

First records of the genus *Berghia* Trinchese, 1877 (Opisthobranchia: Aeolidiidae) from Argentina, with description of a new species

Primer registro del género Berghia Trinchese, 1877 (Opisthobranchia: Aeolidiidae) para Argentina, descripción de una nueva especie

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Abstract

There is considerable confusion among the species of aeolid nudibranch from the Western Atlantic assigned to the European *Berghia coerulescens* (Laurillard, 1830), *Berghia verrucicornis* (Da Costa, 1867) and *Spurilla neapolitana* (Delle Chiaje, 1823). The genus *Berghia* Trinchese, 1877 is recorded at the first time from Argentina. Our material is compared and discussed with species of *Berghia* from the Atlantic and Mediterranean coasts. We consider that *B. coerulescens* does not occur in the West Atlantic, while the western occurrence of *B. verrucicornis* requires further investigation. *Berghia rissodominguezi* is described as a new species with a Western Atlantic distribution from Caribbean to North Patagonian waters. The species *Spurilla columbina* García-Gómez and Thompson, 1990 is included in the genus *Berghia* and its distribution is extended to the Canary Island.

Resumen

Existe una gran confusión entre las especies de nudibrancos aeolidáceos del Atlántico Oeste asignadas a las especies europeas *B. coerulescens* (Laurillard, 1830), *B. verrucicornis* (Costa, 1867) and *S. neapolitana* (Delle Chiaje, 1823). El género *Berghia* Trinchese, 1877 es citado por primera vez para Argentina. Nuestro material es comparado y discutido con especies de *Berghia* de la costa Atlántica y Mediterránea. La distribución de *B. coerulescens* para el Atlántico Oeste es considerada incorrecta, mientras que la de *B. verrucicornis* como especie anfiatlántica, requiere de investigaciones futuras. Se incluye a la especie *Spurilla columbina* García-Gómez and Thompson, 1990 dentro del género *Berghia*, extendiendo su distribución hasta las Islas Canarias.

Palabras clave: Aeolidiidae, *Berghia*, new species, South Atlantic, Argentina.

Key words: Aeolidiidae, *Berghia*, nueva especie, Atlántico Sur, Argentina.

INTRODUCTION

The validity of the nudibranch gastropod genera *Spurilla* Bergh, 1864 and *Berghia* Trinchese, 1877 has been questioned by several authors: RUDMAN (1982) was the first to consider synonymising them. He points out that the only morphological difference between these genera is the posterior ornamentation on the rhinophores, which are lamellated in *Spurilla* (*Eolis neapolitana* Delle Chiaje, 1823, type species by monotypy) and papillated in *Berghia* (*Eolidia coerulescens* (Laurillard, 1830), type species by monotypy). He did not considered this sufficient difference to separate two genera and declared *Berghia* to be a junior synonym of *Spurilla*, concluding that the Aeolidiidae genera needed a complete revision.

GOSLINER (1980, 1985) attempted to clarify the characteristics of this family, and he concluded that these genera should remain distinct until more consistent differences are discovered. Several authors (CERVERA AND GARCIA-GOMEZ, 1986; CERVERA *ET AL.*, 1988; GARCIA-GOMEZ AND THOMPSON, 1990), however, have not adopted Gosliner's suggestion, but have followed Rudman's synonymy without contributing any additional evidence.

On the other hand, in the Western Atlantic numerous records of both genera have been cited from the Brazilian coast (MAC FARLAND, 1909; MARCUS, 1955, 1957, 1976; RIOS, 1994), the Caribbean Sea (EDMUNDS, 1964; MARCUS & MARCUS, 1970; THOMPSON, 1980; EDMUNDS AND JUST, 1983) and Florida coasts (MARCUS, 1972). All of these records have been assigned to the European species *Berghia coerulescens*, *B. verrucicornis* (DA COSTA, 1867) and *Spurilla neapolitana*, which have therefore been considered as amphiatlantic species. However, there are doubts as to the wisdom of this conclusion, because some reports of these species are not consistent with the description given by TARDY (1962), who demonstrated that in Europe there are in fact two species of *Berghia*. In the present paper we compared and discussed the species of the genus *Berghia* recorded at the first time in Argentina with the species considered amphiatlantic until now.

MATERIAL AND METHODS

The specimens studied come from Muséum National d'Histoire Naturelle, Paris (MNHN), material conserved in the Laboratorio de Zoología, Universidad de Oviedo (LZUO) and specimens collected from Patagonia (Argentina).

