

## First new *Dodecaceria* (Polychaeta: Cirratulidae) species from the SW Atlantic (38°S - 57°W, Argentina)

Primera especie nueva de *Dodecaceria* (Polychaeta: Cirratulidae) para el Atlántico SO (38°S - 57°W, Argentina)

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**Resumen.**- Los cirratúlidos son un grupo difícil debido a que tienen pocos caracteres taxonómicos y estos están frecuentemente mal interpretados. El género *Dodecaceria* ha sido revisado en muchas partes del mundo, pero no en las costas del Atlántico sudoccidental. Los estudios bentónicos de áreas orgánicamente enriquecidas de Mar del Plata han revelado la presencia de varias especies de cirratúlidos en relación a áreas impactadas moderadamente por efluentes domésticos. Uno de estos cirratúlidos ha sido identificado como una nueva especie de *Dodecaceria*, caracterizada por tener gran número de branquias, entre 12 y 18, primer par surgiendo entre el peristomio y el primer setígero, y el segundo en el primer setígero. Quetas capilares festoneadas en un solo lado, y el patrón de quetas capilares y ganchos en cuchara en el neuropodio es único. La especie es descripta, incluyendo gráficos y fotografías electrónicas.

Palabras clave: Polychaeta, taxonomía, cirratúlidos, Atlántico sudoccidental

**Abstract.**- Cirratulids are a difficult group because they have a few taxonomic characters and these are often misinterpreted. The genus *Dodecaceria*, in particular has been reviewed in several parts of the world but not in the southwestern Atlantic shore. The benthic surveys of organically enriched areas of Mar del Plata have shown the presence of several cirratulids species in relation to intermediate sewage-impacted areas. One of these cirratulids have been identified as a new species of *Dodecaceria*, characterized by a large number of pair of branchiae ranging 12 to 18, first pair arising between peristomium and first chaetiger and the second in the first chaetiger. Capillary chaetes are festooned in one side, spoon-like hooks of two types, one with smooth subdistal edges and the others not excavated; the pattern of capillaries and spoon-shaped hooks in neuropodium is unique. The species is described, including draws and electronic photographs.

Key words: Polychaeta, taxonomy, cirratulids, SW Atlantic

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## Introduction

Polychaetes belonging to the family Cirratulidae Ryckholt are poorly known and many common species frequently are called by different names. There are a few taxonomic characters and these are often misconstrued such that different generic designations are applied to a single species (Blake 1996). Most of the older descriptions are not sufficient to adequately characterize species (Blake 1996). Some characters such as the first appearance of acicular spines are often related to growth, and because this character has been considered important in the differentiation of one species from another (Banse & Hobson 1968), it is likely that single species are known under different names according to their stage of development (Blake 1996).

The main genera of cirratulids are divided into three groups: the multitentaculate *Cirratulus* Lamarck,

*Cirriformia* Hartman, *Protocirrinervis* Czerniavsky and *Timarete* Kinberg; the bitentaculate from soft-substrate *Aphelochaeta* Blake, *Caulleriella* Chamberlin, *Chaetozone* Malmgren, *Monticellina* Laubier, and *Tharyx* Webster & Benedict; and the bitentaculate from hard-substrate *Dodecaceria* Oersted (Blake 1996). The genera *Aphelochaeta* and *Protocirrinervis* have been recently resurrected by Blake (1991) and Petersen<sup>1</sup> (1991), respectively.

The studies on cirratulids in Argentina are scarce. Orensanz (1974) made a list of all species cited from the cold Magellanic region, but there is not an equivalent list

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<sup>1</sup>Petersen ME. 1991. A review of asexual reproduction in the Cirratulidae (Annelida: Polychaeta), with redescription of *Cirratulus gaiheadius* (Hartman, 1965), new combination, and emendation or reinstatement of some cirratulid genera. Bulletin of Marine Science 48: 592 (Abstract).

for the warm-temperate region (32°-42°S). The area of Mar del Plata is of particular interest because belongs to the warm-temperate region and long-term data on intertidal and subtidal benthic communities are available from 1997. The ecological benthic studies of sewage-impacted areas organically enriched have shown the presence of two cirratulids in the intertidal, now identified as *Caulleriella galeanoi* Elias & Rivero and *Caulleriella bremecae* Elias & Rivero (Elias & Rivero 2008). A third intertidal new species of *Protocirrinieris* and a subtidal new species of *Aphelochaeta* were also described (Elias & Rivero in press)<sup>2</sup>. These ecological studies have shown also the presence of the genus *Dodecaceria* in both intertidal and subtidal areas. In these work we examined the species of *Dodecaceria* around Mar del Plata (38°S-57°W), and a new species is described.

