Biologia Serbica, 2017, 39(2):25-42

DOI 10.5281/zenodo.827196

Original paper

New data on the genus *Niphargus* Schiödte, 1849 (Fam. Niphargidae) in Spain (Contribution to the Knowledge of the Amphipoda 294)

Gordan S. Karaman

Montenegrin Academy of Sciences and Arts, Riste Stijovica 5, 20000 Podgorica, Montenegro

Received: 31 March 2017 / Accepted: 30 May 2017 / Published online: 20. July 2017

Summary. *Niphargus ciliatuscis montanus* Margalef, 1952, a poorly described and scarcely known taxon from the Cueva de Guesaltza (= Gesaltza) Cave, Guipuzcoa (= Gipuzkoa), Aranzazu (= Arantzazu), N Spain, is redescribed and figured here from new localities of N Spain. Based on relevant taxonomical characters, it is elevated to the rank of distinct species, *Niphargus cismontanus* Margalef, 1952. Its taxonomical characters and relation to some other *Niphargus* species from Spain and France are discussed.

Keywords: Amphipoda, Niphargidae, *Niphargus cismontanus*, Spain, subterranean waters, taxonomy.

INTRODUCTION

The subterranean fresh- and brackish water fauna of Amphipoda in Spain has been studied by various authors (Margalef, Stock, Ruffo, Notenboom, Balazuc, Schellenberg, G. Karaman, etc.), but this fauna is still only partially known.

Within the subterranean family Niphargidae, only several taxa of the genus *Niphargus* Schiödte, 1849 from Spain are known (*N. gallicus* Schellenberg, 1935, *N. delamarei* Ruffo, 1954, *N. laisigeronensis* G. Karaman, 2015, *N. cismontanus* Margalef, 1952, *N. notenboomius* G. Karaman, 2015, *N. spiritus* G. Karaman, 2016). Some other taxa [*N. longicaudatus* (Costa, 1851), *N. puteanus* (Koch, 1836), etc] mentioned for Spain by single authors and without descriptions, must be reexamined and confirmed. They probably belong to some other taxa.

The first described *Niphargus* taxon from Spain was *Niphargus ciliatus cismontanus* by Margalef (1952) from Cueva de Guesaltza, Arantzazu, is considered here as a distinct species.

Thanks to Dr. Jos Notenboom from the Netherlands, I have studied some samples of *Niphargus* from Spain and some new data are presented in this paper. In the paper by Margalef (1952) *Niphargus ciliatus cismontanus* (= *Niphargus cismontanus*) had only been partially described and figured, and numerous taxonomical characters of this taxon remained unknown. For this reason, here I redescribe this species based on specimens from five new localities.

MATERIAL AND METHODS

The studied material collected from subterranean waters in Spain was preserved in 70% ethanol. The studied specimens were dissected using a WILD M20 microscope and drawn using a camera lucida attachment. All appendages were temporarily submersed in a mixture of glycerine and water for study. The body-length of examined specimens was measured from the tip of the head to the end of the telson using a camera lucida. All illustrations were inked manually. After the end of the study, the dissected body-parts were fixed in Liquid of Faure and covered by thin cover glass.

Some morphological terminology and seta`s formulae follows Karaman`s terminology (Karaman G. 1969, 2012a): for mandibular palpus article 3 [A = setae on outer face; B = setae on inner face; C = additional setae on outer face; D = lateral marginal setae; E = distal long setae] and for setae and spines on propodus of gnathopods 1 and 2 [S = corner S-spine; L = lateral slender serrate L-spines; M = facial M-setae; R = subcorner R-spine on inner face]. Term "setae" and "spines" are used based on its shape, not origin.

E-mail: karaman@t-com.me

The investigations were provided based on morphological, ecological and zoogeographical studies.

TAXONOMICAL PART

Family Niphargidae

Niphargus cismontanus Margalef, 1952 nov. stat.

(Figs 1-9)

Niphargus ciliatus cismontanus Margalef 1952: 32, Figs 2, 3; Margalef 1953: 101; Balazuc, 1954: 173; Margalef 1970: 170, Fig. 2e-i; Barnard & Barnard 1983: 690; G. Karaman and Ruffo 1986: 524; Ginet 1988: 231; Ginet 1991: K, Figs 2, 3; Ginet 1996: 84, Figs 2, 3.

Material examined

83-11/38- Well W. of road Dima-Ochandiario (?Otxandio), 11 km from Dima, Vizcaya, N 256696, 600 m a.s.l., Basque Country, Northern Spain, 26.11.1983, 14 exp. (leg. J. Notenboom);

84-6/37- Well 0.25 km S. of Berezano (= Berezao), Onate, Guipuzcoa (= Gipuzkoa), N 48637, 360 m a.s.l., Basque Country, Northern Spain, 19.6.1984, 16 exp. (leg. J. Notenboom);

314/2- Prov. Vizcaya, Rio Rarrakola, the basin of Estepona at Bakio with coord. 139063, 160 m a.s.l. along the road from Bakio to Caserio corrando distance from rising 1 km, Basque Country, Northern Spain, (leg. Begona G. de Bikuna), 1 male 10 mm (no data);

314/3 [Lag 1]- Prov. Vizcaya, Rio Lago at Ibarrangelu (= Ubarranguelua?), UTM coord. WP 295027, along the road, Gernica-Ibarrangelu at km 41-42, 140 m a.s.l., distance from the rising 1 km, Basque Country, Northern Spain, (leg. Begona G. de Bikuna] 1 exp. (no data);

314/4 [3]- "Lamirak (Rio Contomirade [?Coutomivade?] Bemalve?, male 9.2 mm and 6 juv. 5.1.1986 (leg. Pilar Rodriguez)."[unclear locality].

Diagnosis

Large species, metasomal segments 1-3 with a row of dorsoposterior marginal setae. Epimeral plates angular. Urosomal segment 1 with spine and/or setae, urosomal segment 3 naked. Coxae moderately short, coxa 4 without lobe, coxa 5 nearly as long as coxa 4. Propodus of gnathopods is as large as the corresponding coxa. Antenna 1 peduncular article 3 short. Antenna 2 well developed. Mandibular palpus article 1 naked or sporadically provided with 1-4 setae. Maxilla 1: inner plate with 3-4 setae, anouter plate with 7-8 spines (at least 6 with one lateral tooth). Maxilliped well developed. Propodus of gnathopods 1 and 2 is with one R-spine. Basipodit of pereopods 5-7 without a distinct lobe, dactylus is with an elevated number of spines along the inner margin. Pleopods are with 2 retinacula, peduncles scarcely setose. Uropod 1 peduncle in males without a ventrodistal tubercle, but with an elongated inner ramus. Uropod 3 in males with an elongated second article of the outer ramus. Telson is with distal, lateral and facial short spines. Sexual dimorphic characters present (uropod 1, uropod 3, etc.).

Description

Male 19.3 mm from Dima region (83-11/38):

Body large, moderately slender; metasomal segments 1-3 at the dorsoposterior margin with up to 16 unequal setae (Fig. 3E). Urosomal segment 1 at each dorsolateral side with 1 seta; urosomal segment 2 on each dorsolateral side with 2 spines; urosomal segment 3 naked. Urosomal segment 1 at each ventroposterior corner with one spine near the basis of the uropod 1 peduncle (Fig. 5 I).

Epimeral plate 1 partially rounded, with stronger seta in a marked ventroposterior corner, along the posterior convex margin appear several short setae (Fig. 3E); epimeral plate 2 poorly angular with a well marked ventroposterior corner, along the posterior convex margin appear a row of short setae. Epimeral plate 3 distinctly angular, with a poorly pointed ventroposterior corner bearing spine or seta, the posterior margin is slightly sinusoid, with a row of short setae. Epimeral plates 2 and 3 are provided with one subventral spine (Fig. 3E).

Head with a short rostrum and short subrounded lateral cephalic lobes, ventroanterior sinus developed (Fig. 1A), eyes absent.

Antenna 1 much shorter than body (ratio: 76:193); peduncular articles 1-3 progressively shorter (ratio: 69:55:28), scarcely setose, all setae are much shorter than diameter of articles themselves (Fig. 1B); main flagellum consisting of 19 articles (many articles bearing one short aesthetasc) (Fig. 1C). The accessory flagellum is 2-articulated, short, not exceeding half of the length of article 3 (Fig. 1B).

Antenna 2 moderately strong: peduncular article 3 at the ventral margin with a distal bunch of setae (the longest setae reaching the diameter of the article itself); articles 4 slightly longer than article 5 (ratio: 75:70) (Fig. 1D), bearing at the ventral margin 4-5 bunches of setae (the longest setae exceeding the diameter of the article itself). Along the dorsal margin of articles 4 and 5 appear several bunches of setae, usually shorter than those of the ventral margin (Fig. 1D); along the ventral margin are attached 4-5 bunches of setae (the longest setae are as long as or longer than the diameter of article itself. Flagellum consisting of 12 articles bearing at the ventral margin several setae each (the length of setae is decreasing toward the tip of the flagellum). Antennal gland cone short (Fig. 1D).

Mouthparts well developed. The labrum is broader than long, poorly concave distally (Fig. 5A).

Labium broader than long, outer lobes entire, inner lobes well developed (Fig. 1E).

Mandibles are with a triturative molar. Left incisor with 4 teeth and 8 rakers, lacinia mobilis is slightly bifurcate, with numerous small teeth (Fig. 5D). Right incisor with 5 teeth and 7 rakers, lacinia mobilis is with 4 teeth. Mandibular palpus consisting of 3 articles: the first article short, bearing 2 setae (Fig. 5C); the second article is with 15 strong setae. Distal article is subfalciform, slightly longer than the second article (ratio: 85:77) and provided with nearly 30-32 D-setae and 5-6 distal long E-setae (Fig. 5C); on the outer face appears one row of 9 A-setae (Fig. 5E), on the inner face are attached 4 bunches of B-setae (2-5-4-3-) (Fig. 5C).

Maxilla 1: the inner plate is with 3-4 setae (Fig. 1F); the outer plate with 7 spines [6 spines are with one lateral tooth, one spine is with 2-3 small teeth). Palpus 2-articulated, not reaching the distal tip of the outer plate spines, the distal article provided with 7 setae (Fig. 1F).

Maxilla 2: both plates with numerous distomarginal setae, facial setae absent (Fig. 5B).

Maxilliped: the inner plate short, not exceeding mesial tip of palpus article 1, provided with 4 distal pointed spines and several setae (Fig. 1G); the outer plate not exceeding half of the palpus article 2, bearing a row of lateral spines. Palpus article 2 with numerous long setae along the mesial margin, palpus article 3 at the outer margin with one median and one distal bunch of long setae; article 4 at the outer margin with one median seta, at inner margin with 2 distal setae near the basis of the nail (Fig. 1G).

