



## A new squat lobster (Crustacea: Decapoda: Anomura: Chirostylidae) from off NW Spain

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### Abstract

*Uroptychus cartesi*, a new species of squat lobster belonging to the family Chirostylidae, is described based upon material recently collected from the Bank of Galicia, a deep seamount located off north-west Spain. This is now the fifth species of the genus known from the eastern Atlantic. The four species previously recorded in the region (*U. bouvieri*, *U. concolor*, *U. maroccanus* and *U. rubrovittatus*) are morphologically rather remote from the new species. The spinose carapace lateral margin links *U. cartesi* to *U. bouvieri* but the other characters displayed by the new species are largely different from those of that species. *Uroptychus cartesi* is distinguished from *U. bouvieri* by the epigastric region having denticles arranged in small arcs transversely rather than a pair of spines behind the eyes; the anterolateral spine of the carapace is much larger than, instead of subequal to, the lateral orbital spine; the P2–4 propodi are slightly more than half, instead of twice, the length of dactyli; and the penultimate flexor marginal spine of P2–4 dactyli are twice as broad as, rather than as broad as the antepenultimate spine. A key to the species of *Uroptychus* from the eastern Atlantic is provided.

**Key words:** Crustacea, Decapoda, Anomura, Chirostyloidea, Chirostylidae, *Uroptychus*, eastern Atlantic, Spain

### Introduction

Very recently, the Bank of Galicia off the northwestern Spain was explored by the Spanish cruise INDEMARES which conducted faunal and oceanographic investigations, with the aim of supporting the conservation of the marine species of the area. Among the crustaceans collected we found several specimens of an unusual species of squat lobster belonging to the genus *Uroptychus*, from a depth of 1410 m, which represent an undescribed species. The Atlantic harbours only very few species of the genus *Uroptychus* compared to the Indo-Pacific; only four species are known from the eastern Atlantic and 14 from the western Atlantic, whereas more than 118 species are reported from the Indo-Pacific (Baba *et al.* 2008, 2009; Poore & Andreakis 2011). Three of the four eastern Atlantic species were described in the late 19th century and the fourth was described 35 years ago (*U. rubrovittatus* (A. Milne-Edwards, 1881); *U. bouvieri* Caullery, 1896; *U. concolor* (A. Milne-Edwards & Bouvier, 1894); and *U. maroccanus* Türkay, 1976). Thus, this new species is described after what seems to be a long time. The new species is unique among the eastern Atlantic species in most of its morphological characters and rather resembles *U. armatus* (A. Milne-Edwards, 1880) from the western Atlantic.

The terminology used follows Baba *et al.* (2009). The size of the specimens is indicated by the postorbital carapace length. Measurements of appendages are taken in dorsal (pereopod 1), lateral (antennule, pereopods 2–4) and ventral (antenna) midlines. Ranges of morphological and meristic variations are included in the description, with the holotype characters in square brackets. Abbreviations used are: cl., postorbital carapace length; Mxp = maxilliped; P1, pereopod 1; P2–4, pereopods 2–4 (walking legs 1–3). The type material is deposited in the Institut de Ciències del Mar, Barcelona (ICM), and Muséum national d’Histoire naturelle, Paris (MNHN).

## Systematics

### Family Chirostylidae Ortmann, 1892

### Genus *Uroptychus* Henderson, 1888

#### *Uroptychus cartesi*, new species

(Figs. 1–3)

**Type material.** Holotype: male (4.9 mm), ICMD-20111017-01, Bank of Galicia, off NW Spain, “INDEMARES” Station DR15, 42°28.807'N, 011°50.028'W, 1410 m, 8 August 2011. Paratypes: 1 male (6.0 mm), 2 ovigerous females (5.1, 5.3 mm), 1 female with egg exuvia on pleopod 3 (5.4 mm), ICMD-20111017-02, and 1 male (6.9 mm), 1 ovigerous female (6.3 mm), MNHN-IU-2009-579, station data as for the holotype.

