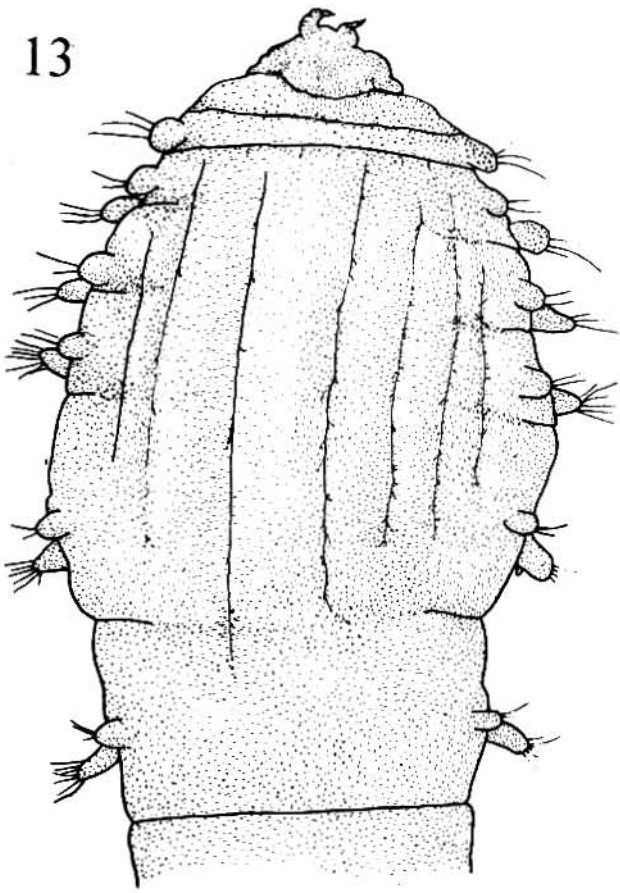
This genus is characterized by the absence of emergent hooks or spines.

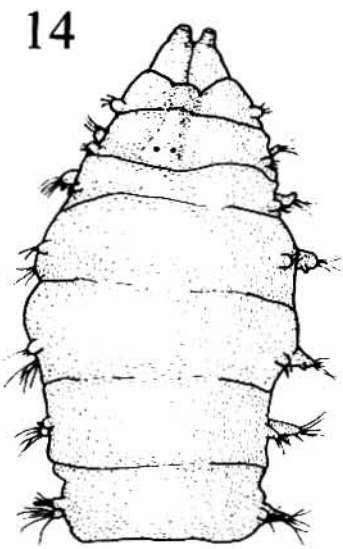
Pilargis berkeleyae Monro 1933 (Fig. 17).

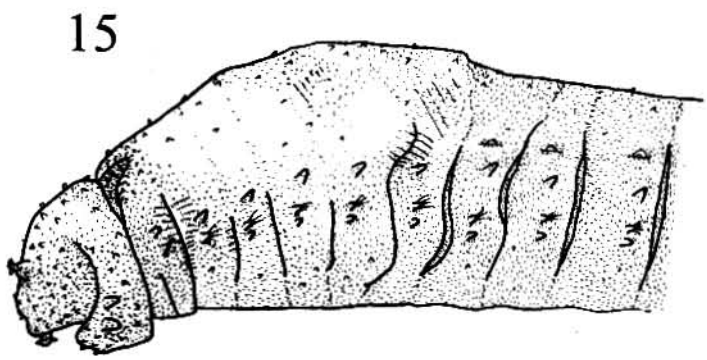
Pilargis berkeleyae Monro 1933:673. Pettibone 1966:161.

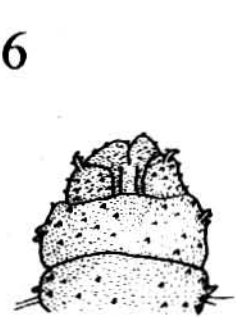


Figs. 9-12. *Sigambra vargasi* n. sp. (Paratype MCZ 20018). Fig. 9. Setiger 1, anterior view. Fig. 10. Setiger 2, anterior view. Fig. 11. Setiger 3, anterior view. Fig. 12. Setiger 19, anterior view. Scale bar Fig. 9 = 40 µm, Fig.s 10-12 = µm.

