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Short Communication

First record of *Parasphaerosyllis indica* Monro, 1937 (Polychaetae: Syllidae) from Easter Island, Chile

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ABSTRACT. This study is the first to report the presence of the polychaete *Parasphaerosyllis indica* Monro, 1937 (Syllidae) near the coastal areas of Easter Island (27°10'S, 109°20'W). This species has a circumtropical geographic distribution and low abundance and frequency rates in relation to other Syllidae species (12) collected from Easter Island. With *P. indica*, the benthic polychaetes biodiversity of Easter Island is now 71 species.

Keywords: *Parasphaerosyllis indica*, Polychaetae, Syllidae, tropical benthos, biodiversity, Easter Island.

Thirteen articles account for most descriptions of Easter Island (27º10'S, 109º20'W) polychaetes (Chamberlin, 1919; Augener 1922; Fauvel, 1936; Hartmann-Schröder, 1962; Kohn & Lloyd, 1973a, 1973b; Rozbaczylo, 1985; Castilla & Rozbaczylo, 1988; Di Salvo *et al.*, 1988; Rozbaczylo & Castilla, 1988; Cañete, 1989, 1997, 2016; Boyko, 2003). These works describe 70 species present along Easter Island's littoral zone (Kohn & Lloyd, 1973b; Fernández *et al.*, 2014). Most are circumtropically distributed and are present in the western Indo-Pacific (Kohn & Lloyd, 1973b; Fernández & Hormazábal, 2014).

However, analyses of new intertidal and subtidal samples identified *Parasphaerosyllis indica*, a previously unreported species from Easter Island coastal areas. The aim of this work is to contribute towards improving knowledge on the biodiversity of benthic polychaetes at this remote site.

Currently, the *Parasphaerosyllis* genus is comprised of five validated species: *P. indica* Monro, 1937; *P. uschacovi* (Chlebovitsch 1959); *P. ezoensis* Imajima & Hartman, 1964; *P. setoensis* Imajima, 1966; and *P. malimalii* (Capa *et al.*, 2001). Analysis of approximately 60 samples collected over three summer periods (1983-1985) (Di Salvo *et al.*, 1988; Cañete, 2016) resulted in the identification of 13 specimens of *P. indica* present in two samples.

Parasphaerosyllis indica Monro, 1937

(Figs. 1a-1g)

Synonymy

Parasphaerosyllis indica Monro, 1937: 273, text-fig. 8.- Fauvel, 1939: 298; 1950: 351; 1953: 9.-Fauvel & Rullier, 1959: 514.- Rioja, 1958: 246, figs 21-27.- Hartmann-Schröder, 1960: 84, pl. 6, Fig. 50; 1980: 49; 1987: 32; 1991: 27.- Westheide, 1974: 64, Figs. 27-29.- San Martín, 1991: 234 -San Martín *et al.*, 2008: Figs. 19e-f, 22a-e, 24a-b. - Liñero-Arana & Díaz-Díaz, 2011: Figs. 4.8-4.10.

Study material

Specimens were collected either manually or during scuba dive by Dr. L.H. Di Salvo (Di Salvo *et al.*, 1988). These were fixed in 10% formaldehyde and deposited for storage in the Systematics Room of the Pontifical Universidad Católica de Chile (SSUC; Santiago, Chile - Easter Island polychaetes). One (1) *P. indica* specimen was collected from Site 10 (1983), *i.e.* Apina Nui, 1 m depth, intertidal pool, under a stone where presence of the cirripede *Euraphia devaneyi* Foster & Newman, 1987 was also recorded. The remaining 12 specimens were found at Site 40 (1985), *i.e.* Hanga Roa, 3 m depth, between tubeworm aggregations constructed by the chaetopterid polychaete *Phyllochaetopterus verrilli* Treadwell, 1943 and *Mesochaetopterus minutus* Potts, 1914 (Cañete, 1989).

Description

The largest specimen measured 7 mm length and 1 mm width, had 74 chaetigers, and had a body that was elon-

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gated, thin, and whitish to transparent. The prostomium was round to oval, with four small, trapezoidal-arranged black eyes. A median antenna was inserted between the posterior eye pair, while side antennae with 22 to 25 articles were inserted towards the anterior margin of the prostomium, in front of the anterior eye pair. Palps fused at the base and were smaller in size than the prostomium. No nuchal organs were observed. The peristomium was shorter than subsequent segments, while the tentacular cirri of the dorsal margin were long and had 40 articles, and, compared to the anterior cirrus, the ventral tentacular cirrus was shorter and presented half the articles than did the anterior cirrus. Dorsal cirri between chaetigers 1 to 18 were all articulated; of similar size; and oriented from the proventricle to the posterior end of the body. The articulated dorsal cirri (25 to 42 articles) alternated with short, unarticulated dorsal cirri that were oval in shape and had a digitiform, short cirrostyle with some muscle fibrils (Fig. 1a). Dorsally bilobed parapodia were supported by one acicula (Fig. 1b).