## Material and methods

Subtidal sampling was performed with a 65x35 cm biological Picard type dredge, and sieved through 0.5 mm mesh in sand-bottoms off sewage effluent (ARA Luisito vessel cruises, 1988-1989, Scagliola 1993). Intertidal samplings were carried out in mussel beds of the little mytilid *Brachidontes rodriguezii* d'Orbigny inhabiting abrasion platforms around a sewage outfall. Several stations were sampled since 1997 by mean of replicate 78 cm<sup>2</sup> corers and sieved through 1 mm mesh (Vallarino *et al.* 2002, Elias *et al.* 2003, 2006).

Material was examined with light microscopy and stereomicroscopy and also with the Scanning Electron Microscope (SEM) JEOL, JSM - 6460 LV. The material for SEM was prepared with a fixation for 24 h with 3% Glutaraldehyde buffered with sodium cacodylate (0.1 mol with a pH between 7.2-7.4), followed by dehydration through an alcohol series (50, 70, 80, 90, 95 and 100%). The sample was dried in HMDS (hexamethyldisilazane), mounted in aluminum discs and coated with gold-palladium.

Type material was deposited in the Museo de Ciencias Naturales de La Plata (MCNLP), Argentina.

## Results

### Taxonomy

Genus *Dodecaceria* Oersted, 1843

### Diagnosis

Prostomium blunt, forming hood over mouth. Peristomium long, achaetous, with pair of thick, grooved

lateral tentacles at junction with chaetiger 1. Several pairs of branchial filaments extending over anterior segments. Chaetae simple, including capillaries and stout, acicular, spoon-shaped hooks.

*Dodecaceria meridiana* n. sp. Fig. 1a-f

*Dodecaceria* cf. *concharum* Elias *et al.* 2001: 526, Table 1; *Dodecaceria concharum* Elias *et al.* 2001: 527, Table 2; Elias *et al.* 2003: 313, Table 1.

