

1 ***Cuchiadromites jadeae*, a new genus and species of primitive crab (Crustacea:**
2 **Decapoda: Podotremata) from the Aptian of Cantabria (Spain), with comments on**
3 **its peculiar surface ornament**

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20 **A B S T R A C T**

21 A new genus and new species of decapod brachyuran, *Cuchiadromites jadeae*, is recorded and
22 described herein from the Lower Aptian (Early Cretaceous) Patrocinio Formation (*Deshayesites*
23 *forbesi* Ammonite Zone) of the coastal cliffs near Cuchía (Cantabria, Spain). *Cuchiadromites*

24 *jadeae* gen. et sp. nov., is the fourth species of brachyuran recovered in this locality. The dorsal
25 carapace of the sole specimen preserves sufficient diagnostic characters that allow placement in
26 the family Longodromitidae. The present species exhibits a profuse dorsal ornamentation of
27 fungiform granules that form cauliflower-shaped clusters reminiscent of the ornamentation seen
28 in fossil and extant species of different eubrachyuran families, for instance Parthenopidae or
29 Dairidae, and also in the anomuran families Paguridae or Xylopaguridae, but not described
30 before in podotreme taxa. This could be due to convergence in groups far distant in geological
31 time and systematic placement.

32 *Keywords:*

33 Longodromitidae

34 Basque-Cantabrian Basin

35 Early Cretaceous

36 *Deshayesites forbesi* Ammonite Zone

37 New taxon

38 Ornamentation

39

40 **1. Introduction**

41 Records of fossil brachyurans in the Aptian strata of the Basque-Cantabrian Basin are
42 scarce (López-Horgue and Bodego, 2017, p. 7; Ossó and Moreno-Bedmar, 2020) and the fossil
43 crustaceans assemblage is clearly dominated by the mecochirid *Atherfieldastacus magnus*
44 (M'Coy, 1849) (López-Horgue, 2009; López-Horgue and Bodego, 2017). However,
45 *Rathbunopon viai* González-León, Ossó, Moreno-Bedmar and Vega, 2016, *Mithracites*
46 *vectensis* Gould, 1859, and *Etyus tresgalloi* Ossó in Ossó and Moreno-Bedmar, 2020, have been
47 recently reported or described from the coastal cliff of Playa de los Caballos beach, near the
48 village of Cuchía (Cantabria, Spain). A new brachyuran, *Cuchiadromites jadeae* gen. et sp.

49 nov., was recently recovered in the same outcrop and described herein. Even so,
50 *Cuchiadromites jadeae* gen. et sp. nov. elevates the number of brachyuran crustacean taxa
51 reported from this outcrop to four.

52

53

54 **2. Geological setting.**

55

56 The studied specimen was recovered at the Cuchía section, which is situated on the
57 eastern side of the Suances, 3 kilometers northwest of the village of Cuchía (Cantabria, Spain)
58 (Fig. 1), in the coastal cliff of the Playa de los Caballos. The Cuchía section is composed of dark
59 clayey marlstones of the Marl Member of the Patrocinio Formation and, in the upper part, where
60 the lithology becomes more variable, a predominance of sandstones of the Sandstone Member
61 of the Patrocinio Formation, which overlies the uppermost part of the Umbrera Formation (e.g.
62 Wilmsen, 2005; Najarro et al., 2011; García-Mondéjar et al., 2015). The decapod of the present
63 study comes from the Marl Member, lower Aptian *Deshayesites forbesi* Ammonite Zone, of the
64 Patrocinio Formation. This age corresponds exactly to the ‘Crackers Beds’ of Atherfield, Isle of
65 Wight, UK, from which a rich crustacean fauna was described (Wright and Collins, 1972). The
66 environment is interpreted to be a prodelta established after a major transgression in the earliest
67 Aptian (López-Horgue, 2009, p. 25). For further data on geology and stratigraphy see Ossó and
68 Moreno-Bedmar (2020, pp. 175–183, and references therein).

69

70 **3. Systematic palaeontology.**

71 Order Decapoda Latreille, 1802

72 Infraorder Brachyura Linnaeus, 1758

73 Section Podotremata Guinot, 1977

74 Subsection Dynomeniformia Guinot, Tavares and Castro, 2013

75 Superfamily Dromioidea De Haan, 1833

76 Family Longodromitidae Schweitzer and Feldmann, 2009

77

78 *Genera included.* *Abyssophthalmus* Schweitzer and Feldmann, 2009; *Cuchiadromites* gen.

