Family Pilargidae (Polychaeta): new distributional ranges and a new record for the Chilean coast

La familia Pilargidae (Polychaeta): nuevos rangos de distribución y un nuevo registro para la costa de Chile

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ABSTRACT

Species of the family Pilargidae are revised based on bibliographic information and on specimens collected in soft bottoms, from 16 to 68 m depth, in three localities of the northern Chilean coast. Five genera and six species, including a new record for the Chilean fauna, *Parandalia fauveli*, are recognized. Synonyms, diagnostic features, geographic distribution data and illustrations are provided for each species. Abundance data and biomass, as well as granulometry and organic matter of the sediments where the specimens were collected, are also reported. Presence of *Pilargis berkeleyae* and *Sigambra bassi* in the collected material allows extension of their distributional ranges from approximately 35-36°S to 18°30'S. A taxonomic key to the six species of Pilargidae from the Chilean coast is provided.

Key words: Pilargidae, Chilean coast, taxonomy, geographical distribution, new record.

RESUMEN

Se revisan las especies de Pilargidae de la costa de Chile a partir de especímenes recolectados en fondos blandos sublitorales, entre 16 y 68 m de profundidad, en tres localidades del extremo norte del país, y se complementa con información bibliográfica. Se reconocen 5 géneros y seis especies incluyendo un nuevo registro para la fauna de Chile, *Parandalia fauveli*. Se incluye sinonimia, caracteres diagnósticos, distribución geográfica e ilustraciones para cada especie. De las especies recolectadas se entregan, además, valores de abundancia y biomasa así como también valores de granulometría y contenido de materia orgánica de los sedimentos que habitan. La presencia de *Pilargis berkeleyae* y *Sigambra bassi*, en el material recolectado, permite extender sus rangos de distribución hacia el norte de Chile desde aproximadamente 35-36°S hasta 18°30'S. Se incluye una clave taxonómica para las seis especies de pilárgidos de la costa de Chile.

Palabras clave: Pilargidae, costa de Chile, taxonomía, distribución geográfica, nuevo registro.

INTRODUCTION

The Pilargidae Saint-Joseph has been characterized by some authors as a badly defined taxon whose members, on occasion, have been placed among the Hesionidae or the Syllidae (Hartman 1947, Pettibone 1963). It has also been considered an enigmatic family because its species are, in general, scarce and of a supposedly very ample distribution (Salazar-Vallejo & Orensanz 1991). The pilargid species live in sand or muddy sand, from the intertidal zone down to great depths (Pettibone 1982). Day (1967) considers them as carnivores or omnivores, although according to Fauchald & Jumars (1979) there is no empirical

evidence on their feeding habits. Speculations about their feeding habits have been based only on anatomical observations (Wolf 1984).

The Pilargidae have been the subject of various general revisions: Hartman (1947), Pettibone (1966), Wolf (1984) and Salazar-Vallejo & Orensanz (1991).

On a global level, the family includes 50 species distributed in 10 genera (Pettibone 1982). Along the coasts of Chile, the knowledge on the pilargids goes back to findings from the "Lund University Chile Expedition" in 1948-1949 (Wesenberg-Lund 1962), the oceanographic expedition "Marchile I" in 1960, and collections realized in northern Chile (Hartmann-Schröder 1965), the expedition

of the USNS “Eltanin” in 1962-1966 (Hartman 1967), and subtidal samples obtained in the continental shelf off Bahía de Concepción (Cañete et al. 1990).

The objective of this study is to contribute to the knowledge of the pilargid species present along the Chilean coast. Based on specimens collected in northern Chile between Arica and Bahía de Mejillones, Antofagasta, diagnostic features, synonyms, geographical distribution and illustrations of each of the 6 species found in Chile are presented. Moreover, abundance and biomass data for the species collected in the present study, as well as granulometry and organic matter content of the sediments in which they were found, are reported.

MATERIALS AND METHODS

The species were collected between Arica (18°30’S) and Bahía de Mejillones (23°05’S), 16-68 m depth, between May 1996 and March 1998, as part of a project on diversity and polychaete abundance in subtidal soft-bottoms in northern Chile.

