

IDENTIFICATION KEY TO THE CAVERNICOLOUS ONISCIDEA OF ROMANIA

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Abstract. The authors provide an identification key for the 35 species of cavernicolous Oniscidea recorded from the caves of Romania.

Key words: Oniscidea, identification key, Romanian caves.

1. INTRODUCTION

There is an almost unanimous agreement today about the monophyly of the Oniscidea (TABACARU, 2002; SCHMIDT, 2008), regarded either as a suborder or as an order depending if the Isopoda is considered as order or as a superorder (WATLING, 1983; see TABACARU & DANIELOPOL, 2011, 2012). However, there are different opinions regarding the classification inside the group.

Certain authors see the division Infraorder Tylomorpha (Tylidae) – Infraorder Ligiamorpha (all Oniscidea except the Tylidae) as the first dichotomy inside the Oniscidea. Other authors, following the classification of ERHARD (1998) consider the division Diplocheta (Ligiidae) – Holoverticata (all Oniscidea except the Ligiidae) as the first dichotomy within the Oniscidea.

In our opinion, Tylomorpha was the first to split from the ancestors of the Oniscidea and has kept the primitive character of distinct coxal plates but it has also differentiated numerous own characters; as consequences there are many differential characters between the two lineages:

Tylomorpha Vandel, 1943

1. Coxal plates clearly distinct from tergites;
2. Male genital papillae absent;
3. Rudimentary pleopode 1 at both sexes;
4. Exopodites of pleopods 2-5 with respiratory organs with ventral stigma;
5. The presence of a septum separating the pleopods from the anal region;
6. Ventrally placed uropods, forming opercula closing, along with the septum, the anal region;
7. Incubatory (brood) pouch prolonged by an internal sack;
8. Reduction of the antennule to one article.

Ligiamorpha Vandel, 1943

1. Coxal plates fused to the tergites;

2. Male genital papillae (two or one) always present;
3. Pleopode 1 well developed, at least in the male;
4. Pleopods without respiratory organs with ventral stigma;
5. Absence of septum separating the pleopods from the anal region;
6. Uropods are not ventrally placed and do not form opercula to close the anal region;
7. Incubatory (brood) pouch without internal sack;
8. Antennulae formed by two or three articles.

All the Oniscidea found in caves belong to the Infraorder Ligiamorpha.

In general, we may say there is an agreement regarding the monophyly of the group Microcheta+Synocheta+Crinocheta, a group named Orthogonopoda Tabacaru & Danielopol, 1996. The group is supported especially by the conformation of the endopodite of pleopode 2, namely the endopodite of pleopode 2 male with a perpendicular articulation on the basipodite and without an angle between the basal and the second article (TABACARU, 1994; ERHARD, 1995; TABACARU & DANIELOPOL, 1996). The Infraorder Ligiamorpha includes Super-section Diplocheta Vandel, 1957 (Ligiidae) representing the primitive sister-group and the Super-section Orthogonopoda, the evolved sister-group.

Within the Orthogonopoda, there are different opinions concerning the position of the Section Microcheta (Mesoniscidae). Some authors regard the Microcheta as the sister-group of Euniscoidea (Synocheta + Crinocheta). Other authors consider the Mesoniscidae as close to Synocheta and divide the Orthogonopoda in this way: Microcheta + Synocheta as the sister-group of Crinocheta.

We note that Vandel himself (the author of the taxa Euniscoidea Vandel, 1943) regards the Mesoniscidae as closer to Synocheta (VANDEL, 1957). Within Vandel's classification, the name Euniscoidea represents not a monophyletic group but a certain level of the genital papillae, independently evolved at Crinocheta and Synocheta.

The following classification is used in our paper:

Order Isopoda Latreille, 1817

Sub-order Oniscidea 1802

Infra-order Tylomorpha Vandel, 1943

Infra-order Ligiamorpha Vandel, 1943

Super-section Diplocheta Vandel, 1957

Family Ligiidae Leach, 1814

Genus *Ligidium* Brandt. 1833

Super-section Orthogonopoda Tabacaru & Danielopol, 1996

Section Microcheta Schmalfuss, 1989

Family Mesoniscidae Verhoeff, 1908

Genus *Mesoniscus* Carl, 1906

- Section Synocheta Legrand, 1946
- Family Trichoniscidae G. O. Sars, 1899
 - Sub-family Trichoniscinae G. O. Sars, 1899
 - Genus *Trichoniscus* Brandt, 1833
 - Genus *Hyloniscus* Verhoeff, 1908
 - Genus *Androniscus* Verhoeff, 1908
 - Genus *Stylohylea* Verhoeff, 1930
 - Genus *Caucasonethes* Verhoeff, 1932
 - Genus *Biharoniscus* Tabacaru, 1963
 - Sub-family Haplophthalminae Verhoeff, 1908
 - Genus *Haplophthalmus* Schöbl, 1860
 - Genus *Monocyphoniscus* Strouhal, 1939
 - Genus *Banatoniscus* Tabacaru, 1991
 - Sub-family Thaumatoniscellinae Tabacaru, 1993
 - Genus *Thaumatoniscellus* Tabacaru, 1973
 - Family Buddelundiellidae Verhoeff, 1930
 - Genus *Buddelundiella* Silvestri, 1897
- Section Crinocheta Legrand, 1946
- Family Porcellionidae Barnard & Ratzeburg, 1831
 - Genus *Porcellionides* Miers, 1877
 - Genus *Leptotrichus* Budde-Lund, 1885
 - Family Armadillidiidae Brandt, 1833
 - Genus *Armadillidium* Brandt, 1833
 - Family Cylisticidae Verhoeff, 1949
 - Genus *Cylisticus* Schnitzler, 1853
 - Family Scleropactidae Verhoeff, 1838
 - Genus *Kithironiscus* Schmalfuss, 1995

2. IDENTIFICATION KEY TO THE CAVERNICOLOUS ONISCIDEA OF ROMANIA

1 (2) Cephalothorax with occipital furrow; antennae with rudimentary exopodite (squama); males with two genital papillae clearly distinct; endopodite of pleopode 2 male (Fig. 1A) with a right angle between the basal and the second article (Super-section **Diplocheta**, Family Ligiidae); uropods basipodite with an internal elongation supporting the endopodite (Fig. 1B) (Genus *Ligidium* Brandt, 1833); the endopodite of the uropods does not exceed in length the exopodite; smooth, shiny tegument; color marbled brown with yellowish-grey; big eyes, formed by a high number of ommatidia; length: 7-11 mm.....*Ligidium hypnorum* (Cuvier, 1792)

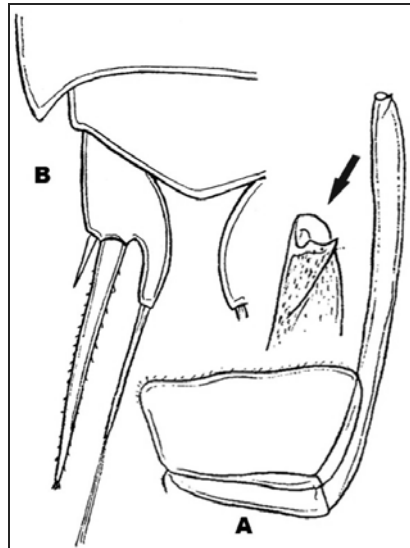


Fig. 1. *Ligidium hypnorum*: A. pleopode 2 male; B. uropods basipodite (after RADU, 1983 modified).

2 (1) Cephalothorax without occipital furrow; antennae without rudimentary exopodite (squama); genital papillae joined or fused in a sole apophysis; endopodite of pleopode 2 male with a perpendicular articulation on the basipodite but without an angle between the basal and the second article (Super-section **Orthogonopoda**).....3

3 (52) Mandibles with *pars molaris*; inner endite of the maxillule with three penicilli; pereopodes with simple claw; eyes, if present, made up by one or three ommatidia; antennal flagellum with weakly separated articles; a sole spermatophore resulting from the joining of the two spermatophores (Fig. 2) or by the fusion of the *vasa deferentia*; endopodite of pleopode 1 male without spermatid furrow; stomach with superomedianum (Monospermophora).....4

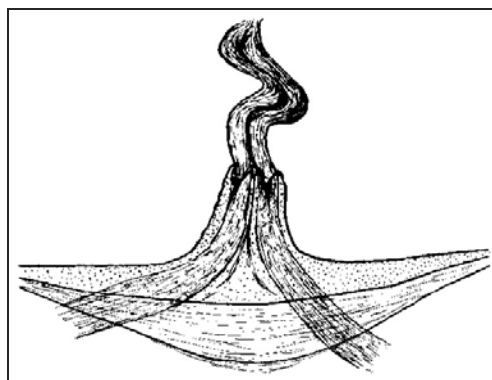


Fig. 2. Genus *Mesoniscus*: genital apophysis (after GRUNER & TABACARU, 1964 modified).