**Description.** *Carapace*: 0.94–0.96 [0.91] (males), 0.87–0.91 (females) times as long as broad. Dorsal surface moderately convex from side to side, feebly so from anterior to posterior, with feeble depression between gastric and cardiac regions; sparingly, finely granulose, with sparse short setae. Denticle-like tiny spine on hepatic region posterior and mesial to anterolateral spine. Epigastric region with denticles transversely arranged in several small arcs (more distinct in larger specimens). Lateral margins weakly, convexly divergent posteriorly; anterolateral spine well developed, directed straight forward, overreaching article 2 of antenna; branchial margin with row of spines, anteriormost situated at anterior end, small but distinct, preceded by 2–4 [3] spines (between anterolateral spine and first branchial marginal spine) distinctly ventral to level of row, followed by 1 or [2] smaller spines on anterior branchial region and 4 moderate-sized, posteriorly diminishing spines on posterior branchial margin, last [small] or not spiniform but obtusely produced, followed by concave, ridged margin. Rostrum triangular, with interior angle of 30–[33]°, nearly horizontal, ending in sharp tip; dorsal surface feebly excavated; lateral margin with 1–3 [2 or 3] tiny spines distally; length 0.50–0.54 [0.53] that of carapace. Lateral orbital angle rounded (one female paratype), with very small (one female paratype) or moderately small spine (holotype and other paratypes), clearly smaller than anterolateral spine. Pterygostomial flap with several denticles roughly in longitudinal row on surface, anteriorly ending in small spine directed somewhat upward.

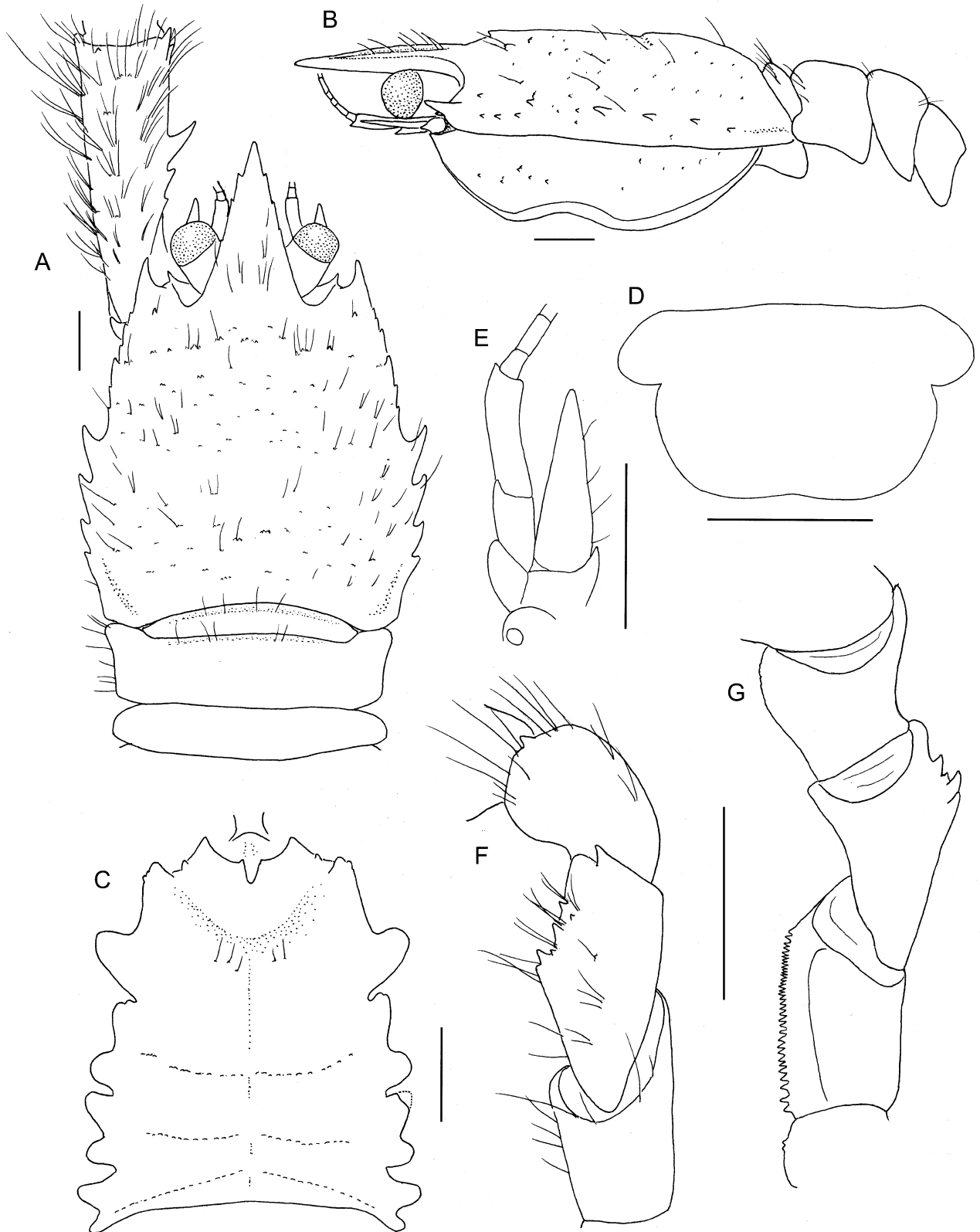
*Sternum*: Sternal plastron 1.1 times longer than broad; lateral extremities slightly divergent posteriorly. Excavated sternum (sternites 1–3) with convex anterior margin, surface with weak median ridge. Sternite 3 strongly depressed in ventral view, anterior margin [concavely excavated] or broadly V-shaped, with pair of small or obsolescent submedian spines separated by narrow U-shaped or [V-shaped] notch; anterolateral end sharp angular, lateral margin with tiny spine near lateral extremity. Sternite 4 with anterolateral margin weakly divergent posteriorly (anterior breadth 0.63–0.66 [0.64] times greatest breadth), anterolateral end rounded, bearing a few small denticles; posterolateral margin as long as anterolateral margin.