Three samples of sediment were taken with a 0.1 m² Van Veen type dredge at each site. The first two were used in obtaining the fauna, which was separated from the sediment with a 1.0 mm mesh net and fixed in 10% formalin neutralized with borax. Specimens were then sorted and identified to the species level, counted and weighed (wet weight, 0.001 g precision scale). The last sample dredged was used in determining the organic matter content and granulometric characteristics of the sediment.

Figures were prepared by means of a camera lucida on a Wild M-5 stereoscopic microscope.

Numbers in parenthesis in the section corresponding to the material examined indicate the number of specimens examined.

The specimens are deposited in the polychaete collection in the Sala de Sistemática, Departamento de Ecología, Pontificia Universidad Católica de Chile, Santiago (SSUC).

KEY TO THE GENERA AND SPECIES OF PILARGIDAE
RECORDED FROM THE SOUTHEASTERN
PACIFIC OCEAN OFF CHILE

- 1 (2) Notopodia with stout protruding hooks or spines 3
- 2 (1) Notopodia without protruding hooks or spines genus *Pilargis*
..... *Pilargis berkeleyae*

- 3 (4) Notopodia with recurved protruding hooks 5
- 4 (3) Notopodia with stout, straight spines .. 9
- 5 (6) Antennae shorter than palps; integument papillated genus *Ancistrosyllis*
..... 7
- 6 (5) Antennae longer than palps; integument smooth genus *Sigambra*
..... *Sigambra bassi*
- 7 (8) Ventral cirri beginning on setiger 1; 2 pairs of tentacular cirri
..... *Ancistrosyllis groenlandica*
- 8 (7) Ventral cirri beginning on setiger 4; 1 pair of tentacular cirri *Ancistrosyllis quellina*
- 9 (10) Prostomial antennae and peristomial cirri present genus *Synelmis*
..... *Synelmis albin*
- 10 (9) Prostomial antennae and peristomial cirri absent genus *Parandalia*
..... *Parandalia fauveli*

Ancistrosyllis groenlandica McIntosh, 1879
(Fig. 1 A-C)

Ancistrosyllis groenlandica McIntosh, 1879: 502, pl. 65, figs. 3, 20; Pettibone, 1966: 166-168; Hartman, 1967: 53; Imajima, 1987: 153-155, fig. 2 a-k; Salazar-Vallejo & Orensanz, 1991: 271-272, fig. 2 A-D.

Description and figures adapted from Pettibone (1966).

Description: Up to 40 mm in length, width 1mm, up to 70 segments. Body flattened dorsoventrally, widest in middle region, tapering anteriorly and posteriorly. With conspicuous rust-colored glandular areas in anterior part of notopodial lobe, beginning on setiger 4, and ventrally near bases of parapodia. Integument covered with numerous scattered short papillae. Prostomium (Fig. 1A) with large palpophores and small button-like palpostyles; with three small subequal antennae shorter than palps; without eyes. Proboscis short, cylindrical, with few scattered papillae. Peristomium with two pairs of short subequal cirri, similar to antennae. Dorsal cirri of first segment about twice as long as those of the second segment. Dorsal cirri short and fusiform, extending slightly beyond neuropodial lobes. From setiger 4 to 6, notopodia (Fig. 1B) with somewhat inflated notoacicular lobes and protruding hooked setae (Fig. 1C). Neuropodial lobe conical, with neuroaciculum and neurosetae (Fig. 1C) variable in length. Pygidium rounded, with paired short anal cirri similar to dorsal cirri.

Fig. 1. *Ancistrostylis groenlandica* (after Pettibone 1966), A) anterior end in dorsal view; B) middle parapodium; C) notopodial hooked seta and neurosetae. *Ancistrostylis quellina* (after Wesenberg-Lund 1962), D) anterior end in dorsal view; E) 16th parapodium from the right side, dorsal view; F) seta. *Parandalia fauveli*, G) anterior end in dorsal view; H) 12th parapodium; I) neuropodial seta from 12th parapodium.

