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First Record of the Genus *Janolus* Bergh, 1884 (Opisthobranchia: Arminacea: Zephyrinidae) from the Pacific Coast of South America, with the Description of a New Species

by

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Abstract. A new species of the nudibranch genus *Janolus* Bergh, 1884, from the Chilean coast is described. The external and internal anatomy and coloration are described. The species, ***Janolus chilensis*** sp. nov., is compared with those most similar to it. ***Janolus chilensis*** constitutes the first record of the genus on the Chilean and South American Pacific coasts.

INTRODUCTION

The genus *Janolus* Bergh, 1884, includes only two known species from the American Pacific coast: *J. barbarensis* (Cooper, 1863) and *J. fuscus* (O'Donoghue, 1924). Behrens (1991) illustrated a third undescribed species identified as *Janolus* sp. 1. The known geographical range for these species extends more or less along the North American Pacific coast, depending on the species, but never south of the Gulf of California (Behrens, 1991).

On the Chilean coasts the suborder Arminacea is represented by only one species, *Armina cuvieri* (d'Orbigny, 1837). In this paper we describe a new species of zephyrinid nudibranch, recently illustrated and identified as *Janolus* sp. 1 by Schrödl (1996: tab. 6, fig. 34), from two specimens collected on the north Chilean coast.

SYSTEMATIC DESCRIPTION

Suborder ARMINACEA Odhner, 1934

Family ZEPHYRINIDAE Iredale & O'Donoghue, 1923

Genus *Janolus* Bergh, 1884

Janolus chilensis Fischer, Cervera & Ortea, sp. nov.

(Figures 1–5)

Material: Holotype: One specimen, 45 mm in length collected on hydrozoan and bryozoan colonies attached to floats and culture lines substrates, at 3 m depth, Iquique (20°20'S;70°05'W), north coast of Chile, 10 August 1993, M. Angelica Fischer coll. This specimen, which is not dissected, has been deposited in the collections of the Museo Nacional de Historia Natural (MNHN) de Santiago de Chile, catalogue number 201621.

Paratype: One specimen dissected, 40 mm in length, collected concurrently with the holotype, has been also deposited in the collections of the MNHN, catalogue number 201622.