Coxae 1-4 are relatively short. Coxa 1 broader than long (ratio: 47:35), without ventroanterior protrusion and bearing nearly 15 short marginal setae (Fig. 2A). Coxa 2 is nearly as long as broad, with nearly 13 unequal marginal setae (Fig. 2D). Coxa 3 is slightly longer than broad (ratio: 67:53) with nearly 13 unequal short marginal setae (Fig. 3A). Coxa 4 nearly as long as broad, with broadly subrounded anterior margin, ventroposterior lobe absent (Fig. 3C); along the ventral margin appear a row of nearly 15 unequal marginal setae.

Coxa 5 much broader than long (ratio: 70:45), bilobed, anterior subrounded lobe as long as coxa 4, posterior lobe shorter (Fig. 4A). Coxa 6 smaller than 5, bilobed, with subrounded anterior lobe (Fig. 4C). Coxa 7 entire, much broader than long (ratio: 55:25), with a convex ventral margin (Fig. 4E).

Gnathopods 1-2 are relatively small, with propodus (article 6) not larger than the corresponding coxa (Fig. 2A, D). Gnathopod 1 is slightly smaller than gnathopod 2, with article 2 provided with numerous long setae a long anterior and posterior margin (Fig. 2A). Article 3 at the posterior margin with one distal bunch of setae; article 5 shorter than the propodus (ratio: 35:43), along the anterior margin with one distal bunch of setae. Propodus is trapezoid, poorly longer than broad (ratio: 92:85), along the posterior margin with 9 transverse rows of setae (Fig. 2B). Palm slightly convex, inclined nearly half of propodus-length, defined on the outer face by one S-spine accompanied laterally by 3 serrate L-spines and 6-7 facial M-setae (Fig. 2B, C), on the inner face by one short subcorner R-spine (Fig. 2C). Dactylus reaching the posterior margin of propodus, along the outer margin with 14 mainly paired setae, along the inner margin with several short setae (Fig. 2B).

Gnathopod 2: article 2 along the anterior and posterior margin with numerous long setae (Fig. 2D); article 3 at the posterior margin with one distal bunch of setae; article 5 slightly shorter than propodus (ratio: 42:48), along the anterior margin with one median and one distal bunch of setae. Propodus trapezoid, hardly broader than long (ratio: 103:100), along posterior margin with 10-11 transverse rows of setae (2E). Palm slightly convex, inclined poorly over half of the propodus-length, defined on the outer face by one S-spine accompanied laterally by 3 serrate L-spines and 6 facial M-setae (Fig. 2E, F), on the inner plate with one R-spine (Fig. 2F). Dactylus reaching the posterior margin of the propodus, along the outer margin with 17 mainly paired setae, along the inner margin with a row of short setae (Fig. 2E).

Pereopods 3 and 4 are moderately slender. Pereopod 3: posterior margin of article 2 with longer setae; anterior margin with long proximal setae and short distal setae (Fig. 3A). Articles 4-6 of unequal length (ratio: 48:36:40). Along the posterior margin of article 4 appear 5 bunches of setae (the longest setae nearly as long as the diameter of the article itself); article 5 along the posterior margin with 5 groups of 1-2 spines and short setae; article 6 along the posterior margin with 7 single spines accompanied often with short seta. Dactylus short and strong, much shorter than article 6 (ratio: 17:40), along the inner margin with 4 strong spines, at the outer margin with one plumose median seta (Fig. 3B); nail is shorter than the pedestal (ratio: 30:40).

Pereopod 4 is rather similar to pereopod 3, with hardly smaller pilosity. Articles 4-6 of unequal length (ratio: 44:33:40) (Fig. 3C). Dactylus is much shorter than article 6 (ratio: 17:40), along the inner margin with 4 strong spines, along the outer margin with one plumose median seta (Fig. 3D); nail is shorter than the pedestal (ratio: 31:35).

Pereopods 5-7 are strong, mainly spiniferous. Pereopod 5 remarkably smaller than pereopods 6 and 7, with article 2 longer than broad (ratio: 73:44), along the posterior margin with nearly 12-13 short setae, ventroposterior dilatation not forming a distinct lobe (Fig. 4A). Articles 4-6 of different length (ratio: 44:49:50), along both margins with short spines and setae. Article 2 is longer than article 6 (ratio: 73:50). Dactylus much shorter than article 6 (ratio: 18:50), at the inner margin with 3 strong spines, at the outer margin with one median plumose seta; nail is shorter than pedestal (ratio: 29:40) (Fig. 4B).

Pereopod 6: article 2 longer than broad (ratio: 84:50), along the posterior poorly convex margin appear nearly 15 short setae, ventroposterior dilatation very shallow (Fig. 4C). Articles 4-6 are of unequal length (ratio: 57:70:78), articles

along both margins with short spines and short single setae. Article 2 is slightly longer than article 6 (ratio: 84:78). Dactylus much shorter than article 6 (ratio: 30:78), along inner margin with 3-4 strong spines, at the outer margin with one median plumose seta (Fig. 4D); nail is shorter than the pedestal (ratio: 33:64).

Pereopod 7 does not reach the tip of uropod 1-rami; article 2 much longer than broad (ratio: 89:53), along the posterior slightly convex margin, appear nearly 16 short setae (Fig. 4E), ventroposterior dilatation shallow; articles 4-6 of unequal length (ratio: 52:70:90), articles along both margins with short spines and single setae. Article 2 is nearly the same length as article 6 (ratio: 89:90). Dactylus is much shorter than article 6 (ratio: 27:90), along the inner margin with 6 strong spines, at the outer margin with one median plumose seta (Fig. 4F); nail shorter than the pedestal (ratio: 33:63).

Pleopods 1-3 are with 2 retinacula. Peduncle of pleopod 1 naked (Fig. 5F); peduncle of pleopod 2 with one distoanteriorseta (Fig. 5G); peduncle of pleopod 3 with 5 setae along the posterior margin (Fig. 5H).

Uropod 1 long, peduncle with dorsointernal row of setae (except distal spine) and dorsoexternal row of spines (Fig. 5 I); inner ramus nearly as long as the peduncle, slightly curved, bearing several bunches of short setae and 2 bunches of short spines; outer ramus reaching nearly half of inner ramus-length, bearing several lateral single spines and distal bunch of short spines.

Uropod 2: peduncle with dorsal spines; inner ramus nearly as long as the peduncle, bearing several lateral and distal short spines (Fig. 5J); outer ramus distinctly shorter than theinner one, bearing several lateral and distal short spines.

Uropod 3 long: peduncle relatively short, longer than broad (ratio: 44:24), bearing 3 lateral short spines and 2 groups of distal short spines (Fig. 5K). Inner ramus very short, scale-like, much shorter than the peduncle (ratio: 12:44), provided with lateral and distal spines. Outer ramus long, 2-articulated, narrow; first article along outer margin with 8 groups of short spines and single short simple setae (Fig. 5K); along inner (mesial) margin are attached 6-7 groups of short spines accompanied by 2 plumose longer setae; second article slightly longer than the first (ratio: 162:157), bearing several bunches of short simple setae along the margins and tip.

Telson relatively short, slightly gaping, incised slightly over 2/3 of telson-length; each lobe with 4 distal short spines; along the outer margin of the lobes are attached one spine and 1-2 spine-like setae; along the inner (mesial) margin are attached one spine and one seta (Fig. 4G); on the surface appear 0-1 facial spine and 1-2 short spine-like setae; a pair of short plumose setae is implanted at the outer margin near the middle of each lobe.

Coxal gills appear on legs 2-6, relatively large, ovoid, not exceeding the ventral tip of the corresponding article 2 of the legs (Figs 2D, 3A, C; 4A, C).

Female 15.2 mm from Dima region (83-11/38), with setose oostegites. Body moderately slender, metasomal segments 1-3 with a dorsoposterior row of marginal setae of unequal length: on the metasomal segment 3 appear 2 longer and 9 short dorsoposterior marginal setae (Fig. 9B).

Urosomal segment 1 on each dorsolateral side with one spine and one seta; urosomal segment 2 on each dorsolateral side with 2-3 spines and 0-1 seta; urosomal segment 3 is naked. Ventroposterior corner of the urosomal segment 1 is provided with one spine near basis of uropod 1-peduncle (Fig. 9C).

Epimeral plate 1 with marked ventroposterior corner and with strongly convex posterior margin bearing nearly 6-7 short setae (Fig. 7E). Epimeral plate 2 angular, with marked ventroposterior corner and slightly convex posterior margin bearing several short setae. Epimeral plate 3 with a sharply angular ventroposterior corner, posterior margin inclined, straight, bearing several short setae; epimeral plate 2 with one subventral spine, epimeral plate 3 with 2 subventral spines (Fig. 7E).

Antenna 1 is shorter than the body (ratio: 75:152), peduncular articles 1-3 like those in males; main flagellum consisting of 23-26 articles. Antenna 2 like that in males, the flagellum consists of 12 articles.

Mouthparts like those in males. Mandibular palpus article 1 with one seta, article 2 with 17 strong setae (Fig. 6E); palpus article 3 subfalciform, poorly longer than article 2 (65:60), bearing nearly 28 D-setae and 5-6 distal E-setae, on the outer face appear one row of 10 A-setae, on the inner face are implanted 4 bunches of B-setae (Fig. 6E).

Maxilla 1 inner plate with 3 setae, the outer plate is with 7 spines (6 spines with one lateral tooth, one spine with 2 teeth), palpus with 6-8 setae.

Maxilliped: the inner plate is provided with 5 spines mixed with several strong setae (Fig. 9A), palpus article 3 at theouter margin with one median and one distal bunch of setae; palpus article 4 at the inner margin with 2 distal setae near basis of the nail and with 0-1 median seta along the outer margin.

Coxae are slightly longer than those in males. Coxa 1 nearly as long as broad, with a broadly subrounded ventroanterior corner, along margins appear nearly 16 short unequal setae (Fig. 6A). Coxa 2 longer than broad (ratio: 61:50), with a broadly subrounded ventral margin bearing nearly 14 unequal setae (Fig. 6C). Coxa 3 longer than broad (ratio: 68:55), along the ventral broadly subrounded margin are implanted nearly 12 unequal setae (Fig. 7A). Coxa 4 is longer than broad (ratio: 67:58), the posterior margin is concave but without a lobe; the ventral margin is remarkably broadly subrounded and provided with nearly 12 setae (Fig. 7C).

