# A new species of *Salentinella* Ruffo, 1947 from a thermo-mineral cave in southern Spain, with comments on the systematic position of the family Salentinellidae (Amphipoda)

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## ABSTRACT

A new species of the stygobiont amphipod genus *Salentinella* Ruffo, 1947 is described from a thermo-mineral cave of Granada, southern Spain. Detailed observation of the appendages of the new species and of fresh specimens of *S. angelieri* Delamare-Deboutteville & Ruffo, 1952, and their comparison with the descriptions of other members of the family, have revealed that a simple callynophore is present on the antennule in both sexes of salentinellids. Furthermore, salentinellids have resulted to show a non-senticaudatan (i.e., lack of apical spines on rami) condition of uropods I and II. Both features question the current placement of the family within the senticaudatan parvorder Bogidiellidira. An identification key to all known members of the family Salentinellidae is provided.

**Key Words:** biospeleology, Crustacea, Iberia, stygofauna, taxonomy

## INTRODUCTION

Salentinellids (Salentinellidae Bousfield, 1977) are strictly subterranean aquatic amphipods endemic to the peri-Mediterranean region. The family currently accommodates a total of 14 species in four genera: the monotypic *Parasalentinella rouchi* Bou, 1971, *Aposalentinella latus* Messouli, Coineau & Boutin, 2018, and *Coxosalentinella gineti* (Balazuc, 1957), and around eleven species of *Salentinella* Ruffo, 1947 (see below and Messouli *et al.*, 2018). They occur in wells, caves, and the underflow of rivers and riverbanks, mainly in the Mediterranean, but a few species are found in Atlantic river watersheds of France and Spain (Coineau, 1963; Platvoet, 1987; Messouli *et al.*, 2002). None of these species has been reported thus far from fully marine habitats despite the fact that some (viz. *Salentinella gracillima* Ruffo, 1947 and *S. angelieri* Delamare-Deboutteville & Ruffo, 1952 in Ruffo & Delamare-Deboutteville, 1952) are common inhabitants of anchialine caves and brackish-water coastal aquifers. Whereas most salentinellids have a restricted distribution, the range of *S. angelieri* mostly overlaps the rest of the species and covers continental Greece and several north Aegean islands (e.g., Zante, Cephalonia), the Adriatic Sea coasts of Croatia and Italy, and almost all countries and islands of the western Mediterranean (Italy, France, Spain, Morocco,

Argelia; see Platvoet, 1987 and references therein; Karaman & Pesce, 1980; Pesce, 1985; Belaidi *et al.*, 2011). Salentinellids reach their highest diversity in the Iberian Peninsula (eight species), followed by continental France (five) and Italy (two). No salentinellids have been reported thus far from the southeastern quadrant of the Mediterranean.

Ruffo (1986) proposed that salentinellids were of marine origin and that they occupied the continental waters recurrently in different periods. Accordingly, *S. angelieri*, with its eurihalinity and broad coastal distribution, would be a recent colonizer, whereas the rest of members of the family, each restricted to a rather small area, would be earlier colonizers. Notenboom (1991) went further and suggested that the colonization of inland ground waters by salentinellids was mediated by past marine sea-level regressions, and proposed an alternative hypothesis for species diversification where the species with reduced ranges might have evolved from peripheral isolated populations of *S. angelieri*.

Salentinellids are remarkable among amphipods since the female allegedly does not develop oöstegites in any stage of the life cycle. Despite assertions by Barnard & Barnard (1983) and Lowry & Myers (2013), no indubitable report exists on the occurrence of such structures in salentinellids. A female ventral brood pouch conformed by oöstegites derived from the pereiopod

coxae is considered to be the main diagnostic trait of the super-order Peracarida Calman, 1904. In any case, their absence in salentinellids does not confer the group with any special phyletic relevance since similar cases occur also among isopods, otherwise universally acknowledged as peracarids (Hansen, 1905; Boutin *et al.*, 2002).

One of the four salentinellid genera, the monotypic *Parasalentinella rouchi*, is noteworthy in the display of epimeral extensions on urosomites I, II (see Messouli *et al.*, 2002). This feature is at odds with the canonical amphipod body plan (Dahl, 1977), where epimeral plates are developed at most only on pleonites I–III, and has been associated to the peculiar living habits of the species, capable of volvation (rolling up into a disc) in the interstitial environment where it dwells in.

The phylogenetic relationships of Salentinellidae are difficult to trace. Bousfield (1982) placed the taxon in superfamily Liljeborgioidea Stebbing, 1899, together with Liljeborgiidae Stebbing, 1988, Sebidae Walker, 1908, and Paracrangonyctidae Bousfield, 1982, a hypothesis that was not supported by Ruffo (1986), who manifested his doubts on these proposals on the systematic affinities of the family, especially with regard to Paracrangonyctidae. D'Udekem d'Acoz (2010) did not rule out a relationship between Liljeborgiidae and Salentinellidae, but considered that further evidence is required before accepting Bousfield's scheme. Barnard & Barnard (1983) suggested the subfamilies were close to eriopisellids and hadziids (Barnard & Barnard, 1983: 155), or metacrangonyctids (Barnard & Barnard, 1983: 700). Lowry & Myers (2013, 2017) placed them in their senticaudatan infraorder Bogidiellida Hertzog, 1936, together with two other strictly subterranean families, Artesiidae Holsinger, 1980 and Bogidiellidae Hertzog, 1936. This placement was questioned by Messouli *et al.* (2018), who considered salentinellids to be close to lysianassoids. The only published molecular phylogenetic analysis of amphipod relationships at the family level that includes salentinellids (Verheye *et al.*, 2015) lacks the resolving power to settle the issue.

We describe herein a new species of *Salentinella* from a thermomineral cave in Granada, southern Spain. This cave was previously known by harbouring the single population known of the harpacticoid copepod *Parapseudoleptomesochra balnearica* Rouch, 1986 (see Rouch, 1986). Detailed observation of the appendages of the new species and of fresh specimens of *S. angelieri*, and their comparison with the descriptions of other members of the family, have revealed that a simple callynophore (*sensu* Lowry, 1986) is present on the antennule in both sexes of salentinellids. Furthermore, salentinellids have resulted to show a non-senticaudatan condition (*sensu* Lowry & Myers, 2013; i.e., lack of apical spines on rami) of uropods I and II. Both features challenge Lowry & Myers' (2013, 2017) broadly accepted placement of the family within their senticaudatan parvorder Bogidiellidira.

