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A NEW TROGLOBIOTIC SPECIES, *ALPIONISCUS (ILLYRIONETHES) IAPODICUS* N. SP. (CRUSTACEA: ONISCIDEA: TRICHONISCIDAE), FROM LIKA REGION, CROATIA

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Bedek, J., Horvatović, M. & Karaman, I. M.: A new troglobiotic species, *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. (Crustacea: Oniscidea: Trichoniscidae), from Lika region, Croatia. Nat. Croat., Vol. 26, No. 2, 205-214, 2017, Zagreb.

Alpioniscus (*Illyrionethes*) *iapodicus* n. sp. is described and illustrated. Representing the 14th nominal species of the subgenus *Illyrionethes* from the Dinaric karst, it is a troglobiotic species collected from the caves in the central part of the Lika region, Croatia. The new species belongs to the *strasseri* group. Morphological characters differentiating *A. iapodicus* from other *strasseri* group representatives are discussed.

Key words: Dinaric karst, Lika region, new species, *Alpioniscus*, Isopoda, terrestrial, Trichoniscidae, troglobiotic

Bedek, J., Horvatović, M. & Karaman, I. M.: Nova troglobiontska vrsta *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. (Crustacea: Oniscidea: Trichoniscidae) iz Like (Hrvatska). Nat. Croat., Vol. 26, No. 2, 205-214, 2017, Zagreb.

U radu se opisuje i ilustrira nova vrsta *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. Radi se o troglobiontnoj vrsti prikupljenoj u špiljama središnjeg dijela Like, i predstavlja četrnaestu nominalnu vrstu podroda *Illyrionethes* iz Dinarskog krša. Nova vrsta pripada grupi *strasseri*. Raspravlja se o morfološkim obilježjima koji razlikuju *A. iapodicus* od ostalih predstavnika te grupe.

Ključne riječi: Dinarski krš, Lika, nova vrsta, *Alpioniscus*, Isopoda, kopneni, Trichoniscidae, troglobiont

INTRODUCTION

The genus *Alpioniscus* includes two subgenera: *Alpioniscus* Racovitza, 1908, with 14 species, and *Illyrionethes* Verhoeff, 1927, with 16 species (Schmalfuss, 2003; Taiti & Argano, 2009; Andreev, 2013a,b). Both subgenera have disjunct ranges, and are distributed across karstic regions in the south of Europe. In all, 13 nominal species of the subgenus *Illyrionethes* have been recognized in the Dinaric Karst (Schmalfuss, 2003; Bedek *et al*., 2011), while 11 putative species remain undescribed (Bedek & Taiti, 2011; Horvatović, 2014). All *Illyrionethes* species from the Dinaric karst are troglobionts. The new species was collected in 14 localities, underground caves, in the central part of the Lika region, Croatia; 11 of them are known today (Fig. 1). In the type locality, the cave Markov ponor, Lipovo polje, Donji Kosinj, Croatia, it was collected in the most distant channel, referred to as Kanal krivih brojeva (Channel of the wrong numbers) (Bakšić, 2008).

