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Short communication

**A new species of polychaete worm from Juan Fernández Archipelago, Chile,
Scoloplos juanfernandezensis n. sp. (Polychaeta: Orbiniidae)**

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ABSTRACT. A new species of Orbiniidae, *Scoloplos juanfernandezensis* n. sp. from the Robinson Crusoe Island (33°37'S, 78°51'W), Juan Fernández Archipelago, Chile, is described. The samples were collected by means of SCUBA from depths between 4 and 10 m, between the years 2008 and 2012. This is the first record of the family Orbiniidae for the Juan Fernández Archipelago. The new species is principally characterized by the dichotomously branched branchiae in the mid-posterior chaetigers with 2 to 4 terminal filaments, thoracic neuropodial hooks hooded, neuropodial acicula embedded with straight distal end, emergence of the first branchiae between chaetigers 20-28, but starting not always occurs on both sides of the segment at a time, the absence of subpodials papillae and the morphology of the parapodia. *Scoloplos juanfernandezensis* most closely resembles *Scoloplos cylindrifer* Ehlers, 1905, from New Zealand and Australia and *Leodamas latum* (Chamberlin, 1919) from Pacific side of Panamá.

Keywords: benthic polychaetes, annelids, Orbiniids, biodiversity, Southeastern Pacific Ocean.

Orbiniids comprise a family of worldwide distributed, moderate sized, sediment burrowers and non-selective deposit-feeders polychaetes found in all depths, from shallow tidal zone to abyssal deep water. They are easily recognized by the form of their elongate body divided into a wide anterior thoracic region formed of firm, muscular, dorso-ventrally flattened expanded segments and a posterior abdominal region consisting of numerous, soft and fragile segments that are rounded in cross section. The prostomium is smooth, conical, more or less acutely pointed, globular, broad, or spatulate; without any sensory appendages or palps, but nuchal slits or depressions are sometimes present; with a pair of small eyes sometimes present. The proboscis is unarmed and when everted is either saclike or branched. The peristomium consists of one or two achaetous rings (Blake, 1996; Glasby, 2000; Solís-Weiss *et al.*, 2009). Worldwide, the Orbiniidae consist of 17 genera and about 150 species (Zhadan *et al.*, 2015).

The polychaete fauna of the Juan Fernández Archipelago (JFA) has been understudied with only few investigations. Ehlers (1901) studied the polychaetes collected by the German zoologist Dr. Ludwig H. Plate, along the Chilean coast and the JFA, from May 1893 to May 1895; Augener (1922) studied

the polychaetes collected by Käre Bäckström in the JFA during the Swedish Pacific Expedition, 1916-1917; and more recently, Blake (1983) studied the Spionidae collected in the JFA by the R/V Anton Bruun, from November 1965 to May 1966, as part of the Southeastern Pacific Biological and Oceanographic Program (SEPBOP).

Rozbaczylo & Castilla (1987) reviewed the polychaete literature from the JFA and reported 43 known species of polychaetes distributed in 18 families, with a 25% of endemism.

In this study, we report for the first time the presence of the family Orbiniidae in the Juan Fernández Archipelago and we describe a new species of the genus *Scoloplos*, *S. juanfernandezensis* n. sp. The new species is characterized, and differs from other species of the genus mainly by the location of the first pair of branchiae, by having dichotomously branched branchiae in the mid-posterior chaetigers, the absence of subpodial papillae and the morphology of the parapodia.

Recent studies by Blake (2000), Kruse *et al.* (2004), Bleidorn (2005), Bleidorn *et al.* (2009), Dean & Blake (2015), and Zhadan *et al.* (2015) have helped to clarify some questions about the family Orbiniidae and the ge-

nus *Scoloplos*. Blake (2000), Bleidorn (2005), Bleidorn *et al.* (2009) and Dean & Blake (2015) have considered the subgenera *Scoloplos* and *Leodamas* as separate genera because they are not closely related and do not constitute sister groups.