4 (7) Cephalothorax without antennal lobes; antennules with reduced third article and included in the second article; males with two reduced genital apophysis and with joined genital orifices (Fig. 2); completely depigmented body; absent eyes (Section **Microcheta**, Family Mesoniscidae, Genus *Mesoniscus* Carl, 1906).....5

5 (6) Regular rows of big and rare granules on the cephalon and pereion; pleonites with only one row of granules (Fig. 3 A, B, C); body length: 6.5-7 mm.....*Mesoniscus graniger graniger* (Frivaldsky, 1865)

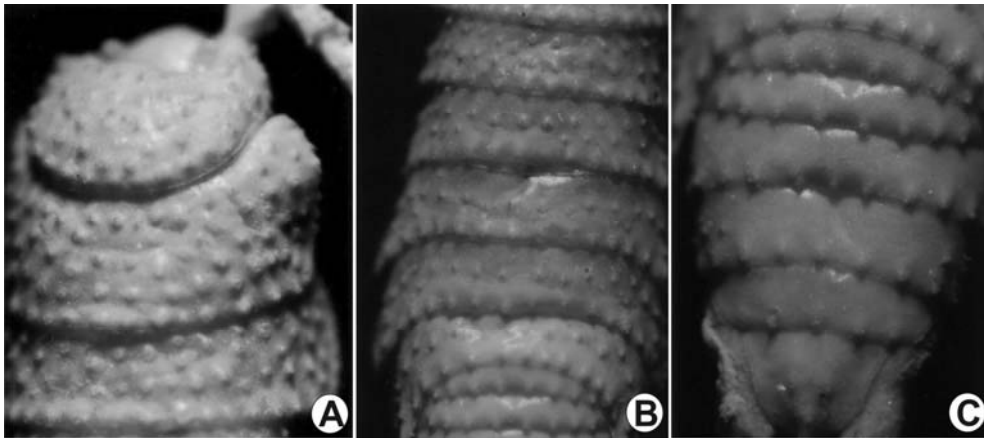


Fig. 3. *M. g. graniger*: A. cephalon; B. pereion; C. pleon (after GIURGINCA, 2003, 2009 modified).

6 (5) Irregular rows of small and numerous granules on the cephalon and pereion; pleonites with two rows of granules (Fig. 4 A, B, C); body length: 12-13 mm.....*Mesoniscus graniger dragani* Giurginca, 2003

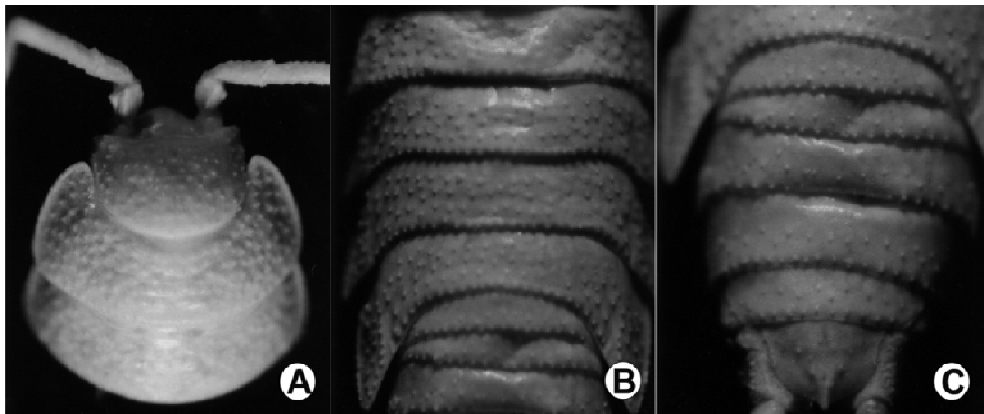


Fig. 4. *M. g. dragani*: A. cephalon; B. pereion; C. pleon (after GIURGINCA, 2003, 2009 modified).

- 7 (4) Cephalothorax with antennal lobes; antennules with the third article distinct from the second one; males with a sole genital apophysis with fused *vasa deferentia* with a sole genital orifice (Section **Synocheta**).....8
- 8 (51) Non-conglobating species; cephalothorax without frontal line, only with a super-antennal line; narrow uropod basipodite (Family Trichoniscidae).....9
- 9 (40) Neopleurons 3-5 are small so the pleon is clearly narrower than the pereion; tergites smooth or with granules but without longitudinal ribs or tubercles (Sub-family Trichoniscinae).....10
- 10 (11) Pereiopode VII without sexual dimorphism (Fig. 5A); first male pleopode with the mono-segmented endopodite and without a terminal spine (Fig. 5B); completely depigmented and eyeless species; body length: 3 mm.....*Caucasonethes vandeli* Tabacaru, 1993
- 11 (10) Pereiopode VII male with differential characters; first male pleopode with bi-segmented endopodite or at least with a terminal spine.....12
- 12 (25) Pleopode 1 male endopodite with the distal article with a ciliated rod, sometimes reduced to a spine, or with a rod ending with an oval blade; ocular apparatus either absent or formed by a sole, big ommatidia.....13
- 13 (22) Ocular apparatus formed by a big, pigmented ommatidia; meropodite of pereiopode VII male with a wide apophysis or a basal spur on the inner side; simple, conical genital apophysis without lateral expansions.....14

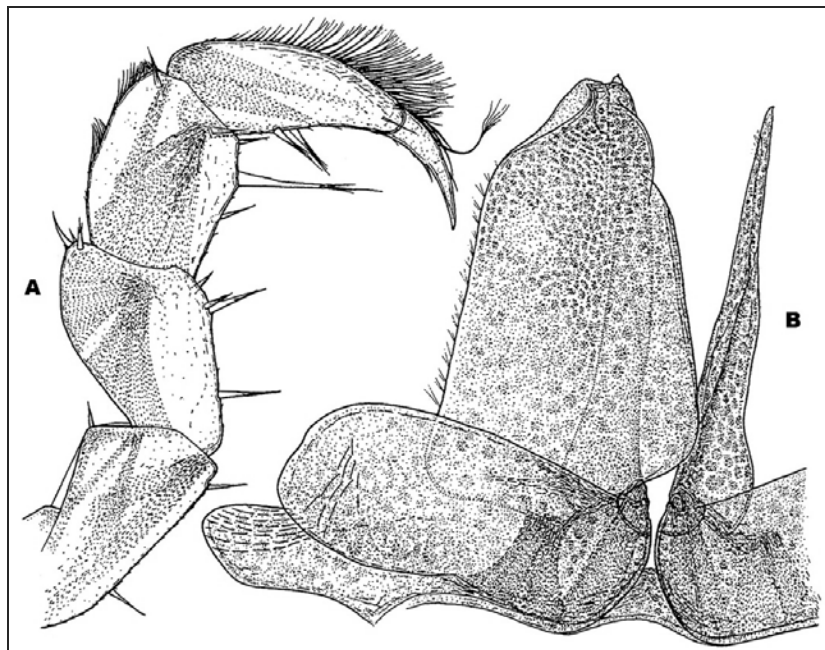


Fig. 5. *Caucasonethes vandeli*: A. pereiopode VII male; B. pleopode 1 male (after TABACARU, 1993 modified).

14 (15) Pereiopode VII male meropodite with a strong apophysis and forming a pincer with the grooved carpopodite (Fig. 6A); pleopode 1 male endopodite (Fig. 6B) with the distal article ending in an oval blade transversally striated (Genus *Androniscus*); the sole ommatidia is black, strongly pigmented; the body is pink, a color that disappears in alcohol; body length: 3-4 mm.....*Androniscus roseus* (C.L. Koch, 1837)

15 (14) Meropodite of the pereiopode VII male presents at its base a hook-like, curved spur; endopodite of pleopode 1 male ending with a ciliated rod or a simple spine (Fig. 7B) (Genus *Hyloniscus*).....16

16 (19) Pleopode 2 male with the endopodite robust to the tip and with a complex structure (Fig. 8B).....17

17 (18) The spur at the base of the pereiopode VII male meropodite is narrow and elongated like a hook, clearly longer than the width of its base (Fig. 7A & B); body brown, sometimes, purplish; body length: 4-6 mm.....*Hyloniscus riparius* (C.L. Koch, 1838)

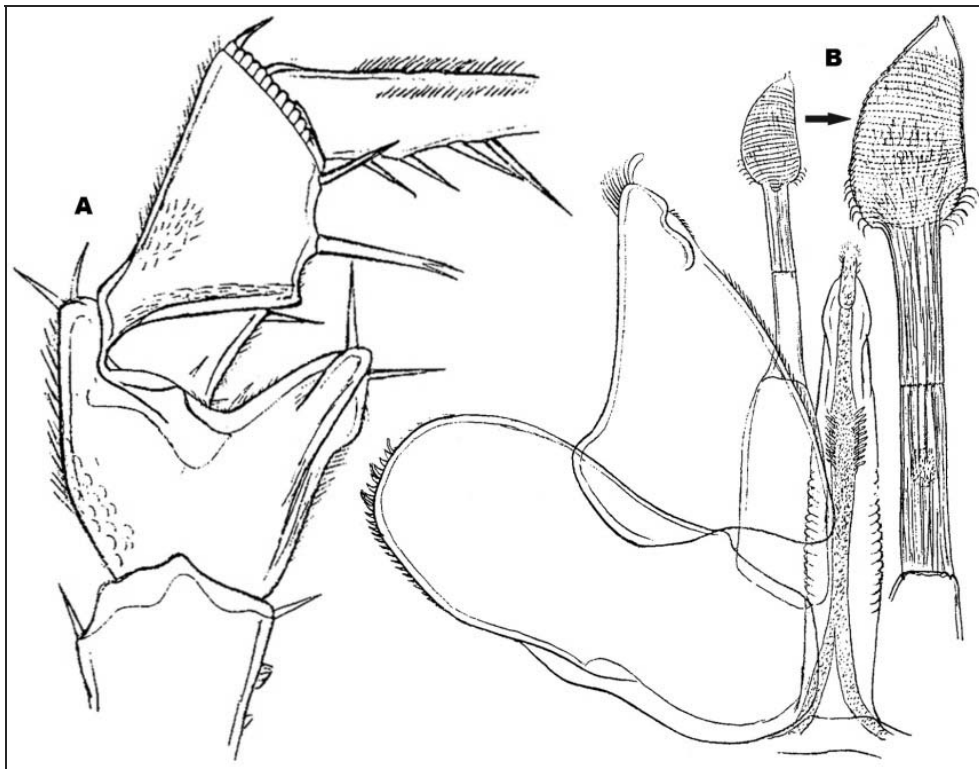


Fig. 6. *Androniscus roseus*: A. pereiopode VII male; B. pleopode 1 male (after Radu, 1983 modified).