Coxa 5 is much broader than long (ratio: 69:53), bilobed, the anterior subrounded lobe is nearly as long as coxa 4, the posterior lobe is smaller (Fig. 8A). Coxa 6 is bilobed but smaller than coxa 5, broader than long (ratio: 56:41), the anterior lobe is subrounded (Fig. 8C). Coxa 7 shallow,

broader than long (ratio: 52:24), entire (Fig. 7E).

Gnathopods 1-2 are rather similar to those in males, relatively small, with the propodus nearly as large as the corresponding coxa (Fig. 6A, C).

Gnathopod 1: article 2 along the anterior and posterior margin with numerous long setae; article 3 at the posterior margin with one distal bunch of setae. Article 5 slightly shorter than propodus (ratio: 37:45), along the anterior margin with one distal bunch of setae (Fig. 6A). Propodus trapezoid, poorly longer than broad (ratio: 92:85), along the posterior margin with 7 transverse rows of setae (Fig. 6B). Palm slightly convex, inclined nearly half of the propodus-length, defined on the outer face by one corner S-spine accompanied laterally by 4 L-spines and 3+4 facial M-setae (Fig. 6B), on the inner face by one short R-spine. Dactylus reachs the posterior margin of the propodus, along the outer margin bearing 10 single or paired setae, along the inner margin appear row of short setae (Fig. 6B).

Gnathopod 2 is larger than gnathopod 1; article 2 along the anterior and posterior margin with numerous long setae (Fig. 6C); article 3 at the distoposterior corner with one bunch of setae; article 5 slightly shorter than the propodus (ratio: 42:50), along the anterior margin with 1-2 bunches of setae (Fig. 6C). Propodus trapezoid, nearly as long as broad, along the posterior margin with 9-10 transverse rows of setae (Fig. 6D). Palm slightly convex, defined on the outer face by one corner S-spine accompanied laterally by 3 L-spines and 6 facial M-setae (4+2) (Fig. 6D), on the inner face by one subcorner R-spine. Dactylus reaching the posterior margin of propodus, along the outer margin with 16 paired setae, along the inner margin with a row of short setae (Fig. 6D).

Pereopods 3 and 4 are rather similar to each other. Pereopod 3: article 2 along both margins with row of long setae in the proximal part and short setae in distal part. Articles 4-6 of unequal length (ratio: 50:36:42); article 4 along the posterior margin with 5 bunches of setae (the longest setae reaching diameter of article itself); article 5 at the posterior margin with 5-6 paired or simple short spines accompanied by single short setae (Fig. 7A); article 6 along the posterior margin with 6-7 single or paired short spins mixed with single short setae. Dactylus is much shorter than article 6 (ratio: 20:42), along inner margin are attached 5 strong spines, along the outer margin appear one median plumose seta (Fig. 7B); nail shorter than the pedestal (ratio: 29:33).

Pereopod 4: pilosity of all articles is rather similar to these of pereopod 3 (Fig. 7C). Articles 4-6 of unequal length (ratio: 45:35:40). The longest setae on article 4 reach the diameter of the article itself, on article 5 the setae are shorter and mixed with spines. Dactylus much shorter than article 6 (ratio: 21:40), along the inner margin with 4 strong spines, along the outer margin with one median plumose seta (Fig. 7D); nail poorly shorter than the pedestal (ratio: 28:30).

Pereopod 5 is shorter than pereopods 6 and 7, with article 2 longer than broad (ratio: 75:45), anterior margin is not produced ventrally and bearing 6 single or paired spine-like setae, the posterior poorly convex margin is provided with nearly 16 short setae, ventroposterior lobe is not fully developed (Fig. 8A). Articles 4-6 of unequal length (ratio: 46:51:55); article 4 along anterior margin with bunches of short setae and single spines, along the posterior margin with spines; articles 5 and 6 along both margins with bunches of strong spines. Article 6 is shorter than article 2 (ratio: 55:75), bearing a distal bunch of long setae and single spines, along both margins with several bunches of spines. Dactylus much shorter than article 6 (ratio: 20:53), along the inner margin with 4 strong spines, along the outer margin with one median plumose seta; nail is shorter than the pedestal (ratio: 25:35) (Fig. 8B).

Pereopod 6: article 2 slightly ovoid, longer than broad (ratio: 89:54), along the anterior convex margin with 6 bunches of short spine-like setae, along the posterior convex margin with nearly 13 short setae, ventroposterior dilatation shallow (Fig. 8C). Articles 4-6 of unequal length (ratio: 58:74:83), articles along the anterior and posterior margin with bunches of short spines. Article 6 is only slightly shorter than article 2 (ratio: 83:89), with adistal bunch of setae and spines. Dactylus much shorter than article 6 (ratio: 26:83), along the inner margin with 5 strong spines, at the outer margin with one median plumose seta (Fig. 8D); nail shorter than the pedestal (ratio: 27:54).

Pereopod 7 does not reach the tip of uropod 1-rami; article 2 slightly ovoid, much longer than broad (ratio: 90:55), along the anterior convex margin with 7 groups of spine-like setae, along the posterior slightly convex margin with nearly 18 short setae, ventroposterior lobe very shallow and poorly developed (Fig. 8E). Articles 4-6 of unequal length (ratio: 54:70:96), with numerous bunches of short spines along both margins. Article 6 is longer than article 2 (ratio: 96:90). Dactylus is much shorter than article 6 (ratio: 29:96), along the inner margin with 5-6 strong spines, along the outer margin with one median plumose seta (Fig. 8F); nail shorter than the pedestal (ratio: 30:60).

Pleopods 1-3 are with 2 retinacula; peduncle of all pleopods scarcely setose.

Uropod 1: peduncle is longer than the rami, provided with a dorsoexternal row of spines and dorsointernal row of 4 setae and 2 spines (Fig. 9C); the outer ramus is distinctly shorter than the inner one, bearing several lateral and distal short spines; the inner ramus with lateral and distal short spines, as well as with one subdistal bunch of simple setae and one lateral simple seta (Fig. 9C).

Uropod 2: peduncle with dorsal spines; the outer ramus is shorter than the inner one, bearing 4 lateral and 4 distal strong short spines; the inner ramus bearing 4 lateral and 4 distal spines as well as one lateral simple seta (Fig. 9D).

Uropod 3: peduncle longer than broad (ratio: 45:30), bearing 3-4 lateral small spines and several short distal spines. The inner ramus is very short, scale-like, remarkably

shorter than the peduncle and provided with distal spine and seta (Fig. 9E). The outer ramus is strong, 2-articulated: the first article dilated, along the outer margin with 5 bunches of strong spines, along the inner margin with 5 bunches of spines mixed with single long plumose setae; the second segment much shorter than the first one (ratio: 47:136), bearing short simple setae along both margins and tip.

Telson is slightly gaping, hardly broader than long (ratio: 80:77); each lobe provided with 4 distal short spines, as well as 3 spines along outer margin and 3 spines along inner (mesial) margin (Fig. 7F); on the facial surface appear one strong spine and 3 short slender spine-like setae; a pair of short plumose setae is attached along the outer margin near the middle of each lobe.

Coxal gills 1-6 are very large, ovoid, usually exceeding distal tip of corresponding article 2 of legs (Figs 6C; 7A, C; 8A, C).

Oostegites large, with marginal setae (Figs 6C, 7C).

Variability

Male 21.0 mm from Dima: left mandibular palpus article 1 is with 4 setae, right palpus article 1 is naked; other specimens (males and females) from both localities were with the palpus article 1 naked.

Other specimens: Maxilla 1 inner plate with 3, rather 4 setae; outer plate in all specimens was with 7 spines only (6 with one lateral tooth, inner spine with 2-3 small lateral teeth), palpus never reaching the tip of the outer plate-spines.

The inner plate of the maxilliped is provided with 4-5 distal pointed spines. Epimeral plates are slightly more angular or pointed in females than those in males. Metasomal segments 1-3 are always with an elevated number of dorsoposterior marginal unequal setae (up to 16). The telson in males and females is gaping, with distal, marginal and facial spines, spines are shorter than half of the telson-length. Uropod 1 peduncle with dorsointernal row of setae (except distal spine), the inner ramus in males is always remarkably longer than the outer one.

Uropod 3: peduncle is always relatively short, the second article of the outer ramus in large males is as long as the first article, in smaller males the distal article is rather shorter than the first article (ratio: 40:60); the inner ramus is always very short and scale-like. The distal article of the outer ramus in females is always much shorter than the first article. A number of strong spines on the inner margin of dactylus on pereopods 3-7 is always elevated (3-6 spines).

Male 15 mm from Onate: maxilla 1 inner plate with 4 setae, outer plate with 7 spines (6 with 1 lateral tooth); Mandibular palpus article 1 naked. Gnathopods 1-2 are with one R-spine on the propodus. Dactylus of pereopods 3-7 is provided with 3-4 spines. Urosomal segment 1 on each dorsolateral side with 1 spine and 1 seta, on urosomal segment 2 with 1-2 spines and 1-3 setae. Metasomal segment 3 with 15 dorsolateral short setae. Uropod 1 like that of specimens from Dima. Uropod 3 distal article of outer ramus is shorter than the first article (ratio: 40:60).

The specimens from the other three mentioned localities agree with those from Dima and Onate.

Locus typicus: cueva de Guesaltza (= Gesaltza) Cave, Guipuzcoa (= Gipuzkoa), Aranzazu (= Arantzazu), N Spain.

Distribution: N Spain, Basque Country: locus typicus (Margalef, 1952) (Fig. 10, 1); Goenaga`ko leizia (road Itziar-Deba, Pays Vasco) (Margalef, 1970) (Fig. 10, 2); Onate (Fig. 10, 3); Dima (Fig. 10, 4); Rio Lago (Fig. 10, 5); Bakio (Fig. 10, 6); Lamirak (?) (present work).

Remarks and affinity

The specimens from Dima and Onate regions, described here, are similar to the specimens of *Niphargus cismontanus* Margalef 1952, from Cueva de Guesaltza Cave, Guipuzcoa, by numerous mentioned characters (pereopods, gnathopods, uropods, etc.). This species was described very briefly based on one male of length17.0 mm, and later Margalef (1970) mentioned this taxon for the cave Goenaga`ko leizia (Itzar-Deba, Pais Vasco). Ginet (1988; 1996) repeated Margalef`s Figures and description.

Margalef (1952) mentioned that uropod 3 of *N. cismontanus* was missing in all studied specimens. He mentioned and figured 8 spines on the outer plate of maxilla 1 with remarks that on metasomal segments 2 and 3 two distoposterior setae appear.

