# The terrestrial isopods (Isopoda: Oniscidea) of Greece. 26th contribution: The genus *Armadillidium* (Armadillidiidae) in the province Epirus[1]

Helmut Schmalfuss

Abstract

Based on the revision of the literature, the reinvestigation of type material and the investigation of new collections, 14 species of *Armadillidium* are reported from the province Epirus (= Ípiros) on the northwestern mainland of Greece. Six species were treated in previous contributions of this series. The diagnostic characters of the eight remaining species are described and illustrated, mostly by SEM-photographs, and the Greek records of these species are mapped.

K e y w o r d s : Isopoda, Oniscidea, *Armadillidium*, Greece, Epirus.

Zusammenfassung

Die Untersuchung neuer Aufsammlungen, die Durchsicht der Literatur und die Nachuntersuchung von Typenmaterial ergaben 14 *Armadillidium*-Arten für die Provinz Epirus (= Ípiros) auf dem nordwestlichen griechischen Festland. Sechs Arten wurden in vorangehenden Beiträgen dieser Serie behandelt. Die diagnostischen Merkmale der übrigen acht Arten werden beschrieben und illustriert, meist mit Hilfe von REM-Aufnahmen, und die griechischen Nachweise dieser Arten werden kartiert.

Contents



## 1 Introduction

In the first part of this new revision of the Greek species of *Armadillidium* (Schmalfuss 2006a) the 18 species from the Peloponnese were treated. The second part contains the 13 species living on the Aegean islands (Schmalfuss 2006b). The third part is dedicated to the 14 species of the northern Greek mainland, comprising the provinces of Macedonia and Thrace (Schmalfuss 2008). In the present fourth part the species from the province Epirus (= Ípiros) on the northwestern mainland are treated (map Fig. 1). In contrast to the provinces of Macedonia and Thrace the material investigated from the province Epirus did not contain any undescribed species. Verhoeff (1902, 1907) and Strouhal (1956) have described a number of *Armadillidium* species from Epirus, based on extensive surveys of this region.

[1] 25th contribution see Stuttgarter Beiträge zur Naturkunde A, Neue Serie 1: 153–201 (2008).

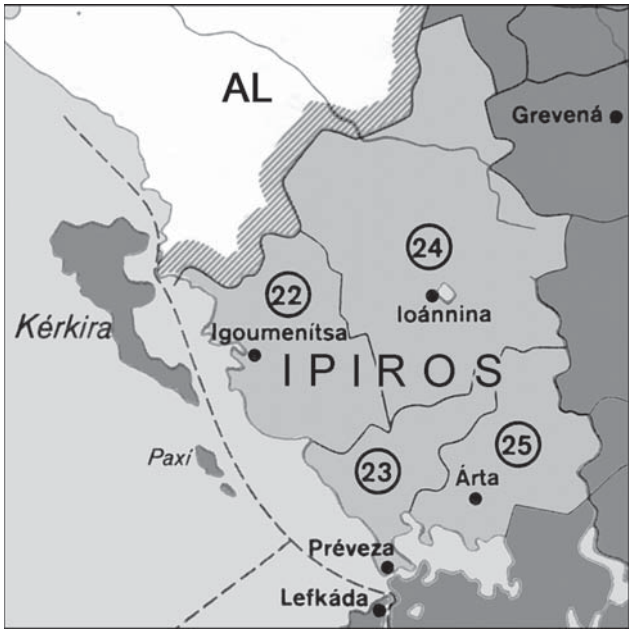


**Fig. 1.** Map of the treated area, the western Greek province Epirus (= Ípiros). – The numbers indicate the political prefectures (nomoí) which are used to localize the collecting data: 22 = Thesprotía, 23 = Préveza, 24 = Ioánnina, 25 = Árta.

In these four publications 43 species of *Armadillidium* are considered as valid and described in detail. Two more papers are planned to cover all regions of Greece:

– The Ionian islands, with a preliminary number of 20 species, nine of which were not treated in previous parts;

– The central Greek mainland including the provinces of Thessalía, Stereá Elláda and Atikí, with a preliminary number of 15 species, 7 of which were not treated in previous parts.

This adds up to a preliminary number of 59 species of *Armadillidium* for all of Greece. A final summarizing discussion of all Greek species of the genus will be given after the publication of the two parts mentioned above.

Abbreviations

| | |
|---|---|
| *A.* | *Armadillidium* |
| AL | Albania |
| ex. | example(s), specimen(s) |
| BMNH | British Museum of Natural History London |
| GR | Greece |
| ZMHB | Museum für Naturkunde Berlin |
| NMW | Naturhistorisches Museum Wien (Vienna) |
| SMNS | Staatliches Museum für Naturkunde Stuttgart |

Acknowledgments

The following persons have donated or loaned isopod material used in this revision: Dr. M. Baehr (Munich/Germany), D. Bartsch (SMNS), Dr. P. Dworschak (NMW), Dr. J. Gruber (NMW), Dr. B. Hauser (Geneva/Switzerland), Dr. J. Kontschán (Budapest/Hungary), Prof. Dr. W. Kühnelt † (Vienna/Austria), Dr. H. Malicky (Lunz am See/Austria), Dr. G. Osella (L'Aquila/Italy), Dr. W. Schawaller (SMNS), J. Schönfeld (Westum/Germany), Dr. S. Sfenthourakis (Pátra/Greece), and Dr. K. Thaler † (Innsbruck/Austria).

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Dr. S. Sfenthourakis (Pátra/Greece) and Dr. S. Taiti (Firenze/Italy) reviewed the present paper.

To all of them I wish to express my sincere thanks.

## 2 Methods

The material used for the SEM-preparations was, if not otherwise stated, air-dried. The mounted material was coated with a 20 nm Au/Pd layer and examined with an ISI-SS40 scanning electron microscope at 10 KV. Digital photographs were directly acquired by using DISS 5 (point electronic).

## 3 The genus *Armadillidium* in the Epirus

### 3.1 *Armadillidium albanicum* Verhoeff, 1901 (Figs. 2–11, map Fig. 12)

Literature records

Verhoeff 1901a: 37 (GR, "Korfu" = Ionian island Kérkira; AL, "Aulona" = Vlorë); Verhoeff 1907a: 468; Strouhal 1927: 15 (island Kérkira); Strouhal 1936: 92, fig. 13 (island Kérkira); Strouhal 1937a: 128 (island Kérkira); Strouhal 1937b: 233; Strouhal 1966: 293; Arcangeli 1952: 8 (AL, "sorgente Senufer" near Vlorë (= Valona); Schmalfuss 1981: 277, figs. 1–7.

Material examined

**Greece**: 1 ex., Ionian island Kérkira, Kavalóvuno near Khlomós, leg. Mahnert, 11.IV.1972 (SMNS 2173). – 2 ex., northwestern mainland, district Ioánnina, Votonósi, 700 m, leg. Kontschán, 13.V.2006 (SMNS 1487).

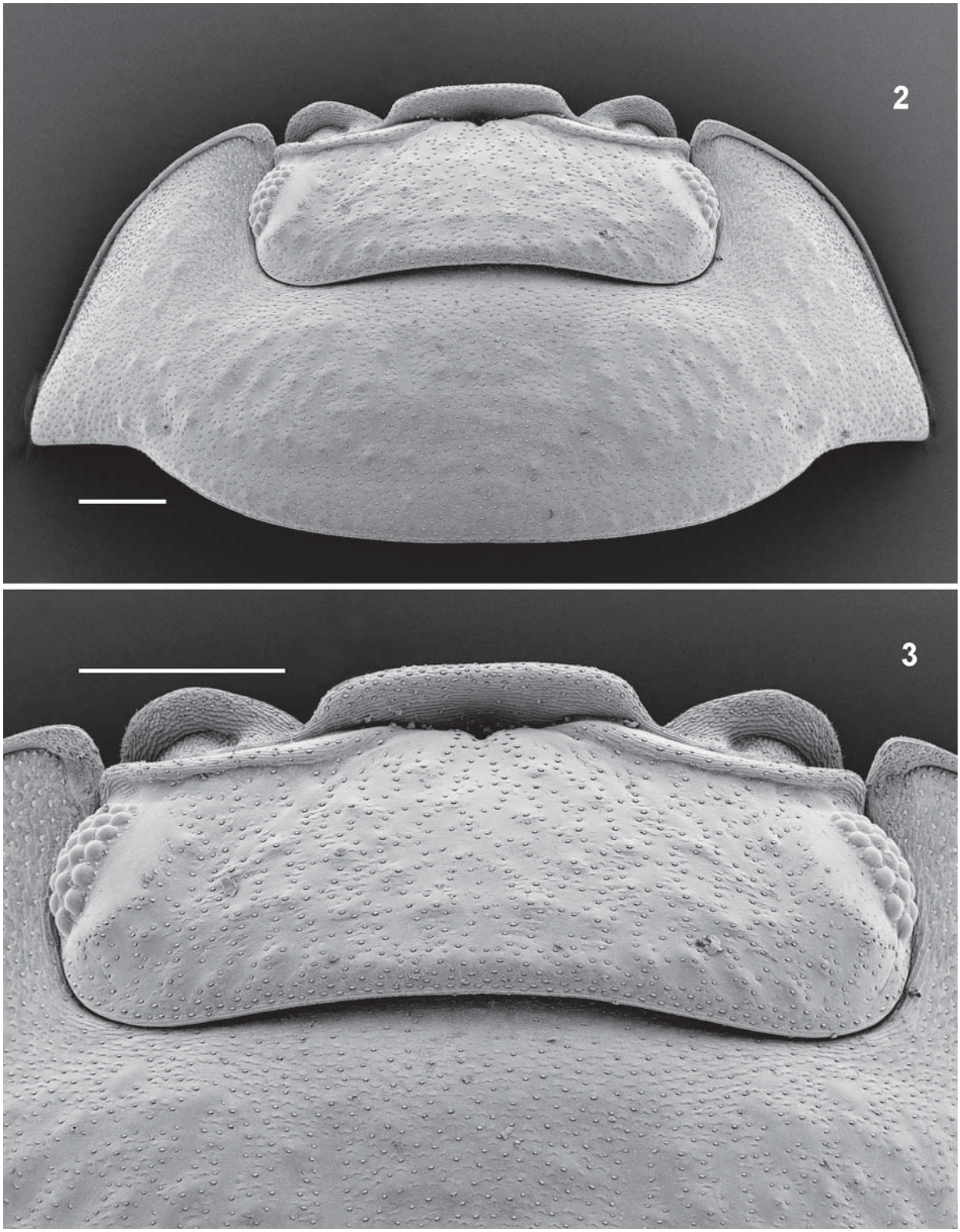
Diagnostic characters

Maximum dimensions: 19 × 10 mm.