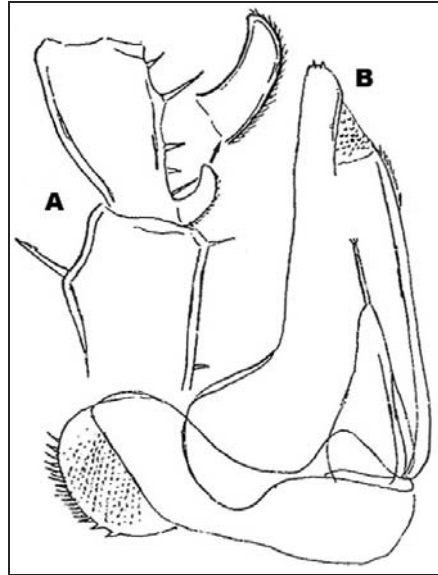


Fig. 7. *Hyloniscus riparius*: A. pereopode VII male; B. pleopode 1 male (after Radu, 1983 modified).

18 (17) The spur at the base of the pereopode VII male meropodite is short and wide at the base (Fig. 8A&B); brown body with yellowish-white spots on the pleon; body length: 4.5-7 mm.....
*Hyloniscus transsylvanicus* (Verhoeff, 1901)

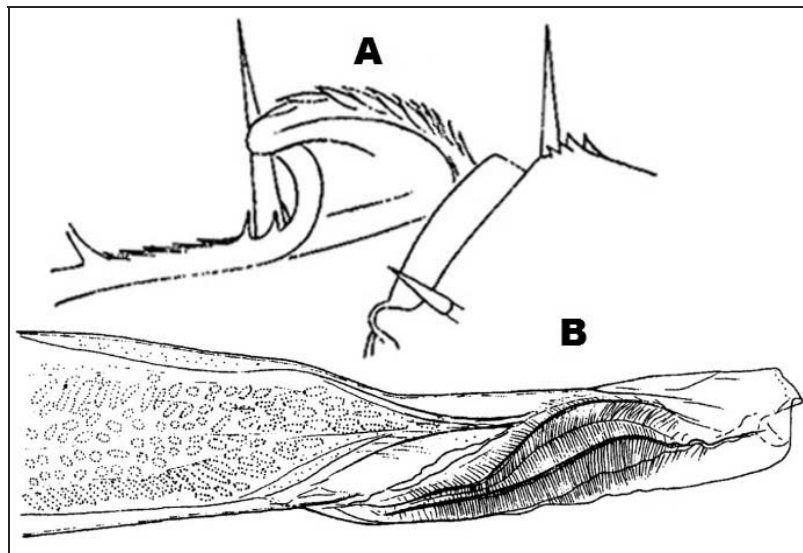


Fig. 8. *Hyloniscus transsylvanicus*: A. pereopode VII male (after RADU, 1983 modified);
 B. tip of the endopodite of pleopode 2 male (after TABACARU, 1996 modified).

- 19 (16) Endopodite of pleopode 2 male very narrow in the distal part.....20
- 20 (21) The spur at the base of the pereopode VII male meropodite is narrow and elongated like a hook, while the ischiopodite presents on the posterior edge a semicircular scale brush(Fig. 9A); endopodite of pleopode 2 ending with a tip pointing toward the exterior (Fig. 9B); body purplish-brown; body length: 3-4 mm.....*Hyloniscus dacicus* Tabacaru, 1972
- 21 (20) The spur at the base of the pereopode VII male meropodite is short and wide at the base, while the ischiopodite has no scale brush (fig. 9C); endopodite of pleopode 2 ending with a very thin flagellum (Fig. 9D); body weakly pigmented by a net of purplish cromatophores which are alcohol-proof; body length: 3-4 mm.....*Hyloniscus flammuloides* Tabacaru, 1972

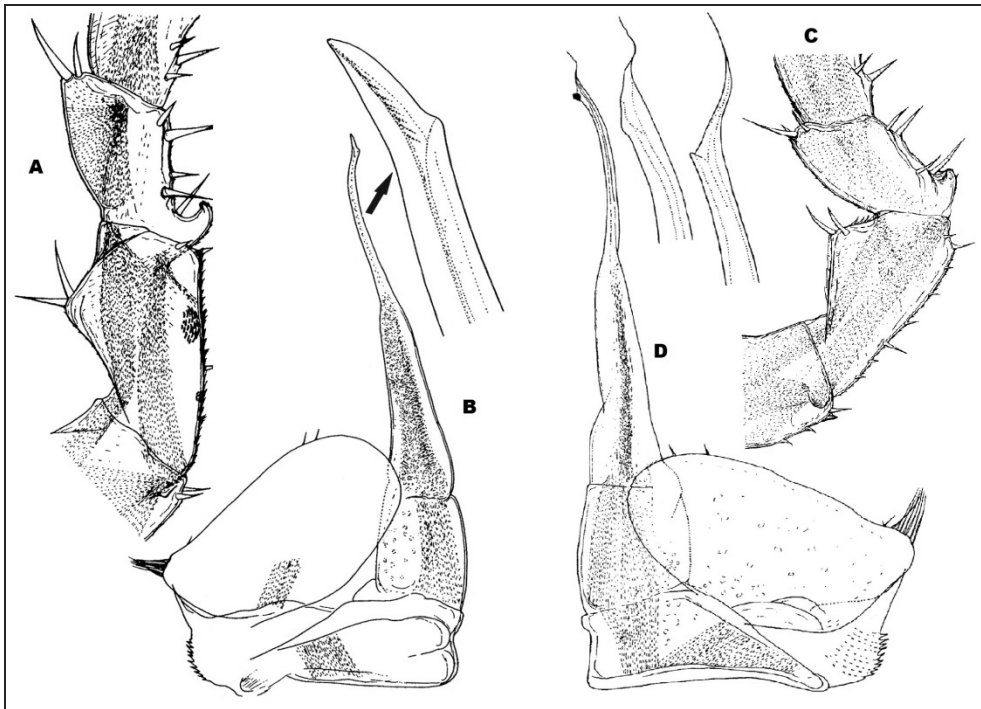


Fig. 9. *H. dacicus* (A. pereopode VII male; B. pleopode 2 male) and *H. flammuloides* (C. pereopode VII male; D. pleopode 2 male) (after TABACARU, 1996 modified).

- 22 (13) Absent ocular apparatus; meropodite of pereopode VII male without an apophysis or spur but the carpopodite with a strongly hypertrophied spine (Fig. 10); the distal part of the genital apophysis has on each side a lamellar expansion and terminally a blade shaped like a 'M' letter (Genus *Biharoniscus*)23

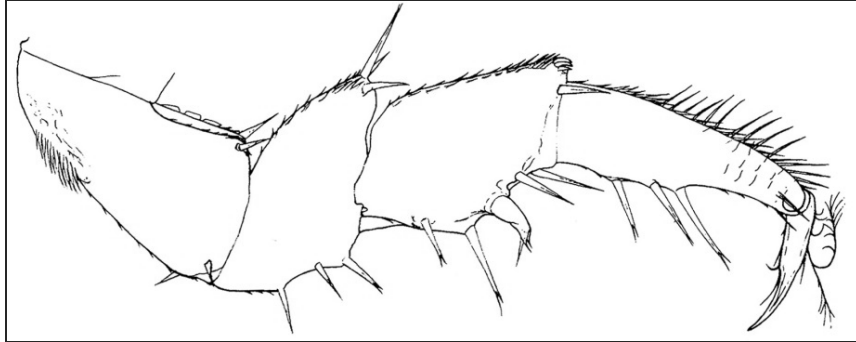


Fig. 10. *Biharoniscus racovitzai*: pereopode VII male (after TABACARU, 1963 modified).