*Abdomen*: Unarmed. Somite 1 with distinct transverse ridge bearing setae [sparse] or moderate in density. Somite 2 also transversely ridged along anterior margin bearing sparse setae; pleural lateral margins weakly concave, weakly divergent posteriorly, rounded on both anterior and posterior ends. Pleura of somite 3 with bluntly angular posterolateral margin. Somites 4 and 5 with rounded posterolateral margin. Telson 0.49–[0.53] as long as broad; posterior plate 1.4–1.7 [1.5] times longer than, [0.8]–0.9 times as broad as anterior plate, posterior margin weakly emarginate.

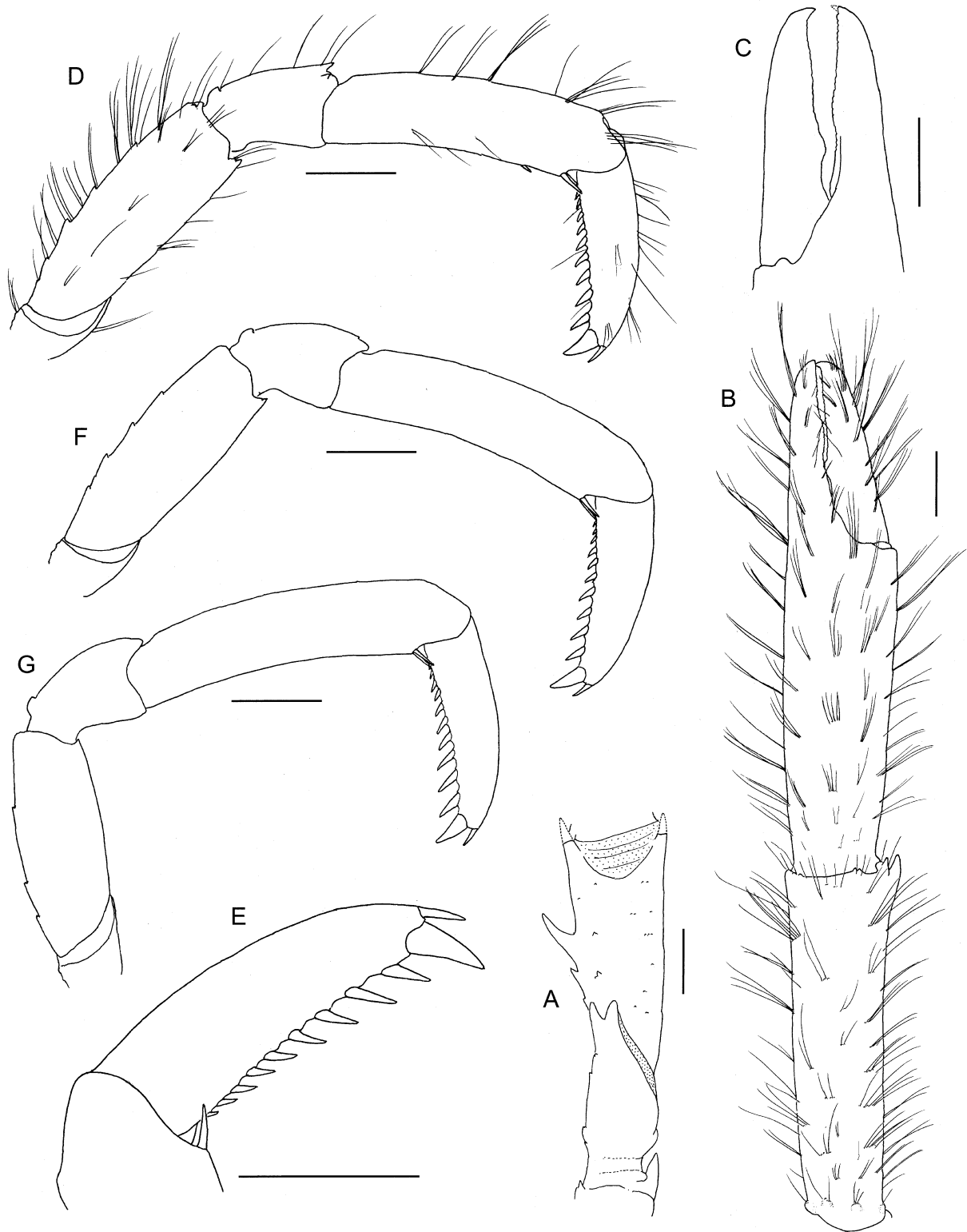
*Eyes*: 1.5 times as long as broad, terminating in or [somewhat overreaching] midlength of rostrum, cornea not inflated, equally long and broad as remaining eyestalk.