79 nov.; *Levashidromites* Van Bakel, Mychko, Spiridonov, Jagt and Fraaije, 2020; *Longodromites*

80 *Patrulius*, 1959; *Pilidromia* Schweitzer, Feldmann, Lazăr, Schweigert and Franțescu, 2018;

81 *Planoprosopon* Schweitzer, Feldmann and Lazăr, 2007; *Rosadromites* Schweitzer, Feldmann,

82 Rader and Franțescu, 2016.

83

84 *Remarks.* Features of the carapace morphology of *Cuchiadromites jadeae* gen. et sp. nov., such

85 as protruded front, subpentagonal elongate carapace, well-defined grooves, and vertical lateral

86 margins, are similar to that of several genera currently placed within the family

87 Longodromitidae Schweitzer and Feldmann, 2009, a large family that ranges from the Jurassic

88 to the Cretaceous, and whose composition has been recently reviewed and clarified by Van

89 Bakel et al. (2020 in press). Thus, *Cuchiadromites jadeae* gen. et sp. nov. is compared with all

90 the genera placed in that family at one time or another. As a result, *Cuchiadromites jadeae* gen.

91 et sp. nov. is placed within Longodromitidae. *Planoprosopon heydeni* (Von Meyer, 1857), from

92 the Oxfordian of Aragon (Spain), is the only representative of Longodromitidae in the Iberian

93 Peninsula known to date (Vía and Sequeiros, 1993).

94 *Cuchiadromites jadeae* gen. et sp. nov. exhibits a peculiar and profuse dorsal

95 ornamentation. Fungiform granules that appear to coalesce upwardly, form cauliflower-shaped

96 clusters with interstitial pores in determinate areas of the dorsal carapace. This kind of cuticular

97 ornamentation is not described, to our knowledge, in any pre-Cenozoic taxon and recalls that of

98 fossil and extant species of Parthenopidae Macleay, 1838, and Dairidae Serène, 1965, whose

99 morphology and functionality was studied by Guinot (1979). Several fossil and extant xanthid or

100 aethrid eubranchyurans, as well as paguroid anomurans, also exhibit similar cuticular

101 ornamentation; we have not found any podotreme crab, fossil or extant, exhibiting such
102 ornamentation.

103

104 ***Cuchiadromites*** gen. nov.

105 urn:lsid:zoobank.org:act:4D957072-2AA4-4AB0-9791-D0B890331B0E

106 Type species. *Cuchiadromites jadeae* gen. et sp. nov.; monotypic.

107 *Etymology.* From Cuchía (Cantabria, Spain), where the holotype was recovered, and *-dromites*,
108 common suffix for genera in this family and superfamily.

109

110 *Diagnosis.* As the type species.

111

112 ***Cuchiadromites jadeae*** gen. et sp. nov.

113 urn:lsid:zoobank.org:act:CA6393FC-F940-46E8-AFE0-32D5FA25F24D

114 Figs. 2 and 3

115

116 *Type material.* The holotype, and sole specimen known to date, is an isolated carapace with
117 cuticle preserved housed in the collections of the Museo Marítimo del Cantábrico of Santander
118 (Cantabria, Spain) under registration number MMC-CE020571. The holotype measures 7 mm in
119 length, 7.5 mm in width, 2.5 mm in rostral width, and 5.5 mm in fronto-orbital width.

120 *Type locality and horizon.* Coastal cliff of the Playa de los Caballos near the village of Cuchía
121 (Cantabria, northern Spain); Marl Member of the Patrocinio Formation, lower Aptian
122 (*Deshayesites forbesi* Ammonite Zone).

123

124 *Etymology.* From Jade Tresgallo Villa, daughter of Óscar Tresgallo Torre, collector of the
125 holotype.

126

127 *Diagnosis.* Carapace small, subpentagonal, flattened, dorsal surface profusely ornamented;
128 maximum width at metabranchial level. Regions well marked; lobes in all regions covered by
129 clusters of densely fungiform granules. Front protruded, downturned. Orbits rounded, complete,
130 directed forward, orbital fossae large; supraorbital margin with two opened fissures separated by
131 a tooth; intra- and outer orbital teeth present. Lateral margins subparallel. Anterolateral margin
132 short, sharp-edged, as a flange, with a prominent tooth directed upward. Posterolateral margin
133 much longer than the anterolateral margin, epibranchial portion sharp-edged, as a flange, with
134 prominent elongate epibranchial tooth; row of coarse rounded granules in posterior portion.
135 Lateral sides of carapace as vertical walls; subhepatic lobe inflated, coarsely granulated.
136 Pterygostome elongate, subtriangular; branchiostegite elongate, pleural suture present.
137 Mesogastric region with posterior portion sub-rhomboidal; anterior mesogastric process
138 elongate, longer than posterior portion, sides parallel. Cervical, post-cervical, branchial, and
139 branchio-cardiac grooves well-defined; cervical and branchial grooves subparallel, making
140 dorsal surface tripartite; grooves notching the carapace laterally and converging at the lateral
141 carapace walls; cervical groove deep, prominent, widely V-shaped; post-cervical groove
142 continuous, reaching the lateral margin.