The cirriform ventral cirrus was slightly longer than the parapodial lobe. The falciger chaetae were compound heterogomph (Figs. 1c-1d), and the distal zone of the base of these chaetae had thin spines and a bidentate blade with similarly sized teeth (Fig. 1c). The anterior parapodia had five to eight compound chaetae that decreased in the posterior segments to four or five; parapodia were articulated and globular cirri, with the same number and type of chaetiger chaetae. Simple capillary chaetae in the posterior segments were distally curved, blunt, unidentate, and with a scarce number of thin subdistal spines (Fig. 1e). There was only one acicula, which was thin and had a slightly curved tip (Fig. 1f). The only capillary setae in the ventral margin of the parapodium were present in the posterior segments, were bidentate, had similarly sized teeth, and showed thin subdistal spines (Fig. 1g). The pharynx extended from seven to eight segments (between segments one and eight), while the rectangular proventricle extended from seven to eight segments (segments 9 to 16) and possessed 22 to 27 rows of papillae.

Taxonomic note

Parasphaerosyllis was similar to representatives of the *Syllis* genus, differing only in the aspect of the globular dorsal cirrus (Figs. 1a-1b); *Syllis* show only one type of short, articulated dorsal cirri with <10 articles. *Syllis armillaris* (Kohn & Lloyd, 1973b) has been reported at Easter Island, which could cause confusion with *P. indica* (San Martín *et al.*, 2008). However, the globular dorsal cirrus appearance, which is accompanied by a cirriform stylode, allows for proper differentiation. Liñero-Arana & Díaz-Díaz (2011) reported that on the Caribbean coast of Venezuela, *P. indica* has a shorter pharynx (six chaetigers) and that it proventricle extends from three to five chaetigers, unlike Easter Island specimens. Capa *et al*. (2001) described *P. malimalii*, which differs from *P. indica* by having thick simple chaetae in the median and posterior parapodia, in addition to having short shafts of the compound chaetae with a small proximal tooth. Additionally, the globular dorsal cirrus appeared in *P. indica* between chaetigers 16 to 18, while in *P. malimalii* it begins to appear at chaetiger 20. *P. setoensisis* Imajima, 1996 could be synonymous with *P. indica* (Capa *et al.*, 2001). *P. uschakovi* collected at the Kuril Islands and *P. ezoensis* Imajima & Hartman, 1964 collected in Korea and the northern coast of Japan differed from *P. malimalii* in having an oval distal cirrus digitiform at the end of the globular dorsal cirrus.

Habitat

P. indica was found living in ponds of the rocky intertidal zone, on calcareous algae and biogenic residues originated from corals, and between tubes of subtidal chaetopterid polychaete of Easter Island (Di Salvo *et al.*, 1988).

Geographic distribution

This species is distributed among circumtropical and warm temperate waters. According to San Martín *et al.* (2008), *P. indica* is also distributed in the Atlantic Ocean (*e.g.*, Canary Islands, Cape Verde Islands, Cuba, and Venezuelan Caribbean) (Liñero-Arana & Díaz-Díaz, 2011); in the Pacific Ocean (*e.g.*, Panama, Mexico, Galapagos Islands, Ecuador, and Easter Island, Chile); and in the Indian Ocean (*e.g.*, Arabian Peninsula and northern, western, and southern coast of Australia). These populations are believed to be a single species. However, molecular studies are needed to establish a complex of sibling species (San Martín *et al.*, 2008). Finally, Imajima & Hartman (1964) described *P. ezoensis* at the northern coast of Japan, so it is likely that both are different species.

Members of the Syllidae family are particularly important in cryptic environments such as sponges, dead coral remains, basaltic rocks, and biogenic sediments (Kohn & Lloyd, 1973a, 1973b), where they can dominate in terms of abundance and species richness (Ochoa-Rivera *et al.*, 2000; Cinar & Ergen, 2002). According to Kohn & Lloyd (1973b), 50% of the polychaete abundance at Easter Islands was provided by members of the Syllidae family, providing 65% of all the individuals found in samples that consisted in a mixture of sand and algae, and 35% in samples consisting of intertidal basalt boulders.