*Antennule and antenna*: Ultimate article of antennule [2.7]–3.4 times longer than broad. Antennal article 2 with strong distolateral spine. Antennal scale [slightly falling short of] or reaching distal end of article 5, breadth [1.5]–1.9 times that of article 4. Articles 4 with distinct distomesial spine. Article 5 with tiny distomesial spine, length 1.7–2.1 [1.8] times that of article 4, breadth [0.5]–0.7 that of ultimate antennular article. Flagellum consisting of 10–14 [11] segments, about 3 times length of article 5, not reaching distal end of P1 merus.

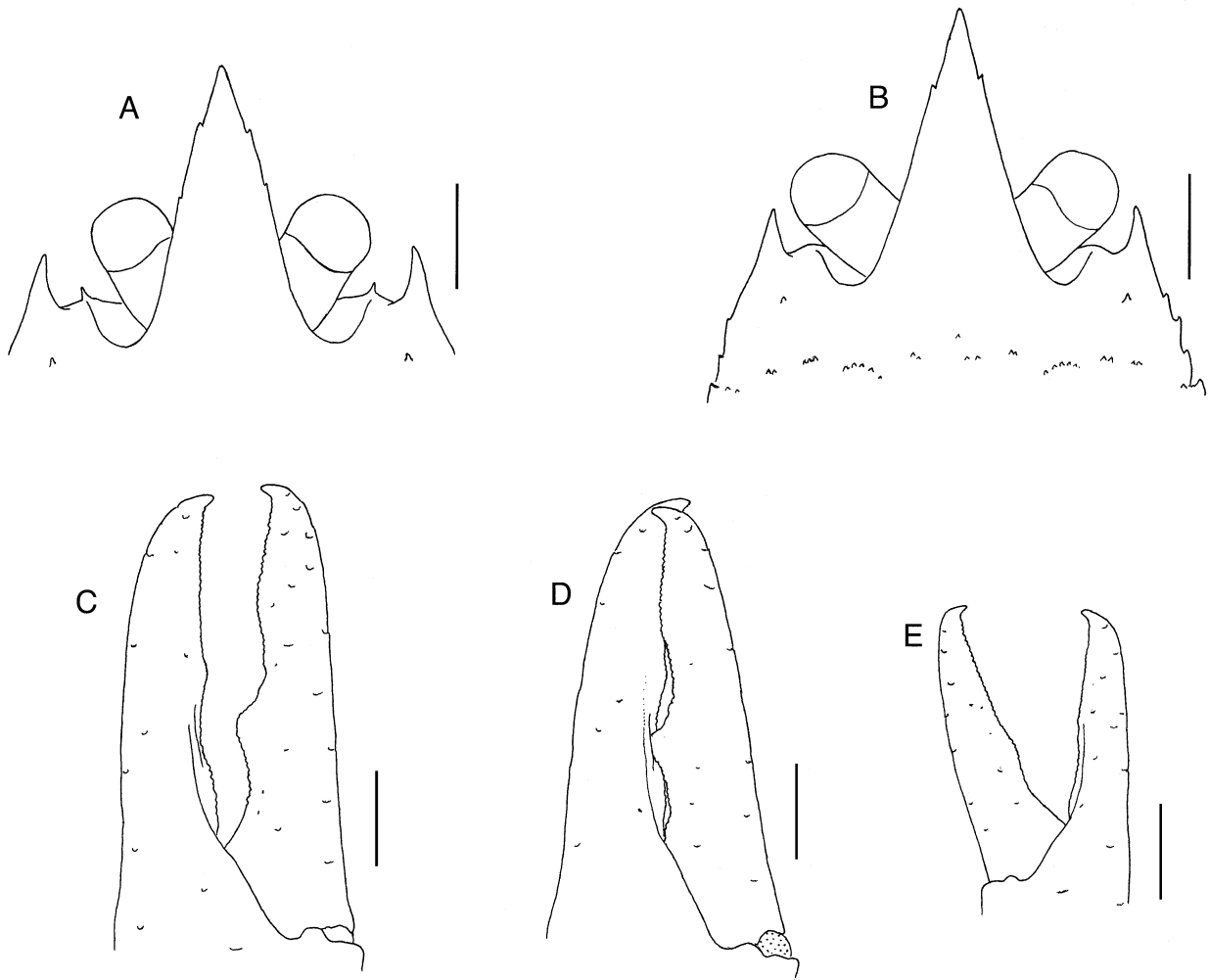
*Mxp*: Mxp1 with bases distinctly separated from each other. Mxp3 sparsely setose on lateral surface. Basis with 2 obsolescent denticles on mesial ridge. Ischium with 33–40 [34] denticles on crista dentata, small on distal half; flexor margin rounded distally. Merus having mesial face flattish; flexor margin well ridged along distal half bearing 4 small spines with 1 or 2 accompanying denticles, somewhat rounded on proximal half; distolateral spine distinct. Carpus with small distolateral spine.