Ancistrostylis groenlandica (según Pettibone 1966), A) extremo anterior, vista dorsal; B) parápodo medio; C) seta ganchuda notopodial y neuroseta. *Ancistrostylis quellina* (según Wesenberg-Lund 1962), D) extremo anterior, vista dorsal; E) parápodo 16 del lado derecho, vista dorsal; F) seta. *Parandalia fauveli*, G) extremo anterior, vista dorsal; H) parápodo 12; I) seta neuropodial del parápodo 12.

Distribution: West Greenland; British Isles; Gulf of St. Lawrence to offshore New Jersey; Mediterranean; West Africa; Japan; off northeastern South America (Pettibone 1966, Imajima 1987); Falkland Islands (Hartman 1967); southwestern Chile off Arauco, 957 m, off Isla de Chiloé, 3651-3655 m; Strait of Magellan, Paso del Hambre, 485 m; Drake Passage, NW of South Shetland Islands, 3867-4086 m (Hartman 1967, Rozbaczylo 1985).

Ancistrosyllis quellina Wesenberg-Lund, 1962 (Fig. 1 D-F)

Ancistrosyllis quellina Wesenberg-Lund, 1962: 68-73, figs. 22-26.

Description and figures adapted from Wesenberg-Lund (op. cit.).

Description: Complete specimens with 28 and 43 setigers measuring 5 and 9.5 mm, respectively. The colour is yellowish-brown; on the anterior border of each parapodium there is a rusty red patch. Prostomial lobe small and inconspicuous (Fig. 1D); palpophores massive and broad forming the convex margin of the head; they are nearly fused, and from their ventral side a pair of palpostyles arise. Two oblong dark eyespots on each side of the head. A small, unpaired, conical antenna between the eyes; no lateral antennae were observed. Pharynx muscular, cylindrical, very long, reaching backwards, internally, to the 6th setiger; a circle of about 14 large liguliform papillae bordering the oral aperture, was observed through the transparent body; without jaws. Peristomium asetigerous, with a single pair of small, subulate tentacular cirri. The three anteriormost parapodia uniramous, the rest sesquiramous; the former are rather blunt, the rest gradually getting longer and more conical. First parapodium with dorsal cirrus twice as long as those of following parapodia; no ventral cirri in the first three parapodia. From the fourth setiger there is a reduced, liguliform notopodium and a much longer, pointed neuropodium, both with short subulate cirrus. Notopodia (Fig. 1E), from the 4th segment to the last but two, with a single, large, coarse, strongly curved, transparent hook, rising above the base of the dorsal cirrus. Up to 12 neurosetae, smooth (Fig. 1F). Pygidium with two short, digitiform anal cirri.

Distribution: Up until now, known only for type locality, Golfo de Ancud, SW of Isla Queullín, 300 m.

Remarks: According to Wesenberg-Lund (op. cit.), *A. quellina* is most similar to *A. groenlandica* McIntosh, but they differ by the following characteristics present in the former species: only one pair of peristomial cirri; no ventral cirrus in the first three setigers; notopodium with only a single hook (*A. groenlandica* also has a slender bristle); neuropodial bristles differing in length and without wings or claw. It also has been pointed out the absence of prostomial paired antennae in *A. quellina*, but this is a characteristic that needs confirmation.

Parandalia fauveli (Berkeley and Berkeley, 1941) (Fig. 1 G-I)

Loandalia fauveli Berkeley and Berkeley, 1941: 30, figs. 4-6; Pettibone, 1966: 196-199, figs. 22-23; Hartman, 1968: 379, figs. 1-3.

Loandalia americana Hartman, 1947: 506-509, pl. 63, figs. 1-7; 1951: 39, pl. 12, figs. 1-3.

