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First record of the exotic isopod *Sphaeroma serratum* (Crustacea: Isopoda) from Uruguayan waters (southwestern Atlantic)

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The isopod *Sphaeroma serratum* (Fabricius, 1787) is reported from Uruguay for the first time and it is considered an introduced species in the region. The species was found very abundant and specimens were collected under the rocks in an intertidal area at La Paloma port in 2002 (34º39´S, 54º08´W). The specimens we examined fully agree with previous descriptions. Considering that this species has been reported as introduced in Argentina and Brazil, here we hypothesized the potential routes of introduction to Uruguay.

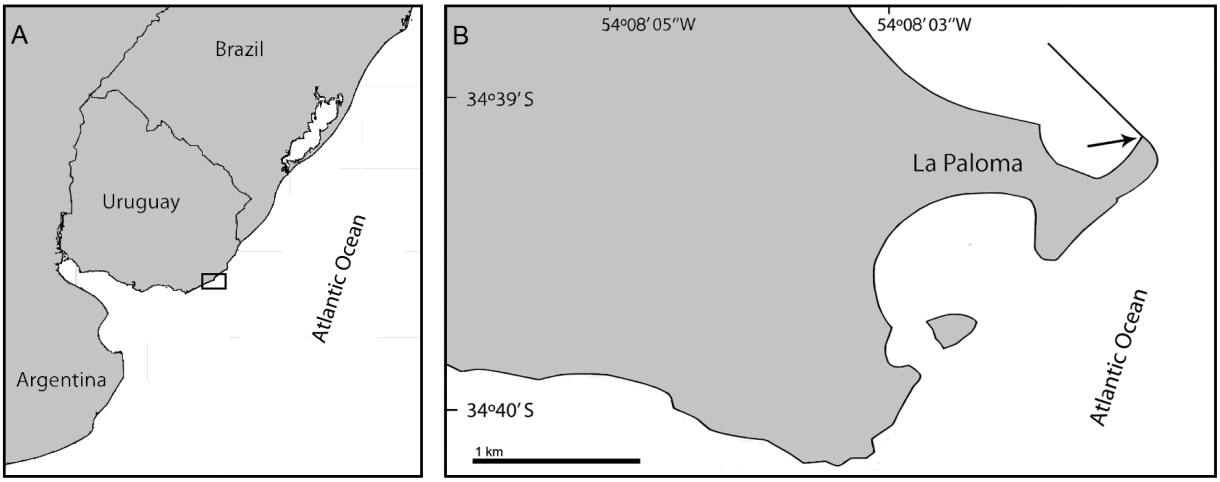

FIGURE 1. A, Map of Uruguay. B, La Paloma port, where the isopod *Sphaeroma serratum* was collected.

The genus *Sphaeroma* Bosc, 1802 includes several species that have been introduced in many tropical and temperate regions worldwide (e.g. Holdich & Harrison 1983; Jacobs 1987; and references therein). This is the case for *Sphaeroma serratum*, which shows a remarkably wide geographic distribution, being found in the intertidal zone under stones in marine waters, as well as in brackish habitats. This species is likely to be native of the North Atlantic; it has been studied from many localities in the NE Atlantic (from the British Islands to Morocco), including most of the coastal areas of the Mediterranean Sea, the Azores (where it is considered cryptogenic by Cardigos *et al.* 2006), the Black Sea (in Bulgarian, Rumanian and Turkish coasts), the Aegean Sea, the Suez Canal and NW Africa (Monod 1931; Omer-Cooper & Rawson 1934; Holdich & Tolba 1985; Castelló 1986; Kirkim *et al.* 2006; and references therein). In the southern hemisphere *S. serratum* was reported introduced in Australia (Holdich & Harrison 1983; Hass & Knott 1998), South Africa (Kensley 1978), Argentina and Brazil. In Argentina, it was first detected by 1964 in Mar del Plata (38˚ SL), and rapidly became a very abundant organism in rocky shores and ports of warm temperate areas southern Mar del Plata (Roux & Bastida

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1989; Adami *et al.* 2004; Dos Santos *et al.* 2009). In Brazil, specimens of *S. serratum* were first collected in 1989 in Rio de Janeiro (22˚ SL) (Pereira *et al.* 2001). This work is the first report of *S. serratum* in the Uruguayan coast, where we found it inside La Paloma port (Fig. 1). The specimens collected were dissected and their appendages were examined under a compound microscope in order to compare them with previous descriptions of the species.