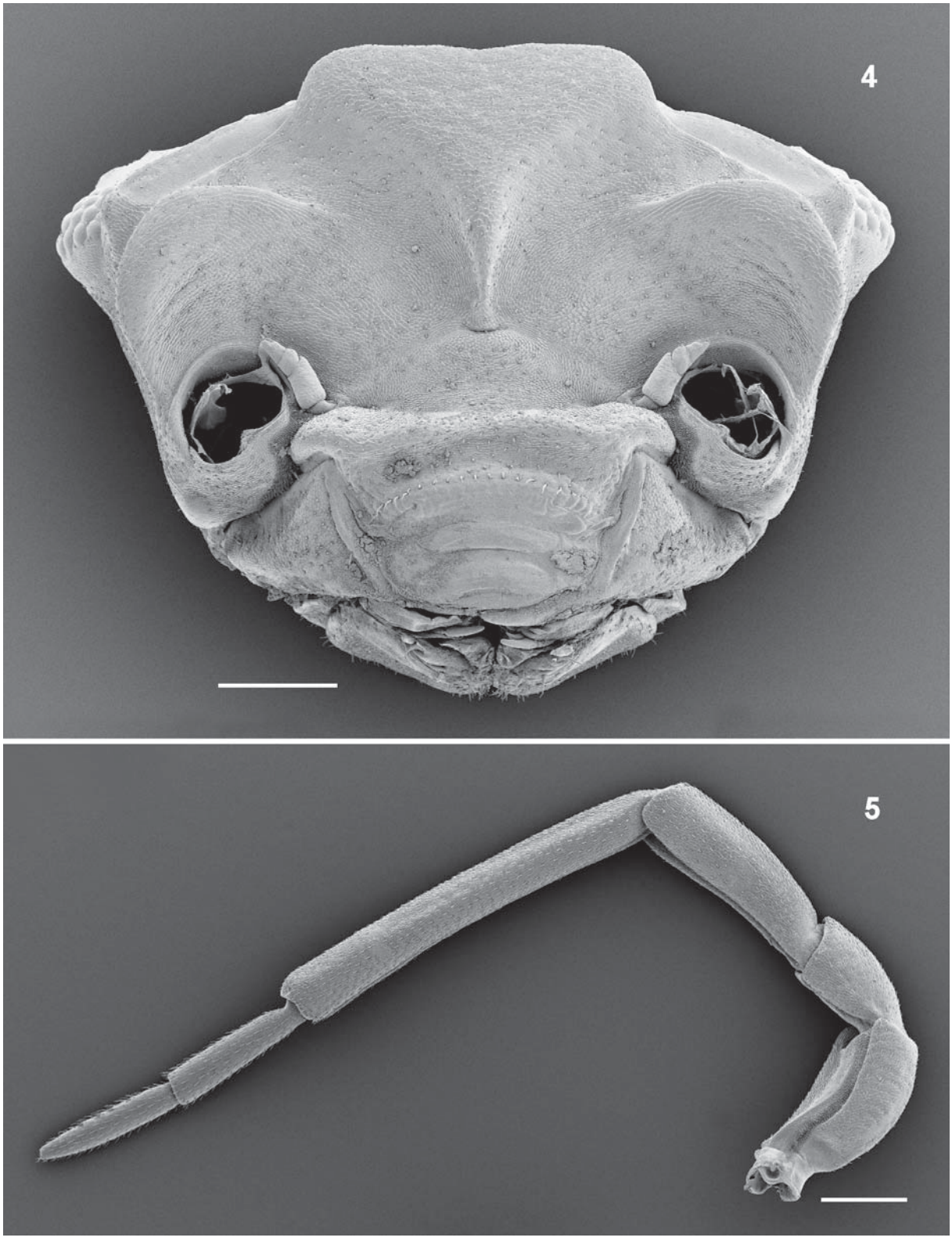
Coloration: Three rows of yellow spots on tergites, epimera and telson yellow.

Cuticular structures: Tergites slightly granulated.

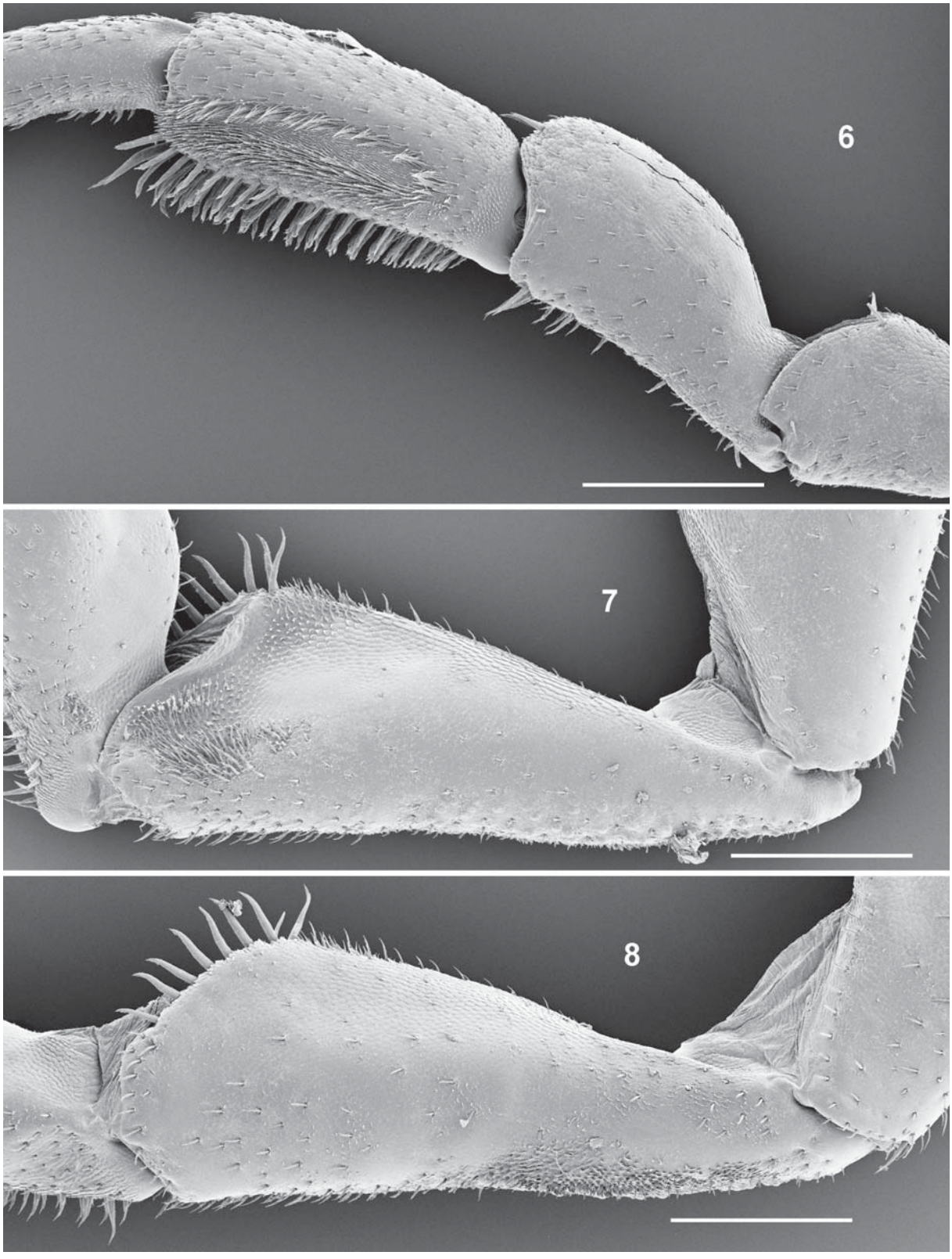
Frontal shield from behind surpassing frontal margin of head at least by one third of its width, laterally with rounded or pronounced angles (Figs. 2–3); antennal lobes trapezoidal (Fig. 4). Hind margin of pereion-epimeron 1 with rounded angle (Fig. 9). Telson slightly longer than wide, with straight sides and broadly rounded apex (Fig. 10). Flagellum of antenna with the two segments of about the same length (Fig. 5). Male pereiopod 1 with dense brush of short spines on carpus, but not on merus (Fig. 6). Male ischium 7 ventrally nearly straight, frontally with a small distal field of setae, caudally with a proximal



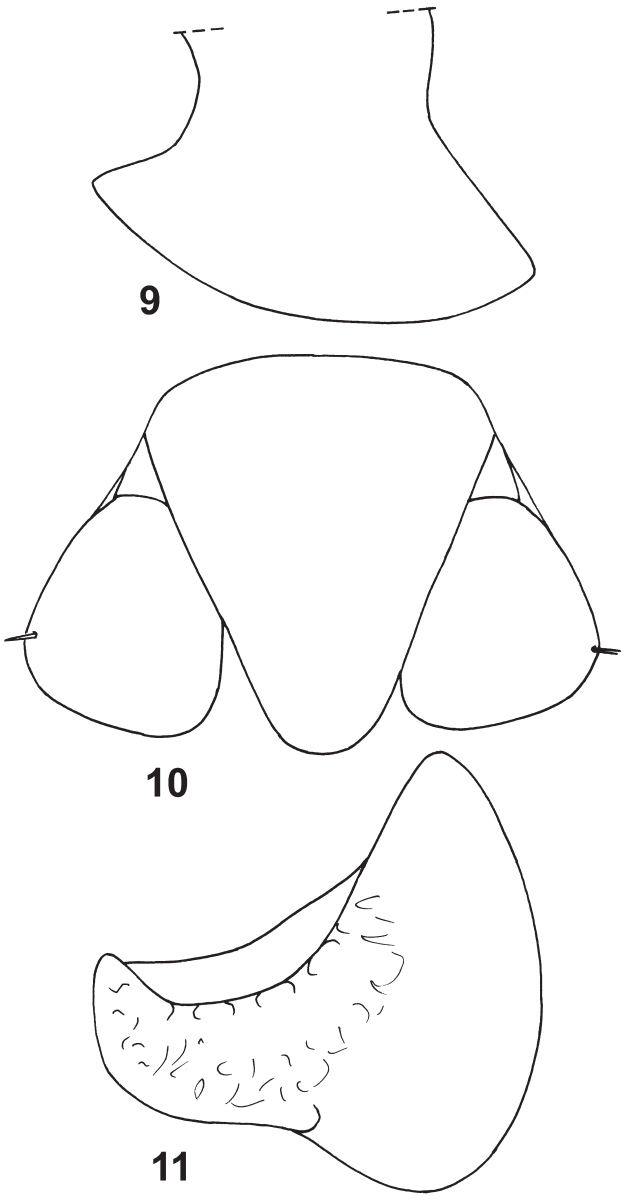

**Figs. 2–3.** *Armadillidium albanicum* (prefecture Ioánnina, SMNS 1487), ♂, 11.5 × 5.5 mm. – **2**. Head and pereion-tergite 1, dorsal view. **3**. Head, dorsal view. – Scales: 0.5 mm.




**Figs. 4–5.** *Armadillidium albanicum* (4: prefecture Ioánnina, SMNS 1487, ♀, 15.5 × 7.0 mm; 5: island Kérkira, SMNS 2173, ♂, 16.8 × 8.4 mm). – **4**. Head, frontal view. **5**. Antenna. – Scales: 0.5 mm.




**Figs. 6–8.** *Armadillidium albanicum* (island Kérkira, SMNS 2173), ♂, 16.8 × 8.4 mm. – **6**. Pereiopod 1, frontal view. **7**. Ischium 7, frontal view. **8**. Ischium 7, caudal view. – Scales: 0.5 mm.




**Figs. 9–11.** *Armadillidium albanicum* (island Kérkira, SMNS 2173), ♂, 16.8 × 8.4 mm. – **9**. Pereion-epimeron 1, lateral view. **10**. Telson and uropods in situ, dorsal view. **11**. Pleopod-exopodite 1, dorsal view.

area of scales (Figs. 7–8). Male pleopod-exopodite 1 with pronounced triangular hind-lobe (Fig. 11), endopodite 1 with apex straight, the extreme tip slightly pointing outwards (SCHMALFUSS 1981: fig. 7).

