

A NEW SPECIES OF PHALLODRILINAE (CLITELLATA, NAIDIDAE) FROM THE ATLANTIC COAST OF GALICIA (SPAIN)

Enrique Martínez-Ansemil¹ & Carlos Caramelo^{2,*}

^{1,2} Departamento de Biología, Facultade de Ciencias, Universidade da Coruña.

* Corresponding author: caramelo@udc.gal – <https://orcid.org/0000-0002-1928-5582>

¹ Email: eamsemil@udc.gal – <https://orcid.org/0009-0008-1129-8021>

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ABSTRACT

A new species of Phallodrilinae is described from the Atlantic coast of Galicia (Ria of Ferrol, Spain), *Gianius urgorii* sp. nov. This is the second species of *Gianius* Erséus, 1992 with the spermathecae located at the atrial segment, a very uncommon fact among the Phallodrilinae and the entire Naididae. The aberrant location of the spermathecae and the bipartite condition of the spermathecal ducts are very likely two synapomorphies shared with *Gianius eximius* Erséus, 1997, a species described from the Pacific coast of Hong Kong.

Keywords. Annelida, Clitellata, Naididae, Phallodrilinae, *Gianius urgorii*, new species, marine oligochaetes.

RESUMEN

Una nueva especie de Phallodrilinae (Clitellata, Naididae) de la costa Atlántica de Galicia (España)

Se describe una nueva especie de Phallodrilinae de la costa atlántica en Galicia (Ría de Ferrol, España), *Gianius urgorii* sp. nov. Es la segunda especie de *Gianius* Erséus, 1992 con las espermatecas localizadas en el segmento atrial, un hecho bastante poco común en los Phallodrilinae y en el conjunto de los Naididae. La localización aberrante de las espermatecas y la condición bipartita de los conductos espermatecales son, muy probablemente, dos sinapomorfias compartidas con *Gianius eximius* Erséus, 1997, especie descrita de la costa Pacífica en Hong Kong.

Palabras clave. Annelida, Clitellata, Naididae, Phallodrilinae, *Gianius urgorii*, nueva especie, oligoquetos marinos.

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Introduction

During a large study of the annelid diversity and ecology associated with intertidal rocky shores in the semi-enclosed industrial and urban embayment of Ferrol (Galicia, NW Spain) (Parapar *et al.*, 2009), a high number of oligochaete (18 species) were identified and two new species described. As a complement to this work, we describe here a new species of Phalloporilinae, that was cited as *Gianius* sp. in the aforementioned paper.

Material and methods

The three specimens here studied were collected in 2 of the 13 stations sampled in A Malata Bay and Punta Caleira (Ria of Ferrol). The ecological characteristics of this urban embayment and these two stations are described in Parapar *et al.* (2009). Samples were taken by scraping of the rocky substratum, fixed in the field with 4% buffered formaldehyde solution and stored in 70% ethanol. Specimens were stained in hematoxylin, dissected, mounted in Canada balsam and study under a light microscope provided with interference contrast optics (Nikon Eclipse 90i with camera DS-Fi1). Specimens were deposited in the Museo de Historia Natural, University of Santiago de Compostela (MHNUSC), Spain.

Results

Gianius urgorríi sp. nov.

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Figs 1–2

TYPE MATERIAL

Holotype. Mature specimen, stained in hematoxylin, dissected and mounted in Canada balsam; A Malata Bay, Ria of Ferrol, Galicia; 43°29.364 N, 8°15.071 W; 22.VIII.2002; J. Parapar, E. Martínez-Ansemil & C. Caramelo leg.; MHNUSC_10152.

Paratypes. 1 specimen, not fully mature (spermathecae not fully developed), stained in hematoxylin, dissected and mounted in Canada balsam; same data as for holotype; MHNUSC_10153_1. — 1 specimen, not fully mature (spermathecae not fully developed), stained in hematoxylin, dissected and mounted in Canada balsam; Punta Caleira, Ria of Ferrol, Galicia; 43°29.364 N, 8°15.071 W; 26.V.2002; J. Parapar, E. Martínez-Ansemil & C. Caramelo leg.; MHNUSC_10153_2.

ETYMOLOGY

Named after Professor Victoriano Urgorri, a renowned researcher on Marine Biology, founder of the Marine Biological Station of A Graña, Ferrol (University of Santiago de Compostela, Spain).