143 *Description.* Carapace small, subpentagonal, flattened, dorsal surface profusely ornamented by
144 fungiform granules; maximum width at metabranchial level. Regions well marked; all region
145 lobes covered by clusters of fungiform granules, and cauliflower-shaped clusters of coalescent
146 granules. Front protruded, downturned; rostrum not preserved. Orbits rounded, complete, orbital
147 fossae relatively deep and large, forward directed; supraorbital margin gently oblique and concave
148 in dorsal view, with two opened fissures separated by a tooth; intra-orbital tooth weakly
149 prominent; outer orbital teeth broken, probably forward/laterally directed. Lateral margins
150 subparallel. Anterolateral margin short, sharp-edged, as a flange, with a prominent,
151 subrectangular tooth upward directed. Posterolateral margin about four times longer than the
152 anterolateral margin, epibranchial portion sharp-edged, as a flange, with prominent, upward

153 directed and elongate subrectangular epibranchial tooth; edge of posterior portion of
154 posterolateral margin with a row of coarse, rounded granules, at level of mesobranchial region.
155 Lateral walls of carapace as vertical walls, tripartite; subhepatic lobe inflated, coarsely granulated.
156 Posterior margin not preserved. Pterygostome subtriangular elongate, posterior part granulated.
157 Pleural suture visible. Frontal region granulated. Mesogastric region slightly swollen, well
158 delineated, posterior portion sub-rhomboidal, centrally with a cluster of fungiform granules;
159 anterior mesogastric process elongate, longer than posterior portion, well-delineated, with a row
160 of dense granules, lateral sides parallel. Protogastric region lobes swollen, areolate, prominent
161 granulose tubercle in the central portion, and scattered granulose tubercles and granules in the
162 anterior portion adjacent to the anterior mesogastric process. Urogastric region transversely
163 narrow, defined by a cluster of constrained and prominent granules at each side of the carapace
164 axis; separated from the metogastric region by the cervical groove, and confluent laterally with
165 the epibranchial region. Cardiac region rounded diamond-shaped, strongly swollen, surface
166 cauliflower structured, laterally bounded by the branchiocardiac grooves. Epibranchial region
167 narrow, delimited by the cervical groove anteriorly and the post-cervical groove posteriorly;
168 weakly swollen, defined by a medial coarse cauliflower shaped tubercle, confluent with urogastric
169 granules, transversely followed by a row of spaced granules that terminate at the prominent,
170 upraised, epibranchial tooth. Mesobranchial region narrow, delimited anteriorly by the post-
171 cervical groove and posteriorly by the branchial groove; slightly swollen, defined by a cluster of
172 fungiform granules placed transversely, medially more prominent. Metabranchial region slightly
173 swollen, large, ornated with scattered fungiform coarse granules of different sizes. Hepatic region
174 weakly differentiated from the protogastric lobes, slightly swollen and defined by raised
175 granulated tubercle. Cervical groove deep, broadly V-shaped; cervical, post-cervical, and
176 branchial grooves well defined and sub-parallel; cervical and branchial grooves notching the
177 carapace lateral margins and converging at the lateral carapace walls; post-cervical groove
178 continuous, notching the lateral margin. Sternopleonal elements and appendages not preserved.
179

180 *Discussion.* The unique holotype lacks the rostrum and posterior portion of the carapace, which
181 could distort the actual ratios of the carapace measurements. Based on carapace morphology
182 within the family, *Cuchiadromites* gen. nov. presumably would be slightly longer than wide.
183 Despite the incomplete preservation of the carapace outline, the general outline, and groove
184 pattern of *Cuchiadromites* gen. nov., such as a protruded front, a subpentagonal elongate
185 carapace, well-defined grooves, the cervical and branchial grooves which continue on the lateral
186 walls of the carapace, are reminiscent of several genera such as *Planoprosopon* or *Rosadromites*,
187 placed herein within Longodromitidae (see above). The new genus presents morphological
188 similarities with other genera previously assigned to Longodromitidae; however, the composition
189 of Longodromitidae has been changed and extended in the last decade. The family may be
190 heterogeneous and for that reasons is currently being redefined (Van Bakel et al., 2020 in press).
191 For instance, of the three constituent genera of the family—*Longodromites*, *Abyssophthalmus*,
192 and *Planoprosopon*—*Planoprosopon*, in particular, is morphologically closest to *Cuchiadromites*
193 gen. nov. The genera *Antarctiprosopon* Schweitzer and Feldmann, 2011 and *Vespridromites*
194 Schweitzer and Feldmann, 2011, subsequently added to Longodromitidae (Karasawa et al. 2011,
195 p. 536) and now excluded (see discussion in Van Bakel et al., 2020 in press), exhibit some
196 morphological similarities to the new genus, such as subrectangular outline, flattened dorsal
197 surface, protruded front, and vertical lateral margins. In any case, *Cuchiadromites* gen. nov. fits
198 with the original diagnosis of Longodromitidae (see Schweitzer and Feldmann, 2009, p. 100), a
199 later diagnosis (Schweitzer et al., 2012, p. 12), and the current, most recent diagnosis (Van Bakel
200 et al., 2020, in press), such that *Cuchiadromites* gen. nov. is placed here within Longodromitidae.
201 However, no other genera of that family possesses an ornamentation as exuberant as
202 *Cuchiadromites* gen. nov. Other than that, differences are also present as set forth below.