Distribution (map Fig. 12)

For sure known from southern Albania, the Greek island Kérkira and the northwestern Greek mainland

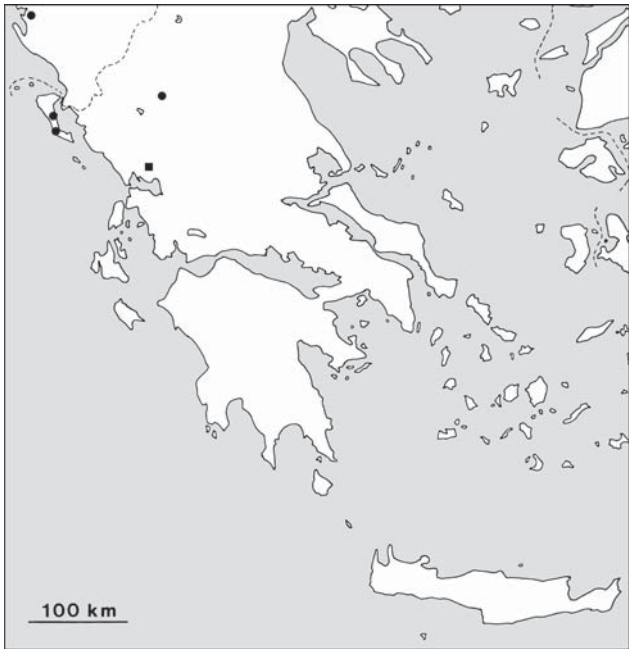



**Fig. 12.** Safe records of *Armadillidium albanicum* (●) and of *A. artense* (■).

(district Ioánnina, see record in the present paper). A record from the Aegean island Tínos is certainly wrong (compare STROUHAL 1966: 257).

Remarks

In a former publication (SCHMALFUSS 1981: 277, figs. 1–7) I have redescribed the type material of this species and designated a lectotype (SMNS T37); paralectotypes in SMNS (T39), ZMHB (Nr. 10293) and BMNH.

Perhaps *Armadillidium astriger* (non Koch, 1841) reported from Kérkira by VOGL (1876: 513) belongs to this species (compare STROUHAL 1927: 15, 1929: 91), but the material was not retrievable.

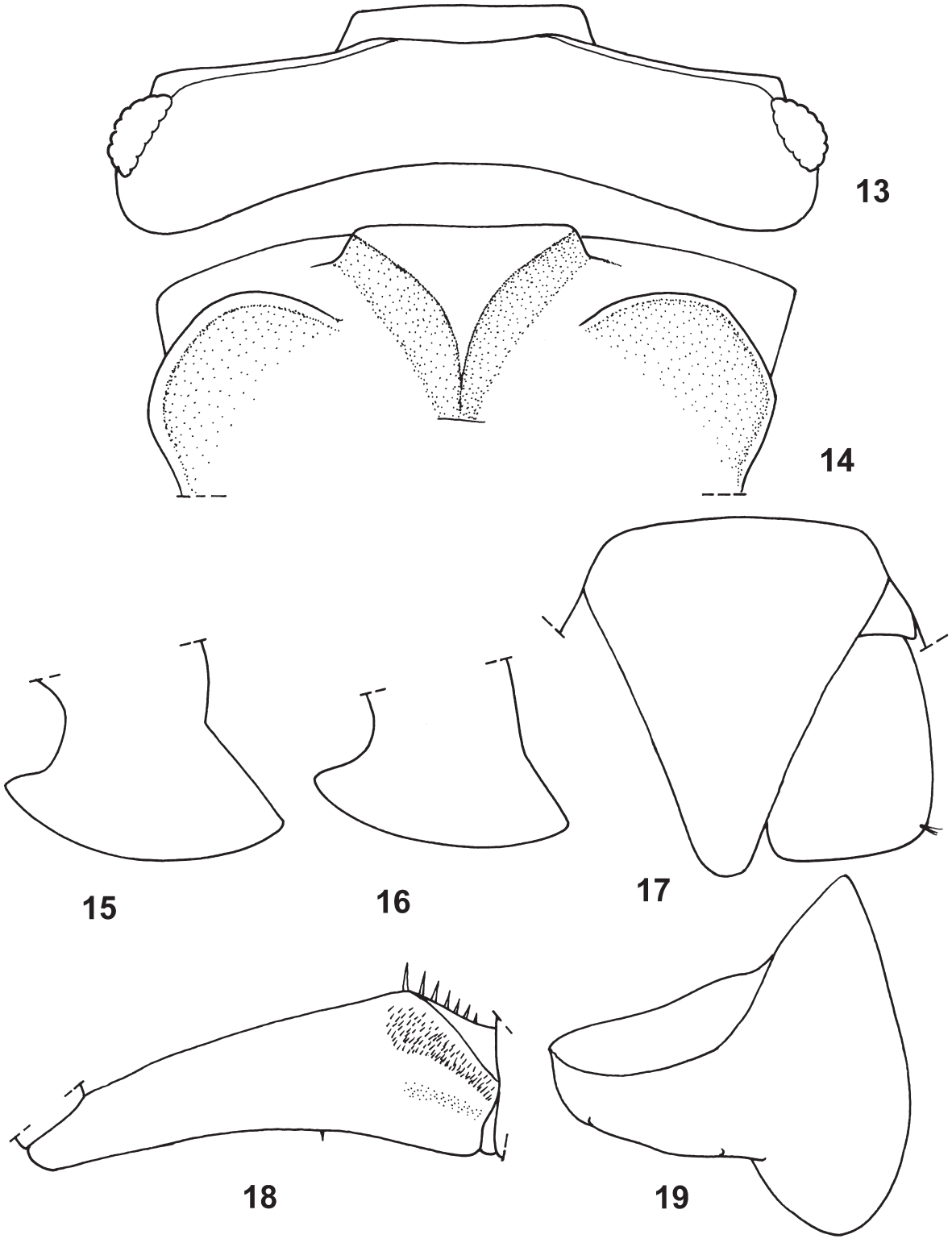
### 3.2 *Armadillidium artense* Strouhal, 1956
(Figs. 13–19, map Fig. 12)

Literature records

STROUHAL 1942: 149 (nomen nudum; GR, western mainland, surroundings of Árta); STROUHAL 1956: 599, figs. 22–27 (surroundings of Árta).

Material examined

**Greece**: 13 ex. (syntypes), western mainland, surroundings of Árta, leg. BEIER, 30.IV.–3.V.1932 (NMW). – 8 ex. (syntypes), as before, Petrovúni, leg. BEIER, 29.IV.1932 (NMW).




**Figs. 13–19.** *Armadillidium artense* (Petrovúni near Árta, syntypes). – **13**. ♂, 13.5 × 6.8 mm, head, dorsal view. **14**. ♂, 13.5 × 6.8 mm, head, frontal view. **15**. ♂, 7.2 mm wide, pereion-epimeron 1, lateral view. **16**. ♂, 6.5 mm wide, pereion-epimeron 1, lateral view. **17**. ♂, 13.5 × 6.8 mm, telson and uropods, dorsal view. **18**. ♂, 15 mm long, ischium 7, frontal view. **19**. ♂, 15 mm long, pleopod-exopodite 1, dorsal view.

Diagnostic characters

Maximum dimensions: 15.0 × 7.7 mm (Strouhal 1956).

Coloration: Bluish gray, females and juveniles lighter.

Cuticular structures: Tergites strongly tuberculated (stronger than *A. jonicum*).

Frontal shield from behind surpassing frontal margin, upper margin straight, laterally with rounded angles (Fig. 13); antennal lobes trapezoidal (Fig. 14). Hind margin of pereion-epimeron 1 variable, with obtuse angle or rounded, extreme shapes illustrated in Figs. 15–16. Telson longer than wide, with straight sides and rounded apex (Fig. 17). Flagellum of antenna in adults with distal segment slightly shorter than proximal one. Male ischium 7 ventrally concave, frontal side with distal hair-field (Fig. 18). Male pleopod-exopodite 1 with pointed triangular hind-lobe (Fig. 19), endopodite 1 with apex straight.

Distribution (map Fig. 12)

Greece, western mainland, surroundings of Árta.

Remarks

In the collection of the SMNS the species is not present. The drawings were made after type material, which I had loaned many years ago from the NMW. Strouhal had made slide preparations of pereiopods and pleopods of the two biggest males from the type series from Petrovúni. These preparations were at my disposal, the specimens were, however, not present in the investigated type material. Therefore no lectotype is designated.

### 3.3 *Armadillidium bicurvatum* Verhoeff, 1901

This species was treated in the 23rd contribution of this series (Schmalfuss 2006a). It is known from the western parts of Greece including the Peloponnese and western Crete and has also been found in southern Albania (Schmalfuss 2006a: map fig. 51).

### 3.4 *Armadillidium corcyraeum* Verhoeff, 1901 (Figs. 20–29, map Fig. 30)

Synonyms: *A. graecorum* Verhoeff, 1907, *A. odysseum* Verhoeff, 1901.

Literature records

Verhoeff 1901b: 68 (GR, Ionian island "Korfu" = Kérkira); Verhoeff 1901c: 138 (*A. odysseum*, island "Korfu" = Kérkira); Verhoeff 1907: 474 (*A. graecorum*, GR, western mainland district Préveza); Strouhal 1927: 25 (*A. odysseum*, Ionian islands "Korfu" = Kérkira and "S. Maura" = Lefkáda); Strouhal 1929: 95, figs. 30–32 (island "Korfu" = Kérkira); Strouhal 1936: 99 (island "Korfu" = Kérkira); Strouhal 1937a: 129 (island "Korfu" = Kérkira); Strouhal 1956: 597 (island "Korfu" = Kérkira); Strouhal 1966: 295, figs. 23–28 (island "Korfu" = Kérkira); Schmalfuss 1981: 281, figs. 28–34 (GR, Ionian island Paxí; not: central mainland, district Tríkala, see Remarks); Schmalfuss 1985a: 10 (GR, Ionian island Paxí); Schmalfuss 1985b: 291 (GR, Ionian island Lefkáda; western mainland, districts Thesprotía and Préveza).

The reports from the Ionian islands Kefalloniá (Strouhal 1927: 25) and Zákinthos (= "Zante") (Strouhal 1939: 184) need confirmation, because they refer to females only. A collection from Kefalloniá and Zákinthos (SMNS, leg. Erhard & Schmalfuss 1996) with more than 600 specimens of *Armadillidium* does not contain any specimens of *A. corcyraeum*.

Material examined

**Greece**: 1 ex., Ionian island Kérkira, Sidári, leg. Schawaller & Scheuern, 21.IV.1981 (SMNS 1397). – 1 ex., island Kérkira, Nimfés, leg. Malicky, 28.IX.1980 (SMNS 1376). – 5 ex., island Kérkira, Kávos, leg. Schawaller & Scheuern, 13.IV.1981 (SMNS 1394). – 49 ex., Ionian island Paxí, leg. Hausen, IV.1979 (SMNS 1139), and leg. Schawaller & Scheuern, 17.–19.IV.1981 (SMNS 1391, 1422, 1424, 1425). – 18 ex., Ionian island Lefkáda, leg. Goessler, VII.1910 (SMNS 2066). – 2 ex., western mainland, prefecture Ioánnina, Lake of Ioánnina, northeastern shore, leg. Vigna, 8.XI.1981 (SMNS 2152). – 14 ex., western mainland, prefecture Thesprotía, 23 km S of Igumenítsa, 150 m, maquis and *Quercus macrolepis*, leg. Schmalfuss, 7.V.1994 (SMNS 2425). – 12 ex., prefecture as before, Sívota, 25 km S of Igumenítsa, coastal maquis, leg. Schawaller, 6.V.1994 (SMNS 2444). – 15 ex., as before, 12 km NE of Igumenítsa, leg. Schawaller, 6.V.1994 (SMNS 2445). – 4 ex., as before, 2 km NE of Kartéri, leg. Baehr, 17.IV.1983 (SMNS 2016). – 6 ex., as before, Mórfi, leg. Baehr, 18.IV.1983 (SMNS 2000), and leg. Thaler & Knoflach, 21.IX.1996 (SMNS 2790). – 2 ex., western mainland, prefecture Préveza, 3 km N of Mirsíni, leg. Malicky, 16.IV.1984 (SMNS 2112). – 5 ex., as before, N of Préveza, 500 m, leg. Baehr, 18.IV.1983 (SMNS 2014).