23 (24) Exopodite of pleopode 1 male ending with a widely rounded lobe (Fig. 11A); completely depigmented body; 2.6-4 mm in length.....
*Biharoniscus racovitzai* Tabacaru, 1963

24 (23) Exopodite of pleopode 1 male ending with a lobe elongated toward its base and presenting a lateral prominence (Fig. 11B); completely depigmented body; 3.2-4 mm in length.....*Biharoniscus fericeus* Tabacaru, 1973

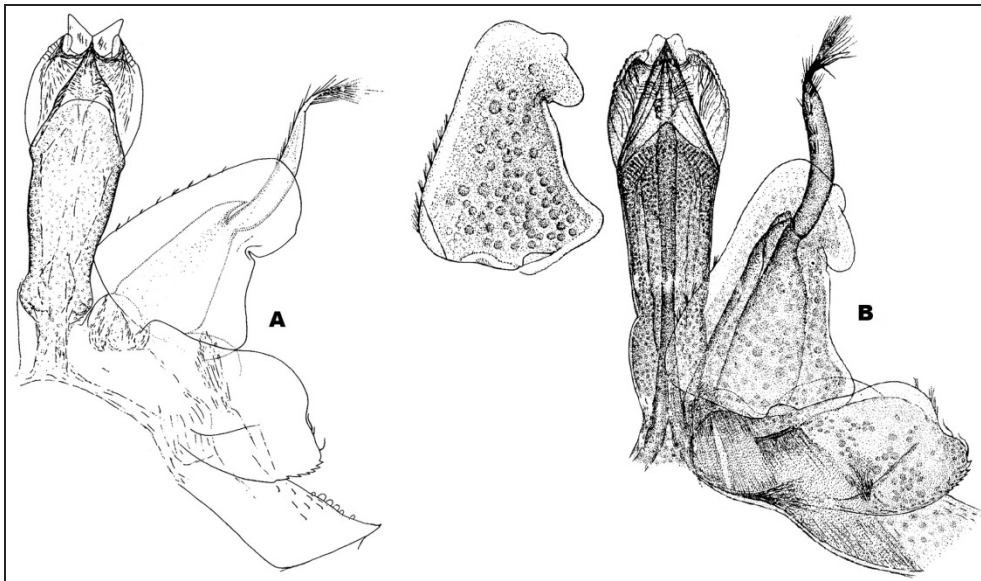


Fig. 11. *Biharoniscus racovitzai* (A) and *B. fericeus* (B) (after TABACARU, 1963, 1973 modified).

25 (12) Endopodite of pleopode 1 male with the distal article shaped like a knife blade; ocular apparatus formed by three small ommatidia or absent.....26

26 (27) Tergites with rows of small tubercles; pleopode 1 male endopodite distal article inserted on the inner side of the basal article; pleopode 1 male exopodite with a terminal lobe separated by a groove (Fig. 12A); pleopode 2 endopodite with a robust and complexly structured distal article presenting a terminal flagellum (Fig. 12B); three pigmented ommatidia but the body is weakly pigmented; body length: 3.5-4.5 mm.....*Stylohylea bosniensis* (Verhoeff, 1901)

27 (26) Tergites smooth or slightly granulated; pleopode 1 male endopodite distal article inserted terminally on the basal article; pleopode 1 male exopodite without a terminal lobe separated by a groove; pleopode 2 endopodite with a simple, styliform distal article (Genus *Trichoniscus*).....28

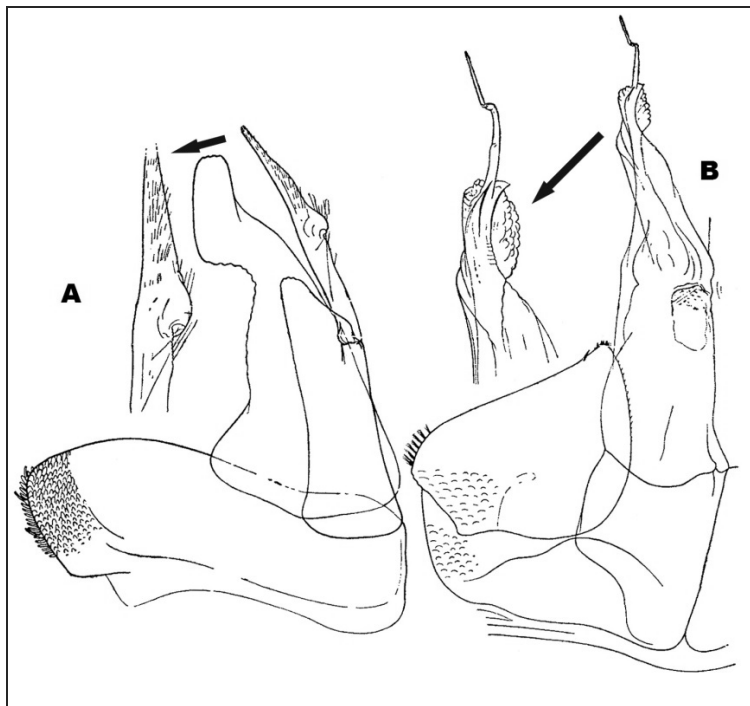


Fig.12. *Stylohylea bosniensis*: A. pleopode 1 male; B. pleopode 2 male (after RADU, 1977 modified).

28 (31) Pleopode 1 male exopodite presents on the external edge a notch or a prominent tooth like a beak delimitating a terminal lobe; pereopode VII male presents protuberances or swelled up articles.....29

29 (30) Pereopode VII male basipodite, ischiopodite, meropodite and carpopodite with protuberances covered by scales (Fig. 13A); endopodite of pleopode 1 male without transversal striations at the end (Fig. 13B); three ommatidia forming a triangle and included in a mass of black pigment, reddish-purplish brown body; body length: 1.6-2.7 mm.....
.....*Trichoniscus carpaticus* Tabacaru, 1974

30 (29) Meropodite and carpopodite of the pereopode VII male are more swelled up than in females while the ischiopodite has a concave sternal edge (Fig. 14A); three ommatidia included in a mass of black pigment (Fig. 14B) but the body has a weak pigmentation that disappears in alcohol; body length: 2-2.5 mm.....*Trichoniscus pygmaeus* Sars, 1899

31 (28) Exopodite of pleopode 1 male has a strongly concave external edge but without a notch or a tooth (Fig. 14C); pereopode VII male without protuberances or swelled up articles but the basipodite presents at the distal sternal tip a brush of curved scales.....32

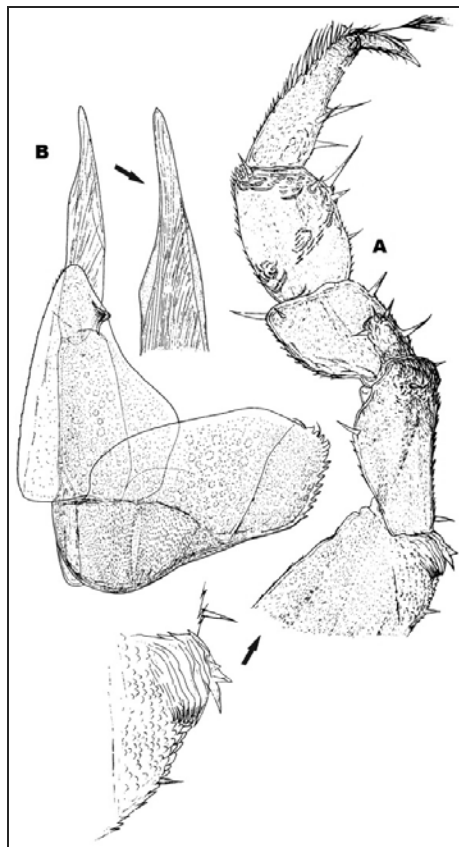


Fig. 13. *Trichoniscus carpaticus*: A. pereopode VII male; B. pleopode 1 male (after TABACARU, 1974 modified).

32 (33) Without glandular-piliferous organs; with three pigmented ommatidia but the body is slightly pigmented or completely depigmented; body length: 2.5-3 mm.....*Trichoniscus inferus* Verhoeff, 1908

33 (32) With glandular-piliferous organs.....34

- 34 (35) Glandular-piliferous organ on the posterior edge of the cephalothorax and the anterior edge of the first pereionite (Fig. 15); three pigmented ommatidia while the body is slightly pigmented; body length: 2.5-3 mm.....
*Trichoniscus dancaui* Tabacaru, 1996
- 35 (34) Glandular-piliferous organs only on pereionites; eyeless and completely depigmented body.....36

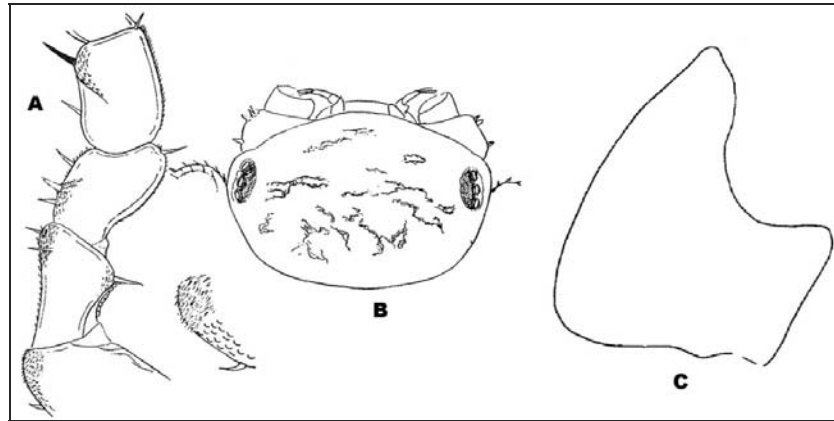


Fig. 14. *Trichoniscus pygmaeus* (A and B) (after RADU, 1983 modified) and *Tr. inferus* (C) (after TABACARU, 1996 modified).

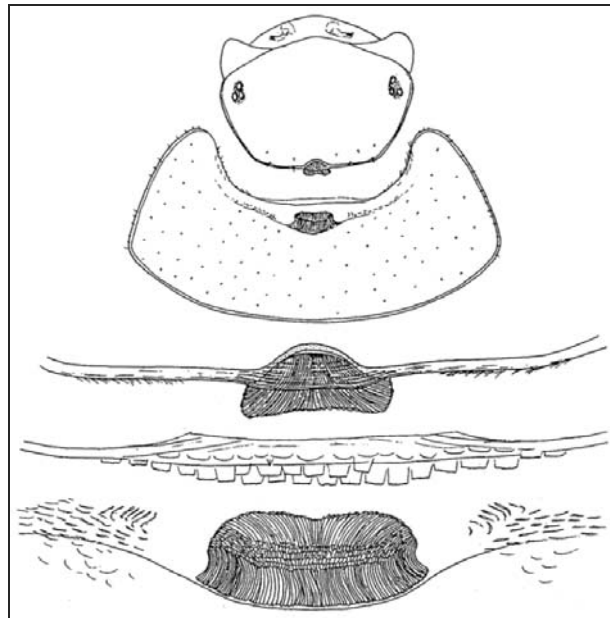


Fig. 15. *Trichoniscus dancaui* (after TABACARU, 1996).