Risso-Domínguez deposited in MNHN (3 March 1963), one specimen labelled as holotype: *Berghia puelchana* from Mar del Plata Port (Buenos Aires). This nominal species are considered *nomen nudum*, because the original description has not been found. Five specimens of *Berghia* were collected from Gulf of San José (Península Valdés), between 1992/1995.

We also examined additional material of *Berghia* from different localities deposited in LZUO. *B. verrucicornis*: El Puntal (Asturias) 27 Jan. 1978, 1 specimen 7 mm preserved length, Coll. J. Ortea. Melenara (Las Palmas, Canary Islands) 10 Mar. 1981, 1 specimen 8 mm preserved length, Coll. R. Castillo. Príncipe Island (Gulf of Guinea) 16 Feb. 1990, 1 specimen 7 mm preserved length, Coll. X. Fernández. *B. coerulescens*: Punta Magenesi (Sicily) 5 Jun. 1990, 1 specimen 12 mm preserved length, Coll. G. Rodríguez. *Spurilla columbina*: Barranco Hondo, Tenerife (Canary Island) 7 Aug. 1996, 1 specimen 34 mm preserved length, Coll. L. Moro.

Family AEOLIDIIDAE d'Orbigny 1834

Genus *Berghia* Trinchese, 1877

Berghia rissodominguezi new species

(Fig. 1-2, Plate 1)

Berghia coerulescens (Laurillard, 1830): MARCUS, 1957: 477, figs. 237-246; EDMUNDS, 1964: 29-30; MARCUS, 1976: 9.

Berghia verrucicornis (Costa, 1864): MARCUS, 1972: 304-305; MARCUS, 1977: 16; THOMPSON, 1980: 97; RIOS, 1994: 220, fig. 1090, pl. 76.

? *Berghia* sp. (A.C) EDMUNDS, 1968: 213-217, fig. 8-9.

Material examined: Mar del Plata (38°2'11"S, 57°31'37"W, Buenos Aires) intertidal zone, 18 Jan. 1961, 1 specimen 50 mm long in life (MNHN), Coll. C. Risso Domínguez. Patagonia, intertidal zone, specimens studied live from Gulf of San José (42°25'S, 64°19'W, Chubut), the length including the tail is: 23 Jan. 1992, 1 specimen 31 mm in length, Coll. C. Muniain; 28 Nov.

1993, 2 specimens 45 mm and 50 mm in length (dissected), Coll. C. Muniain; 13 Dec. 1995, 2 specimen 48 mm length and 52 mm, Coll. J. Pérez Barbería.

Type material: Holotype (deposited in MNHN, 13/12/95, 52 mm long, not dissected).

Description: External features: Living animal thin and elongate, 52 mm in length (Holotype, MNHN, PI 1A). General body colour translucent white. There are oblique bright orange lines on the borders of the insertion of the cerata and in front of the rhinophores. Over the head and between the rhinophores is an orange triangle. Translucent ceras with central reddish-brown diverticulum, ending in a short white cnidosac. An orange band with a thin subapical red ring around it are present. The digestive gland forms a brown-red dorsal digestive mid-dorsal line, visible through the mantle surface from the third group of cerata back to the last cerata. Rhinophores are long, tuberculate on the lateral and posterior sides, with cream-white coloration and yellow on apical portion. The translucent oral tentacles have a wide area of the same yellow colour covering two-thirds of them. The tentacles are long and slender, and approximately twice as long as the rhinophores. Cerata cylindrical and elongate with a rounded apex, uniform in diameter throughout most of their length (Fig. 1A). There are 6-8 clusters of cerata on each side, containing between 3 to 24 cerata per arch. The anteriormost cluster shows the greatest number of cerata 21-24 (holotype) and the most curved shape, decreasing in number and length towards the tail. The posterior 1-2 clusters consist of rows 1-3 cerata. The inconspicuous renopericardical prominence is situated between the first and second cerata arch, which are further apart than the others. Foot grooved anteriorly, with elongated foot corners and tapering gradually to the tail.

Internal anatomy: The radula of a specimen 50 mm length (MNHN) contains 27 teeth with 47-50 deeply pectinate denticles on each side of the triangular central cusp. The innermost denticles are short so that the profile of the tooth is notched; the outermost denticles are uniform in shape (Fig. 2 A). The jaws are elongate (1.2 mm long) with a fragile, smooth masticatory border. The salivary glands are shorter than the buccal mass.