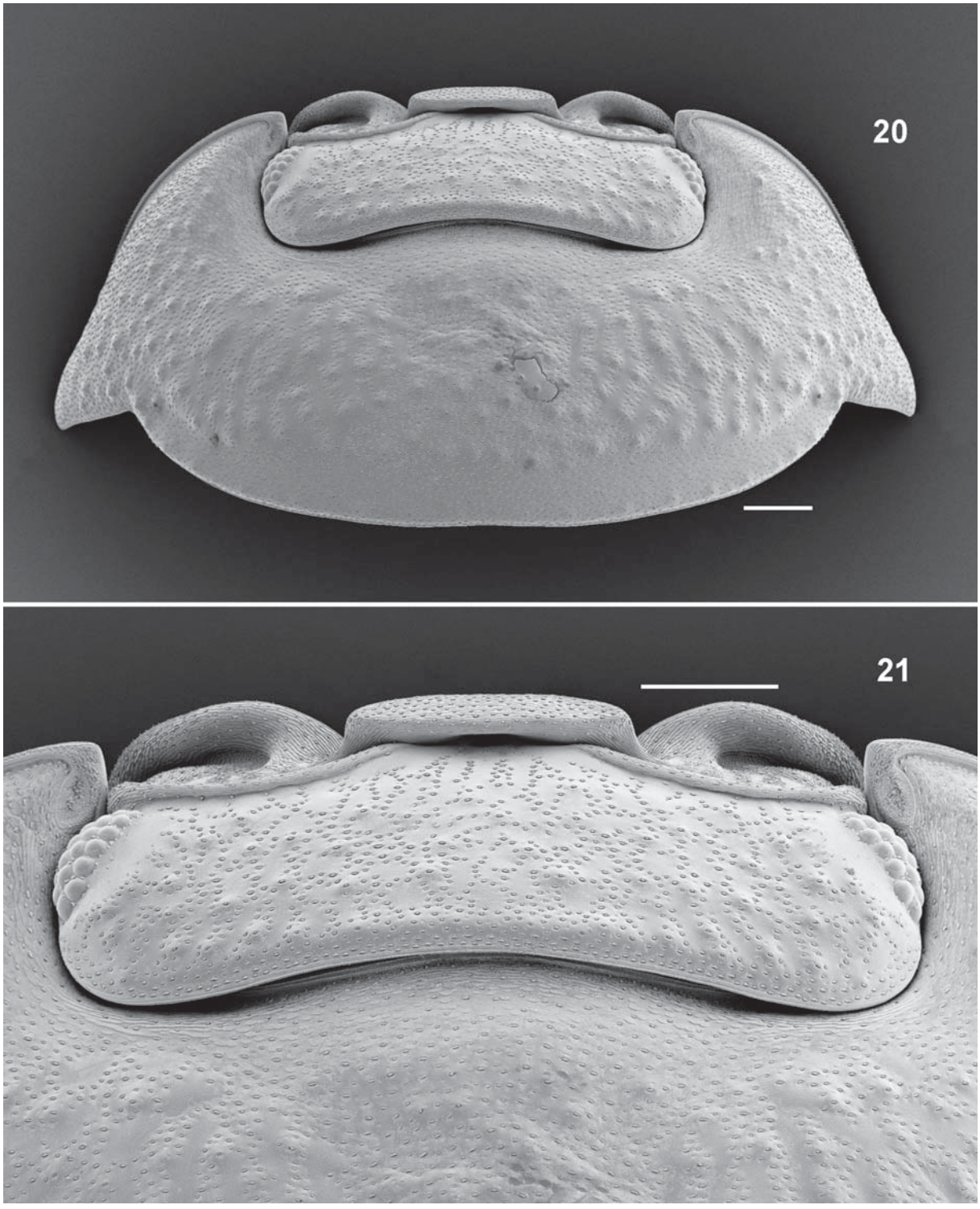
Diagnostic characters

Maximum dimensions: 19.0 × 8.5 mm.

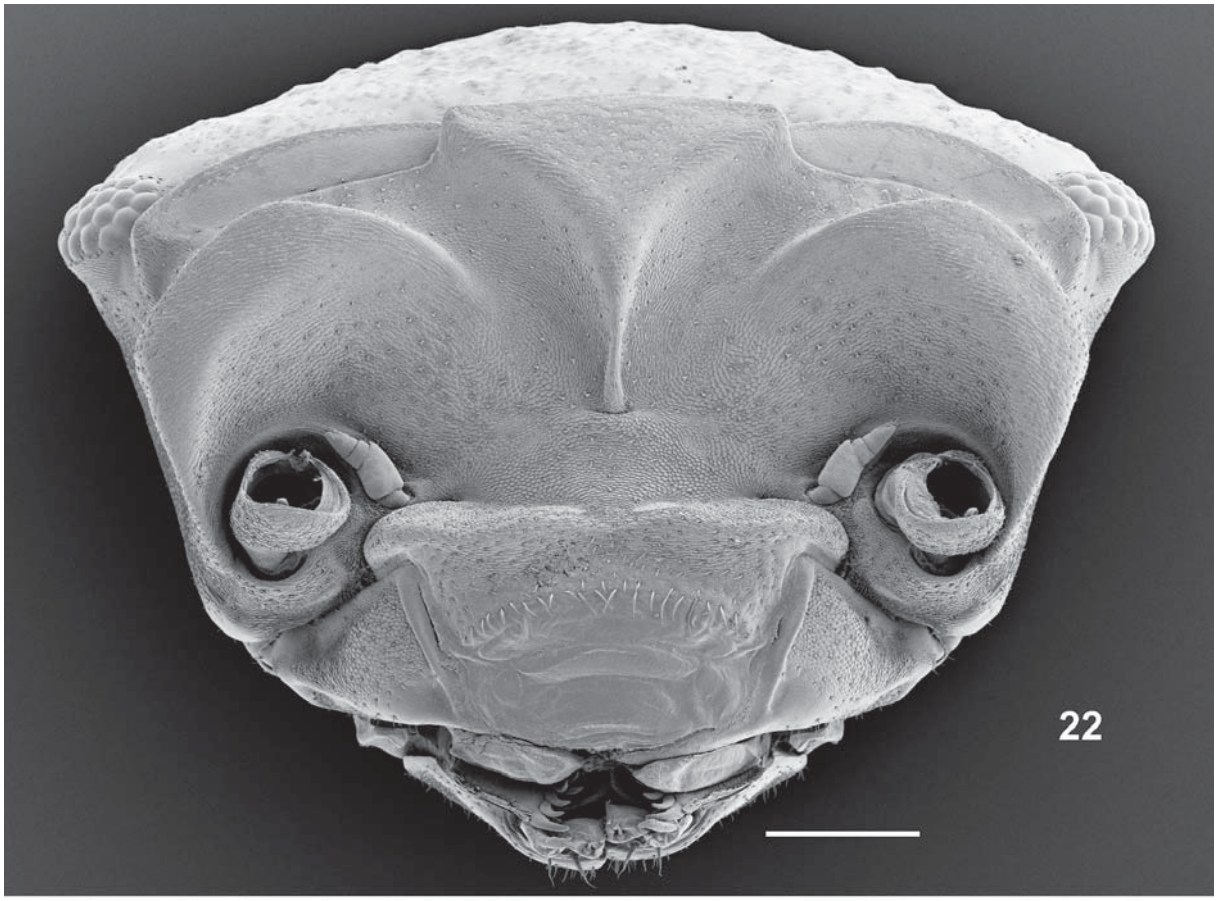
Coloration: Tergites gray, many specimens from the islands and the coast with three rows of white spots on pereion tergites, sometimes a white band on pereion tergite 1, also uropods can be white. Specimens from inland localities without white spots, uniformly gray. Juveniles brownish with epimera lighter.

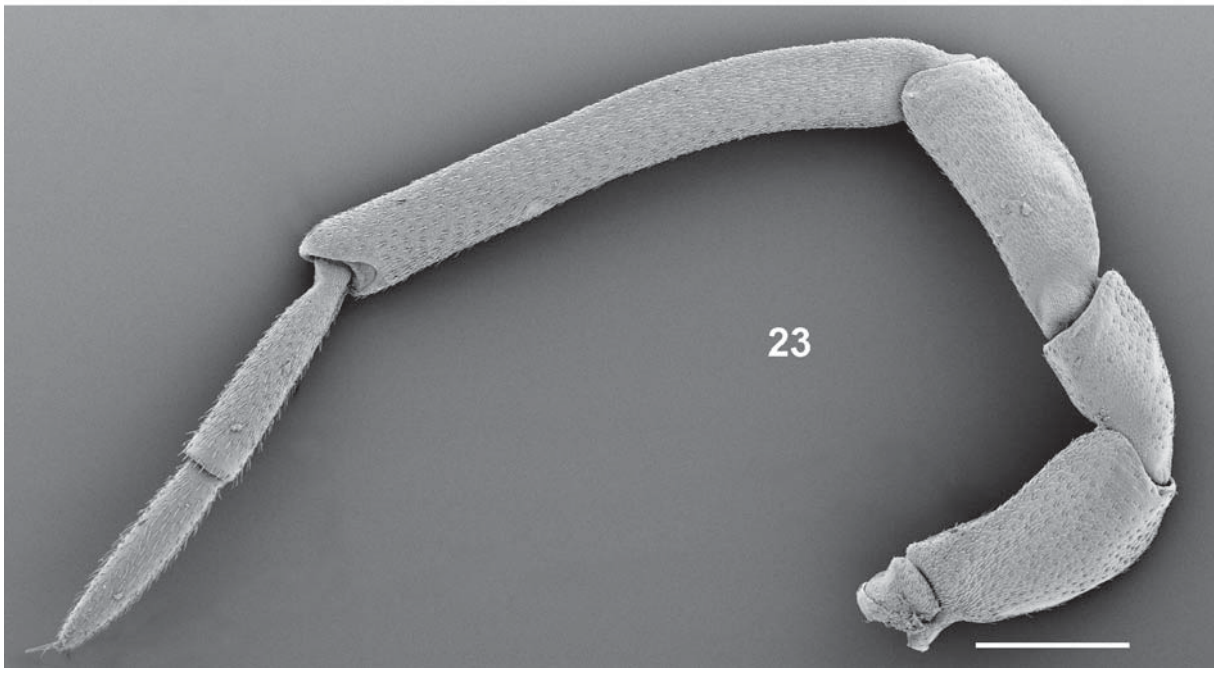
Cuticular structures: Variable, tergites from heavily to faintly granulated (Fig. 20).

Frontal shield from behind slightly surpassing frontal margin of head, upper margin straight, with oblique angles laterally (Figs. 20–21); antennal lobes in frontal view trapezoidal with rounded medial part (Fig. 22). Hind margin of pereion-epimeron 1 with distinct or rounded angle (Fig. 27). Telson as wide as long, with nearly straight sides and broadly rounded or truncate apex (Fig. 28). Antenna see Fig. 23, the two segments of the flagellum of nearly the same length. Male carpus 1 with brush of short spines (Fig. 24). Male ischium 7 ventrally slightly concave, frontally with distal hair-field (Figs. 25–26). Male pleopod-exopodite 1 with long pointed hind-lobe (Fig. 29), endopodite 1 with apex straight, the very tip slightly pointing outwards (Schmalfuss 1981: fig. 34).