## MATERIAL AND METHODS

Specimens were treated in the laboratory with lactic acid to remove internal tissues to facilitate observation. Drawings were prepared using a camera lucida on a Leica DM 2500 microscope (Leica Biosystems, Wetzlar, Germany) equipped with Nomarski differential interference contrast. Material preserved on slides was mounted in lactophenol and the coverslips sealed with nail varnish. Body measurements were derived from the sum of the maximum dorsal dimensions of head, pereonites, pleosomites, and urosomites, and exclude telson length.

"Spine" and "seta" are used in their traditional sense (see D'Udekem d'Acoz, 2010) in the descriptions, "spine" referring to any stout, inflexibly articulated ectodermic structure, whereas "seta" to any long, flexible articulated ectodermic structure. "Spinule" is applied either to very slender spines, or to inflexible

slender lateral projections of spines and setae; "denticle" for inflexible, stout lateral projections of spines or setae; and "setule" either for very short setae or for flexible lateral projections of setae.

Based on comparative limb morphology, the inner and outer "plates" of the amphipod maxillule and maxilla are identified as the coxal and the basal endite present in homologous position in other malacostracans, respectively (see Boxshall, 1998). It is worth noting that the basic maxillule in malacostracans is a biramous appendage comprising at most a 2-segmented protopod composed of coxa and basis, each bearing a single endite, an unsegmented exopod (lost in amphipods), and a 3-segmented endopod (reduced to only two segments at most in amphipods, the so-called "palp") (Boxshall, 1998).

## TAXONOMY

**Order Amphipoda** Latreille, 1816
**Family Salentinellidae** Bousfield, 1977 emended Messouli, Coineau & Boutin, 2018
**Genus *Salentinella*** Ruffo, 1947 emended Messouli, Coineau & Boutin, 2018
***Salentinella casteresi* sp. nov.**
(Figs. 1–5)

*Material examined:* Raja Santa Cave, Sierra Elvira, Granada, southern Spain, 37°14′09.95″N, 3°42′53.68″W. Holotype: female 3.9 mm, completely dissected and preserved on single slide. Collected by Iñigo Casteres, 7 January 2018. Paratypes: six females, of which one completely dissected and mounted on single slide. Collected by Luis Sánchez Tocino and Alberto Tinaut, 21 April 2018. Accompanying fauna: *Stenasellus* sp. (Isopoda). Holotype and one of paratypes (CCZ-UGR 19988, 19989) deposited in the collection of the Zoology Department, University of Granada, Spain (https://ccz.ugr.es/); rest of specimens at the collection of Instituto Mediterráneo de Estudios Avanzados, Esporles, Spain (IMEDEA).

*Diagnosis:* Salentinellid with main flagellum of antennule short, less than 50% corresponding peduncle; third segment of peduncle comparatively elongated, about 51% proximal segment. Incisor of mandibles finely dentate, each with numerous (> 7) teeth. Rake-like spines on basal endite of maxillule densely spinulose (each with >10 long spinules). Female gnathopod II carpus conspicuously elongated, about 1.6×corresponding propodus. Coxa of female pereiopod V with spur-like ventral extension on medial margin. Pleopods lacking retinacles.

*Etymology*: Species name after the Granadian speleologist Iñigo Casteres, who collected the first specimens known and kindly offered them to us for study.

*Distribution*: Species known only from the type locality.

*Description of female*: *Body* (Fig. 1A) up to 4.8 mm long, unpigmented, eyeless; tergites of all somites devoid of spines ("robust setae") except for ecdysial spine implanted ventrally at each side of urosomite I, before insertion of uropod I, posterodistal spine implanted ventrally at each side of urosomite III before insertion of uropod III. *Head* (Fig. 1B) lateral lobes acute; rostrum wanting. *Epimeral plates I–III* (Fig. 5A) margins unarmed; posterodistal angle of plates progressively more acute, produced towards posterior.

Antennule, antenna short, both much shorter than body length, each with flagellum much shorter than corresponding peduncle (Fig. 1A, B)