The genital apertures are situated centrally in the first ceratal arch, while the anus is located within the second arch on the left side. The nephroproct is pre-anal, ventral and anterior to the second ceratal arch. Internally, the ovotestis consist of many globular lobe which decrease in size towards the tail. A conspicuous ampulla (8 mm length and 1.2 mm width), lies on top of the rest of the organs, and is connected to an ovoid seminal receptacle. The prostate is elongated, expanding into a deferent duct, but the conjunction between the two is not well delimited. The duct is ends in a rounded penial papillae (Fig. 1B, C).

Distribution and Biology: *Berghia rissodominguezi* is only known from the West Atlantic, the north and south limits of its distribution are Florida (MARCUS, 1972) and the Gulf of San José, respectively. This species inhabits warm waters, and can be found under stones in intertidal pools. It is not as common in Patagonia as *Spurilla* which can be collected large number in the same time (summer). When being handled, *Berghia rissodominguezi* is more prone to ceras autotomy than is *S. neapolitana*.

Etymology: The species is named in honour of Carlos Risso Domínguez, who collected the first specimen known as *Berghia* from Argentina.

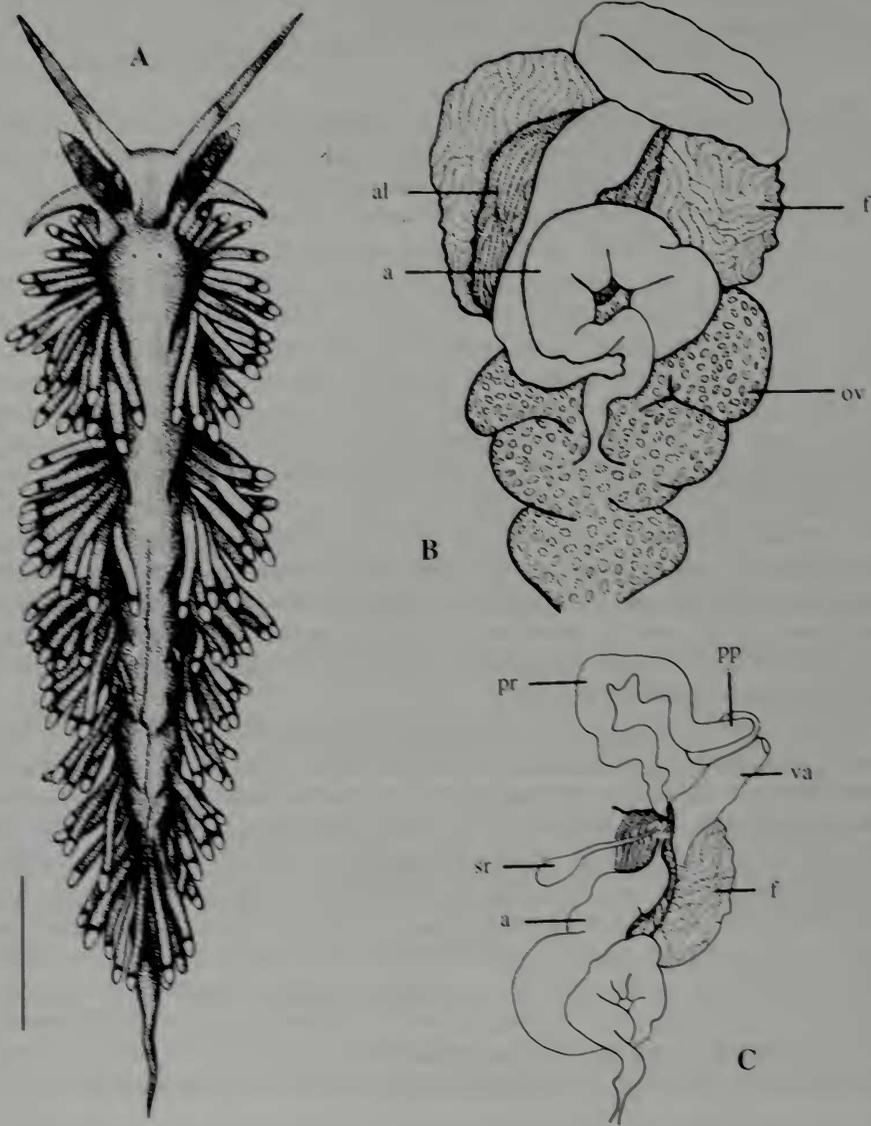


Figure 1. *Berghia rissodominguezi* new species. A. Dorsal view of a living animal, (scale bar= 7 mm). B-C, Dorsal view of the genital system. B: a, ampulla; al, albumen gland; f, female gland; ov, ovotestis. C: a, ampulla; f, female gland; pp, penial papilla; pr, prostate; sr, seminal receptacle; va, vagina.