The same author mentioned and figured 3 plumose setae on each lobe of the telson (2 lateral and one distal seta), with remarks that this character is unique regarding this group of amphipods (we observed that numerous other *Niphargus* species also have one third very small distal plumose seta at the tip of each lobe near the basis of the distal spines, but usually neither mentioned nor figured by the authors).

Margalef (1970) mentioned this taxon for the cave Goenaga`ko leizia (Itziar-Deba, Pais Vasco), and figured the angular epimeral plate 3, the telson with distal and lateral short spines, as well as the dactylus of pereopod 7 with 6 spines along the inner margin. However, no data was reported for the metasomal setae, the number of spines on maxilla 1 outer plate, the plumose setae on the telson or other taxonomical data.

Our specimens from Onate and Dima slightly differ from males taken from Gesaltza Cave by the presence of 7 spines on the maxilla 1 outer plate; by the presence of a row of dorsoposterior marginal setae on metasomal segments 2 and 3 (up to 16) and by the sporadic presence of 1-4 setae on mandible palpus article 1. It was not possible to establish other differences because of the scarce original description of *N. cismontanus*.

The increased number of distal spines on the maxilla 1 outer plate is known in some other *Niphargus* taxa also

[*Niphargus remyi* S. Karaman 1934 (loc. typ.: Čedovo near Sjenica, Serbia)] with the outer plate of maxilla 1 provided with 8 spines, and this character is a stable character for this species (G. Karaman 2012b). On the other hand, occasionally 8 spines in both or only one maxilla 1 can occur in various taxa, and in these cases this character is not considered to be stable.

Margalef (1952) figured a naked mandible palpus article 1 in *N. cismontanus*. The sporadic presence of setae on mandibular palpus article 1 in some of the Spanish specimens is very interesting because usually the presence of setae on mandibular palpus article 1 within genus *Niphargus* is a stable taxonomic character (*Niphargus timavi* S. Karaman, 1954; *Niphargus religiosus* G. Karaman 2007, etc.).

The localities of Onate and Dima region are rather close to the locus typicus of *N. cismontanus* (Fig. 9A).

We identified the specimens from Onate and Dima as *N. cismontanus* based on the known but scarce number of taxonomic characters of only one male specimen (holotype) from Gesaltza Cave. But, we cannot exclude the possibility that mentioned different characters of the population from Gesaltza Cave (8 spines on maxilla 1 outer plate and a scarce number of MTS setae) appear in all specimens of this locality, leaving the possibility that specimens from Dima and Onate can represent one different form of the *N. cismontanus*-complex.

Closely related species *Niphargus ciliatus* Chevreux 1906 from Meailles Cave (Castellane dept., Haute Provence, southeastern France),were shortly described without any figures. Later Chevreux and Fage (1925) presented the first figures of this species accompanied by a description identical with that of 1906. They mentioned several localities for this species: Meailles Cave (Basses Alpes); Pau; Mont-de-Marsan, in wells (SW France); Italy.

Chevreux and Fage (1925) mentioned and figured a male 14 mm, with the following characteristics: narrowed basipodits of pereopods 5-7, dactylus of pereopods 3-7 with 4-5 spines, subrounded epimeral plate 3, uropod 3 with a distal article of the outer ramus as long as the first article; lobes of telson with 4 distal and one mesial marginal spine; inner plate of maxilla 1 with 2-3 setae, but no data regarding uropod 1.

Balazuc (1954) cited these data again.

Ginet (1988, 1991, 1996) mentioned that the type specimens of *N. ciliatus* from Meailles Cave are missing (not present in the Paris Museum), and that specimens target as *N. ciliatus* from Meailles Cave in the Paris Museum do not correspond to the Chevreux (1906) description and figures of *N. ciliatus*, but correspond to specimens known from Mont-de-Marsan. He established a new type-locality of *N. ciliatus*, Mont-de-Marsan, presenting a description and figures of this species from Mont-de-Marsan, Pau (Basses Pyrenees), Aureilhan (SW France) and Sain-Marie de Gosse (the same department of SW France).

Our specimens from Dima, Onate and the other 3 localities (N Spain) seem to be rather similar to the specimens from Mont-de-Marsan based on the description and figures of Ginet (1988,1991,1996), but differ distinctly from the later by several important characters of uropods, gnathopods etc. Based on these known differences, we consider our specimens from Spain to be members of *Niphargus cismontanus* Margalef, 1952.On the other hand, further taxonomic differences between *N. cismontanus* and *N. ciliatus* must be reexamined based on new material. Further studies on the French taxa of genus *Niphargus* will shed more light on the relations and composition of the *N. cismontanus - N. ciliatus* complex.

CONCLUSIONS

The subterranean fauna of the genus *Niphargus*Schiödte, 1849 in Spain is under the influence of that known from France, but with some differences. Among several *Niphargus* taxa known from Spain, *Niphargus ciliatuscis montanus* Margalef 1952 [locus typicus: cueva de Guesaltza (= Gesaltza) Cave, Guipuzcoa, Aranzazu, N Spain] was scarcely described using only one male, and numerous taxonomical characters of this taxon were unknown, including these of females. Despite the fact that Margalef (1970) cited this taxon for another cave from Pais Vasco (cave Goenaga`ko leizia), a description of potentially collected female specimens was not given.

Niphargus cismontanus Margalef, 1906 here considered as a distinct species is redescribed and figured, based on specimens from 5 localities from the region, close to already known localities.

Niphargus cismontanus is very close to *Niphargus ciliatus* Chevreux 1906 (locus typicus: Mont-de-Marsan, SW France), but differs distinctly from it by various important characters. As both species are known from a very limited number of localities, the further differences between *N. cismontanus* and *N. ciliatus* must be checked in a larger number of localities of the *N. cismontanus - ciliatus* complex from N. Spain and France.

ACKNOWLEDGEMENT

I am indebted to Dr. Jos Notenboom from the Netherlands for the material used in this study. This study was supported by the Montenegrin Academy of Sciences and Arts.

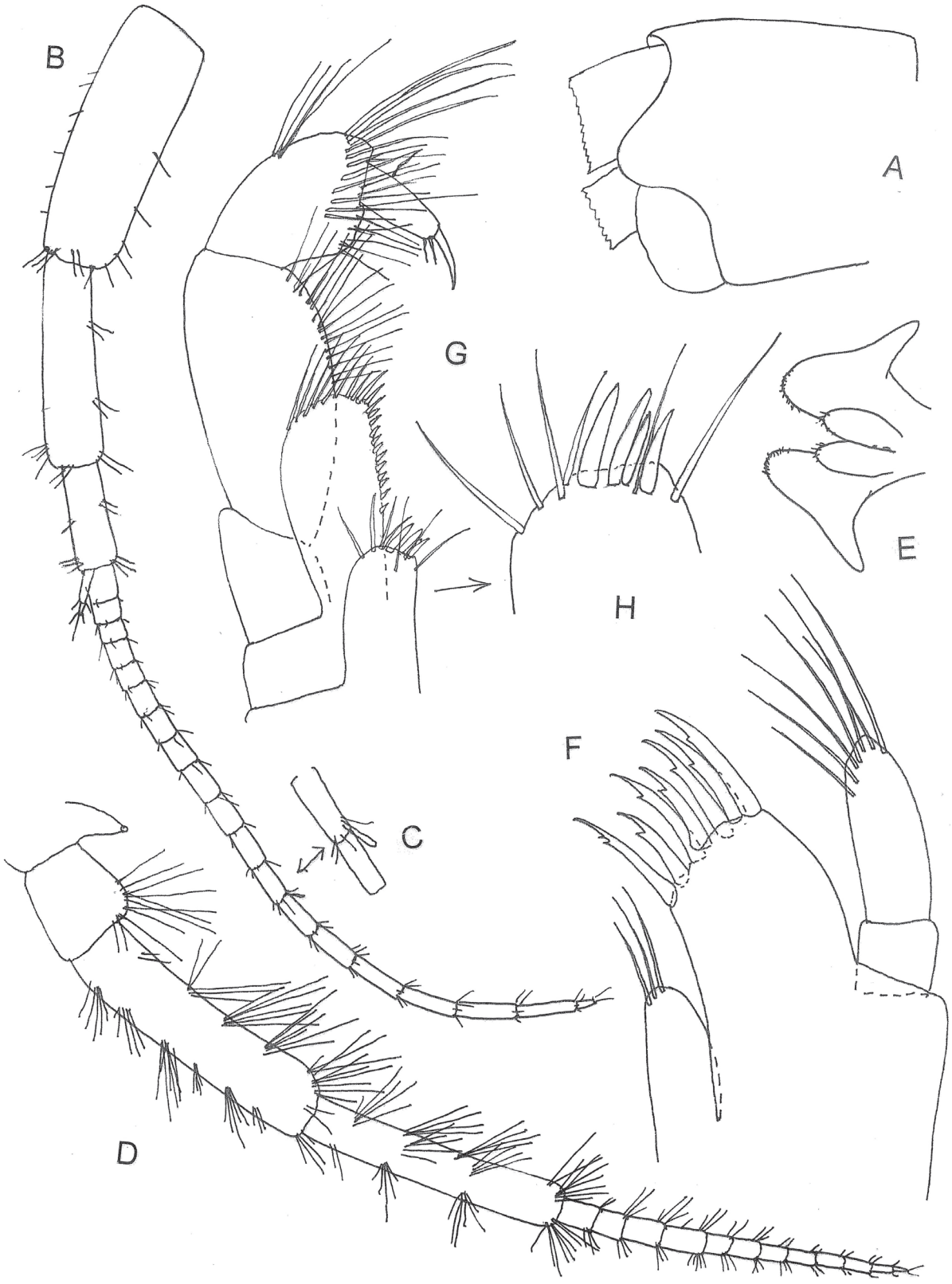

Fig. 1. *Niphargus cismontanus* Margalef, 1952, 11 km W of Dima, Vizcaya, Spain, male 19.3 mm in length: **A** = head; **B** = antenna 1; **C** = aesthetasc; **D** = antenna 2; **E** = labium; **F** = maxilla 1; **G** = maxilliped; **H** = inner plate of maxilliped.