**FIGURE 1.** *Uroptychus cartesi* n. sp., holotype, male. A, carapace and anterior part of abdomen, proximal part of left P1 included, dorsal. B, same, lateral. C, sternal plastron, sternites 1–3 included, ventral. D, telson. E, left antenna, ventral. F, left Mxp3, lateral. G, same, ventral. Scales = 1 mm.



**FIGURE 2.** *Uroptychus cartesi* n. sp., holotype, male. A, Left P1, proximal part, setae omitted, ventral. B, same, distal part, dorsal. C, same, fingers, setae omitted, ventral. D, right P2, lateral. E, same, distal part, setae omitted, lateral. F, right P3, setae omitted, lateral. G, right P4, setae omitted, lateral. Scales = 1 mm.



**FIGURE 3.** *Uroptychus cartesi* n. sp., paratypes. A, anterior part of carapace, dorsal, ovigerous female (5.3 mm), B, same, ovigerous female (5.1 mm), C, right P1 fingers, opened, ventral, male (6.9 mm). D, same, closed. E, left P1 fingers, opened, ventral, ovigerous female (5.1 mm). Scales = 1 mm.

*P1*: Relatively slender, [4.0]–4.6 (males), 3.8–4.2 (females) times longer than carapace, sparsely tuberculate or granulate bearing setae, subcylindrical but palm and fingers somewhat depressed. Ischium dorsally bearing short triangular, somewhat dorsoventrally depressed spine, ventromesially bearing well-developed subterminal spine proximally followed by a few [4] denticle-like spines. Merus [0.9]–1.0 times as long as carapace, mesially with strong spine at midlength proximally followed by 1 or [2] smaller spines; ventral surface with 2 small spines mesial to midline, terminal margin mesially bearing 1 dorsal and 1 ventral spine, laterally 1 ventral spine. Carpus [1.1] – 1.2 times longer than merus, terminal margin mesially bearing 1 dorsal and 1 ventral spine, laterally 1 ventral spine; 4 protuberances on dorsal surface in close proximity to juncture with merus. Palm 1.0 (males), 0.9 (females) times as long as carpus, [3.1]–3.4 (males), 3.3 (females) times longer than broad, somewhat depressed, 0.8 times as broad as high. Fingers ventrally horizontal in lateral view, not gaping, distally ending in incurved spine; fixed finger having opposable margin somewhat concave on proximal half, feebly so in smallest female; opposable face in males with longitudinal concavity on proximal third accommodating opposing cristiform process on movable finger when closed (visible in ventral view); in females, longitudinal concavity and cristiform process obsolescent; movable finger 0.50–[0.56] length of palm.