The Juan Fernández Archipelago is located in the Southeastern Pacific Ocean, approximately 650 km west from Valparaíso and is constituted from three main islands: Robinson Crusoe (33°37'S, 78°51'W), Santa Clara (33°42'S, 79°01'W), and Alejandro Selkirk (33°45'S, 80°45'W) (Rozbaczylo & Castilla, 1987). Benthic samples were collected in various locations around the Robinson Crusoe Island (33°37'S, 78°51'W) (Fig. 1), by means of SCUBA, from depths between 4 and 10 m, between the years 2008 and 2012. Specimens were fixed in 10% formalin and preserved in 70% ethanol. Specimens were observed and photographed with a stereomicroscope, a trinocular phase contrast microscope with a high resolution digital camera. Drawings of Figure 2 were made with a drawing tube on a stereoscopic microscope (Figs. 2, 3c) was taken with a Cyber-shot camera. To add contrast to external structures, such as parapodia, branchiae, and papillae, the specimens were dyed with methyl green, Rose Bengal and an aqueous solution of methylene blue. Type specimens have been deposited in the Museo Nacional de Historia Natural, Santiago (MNHCL ANN), and in the "Colección de Flora y Fauna Profesor Patricio Sánchez Reyes", Departamento de Ecología, Facultad de Ciencias Biológicas, Pontificia Universidad Católica de Chile, Santiago (SSUC). Non-type specimens are deposited in the reference collection of FAUNAMAR Ltda., Santiago.

Taxonomic account

Genus *Scoloplos* Blainville, 1828

Diagnosis. Prostomium pointed, conical; single achaetous peristomial ring. Thoracic neuropodia bearing crenulated capillaries and hooks arranged in one or more rows; abdominal furcate and flailed notochaetae present or absent. Abdominal neuropodia with embedded, non-projecting acicula. Branchiae simple or branched, from chaetiger 8 or later. 1-2 thoracic neuropodial podial papillae, 0-2 thoracic subpodial papillae, 0-4 abdominal subpodial papillae, stomach papillae absent (Zhadan *et al.*, 2015).

Scoloplos juanfernandezensis n. sp. (Figs. 2a-m', 3a-3c).

Material examined. Juan Fernández Archipelago, Robinson Crusoe Island, 33°37'S, 78°51'W, in front of El Pungal, 4 m depth, Alvaro Palma, coll., 11 March 2008, holotype (MNHCL ANN-15017) and paratypes (MNHCL ANN-15018 and MNHCL ANN-15019); in front of Bahía Villagra, 10 m depth, 12 September

2008 paratype (SSUC 9008); in front of Sal Si Pudes, 4-10 m depth, 1 August 2012, paratype (SSUC 9009); in front of Punta Lobería, 4-10 m depth, 20 January 2011, paratype (MNHCL ANN-15020); in front of Bahía Padre, 9 m depth, 4 November 2008, paratypes (SSUC 9010 and SSUC 9011); in front of El Francés, 4-10 m depth, 19 January 2011, paratype (MNHCL ANN-15021); in front of El Palillo, 4-10 m depth, 16 January 2011, paratype (MNHCL ANN-15022); in front of El Inglés, 10 m depth, 20 November 2008, FAUNAMAR reference collection (N°00011); in front of El Inglés, 4-10 m depth, 28 March 2010, paratype (SSUC 9012); in front of El Pungal, 6 m depth, 1 November 2008, paratype (SSUC 9013); in front of El Pungal, 4.5 m depth, 3 November 2008, FAUNAMAR reference collection (N°00014) and FAUNAMAR reference collection (N°00015); in front of El Pungal, 6 m depth, 1 November 2008, paratype (MNHCL ANN-15023); in front of El Palillo, 4-10 m depth, 3 July 2010, paratype (SSUC 9014).