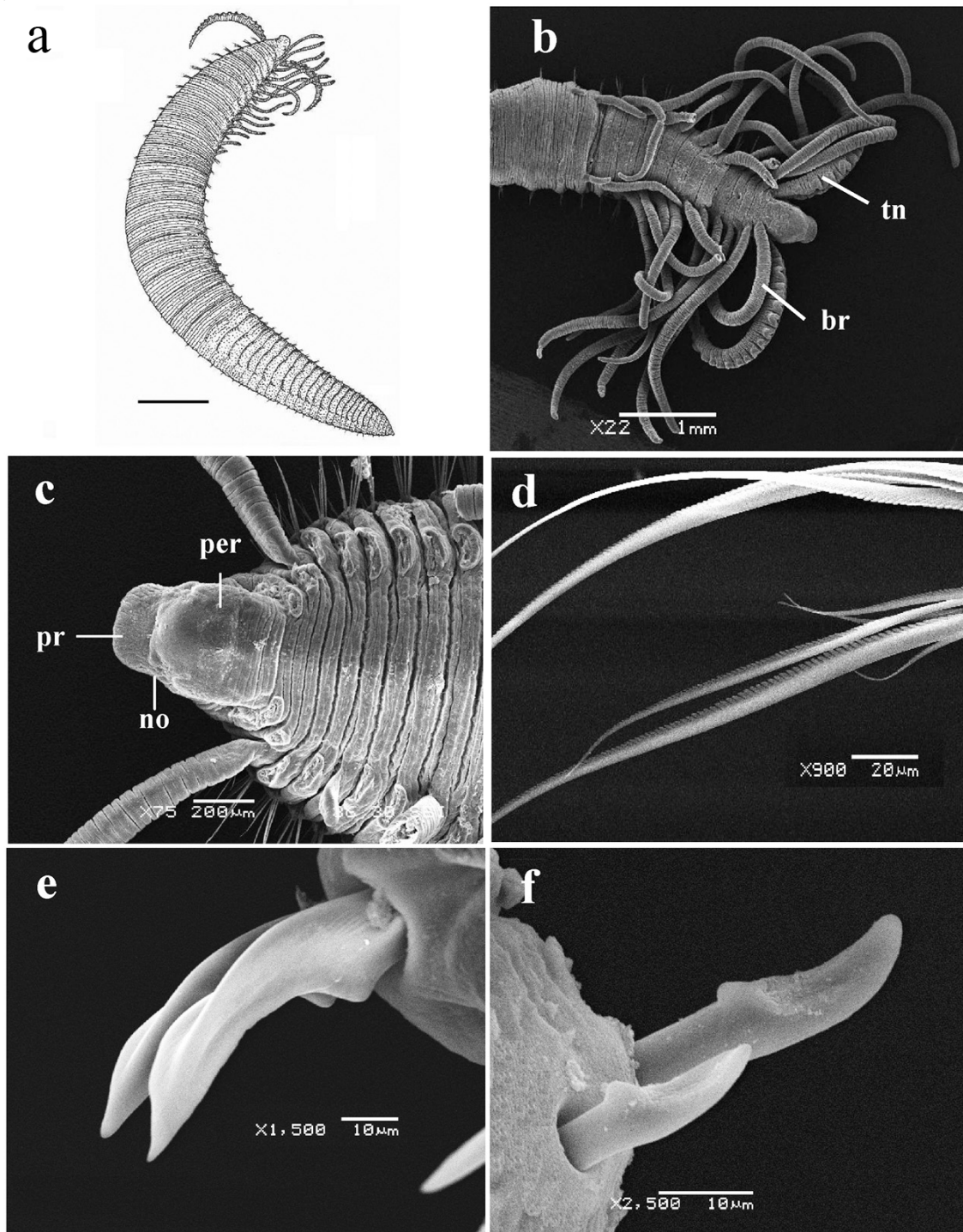
### Material examined

Argentina, Mar del Plata. Holotype: Sta. 3, at 450 m from the sewage outfall, 37°55.591'S, 57°31.701'W, intertidal limestone among mussels, December 2001 (MCNLP n° 6447). Paratypes: Sta. 2, 200 m off sewage outfall, intertidal limestone among mussels, June 2001 (1 incomplete specimen), Sta. 1, 50 m off sewage outfall, intertidal limestone among mussels, March 2001 (1 complete specimen), Sta. 2, 200 m off sewage outfall, intertidal limestone among mussels, March 2008 (2 complete specimens). Sta. 1, 37 56.08' S, 57 31.21' W, 7 m depth, limestone substrate, ARA Luisito vessel cruises, June 1988, Scagliola collection (1 incomplete specimen) (Paratypes MCNLP n° 6448, 3 complete specimens, 2 incomplete specimens). Other material examined: 24 paratypes (16 intertidal and 8 subtidal) examined with SEM.

A moderate sized organism, holotype 13.95 mm long and a maximum width of 3.10 mm for 77 chaetigers. Body of variable shape but always cylindrical in anterior cross section (Fig. 1a,b); holotype (like most of the examined specimens) fusiform; some paratypes with posterior segments ventrally grooved and with a crest in the dorsum; other paratypes are narrow anteriorly but laterally expanded posteriorly or narrow throughout; all specimens have crowded chaetigers in both extremes. The segments have interannulations anteriorly, from 2 annuli in anteriormost segments to 8 in middle region. Pygidium is always simple, curved somewhat ventrally, anus ventral. Live specimens are orange to brown or almost black, the coloration pattern is the same after preservation. In regenerated brown specimens the new tissue is orange, and in some individuals a black or red fringe can be observed on both the new and the old segments. Branchiae orange- or brown-greenish with the tip darker or black; palps pale tan with darker tips.