*P2–4*: Moderately thick mesio-laterally and moderately setose. Meri having dorsal margin not crested but rounded with [4]–6 small spines on P2 and P3, [3] or 4 tiny or obsolescent spines on P4, unarmed on distal end; ventral margin distally ending in spine. P3 merus 0.9–[1.0] length of P2 merus, P4 merus [0.9]–1.0 (males), 0.9 (females) length of P3 merus; breadth subequal on P2–4; length-breadth ratio, 2.7–3.1 [2.9] on P2, 2.6–3.0 [2.9] on

P3, [2.5]–2.9 on P4; P2 merus 0.6 length of carapace, 0.8–0.9 length of P2 propodus; P3 merus 0.7–[0.8] length of P3 propodus; P4 merus 0.7 length of P4 propodus. Carpi subequal on P2–4, [longer on P2 than on P3 and P4] or shorter on P4 than on P2 and P3; carpus-propodus length ratio, 0.3 on P2–4; extensor margin with distinct protuberance near proximal end and small terminal spine laterally accompanying much smaller one on P2 but both obsolete on P3 and P4 and even in some specimens on P2. Propodi successively longer posteriorly, length-breadth ratio, 4.0–4.5 [4.2] on P2, 4.3–4.8 [4.6] on P3, 4.5–5.2 [5.0] on P4; propodus-carpus length ratio, 2.8–3.2 [2.9] on P2, 3.2–[3.6] on P3, 3.1–[3.8] on P4; flexor margin in lateral view somewhat concavely curving, ending in pair of spines preceded by 0–2 [1] spines on P2, [0]–1 spine on P3, none on P4. Dactyli [shorter on P2 than on P3 and P4, subequal on P3 and P4]; subequal on P2 and P4, longer on P3; or subequal on P2–4; dactylus-carpus length ratio, [1.7]–1.9 on P2, 1.7–2.1 [2.0] on P3, 1.9–2.1 [2.0] on P4; dactylus-propodus length ratio, 0.6 on P2, 0.5–[0.6] on P3 and P4; flexor margin nearly straight, with 9–[11] proximally diminishing, moderately inclined triangular spines proximal to prominent penultimate spine, ultimate spine somewhat more slender than antepenultimate, penultimate spine sharply pointed distally, twice longer than basal breadth and twice broader than antepenultimate spine.

**Number of eggs carried and egg size (female carapace length).** Eight eggs, 1.23 × 1.19 mm – 1.40 × 1.28 mm (cl 6.3 mm); 6 eggs, 1.20 × 1.52 mm – 1.48 × 1.39 mm (cl 5.1 mm); 1 egg, 1.52 × 1.54 mm (cl 5.3 mm).

**Color in preservative (alcohol).** Orange on anterior half of carapace including rostrum, P1 except for distal half of fingers, and entire P2–4.

**Etymology.** The species is dedicated to Joan E. Cartes (ICM), for his important contribution to the knowledge of the deep-sea Iberian fauna.

**Remarks.** No close relatives of the new species are found in the eastern Atlantic. The spinose carapace lateral margin as displayed by the new species is possessed only by *Uroptychus bouvieri* Caullery, 1896, but the details of their spination are different. The anterolateral spine in *U. cartesi* is strong, distinctly overreaching the lateral orbital spine, whereas it is subequal to, not overreaching, that spine in *U. bouvieri*; also the anteriormost branchial marginal spine is distinctly smaller than the first of the posterior branchial marginal spines in *U. cartesi*, whereas these spines are equally strong in *U. bouvieri*. In addition, *Uroptychus cartesi* differs from *U. bouvieri* in the following features: the epigastric region bears denticles arranged in several small arcs instead of a pair of spines behind the eyes; the P2–4 carpi are shorter, about half to slightly more than half, instead of twice, length of the dactyli; the propodal flexor margin distally ends in a pair of spines proximally followed by 0–2 spines instead of a row of spines; the penultimate flexor marginal spine on P2–4 dactyli is twice as broad rather than equally broad as the antepenultimate spine; the P1 carpus is unarmed dorsally and mesially except for the terminal spines, instead of bearing longitudinal rows of spines, one dorsal and two mesial.