*Antennule* (Fig. 1B) slightly shorter than antenna, attaining 93% antenna length. Peduncle segments progressively shorter towards distal, relative length 1:0.7:0.5; distal segment comparatively elongated, about 69% second segment, 51% proximal segment. Main flagellum 3-articulate, about 50% peduncle; proximal article (Fig. 1C) with 9 long simple aesthetascs disposed along medial
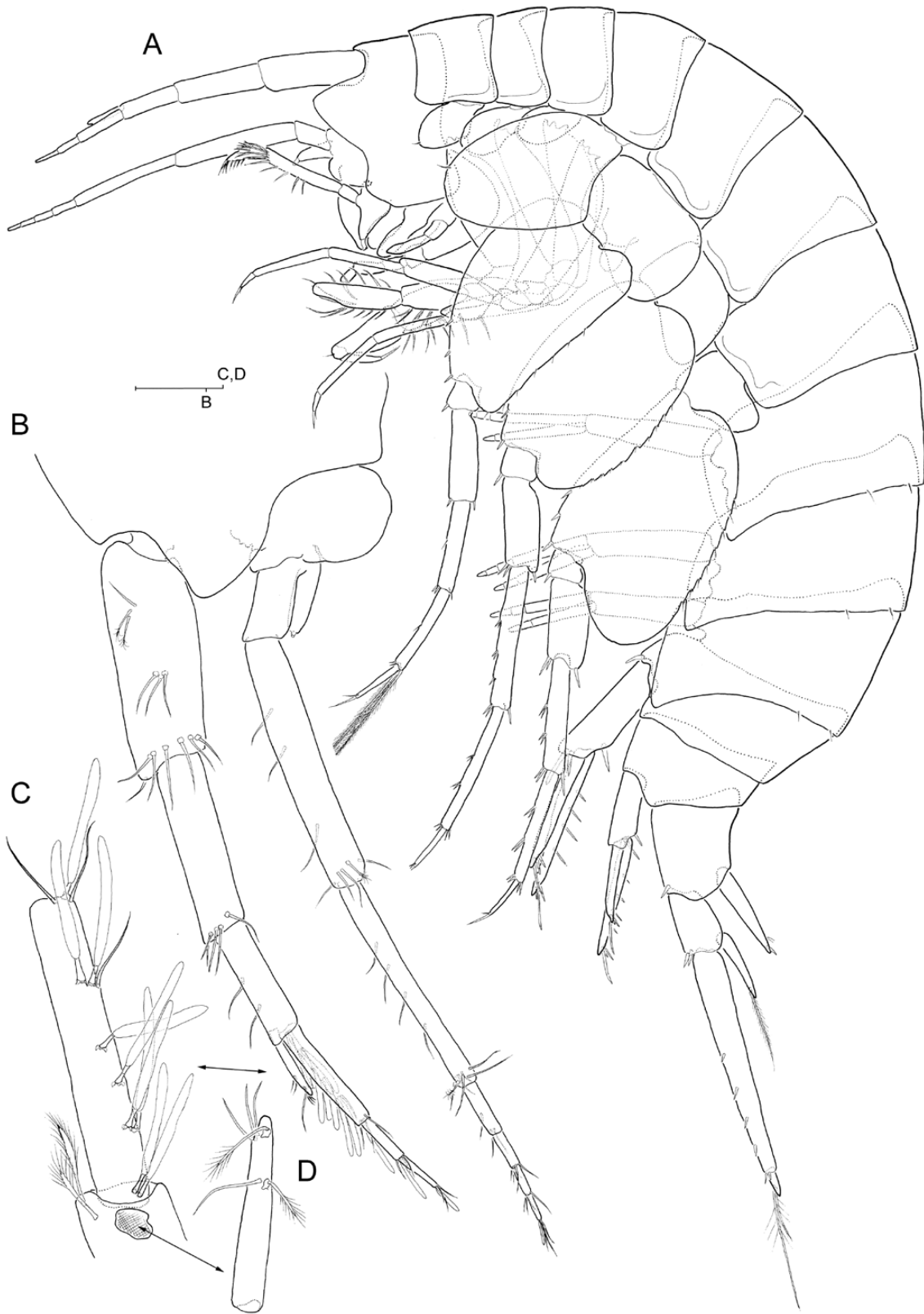
**Figure 1.** *Salentinella casteresi* **sp. nov**., female paratype 4.6 mm. General aspect (**A**); head with left antennule and antenna attached, lateral (**B**); inset of callynophore of left antennule of latter, medial (**C**); inset of accessory flagellum of left antennule, medial (**D**). Scale bar = 0.05 mm.

surface; all articles with aesthetasc present on distal margin. Accessory flagellum (Fig. 1D) unarticulate, about 75% proximal article of main flagellum, with rounded tip.

*Antenna* (Fig. 1B) proximal peduncle segment swollen; gland cone long, slender, almost reaching distal margin of third peduncle segment, oriented parallel to it; relative length of two distalmost

peduncle segments 1:0.9. Main flagellum 4-articulate, 66% length of distal (fifth) peduncle segment; distal article with short, simple aesthetasc on tip.

*Labrum* (Fig. 4A) ordinary, globose. *Paragnaths* (lower lips) (Fig. 4B) without inner lobes.

*Left mandible* (Fig. 2A) incisor with 8 teeth. Lacinia with 6 teeth plus rod-shaped micro-spinulose process adjoined to ventral margin. Setal row composed of 3 laxly spaced, slender pappose elements. Molar triturative, columnar, without molar seta. Palp 3-segmented; proximal segment shortest, about 75% distal segment; second segment long, with 3 simple setae along anterior margin, transverse row of 5 setae subdistally; distal segment with transverse row of 5 setae proximally on medial surface, 8 setae along anterodistal margin, of which distalmost 3 longer than rest. *Right mandible* (Fig. 2B) incisor with 9 teeth. Lacinia bifid, distal branch spatulate with finely dentate distal margin. Setal row with only 2 elements. Molar provided with conspicuosly long molar seta. Palp as left counterpart.

*Maxillules* (Fig. 2C) symmetrical. Coxal endite (inner plate) triangular with 2 pappose setae on tip. Basal endite (outer plate) with 9 rake-like finely spinulose spines, each provided with more than 10 slender spinules. Endopod (palp) 2-segmented, distal segment slightly expanded distally, with 3 triangular spines on distal margin, simple seta subdistally on inner margin.

*Maxilla* (Fig. 2D) coxal endite (inner plate) without oblique row of setae; rest of limb as figured.

*Maxilliped* (Fig. 2E) basal endite (inner plate) with 4 spines on distal margin, distolateral spine longer, more slender than rest. Ischial endite (= outer plate) with 3 blunt spines on distomedial margin. "Palp" (merus-to-dactylus) dactylate, slender, none of component segments expanded, all weakly setose; dactylus with long, slender unguis.

Pereiopodal *coxal plates I–III* (Figs 1A; 3A, C, E) similar, reduced, each with slightly produced, evenly rounded anteroventral margin. *Coxal plate IV* (Figs 1A; 3G) largest, much longer than broad (about 1.5 width), with anteroventral margin strongly produced into evenly rounded lobe; posterior margin excavate. *Coxal plate V* (Figs 1A; 4C) bilobed, anteroventral lobe less produced than posteroventral lobe; distomedial margin of coxa with strong spur-like process directed ventrally, not present on coxae of other limbs (compare Figs 4D and 4F; spur also visible in Fig. 1A). *Coxal plate VI* (Fig. 4E) subrectangular, with posterodistal margin slightly produced. *Coxal plate VII* (Fig. 4G) with posterior margin strongly produced into lobe; anterior, distal margins both straight.

*Coxal gills* (Figs 3C, E, G; 4C-F) present on gnathopod II and pereiopods III–VI, each sac-like with well-developed peduncle.

*Gnathopod I* (Fig. 3A) shorter than gnathopod II due to shorter basis, carpus, propodus. Carpus longer (1.2× longer) than propodus. Propodus (Fig. 3B) pyriform, 2.2× longer than wide, widest proximally; palm angle indistinct, marked by 2 modified (micro-denticulate proximally) stout, flagellate setae; palm margin slightly convex, smooth, unarmed.

*Gnathopod II* (Fig. 3C) with much longer, more slender basis than gnathopod I. Merus differing from gnathopod I counterpart in lack of stout flagellate setae. Carpus conspicuously elongated, 1.6× propodus, with medial margin fringed with 6 pairs of stout flagellate setae. Propodus (Fig. 3D) 3.2× longer than broad, much longer, more slender than gnathopod I counterpart, not expanded proximally (margins subparallel).

