



Revista de Biología Marina y Oceanografía

ISSN: 0717-3326

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Universidad de Valparaíso

Chile

Elias, Rodolfo; Vallarino, Eduardo A.; Bremec, Claudia S.
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Revista de Biología Marina y Oceanografía, vol. 35, núm. 2, diciembre, 2000, pp. 181-184
Universidad de Valparaíso
Viña del Mar, Chile

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Protoariciella uncinata* Hartmann-Schröder, 1962 (Polychaeta, Orbiniidae): a new record for intertidal mussel beds of the Southwestern Atlantic shore affected by sewage effluents

Protoariciella uncinata Hartmann-Schröder, 1962 (Polychaeta, Orbiniidae): un nuevo registro para la comunidad de mitilidos intermareales del Atlántico sudoccidental afectada por efluentes cloacales

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Resumen.- La especie *Protoariciella uncinata* (Polychaeta, Orbiniidae) es mencionada por primera vez para el Atlántico sudoccidental, proveniente de muestreos intermareales realizados en la comunidad del mitilido *Brachidontes rodriguezi* del área de Mar del Plata, Argentina. La especie ha sido anteriormente citada para bancos de mitilidos de Chile y Perú. El trabajo también brinda información sobre distribución espacial, relación con el gradiente orgánico producido por efluentes cloacales, densidad y otros datos ecológicos.

Palabras clave: Protoaricinae, primer registro, distribución, Océano Atlántico.

Abstract.- *Protoariciella uncinata* (Polychaeta, Orbiniidae) is mentioned for the first time in southwestern Atlantic shores, from mytilid mussel beds of *Brachidontes rodriguezi* of the Mar del Plata area, Argentine. The species was formerly described for mytilids banks of the Pacific coast of Chile and Peru. The work also provides information about spatial distribution, relationship with sewage organic enrichment, density and other ecological data.

Keywords: Protoaricinae, first mention, distribution, Atlantic Ocean.

Introduction

Mussel beds are effective refuges for several small organisms. In the Southwestern Atlantic shore, the *Perna perna* community (Jacobi 1987) in southern Brazil, and the *Brachidontes rodriguezi* community in Uruguay and northern Argentina (Olivier *et al.* 1966, Penchaszadeh 1973, Scelzo *et al.* 1996) are examples of this phenomenon. In the latter community, debris and sediments accumulate among byssal filaments (up to 19 kg m⁻² in horizontal substrates), being colonized by polychaetes, nemerteans and other invertebrates (Penchaszadeh 1973). These processes increase when patches become older and multilayered.

The identification of the associated polychaetes in the *Brachidontes rodriguezi* community was incomplete. Recently, in a study of the community structure of *B. rodriguezi* (Vallarino *et al.* 1999¹)

developed in abrasion platforms affected by domestic sewage of the Mar del Plata City (38 °S – 57 °W), a number of polychaetes were identified (Elias *et al.* 1999²). One of them corresponds to *Protoariciella uncinata* Hartmann-Schröder (1962a). This is the first mention of the species in waters of the Southwestern Atlantic shore, being formerly cited for the Pacific coasts of Peru and Chile.

Material And Methods

Study area

The sampling area is an open coast subjected to the littoral current (south to north), with extense sand beaches only interrupted by quarcitic outcrops and

¹ Vallarino EA, R Elias & MS Campodonico. 1999. La comunidad intermareal de *Brachidontes rodriguezi* bajo condiciones de enriquecimiento orgánico por efluentes cloacales. VIII COLACMAR, Trujillo, Perú, vol. II: 893-894.

² Elias R, EA Vallarino, CS Bremec & MC Gravina. 1999. Los poliquetos de la comunidad intermareal como bioindicadores de enriquecimiento orgánico en el Atlántico sudoccidental. VIII COLACMAR, Trujillo, Perú, vol. II: 904-905.

abrasion platforms of caliche (consolidate loees). Biogeographically, the region is a transitional temperate-cold water area, between the subantarctic (Patagonia) and the subtropical region (southern Brazil). Seawater temperature ranges between 8 and 21 °C and salinity between 33 and 34 PSU. Semidiurnal tides vary between 0,90 to 0,60 m.

Sewage discharges are produced in intertidal abrasion platforms, about 6 km north to the city, where 5 stations (named A, far, to E, close to the effluent) were randomly sampled with a 78 cm² corer in two tidal levels (4 sampling units in the upper fringe and 4 in the lower fringe). A control station (X) was sampled in the same way 9 km north to the effluent in a similar abrasion platform (Santa Elena Formation).