For more detailed comparison, an ovigerous female (cl 4.7 mm) (BALGIM stn CP91, off Rabat, Morocco, 34°22'N, 07°25'W, 948 m, 07 June 1984, MNHN-Ga 1878), and an ovigerous female (cl 5.1 mm) and a male (cl 3.6 mm) (INDEMARES, Stn G6, Bank of Galicia, 42°49.126'N, 011°46.592'W, 903 m) referable to *U. bouvieri* were examined: in these specimens, the sternal plastron is 0.7 times as long as broad, with the lateral extremities strongly divergent posteriorly; and the sternite 4 bears the anterolateral margin more than 1.5 times longer than the posterolateral margin, both being the distinctive differences from *U. cartesi*.

*Uroptychus rubrovittatus* (type, ovigerous female 10.0 mm, Bay of Biscay, 44°02'N, 9°27'E, 899 m, MNHN-Ga 514, and INDEMARES, Stn G3, Bank of Galicia, 42°38.972'N, 011°49.092'W, 785 m, were examined) and *U. cartesi* share the P2–4 dactyli longer than the carpi, with a prominently broad penultimate flexor marginal spine, whereas in the other three eastern Atlantic species the dactyli are as long as or shorter than the carpi, with the penultimate flexor marginal spine about as broad as the antepenultimate spine. *Uroptychus cartesi* is distinguished from *U. rubrovittatus* by the following features: the carapace lateral margin is armed with distinct multiple spines instead of an anterolateral spine only; the carapace dorsal surface is sparsely granulose with denticles on the epigastric region, instead of being very granulose and unarmed; the flexor margin of P2–4 dactyli bears 9–11 instead of about 20 spines proximal to the pronounced penultimate spine.

When compared with the western Atlantic species, *U. armatus* (A. Milne-Edwards, 1880) may be the closest to the new species, in that the carapace bears lateral spines, the abdominal somite 2 is weakly divergent posteriorly, and the sternal plastron bears a median notch on the excavated anterior margin (A. Milne-Edwards & Bouvier, 1897). Examination of the material now available in the Smithsonian Institution of *U. armatus* (male, 2.2 mm, off Havana, 182 fms, “Albatross” Stn 2349, USNM 19165; 1 ovigerous female, size not measured, off west end of Grand Bahama Island, on *Madrepora*, not yet registered) shows additional characters shared by the new species:

the P2–4 have the propodi with only a pair of terminal spines on the flexor margin and the dactyli with a prominent penultimate spine on the flexor margin; the excavated sternum (sternites 1–3) has a convex anterior margin broadly separating Mxps 1. In *U. armatus*, however, the anterolateral spine is relatively small although larger than the lateral orbital spine, not so strong as to extend far beyond that spine as in *U. cartesi*; the dorsal surface of the carapace is smooth, covered with long soft plumose setae; the anterior margin of the sternite 4 is 1.5 times as long as the posterolateral margin; the ultimate spine of P2–4 dactyli is much longer than the penultimate spine and much (twice) broader than the antepenultimate spine; and the antennal articles 4 and 5 are unarmed.

The carapace spination of the new species somewhat resembles that of *U. intermedius* (A. Milne-Edwards, 1880) from the Caribbean Sea (see A. Milne-Edwards & Bouvier 1897). However, *U. intermedius* is distinctive in the following features: epigastric spines are distinct; sternite 3 is much more deeply excavated on the anterior margin; P1 is spinose except for the fingers; antennal article 5 bears a strong distomesial spine; P2–4 are spinose on the dorsal or extensor borders of the meri, carpi and propodi; P2–4 carpi are subequal to the dactyli in length, and the dactyli bear a penultimate flexor marginal spine that is not prominent and is as large as the antepenultimate spine.

According to J.E. Cartes (personal communication), the haul at Station DR15 also caught gorgonacean and antipatharian corals. Very possibly the present specimens were associated with one of these corals.

**Distribution.** Known only from the type series from off north-west Spain, at 1410 m.

### Key to species from the eastern Atlantic

1. Anterolateral spine of carapace smaller than or subequal to lateral orbital spine . . . . . 2
- Anterolateral spine of carapace larger than lateral orbital spine . . . . . 3
2. Pair of epigastric spines behind eyes. P2–4 propodi with straight flexor margin bearing row of spines, terminal one single; carpi twice length of dactyli . . . . . *U. bouvieri* Caullery, 1896
- Carapace dorsal surface with scattered small spines on anterior half and along lateral margins. P2–4 propodi with convex flexor margin bearing pair of terminal spines preceded by row of spines; carpi as long as dactyli *U. maroccanus* Türkay, 1976
3. Carapace lateral margin with distinct spines in addition to anterolateral spine . . . . . *U. cartesi* n. sp.
- Carapace lateral margin obscurely denticulate, armed with anterolateral spine only . . . . . 4
4. Carapace dorsally granulose. Flexor margin of P2–4 propodi with pair of terminal spines only; dactyli with pronouncedly broad penultimate spine preceded by short, slender, inclined spines; carpi at most half length of dactyli. . . . .
- . . . . . *U. rubrovittatus* (A. Milne-Edwards, 1881)
- Carapace smooth with pair of tuberculate ridges behind eyes. Flexor margin of P2–4 propodi with pair of terminal spines preceded by row of spines; dactyli with triangular spines, penultimate spine as broad as antepenultimate spine; carpi distinctly longer than dactyli. . . . . *U. concolor* (A. Milne-Edwards & Bouvier, 1894)