Description. Body long, slender; holotype (MNHCL ANN-15017) incomplete with 210 chaetigers, 30.1 mm long, thorax 2.2 mm wide, with 17 thoracic chaetigers; smallest complete paratype (MNHCL ANN-15023) 14.2 mm long; largest complete paratype (SSUC 9008) 83.3 mm long. Thorax dorso-ventrally flattened with 1.5-3.1 mm maximum width; posterior thorax slightly wider than abdomen; abdomen cylindrical (Fig. 2a). Color of preserved specimens brown to pale yellow. Prostomium sharply conical; without eyespots. Single achaetous peristomial ring, shorter than prostomium, broad, bearing a pair of nuchal organs located laterally at anterior border (Fig. 2b). Everted proboscis large, multilobed (Fig. 2a). Thorax with 16-18 chaetigers, usually 17. All parapodia biramous. Subpodial lobes and stomach papillae absent. Thoracic notopodial post-chaetal lobes digitate to triangular, from chaetiger 1 as small papillae (Fig. 2c), reaching two-thirds chaetal length in posterior thoracic chaetigers; thoracic neuropodial post-chaetal lobes papilliform on chaetiger 1-2, then triangular (Figs. 2c-d, 2f). Anterior abdominal notopodial post-chaetal lobes triangular, similar in length to branchiae (Fig. 2g); on mid-posterior and posterior chaetigers, these lobes shorter than branchiae (Figs. 2h-i; 3b-c); abdominal neuropodial post-chaetal lobes are triangular, then gradually becoming narrow and elongated posteriorly; they shorter than notopodial lobes. Straight neuropodial aciculae embedded, not emergent. In last abdominal chaetigers notopodial post-chaetal lobes digitiform and neuropodial post-chaetal lobes papilliform. Lateral organs developed at base of notopodia (Figs. 2k-k'). All thoracic notopodia with crenulated capillary chaetae, fewer in number than in

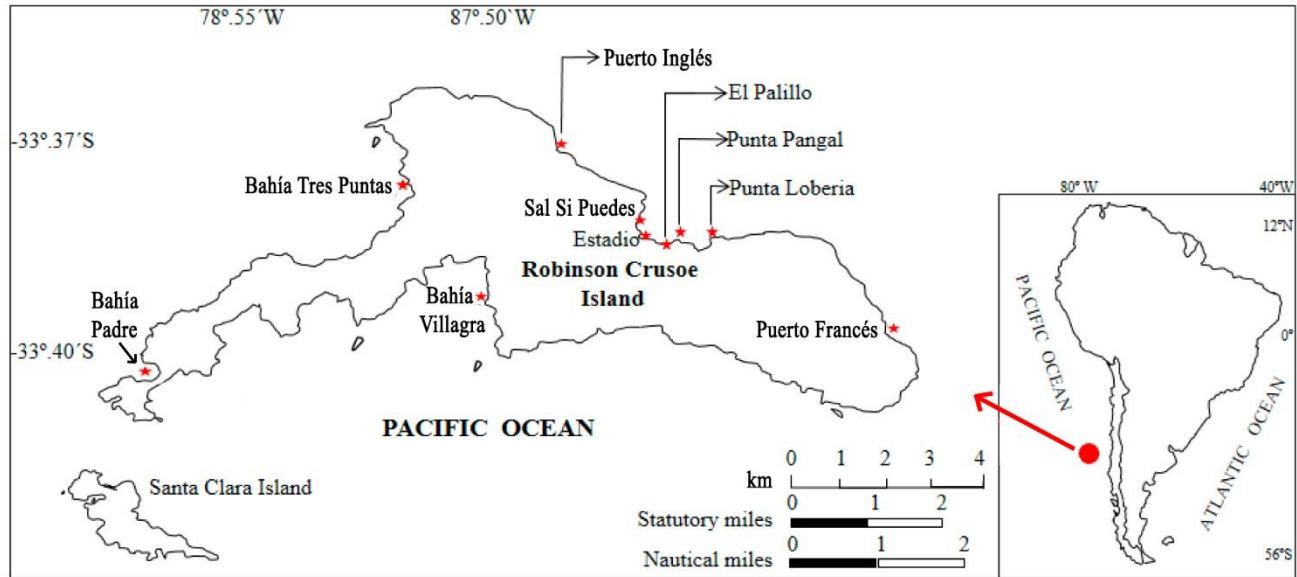


Figure 1. Geographical location of the localities where the specimens of *Scoloplos fernandezensis* n. sp. were collected from 4-10 m depth around the Robinson Crusoe Island, Juan Fernández Archipelago.