Prostomium rounded, laterally expanded, slightly curved (like a duck peck); a pair of fronto-lateral nuchal organs; with SEM they look like slits (Fig. 1c), in live pale specimens appeared as yellowish or pale areas. Peristomium achaetous, without annulations, with a dorsal crest, peristomial ring comprises first chaetigers. A pair of crenulated and gross palps, laterally inserted between

<sup>2</sup>Eliás R & MS Rivero. 2007. Two new species of Cirratulidae (Annelida: Polychaeta) from Mar del Plata, Argentina (SW Atlantic). *Zoosymposia* (in press).



**Figure 1**

*Dodecaceria meridiana* n. sp. a: General view of the whole organism. Scale bar: 100  $\mu$ m; b: SEM of anterior region showing tentacles and first branchiae; c: SEM showing prostomium, peristomium and nuchal organs; d: Capillary chaetes; e: Distally rounded spoon-like hooks 1,500x; f: acute spoon-like hooks 2,500x

*Dodecaceria meridiana* n. sp. a: Vista general de un organismo entero. Escala: 100  $\mu$ m; b: MEB de la región anterior mostrando tentáculos y primera branquia; c: MEB mostrando prostomio, peristomio y órgano nuchal; d: setas capilares; e: Gancho en forma de cuchara distalmente redondeado 1.500x; f: Gancho en forma de cuchara de punta aguda 2.500x



peristomium and first chaetiger. Holotype with 12 pair of annulated branchiae (7-18 in paratypes), first pair inserted dorso-laterally between peristomium and first chaetiger, following branchiae dorsal to notopodium. First branchiae short, following longer, but the latest short, always directly ahead.

Notopodium with 7-8 capillaries chaetes in the first 7 chaetigers (7 to 17 in paratypes); from chaetiger 8 (8 to 18 in paratypes) to the end with 3-4 hooks accompanied with a capillary each one. Neuropodium with 6-7 capillaries in the first 7 chaetigers (7 to 15 in paratypes), following 2 chaetigers (3 in paratypes) with 3-4 spoon-shaped hooks accompanied by 4-5 capillaries, next 13 chaetigers (7 to 40 in paratypes) with only 3-4 hooks, next 15 chaetigers (21 in paratypes) with 4 spoon-shaped hooks and 2 capillaries; next 15 chaetigers (24 to 53 in paratypes) with only 2-3 hooks; last 20 chaetigers in both holo- and paratypes with 2 hooks and 1 capillary.

Capillaries of both noto- and neuropodium with a smooth edge and the other bi-festooned all along (Fig. 1d). Spoon-shaped hooks acute and with a crest below the shallow excavation (Fig. 1e) or slightly excavated hooks with smooth subdistal edges and distally rounded (Fig. 1f).

#### Methyl green staining pattern

There is no evident pattern, staining is homogeneous throughout. Regenerate specimens stained pale green also uniformly.

#### Habitat

The species is only known for Mar del Plata, in intertidal stony-rocks around sewage outfall, and in shallow subtidal stony patches.

The worm builds hard tubes, extending both extremes through the single opening. Apparently, they settle in holes and crevices in stones-rocks, but also build a tube. They do not form aggregations of worms like *Dodecaceria fewkesi* Berkeley & Berkeley. The species has not been recorded boring shells of molluscs. In aquarium the organisms placed in a sand bottom (salinity 35-38 psu, temperature 18.5-22°C) build a hard tube, but seems to be weak respect to tubes built in stones-rocks.

Some specimens with large eggs in posterior region during late spring (November-December). No epitoky phenomenon has been observed. Eschizogamy has been observed, one or both extremes break out and the parts and the fragments regenerated the whole organisms. The importance of this mechanism in the reproductive biology is unknown.