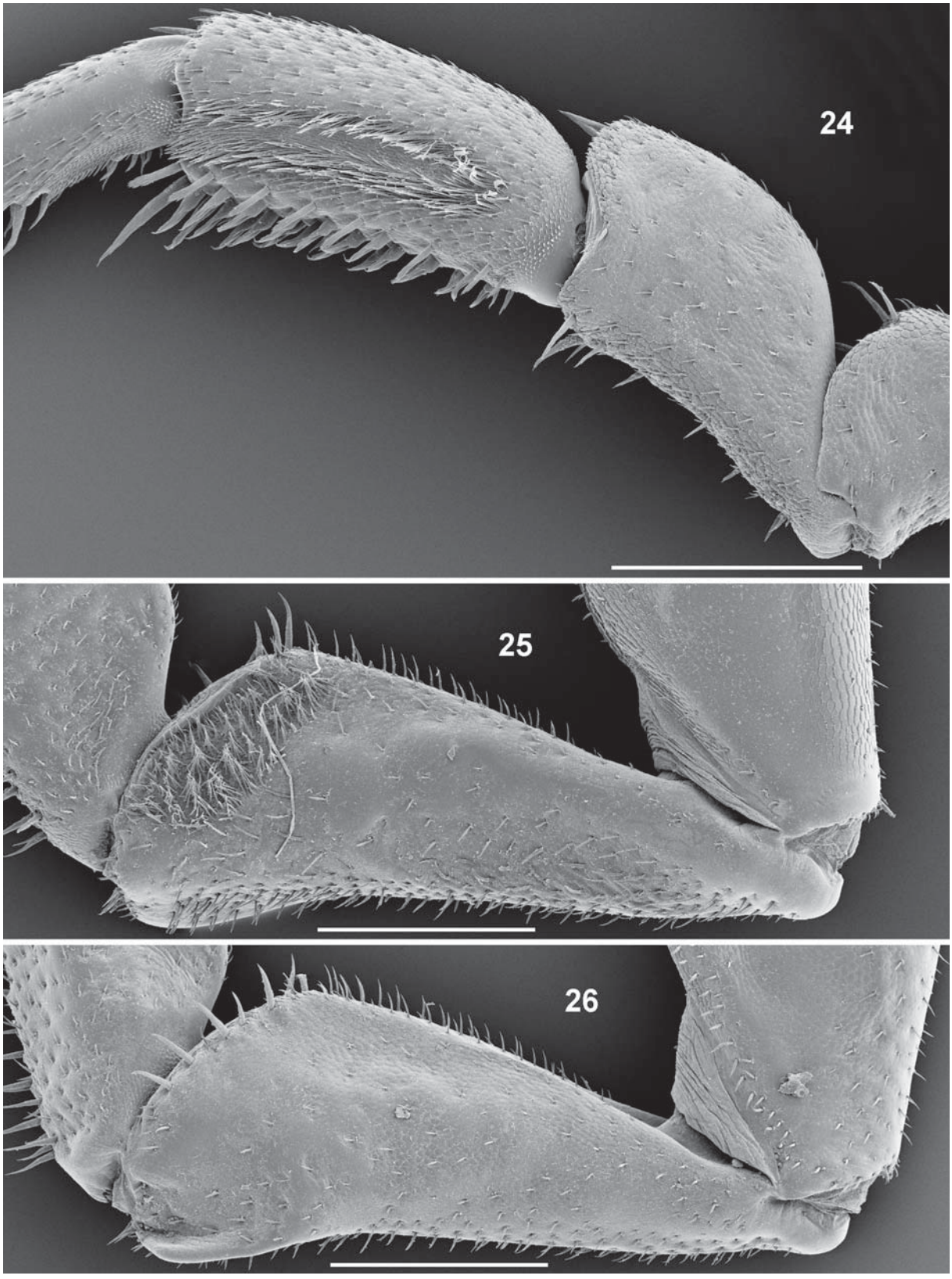



**Figs. 20–21.** *Armadillidium corcyraeum* (S of Igumenítsa, SMNS 2444), ♀, 13.5 × 6.5 mm. – **20**. Head and pereion-tergite 1, dorsal view. **21**. Head, dorsal view. – Scales: 0.5 mm.

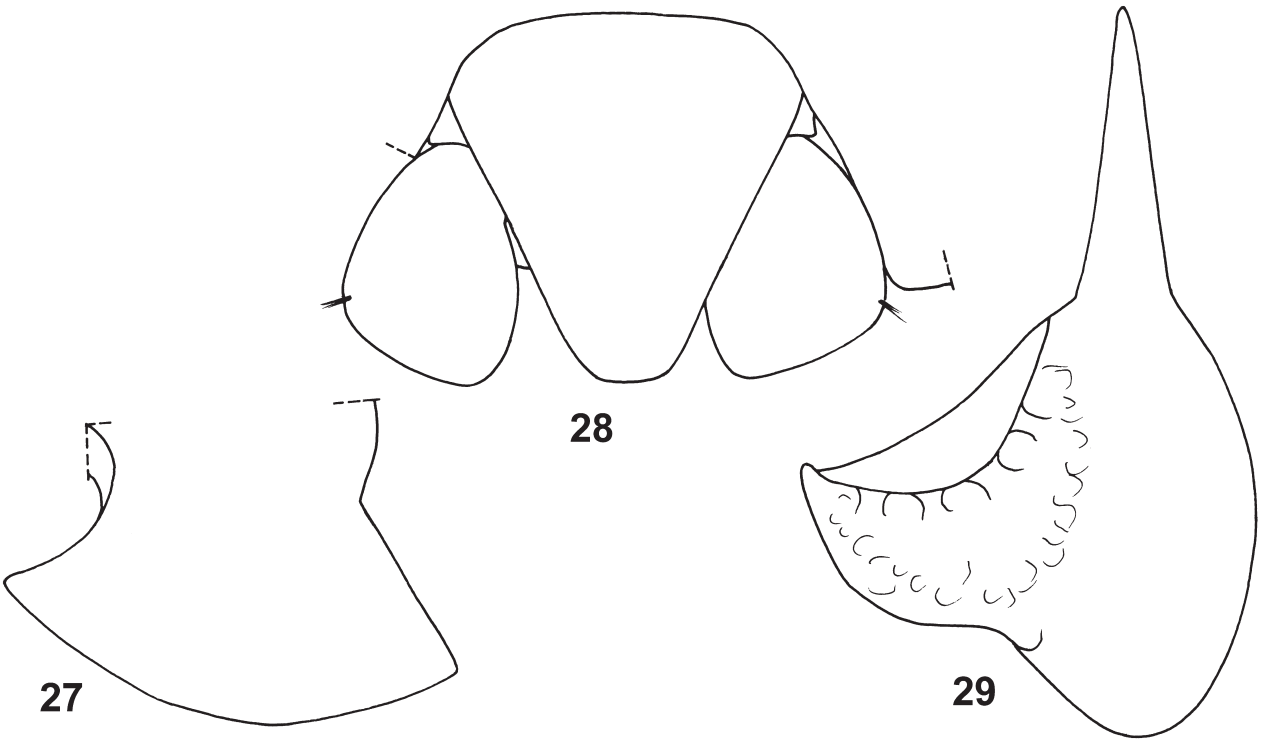



**Figs. 22–23.** *Armadillidium corcyraeum* (S of Igumenítsa, SMNS 2444). – **22**. ♀, 15.0 × 6.6 mm, head, frontal view. **23**. ♂, 15.5 × 6.8 mm, antenna. – Scales: 0.5 mm.




**Figs. 24–26.** *Armadillidium corcyraeum* (S of Igumenítsa, SMNS 2444), ♂, 15.5 × 6.8 mm. – **24**. Pereiopod 1, frontal view. **25**. Ischium 7, frontal view. **26**. Ischium 7, caudal view. – Scales: 0.5 mm.




**Figs. 27–29.** *Armadillidium corcyraeum* (S of Igumenítsa, SMNS 2444), ♂, 15.5 × 6.8 mm. – **27**. Pereion-epimeron 1, lateral view. **28**. Telson and uropods in situ, dorsal view. **29**. Pleopod-exopodite 1, dorsal view.

Distribution (map Fig. 30)

Known for sure from the Ionian islands Kérkira and Lefkáda and the adjacent mainland of the western Epirus, but certainly to be expected also in southern Albania.

Remarks

Strouhal (1929: 95) synonymized *A. odysseum* Verhoeff, 1901 with *A. corcyraeum*. I have examined type material of *A. graecorum* Verhoeff, 1907 and came to the conclusion, after comparison with the type specimens of *A. corcyraeum*, that it is also a synonym of this species (Schmalfuss 1981: 281). On the other hand *A. simile* seems to be a separate species, contrary to my suggestion made in Schmalfuss (1985b: 291). The samples from Kalambaka (SMNS 1721, 1843) which were published as *A. corcyraeum* in Schmalfuss (1981) are also considered a different species and will be described in a future contribution.

The species exhibits a certain variability concerning the shape of the pereion-epimeron 1, the granulation of the tergites, and the coloration. If the specimen figured as *A. corcyraeum* from Kérkira in Strouhal (1966: figs. 24–28) belongs to this species, also the male pleopod-exopodite 1 shows a variable structure. Further detailed studies may reveal *A. corcyraeum* to be a sort of superspecies, which has to be split into a number of separate entities on the species level.