203 *Abyssophthalmus*, *Longodromites*, and *Pilidromia*, all from the Upper Jurassic of Europe,
204 differ from *Cuchiadromites* gen. nov. in having a relatively longer anterior carapace, a narrower
205 carapace at the level of the metabranchial regions, and post-cervical grooves not reaching the
206 lateral carapace margin. In addition, the posterolateral margins of these Jurassic longodromitids
207 are bluntly rounded instead of sharp-edged and vertical as in *Cuchiadromites* gen. nov. (compare

208 von Meyer, 1842, p. 71, fig. 1, 2; Schweitzer and Feldmann, 2009, p. 108, fig. 8; Reuss, 1858, p.
209 11; Schweitzer and Feldmann, 2009, pp. 101–108, fig. 7; Schweitzer et al., 2018, pp. 325–326,
210 fig. 12).

211 *Rosadromites* (type: *R. texensis* Schweitzer, Feldmann, Rader and Franțescu, 2016), from
212 the Lower Cretaceous of the USA, differs from the new genus by its narrower orbits and weakly
213 defined and incomplete post-cervical groove, which does not divide the lateral carapace margin
214 into two portions at the mesobranchial region (Schweitzer et al., 2016, pp. 8–9, fig. 5), as it does
215 in *Cuchiadromites*. Also, in *Rosadromites* there is a clear groove between the protogastric and
216 hepatic region; this is not observed in other Longodromitidae, neither in *Cuchiadromites* gen.
217 nov.

218 *Planoprosopon*, from the Middle to the Upper Jurassic of Europe, has a relatively longer
219 carapace and longer anterolateral margins that differentiate it from the new genus. In addition, the
220 orbits are placed somewhat more obliquely than in *Cuchiadromites* gen. nov. (see von Meyer,
221 1842, p. 556; Schweitzer et al., 2007, pp. 104–106, fig. 3).

222 Several genera have been recently removed from the Longodromitidae (see Van Bakel et
223 al., 2020, in press); nevertheless, it may be prudent to compare them here with *Cuchiadromites*
224 gen. nov.

225 *Vespridromites*, known from three species from the Lower and Upper Cretaceous of
226 North America (see Bishop, 1985, pp. 616–618, figs. 3.5, 8, 9; Schweitzer and Feldmann, 2011,
227 pp. 8–10, fig. 4), possesses a rather similar, compact outline as *Cuchiadromites* gen. nov.
228 However, it differs in having the maximum carapace width at the level of anterolateral margin, a
229 wider orbitofrontal margin, rounded posterolateral margins at the level of the metabranchial
230 region, and a cervical groove running almost horizontally (vs widely U-shaped in *Cuchiadromites*
231 gen. nov.). Moreover, the post-cervical groove is not continuous.

232 *Antarctiprosopon*, with the sole species *A. chaneyi* (Feldmann and Wilson, 1988) from
233 the Eocene of Antarctica, differs from *Cuchiadromites* gen. nov. by its longer anterolateral
234 margins and weakly defined and incomplete post-cervical groove (see Feldmann and Wilson,
235 1988, figs. 6.1–10, 7; Schweitzer and Feldmann, 2011, pp. 10–12, fig. 5).

236 *Coelopus*, until recently included in Longodromitidae (see Karasawa et al. 2011, p. 536,
237 Schweitzer et al., 2017, p. 216; 2018, p. 320), has been restricted to the type species *Coelopus*
238 *jolyi* Étallon, 1861 (Oxfordian, France; original material not located) by Robins and Klompmaker
239 (2019). Former benchmark species of *Coelopus* now belong to *Ovalopus* Klompmaker and
240 Robins, 2019 in Jurellanidae Klompmaker and Robins, 2019 (see Robins and Klompmaker,
241 2019). *Coelopus* sensu stricto is clearly distinguishable from *Cuchiadromites* gen. nov. by its
242 blunt lateral margins (sharp-edged in *Cuchiadromites*) and the absence of a supraorbital tooth (see
243 Étallon, 1861, p. 148, pl. 1, fig. 5). *Ovalopus* from the Middle and Upper Jurassic of Europe is
244 distinguished from *Cuchiadromites* gen. nov. by its rounded outline, a wide base of the rostrum,
245 blunt posterolateral margins, and lack of a post-cervical groove.