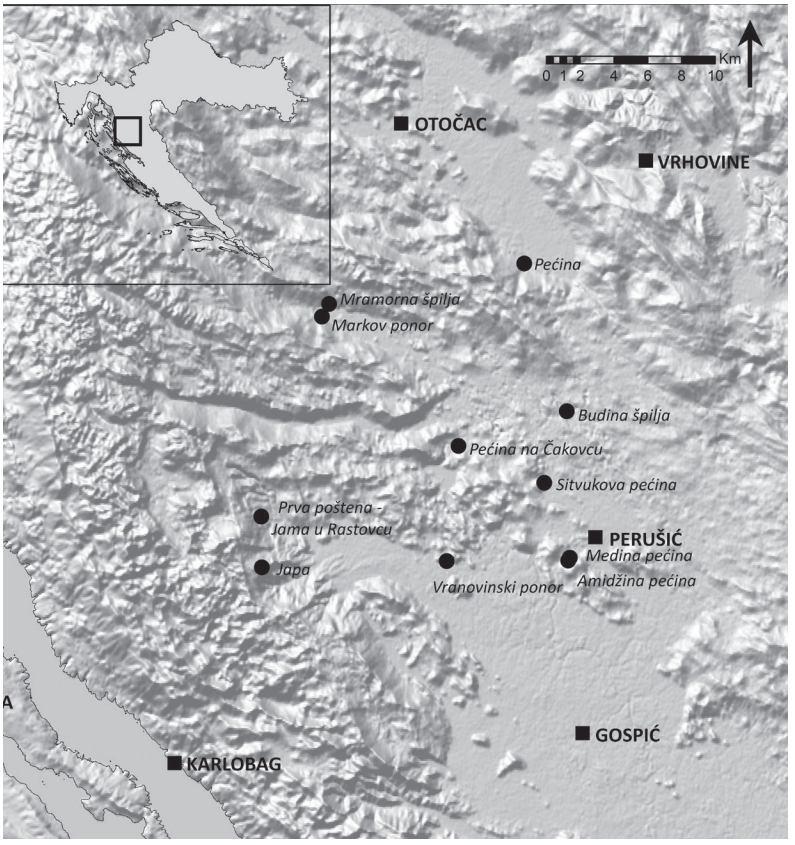

Fig. 1. Distribution of *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. (black circles).

MATERIAL AND METHODS

Specimens were hand collected with tweezers, fixed and stored in 75% ethanol with glycerol or 96% ethanol. Several specimens were dissected, and mounted for micropreparations in Hoyer's medium. Identifications are based on morphological characters indicated in the original descriptions. Specimens were examined under a Zeiss Stemi 2000-C and a Zeiss Primo Star microscope (Carl Zeiss, Jena, Germany). The micropreparations were photographed using Canon EOS 40D and EOS Utility software (Canon, Tokyo, Japan). The drawings were made based on the photographs, using CorelDRAW X8 (Corel Corporation, Ottawa, Canada). The examined material, species diagnosis and description, etymology and remarks are given. Terminology used in species description is mainly based on Vandel (1960, 1962). The locality coordinates are in the WGS84 coordinate system. The map was drawn using ArcMap 10.1 software and related basemap.

Abbreviations:

CBSSC	Croatian Biospeleological Society Collection, Zagreb, Croatia
CCC	Cave Cadastre of the Republic of Croatia, hosted by Croatian Agency for the Environment and Nature, Zagreb, Croatia (Croatian Agency for the Environment and Nature, 2017a)
CNHM	Croatian Natural History Museum, Crustacea Collection, Zagreb, Croatia
MZUF	Museo di Storia Naturale dell'Università di Firenze, Sezione di Zoologia La Specola, Florence, Italy

SMNS Staatliches Museum für Naturkunde Stuttgart, Isopod Collection, Stuttgart, Germany

ZZDBE Zoological Collection of Department of Biology and Ecology, Faculty of Sciences, University of Novi Sad, Novi Sad, Serbia

TAXONOMY

Trichoniscidae

Trichoniscinae

Genus *Alpioniscus* Racovitza, 1908

Subgenus *Illyrionethes* Verhoeff, 1927

Alpioniscus iapodicus n. sp.

Synonymy: *Alpioniscus* (*Illyrionethes*) n. sp. 4: Horvatović, 2014, partim.

Type material. Holotype ♂ Croatia, Lika, Donji Kosinj, Lipovo polje, Markov ponor (CCC No. HR01480), 44,7653017089 °N, 15,1771778411 °E, 19.X.2011, leg. J. Bedek (CBSSC IT4109).