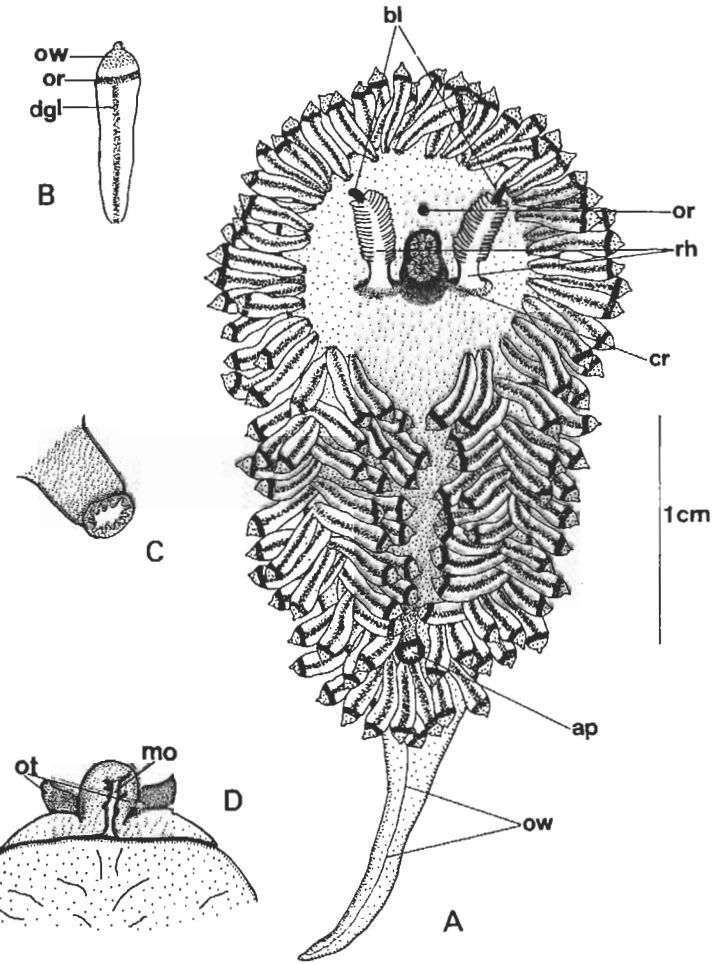


Figure 1

*Janolus **chilensis*** Fischer, Cervera & Ortea, sp. nov. A. Dorsal view of the living animal. B. Color pattern of a ceras. C. Detail of the anal papilla. D. Ventral view of the anterior part of the animal. Key: ap, anal papilla; bl, blue; cr, caruncle; dgl, digestive gland; mo, mouth; or, orange; ot, oral tentacle; ow, opaque white; rh, rhinophore.

Figure 2

*J. **chilensis*** Fischer, Cervera & Ortea, sp. nov. Several cerata showing branching of digestive gland.

Description: Body stout, broadest anteriorly, narrower behind rhinophores, and ending in long, fine tail. Body of live animal translucent white; rhinophores also translucent with blue apex (Figure 1A). Cerata translucent with opaque white apical band, orange subapical band, and narrow translucent band between them (Figure 1B). Branches of digestive gland in cerata translucent brown. Tail translucent with thin central opaque white line. Head wider than rest of body. Pair of short, pointed oral tentacles present in front of head, near mouth. Edge of foot smooth and anteriorly rounded with deep transverse groove (Figure 1D). Rhinophores perfoliate, with 16 thin complete or incomplete transverse lamellae, shortest at base of club. Between rhinophores is an obvious orange bilobed caruncle formed by many lumpy groups (Figure 1A). Anterior to it is also an orange spot. Anus at end of body, where tail begins; anus a short tube opening like flower with nine folds (Figure 1A, C). No anal gland observed. Cerata arranged dorsoventrally around body, 36 on each side. At head, are two alternating ceratal rows. In middle of body are three alternating ceratal rows. Behind anus, cerata form only single row. Cerata shorter and thinner anteriorly and longer and thicker in central body region. Cerata smooth, digitiform, inflated in apical zone with little nipple-shaped end. Digestive gland in cerata appears as slender mostly unbranched tributary, but some have two to five branches that terminate in subapical zone (Figure 2).

Jaws strong, roughly triangular in shape, each side with six broad teeth (Figure 3A, B). Radula broad and well developed. Radular formula of 40 mm specimen 18 × 18–24.1.18–24. Rachidian tooth smooth, straight, large, winged, with two small denticles on each side (Figure 4A, B,r). Lateral teeth sickle-shaped. Cusp of lateral teeth becomes shorter from inner portion toward outer edge of radula. Three inner lateral teeth possess two to four denticles (Figure 4A, B).

Reproductive system diaulic (Figure 5A). Penis smooth, muscular, broad, and elongate with pointed end (Figure 5B). Penial sac thick and muscular. Vas deferens narrow, relatively short, and coiled twice, without differentiated prostatic portion. Junction of vas deferens and ampulla inside female gland. Ampulla thin, elongate, and refringent, continuing distally as slender hermaphroditic duct, which branches into three ducts. Female gland massive, surrounding bursa copulatrix. Bursa rounded joining female gland via relatively long vagina. Both bursa copulatrix and vagina represented by discontinuous line in figure 5A, according to their arrangement.