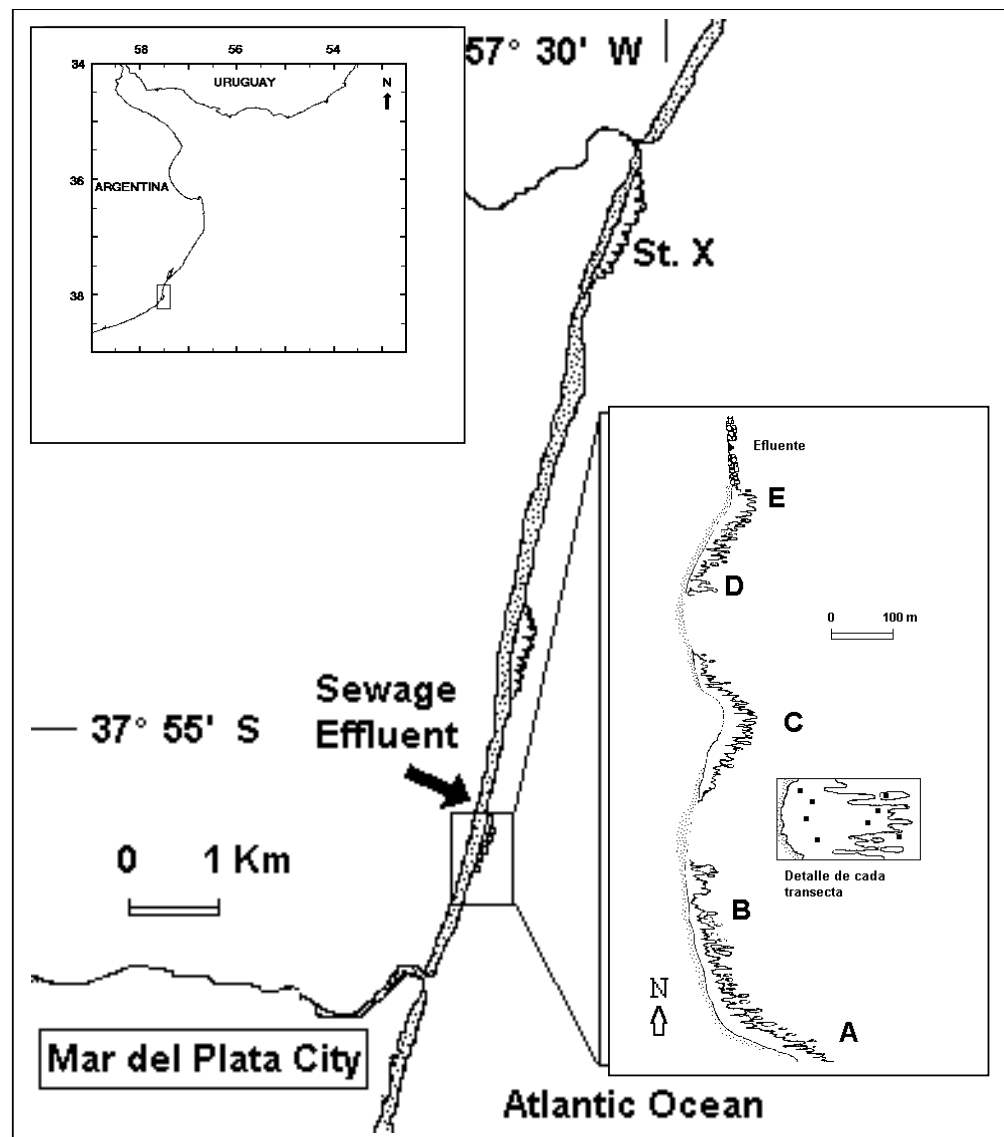


Figure 1

Sampling design in the intertidal mussel beds of the mytilid *Brachidontes rodriguezi* affected by sewage discharge.

Diseño de muestreo en los bancos intermareales del bivalvo mitilido *Brachidontes rodriguezi* afectados por descargas cloacales.

The material examined was collected from 1- station X (37° 50.860 S – 57° 27.315 W, 150 specimens from 8 sampling units), 2- stations A (33 specimens), B (70) and C (39), placed around the intertidal effluent (37° 55.591 S – 57° 31.701 W); 3- sampling units (also 78 cm² corers) in vertical artificial substrates of centric beaches of Mar del Plata (Scelzo *et al.* 1996), 24 specimens.

Results and Discussion

The material examined fits well with the description of Hartmann-Schröder (1962a): Protoaricinae (first two segments achaetous), branchiae from the third setiger, all thoracic notosetae are crenulate capillaries, acicular setae present in posterior notopodia. In our material, notosetae include thick hooks with three to five teeth. The description of specimens from Chile (Hartmann-Schröder 1962b) shows hooks with only three teeth. Other remarkable features are: prostomium pointed in many specimens, posterior end in some individuals shows an elongate morphology. The number of setigers varies from 45 to 78 in 3,5 to 14 mm long, in specimens from Mar del Plata (Fig. 2).

Protoariciella uncinata has been found in intertidal sediments accumulated between mussel beds of *Brachidontes rodriguezi*. These sediments are poorly

sorted, being a mixture of sand grains (fine to coarse) with shell debris. In abrasion platforms interstitial sediments can reach up to 100 kg m⁻² (Fig. 3), in a thick layer placed between mussels and substrate. Organic matter content of sediments varies along a gradient from effluent (Fig. 4).

The distribution of *Protoariciella uncinata* shows a negative effect due to organic pollution, being mean density lower in impacted areas (Stations E to A), rather than in control sites (Station X) (Fig. 5). The species was also found in vertical artificial substrates (breakwaters) of central Mar del Plata beaches, in high and middle levels of the intertidal (Scelzo *et al.* 1996).