Paratypes: 6 ♂♂, 2 ♀♀, 2 juv. ibid. (CBSSC IT2479); 4 ♂♂, 4 ♀♀ ibid. (ZZDBE 1142); 2 ♂♂, 2 ♀♀ ibid. (MZUF 9763); ♂, ♀ Croatia, Lika, Ličko Lešće, Pećina, 44,7952856754 °N, 15,3279411137 °E, 22.IX.2005 leg. M. Pavlek (CBSSC IT3344); 1 juv. ibid. 7.II.2008 leg. R. Ozimec (CBSSC IT3347); ♂ Croatia, Lika, Donji Kosinj, Lipovo polje, Petranović Draga, Mramorna špilja, 44,772160231 °N, 15,1823031537 °E*, 30.V.1999 leg. R. Ozimec (CBSSC IT3367); ♂, 2 ♀♀ Croatia, Lika, Perušić, Studenci, Milkovići, Budina špilja (CCC No. HR01195), 44,716915063 °N, 15,3613735717° E, 24.VII.2007 leg. M. Pavlek (CBSSC IT3373); 2 ♂♂, ♀, 1 juv. ibid. 29.I.2011 leg. L. Đud (CBSSC IT3843); ♀ ibid. leg. H. Bilandžija (CBSSC IT3848); 2 juv. ibid. leg. P. Bregović (CBSSC IT3846); 2 ♂♂, ♀ ibid. 11.VI.2011 leg. B. Jalžić (CBSSC IT3374); 3 ♂♂, 1 juv. Croatia, Lika, Donji Kosinj, Mlakva, Javorinske drage, Pećina na Čakovcu (CCC No. HR01706) 44,6975593882 °N, 15,2808266387 °E, 2.V.2015 leg. B. Jalžić (CBSSC IT3765); 3 ♂♂, ♀ Croatia, Lika, Perušić, Sitvuki, Sitvukova pećina, 44,6786713198 °N, 15,3453423752 °E, 8.VIII.2014 leg. J. Bedek (CBSSC IT3383); ♂, ♀ Croatia, Lika, Perušić, Velika Plana, Rastovac, Prva poštena - Jama u Rastovcu (CCC No. HR00953), 44,6582649068 °N, 15,1343931909 °E, 2.VIII.2015 leg. D. Basara (CBSSC IT3921); ♀ Croatia, Lika, Perušić, Grabovača, Medina pećina, 44,6389475032 °N, 15,3651981516 °E, 14.VIII.1902, leg. A. Langhoffer (CNHM 653); 2 ♂♂, ♀, 2 juv. ibid. 30.XII.2011, leg. J. Bedek, M. Lukić (CBSSC IT2545); ♀ ibid. 12.V.2014, leg. K. Cindrić (CBSSC IT3381); ♀ ibid. 16.V.2014, leg. J. Bedek (CBSSC IT3907); 1 juv. ibid. 17.V.2014, leg. L. Kekelj (CBSSC IT3382); 3 ♂♂, 4 ♀♀, 4 juv. Croatia, Lika, Perušić, Grabovača, Amidžina pećina, 44,6373404989 °N, 15,3639653667 °E, 30.XII.2011, leg. J. Bedek, M. Lukić (CBSSC IT2546); ♀ ibid. 10.VI.2012 leg. J. Bedek (CBSSC IT3849); ♀ ibid. leg. L. Deharveng, A. Beddos (CBSSC IT3850); 1 juv. ibid. leg. L. Kekelj (CBSSC IT3378); ♂ Croatia, Lika, Pazarište, Vranovine, Vranovinski ponor (CCC No. HR00490) 44,6361639727 °N, 15,2731928977 °E, 16.VII.1967 leg. Deeleman (SMNS 5276); 2 ♂♂ Croatia, Velebit, Pazarište, Japage, špilja Japa (CCC No. HR00344), 44,6312734108 °N, 15,1354392714 °E, 14.VIII.2006, leg. J. Bedek (CBSSC IT544); 3 ♂♂, 2 ♀♀ Croatia, Lika, Gospić, Mušaluk, Pećina pri mušalučkom donjem selu (a cave unknown at present), 12.IX.1964 leg. E. Pretner (ZZDBE 0899); ♂, ♀ Croatia, Lika, Gospić, Klanac, Grčka pećina (a cave unknown at present), 17.VII.1963 leg. Deeleman (SMNS 5344); ♂, 7 ♀♀ Croatia, Lika, Pazarište, Mlakva, Mlakvena greda (a cave unknown at present), 9.VII.1965 leg. Deeleman (SMNS 5295).

Other material (for DNA analyses): 2 ♂♂, 4 ♀♀, 1 juv. Croatia, Lika, Donji Kosinj, Lipovo polje, Markov ponor (CCC No. HR01480), 44,7653017089 °N, 15,1771778411 °E, 19.X.2011, leg. J. Bedek (CBSSC IT4113); ♂, 2 ♀♀ ibid. leg. M. Lukić (CBSSC IT2601); ♀ Croatia, Lika, Ličko Lešće, Pećina, 24.VI.2011 leg. M. Lukić (CBSSC IT3338); ♂, 3 ♀♀, 3 juv. Croatia, Lika, Perušić, Studenci, Milkovići, Budina špilja (CCC No. HR01195), 44,716915063 °N, 15,3613735717° E, 11.VI.2011, leg. N. Raguž (CBSSC IT3371); 1 juv. Croatia, Lika, Perušić, Sitvuki, Sitvukova pećina, 44,6786713198 °N, 15,3453423752 °E, 8.VIII.2014, leg. K. Cindrić (CBSSC IT3384); ♀ Croatia, Lika, Perušić, Grabovača, Medina pećina, 44,6389475032 °N, 15,3651981516 °E, 8.VIII.2014, leg. T. Dražina (CBSSC IT3380); ♀ Croatia, Lika, Perušić, Grabovača, Amidžina pećina, 44,6373404989 °N, 15,3639653667 °E, 11.V.2014 leg. K. Cindrić (CBSSC IT3379).