Occurrence: AS004 (2), AS007(2), AS008 (1), MS019 (5)

Description: Length of the larger complete specimen 32 mm, width 1.5 mm, 96 setigers. Those preserved in alcohol are iridescent, light brown in colour. Body elongated, subcylindrical, with inflated anterior region through first 6 setigers (Fig. 1G). Prostomium small, subtriangular, widest at its posterior margin, with palpophores indistinct from rest of prostomium; without antennae, eyes or other visible structures. Palpi biarticulate, directed forward, with minute palpostyles, more or less telescoped within palpophores. Peristomium somewhat longer than the next segment (first setigerous segment); shallowly emarginate at its anterior dorsal edge where it meets the prostomium. First pair of parapodia uniramous, the remainder subbiramous. Notopodia beginning on setiger 2, shaped like small papillar lobes (Fig. 1H), with stout crystal-clear notoacacula present from setiger 7 to the end of body; with additional slender notosetae, 0-3 in number. Neuropodia cylindro-conical with small lobe ("ventral cirrus") on ventral side of their distal ends, from setiger 6. Neurosetae simple (Fig. 1I), geniculate or curved, tapering to fine tips, with numerous transverse spinous rows. Pygidium a rounded anal plate, concave ventrally, with pair of lateral cirri and midventral one; the lateral are much longer and measure approximately 1.5 to 2 times the length of pygidium.

Remarks: This represents the first record of the species in the southeastern Pacific Ocean off Chile.

Distribution: Southern California; Gulf of Mexico (Florida, Mississippi, Louisiana); Central America, Guatemala (Pettibone 1966); Bay of Ancón, Perú (Tarazona et al. 1988, 1996); Chile, from Arica (18°30'S) to Mejillones, Antofagasta (23°05'S), between 16 and 40 m depth.

Ecological remarks: Organisms of this species were collected in Arica, Iquique and Mejillones, in 16 and 40 m depth, in fine sandy-type sediment ($1.87 < \phi < 3.14$), with low values of mud-clay (0.08 and 4.73%) and total organic matter values in the sediment of 1.71 and 8.88%. Specimens were collected in March 1997 and March 1998 with abundances of 1 and 11 ind/0.2m², and biomass ranging from 0.01 to 6.02 g/0.2m².

Pilargis berkeleyae Monroe, 1933 (Fig. 2 A-B)

Pilargis berkeleyi [sic] Monroe, 1933: 673-675, figs. 1-4; Hartman, 1947: 491-494, pl. 59, figs. 1-8; 1968: 383, figs. 1-5.

Pilargis berkeleyae: Pettibone, 1966: 161-164, figs. 1-2; Kirkegaard, 1983: 211; Imajima, 1987: 162-164; Cañete, Gallardo & Carrasco, 1990: 154-156; Salazar-Vallejo & Orensanz, 1991: 274-275, fig. 3 a-c.

Occurrence: MS013 (1), MS006 (1)

Description: Length of the largest complete specimen 23 mm, width 2.5 mm, 97 setigers. Colour in preserved specimens yellowish-brown. Body flattened, ribbon-like, tapered anteriorly and posteriorly. Integument minutely papillated on body and appendages. Prostomium small (Fig. 2A) with paired short lateral antennae; with ovate palpophores and minute palpostyles. Peristomium fused with prostomium, with two pairs of short tentacular cirri, fusiform, dorsal pair slightly longer than ventral pair. All parapodia subbiramous (Fig. 2B); notoacacula colorless, without notosetae; dorsal cirri conical to ovate. Dorsal cirri of first setigerous segment longer than following. From setiger 7 notopodia with cirrophores clearly thicker than those of anteriormost segments. Reddish to dark-brown glandular areas in anterior face of notopodial cirrophores from setiger 9-10 to the end of the body; also with small pigmented glandular areas at the ventral base of neuropodia from setiger 10 to approximately the end of body. Neuropodia conical, with stout neuroacacula and bundle of

simple neurosetae; neurosetae variable in length, finely serrated on anterior edge, falcate and bidentate; ventral cirri conical. Pygidium rounded with 2 conical anal cirri.

Distribution: Washington to southern California (Pettibone 1966); Posyet Bay (Sea of Japan); Japan (Imajima 1987); West Africa; Liberia, off the Congo River; Angola (Kirkegaard 1983); Río de la Plata, off Uruguay (Salazar-Vallejo & Orensanz 1991); Chile, from Arica (18°30' S) to Concepción (36°31'S), between 23 and 70 m depth.