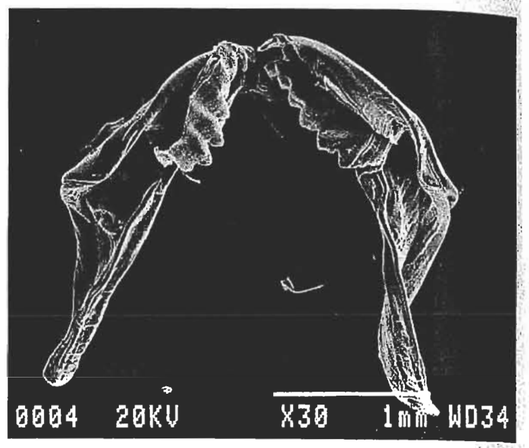


Figure 3

*J. **chilensis*** Fischer, Cervera & Ortea, sp. nov. Paratype, MNHN 201622. A, Jaws (scanning electron micrograph). B. Detail of the denticles of the jaws (scanning electron micrograph).

DISCUSSION

*Janolus **chilensis*** can be separated from the other two American Pacific *Janolus* species (see Table 1). Thus, *J. barbarensis* differs from our species by having an anal gland and a receptaculum seminis. It also lacks lateral

Table 1

Comparative morphology of *Janolus **chilensis*** sp. nov. and its most similar Pacific species.

Species	Color	Digestive ceratal branches	Anal gland	Jaws	Radular formula and teeth	Receptaculum seminis	Bursa copulatrix	Penis	References
Janolus barbarensis (Cooper, 1863)	body translucent white; cerata with gold subapical ring and blue tips, branches of digestive gland brown; rhinophores with lemon yellow subapical ring and blue tip; orange caruncle	branched	present	7–9 denticles	16 × 27.1.27; rachidian narrow, without denticles; inner lateral teeth about 6 denticles; remaining lateral smooth	spherical, thin-walled, distal	short, spherical, serial, proximal	large, muscular, thickest near the middle	Cockerell & Eliot (1905); MacFarland (1966); Gosliner (1981, 1982)
J. fuscus O'Donoghue, 1924	body translucent white, with mid-dorsal red-brown lines; cerata with subapical yellow and apical opaque white bands, branches of the digestive gland brown; rhinophores pink and opaque white tip; red-brown caruncle	unbranched	absent	10–13 denticles	21–26 × 22–25.1.22–25; rachidian broad, denticulate; inner laterals 2 denticles; remaining laterals smooth	pyriform, distal	elongate, semi-serial, proximal	conical, thickened posteriorly	O'Donoghue (1924); MacFarland (1966); Gosliner (1981, 1982)
*J. **chilensis*** sp. nov.	body translucent white; cerata with opaque white tip and orange subapical ring; branches of the digestive gland pale brown; rhinophores tip dark blue; orange caruncle	branched	absent	6–7 denticles	18 × 18–24.1.18–24; rachidian narrow, denticulate; inner three lateral with 2–4 denticles; remaining lateral smooth	absent	spherical, semi-serial	thick, muscular, conical, pointed	present study

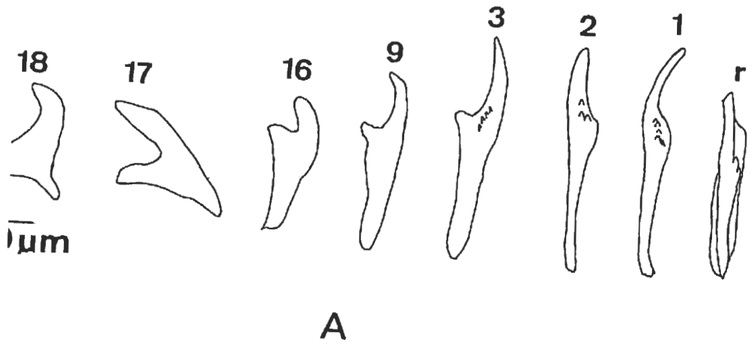
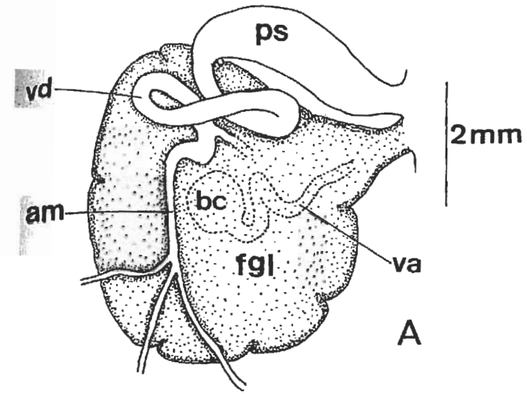