246 *Dioratiopus* (type and only species: *Dioratiopus salebrosus* Woods 1953), from the
247 Lower Cretaceous (Albian) of Australia, possesses a similar outline; however, it differs from
248 *Cuchiadromites* gen. nov. in having a more flattened dorsal surface, posterolateral margins with
249 blunt edges, lack of lateral teeth, less pronounced grooves, lack of a distinct and complete post-
250 cervical groove, and wider fronto-orbital width (compare Woods, 1953, p. 53, fig. 2, pl. 2, figs.
251 4–5).

252 *Glaessnerella* (type species: *G. spinosa* Van Straelen, 1936; Albian of France),
253 represented by a dozen of species from the Lower and Middle Cretaceous of Europe (see e.g.
254 Wright and Collins, 1972), is differentiated from *Cuchiadromites* gen. nov. by its obliquely placed
255 orbits, its non-delineated orbital fossae, its completely rounded lateral margins, and its more
256 horizontal cervical groove (compare Van Straelen, 1936, p. 33, pl. 4, fig. 5; Wright and Collins,
257 1972, pp. 36–37, pl. 4, figs. 1–6, text-figs. 6f–i).

258 *Navarrara*, known from a single species (*N. betsieae* Klompmaker, 2013) from the
259 Albian-Cenomanian reefal limestones of northern Spain, exhibits a subrectangular carapace
260 similar to that of *Cuchiadromites* gen. nov., and similar lobes ornamented with granules and
261 tubercles. However, it differs from *Cuchiadromites* gen. nov. by having posterolateral margins
262 with rounded edges and curving posteriorly at the metabranchial level, and an incomplete post-
263 cervical groove (see Klompmaker, 2013, pp. 155–157, fig. 4). In addition, the lateral margins are

264 armed with spines, absent in *Cuchiadromites* gen. nov., and the anterior mesogastric process is
 265 much longer than in the new genus. *Navarrara* is now placed in Telamonocarcinidae Larghi, 2004
 266 (Eubrachyura: Dorippoidea MacLeay, 1838); see Van Bakel et al. (2020, in press) for further
 267 discussion.

268 Thus, we conclude that, in view of the differences discussed above, and aside from the
 269 unique ornamentation exhibited by the Cantabrian specimen, it is appropriate to erect a new genus
 270 *Cuchiadromites* gen. nov.

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272

273 4. Remarks on the dorsal ornamentation *Cuchiadromites jadeae* n. gen, n. sp.

274 The fungiform, upwardly coalescent granules that form cauliflower-shaped clusters with
 275 interstitial pores in specific areas of the dorsal carapace of *Cuchiadromites jadeae* n. gen, n. sp.,
 276 are reminiscent of cuticular ornament in a handful of other unrelated taxa.

277 A similar type of cuticle ornamentation covering the dorsal carapace completely is seen
 278 in *Phrynolambrus corallinus* Bittner, 1893 (Parthenopidae) and *Daira salebrosa* Beschin,
 279 Busulini, De Angeli and Tessier, 2002 (Dairidae), from the Eocene, and in *Pterocarcinus*
 280 *bayleyi* Blow, 2003 (Leucosiidae), from the Pliocene (see Bittner, 1893, pp. 19–20, figs. 3, 3a,
 281 3b; Beschin et al., 2002, pp. 15–16, fig. 10, t. 2, figs. 5–6; Blow, 2003, pp. 173–77, figs. 2, 3, 4).
 282 The cuticular construction is also observed in several extant parthenopids such as *Garthambrus*
 283 Ng, 1996 and *Dairoides* Stebbing, 1920; in the xanthid *Actaea* De Haan, 1833, the dairid *Daira*
 284 De Haan, 1833, or the aethrid *Drachiella* Guinot in Serene and Soh, 1976 (e.g. McLay and Tan,
 285 2009, figs. 9A–B, 13B; Ng and Tan, 1999, fig. 5; Guinot, 1976, t. 12, figs. 5, 5a; Guinot, 1967,
 286 fig. 3; Viswanathan et al., 2019, fig. 1).

287 Guinot (1967, 1976) already called attention to the kind of ornamentation observed in
 288 the eubrachyuran genera listed above. In respect to *Phrynolambrus* (see Bittner, 1893, p. 19),
 289 Guinot (1979, pp. 55–56) reviewed the different descriptions and interpretations made by

290 previous authors on its cuticular ornamentation. At the same time, she re-described and
291 interpreted the structure and composition of this type of ornamentation that “certainly contribute
292 to the maintenance of a certain humidity on the body, at the circulation of respiratory water.”
293 (Guinot, 1979, p. 50). Similarly, Blow (2003, p. 177) advocates for a different function of this
294 type of ornamentation in each taxon, suggesting that, in the case of *Pterocarcinus bayleyi*, the
295 primary function was concealment. Likewise, Guinot (1979, pp. 48–56, figs. 10, 11, 12, 12, 14),
296 noted that this type of ornamentation, shared by taxonomically distinct groups may be due to a
297 convergent process.