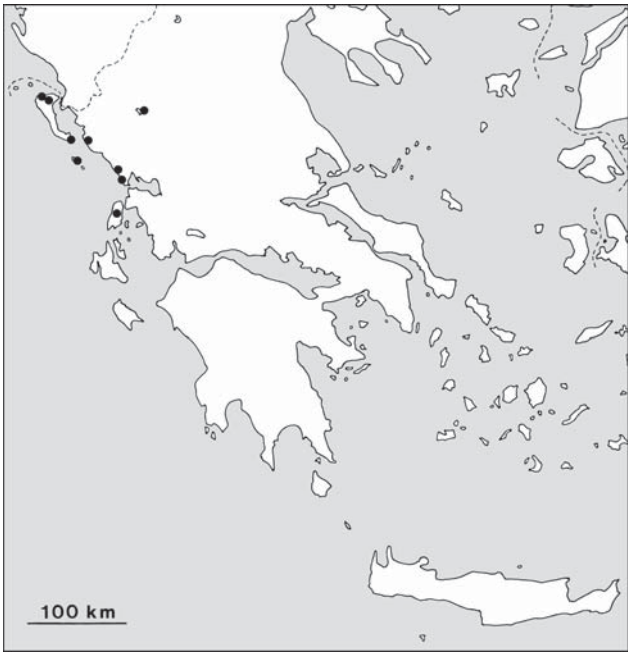
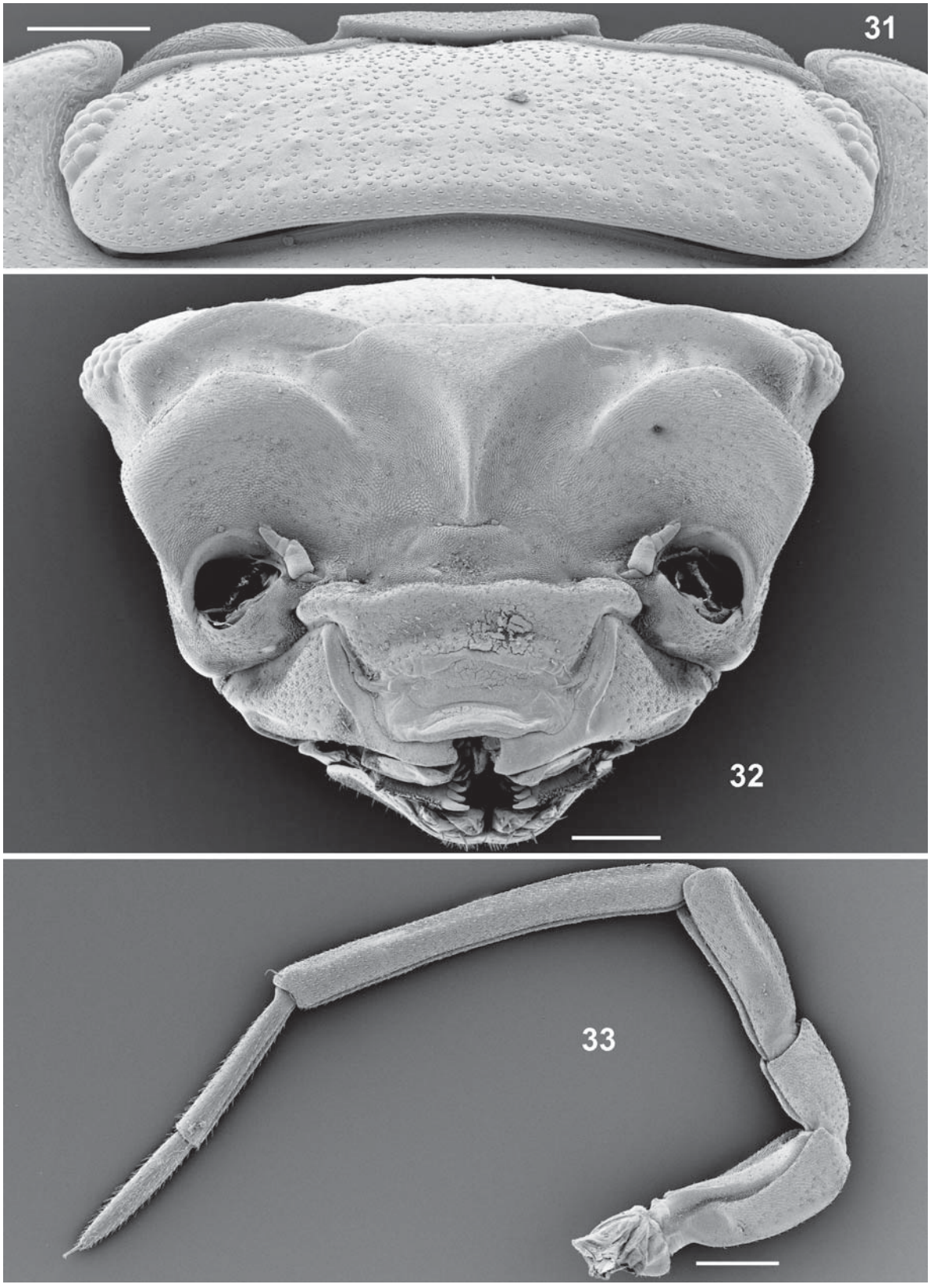
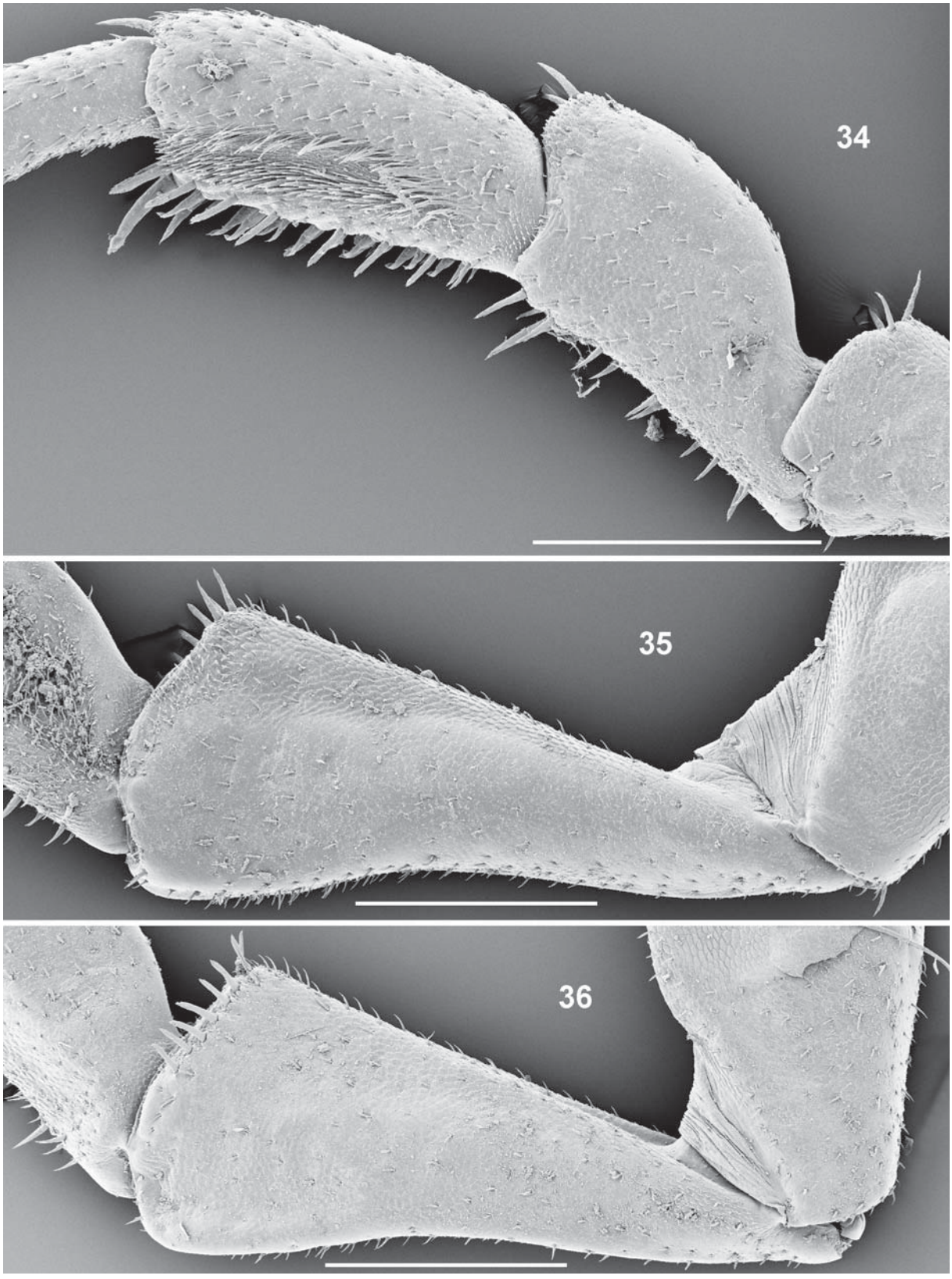


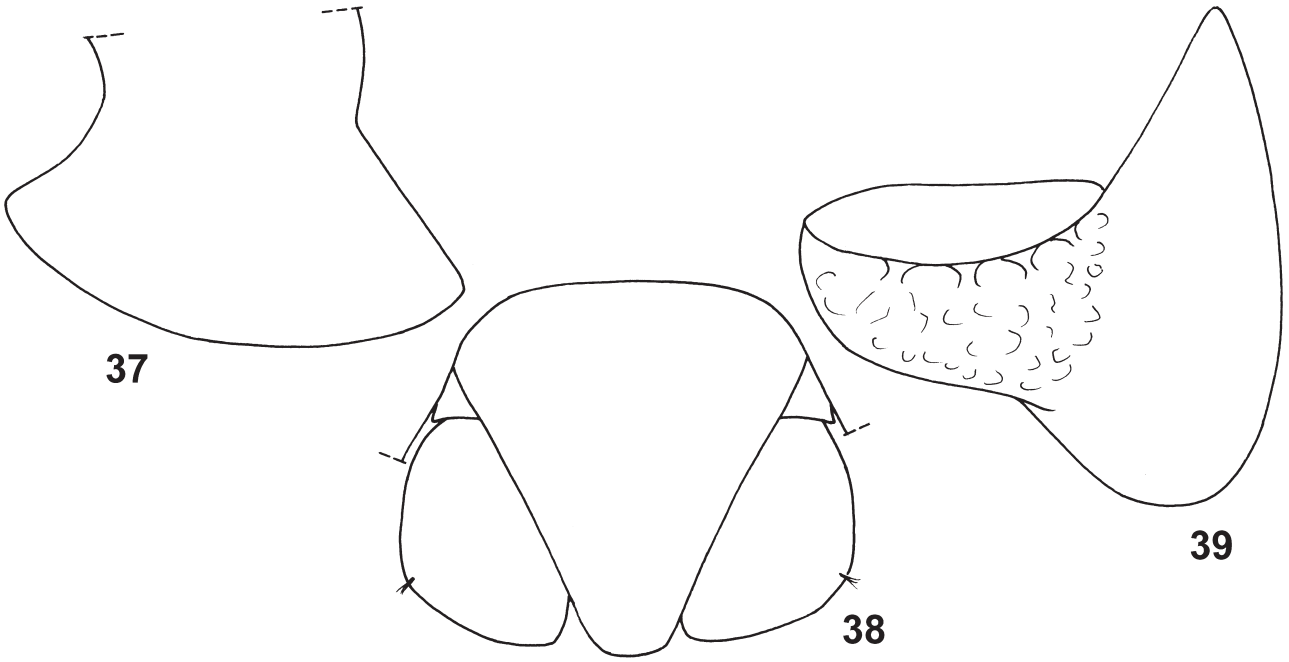

**Fig. 30.** Records of *Armadillidium corcyraeum*.




**Figs. 31–33.** *Armadillidium epiroticum* (31: prefecture Àrta, SMNS 2134, ♂, 12.0 × 5.5 mm; 32–33: prefecture Préveza, SMNS 2021, ♀, 19.2 × 9.2 mm). – **31**. Head, dorsal view. **32**. Head, frontal view. **33**. Antenna. – Scales: 0.5 mm.




**Figs. 34–36.** *Armadillidium epiroticum* (prefecture Àrta, SMNS 2134), ♂, 12.2 × 5.8 mm. – **34**. Pereiopod 1, frontal view. **35**. Ischium 7, frontal view. **36**. Ischium 7, caudal view. – Scales: 0.5 mm.




**Figs. 37–39.** *Armadillidium epiroticum* (prefecture Àrta, SMNS 2134), ♂, 12.2 × 5.8 mm. – **37**. Pereion-epimeron 1, lateral view. **38**. Telson and uropods in situ, dorsal view. **39**. Pleopod-exopodite 1, dorsal view.

### 3.5 *Armadillidium epiroticum* Strouhal, 1956 (Figs. 31–39, map Fig. 40)

#### Literature records

STROUHAL 1942: 148 (*A. jonicum epiroticum*, nomen nudum; GR, western mainland, surroundings of mountain Xerovúni in the southeastern corner of the prefecture Ioánnina); STROUHAL 1956: 598, figs. 18–19 (*A. jonicum epiroticum*; locality as before).

#### Material examined

**Greece**: 12 ex. and appendage preparations of two further ♂♂ (syntypes), western mainland, province Epirus, prefecture Árta, Xerovúni Mountain, Nisísta, 700–800 m, leg. BEIER, 30.V.–1.VI.1933 (NMW). – 2 ex., prefecture Árta, northern shore of the Amvrakikós Gulf, Salaóra, leg. WOLFF & LOOSJES, 30.IV.1964 (SMNS 2134). – 1 ex., province Epirus, prefecture Préveza, 2 km E of Kanalláki, leg. BAEHR, 18.IV.1983 (SMNS 2021).

#### Diagnostic characters

Maximum dimensions: 19.5 × 9.0 mm (STROUHAL 1956).

Coloration: Dark gray, juveniles brownish.

Cuticular structures: Tergites weakly granulated (more weakly than *A. jonicum*).