Figura 1. *Berghia rissodominguezi* especie nueva. A. Vista dorsal de un animal vivo, (escala= 7mm). B-C, Vista dorsal del sistema genital. B: a, ampolla; al, glándula del albumen; f, glándula femenina; ov, ovotestis. C: a, ampolla; f, glándula femenina; pp, papila peneal; pr, próstata; sr, receptáculo seminal; va, vagina.

DISCUSSION

Western Atlantic specimens of *Berghia* have been considered to belong to a single and variable species, *B. coerulescens* (ENGEL, 1925; MARCUS, 1957; EDMUNDS, 1964, 1966; Marcus, 1976). Since TARDY (1962), some of the old records have been re-examined and assigned to *B. verrucicornis*. EDMUNDS (1968) suggested the existence of second western Atlantic species when he compared the specimens from Ghana and re-examined the variable Jamaican material cited as *B. coerulescens*. He assigned the Ghanaian specimens to *B. verrucicornis*, and separated the variable material from Jamaica as specimens A, B and C. In all three specimens the ceras insertions are conspicuously marked with bright orange, an important character absent in *B. verrucicornis* (Pl. 1 B). EDMUNDS (1968) did not describe a new species from Jamaica which leads to confusion, but suggested two possibilities, either that “it is possible that there is a single West Atlantic species of *Berghia* which is very variable” or “it is possible that there are two or more species of West Atlantic *Berghia*, each as distinct as are the two European species”. Nevertheless, THOMPSON (1980) assigned to *B. verrucicornis* the material from Jamaica and pointed out that “both European species of *Berghia* have now been recorded from the Caribbean

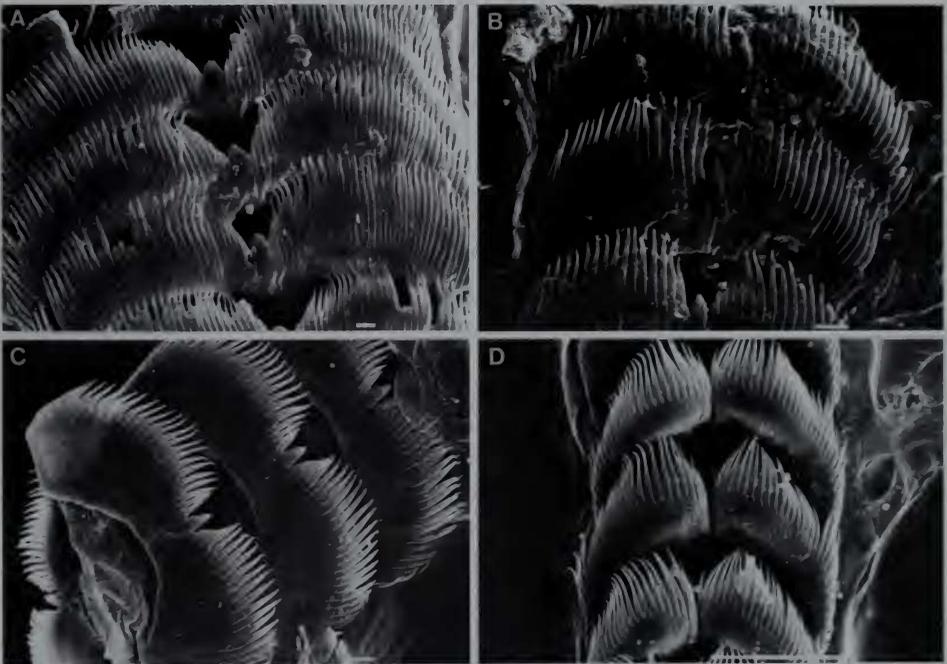


Figure 2. Radular teeth in the species of *Berghia* compared. A. Three median teeth in *Berghia rissodominguezi* (paratype, MNHN). Scale bar=10 µm. B. *Berghia verrucicornis* from Asturias (North Spain). Scale bar=10 µm. C. *Berghia verrucicornis* from Las Palmas (Canary Islands). Scale bar=10 µm. D. *Berghia coerulescens* from Sicily. Scale bar=100 µm.