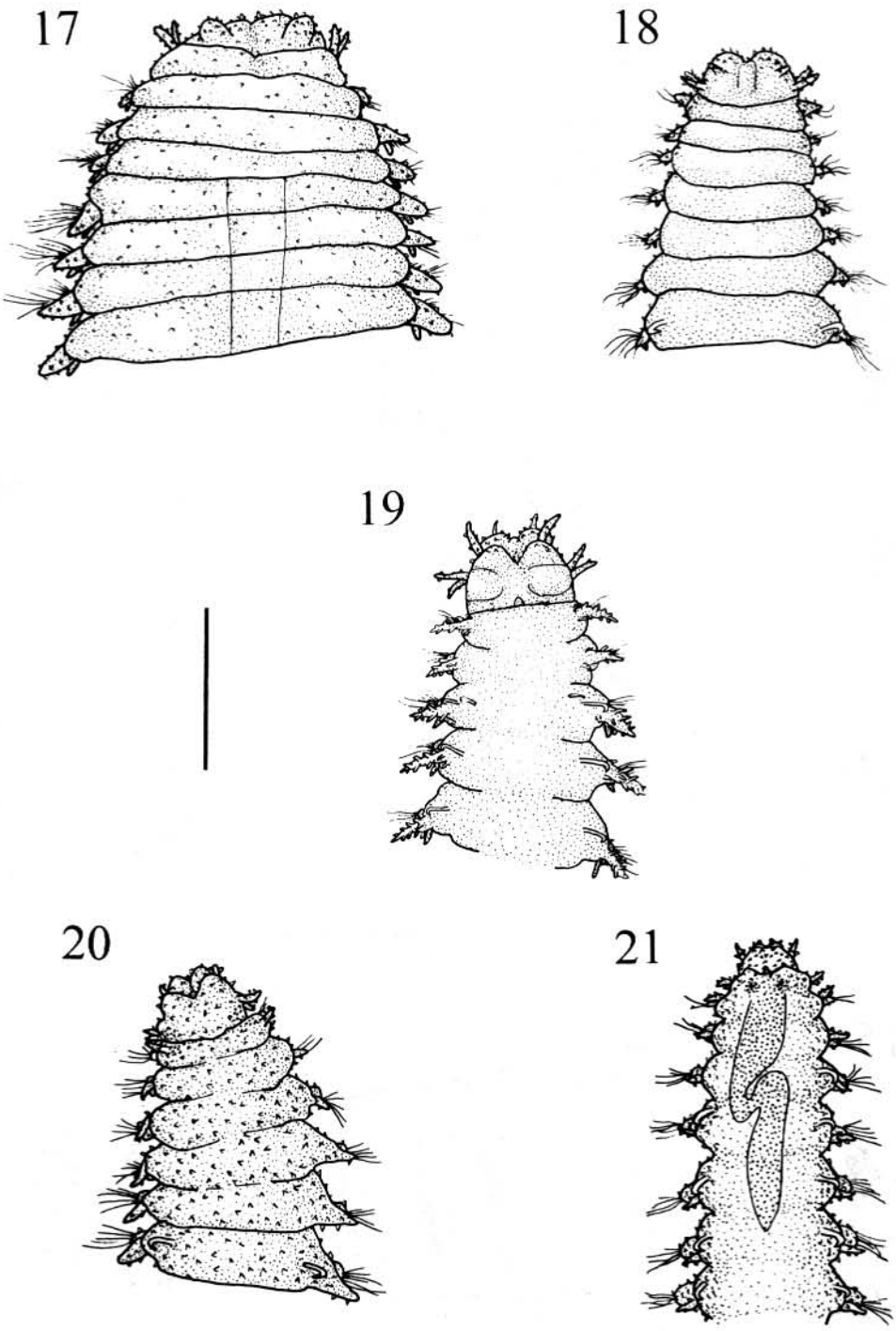








Figs. 13-16. Fig. 13. *Loandalia riojai*, dorsal view of anterior. Fig. 14.*Parandalia tricuspis*, dorsal view of anterior. Fig. 15. *Cabira incerta*, lateral view of anterior. Fig. 16.*Cabira incerta*, dorsal view of prostomium and peristomium. Scale bar = 1 mm.



Figs. 17-21. Fig. 17. *Pilargis berkeleyae*, dorsal view of anterior. Fig. 18.*Ancistrosyllis hamata* , dorsal view of anterior. Fig. 19. *Ancistrosyllis papillosa*, dorsal view of anterior. Fig. 20.*Ancistrosyllis jonesi* , dorsal view of anterior. Fig. 21. *Ancistrosyllis hartmanae*, dorsal view of anterior. Scale bar = 1 mm.