Frontal shield from behind not surpassing frontal margin, upper margin straight (Fig. 31); antennal lobes trapezoidal (Fig. 32). Hind margin of pereion-epimeron 1 with sharp angle (Fig. 37). Telson nearly as wide as long, with straight sides and rounded apex (Fig. 38). Flagellum of antenna in adults with distal segment slightly shorter than proximal one (Fig. 33). Male carpus 1 with weakly developed ventral brush of spines (Fig. 34). Male ischium 7 ventrally slightly concave, frontal side without distal

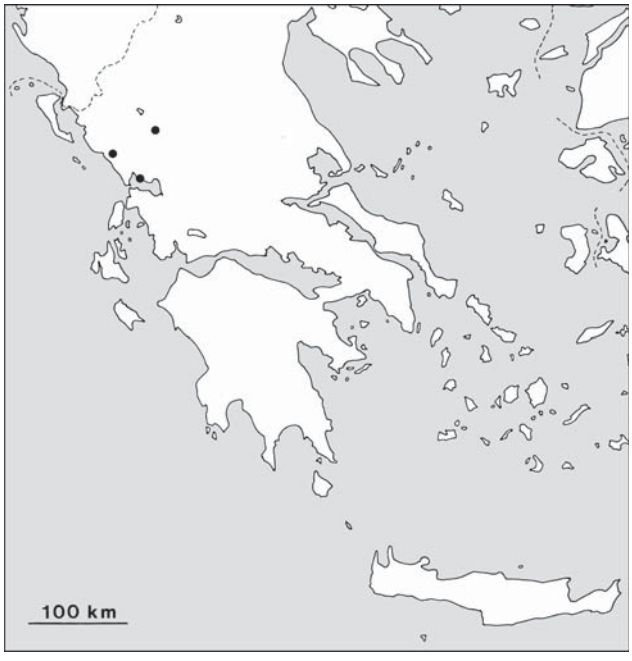
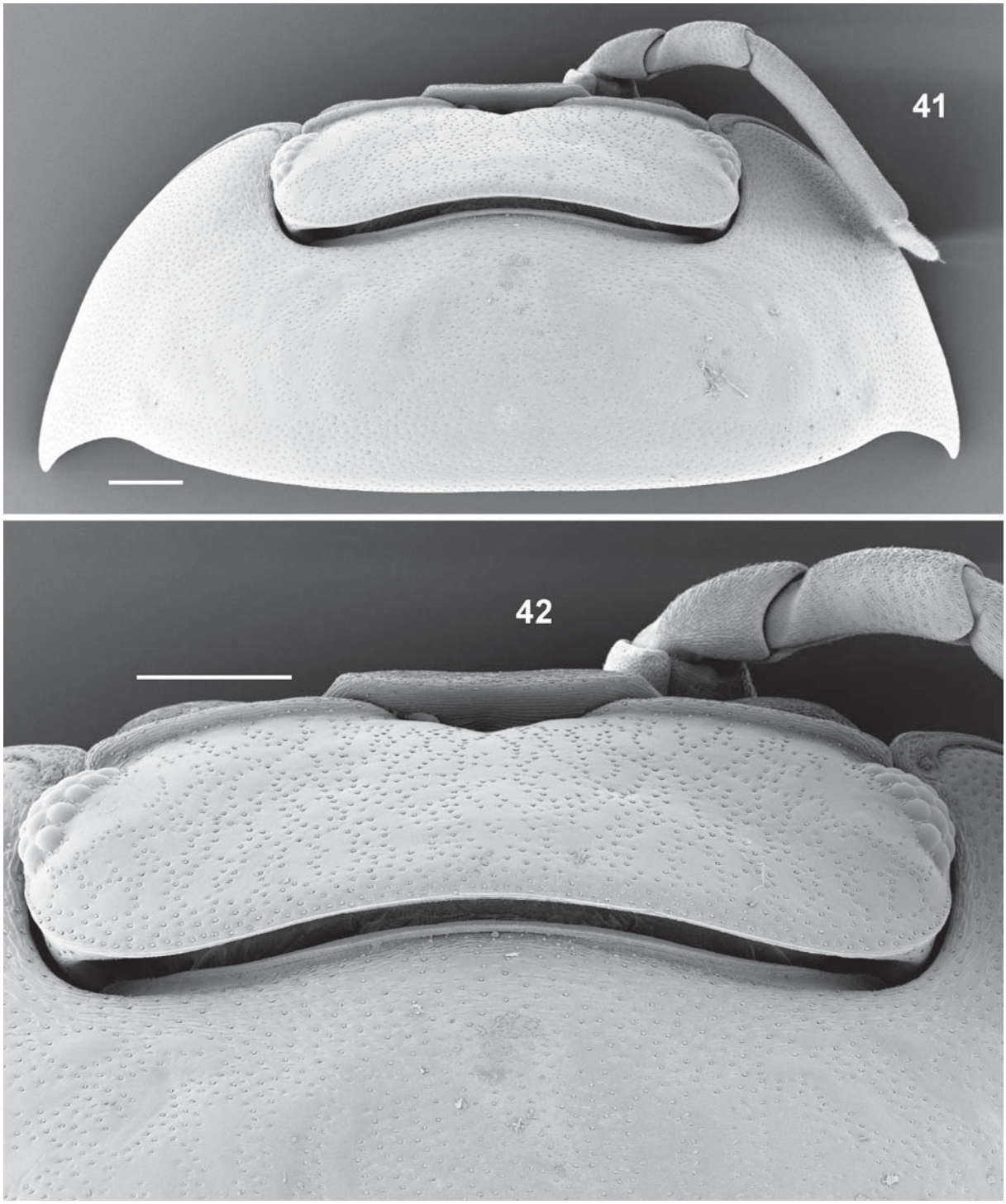
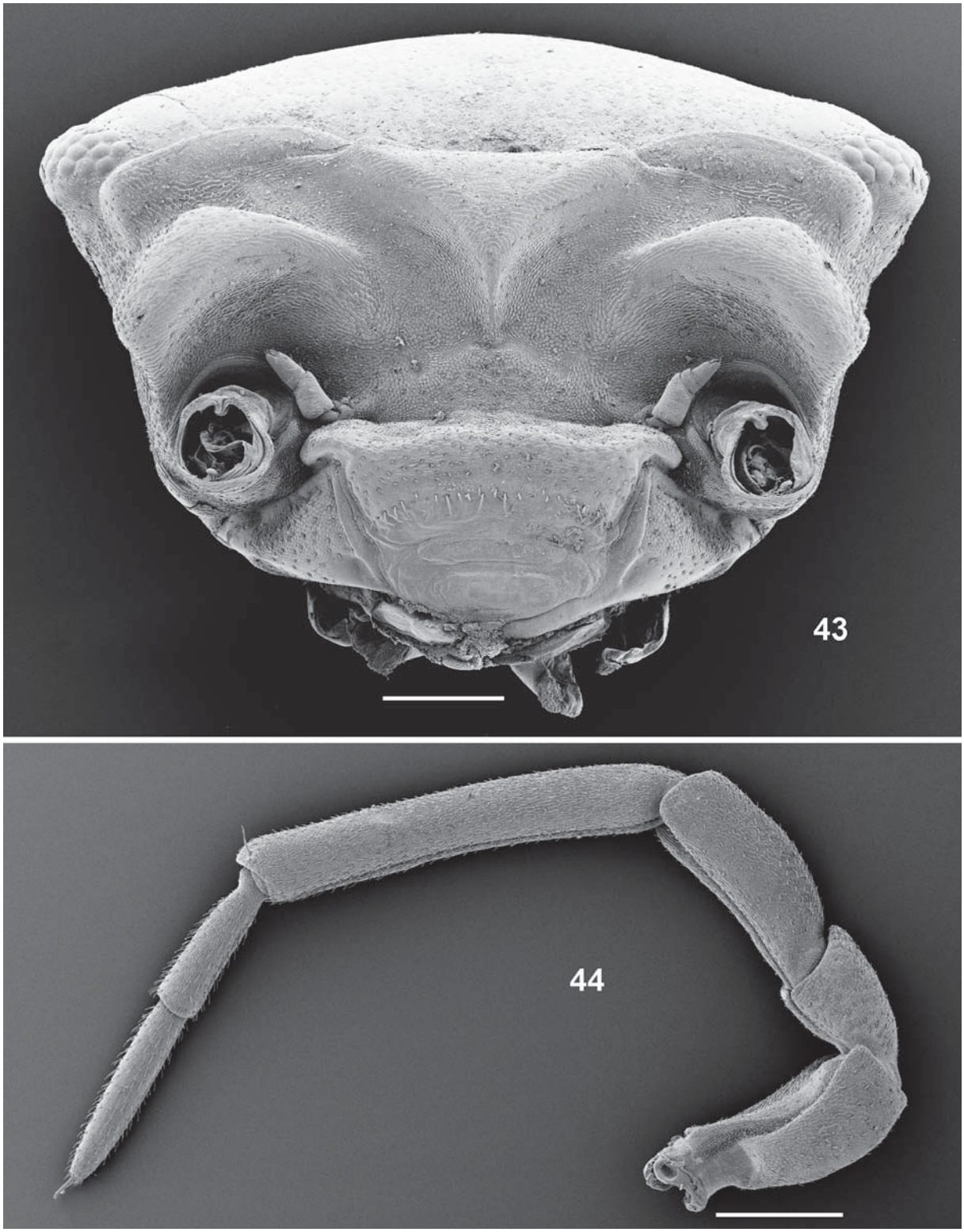