*Pereiopods III–IV* (Fig. 3E-H) similar, each with nail (dactylus + unguis) much shorter than half length of corresponding propodus.

*Pereiopods V–VII* (Fig. 4C, E, G) with basis expanded, that of pereiopod V with slightly concave posterior margin; posterodistal lobe comparatively narrow, not overreaching distal margin of corresponding ischium in pereiopods V-VI, but broad, overhanging until surpass amply distal margin of ischium in pereiopod VII. Merus of pereiopod V slender (Fig. 4C); that of pereiopods VI-VII slightly expanded but with distolateral angle not strongly produced into lobe (Fig. 4E, G). Propodus of pereiopod V with 2 long plumose setae on distolateral angle (Fig. 4C), much longer than corresponding nail (dactylus + unguis). Pereiopod VI longest whereas pereiopods V, VII of about same length.

*Pleopods I–III* (Fig. 5B) all similar, biramous, each with protopod slightly longer than rami, with exopod slightly longer than endopod; protopod lacking coupling hooks. Two setae on medial margin of proximal article of endopod modified, bifid.

*Uropod I* (Fig. 5C) biramous, exopod as long as protopod, much shorter than endopod. Protopod with 2 unequal spines on distolateral angle, single spine on distomedial angle; exopod without marginal armature; endopod with 4 setae along medial margin; both rami with 3 unequal subdistal spines.

*Uropod II* (Fig. 5D) similar to uropod I but much shorter, with single spine on distomedial angle of protopod, 3 along medial margin of endopod.

*Uropod III* (Fig. 5E) longest, elongated, slightly shorter than antennule. Protopod rectangular, about 1.8× as long as broad, with 2 spines on distolateral angle, single spine on distomedial angle, single spine on distodorsal margin. Exopod 2-segmented, proximal segment elongated, about 6× longer than broad, about 3× longer than protopod; lateral margin with 3 spines along distal half, pair of spines on distolateral angle; distal half of medial margin with 5 duplets (spine + plumose seta) distributed as figured. Distal segment of exopod reduced (attaining hardly one-seventh length of preceding segment), pointed, with 2 unequal plumose setae subdistally. Endopod short (31% exopod length) unsegmented, lanceolate, with long plumose seta implanted subdistally, reduced simple seta proximally on medial margin.

*Telson* (Fig. 5F) much longer (1.6× longer) than broad, cleft up to 58% of length; lobes notched distally, each with single terminal spine implanted in notch; pair of penicillate setae implanted subdistally on dorsal surface of each lobe at about 88% of their length from base.

*Male*: Unknown.

*Remarks*: The new species displays a set of features not recorded in any other representative of the family. Thus, the peduncle of the antennule is comparatively elongated, with the distal segment attaining 51% length of the proximal segment, whereas in the rest of salentinellids it is up to 46% as long as the proximal segment at most (viz. *Coxosalentinella gineti*, *Salentinella anae*). The incisor of both mandibles is finely multi-dentate (with 8, 9 teeth, coarsely dentate with only 4–6 teeth in other taxa). The nine rake-like spines present on the basal endite of maxillule are also finely pectinate (each with >10 long spinules, smooth or coarsely denticulate with few denticles in other species). The female gnathopod II shows a comparatively elongated carpus, which attains 1.6 × length of the corresponding propodus (up to 1.42 × length of propodus in other salentinellids, viz. *S. angelieri*).

Furthermore, the new species lacks coupling hooks on the protopod of pleopods, a feature shared only with *Parasalentinella rouchi*, *Salentinella anae*, and *S. ruffoi*; the rest of taxa displaying two coupling hooks per protopod except the monotypic *Aposalentinella latus*, which displays only one coupling hook (see Platvoet, 1987). Other features enabling the distinction of the new species from the rest of representatives of the family are shown in the key provided below.

With regard to the origin of the new species, it is worth noting that the Granada Basin was marine until the end of the Tortonian (Upper Miocene; 7.2 mya), and that the Sierra Elvira massif, where Raja Santa Cave is located, is a Quaternary horst, a zone uprisen by faults during the last million years, within the Granada Basin. The Sierra Elvira massif did not exist as such at the Tortonian, and much less the Raja Santa Cave itself. It is thus extremely difficult to assign a direct marine derivation to the new taxon, although, it is conceivable it derived from a marine ancestor left stranded in continental subterranean waters of the Granada Basin after the sea receded completely from that area
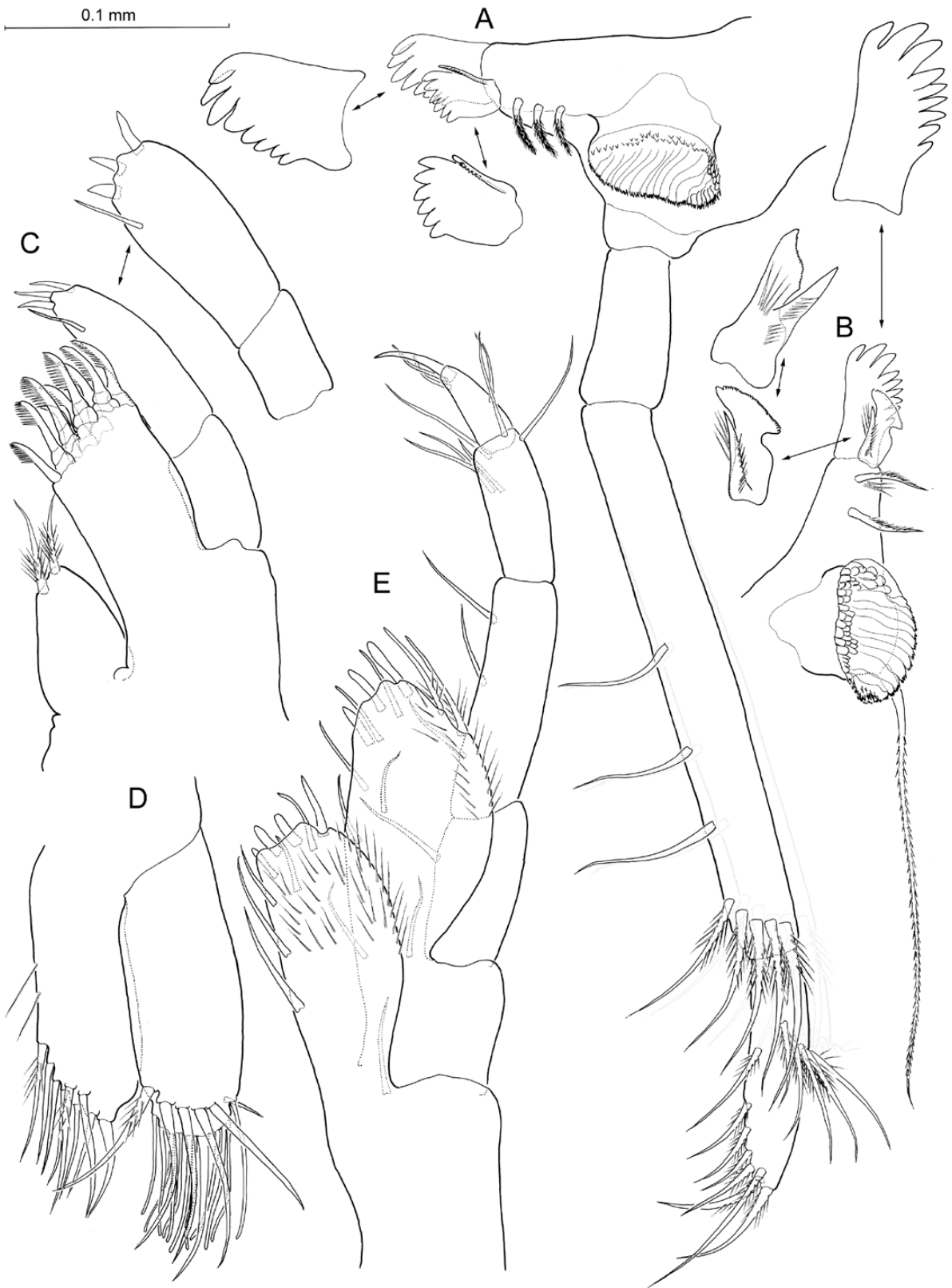
**Figure 2.** *Salentinella casteresi* **sp. nov.**, female paratype 4.6 mm. Left mandible with insets of incisor and lacinia (**A**); right mandible with inset of incisor and two insets of lacinia (**B**); left maxillule, posterior (**C**); right maxilla, posterior (**D**); right maxilliped, anterior (dorsal) (**E**).