neuropodia (Fig. 2j). All thoracic neuropodia with an anterior J-shaped row (Fig. 2e) of slightly curved serrated hooks with a thin, translucent hood open, like a valve that covers the back distal portion of the hook (Figs. 2m, 2m'), and 3-4 rows of crenulated capillary chaetae (Fig. 2l). From chaetiger 1-10 with up to 10-16 hooks per segment (Fig. 2m). All abdominal chaetae crenulated capillaries. Notopodial furcate chaetae absent. Branchiae emerge from chaetigers 20-28, as short digitate papillae (Fig. 2a), thereafter increasing in size and similar to notopodial lamellae in mid-body segments. By chaetigers 70-80, branchiae begin branching dichotomously and asymmetrically (Fig. 2g). Subsequently, each branch divides again resulting in three terminal filaments between chaetigers 110-170, or four (Figs. 2h-3a). In a few cases five terminal filaments occur (Table 1). Posterior abdominal chaetigers shorter in length and with branchiae larger, more close-packed and with 2-4 terminal filaments (Figs. 2i-2j, 2c-3b). Pygidium with anus surrounded by several terminal lobes and with two large ventral cirri (Figs. 3b-3c).

Variation. Branchiae begin on chaetigers 20-28 but starting not always occurs on both sides of the segment at a time. In the same way, the beginning of the branchial branching not always occurs on both sides of the segment at a time, this branching can occur on one side while on the other side it occurs in subsequent segments. The number of branches and the chaetiger where the branching begins varies among specimens,

(Table 1); the maximum number of branches observed was six branches in paratype MNHNCL ANN-15022.

In some cases the branchiae start branching in a chaetiger much earlier than in the rest of the specimens. The occurrence of branchiae with two branches start in chaetiger 44, as can be seen with paratype MNHNCL ANN-15020 (Table 1), before the general observed start between chaetigers 70-87; in paratype MNHNCL ANN-15019 the occurrence of branchiae with three branches is in chaetiger 88, before the general observed start between chaetigers 110-160.

Remarks. *Scoloplos juanfernandezensis* n. sp. belongs to a small group of species of *Scoloplos* with branched branchiae in the abdominal segments. This characteristic is shared with two other species: *Scoloplos cylindrifer* Ehlers, 1905 (= *S. (L.) dendrobranchus* Hartman, 1957) from New Zealand and *Leodamas latum* (Chamberlin, 1919) from Pacific side of Panama. *Scoloplos juanfernandezensis* n. sp. differs from *L. latum* because the branchiae in the latter begin between segments 5-6 of the thorax and the branching of the branchiae is palmate instead of dichotomous. The other difference with *Scoloplos cylindrifer* is the absence of emerging abdominal neuropodial aciculae in *Scoloplos juanfernandezensis* n. sp., Hartman (1957) described this acicula for *S. cylindrifer* (= *S. dendrobranchiatus*) distally curved with emergent tip, while in *S. juanfernandezensis* n. sp. is straight. Thoracic neuropodial hooks are hooded in *S. juanfernandezensis* and without hood in *S. cylindrifer*. Also the branchiae