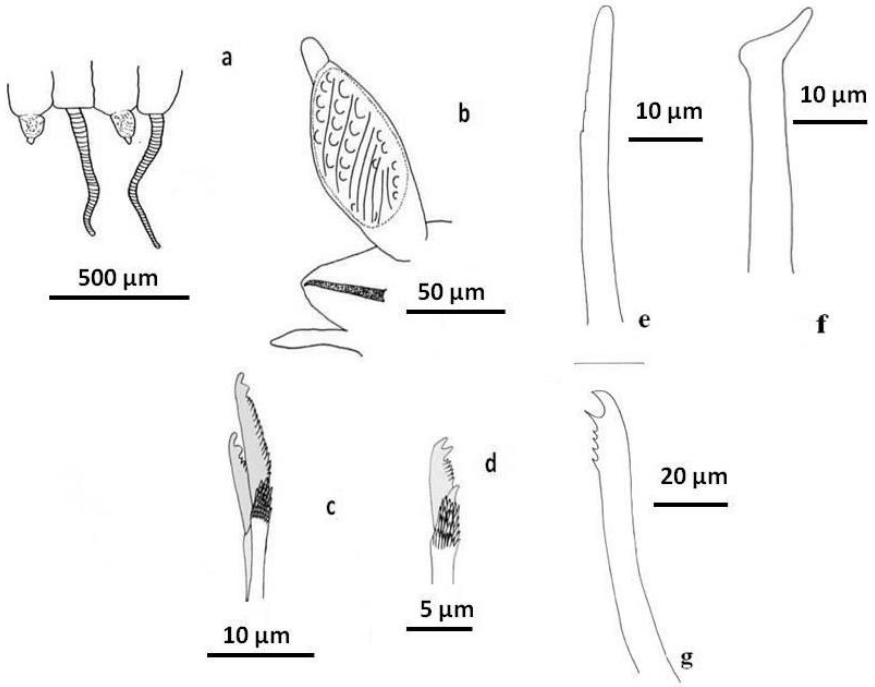

Figure 1. *Parasphaeroyllis indica* a) dorsal view of segments 18-21, showing the pattern of dorsal articulated cirri intercalated with globular dorsal cirri, b) anterior view, parapodium 58, with globular dorsal cirrus that has a digitiform distal end, c) falciger, heterogomph, and bidentate chaetae of anterior parapodia, large shaft, d) falciger, heterogomph, and bidentate chaetae of anterior parapodia, short shaft, e) serrated, dorsal simple chaeta, medium setiger, f) acicula, posterior parapodium, and g) ventral, simple bidentade chaeta.

With this new record, the number of benthic polychaete species reported for the littoral zone of Easter Island increases to approximately 71 (Kohn & Lloyd, 1973b; Cañete, 1989, 1997), and the number of Syllidae family representatives registered to date at the island increases to 13. Finally, it is important to stress the urgent need to know the current status of the benthic biodiversity at Easter Island, particularly as the government is discussing if the island should be part of a large park for protecting marine biodiversity (Boyko 2003, Cañete, 2016). Chilean oceanic islands have received little attention, both scientifically and in terms of conservation. In fact, the first marine protected areas surrounding these islands were created in the last two years, ten years after the same occurred for Chilean continental islands. This occurred despite the high concentration of endemic species (Di Salvo *et al.*, 1988; Fernández & Hormazábal, 2014; Fernández *et al*., 2014) and the increasing pressure from fisheries activities around the Chilean oceanic islands (Castilla & Rozbaczylo, 1987; Zylich *et al*., 2014).

According to the biogeographic system proposed by Spalding *et al.* (2007), 'realms' are continental and subcontinental areas with common geographic and biotic characteristics, whose biota has internal coherence at high taxonomic levels due to a common evolutionary history and high endemism of genera and families. Therefore, the distribution range of *P. indica* shows a spatial coverage that, in 'realm' levels, includes the following areas: i) west Indo-Pacific, ii) central Indo-Pacific, iii) east Indo-Pacific, iv) Tropical East Pacific, and v) Tropical Atlantic. This geographical distribution can be explained by the reproductive strategy of Syllidae polychaetes, which are capable of forming stolons through an asexual process termed schizogamy. Reproductive specimens can swim to the sea surface and can be transported in the water column over long distances (San Martín *et al.*, 2008).

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