during the Tortonian. The thermal water at Raja Santa Cave is deep water that ascends quickly to the surface along the faults that limit Sierra Elvira massif. Runoff water in origin, it permeates into the massifs that border the Granada Basin to the south (Sierras de Almijara y Tejeda), to migrate underground to the north across the pre-Miocene basement until this water is pressed against the
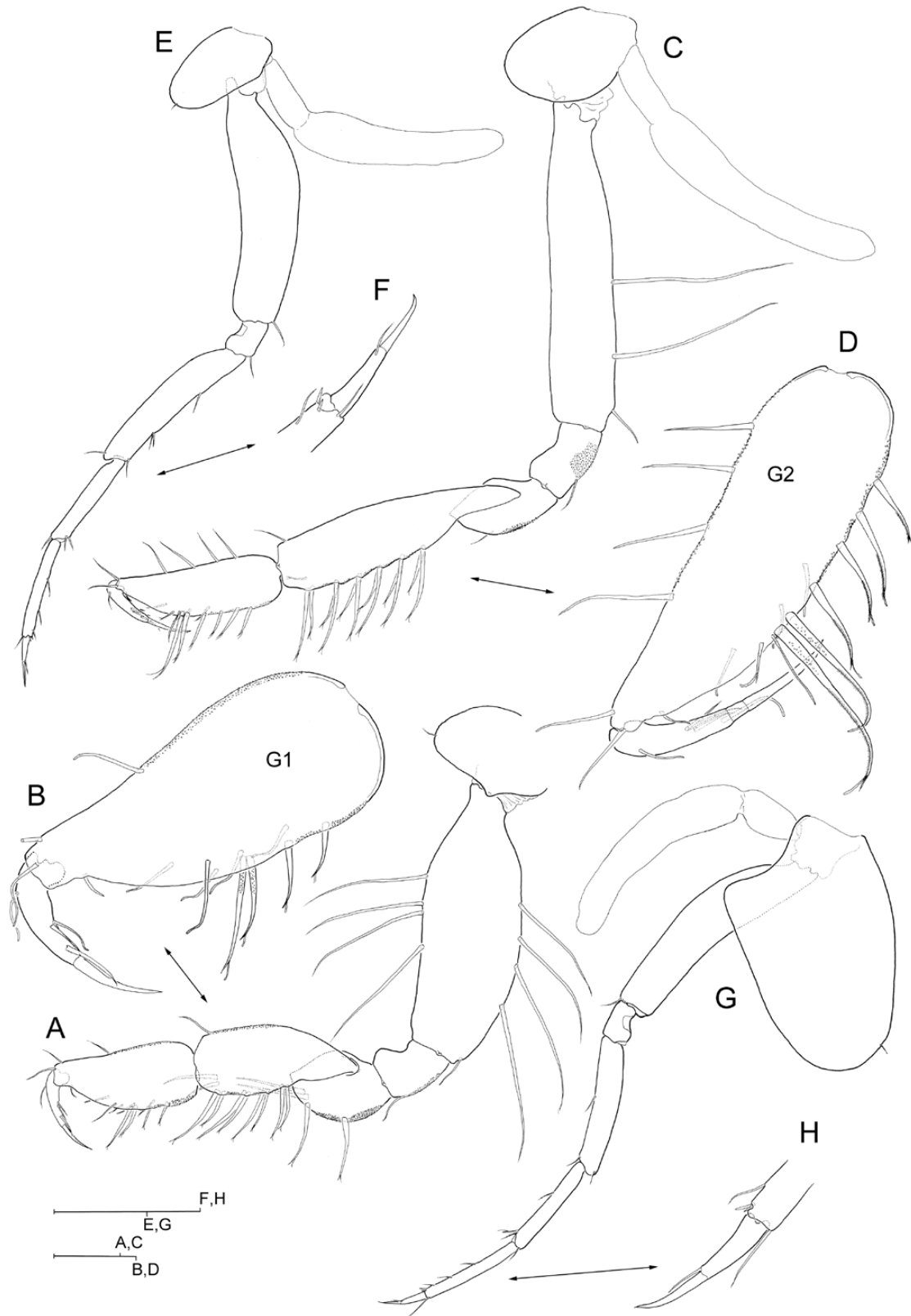
**Figure 3.** *Salentinella casteresi* **sp. nov.**, female paratype 4.6 mm. Left gnathopod I, lateral (**A**); inset of hand of latter, lateral (**B**); left gnathopod II, lateral (**C**); inset of hand of latter, lateral (**D**); left pereiopod III, lateral (**E**); inset of nail (= dactylus + unguis) of latter (**F**); right pereiopod IV, lateral (**G**); inset of nail of latter (**H**). Scale bars = 0.1 mm (A, C, F, H), 0.2 mm (E, G), 0.05 mm (B, D).