DESCRIPTION (Figs 1–2)

Fixed material. Length 4–5 mm. Number of segments 48–56. Width at segment V 100–140 µm, maximum width at clitellum 145–180 µm. Prostomium roundish, slightly shorter than large: 60–80 µm long, 75–84 µm wide at base. Secondary annulation present, consisting in 2–3 well marked rings per segment all along the worm, except in segments II–IV. Clitellum extending over 1/2X–XII. Male pores at the posterior part of segment XI, aligned with ventral somatic setae. Spermathecal pores at the atrial segment, close to the septum 10/11 (Fig. 1), aligned with ventral somatic setae. Somatic setae (Fig. 2A) all bifid, with short teeth, upper slightly shorter than lower, 2–3–(4) setae per bundle all along the body, 30–42 µm long (shorter in II: 26 µm). Penial setae (Figs 1, 2B) comb-like arranged, in number of 5–6 per bundle, 49–53 µm long, about 2.5 µm wide, ending in a somewhat hooked single tip.

Pharyngeal glands in segments IV–VI. Esophageal appendages and diverticula absent. Chloragogen cells from segment VI.

Sperm sacs well developed, extending to segment VIII anteriorly and to segment XIII posteriorly. Oviparous sac attempt 15/16. Atria (Figs 1, 2C) small, spindle shaped, curved (85 µm long, 16 µm maximum wide), with thin muscular walls. Two elongated, middle size, prostate glands per atrium (Figs 1, 2B–C), the anterior one attached to the most ental part of the atrium, and the posterior one attached very likely to its most ectal part (or to the ventral wall near the male pore). Vasa deferentia long and winding (Figs 1, 2D), about two times longer

than atria (170 μm long, 7-9 μm in diameter), entering the apical end of atria. Spermathecae (Figs 1, 2E) with a long duct (55-65 μm long, 17 μm maximum diameter) and a thin-walled pyriform to globular ampulla (75-92 μm long, 53-56 μm wide) filled with a dense mass of spermatozooids. The spermathecal ducts are clearly bipartite; the ectal part is narrow and surrounded by a thin layer of circular muscles, and the ental part is wider. The base of the ampullae has a singular structure, consisting in a large inner collar narrowing the entrance of the spermathecal ducts (Fig. 1).

HABITAT

Intertidal rocks with *Fucus vesiculosus* L. and *Mytilus edulis* Linnaeus, 1758. Surface water salinity 35‰ in A Malata Bay and 31‰ in Punta Caleira.