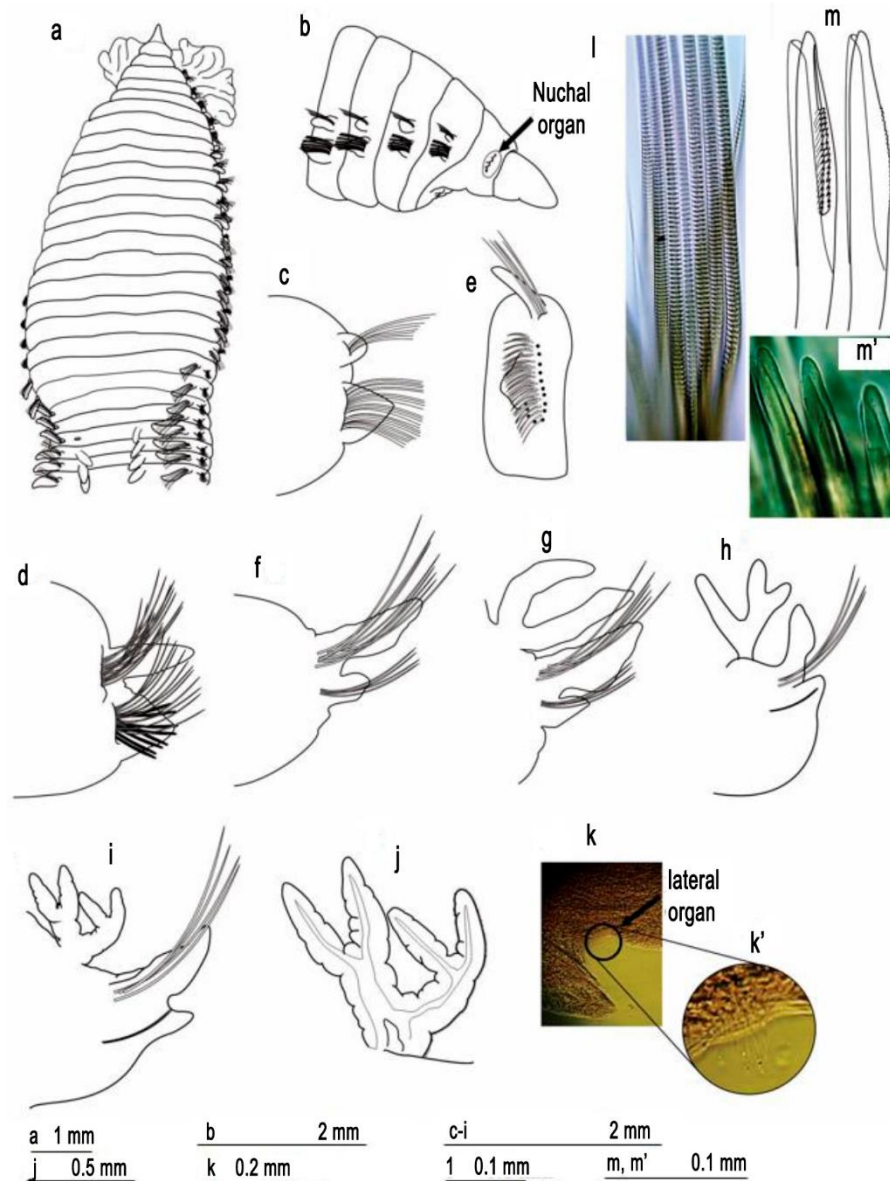


Figure 2. *Scoloplos juanfernandezensis* n. sp. a) Anterior end, dorsal view, b) anterior end, lateral view, c) first chaetiger, d) chaetiger 10, lateral view, e) chaetiger 10, frontal view, f) chaetiger 17, g) chaetiger 78, h) chaetiger 105, i) chaetiger 300, j) branchiae detail from chaetiger 300, k) lateral organ of chaetiger 300, k') detail of the lateral organ, l) crenulate chaetae, m-m') neuropodial thoracic hooded hook.

begin between chaetigers 10-25 instead of chaetigers 20-28 in *Scoloplos juanfernandezensis* n. sp. and the thorax has more than 20 segments while in *Scoloplos juanfernandezensis* n. sp. the thorax has 16-18 chaetigers. *Scoloplos cylindrifer* is known only from New Zealand and Australia in intertidal zones, associated with sand, *Zostera* beds and mixed substrates. *S. juanfernandezensis* n. sp. specimens were collected in shallow subtidal depths of 4 to 10 m from sand in hard bottom.

Type locality. Robinson Crusoe Island (33°37'S, 78°51'W), Juan Fernández Archipelago, Southeastern Pacific Ocean, 4-10 m depth.

Etymology. The name of the species is derived from the name of its type locality, the Juan Fernández Archipelago; and the suffix indicates it lives in this region.

Distribution. Only known from the type locality, Robinson Crusoe Island, Juan Fernández Archipelago, Southeastern Pacific Ocean.

Table 1. Variability of the paratypes: (N°): Number of the specimen; (FMAR*): FAUNAMAR Ltda. reference collection; SSUC: Colección de Flora y Fauna Profesor Patricio Sánchez Reyes, Departamento de Ecología, Facultad de Ciencias Biológicas, Pontificia Universidad Católica de Chile, Santiago; MNHNCL ANN: Museo Nacional de Historia Natural, Santiago, B1: Chaetiger of emergence of the first branchiae, B2: Chaetiger of continuous emergence of branchiae with two branches, B3: Chaetiger of continuous emergence of branchiae with three terminal filaments, B4: Chaetiger of emergence of the first branchiae with four terminal filaments, or its absence (X), B5: Presence of branchiae with five (P5) or six (P6) terminal filaments, or its absence (X).