*Coordinates from Croatian Agency for the Environment and Nature (2017b).

Diagnosis. A medium-sized species characterized by a wide and terminally broadly rounded exopod of male pleopod 1, and outer margin deeply concave at about half of its length; male pereopod 7 merus with a caudal hook-shaped lobe on its proximal part, and pronounced hump on carpus dorsal margin; male pleopod 2 endopod with a short bifid terminal seta; antennal flagellum with up to 10 articles; antennula with up to seven aesthetascs.

Description. Maximum body length: ♂, 6.9 mm; ♀, 8.5 mm. Body (Fig. 2) depigmented, dorsal surface smooth. *Cephalon* (Fig. 3A) eyes absent, suprantennal line bent downwards, antennal lobes quadrangular with a central depression. *Pereon* with almost parallel sides, tergites smooth with scattered flask-shaped scale-sensilla (Fig. 3B). Posterior margin of pereonite 1 convex, of pereonites 2 and 3 straight, and of pereonites 4–7 progressively more concave. *Pleon* narrower than pereon, numerous gland pores laterally on pleonites 4 and 5. Pleonites 3–5 with small posterior points visible in dorsal view (Fig. 3C). *Telson* median distal part with concave sides and broadly rounded apex and lateral gland pores (Fig. 3C). *Antennula* (Fig. 3D) of three articles; first article longer than second and third; third article flattened and bearing up to seven aesthetascs on the apical margin. *Antenna* (Fig. 3E) with fifth article as long as flagellum; flagellum with up to 10 articles, with one row of aesthetascs on the second, third and sometimes fourth, fifth, sixth, seventh and eighth article. *Right mandible* with one penicil, lacinia mobilis toothed, pars molaris oval in shape with one penicil (Fig. 4A). *Left mandible* with three penicils, pars molaris oval in shape without penicils (Fig. 4B). *Maxillula* outer branch with 5+6 teeth, apically entire, and two slender stems; inner branch with three penicils, outer and middle ones subequal, inner one distinctly longer (Fig. 4C). *Maxilla* with setose and bilobate apex, inner lobe smaller (Fig. 4D). *Maxilliped* endite narrow, with a large and segmented apical penicil; palp distally with three rou-

Fig. 2. *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. *in situ* in Croatia, Lika, Perušić, Grabovača, Medina pećina (photo J. Bedek).

nded lobes and one setose setae on outer margin; basal article with two compound small setae; basis with a rounded outer lobe protruding posteriorly and a margin covered with long setae (Fig. 4E). *Pereopods* with an ungual seta and a large, bifid and setose dactylar seta (Fig. 5A). *Uropod* (Fig. 3C) with protopod and endopod slightly grooved on outer margin; endopod distinctly shorter than exopod, more proximally inserted. Numerous gland pores on protopod lateral margin.

Male: *Pereopod 1–4* (Fig. 5A) similar in shape, with carpus and merus bearing numerous short scales on rostral surface. *Pereopod 7* (Fig. 5B–C) ischium with straight sternal margin; merus with concave sternal margin and a setose caudal hook-shaped lobe in the proximal part bearing one seta; carpus dorsal margin with a pronounced hump in it's medial part. *Genital papilla* (Fig. 6A) simple, with a