Ecological remarks: Organisms of this species were collected in Arica, Iquique and Mejillones in 23 and 68 m depth, in fine sandy-type sediments ($2.64 < \phi < 3.14$), with low values of mud-clay (0.33 and 4.73%) and total organic matter values in the sediments of 1.71 and 2.15%. Specimens were collected in November 1997 and March 1998 with abundances of 1 and 9 ind/0.2m² and biomass ranging from 0.05 to 0.12 g/0.2m².

Sigambra bassi (Hartman, 1947) (Fig. 2 C-D)

Ancistrosyllis bassi Hartman, 1947: 501-504, pl. 61, figs. 1-8; Hartmann-Schröder, 1965: 109-110.

Sigambra bassi: Pettibone, 1966: 186, fig. 16; Gardiner, 1975: 123, fig. 9d-f.

Occurrence: AS001(1), TS002(1), TS012(1), MS004(2)

Description: Length of the largest complete specimen 20 mm, width 2 mm, 105 setigers. Colour in preserved specimens yellowish-brown. Integument smooth, without papillae. Body flattened dorsoventrally, widest in anterior region. Prostomium (Fig. 2C) with biarticulate palps with large palpophores and small palpostyles; with a median antenna on posterior part of prostomium and two shorter ones laterally. There are no eyes. The everted proboscis is cylindrical, with circlet of 14 conical papillae distally. Peristomium, or tentacular segment, longer than following ones, with 2 pairs of tentacular cirri similar to lateral antennae. First setigerous segment with a pair of dorsal cirri similar to the median prostomial antenna; the ventral cirri are much smaller, resembling those farther back. All parapodia subbiramous (Fig. 2D); notopodia low conical, with stout notopodial hooked notoseta beginning on about setiger 15; dorsal cirri long, subulate. Neuropodia conical, with neuroaciculum and numerous capillary neurosetae of different length; longer ones slender, smooth or faintly serrated, shorter ones serrated; ventral cirri cirriform. Pygidium with paired long anal cirri.

Fig. 2. *Pilargis berkeleyae*, A) anterior end in dorsal view; B) parapodium 20. *Sigambra bassi*, C) anterior end in dorsal view; D) parapodium 20. *Synelmis albini* (after Hartmann-Schröder 1965), E) anterior end in dorsal view; F) posterior parapodium in posterior view; G) inferior neuropodial seta and forked neuroseta.

Pilargis berkeleyae, A) extremo anterior, vista dorsal; B) parápodo 20. *Sigambra bassi*, C) extremo anterior, vista dorsal; D) parápodo 20. *Synelmis albini* (según Hartmann-Schröder 1965), E) extremo anterior, vista dorsal; F) parápodo posterior, vista posterior; G) seta neuropodial inferior y neuroseta ahorquillada.

Distribution: North Carolina; Florida; central and southern California, intertidal to 33 m (Pettibone 1966, Gardiner 1975); Chile, from Arica (18°30'S) to Concepción (36°32'S), between 19 and 94 m depth.

Ecological remarks: This species was collected in Arica, Tocopilla and Mejillones, in 19 and 68 m depth, in fine and very fine sandy-type sediments ($1.87 < \phi < 3.14$), with low values of mud-clay (0.08 and 4.73%) and total organic matter values in the sediments of 1.71 and 8.88%. Specimens were collected in November 1997 and

March 1998 with abundances of 1 and 2 ind/0.2m² and biomass ranging from 0.01 to 0.04 g/0.2m².

Synelmis albini (Langerhans, 1881) (Fig. 2 E-G)

Ancistrosyllis albini Langerhans, 1881: 107-108, fig. 16 a-e.

Ancistrosyllis rigida: Hartmann-Schröder, 1965: 285-287, figs. 286-288.

Synelmis albini: Pettibone, 1966: 191-195, figs. 19-21; Westheide, 1974: 223-225, figs. 12-13;

Gardiner, 1975: 120-122, fig. 9b; Imajima, 1987: 157-158, fig. 4 a-k.

Description adapted from Pettibone (1966) and figures taken from Hartmann-Schröder (1965).