<i>Scoloplos juanfernandezensis</i> n. sp.										
Number	Condition	Length (mm)	Width (mm)	Chaetigers	Thorax	B1	B2	B3	B4	B5
SSUC 9008	Complete (entire)	83,3	2,8	296	18	25	74	159	225	P5
MNHNCL ANN-15022	Complete (splited)	73,2	3,1	310	17	24	77	127	197	P6
SSUC 9010	Complete (entire)	61,9	2,9	269	18	28	70	158	231	X
SSUC 9013	Complete (entire)	54,2	3,1	263	17	23	75	137	192	P5
MNHNCL ANN-15020	Complete (splited)	50,7	2,5	208	18	26	44	112	140	X
SSUC 9014	Complete (splited)	41,2	3,1	203	17	21	72	145	X	X
MNHNCL ANN-15019	Complete (entire)	38,3	1,5	165	18	24	72	88	X	X
MNHNCL ANN-15023	Complete (entire)	14,2	1,7	144	17	23	72	135	X	X
MNHNCL ANN-15021	Incomplete (splited)	92,8	3,9	337	17	24	70	143	164	P5
(FMAR*)0015	Incomplete (entire)	83,8	3,0	253	18	25	77	169	177	X
SSUC 9012	Incomplete (splited)	81,1	3,0	293	18	28	75	120	185	X
MNHNCL ANN-15018	Incomplete (entire)	64,5	3,5	345	17	24	81	162	163	X
(FMAR*)0014	Incomplete (entire)	63,9	3,0	262	16	25	78	147	194	X
(FMAR*)0011	Incomplete (entire)	49,2	2,4	261	17	21	78	149	189	X
SSUC 9011	Incomplete (entire)	48,2	2,8	216	18	27	72	160	211	X
SSUC 9009	Incomplete (entire)	40,1	3,0	226	17	21	83	166	X	X
MNHNCL ANN-15017	Incomplete (entire)	30,1	2,2	210	17	20	87	134	137	X

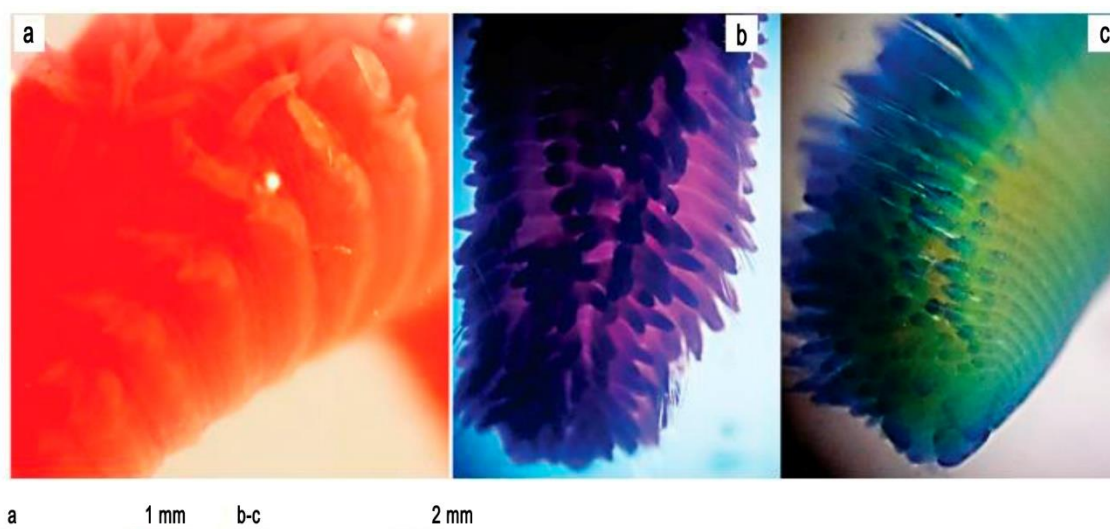


Figure 3. *Scoloplos juanfernandezensis* n. sp. a) Mid-posterior chaetigers, showing branched branchiae, b) distal end, dorsal view, c) distal end with pygidium in ventrolateral view.

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