The *Sphaeroma serratum* population found at La Paloma port is very dense (i.e. thousands of individuals) and the material studied was collected under rocks in the protected intertidal zone of the port in August 2002 (southern winter) and fixed in 10 % buffered formalin. Additional samplings were performed in January 2005 and August 2007 (southern summer and winter, respectively), and *S. serratum* was always observed in the same high densities. The material studied herein belongs to the first finding (129 ♀♀, 110 ♂♂ and 15 juvs), and it is deposited in the invertebrate zoology collection of the Museo Nacional de Historia Natural (Montevideo, Uruguay MNHNM 2153). The specimens examined, from La Paloma port, fully agree with the descriptions presented by Jacobs (1987), Roux and Bastida (1989) and Pereira *et al.* (2001). More than 20 polycromatism morph were described for *Sphaeroma serratum*, among the 254 specimens of *S. serratum* collected from Uruguay, the *bimaculatum* morph was the most frequent one (Fig. 2A, B).

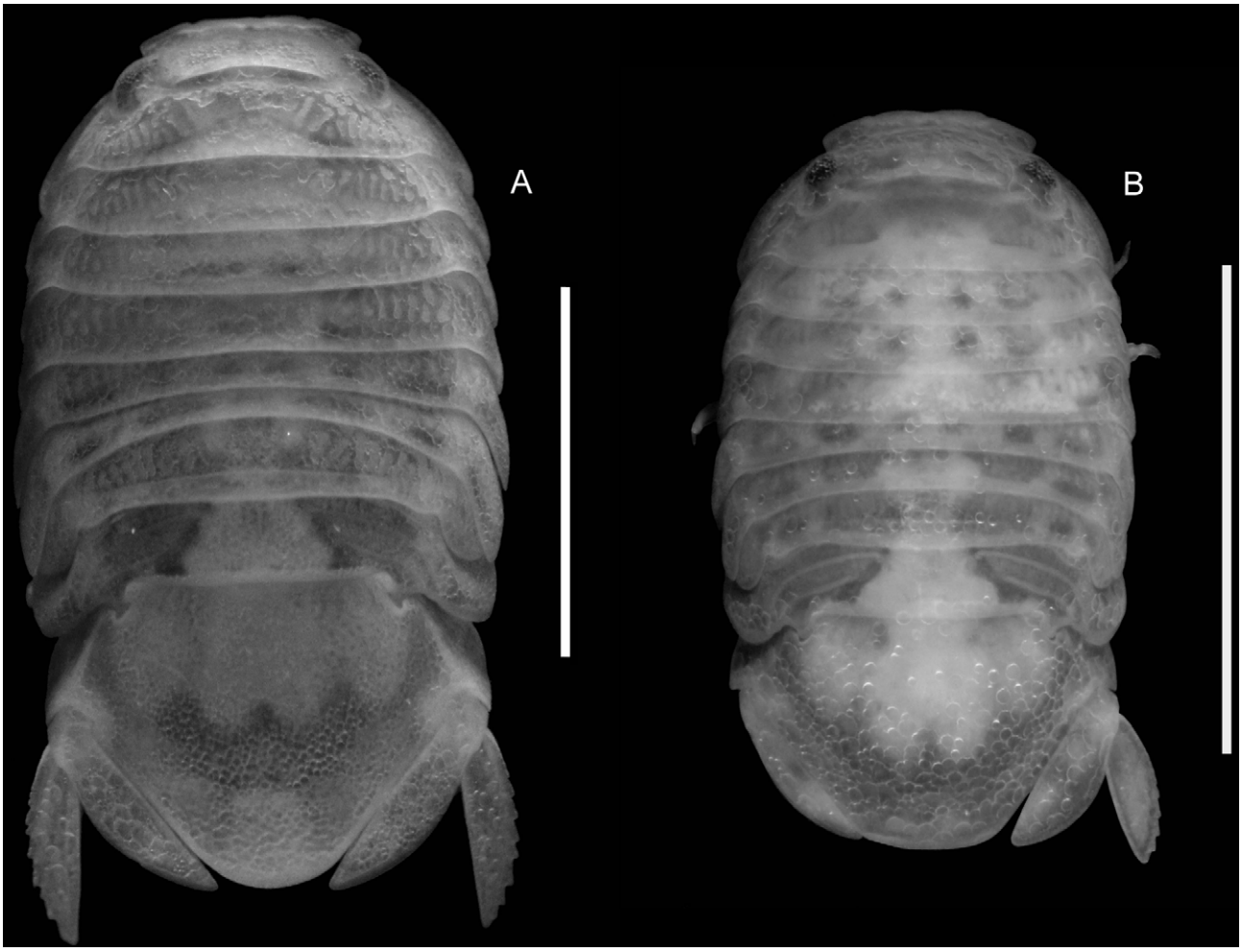

FIGURE 2. *Sphaeroma serratum* (Fabricius, 1787). A, B, dorsal view of male and female, respectively; both showing a *bimaculatum* morph. Scales: 5 mm.

The introduction of *Sphaeroma serratum* seems to have occurred during the early 90's since previous surveys in La Paloma did not reveal its presence (M. Demicheli pers. com.). In addition, we confirm now that the recent record in 2005 of an unidentified Sphaeromatidae from this locality and habitat (Demicheli & Scarabino 2006; Scarabino 2006) refers to this species. Recent sampling and observations along the entire Uruguayan maritime coast did not reveal the presence of *S. serratum* apart from La Paloma port, which strongly suggests the recent introduction of this species in Uruguay. The absence of this isopod in intertidal habitats between Rio de Janeiro and La Paloma (located 12 latitudinal degrees apart from each other), or between Mar del Plata and La Paloma (4 degrees apart) strongly suggest the hypothesis of a human-mediated invasion by intraregional shipping instead of natural dispersion (Chapman & Carlton 1991).