faults that limit Sierra Elvira, where it ascends quickly (Rosino, 2008). This is thermal water of low temperature (32 ºC) that becomes warmed simply by action of the geothermal gradient during their deep circulation.
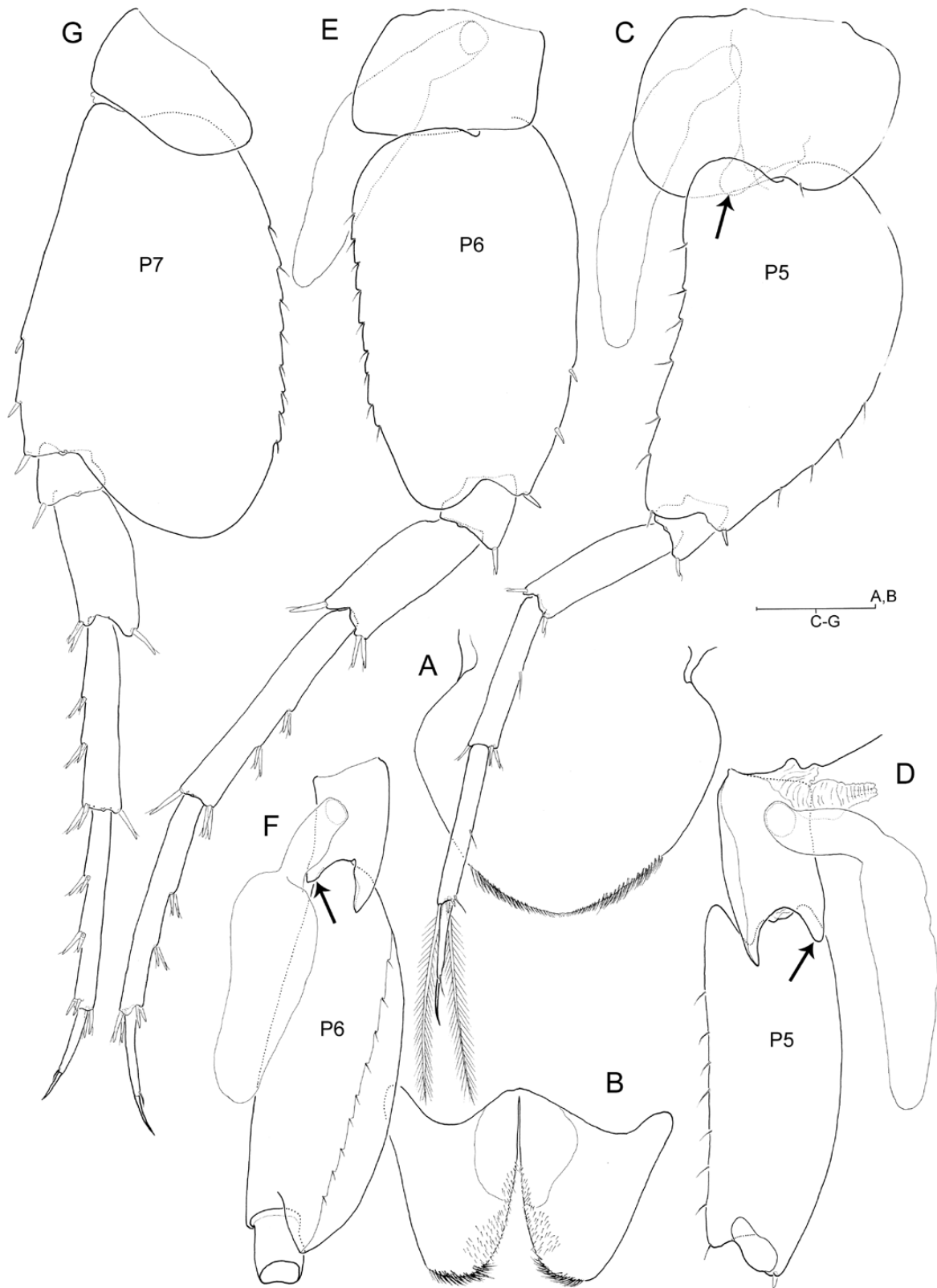
**Figure 4.** *Salentinella casteresi* **sp. nov.**, female paratype 4.6 mm., Labrum (**A**); paragnaths, anterior (**B**); right pereiopod V, lateral (arrow points at spur-like process on coxa) (**C**); detail of coxa and basis of left pereiopod V with gonopore everted, posterior (arrow points at spur-like process on coxa) (**D**); right pereiopod VI, lateral (**E**); detail of coxa and basis of latter, posterior (arrow points at homologous position where spur-like process is developed on coxa of pereiopod V) (**F**); left pereiopod VII, lateral (**G**). Scale bar = 0.1 mm.