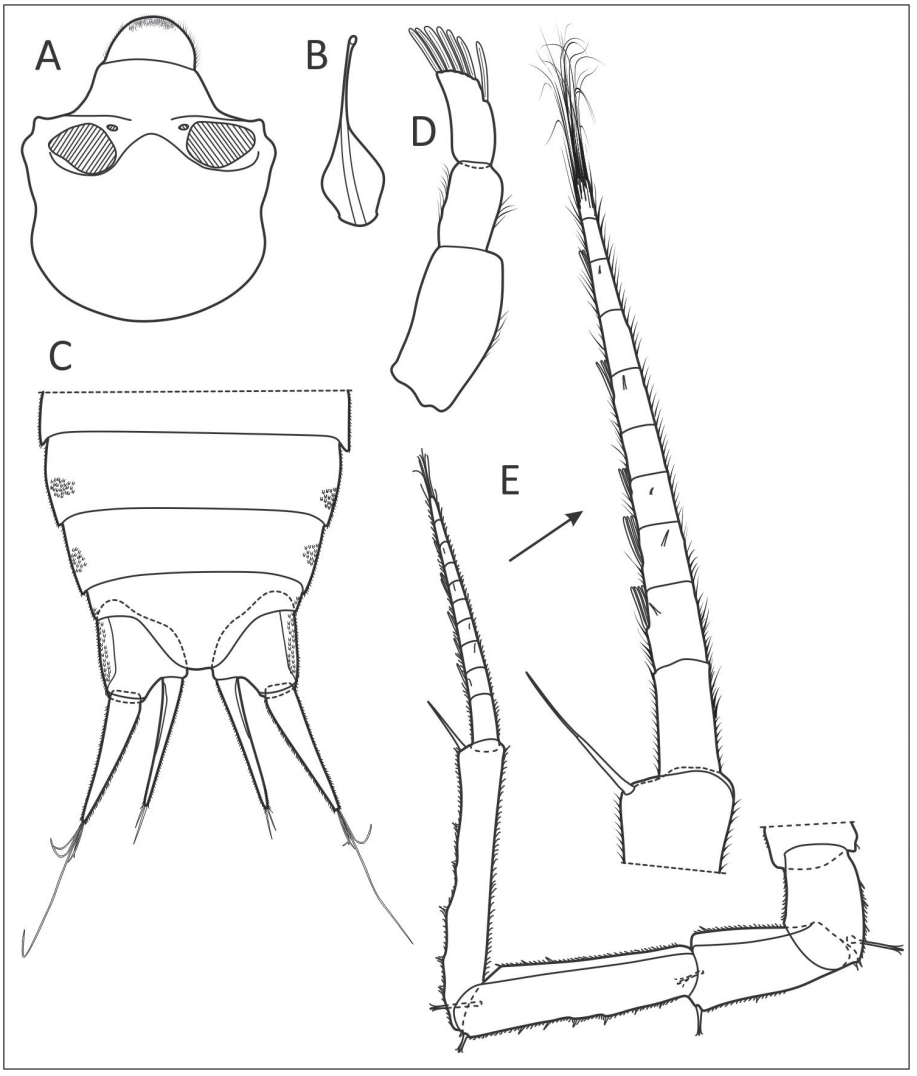

Fig. 3. *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. paratype ♀: A, cephalon; paratype ♂: B, dorsal scale-sensilla; C, pleonites 4, 5, telson and uropods; D, antennula; E, antenna.