36 (37) Pereionites 1-5 bulging in the posterior part and with lanceolated hairs; pereionite 4 with a slight pit covered by hair-like scales in the middle of the curved part (Fig. 16); 2.6-3.5 mm in length.....
*Trichoniscus racovitzai* Tabacaru, 1994

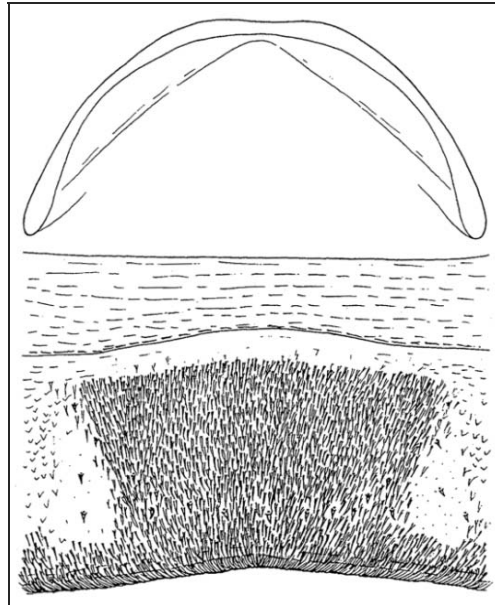


Fig. 16. *Trichoniscus racovitzai* (after TABACARU, 1996 modified).

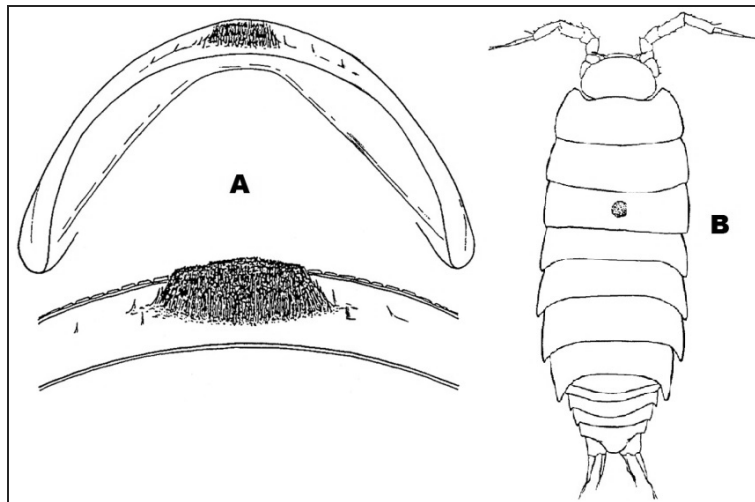


Fig. 17. *Trichoniscus vandeli* (after TABACARU, 1996 modified)
 A. glandular-piliferous organ; B. habitus.

37 (36) Pereionites 1-5 are not curved; glandular-piliferous organs only on pereionites 3 or 4.....38

38 (39) One glandular-piliferous organ shaped like a round hair brush, in the middle of pereionite 3 (Fig. 17); body length: 2.5-3 mm.....*Trichoniscus vandeli* Tabacaru 1996

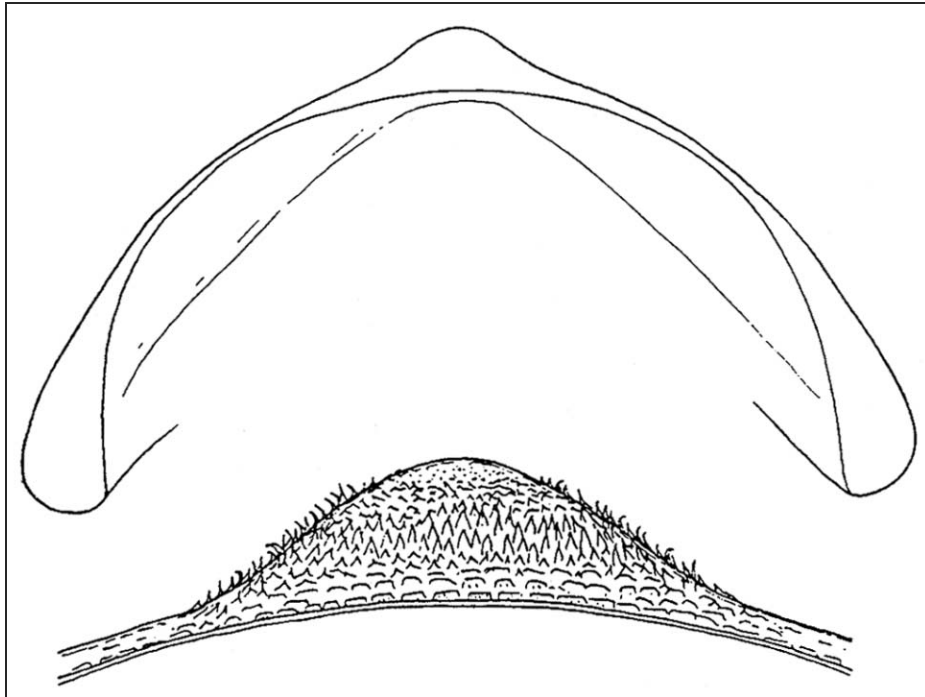


Fig. 18. *Trichoniscus tuberculatus* (after TABACARU, 1996 modified).

39 (38) One glandular-piliferous organ shaped like a big scale covered tubercle, in the middle of pereionite 4 (Fig. 18); body length: 2.5-3.5 mm.....*Trichoniscus tuberculatus* Tabacaru, 1996

40 (9) Neopleurons 3-5 well developed, the pleon is not narrowed in comparison with the pereion, the edges of the pereion are continued by those of the pleon; tergites with longitudinal ribs and prominent tubercles.....41

41 (42) Pleopode 1 male exopodite divided in two parts by a deep notch of the lateral edge: the distal part has three lobes; pleopode 1 male endopodite is a narrow blade with a short spine; genital apophysis like an anchor (Sub-family Thaumatoniscellinae) (Fig. 19A&B); ocular apparatus absent, completely depigmented body; 1.2-1.3 mm in length.....
.....*Thaumatoniscellus orghidani* Tabacaru, 1973

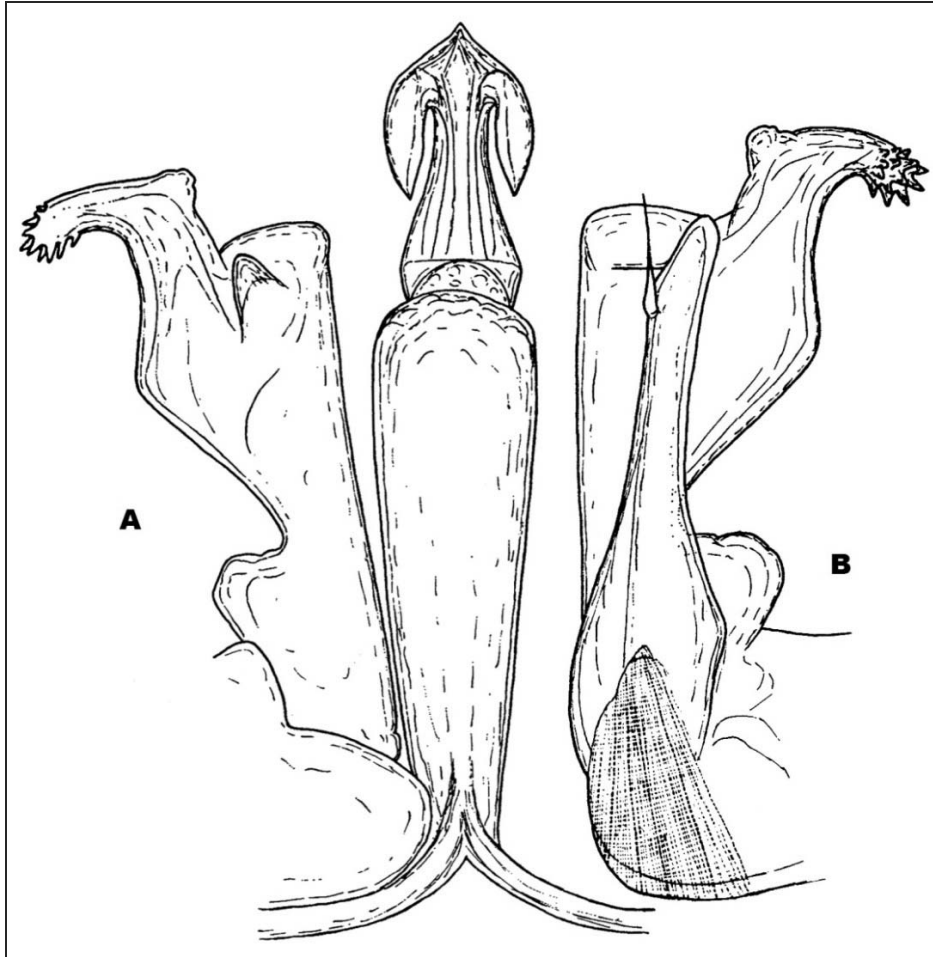


Fig. 19. *Thaumatoniscellus orghidani* (after TABACARU, 1973 modified)
A. genital apophysis; B. pleopode 1 male endopodite.