### Acknowledgements

We thank all colleagues who participated in benthos sample sorting during the cruise INDEMARES-LIFE (07/NAT/E/000732), especially Alberto Serrano (C.O. Santander, I.E.O), chief of the mission, and Joan E. Cartes who first recognized that this material was unusual and made it available for our study. The comparative material used in this paper was from the collections of the Muséum national d'Histoire naturelle, Paris, Institut de Ciències del Mar, Barcelona and the Smithsonian Institution, Maryland. We thank Régis Clevea, Rafael Lemaitre and Karen Reed for the laboratory facilities during visits of KB to their institutions. This paper is a contribution to the project INDEMARES funded by *Fundación Biodiversidad* (LIFE funds). A draft of the manuscript was read by Karen E. Schnabel, and the final version was reviewed by Shane T. Ah Yong.

### References

- Baba, K., Macpherson, E., Poore, G.C.B., Ah Yong, S.T., Bermudez, A., Cabezas, P., Lin, C.-W., Nizinski, M., Rodrigues, C. & Schnabel, K.E. (2008) Catalogue of squat lobsters of the world (Crustacea: Decapoda: Anomura families Chirostyliidae, Galatheidae and Kiwaidae). *Zootaxa*, 1905, 1–220.
- Baba, K., Macpherson, E., Lin, C.-W. & Chan, T.-Y. (2009) *Crustacean Fauna of Taiwan: Squat Lobsters (Chirostyliidae and Galatheidae)*. National Taiwan Ocean University, Keelung, ix + 311 pp.
- Caullery, M. (1896) Crustacés Schizopodes et Décapodes. In: Koehler, R. (Ed.), Résultats scientifiques de la campagne du Cau-

- dan dans le Golfe de Gascogne, août-septembre, 1895. *Annales de l'Université de Lyon*, 26, 365–419, pls 13–17.
- Milne-Edwards, A. (1880) Reports on the results of dredging under the supervision of Alexander Agassiz, in the Gulf of Mexico and in the Caribbean Sea, etc. VIII. Études préliminaires sur les Crustacés. *Bulletin of the Museum of Comparative Zoology at Harvard College, in Cambridge*, 8, 1–68, pls 1, 2.
- Milne-Edwards, A. (1881) Compte rendu sommaire d'une exploration zoologique faite dans l'Atlantique, a bord du navire le Travailleur. *Comptes Rendus Hebdomadaires de Séances de l'Académie des Sciences, Paris*, 93, 931–936.
- Milne-Edwards, A. & Bouvier, E.L., 1894. Considérations générales sur la famille des Galathéidés. *Annales des Sciences Naturelles, Zoologie* (ser. 7), 16, 191–327.
- Milne-Edwards, A. & Bouvier, E.L. (1897) Reports on the results of dredging, under the supervision of Alexander Agassiz, in the Gulf of Mexico (1877–78), in the Caribbean Sea (1878–79) and along the Atlantic coast of the United States (1880), etc. XXXV. Description des Crustacés de la famille des Galathéidés recueillis pendant l'expédition. *Memoirs of the Museum of Comparative Zoology at Harvard College*, 19, 1–141, pls 1–12.
- Poore, G.C.B. & Andreakis, N. (2011) Morphological, molecular and biogeographic evidence support two new species in the *Uroptychus naso* complex (Crustacea: Decapoda: Chirostylidae). *Molecular Phylogenetics and Evolution*, 60, 152–169.
- Türkay, M. (1976) Decapoda Reptantia von der portugiesischen und marokkanischen Küste Auswertung der Fahrten 8,9c (1967), 19 (1970), 23 (1971) und 36 (1975) von F.S. Meteor. "Meteor" *Forschungs-Ergebnisse, Reihe D*, 23, 23–44.