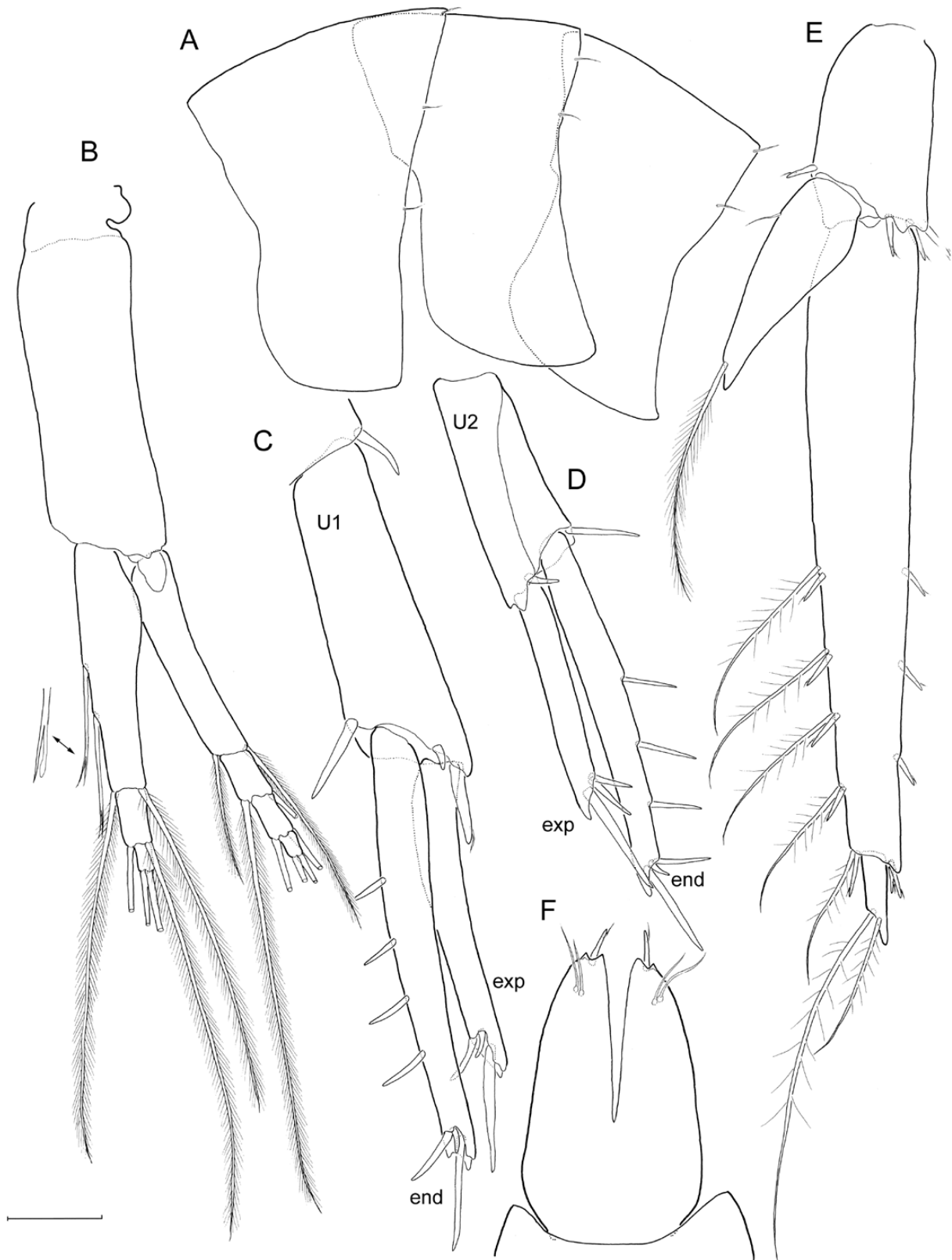**Figure 5.** *Salentinella casteresi* **sp. nov.**, female paratype 4.6 mm. Left epimeral plates, lateral (plate I slightly stretched) (**A**); left pleopod I, posterior, with inset of bifid setae on medial margin of proximal article of endopod (**B**); right uropod I, posterior (**C**); left uropod II, posterior (**D**); right uropod III, dorsal (= posterior) (**E**); telson, dorsal (**F**). Scale bars = 0.2 mm (A), 0.1 mm (B-F).

*Salentinella casteresi* **sp. nov.** is the third representative of the genus recorded in Andalusia, southern Spain. In that region, the broadly distributed *S. angelieri* commonly occurs in coastal areas of the provinces of Almería and Málaga, and also reaches the Lower Guadalquivir Basin (Cantillana, Sevilla). A second species, *S. seviliensis* Platvoet, 1987, is endemic to the Guadalquivir River from Alcolea del Río (Sevilla) up to its upper reaches (Mogón, Jaén; Platvoet, 1987).

## DISCUSSION

The systematic affinities of the family Salentinellidae are difficult to trace. The currently most widely accepted hypothesis (Lowry & Myers, 2013, 2017) places the family in the senticaudatan infraorder Bogidiellida Hertzog, 1936, on the basis of a cladistic analysis performed on 118 morphological characters. But the description of the new species has revealed that salentinellids display two features that are at odds with this systematic placement. First, they do not show a senticaudatan arrangement of spines on the rami of uropods I, II. The presence of apical spines on these uropods is the main defining trait of the suborder Senticaudata Lowry & Myers, 2013, although it is also displayed in a few taxa outside this suborder (Myers & Lowry, 2018). Most salentinellids display apparently terminal spines on the distal portion of rami, but detailed observation reveals that they are in fact implanted subterminally, and that there is a small portion of the ramus extending beyond the spines (see Fig. 5C, D; Messouli *et al.*, 2002: fig. 3a-c; Platvoet, 1984: fig. 2l; Coineau, 1962: fig. 8a, b; 1963: fig. 7a, b; 1968: fig. 23g, h; Dancau, 1973: fig. 4). The non-senticaudatan condition of uropods is most evident in *Coxosalentinella*, where rami are styliform and are completely unarmed distally (Balazuc, 1957: fig. 2; Coineau, 1968: fig. 17d, e).

Salentinellids display a simple callynophore (*sensu* Lowry, 1986) on the proximal article of the main flagellum of the antennule in both sexes, with the male one comprising a higher number of aesthetascs than in females; furthermore, aesthetascs appear disposed in a series of duplets in males. The callynophore is not displayed in senticaudatans although at least some eophliantids (infraorder Talitrida) such as *Wandelia* Chevreux, 1906, show a group of aesthetascs on the proximal article of the main flagellum that might be comparable to a callynophore. A simple callynophore appears in some members of the suborders Colomastigidea Stebbing, 1899, Hyperiopsidea Bovallius, 1886, and Amphilochidea Boeck, 1871, and reaches its maximum structural complexity in some members of the amphilochidean parvorder Lysianassidira Dana, 1849, where aesthetascs appear arranged in rows and distributed in two fields (Lowry & Myers, 2017). This is, on the other hand, the closest group to salentinellids according to Messouli *et al.* (2018).