298 Strikingly, a fossil anomuran, *Lessinipagurus ornatus* De Angeli and Caporiondo, 2017
299 (*Xylopaguridae* Gašparič, Fraaije, Robin and De Angeli, 2016), from the Eocene of Italy,
300 exhibits the same cuticular ornamentation as the eubrachyurans listed above. It is also seen in
301 the extant *Protoniopagurus bioperculatus* Lemaitre and McLaughlin, 1996 (*Paguridae* Latreille,
302 1802).

303 This type of ornamentation is present and previously described in Eubrachyura and
304 Anomura, and already well-known from the Eocene onwards, but no similar examples have
305 hitherto been described in Podotremata.

306 Indeed, while it is true that several species of Podotremata from different families, from
307 the Jurassic to the present, e.g., Bucculentidae, Lecythocaridae, Prosopidae, Dynomenidae and
308 others, exhibit a profuse ornamentation of strong granules, sometimes close-set in determinate
309 regions (e.g. McLay, 1993; McLay and Ng, 2004; Guinot, 2008; Schweitzer and Feldmann,
310 2009; Guinot, 2019), none possesses the pattern of coalescent granules forming clusters as
311 *Cuchiadromites jadeae* gen. et sp. nov. does.

312 Haj and Feldmann (2002) described “basketball-like” cuticular microstructure of the
313 Upper Cretaceous raninoid *Marylyreidus punctatus* (Rathbun, 1935) (*Lyreididae* Guinot, 1993,
314 *Marylyreidinae* Van Bakel, Guinot, Artal, Fraaije and Jagt, 2012), formed with exocuticular
315 fungiform microstructures whose caps form a pebbled surface of the carapace (Haj and

316 Feldmann, 2002). Similar fungiform microstructures are also randomly observed in different
317 species of Upper Cretaceous palaeocorystoid genera, such as *Eucorystes* Bell, 1863 and
318 *Ferroranina* Van Bakel, Guinot, Artal, Fraaije and Jagt, 2012, among others (see also Waugh et
319 al., 2009; Van Bakel et al., 2012). Haj and Feldmann (2002, p. 484) related this type of cuticular
320 microstructure with burrowing and/or predation defense (e. g. Schmalfuss, 1978; Savazzi, 1982).

321 The aforementioned “basketball-like” microstructure of these podotreme crabs, which is
322 difficult to observe with the naked eye, does not seem to be related, at least functionally, to that
323 of *Cuchiadromites jadeae* gen. et sp. nov., nor that of the eubrachyurans cited above. The
324 fungiform microstructure of these podotreme crabs, appears to be a convolution of only the
325 external part of the exocuticle (Haj and Feldmann, 2002, fig. 8). In contrast, larger fungiform
326 ornamentation present in the eubrachyuran and anomuran carapaces, results a convolution that
327 would involve all the layers of the cuticle (e.g. Guinot, 1967, figs. 7–8; 1979, figs. 10A, 11C,
328 13C, 14 and 15; Ossó and Stalennuy, 2011, fig. 3.13; F.A. Ferratges, personal observation).

329 It cannot be concluded whether the cuticular ornamentation of *Cuchiadromites jadeae*
330 n. gen., n. sp., has the same function as that in extant decapods, nor can it be said whether this is
331 a case of analogy or homology. However, its presence in such disparate taxa, both in time and
332 systematic placement, is at least striking.

333 **5. Conclusions**

334 *Cuchiadromites jadeae* gen. et sp. nov. is the fourth species of brachyuran reported in Aptian
335 strata of the Basque-Cantabrian Basin. Placement of *Cuchiadromites jadeae* gen. et sp. nov.
336 within the family Longodromitidae is based both on several recent familial diagnoses, the most
337 recent one by Van Bakel et al. (2020) and represents the second record of the family in the
338 Iberian Peninsula and the first one for the Iberian Cretaceous. The dorsal ornamentation of
339 *Cuchiadromites jadeae* gen. et sp. nov., either with a physiological or cryptic functionality,
340 appeared much earlier than previously described.