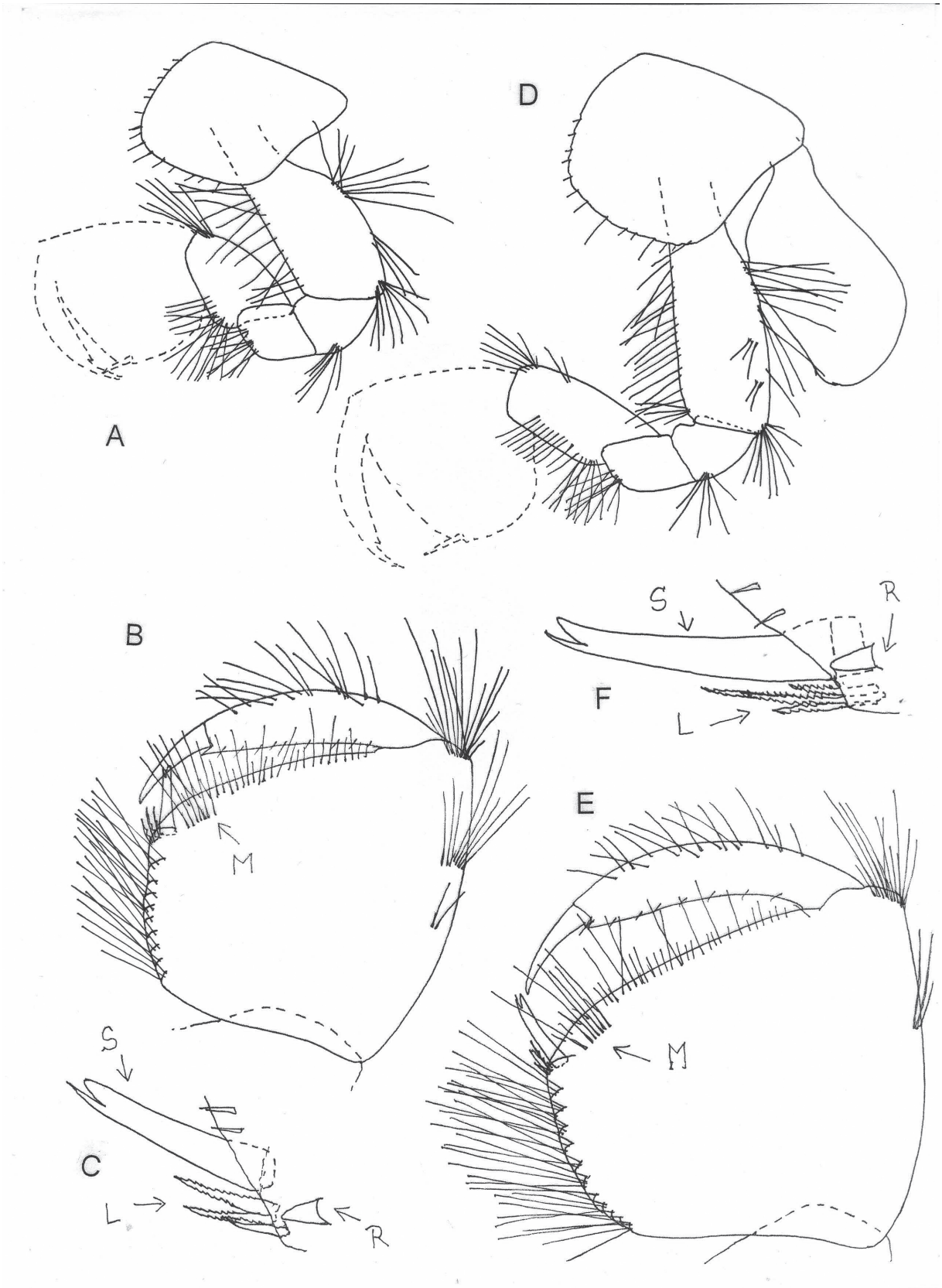

Fig. 2. *Niphargus cismontanus* Margalef, 1952, 11 km W of Dima, Vizcaya, Spain, male 19.3 mm in length: **A-B** = gnathopod 1, outer face (M = facial M-setae); **C** = distal corner of gnathopod 1 propodus, inner face [S = corner S-spine; L = lateral L-spines; R = subcorner R-spine]; **D-E** = gnathopod 2, outer face (M = facial M-setae); **F** = distal corner of gnathopod 2-propodus, inner face [S-corner S-spine; L = lateral L-spines; R = subcorner R-spine].

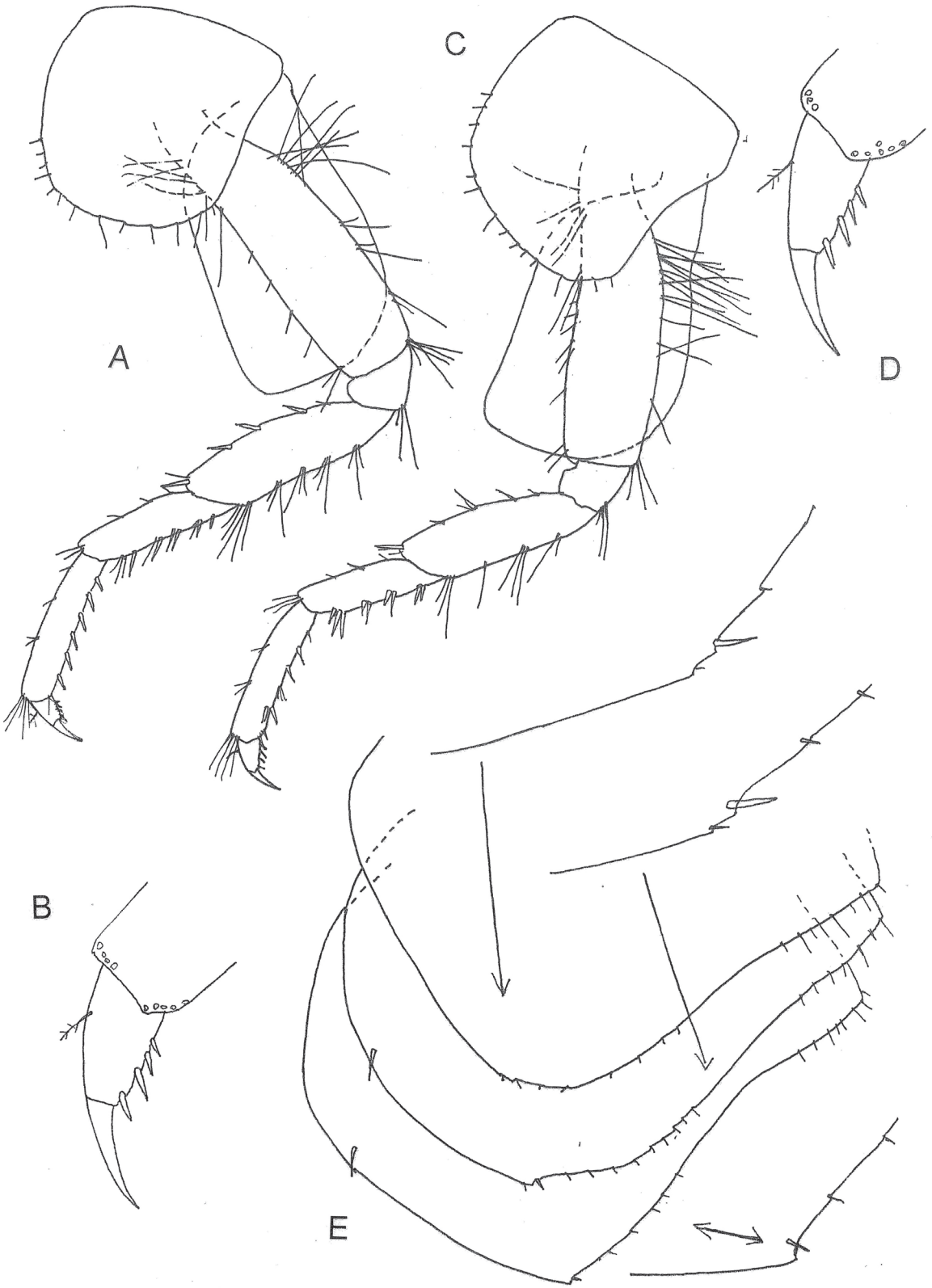

Fig. 3. *Niphargus cismontanus* Margalef, 1952, 11 km W of Dima, Vizcaya, Spain, male 19.3 mm in length: **A-B** = pereopod 3; **C-D** = pereopod 4; **E** = epimeral plates 1-3.

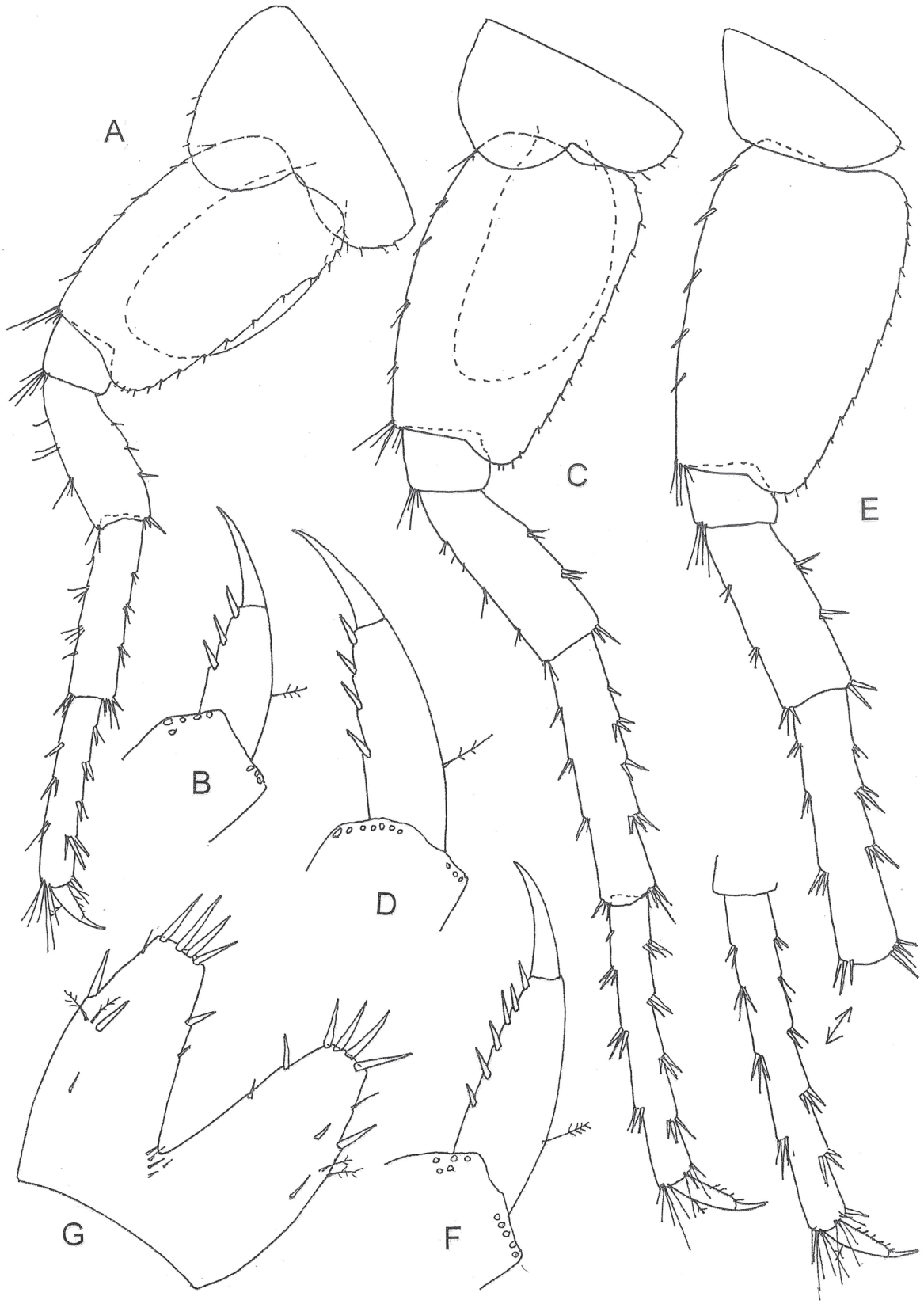

Fig. 4. *Niphargus cismontanus* Margalef 1952 11 km W of Dima, Vizcaya, Spain, male 19.3 mm in length: **A-B** = pereopod 5; **C-D** = pereopod 6; **E-F** = pereopod 7; **G** = telson.