La Paloma is a small area, where the international commercial shipping activity (http://www.anp.com.uy) is almost absent and where ships are mostly dedicated to local fisheries, with the exception of few ships from neighbor countries that exceptionally use this port as a stop site approximately once a year. During the summer season, recreational boats from other countries can be sporadically observed using the port as resting area. The most important international port from Uruguay is Montevideo, located nearly 211 km west of La Paloma and with an important influence of brackish waters due to the massive supply of fresh waters from the Río de la Plata Estuary. In spite of the busy maritime activity in Montevideo port, *Sphaeroma serratum* was never reported there, as it could be expected considering the highest chances of being introduced by commercial ships. In fact, *S. serratum* is not the only newly introduced species in La Paloma. Since the late 90's other exotic species, the sea squirt *Styela plicata*, was found in this port too. Also, the exotics *Synidotea laevidorsalis* (Isopoda) and *Hymenacidion perlevis* (Porifera) and the cryptogenic *Schistomeringos rudolphii* (Polychaeta) are benthic invertebrates also recorded from La Paloma (e. g. Orensanz *et al*. 2002; Demicheli & Scarabino 2006). These reports highlight the necessity of a complete inventory of the benthic invertebrates living in these ports and neighbor areas along the Uruguayan coast, as well as the maintenance of museum collections that will fasten the identification of new and old human-mediated introductions.

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