341

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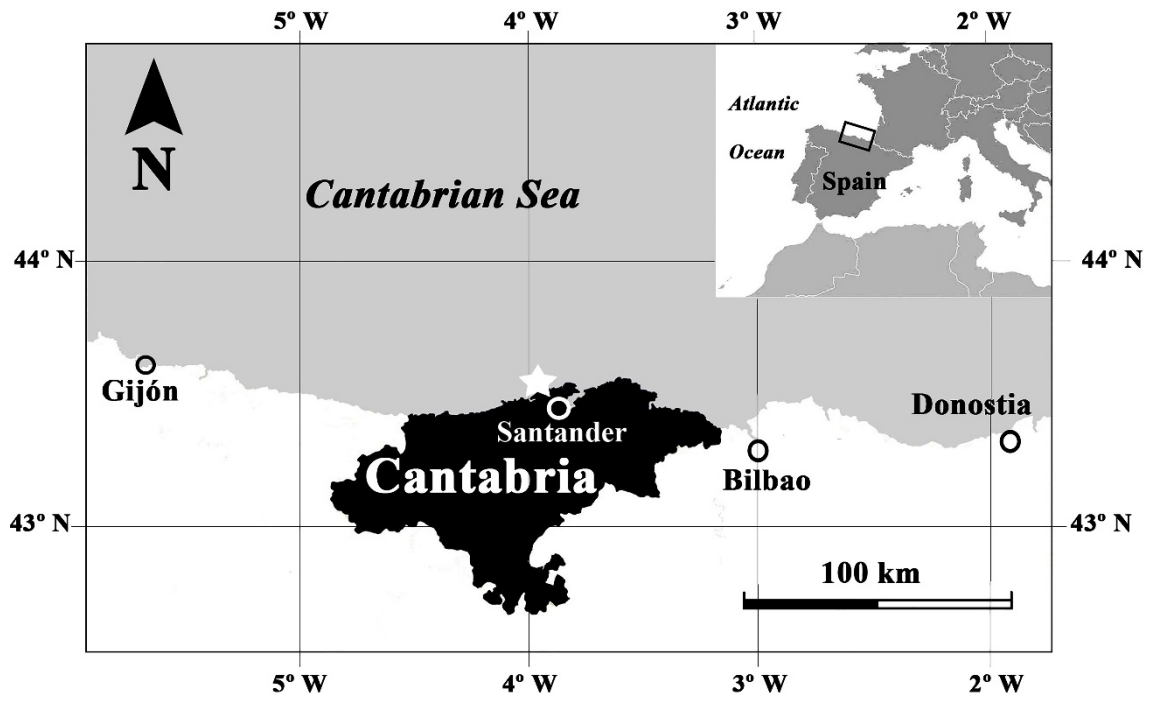
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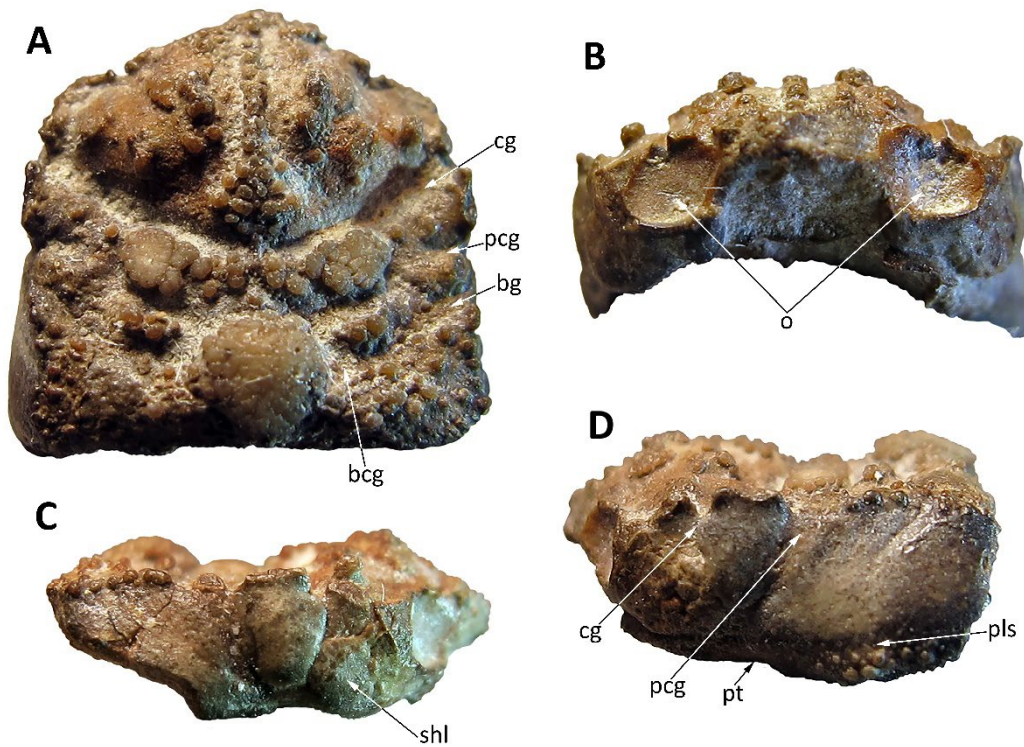
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- 553 **Figure captions.**
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555

556 Fig. 1. Locality map of Cantabria, northern Spain; the star denotes the site that yielded the new
557 decapod described herein.