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## KEY TO THE SALENTINELLIDAE

The taxonomy of *Salentinella* was based initially on morphological features whose diagnostic value was subsequently called into question, such as the number of articles composing the flagellum of antennules and antennae, the relative length of the endopod of uropod III, the outline of the gnathopods, or the number of aesthetascs present on the proximal article of the flagellum of antennule. The latter two features are a mere reflection of sexual dimorphism, not recognized as such at the time (Karaman, 1979; Platvoet, 1984). After the descriptions of the first two species known, *S. gracillima* (description expanded in Ruffo, 1953), and *S. angelieri* (description expanded in Delamare-Deboutteville & Ruffo, 1954) a burst of presumed new taxa followed, most of which currently considered to be synonyms of the broadly distributed *S. angelieri*. Thus, Ruffo (1953) synonymized *S. denticulata* Baschieri-Salvadori, 1952 with *S. angelieri*, as Karaman (1979) did with the following taxa: *S. angelieri balcanica* G. Karaman, 1967; *S. angelieri pisana* Ruffo, 1953; *S. franciscoloi* Ruffo, 1953; and *S. gracillima balcanica* S. Karaman, 1953. The number of junior synonyms of *S. angelieri* was still increased by Platvoet (1984) and Pretus (1991), who added *S. juberthieae* Coineau, 1968 and *S. formenterae* Platvoet, 1984 to the lists, respectively.

Ruffo (1986) followed Claude Bou's (*in litt.*) proposal to synonymize *Salentinella major* Barbé, 1965 to *S. gineti* Balazuc, 1957 (now *Coxosalentinella gineti*), and *S. prognatha* Barbé, 1963 to S. *lescherae* Coineau, 1968. The latter taxon had already been synonymized to *S. major* (= *Coxosalentinella gineti*) by Platvoet (1984).

The genus as it currently stands accommodates a total around 14 species (including the presently described species). Nevertheless, current knowledge of the broad morphological variability of *S. angelieri* (see Karaman, 1979; Platvoet, 1984) suggests that this taxon might be a junior synonym of the type species *S. gracillima*, although unavailability of material to establish direct comparisons between both taxa impedes going further in this hypothesis. These species are the only salentinellids that occur in coastal brackish waters, with the reduced area occupied by *S. gracillima* (endemic to the coast of Puglia, southern Italy) embedded into the broad range of *S. angelieri*, which furthermore includes Puglia as well (see Pesce, 1985).

The new species described herein can be readily separated from the rest of members of the genus following the key provided below, which for the purpose of completeness also includes the monotypic *Parasalentinella*, *Coxosalentinella*, and an odd taxon from Carcagent (Valencia, eastern Spain) known from a single specimen, described but left unnamed by Platvoet (1987), but for which Messouli *et al.* (2018) erected *Aposalentinella*. This last taxon displays a carpus of both gnathopods that is much shorter than the corresponding propodus, and only six spines on the basal endite of the maxillule. Both features depart from the condition found in other salentinellids, where the carpus of gnathopods is equal or longer than the corresponding propodus, and the basal endite of the maxillule bears nine spines:

1. Urosomites II, III provided with ventrolateral epimeral extensions .................................................... *Parasalentinella rouchi* Bou, 1971
   – Urosomites devoid of epimeral extensions ....................................................................................................................... 2
2. Carpus of both gnathopods much shorter than corresponding propodus ......................... *Aposalentinella latus* Messouli, Coinau & Boutin, 2018 (see above)
   – Carpus of gnathopods as long as or longer than corresponding propodus ….................................................................................. 3
3. Gnathopods simple. Coxal plate II hypertrophied ….................................................... *Coxosalentinella gineti* (Balazuc, 1957)
   – Gnathopods subchelate. Coxal plate II reduced ................................................................................................................... 4
4. Merus of pereiopod VII with strongly overhanging posterodistal lobe ….......................................................................................... 5
   – Merus of pereiopod VII ordinary, unlobed………........................................................................................................……………7

5. Dorso-distal margin of second segment of peduncle of antennule produced into large lobe …….....................…..…..... 6
   – Peduncle of antennule ordinary, unlobed .................................................................................... *Salentinella seviliensis* Platvoet, 1987
6. Telson entire …………….......……………………………………………….....…… *S. carracensis* Platvoet, 1987
   – Telson cleft ……………………………………………….........……........… *S. ruffoi* Messouli, Coinau & Boutin, 2018
7. Dorso-distal margin of second segment of peduncle of antennule produced into large lobe ……...........................…..…….…. 8
   – Peduncle of antennule ordinary, unlobed ……........................................................................................... 9
8. Telson cleft to 1/3 length ………..........……………………………………………........... *S. delamarei* Coineau, 1962
   – Telson cleft to 1/4 length ………...............………………………........…… *S. delamarei macrocheles* Coineau, 1968
9. Third peduncle segment of antennule shortened, much shorter than half length of second segment …………...............……… 10
   – Third segment > half-length of second segment ………...............…………………………......…… 12
10. Protopod of uropod I with strong distal projection ….....................………………….......... *S. cazemierae* Platvoet, 1987
    – Uropod I ordinary, without distal projection ………................................................................ 11
11. Urosomite III elongated, much longer than broad ….................……………............ *S. longicaudata* Platvoet, 1987
    – Urosomite III short, about as long as broad …………..……........................……… *S. messanai* Messouli, Coineau & Boutin, 2018
12. Uropod III endopod reduced, at most 17% as long as exopod ….................……….........……… *S. meijersae* Platvoet, 1987
    – Uropod III endopod not reduced ……………..............………………………….......… 13
13. Telson much longer than broad ……….....................……………….........…….. 14
    – Telson about as long as broad ….................…………………….............…….. *S. anae* Messouli, Coineau & Boutin, 2002
14. Incisor of mandibles coarsely dentate, with 4–6 large teeth at most ………….................…………… 15
    – Incisors finely multi-dentate (> 7 small teeth) ………...............…………………. *S. casteresi* **sp. nov.**
15. Urosomite III elongated. Tip of telsonic lobes trifid ……........................…………………… *S. petiti* Coineau, 1963
    – Urosomite III about as long as broad. Tip of telsonic lobes incised, bifid …….......……………......…… *S. gracillima* Ruffo, 1947 and
    *S. angelieri* Delamare-Deboutteville & Ruffo, 1952 (including *S. angelieri* var. *longispina* Platvoet, 1987)

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