Description: Length to 60 mm, width to 1.5 mm, up to 170 segments. Body elongate, subcylindrical, tapered posteriorly, segmental grooves indistinct anterodorsally, with parapodia distinctly set off from body. Colour in preserved specimens yellowish to reddish, dark brown, iridescent, with reddish glandular areas at bases of parapodia. Integument with thick, smooth, iridescent cuticle, without papillae. Prostomium with pair of biarticulate palps sometimes turned ventrally; palpophores large, oval; palpostyles small, oval, sometimes retracted within palpophores; with 3 short antennae; with pair of posterior eyes, each 2-4 contiguous spots. Proboscis long, cylindrical, muscular, without papillae. Peristomium (tentacular segment) prominent, overhanging prostomium and forming ventral lip, achaetous, with 2 pairs of subequal tentacular cirri. Dorsal cirri of first setiger similar to following. Parapodia subbiramous, with dorsal and ventral cirri subequal, subulate to oval with acuminate tips. Notopodia with 1-2 notoacacula and stout, protruding, straight or slightly bent, acicular notosetae, beginning on setiger 5-20 (difficult to detect, not emergent at first). Neuropodia short, cylindrical, with 3 neuroacacula and bundle of neurosetae. Neurosetae limbate, tapering to capillary tips. Pygidium rounded, with pair of anal cirri similar to dorsal and ventral cirri.

Remarks: This species is known in Chile only through its record in Taltal (25°25'S), by Hartmann-Schröder (1965).

Distribution: Widespread in tropical and subtropical waters; Canary Islands; southern to Lower California; Panama; Florida; Marshall Islands; Tuamotu Islands; Gambier Islands; Red Sea; Indian Ocean; Japan (Imajima 1987); North Carolina to Brazil (Gardiner 1975); Galapagos Islands (Westheide 1974); Chile: Taltal, 0.5 m (Hartmann-Schröder 1965).

CONCLUDING REMARKS

In the southeastern Pacific Ocean, off the Chilean coast, a total of 6 pilargid species distributed in 5 genera have been registered until now. The distribution ranges are extended farther north for two of the 5 previously known species (*Pilargis berkeleyae* Monroe, 1933 and *Sigambra bassi*

(Hartman, 1947)) and *Parandalia fauveli* (Berkeley and Berkeley, 1941) is registered for the first time in the southeastern Pacific Ocean between Arica and Antofagasta. These results support the hypothesis that a lower number of registered polychaete species in northern Chile, between 18° and 32°S, in comparison to central (32°-44°S) and southern (44°-56°S) Chile is due, in part, to low sampling intensity in this zone, compared to the other two (Rozbaczylo & Simonetti, 2000).

The first bioecological antecedents on the pilargid species on the coast of Chile are given for posterior comparisons with other localities. The species *Parandalia fauveli*, *Pilargis berkeleyae* and *Sigambra bassi* are characterized by inhabiting fine sand sediments, with low mud-clay and total organic matter values between 1.71 and 8.88%; the lowest abundance values were found in *Sigambra bassi* (1-2 ind/0.2 m²), while the highest reached abundance was for *Parandalia fauveli* (11 ind/0.2m²).

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APPENDIX 1

List of the stations where the analyzed Pilargidae have been found

Listado de las estaciones donde han sido encontrados los Pilargidae **analizados**

AS001: Arica, 18°30'53"S, 70°19'20"W, 19 m
AS004: Arica, 18°31'16"S, 70°19'33"W, 23 m
AS007: Arica, 18°30'41"S, 70°19'32"W, 30 m
AS008: Arica, 18°31'05"S, 70°19'20"W, 16 m

TS002: Tocopilla, 22°04'16"S, 70°11'50"W, 29 m
TS012: Tocopilla, 22°04'13"S, 70°12'08"W, 51 m

MS004: Mejillones, 23°04'21"S, 70°25'32"W, 68 m
MS006: Mejillones, 23°04'24"S, 70°25'32"W, 68 m
MS013: Mejillones, 23°04'21"S, 70°25'42"W, 46 m
MS019: Mejillones, 23°05'18"S, 70°26'33"W, 40 m