558

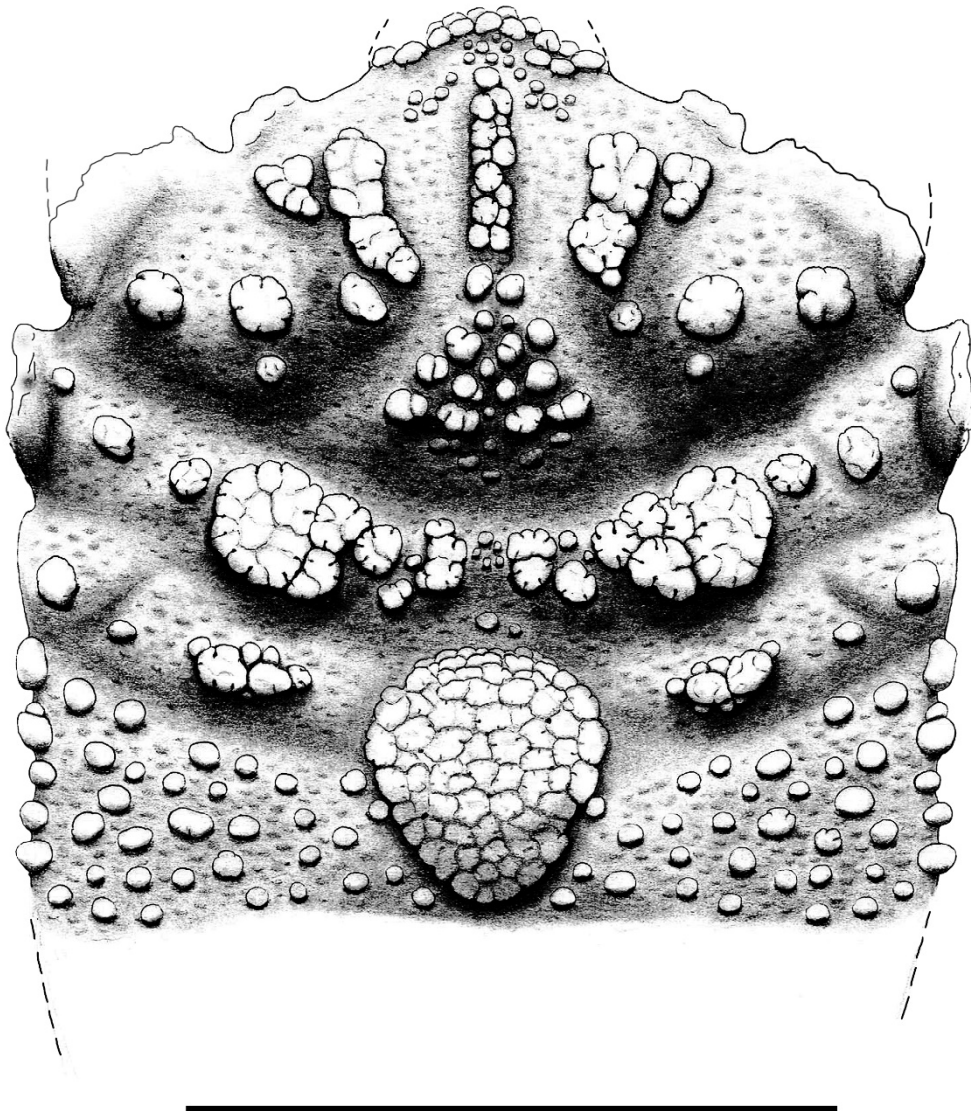


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560 Fig. 2. *Cuchiadromites jadeae* gen. et sp. nov. MMC-CE020571 (holotype) from the Marl
 561 Member of the Patrocinio Formation (Lower Aptian, *Deshayesites forbesi* Ammonite Zone) at
 562 Cuchía (Cantabria, northern Spain), A: dorsal view; B: frontal view; C: right lateral view; D:
 563 left lateral view. Abbreviations: bcg = branchiocardiac groove; bg = branchial groove; cg =
 564 cervical groove; o = orbital fossa; pcg = postcervical groove; pls = pleural suture; pt =
 565 pterygostome; shl = subhepatic lobe. Scale bar equals to 5 mm.

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23/03/2020
F.A.

568

569 Fig. 3. *Cuchiadromites jadeae* gen. et sp. nov., reconstruction of dorsal carapace. Scale bar
570 equals to 5 mm. (illustration by F.A. Ferratges).

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