Imajima 1987:162. Salazar-Vallejo & Orensanz 1991:274. Dean 1996a:74. Blake 1997:270.

Material Examined. Gulf of Nicoya, *Sta. 29*, 9°54'55"N, 84°45'15"W, 18 m, muddy sand, July 1980,(1)(USNM 079933).

Remarks. Neurosetae with fine teeth and bidentate tip, dorsal cirri in anterior setigers inflated.

Distribution. Previously known from the northern Gulf of Mexico to Argentina in the Atlantic and from Canada to California in the Pacific Ocean. This report extends its range to the Gulf of Nicoya, Costa Rica. From intertidal to abyssal depths.

Genus *Ancistrosyllis* McIntosh 1879

The synapomorphy of this genus is possession of a five lobed hind brain (Fitzhugh & Wolf 1990). The genus *Ancistargis* is similar to *Ancistrosyllis* differing only in its lack of a median antenna. Licher & Westheide (1994) synonomize these two genera due to a lack of a "synapomorphic character for *Ancistrosyllis*-species with three antennae" if considered separate taxa. The median antenna of *Ancistargis* species is usually weakly developed (Fig. 11-13) and the presence or absence of such an inconspicuous structure does not warrant separation at the generic level.

Ancistrosyllis hamata (Hartman 1960)
(Fig. 18).

Pilargis hamatus Hartman 1960:88. Reish 1968:76.
Ancistrosyllis hamata. Pettibone 1966:168. Hartman 1968:377. Blake 1997:269.

Ancistargis sp. Maurer *et al.* 1988:48.

Ancistargis hamata (Hartman). Dean 1996a: 74, 1996b:83.

Material Examined.Gulf of Nicoya, *Sta. 22*, 9°48'25"N, 84°52'40"W, 22 m, muddy sand, July 1980,(1). *Sta. 24*, 9°49'25"N, 84°41' 20"W, 1 m, sand, Jan 1981,(1); Apr 1981,(1); June 1981,(2); Aug 1981,(3). *Sta. 28*, 9°52' 16"N, 84°45'30"W, 26 m, mud, July 1980, (1)(USNM 079929); Aug 1981,(1). *Sta. 29*, 9° 54'55"N, 84°45'15"W, 18 m, muddy sand, July 1980,(1); Oct 1980,(1, UCR 111); Apr 1981, (1); June 1981,(1); Aug 1981,(1). *Sta. 30*, 9°54'40"N, 84°45'50"W, 18 m, muddy sand, Oct 1980,(1); Jan 1981,(1); Apr 1981, (1), Aug 1981,(1). **Golfo Dulce**, *Sta. GD12*, 08°21'N, 83°14'W, 200 m, mud, Dec 1993,(1).

Remarks. Complete specimen 39 setigers, 6.2 mm long, 0.55 mm maximum width (0.33 mm without parapodia). Ventral cirri begin on setiger 3 and emergent notopodial begin at setigers 6-7.

Distribution. Previously known from California to the Gulf of Los Angeles, Baja California as well as the French Mediterranean (Katzmann *et al.*1974). This extends its range in the eastern Pacific to Golfo Dulce, Costa Rica. Reported from eleven meters to abyssal depths.

Ancistrosyllis papillosa (Jones 1961)
(Fig. 19).
Ancistargis papillosus Jones 1961:3
Ancistrosyllis papillosa Pettibone 1966:170.
Ancistrosyllis sp. Maurer *et al.* 1988:48 (in part)
Ancistargis hamata (Hartman). Dean 1996a: 74 (in part)

Material Examined. Gulf of Nicoya, *Sta. 1*, 9°57'30"N, 84°53'00"W, 46 m, mud, July 1980,(1)(USNM 079928). *Sta. 24*, 9°49'25"N, 84°41'20"W, 11 m, sand, June 1981,(1 + 1 (UCR 1304)); Aug 1981,(2); *Sta. 28*, 9°52' 16"N, 84°45'30"W, 26 m, mud, July 1980, (1)(USNM 079931). *Sta. 30*, 9°54'40"N, 84° 45'50"W, 18 m, muddy sand, Apr 1981,(1).