Figure 4

:her, Cervera & Ortea, sp. nov. Paratype, MNHN 201622. A. Schematic view of the radular teeth Scanning micrograph of several half-rows of the radula. Key: il, inner lateral teeth; ol, outer lateral n tooth.

ian tooth. On the other hand, *J.* aculum seminis. In the genus *Jan*ne or two receptacles varies in- g the revisions of Gosliner (1981, lan (1986), the species recognized copulatrix are *J. comis* Marcus, ıa), *J. mucloc* (Marcus, 1958), *J.* e, 1970, and *J. eximius* Miller & pecies recognized as having only is *J. hyalinus* (Alder & Hancock, ther species that have both types *tus* (Delle Chiaje, 1841), *J. bar-* 3), *J. novozealandicus* (Eliot, oghue, 1924, *J. capensis* Bergh, Gosliner, 1981, *J. ignis* Miller & a/vagina), and *J. mokohinau* Mil- ler & Willan, 1986 (has a bursa/vagina). However, there are several species whose reproductive systems remain unknown: *J. australis* Bergh, 1884, *J. indicus* (Eliot, 1909), *J. mirabilis* Baba & Abe, 1970, *J. preclarus* (Bouchet, 1975). After the Gosliner and Miller & Willan papers, Ortea & Llera (1988) described *J. faustoi* from the Canary Islands, but with no details of the reproductive system. A bursa copulatrix surrounded by the female gland was also described in *J. muloc* by Marcus (1958), similar to *J. **chilensis***.

On the other hand, the coloration in some representatives of the Zephyrinidae is variable, like *Bonisa nakaza* Gosliner, 1981. This species is recorded with three different patterns of coloration, but in *Janolus* this variability has not been described. *J. **chilensis*** has a distinct pattern of coloration. It is clearly different from the other



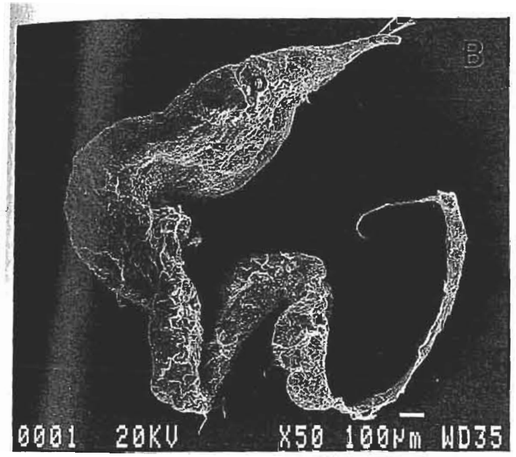


Figure 5

*J. **chilensis*** Fischer, Cervera & Ortea, sp. nov. Paratype, MNHN 201622. A. Reproductive system. B. Detail of the penis. Key: am, ampulla; bc, bursa copulatrix (discontinuous line), fgl, female gland; ps, penial sheath; va, vagina (discontinuous line); vd, vas deferens.

species of *Janolus* from the American Pacific. *Janolus fuscus* has mid-dorsal lines of red-brown, yellow and white cerata, and pink and opaque white rhinophores. *Janulus barbarensis* has cerata with a subapical gold ring, and rhinophores with a subapical lemon-yellow ring and blue tip. *J. **chilensis*** has opaque white ceratal tips, a subapical orange ring, and the tips of the rhinophores are blue (Table 1). The coloration of the remaining species of *Janolus* is clearly different. The rachidian teeth of *J. **chilensis*** are similar to the rachidian teeth of *J. barbarensis*. The two inner lateral teeth of *J. barbarensis* are denticulate, whereas in *J. **chilensis*** the three inner teeth are denticulate.

Etymology: The specific name, ***chilensis***, is from Chile, where the new species was collected.

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