#### Remarks

*Dodecaceria meridiana* n. sp. is characterized by a large number of pair of branchiae, ranging from 12 to 18, and first pair of branchiae between peristomium and first chaetiger and the second in the first chaetiger. The closer species, both biogeographically and with similar number of branchiae are *D. choromytilicola* with 13 pairs but first two pair in the same chaetiger (Carrasco 1977), and *D. opulens* (cited by Moreno *et al.* 2006 as *D. cf. opulens*) having 15 pair of branchiae but two pair in the peristomium and other two pair in the second segment. These two species were described or cited in cold Magellanic region of Chile. *D. multifiligera* is also present in the Magellan region (as well as in Brazil, Amaral *et al.* 2006<sup>3</sup>) but have first pair of branchiae (with palps) from the third segment (first two segments lack chaetes) to the last (Hartman-Schröder 1962). *D. choromytilicola* and *D. opulens* are boring species in bivalves and have uniramous first chaetiger while *D. meridiana* n. sp. has biramous first chaetiger and was not recorded boring bivalves.

*D. concharum* (Oersted, 1843) has been mentioned from the area (Elías *et al.* 2001, 2003), but is probably a misidentification, because *D. meridiana* n. sp. has neuroacicular hooks with subdistal boss smooth, while *D. concharum* is different in having subdistal boss of hooks serrated, with serrations extending along edges of depression, 3 to 6 pair of branchiae, different pattern of capillaries and hooks in neuropodium, and pygidium with two ventral lobes (no lobes in *D. meridiana* n. sp.).

Pattern of capillary chaetes and spoon-shaped hooks is unique in *D. meridiana* n. sp. in having neuropodia with capillaries in first 7-15 segments, followed by capillaries and hooks, then only hooks, again capillaries and hooks, followed by only hooks and finally capillaries and hooks. *D. capensis* (Day 1961) has a similar pattern in the neuropodium, but the sequence is shorter for longer specimens with less chaetigers. *D. meridiana* n. sp. has first 7-8 notopodia with capillaries, then capillaries and hooks like *D. multifiligera*, *D. gallardo* (Carrasco 1977) *D. concharum* and *D. ladii* Hartman (Hartman 1954).

#### Etymology

*Meridianus* mean south, and the species is dedicated to the Uruguayan poet Mario Benedetti, especially for his poetry 'El sur también existe'.

<sup>3</sup>Amaral ACZ, SAH Nallin & TM Stainer. 2006. Catalogo das Especies de Annelida Polychaeta do Brasil. <[http://www.ib.unicamp.br/destaques/biota/bentos\\_marinho/prod\\_cien/texto\\_poli.pdf](http://www.ib.unicamp.br/destaques/biota/bentos_marinho/prod_cien/texto_poli.pdf)> [consulted in July 2<sup>nd</sup>, 2008].

## Discussion

Systematic of the genus *Dodecaceria* was reviewed by Gibson (1978), concluding that pattern of branchiae and chaetae correlated with size, and place a great deal of importance on the mode and details of asexual reproduction. George & Petersen (1991) reviewed the species of the genus in Europe. Differences in states of development or regeneration, as well as reproductive strategies, produced questioning about synonymies or even misidentifications, like *Zeppelina* species (George & Petersen 1991).

In Argentina the presence of *Dodecaceria multifiligera* Hartman-Schröder has been recorded for the intertidal of the Magellanic region (Orensanz 1974) between the kelp *Macrocystis pyrifera* (L.) C. Agardh, and in subtidal soft bottoms of the Strait of Magellan (Gambi & Mariani 1999). *Dodecaceria concharum* and/or *D. cf. concharum* have been mentioned in Argentina (Valentinuzzi de Santos 1971, Rullier & Amoureux 1979, Elías *et al.* 2001, 2003) and Brazil<sup>3</sup> but are probably misidentifications.

Biodiversity of *Dodecaceria* species seems to be higher in Chile since five species have been cited: *D. opulens* Gravier, *D. choromytilicola* Carrasco, *D. fistulicola* Ehlers, *D. gallardoi* Carrasco, and *D. multifiligera*, the first two are probably related to the individuals isolated from abalon shells (Rozbaczylo *et al.* 2007). It is suspected that diversity of cirratulids and *Dodecaceria* species will be higher in argentine and brazilians coasts. In Argentina only from a single location the specialization in the family produced at the present time 6 new species, including the *Dodecaceria* herein described. Further investigations could discover the presence of more species along the two zoogeographical regions involved (the southern cold Magellanic and the warm-temperate region of northern Argentina).

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