Figura 2. Dientes radulares en las especies de *Berghia* comparadas. A. Three median teeth in *Berghia rissodominguezi* (paratype, MNHN). Scale bar=10 µm. B. *Berghia verrucicornis* from Asturias (North Spain). Scale bar=10 µm. C. *Berghia verrucicornis* from Las Palmas (Canary Islands). Scale bar=10 µm. D. *Berghia coerulescens* from Sicily. Scale bar=100 µm.

Sea but they have not been consistently recorded under the correct names". As in other descriptions of West Atlantic specimens, he described the bright orange lines at the ceras insertions, and drew a radula tooth with long and slender denticles, reliable characters present in *Berghia rissodominguezi* n. sp. We examined one specimen from Principe Island and, the vermilion colour to the rhinophores, the small size and the radular morphology confirm that it is the same species recorded by EDMUNDS (1968) from Ghana. Principe is the southern point of distribution cited for *B. verrucicornis* on the eastern Atlantic coast.

The main differences between *B. rissodominguezi* and *B. verrucicornis* are: *B. rissodominguezi* is larger, has conspicuous orange lines at the ceras insertions, white-cream colour rhinophore papillae, yellow tips to the tentacles, elongated cerata, a greater number of radular teeth and longer denticles (Fig. 2A, B, C). *Berghia rissodominguezi* differs from *B. coerulescens* principally in the colour pattern and the radula morphology (Fig. 2A, D).

Another western atlantic species of *Berghia* is *B. creutzbergi* Marcus & Marcus, 1970, in which the radular teeth have alternate large and small denticles, and there is no orange pigment (EDMUNDS & JUST, 1983), which is clearly different from *B. rissodominguezi* n. sp.

From material studied in the present paper we have transferred the species *Spurilla columbina* García-Gómez & Thompson, 1990 to the genus *Berghia*. This species was described from the southern Spain (Andalusian coast), extending now to the Canary Islands.

Based on evidence from numerous record we can ask, are European species of *Berghia* present in the Western Atlantic and are *Berghia coerulescens* and *B. verrucicornis* really amphiatlantic species ?. Following the authoritative review of TARDY (1962) we considered that *B. coerulescens* was never correctly recorded in reports from the western Atlantic. Therefore, we suggest that the distribution of *B. coerulescens* is eastern Atlantic (France and northern Spain) and Mediterranean. The western presence of *Berghia verrucicornis* is more problematic because some authors mentioned characteristics intermediate between *B. verrucicornis* and *B. rissodominguezi* (Edmunds, 1968 specimen B). In consequence, the valid presence of *B. verrucicornis* in the western Atlantic needs further investigation.

In a zoogeographical discussion EDMUNDS (1968, 1977) cites 37 species of Ghanaian opisthobranchs of which 16 occur in the western Atlantic, and he maintains *Berghia verrucicornis* as being amphiatlantic in its range. He suggests that the floating tree trunks with coelenterate polyps could easily transport a colony of aeolids across the Atlantic Ocean. TEMPLADO ET AL. (1990) included both *Berghia coerulescens* and *B. verrucicornis* in their list of amphiatlantic species, but they considered that transatlantic dispersal either as larva or on floating objects as unlikely. They conclude that is more probable that the east and west Atlantic forms are in process of speciation resulting either in two distinct species or in two populations with sufficient differences to merit subspecific rank. The San José Gulf perhaps represents the southern boundary for the subtropical species *B. rissodo-*

Plate 1 (right). Photographs of living animals of *Berghia*. A. *Berghia rissodominguezi*, Gulf of San José, Chubut, Argentina (Holotype, MNHN). B. *Berghia verrucicornis*, Bahía de Algeciras, Spain. C. *Berghia coerulescens*, Sicily, Italy.

Lámina 1 (derecha). Fotografías de los animales vivos de *Berghia*. A. *Berghia rissodominguezi*, Gulf of San José, Chubut, Argentina (Holotype, MNHN). B. *Berghia verrucicornis*, Bahía de Algeciras, Spain. C. *Berghia coerulescens*, Sicilia, Italia.



minguezi, just Cape Hatteras is the northern boundary for many other subtropical marine invertebrates (BERGGREN & HOLLISTER, 1974, cited in TEMPLADO *ET AL.*, 1990).

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