42 (41) Pleopode 1 male exopodite is simple and triangular; pleopode 1 endopodite has two articles, the second one like a knife blade; conical genital apophysis, truncated at the apex; ocular apparatus formed by a sole ommatidia or absent (Sub-family Haplophthalminae).....43

43 (46) Pleonite 3 with a strong median protuberance elongated toward the posterior part going beyond the posterior edge of the pleonite.....44

44 (45) Pleonite 4 with two elongated paramedian tubercles and pleonite 5 with two weakly developed tubercles (Fig. 20A); ocular apparatus formed by one, big, pigmented ommatidia, but the body is depigmented (Fig. 20B); body length: 3-4 mm.....*Monocyphoniscus babadagensis* (Radu, 1965)

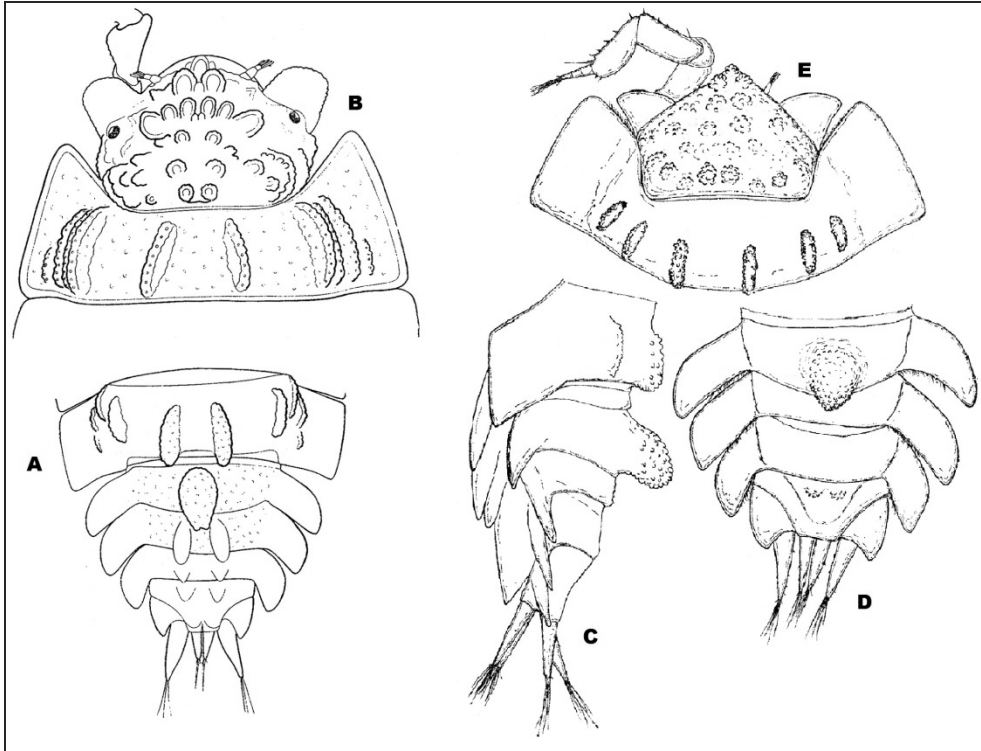


Fig. 20. *Monocyphoniscus babadagensis* (A & B after RADU, 1983 modified) A. pleon; B. cephalon and *Banatoniscus karbani* (C, D, E after TABACARU, 1991) C. and D. pleon; E. cephalon.

45 (44) Pleonites 4 and 5 without tubercles (Fig. 20C&D); ocular apparatus is absent, completely depigmented body (Fig. 20E); 3.5 mm in length.....*Banatoniscus karbani* Tabacaru, 1991

46 (43) Pleonite 3 with two small, paramedian tubercles, situated very close to one another or even joined.....47

47 (48) One pigmented ommatidia (Fig. 21A); pereionites with two pairs of developed ribs (Fig. 21B&C); 1.8-2.3 mm in length.....
.....*Haplophthalmus movilae* Gruia & Giurginca, 1998

48 (47) Ocular apparatus absent; pereionites with three pairs of developed ribs.....49

49 (50) Tegument with an obvious polygonal net; pereopode VII male with a weakly developed carpien lobe (Fig. 22A&B); exopodite of pleopode 1 with an apically

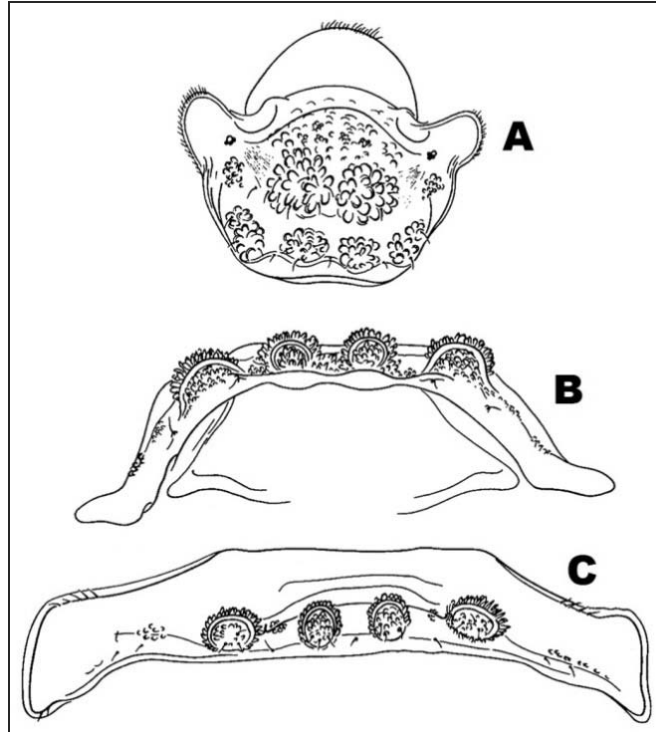


Fig. 21. *Haplophthalmus movilae*: A. cephalon; B&C. pereionites I and VII (after GRUIA & GIURGINCA, 1998 modified).

- rounded inner margin (Fig. 22C); body length: 2.5-3.5 mm
*Haplophthalmus tismanicus* Tabacaru, 1970
- 50 (49) Tegument without an obvious polygonal net; pereopode VII male with a strongly developed carpian lobe (Fig. 22D&E); exopodite of pleopode 1 with an obliquely truncated inner margin (Fig. 22F); body length: 2.5-3.5 mm.....*Haplophthalmus caecus* Radu, Radu & Cadariu, 1955
- 51 (8) Endoantennal rolling up ability; cephalothorax with a frontal and a supra-antennal lines (Fig. 23A); strongly widened uropodes basipodite (Family Buddelundiellidae) (Fig.23B); tergites with strongly developed longitudinal ribs (Fig. 23C); ocular apparatus absent; completely depigmented; body length: 2-2.5 mm.....*Buddelundiella serbani* Tabacaru, 1971
- 52 (3) Mandibles without *pars molaris*; inner endite of maxillule with two penicilli; the pereopodes claw doubled by a robust spine; ocular apparatus formed by more than three ommatidia; antennal flagellum with clearly distinct articles; two distinct spermatophores; endopodite of pleopode1 male with a spermatic furrow; stomach without superomedianum (Section **Crinocheta**).....53
- 53 (60) Species unable to roll into a ball.....54

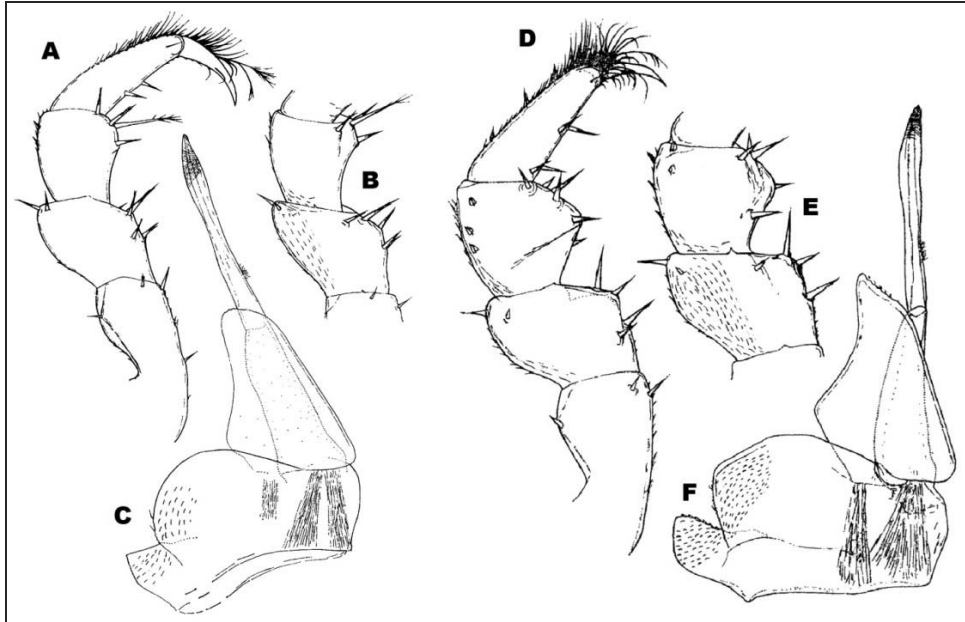


Fig. 22. *Haplophthalmus tismanicus* (A, B, C) (after TABACARU, 1970 modified) A, B. pereopode VII male; C. pleopode 1 male; D, E. pereopode VII male; F. pleopode 1 male and *H. caecus* (D, E, F) (after RADU & ALL., 1955 modified).