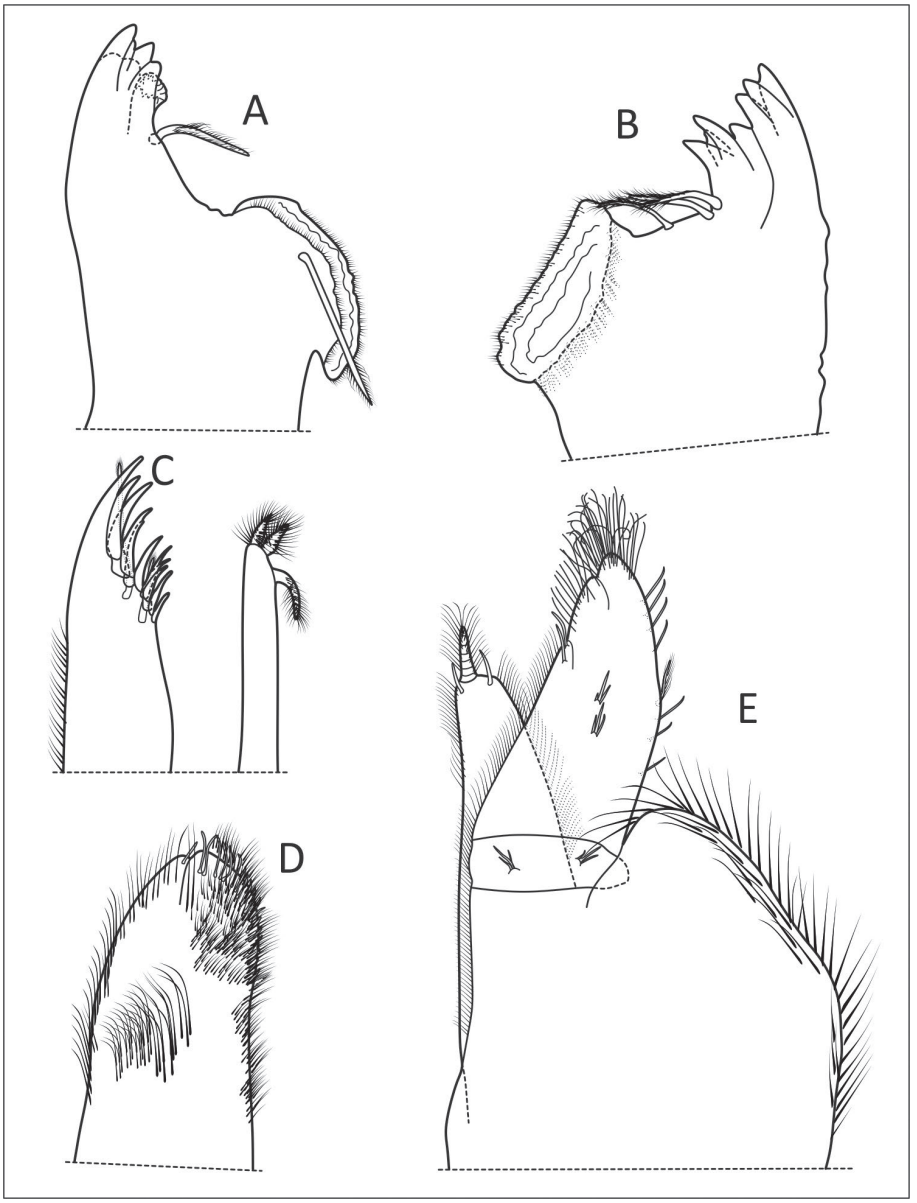

Fig. 4. *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. paratype ♂: A, right mandible; B, left mandible; C, maxillula; D, maxilla; E, maxilliped.