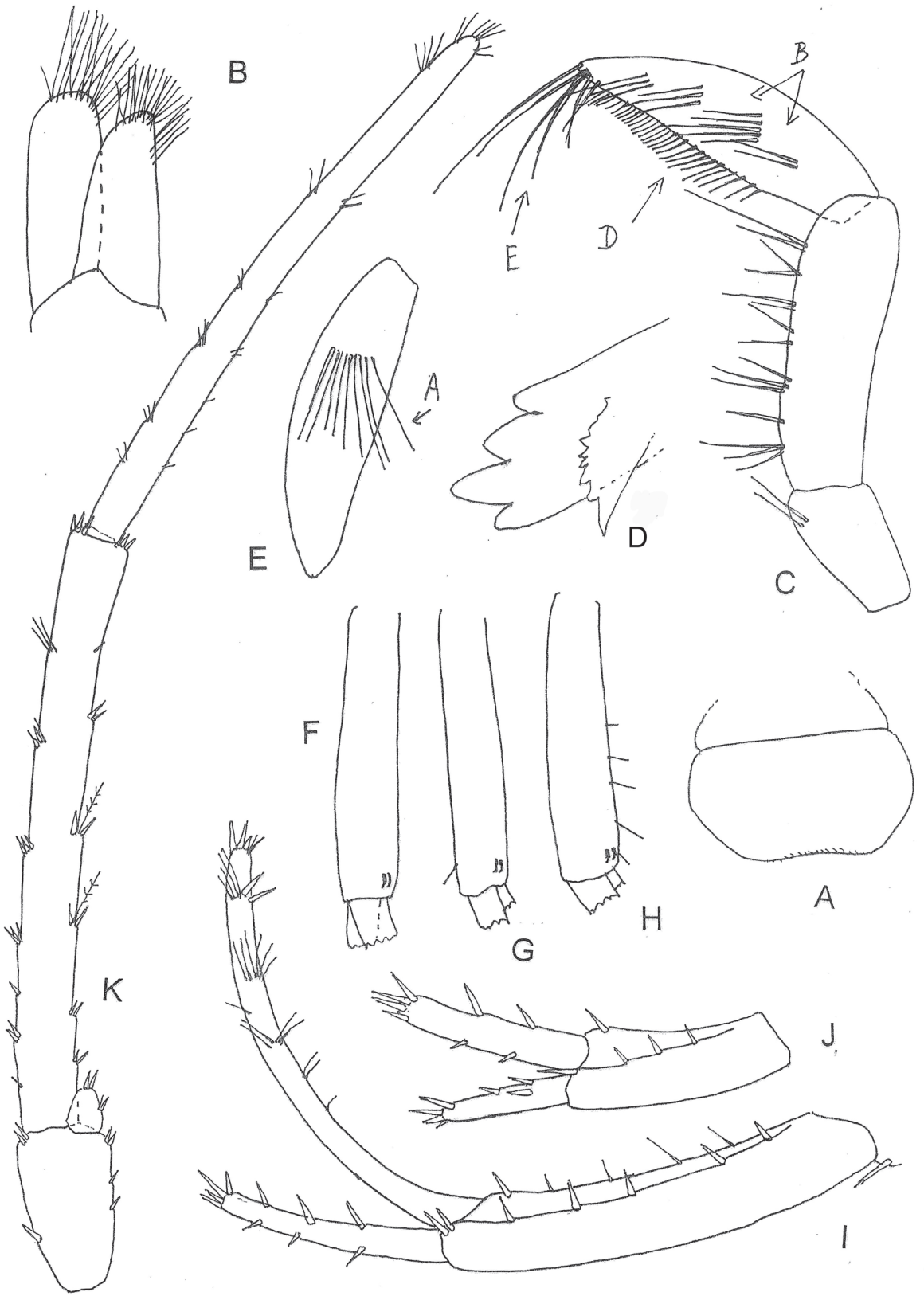

Fig. 5. *Niphargus cismontanus* Margalef 1952, 11 km W of Dima, Vizcaya, Spain, male 19.3 mm in length: **A** = labrum; **B** = maxilla 2; **C** = mandibular palpus, inner face [B = facial B-setae; D = marginal D-setae; E = distal E-setae]; **E** = distal article of mandibular palpus, outer face (A = facial A-setae); **F** = pleopod 1 peduncle; **G** = pleopod 2 peduncle; **H** = pleopod 3 peduncle; **I** = uropod 1; **J** = uropod 2; **K** = uropod 3.

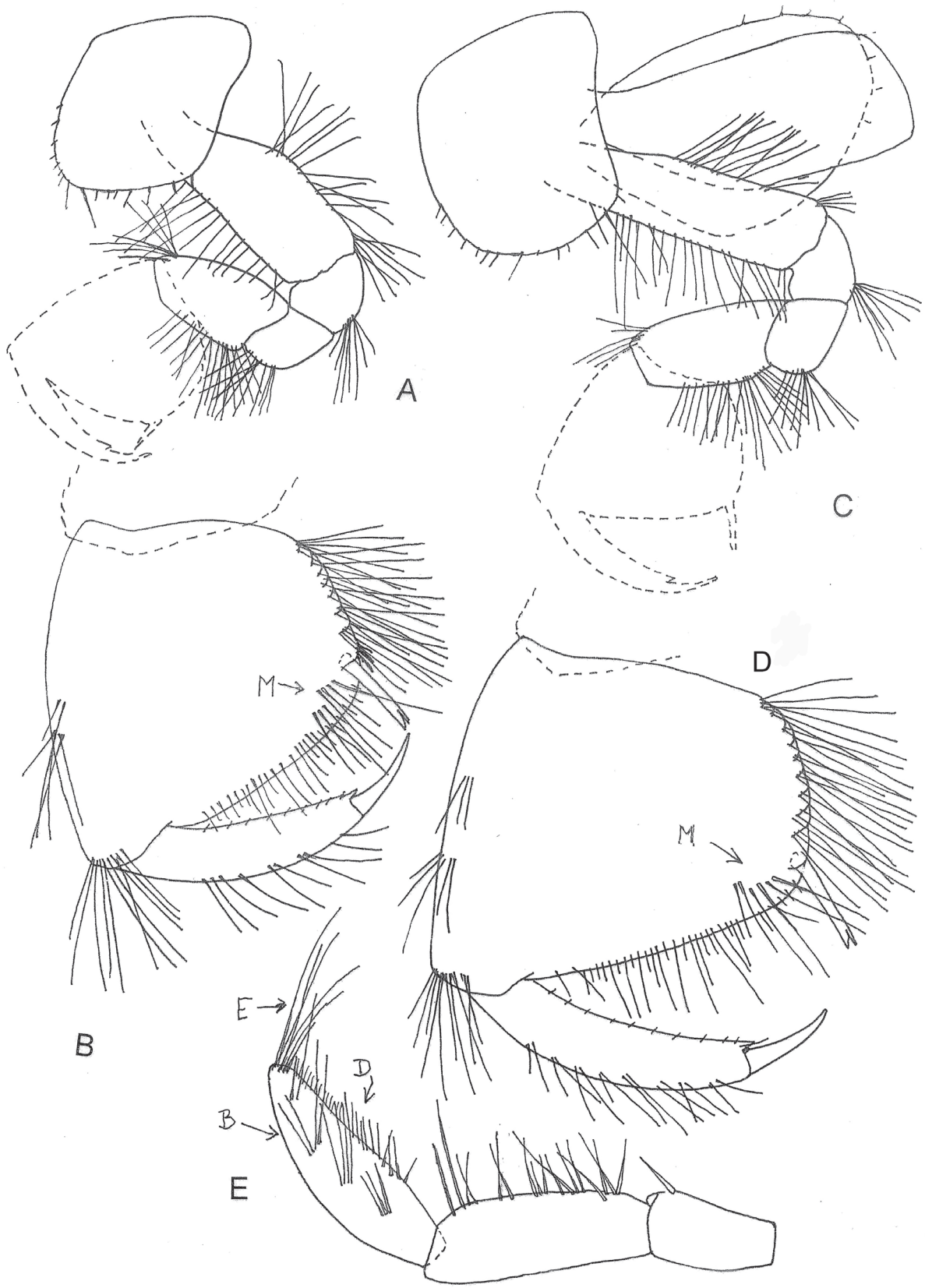

Fig. 6. *Niphargus cismontanus* Margalef 1952, 11 km W of Dima, Vizcaya, Spain, female 15.2 mm in length: **A-B** = gnathopod 1 [M = facial M-setae]; **C-D** = gnathopod 2 [M = facial M-setae]; **E** = mandibular palpus, inner face [B = facial B-setae; **D** = marginal D-setae; E = distal E-setae].