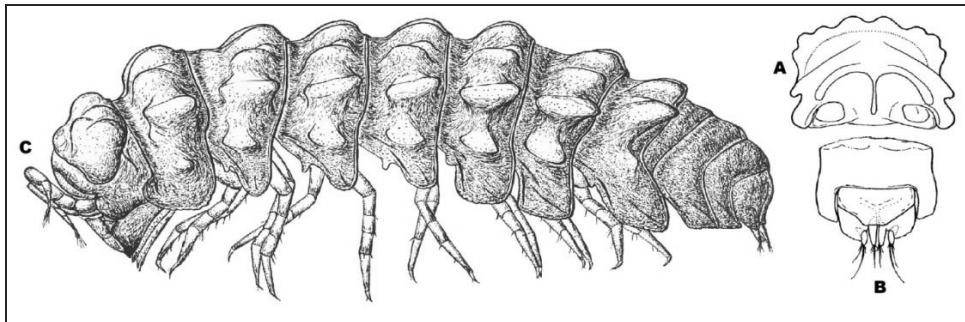


Fig. 23. *Buddelundiella serbani*: A. cephalon; B. pleotelson and uropods; C. habitus (after TABACARU, 1971 modified).

54 (57) Two pairs of pseudo-trachea on the exopodites of pleopods 1 and 2 (Family Porcellionidae).....55

55 (56) The edges of the pereion are continued by those of the pleon, as the pleon is not narrowed in comparison with the pereion; strongly curved body with long hairs; the ocular apparatus is formed by 12-14 pigmented ommatidia (Fig. 24A&B); body light brown slightly purplish; length of body: 7.5-10 mm.....*Leptotrichus pilosus dobrogicus* Radu, 1973

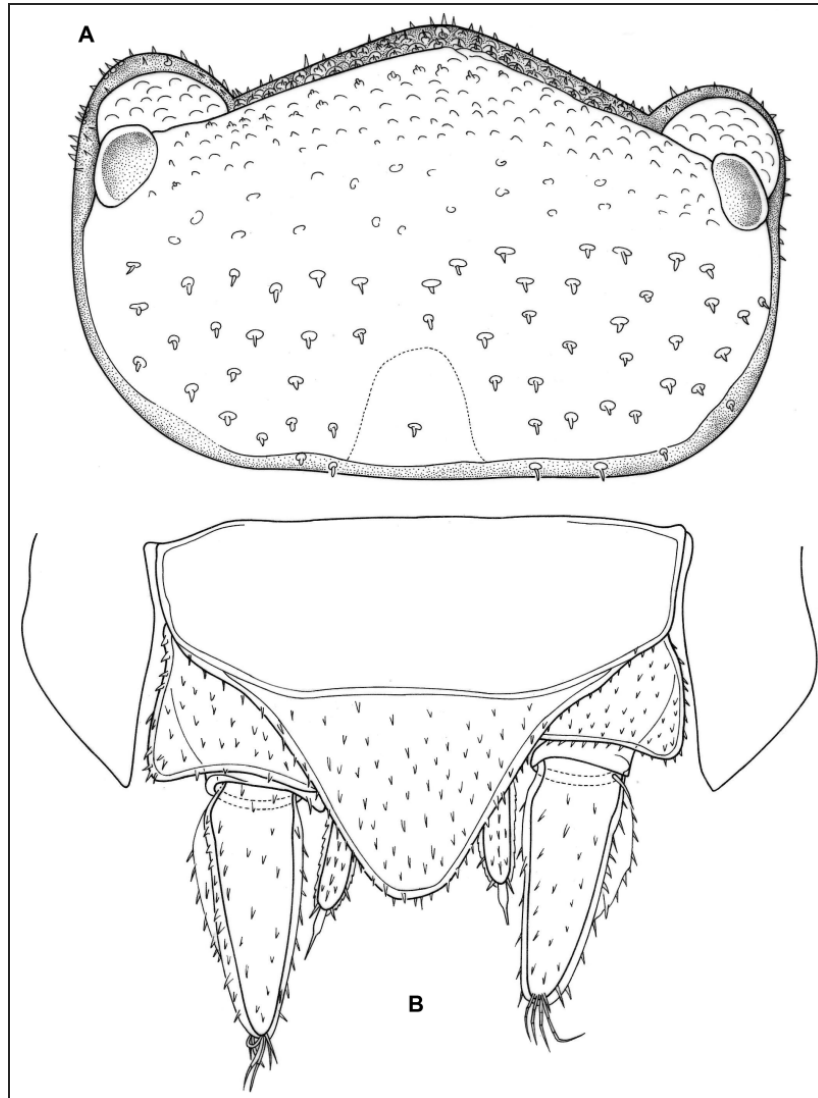


Fig. 24. *Leptotrichus pilosus dobrogicus*: A. cephalon;
B. pleotelson and uropods (GIURGINCA, ORIGINAL).

56 (55) Pleon brusquely narrowed in comparison with the pereion (Fig. 25); the body is not very curved and without long hairs but has an obvious granulation on the cephalothorax and on the tergites; purplish-brown body; 9-12 mm in length.....*Porcellionides pruinosus* (Brandt, 1833)

57 (54) Five pairs of pseudo-trachea on the exopodites of pleopods 1 to 5 (Family Trachelipodidae).....58

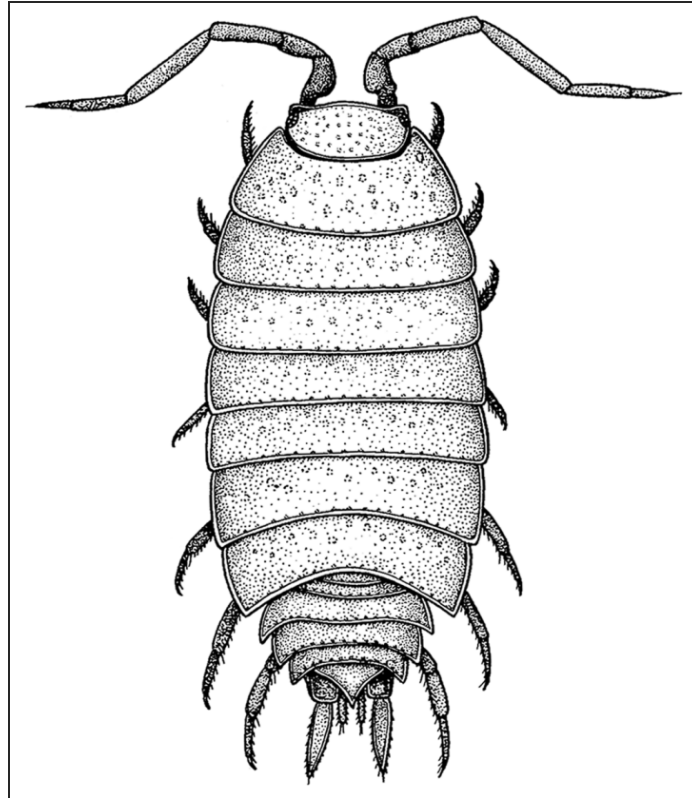


Fig. 25. *Porcellionides pruinosus* (after GRUNER, 1966)

- 58 (59) Cephalothorax with median lobe and antennal lobes strongly developed (Fig. 26A); eyes with many intensely pigmented ommatidia; grey-brown body; 19 mm in length.....*Trachelipus trilobatus* (Stein, 1859)
- 59 (58) Cephalothorax with median lobe and antennal lobes weakly developed (Fig. 26B); antennae, pereopodes and the uropods exopodites remarkably long; eyes with barely visible, 2-4 depigmented ommatidia; completely depigmented body; 13.5-15 mm in length.....
.....*Trachelipus troglobius* Tabacaru & Boghean, 1989
- 60 (53) Species able to roll up into a ball.....61
- 61 (62) Exoantennal rolling up ability (Family Cylisticidae); ocular apparatus with 20-25 strongly pigmented ommatidia (Fig. 27); grey-brown body, 11-15 mm in length.....*Cylisticus convexus* (De Geer, 1778)
- 62 (61) Endoantennal rolling up ability.....63
- 63 (66) Cephalothorax with scutellum and linea frontalis; antennule with three articles; pleopode 1 with well-developed exopodite; uropods with widened exopodite (Family Armadillidiidae).....64