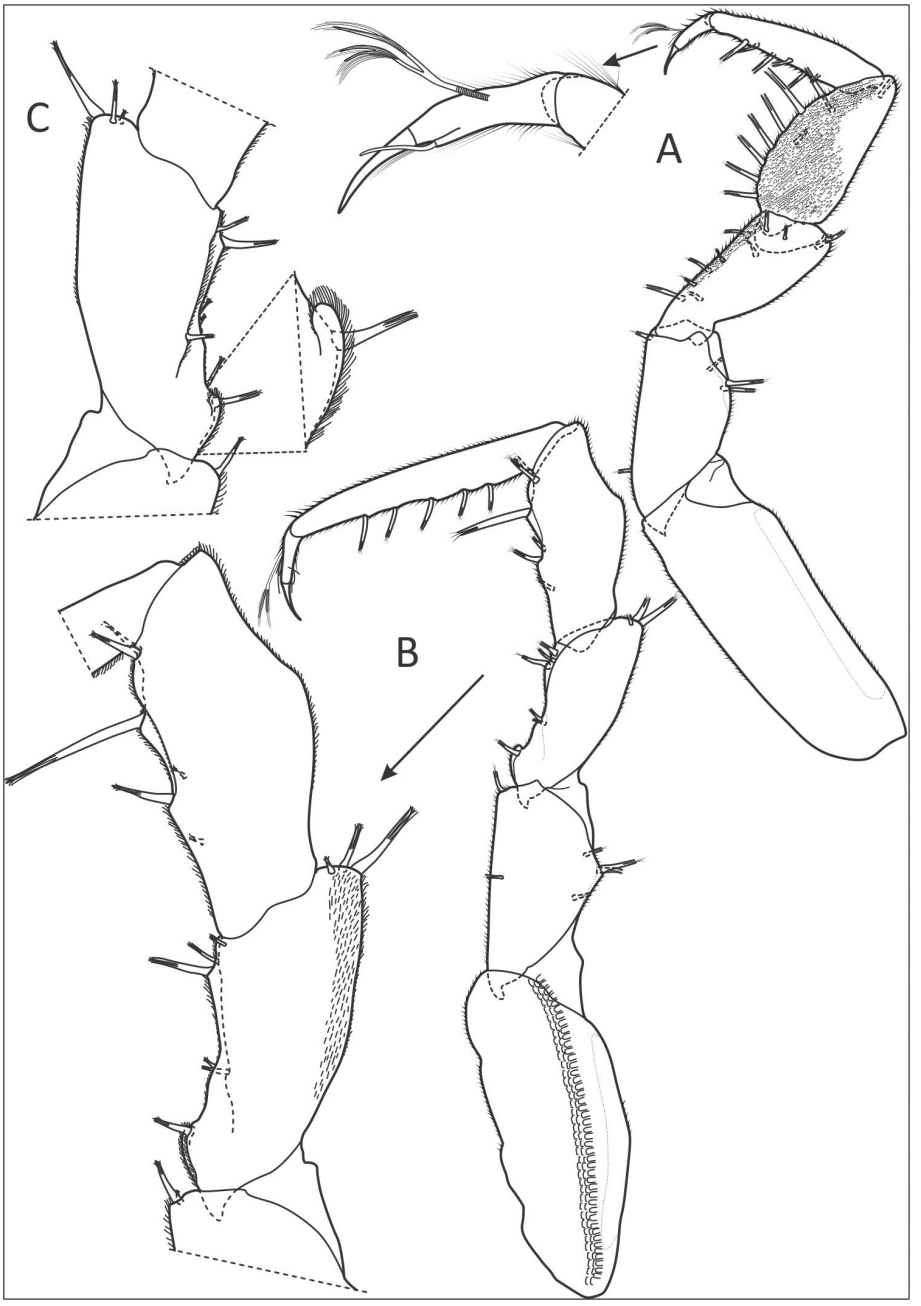

Fig. 5. *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. paratype ♂: A, pereiopod 1; B, pereiopod 7 rostral view with enlargement of merus and carpus; C, pereiopod 7 merus caudal view.