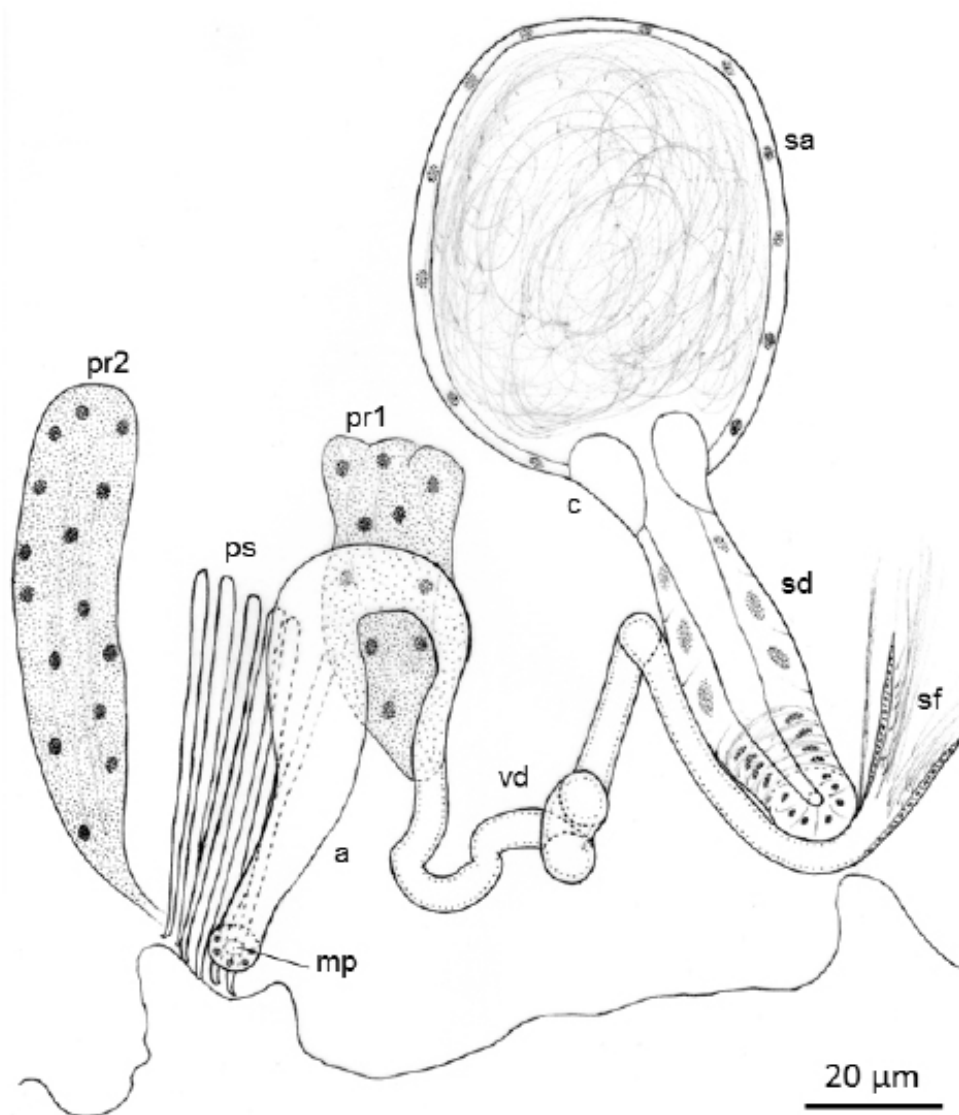


Fig. 1. *Gianius urgorii* sp. nov. Schematic drawing of male apparatus (segment XI). Abbreviations: a: atrium; c: collar; mp: male pore; pr1: anterior prostate gland; pr2: posterior prostate gland; ps: penial setae; sa: spermathecal ampulla; sd: spermathecal duct; sf: sperm funnel; vd: vas deferens.

Fig. 1. *Gianius urgorii* sp. nov. Dibujo esquemático del aparato masculino (segmento XI). Abreviaturas: a: atrio; c: collar; mp: poro masculino; pr1: próstata anterior; pr2: próstata posterior; ps: sedas peneanas; sa: bombilla espermatecal; sd: conducto espermatecal; sf: embudo espermático; vd: conducto deferente.