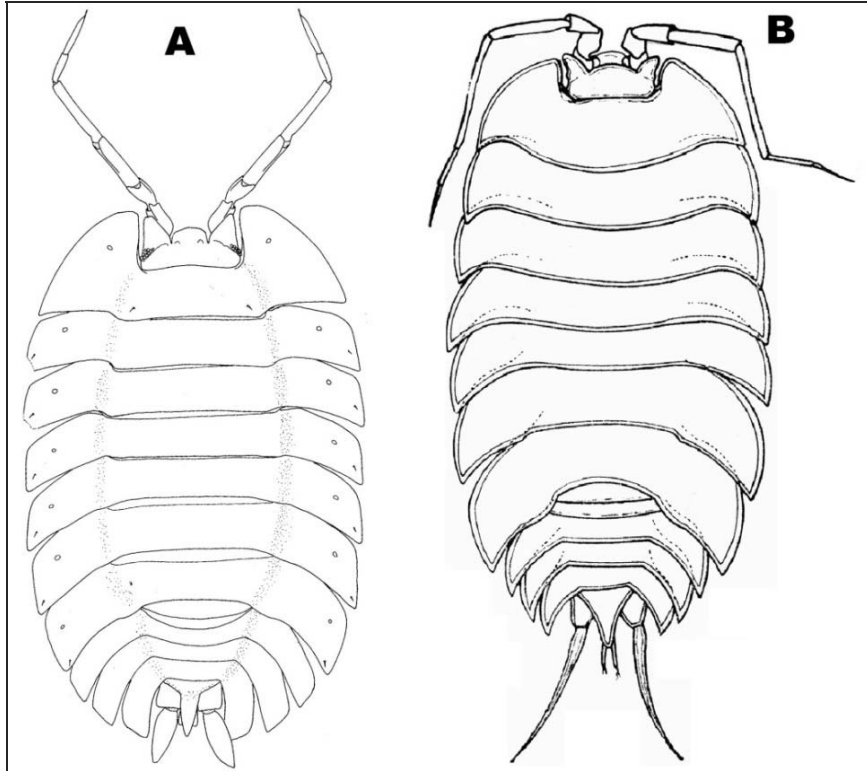


Fig. 26. *Trachelipus trilobatus* (A) (after SCHMIDT, 1997 modified) and *T. troglobius* (B) (after TABACARU & BOGHEAN, 1989 modified).

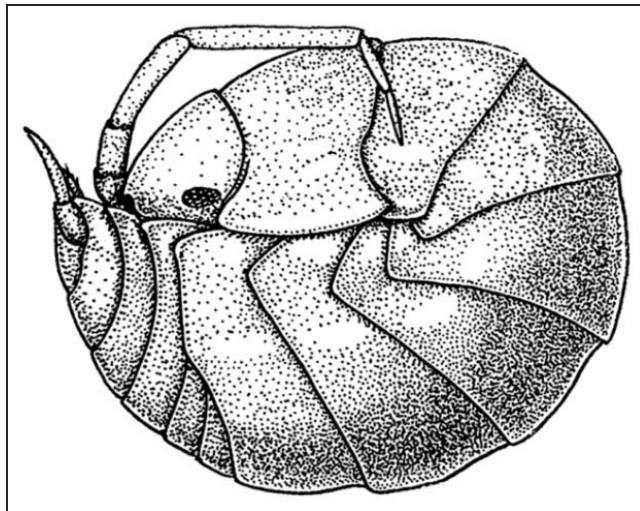


Fig. 27. *Cylisticus convexus* (after Gruner 1966).

64 (65) Pleopode 1 male exopodite with very rounded distal lobe (Fig. 28B); eyes with many intensely pigmented ommatidia (Fig. 28A); grey-brown body with five rows of light spots on the pereion; 9-10 mm in length.....
*Armadillidium versicolor quinquesevriatum* Verhoeff, 1901

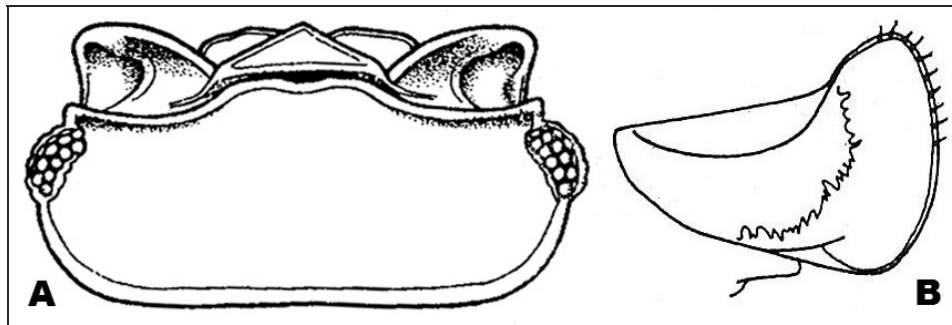


Fig. 28. *Armadillidium versicolor quinquesevriatum* (after RADU, 1985 modified)
 A. cephalon; B. pleopode 1 male exopodite.

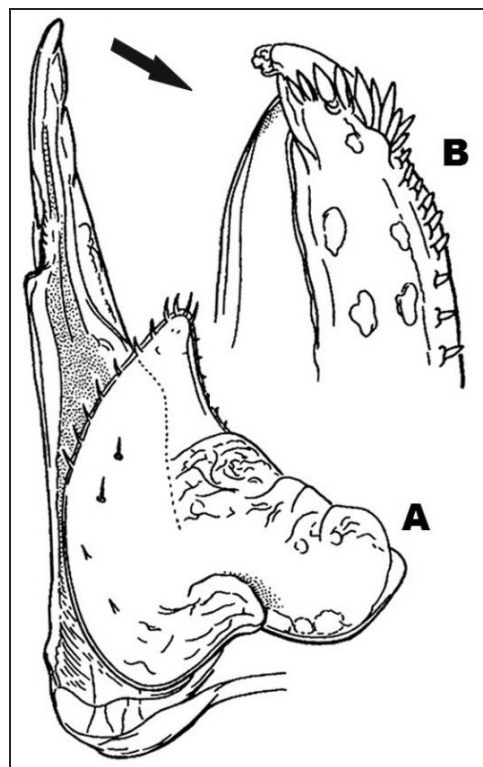


Fig. 29. *Armadillidium tabacarui* A. pleopode 1 male; B. tip of the endopodite of pleopode 1 male (after GRUIA, IAVORSCHI & SARBU, 1994 modified).

65 (64) Pleopode 1 male exopodite with a narrowed distal lobe (Fig. 29 A&B); eyes made up by 16-18 weakly pigmented ommatidia; white or pinkish-white body; 6.45-6.7 mm in length.....

.....*Armadillidium tabacaru* Gruia, Iavorschi, Sarbu, 1994

66 (63) Cephalothorax without scutellum and linea frontalis; antennule with two articles (Fig. 30A); at both sexes, very reduced exopodite of pleopode 1 (Fig. 30B&C); uropods with the endopodite wider than the exopodite (Fig. 30D); ocular apparatus absent; completely depigmented body; 0.9-1.2 mm in length.....*Kithironiscus dobrogicus* Tabacaru & Giurginca, 2002

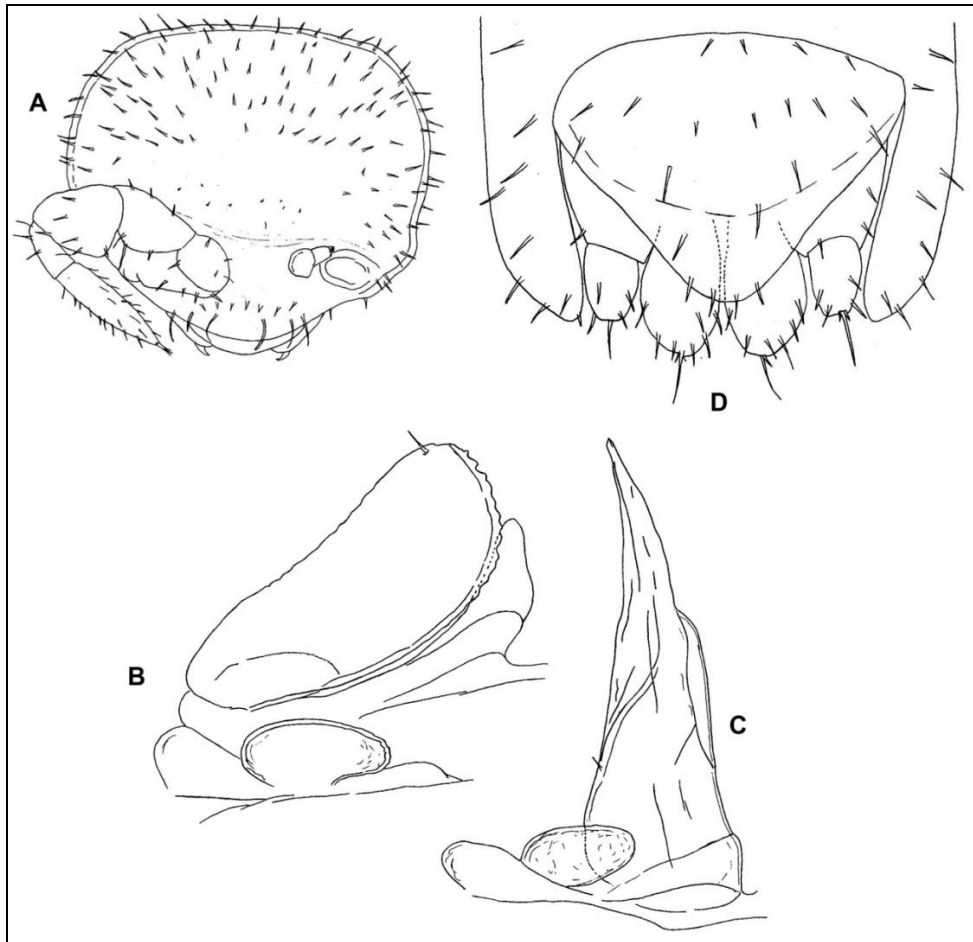


Fig. 30. *Kithironiscus dobrogicus*: A. cephalon; B. pleopode 1 female; C. pleopode 1 male; D. pleotelson and uropods (after TABACARU & GIURGINCA, 2003 modified).

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