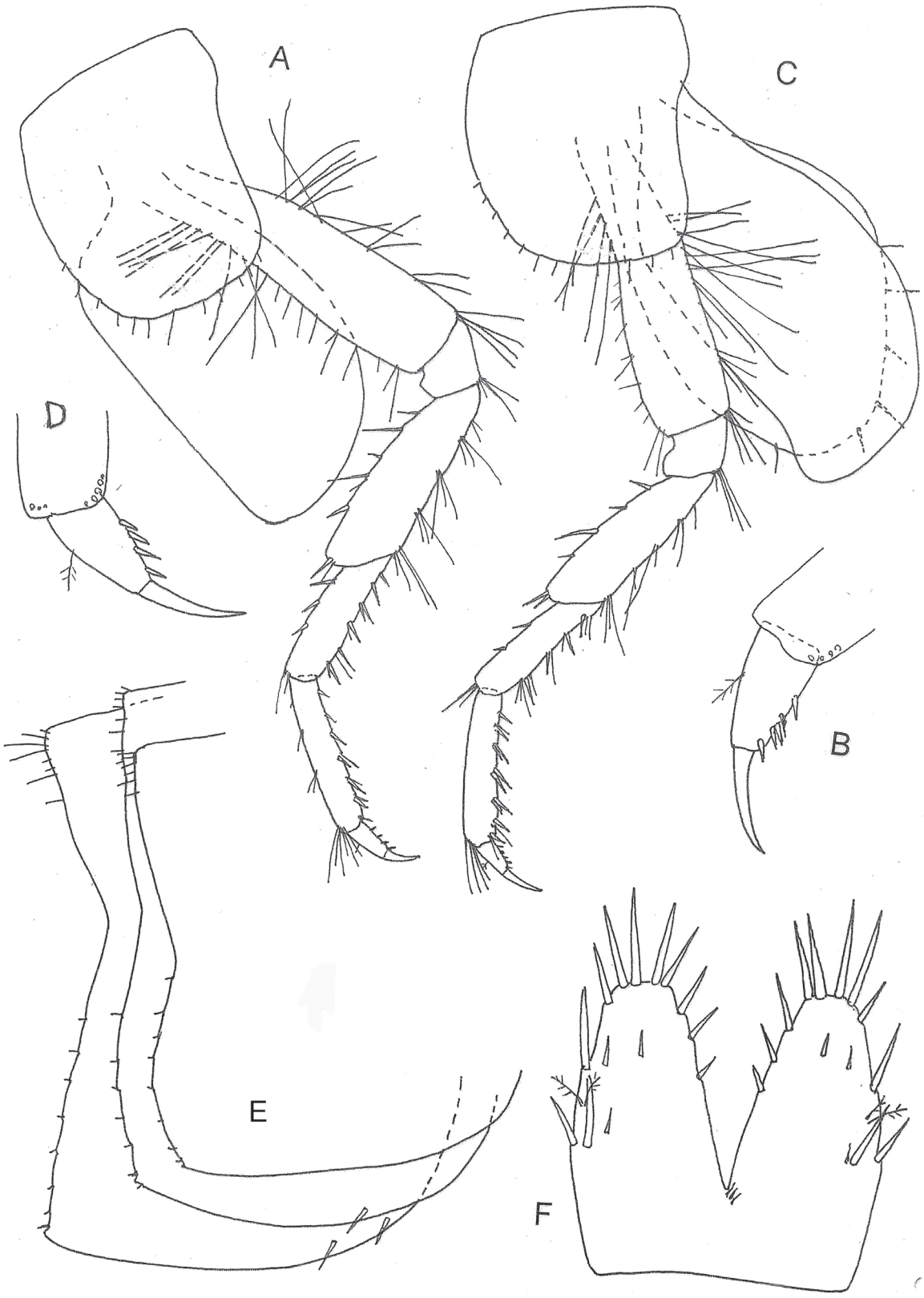

Fig. 7. *Niphargus cismontanus* Margalef 1952, 11 km W of Dima, Vizcaya, Spain, female 15.2 mm in length: **A-B** = pereopod 3; **C-D** = pereopod 4; **E** = epimeral plates 1-3; **F** = telson.

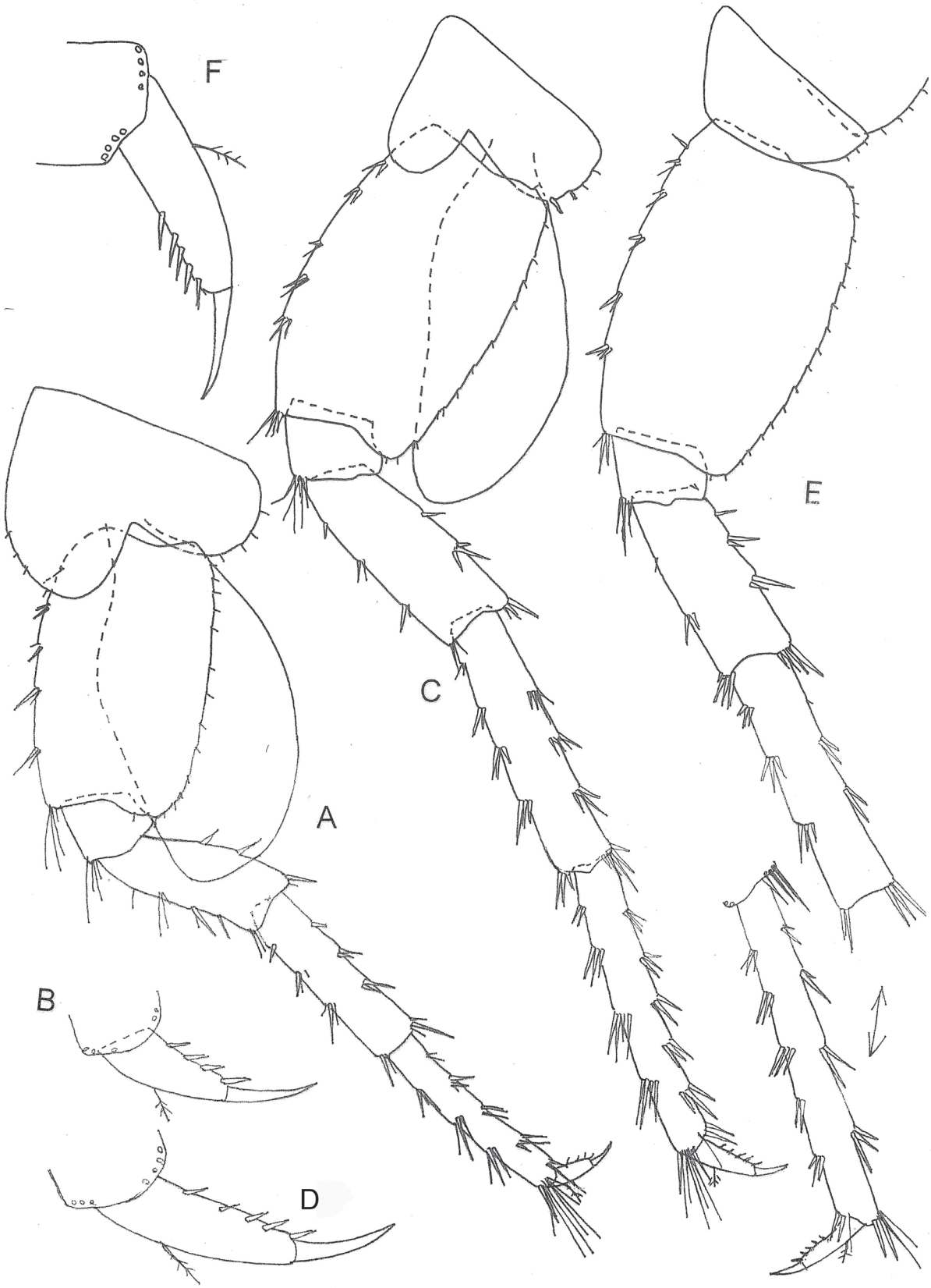

Fig. 8. *Niphargus cismontanus* Margalef 1952, 11 km W of Dima, Vizcaya, Spain, female 15.2 mm in length: **A-B**= pereopod 5; **C-D** = pereopod 6; **E-F** = pereopod 7.

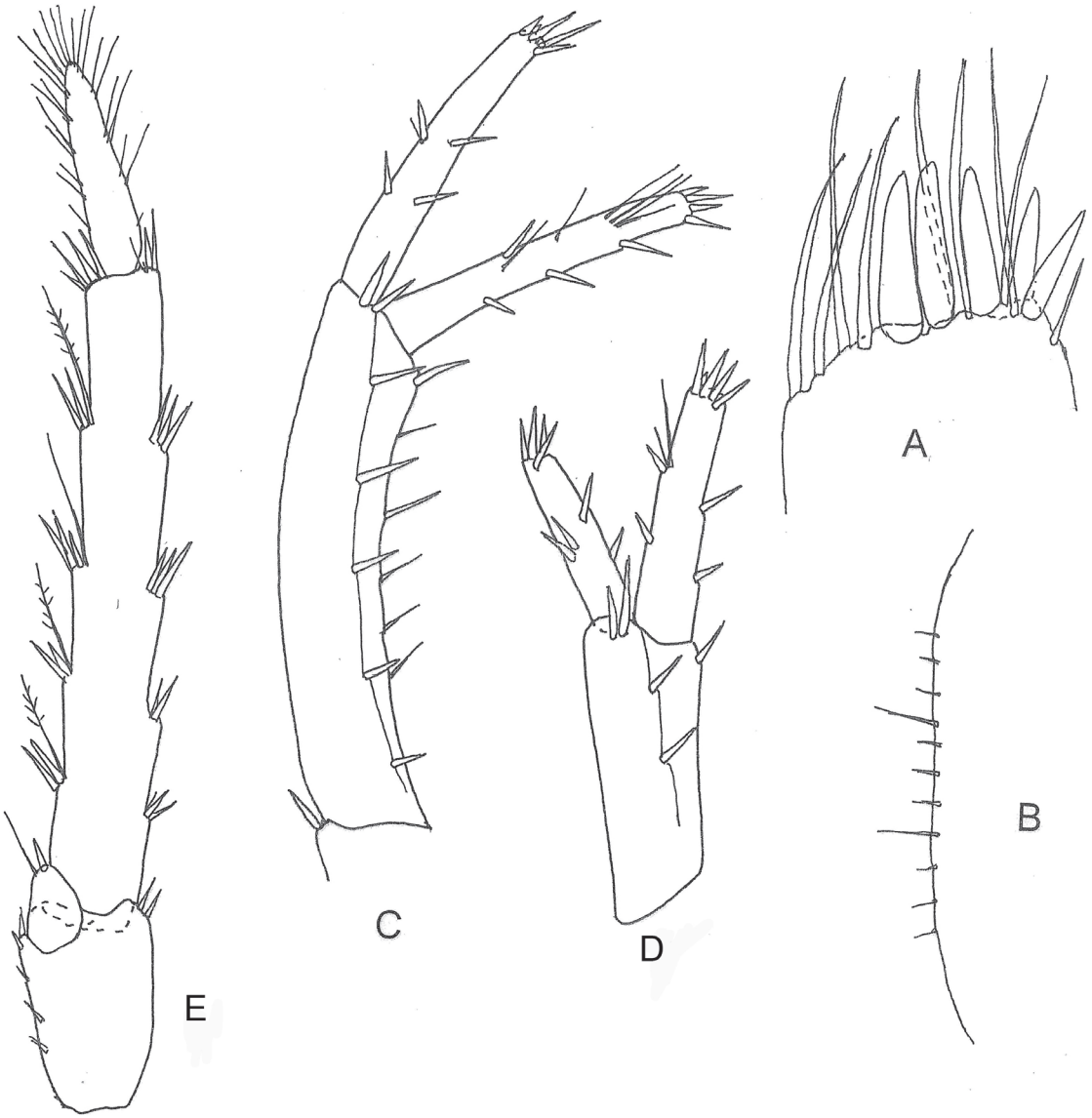

Fig. 9. *Niphargus cismontanus* Margalef 1952, 11 km W of Dima, Vizcaya, Spain, female 15.2 mm in length: **A** = maxilliped inner plate; **B** = distoposterior margin of mesosomal segment 3; **C** = uropod 1; **D** = uropod 2; **E** = uropod 3.