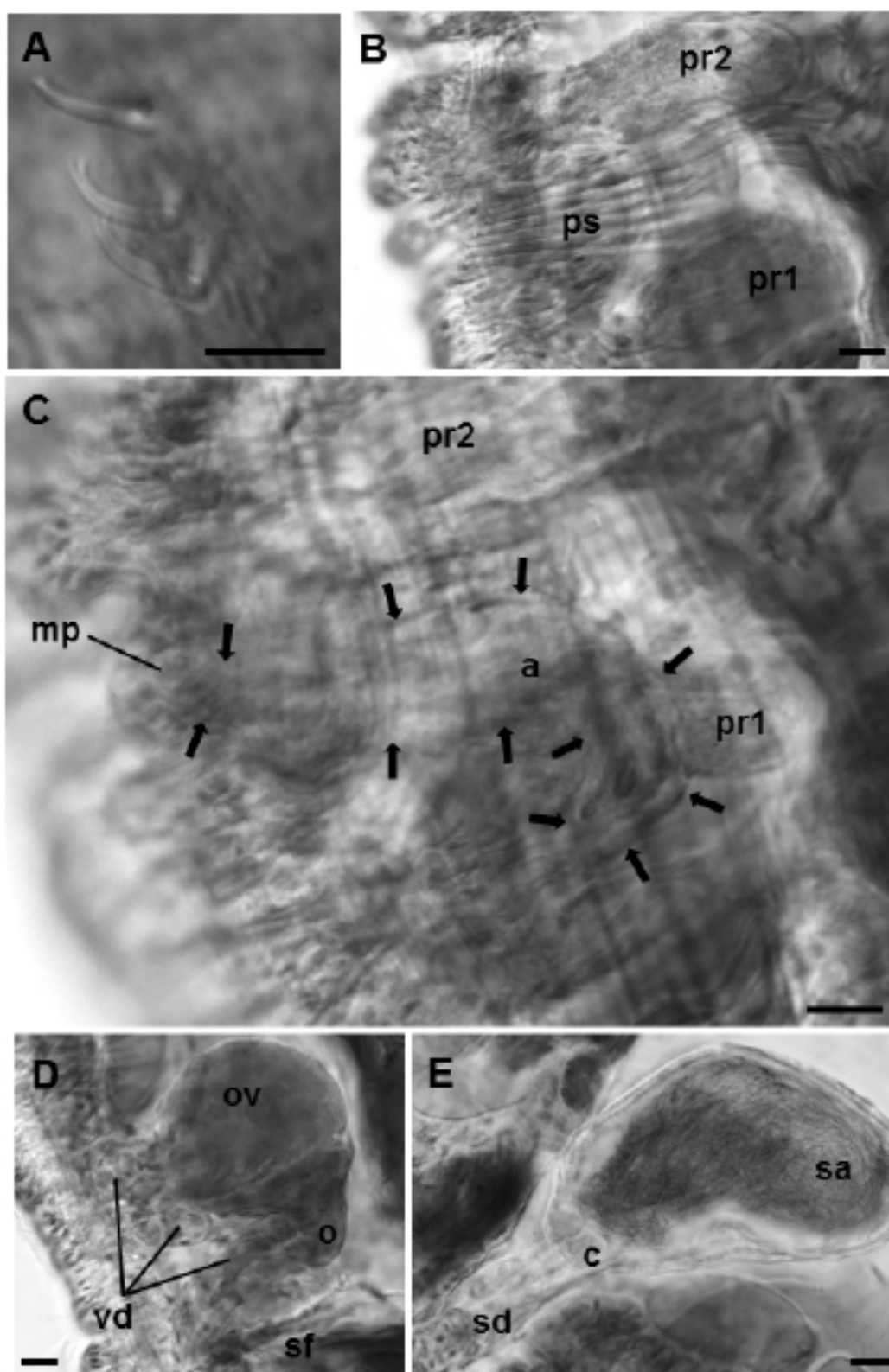


Fig. 2. *Gianius urgorrii* sp. nov. Micrographs of dissected specimen. **A.** Somatic setae. **B.** Prostate glands and penial setae. **C.** Atrium. Arrows showing the atrium limits. **D.** Vas deferens. **E.** Spermatheca. Abbreviations: a: atrium; c: collar; mp: male pore; o: ovary; ov: oocyte; pr1: anterior prostate gland; pr2: posterior prostate gland; ps: penial setae; sa: spermathecal ampulla; sd: spermathecal duct; sf: sperm funnel; vd: vas deferens. Scale bars: 10 μ m.

Fig. 2. *Gianius urgorrii* sp. nov. Micrografías del ejemplar diseccionado. **A.** Sedas somáticas. **B.** Próstatas y sedas peneanas. **C.** Atrio. Flechas señalando los límites del atrio. **D.** Vaso deferente. **E.** Espermateca. Abreviaturas: a: atrio; c: collar; mp: poro masculino; o: ovario; ov: ovocito; pr1: próstata anterior; pr2: próstata posterior; ps: sedas peneanas; sa: bombilla espermatecal; sd: conducto espermatecal; sf: embudo espermático; vd: conducto deferente. Escalas: 10 μ m.

Discussion

The genus *Gianius* was erected by Erséus (1992) to include a small group (seven species at that time) of marine or freshwater subterranean phallo-drilines sharing the apomorphy *atria elongate and curved*, and a few other characters such as: 1) vasa deferentia entering apical ends of atria, 2) two prostate glands per atrium, 3) anterior one attached near entrance of vas deferens, 4) posterior one attached at ectal end of atrium, and 5) from about 4 to over 25 small and straight penial setae per bundle. *Gianius* account now a total of 11 species (4 marine and 7 from freshwater habitats, mainly groundwater). *Gianius urgorrii* sp. nov. is the first marine species of *Gianius* reported from the Iberian peninsula. Morphologically, the new species shares with all of them the characteristics mentioned above but, at the same time, shows some particular traits that lead us to only tentatively include it in this genus.

The aberrant position of the spermathecae of *Gianius urgorrii* sp. nov. (in the atrial segment) is very uncommon among the family Naididae, and only shared with two other species among the Phallo-drilinae currently known, the marine *Milligianius compactus* (Erséus, 1990) and *Gianius eximius* Erséus, 1997. The bipartite spermathecal duct is another important character shared only by *G. eximius* and *G. urgorrii* sp. nov. in the genus. But these two species are clearly separated by several other characters as the number and arrangement of the penial setae in each bundle (about 10, cone-shaped fan arranged, in the former; 5-6, comb-like arranged, in the later), the atrial muscular wall (thick in the former; thin in the later), the length of the vasa deferentia with respect to the atria (barely longer in the former; about two times longer in the later), the spermathecal ampullae (elongate and typically containing one large bundle of sperm surrounded by amorphous mass of secretion in the former; thin-walled pyriform to globular, filled with a dense mass of spermatozooids, and provided with a large inner collar narrowing the entrance of the spermathecal ducts in the later) or the prostate glands (typically globular to oblong in the former; atypically markedly elongate in the later). We must note that another species of *Gianius* with spermathecae in the atrial segment is being described elsewhere by the senior author, but this is a groundwater species from the karst in Cantabria (N Spain), with the typical shape of spermathecae and prostate in the genus.

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Declaration of competing interest

The authors of this article declare that they have no financial, professional or personal conflicts of interest that could have inappropriately influenced this work.

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Authorship contribution statement

Enrique Martínez-Ansemil: Conceptualization, Funding acquisition, Investigation, Methodology, Project administration, Resources, Supervision, Visualization, Writing-original draft, writing- review and editing.

Carlos Caramelo Rego: Investigation, Methodology, Resources, Visualization, Writing-original draft and writing-review and editing.

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