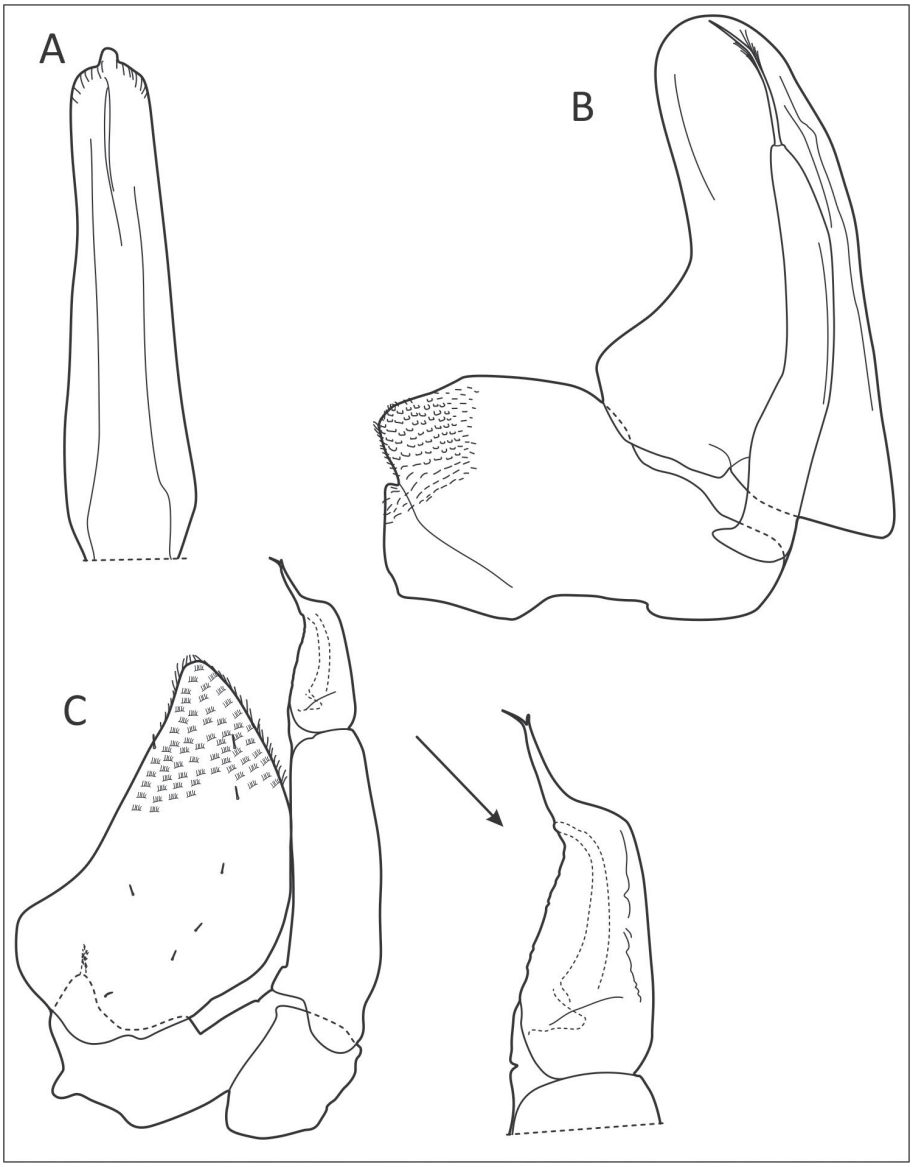

Fig. 6. *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. paratype ♂: A, genital papilla; B, pleopod 1; C, pleopod 2 with enlargement of endopod third article.

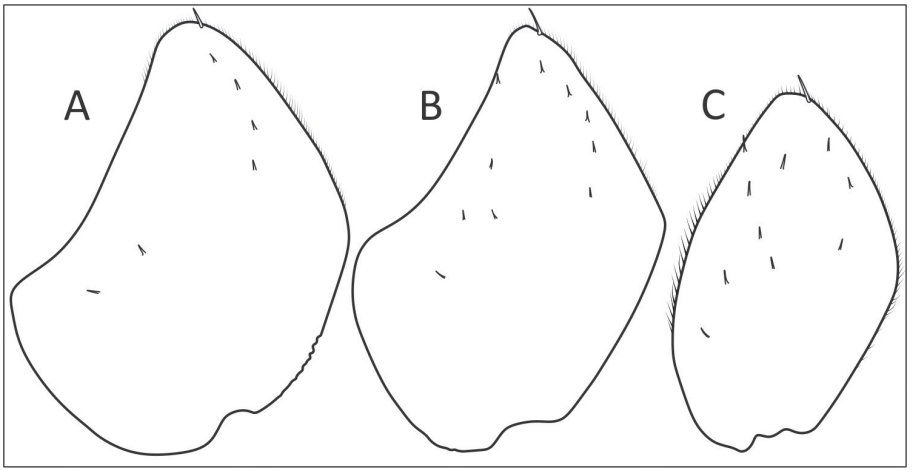

Fig. 7. *Alpioniscus* (*Illyrionethes*) *iapodicus* n. sp. paratype ♂: A, pleopod 3 exopod; B, pleopod 4 exopod; C, pleopod 5 exopod.

rounded apical part. *Pleopod 1* (Fig. 6B) exopod wide, terminally broadly rounded, somewhat less than 3 times as long as wide in its medial part, deeply concave outer margin; endopod narrow with almost parallel sides, armed with a long apical seta. *Pleopod 2* (Fig. 6C) exopod triangular with convex outer margin; endopod of three articles, slightly longer than exopod, third article about three times shorter than second with a strong bifid terminal point. *Pleopod 3-5* exopods as in Fig. 7A-C.

Etymology. The new species is named after the Iapydes (Lat. Iapodes; Hr. Japodi), an ancient tribe inhabiting the montane areas of the Northern Dinaric karst, including the Lika, Kordun and Pounje regions.

Remarks.

Alpioniscus iapodicus n. sp. belongs to the *strasseri* group, which comprises *A. strasseri* (Verhoeff, 1927), *A. balthasari* (Frankenberger, 1937), *A. christiani* Potočnik, 1983 and *A. absoloni* (Strouhal, 1939) (sensu Bedek & Taiti, 2011). It shows closest affinities with *A. balthasari*, widely distributed in Dalmatia, up to the eastern part of Mt Velebit to the northwest and Tomislavgrad in Hercegovina to the east (Bedek *et al*., 2011). Upwards to the north it is replaced by *A. iapodicus* n. sp., clearly differing from the other species of the *strasseri*-group by the: I) position of the hook-shaped lobe of the male merus 7: on the inner side (*A. iapodicus*) *vs*. ventrally positioned (all other *strasseri* group representatives), II) carpus 7 dorsal hump placed in its medial part (*A. iapodicus*) *vs.* proximally positioned (all other *strasseri* group representatives), and III) pleopod 1 exopod proximally wide (*A. iapodicus*) *vs.* narrow (all other *strasseri* group representatives) (Arcangeli, 1932; Buturović, 1955; 1957; Frankenberger, 1937; Kesselyák, 1930; Horvatović, 2014; Potočnik, 1983; Strouhal, 1938; 1939a; 1939b; Verhoeff, 1927).

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