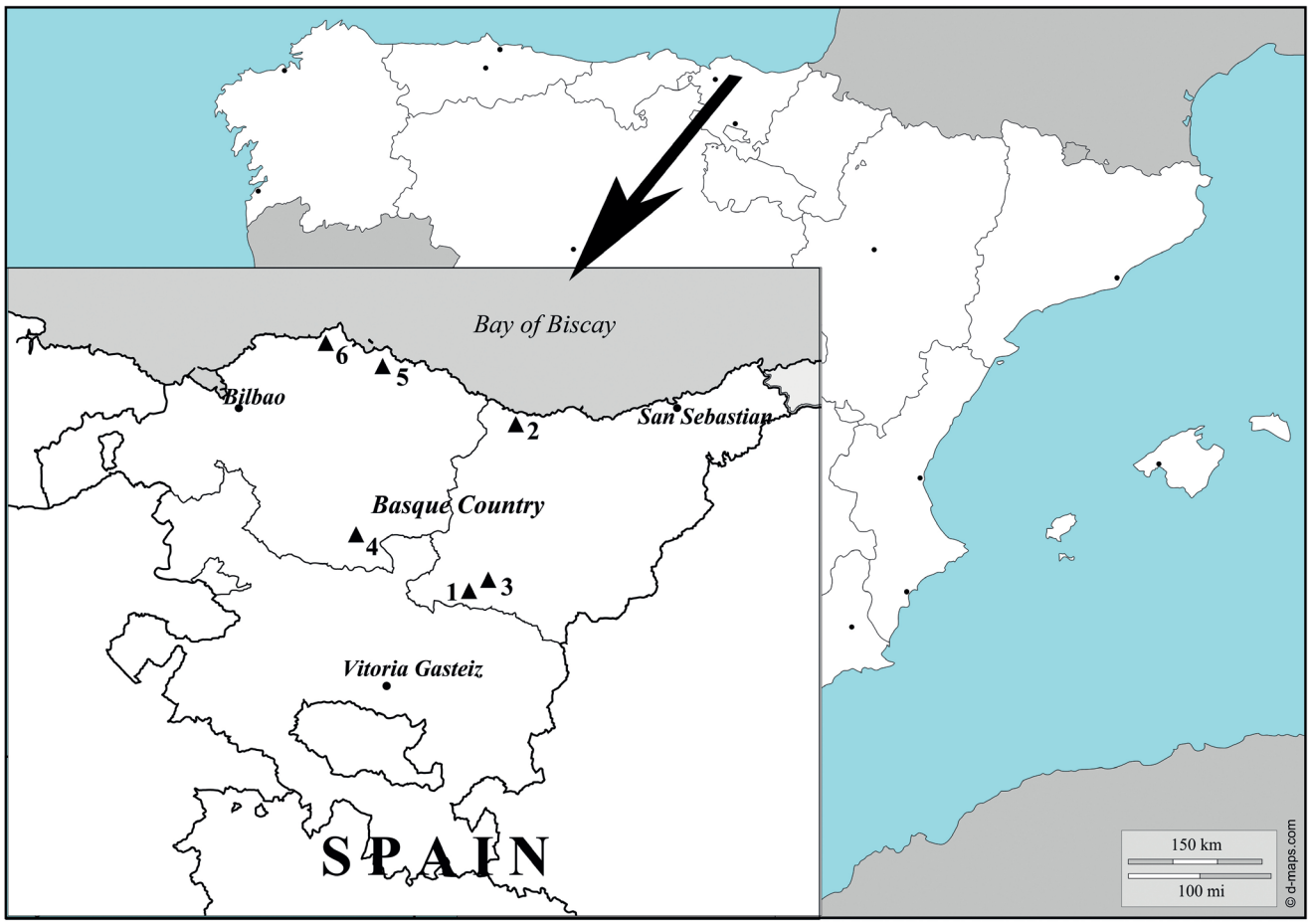

Fig. 10. Map of localities of *Niphargus cismontanus* Margalef 1952 [Spain, Pais Vasco]: 1 = cueva de Guesaltza (= Gesaltza) Cave; 2 = Goenaga`ko leizia (road Itziar-Deba); 3 = Berezano, Onate; 4 = road Dima-Ochandiario (?Otxandio); 5 = Rio Lago; 6 = Bakio. (Original map of Spain: http://d-maps.com/m/europa/spain/espagne/espagne43.pdf)

REFERENCES

Balazuc J. 1954. Les amphipodes troglobies et phreatobies de la faune Gallo-Rhénane. dArchives de Zoologie Expérimentale et Générale. 91(1):153–193.

Barnard JL, Barnard CM. 1983. Freshwater amphipods of the World. I. Evolutionary patterns. II. Handbook and bibliography. Mt. Vernon (Virginia): Hayfield Associates.

Chevreux E. 1906. *Niphargus ciliatus* n. sp. In: Peyerimhoff, P: Recherches sur la faune cavernicole des Basses-Alpes. Annales de la Société entomologique de France. 75:203–222.

Chevreux E, Fage L. 1925. Amphipodes. Faune de France. 9:1–488.

Ginet R. 1988. Description d`une neotype et choix d`une nouvelle localite-type pour le crustace stygobie. *Niphargus ciliatus* Chevreux 1906 (Amphipode). Bulletin mensuel de la Société linnéenne de Lyon 57(7):215–231.

Ginet R. 1991. Bilan systematique du genre *Niphargus* en France. Biologie Animale et Ecologie, Laboratoire d`Hydrobiologie et Ecologie Souterraines. Universite Claude-Bernard Lyon. p. 1–26.

Ginet R. 1996. Bilan systematique du genre *Niphargus* en France. Especes répertoriées jusqu`en 1990 dans les eaux souterraines de la France. Universite Claude-Bernard Lyon-I. p. 1–238 (realisation: Florian Mallard, 1991, complete 1995). Societé linnéenne de Lyon, Lyon.

Karaman G. 1969. XXVII. Beitrag zur Kenntnis der Amphipoden. Arten der Genera *Echinogammarus* Stebb. und *Chaetogammarus* Mart. an der jugoslawischer Adriaküste. Glasnik Republičkog zavoda za zaštitu prirode i Prirodnjačke zbirke u Titogradu. 2:59–84.

Karaman G. 2007. New species *Niphargus religiosus*, sp. n. (Fam. Niphargidae), with remarks to *Amathillina cristata* G.O. Sars, 1894 (Fam. Gammaridae) in Turkey (Contribution to the Knowledge of the Amphipoda 257). Agriculture and Forestry, Podgorica. 53(1-4):49–76.

Karaman G. 2012a. Further investigations of the subterranean genus *Niphargus* Schiödte, 1849 (fam. Niphargidae) in Serbia (Contribution to the Knowledge of the Amphipoda 264). Agriculture and Forestry, Podgorica. 58(2):45–64.

Karaman G. 2012b. Investigations on two subterranean species of the family Niphargidae (Gammaridea) from Serbia, *Niphargus remyi* S. Kar. 1934 and *N. euserbicus*, sp. n. (Contribution to the Knowledge of the Amphipoda 266). Agriculture and Forestry, Podgorica. 58(3):63–95.

Karaman G. 2015. Two new members of the family Niphargidae (Gammaridea) from Spain (Contribution to the Knowledge of the Amphipoda 281). Biologia Serbica. 15(1–2):3-21.

Karaman G. 2016. One new member of the subterranean family Niphargidae from Spain, *Niphargus spiritus*, sp. n. (Contribution to the Knowledge of the Amphipoda 291). Agriculture and Forestry, Podgorica. 62(2):37–58.

Karaman G, Ruffo S. 1986. Amphipoda: *Niphargus*-Group (Niphargidae sensu Bousfield, 1982). In: Botosaneanu L, editor. Stygofauna Mundi, A Faunistic, Distributional, and Ecological Synthesis of the World Fauna inhabiting Subterranean Waters (including the Marine Interstitial), Leiden: E. J. Brill/ Dr. W. Backhuys. p. 514–534.

Karaman S. 1934. VI. Beitrag zur Kenntnis jugoslawischer Süsswasseramphipoden.- Zoologischer Anzeiger, Leipzig. 107(11/12):325-333.

Karaman S. 1954. Die Niphargiden des slovenischen Karstes, Istriens sowie des benachb. Italiens.- Acta, Musei Macedonici Sceintiarum Naturalium, Skopje. 2(8):159–180.

Margalef R. 1952. La vida en las aguas dulces de los alrededores del Santuario de Nuestra Senora de Aranzazu (Guipuzcoa). Munibe, San Sebastian. p. 1–36.

Margalef R. 1953. Los Crustaceos de las aguas continentales ibericas- Biologia de los aguas continentales. Instituto forestal de investigaciones y experiences, Madrid. 10:1–243.

Margalef R. 1970. Anfipodos recolectados en aguas subterraneas Pais Vasco. Munibe (San Sebastian), Sociedad de Ciencias Naturales Aranzadi. 22(3-4):169–174.

Notenboom J. 1990. Introduction to Iberian groundwater amphipods. - Limnetica, 6: 165–176.

Ruffo S. 1954. Anfipodi di acque interstiziali raccolti dal Dr C. Delamare Deboutteville in Francia, Spagna e Algeria (Studi sui crostacei anfipodi XXXIX). Vie et Milieu. 4 (4):669–681.

Schellenberg A. 1935. Schlüssel der Amphipodengattung *Niphargus* mit Fundortangaben und mehreren neuen Formen. Zoologischer Anzeiger. 111(7-8):204–211.