Remarks. Complete specimen 44 setigers, 9.0 mm long, 0.5 mm maximum width (0.3 mm without parapodia). Emergent notopodial hooks begin on setiger 3, paired ventral eyespots weakly pigmented and often inconspicuous, a weakly developed median antenna on the posterior of the prostomium. Ventral cirri begin on setiger 3 and the dorsal cirri possess numerous elongate papillae. Setae are long capillaries and shorter pectinate setae with slightly falcate ends, lacking the "indistinct se-

condary tooth" of Wolf (1984, Fig. 29, 20 G-H).

Distribution. Previously reported from the intertidal to 46 meters from Florida and Texas in the Gulf of Mexico. This is the first record of this species in the eastern Pacific.

Ancistrosyllis jonesi Pettibone 1966
(Fig. 20).

Ancistrosylis jonesi Salazar-Vallejo 1987 (1986): 200.
Ancystrosyllis jonesi Pettibone 1966:173. León-González 1991: 311. Dean 1996a:74.
Ancystrosyllis sp. (in part) Maurer *et al.* 1988:48.

Material Examines. Gulf of Nicoya, *Sta. 24*, 9°49'25"N, 84°41'20"W, 11 m, sand, Oct 1980,(1 + 1(UCR 11201)). *Sta. 28*, 9°52'16"N, 84°45'30"W, 26 m, mud, July 1980,(1)(USNM 079932). *Sta. 29*, 9°54'55"N, 84°45'15"W, 18 m, muddy sand, Jan 1981,(2); June 1981,(1).
Remarks. Complete specimen with 66 setigers, 15.7 mm long, 0.8 mm maximum width (0.4 mm without parapodia). Body dorsoventrally flattened, dorsum with minute papillae, notopodial emergent hooks begin on setiger 6, ventral cirri begin on setiger 3, median antenna inconspicuous

Distribution. Previously described from Chesapeake Bay to Campeche, Mexico in the Atlantic Ocean and from Baja California Sur, Mexico. This extends its range in the eastern Pacific to the Gulf of Nicoya, Costa Rica. Previously collected from the intertidal to 60 meters.

Ancystrosyllis hartmanae Pettibone 1966
(Fig. 21).

Ancystrosyllis hartmanae Pettibone 1966:172. Wolf 1984:29.24.

Material Examined.Golfo Dulce, *Golfito Bay*, 8°38'N, 83°10'W, intertidal 2 Km west of main dock, muddy sand, Sept 1986; (1 + 1 (UCR).

Remarks. Complete specimen 36 setigers, 8.0 mm long, 0.7 mm maximum width (0.5 mm not including parapodia). Ventral cirri and emergent notopodial hooks begin on setiger 3 (third on the right and fourth on the right in Fig. 13), an inconspicuous median antenna. The distinct flexed anterior region of the digestive tract described by Pettibone (1960) is easily seen through the integument.

Distribution. Reported subtidally in 10-135 meters from Chesapeake Bay, USA and the Gulf of Mexico. This is the first record of this species in the eastern Pacific and its first recorded intertidal occurrence.

ACKNOWLEDGEMENTS

The numerous collection trips to Costa Rica have been made possible through the aid and encouragement of the University of Costa Rica's Centro de Investigación en Ciencias del Mar y Limnología (CIMAR) and its director José A. Vargas. This manuscript was improved by the review of an earlier draft by Edward Cutler, Department of Invertebrate Zoology, Museum of Comparative Zoology, Harvard University and other errors corrected by two anonymous reviewers.

RESUMEN

Se informa sobre 13 especies de poliquetos de la familia Pilargidae (Annelida: Polychaeta) de ambientes submareales e intermareales en la costa Pacífica de Costa Rica. Se describe la especie nueva *Sigambra vargasi* y se informa sobre *Sigambra* sp. A, aún no descrita. La ocurrencia en Costa Rica de *Sigambra tentaculata* (Treadwell), *Loandalia riojai* Salazar-Vallejo, *Pilargis berkeleyi* Monro, *Ancistrosyllis hamata* Hartman and *Ancistrosyllis jonesei* Pettibone, representa ampliaciones de ámbito para esas especies. La ocurrencia de *Sigambra pettiboneae* Harnann-Schroder, *Parandalia tricuspis* (Muller), *Cabira incerta* Webster, *Ancistrosyllis papillosa* Jones and *Ancistrosyllis hartmanae* Pettibone son nuevos hallazgos de estas especies en el Océano Pacifico Oriental costero de esta región. *Synelmis cf. albini* (Langerhans) también se menciona en este trabajo. Se incluye una clave dicotomica para la identificación de las especies de Pilargidae de Costa Rica.

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