Around Lima Department (10° 45' S – 12° 57' S, on the Pacific coast of Peru), *Protoariciella uncinata* is a frequent species associated to mussel beds of the mytilid *Perumytilus purpuratus* (Lamarck, 1819) (see Paredes & Tarazona 1980). In central Chile *P. uncinata* is known to be indicator of organically enriched sediments (Cañete, com. pers.).

In this part of the southwestern Atlantic shore, the indicator species are *Capitella capitata* and *Boccardia polybranchia*, which show a 'classical' behaviour as indicators of organic pollution (Eliás *et al.* 1999), being dominant or subdominant in impacted areas (stations E and C).

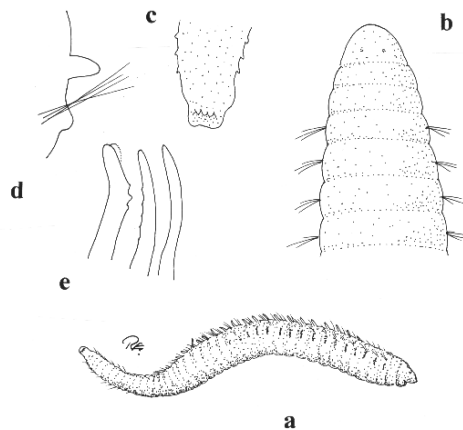


Figure 2

Protoariciella uncinata. a: General view; b: anterior end, in dorsal view; c: posterior end, in ventral view; d: median parapodia; e: uncini. b-e redrawn from the original description.

Protoariciella uncinata. a: vista general; b: parte anterior, en vista dorsal; c: parte posterior, en vista ventral; d: parapodio medio; e: uncini. b-e: redibujado de la descripción original.

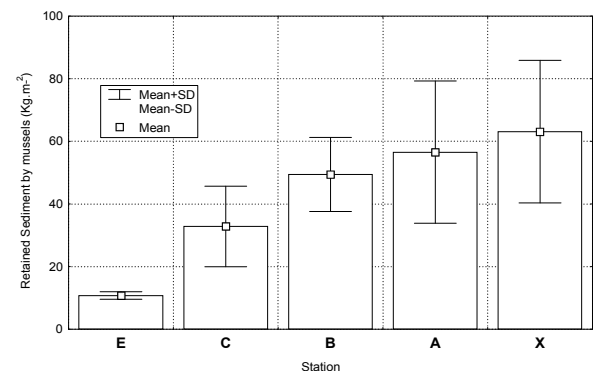


Figure 3

Sediments accumulated (kg m⁻²) between intertidal epilithic mytilids. The area is an abrasion platform affected by sewage.

Sedimentos acumulados (kg m⁻²) entre los mitílidos epilíticos intermareales. El área es una plataforma de abrasión afectada por descargas cloacales.

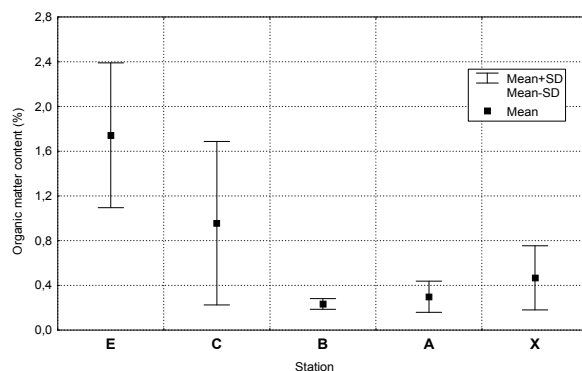


Figure 4

Organic matter content (%) of sediments. Stations E to A are affected by sewage, while station X is a control site 9 km north to the effluent.

Contenido de materia orgánica (%) de los sedimentos. Las estaciones E – A son afectadas por descargas cloacales, mientras que la estación X es un sitio control ubicado 9 km al norte del efluente.

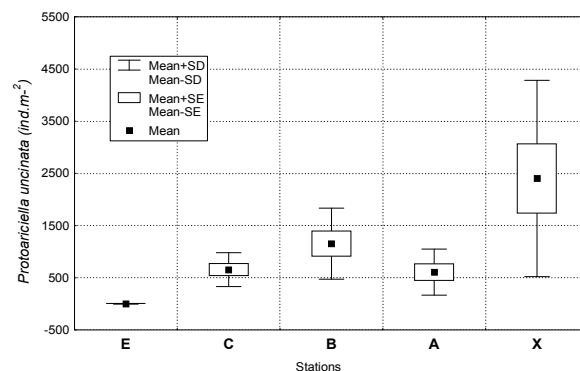


Figure 5

Density (ind m⁻²) of *Protoariciella uncinata* in intertidal mussel beds of *Brachidontes rodriguezi* developed in abrasion platforms affected by sewage.

Densidad (ind m⁻²) de *Protoariciella uncinata* en bancos de bivalvos intermareales de *Brachidontes rodriguezi* desarrollados sobre plataformas de abrasión afectadas por descargas cloacales.

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