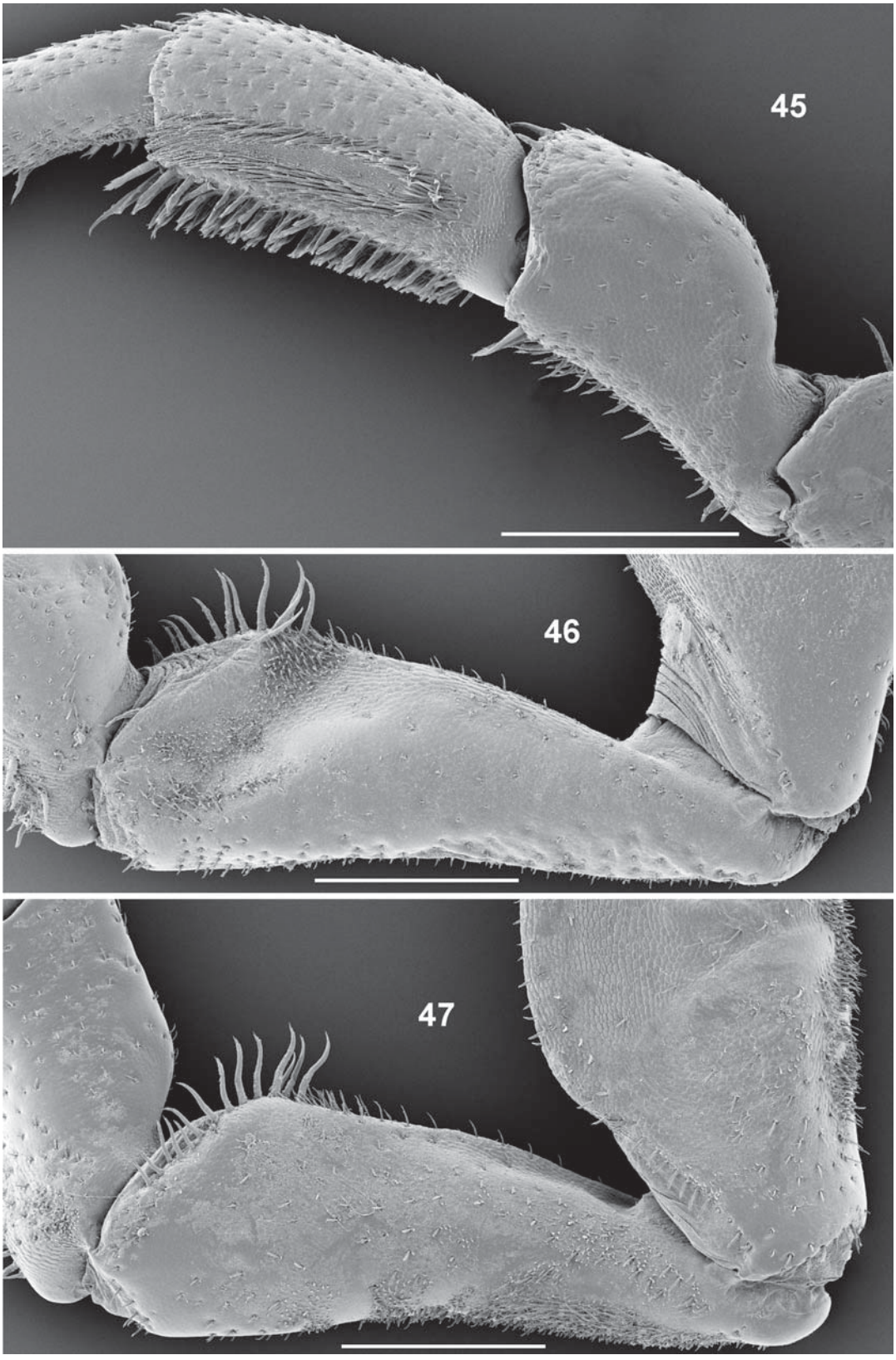

**Fig. 40.** Records of *Armadillidium epiroticum*.



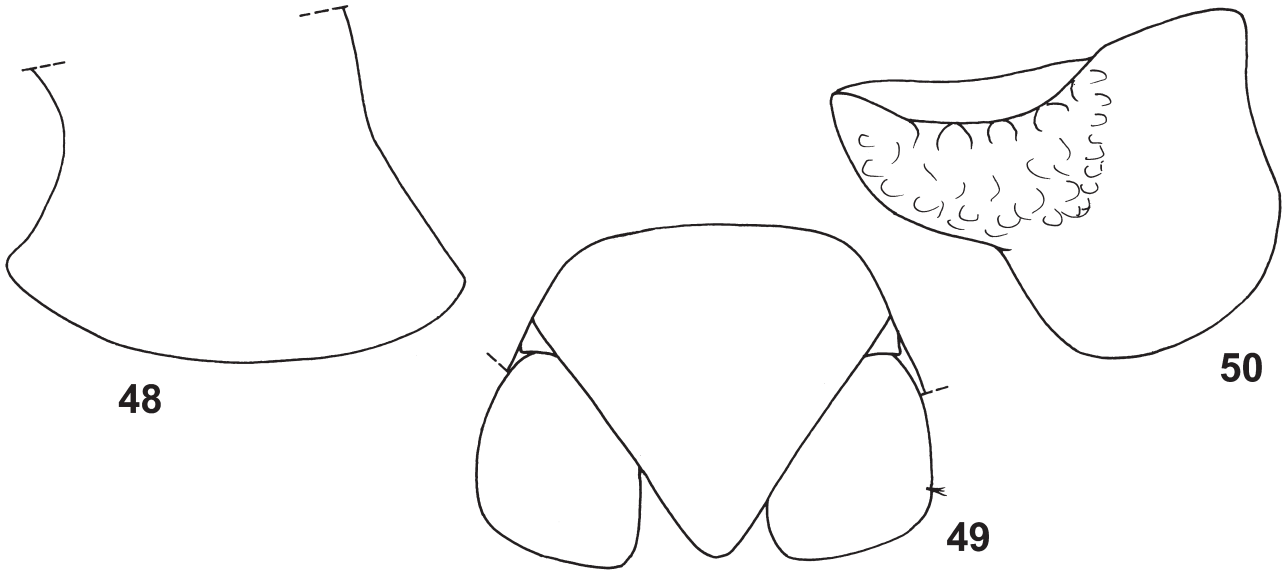

**Figs. 41–42.** *Armadillidium frontetriangulum* (Tímfi Mountain, SMNS 2869), ♂, 12.3 × 5.8 mm. – **41**. Head and pereion-tergite 1, dorsal view. **42**. Head, dorsal view. – Scales: 0.5 mm.




**Figs. 43–44.** *Armadillidium frontetriangulum* (island Kérkira, SMNS 2172), ♂, 15.2 × 7.0 mm. – **43**. Head, frontal view. **44**. Antenna. – Scales: 0.5 mm.




**Figs. 45–47.** *Armadillidium frontetriangulum* (island Kérkira, SMNS 2172), ♂, 15.2 × 7.0 mm. – **45**. Pereiopod 1, frontal view. **46**. Ischium 7, frontal view. **47**. Ischium 7, caudal view. – Scales: 0.5 mm.




**Figs. 48–50.** *Armadillidium frontetriangulum* (island Kérkira, SMNS 2172), ♂, 15.2 × 7.0 mm. – **48**. Pereion-epimeron 1, lateral view. **49**. Telson and uropods in situ, dorsal view. **50**. Pleopod-exopodite 1, dorsal view.

hair-field (Figs. 35–36). Male pleopod-exopodite 1 with pointed triangular hind-lobe (Fig. 39), endopodite 1 with apex straight.

Distribution (map Fig. 40)

Greece, western mainland, southernmost part of province Epirus.

Remarks

STROUHAL had made slide preparations of pereiopods and pleopods from type specimens. These preparations were at my disposal, the specimens were, however, not present in the investigated type material loaned from the NMW. Therefore no lectotype is designated.

This taxon was described as subspecies of *A. jonicum*. The somatic characters (head, pereion-epimera, telson) are nearly identical with the nominate form of *jonicum*, the male sexual characters (ischium 7, pleopod-exopodite 1) show, however, differences which are inside the genus *Armadillidium* normally used as criteria for a separate species status. Thus *epiroticum* is here considered a separate species.

### 3.6 *Armadillidium frontetriangulum* Verhoeff, 1901 (Figs. 41–50, map Fig. 51)

Literature records

VERHOEFF 1901c: 138 (GR, Ionian island Kérkira = Korfu); VERHOEFF 1902: 243 (GR, western mainland, prefecture Ioánnina, "Han Driskos", which is near the village Vasilikí E of Lake of Ioánnina); STROUHAL 1927: 34 (GR, Ionian island Kefalloniá); STROUHAL 1936: 105, figs. 23–24 (Ionian island Kérkira); STROUHAL 1937a: 129 (Ionian island Kérkira); STROUHAL 1956: 611 (GR, western mainland, southeastern corner of prefecture Ioánnina, and northern part of prefecture Préveza); STROUHAL 1966: 304 (Ionian island Kérkira); SCHMALFUSS 1981: 283, figs. 42–47.

Material examined

**Greece**: 1 ♂, Ionian island Kérkira, Pantokrátoras, near Spartílas, leg. HAUSER, 9.IV.1972 (SMNS 2172). – 3 ex., province Epirus, prefecture Ioánnina, Tímfi Mountain, Monódendri, 1000–1500 m, leg. BARTSCH, 21.VI.2005 (SMNS 2869). – 1 ♀, province Epirus, prefecture Thesprotía, 30 km S of Igumenítsa, Mórfi, leg. THALER & KNOFLACH, 21.IX.1996 (SMNS 2790).

Diagnostic characters

Maximum dimensions: 15.0 × 7.5 mm.

Coloration: Dark gray, some population with five rows of yellowish spots on the tergites.

Cuticular structures: Tergites smooth.

Frontal shield from behind slightly surpassing frontal margin, upper margin straight (Figs. 41–42); antennal lobes trapezoidal (Fig. 43). Hind margin of pereion-epimeron 1 with flat rounded angle (Fig. 48). Telson slightly shorter than wide, with straight sides and pointed apex (Fig. 49). Flagellum of antenna with distal segment slightly shorter than proximal one (Fig. 44). Male carpus 1 ventrally with brush of spines (Fig. 45). Male ischium 7 ventrally nearly straight, frontal side with distal groove and small hair-field (Figs. 46–47). Male pleopod-exopodite 1 without hind-lobe, medial margin concave (Fig. 50), endopodite 1 with apex straight.

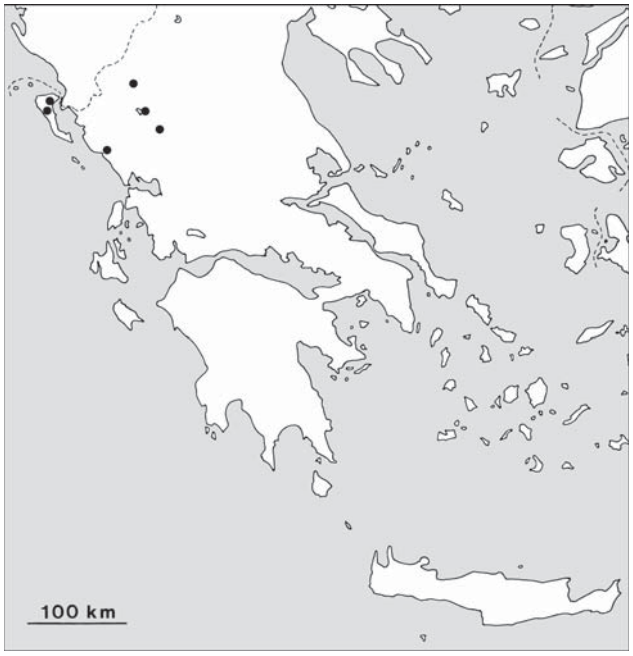



**Fig. 51.** Records of *Armadillidium frontetriangulum*.

Distribution (map Fig. 51)

Greece, Ionian island Kérkira and the southern part of province Epirus on the western mainland; the record from the Ionian island Kefalloniá (Strouhal 1927) seems doubtful; Strouhal mentions the species without details on collecting data, and we have not found the species on Kefalloniá during a collecting mission in 1996 which had yielded more than 600 *Armadillidium* specimens.

Remarks

The species seems to be the next relative of *A. janinense*, conspicuous common derived characters are the male basipodite 7 with hairy setae along medial margin, male ischium 7 with ventral hair-field on caudal side, and the specific shape of male pleopod-exopodite 1 with medial margin concave.

### 3.7 *Armadillidium granulatum* Brandt, 1833

The species has been treated in the 23rd contribution of this series (Schmalfuss 2006a). It is known from the coasts of the Mediterranean Sea, east to Asia Minor and Libya, and the southwestern coast of the Black Sea; isolated records exist from the Atlantic coast of Portugal and northern France. A map of the overall distribution is found in Schmalfuss (2000: fig. 3), safe Greek records are mapped in fig. 64 in Schmalfuss (2006a). For the latter map only samples were used which were investigated by the author, because some of the literature records are doubtful. In Strouhal (1956: 594) *A. granulatum* is reported for the southernmost corner of the Epirus (Préveza). This author usually made reliable identifications, so the species can be included in the inventory of the province Epirus.

### 3.8 *Armadillidium humectum* Strouhal, 1937

The species has been treated in the 23rd contribution of this series (Schmalfuss 2006a). It is known from the western part of Greece (Ionian islands, western mainland and northern Peloponnes) (Schmalfuss 2006a: map fig. 75). In addition to the records listed in the mentioned publication a further sample from the Epirus was found in the SMNS collection: 2 ex., Greece, province Epirus, prefecture Thesprotía, Platariá 12 km S of Igumentítsa, sandy beach, leg. Schawaller, 7.V.1994 (SMNS 2447). In addition to these Greek records it has also been reported from the southwestern coast of Albania (Valona = Vlorë) (Arcangeli 1952: 8).

### 3.9 *Armadillidium inflatum* Verhoeff, 1907 (Figs. 52–58)

Literature records

Verhoeff 1907: 490 (GR, "Epirus"); Schmalfuss 1981: 285, figs. 48–54.

Material examined

The collection of the SMNS does not contain any samples of this species, so I reproduce the drawings of the diagnostic characters which I published in 1981 and which were based on the holotype ♂.

Diagnostic characters

Maximum dimensions: 11 × 6 mm.

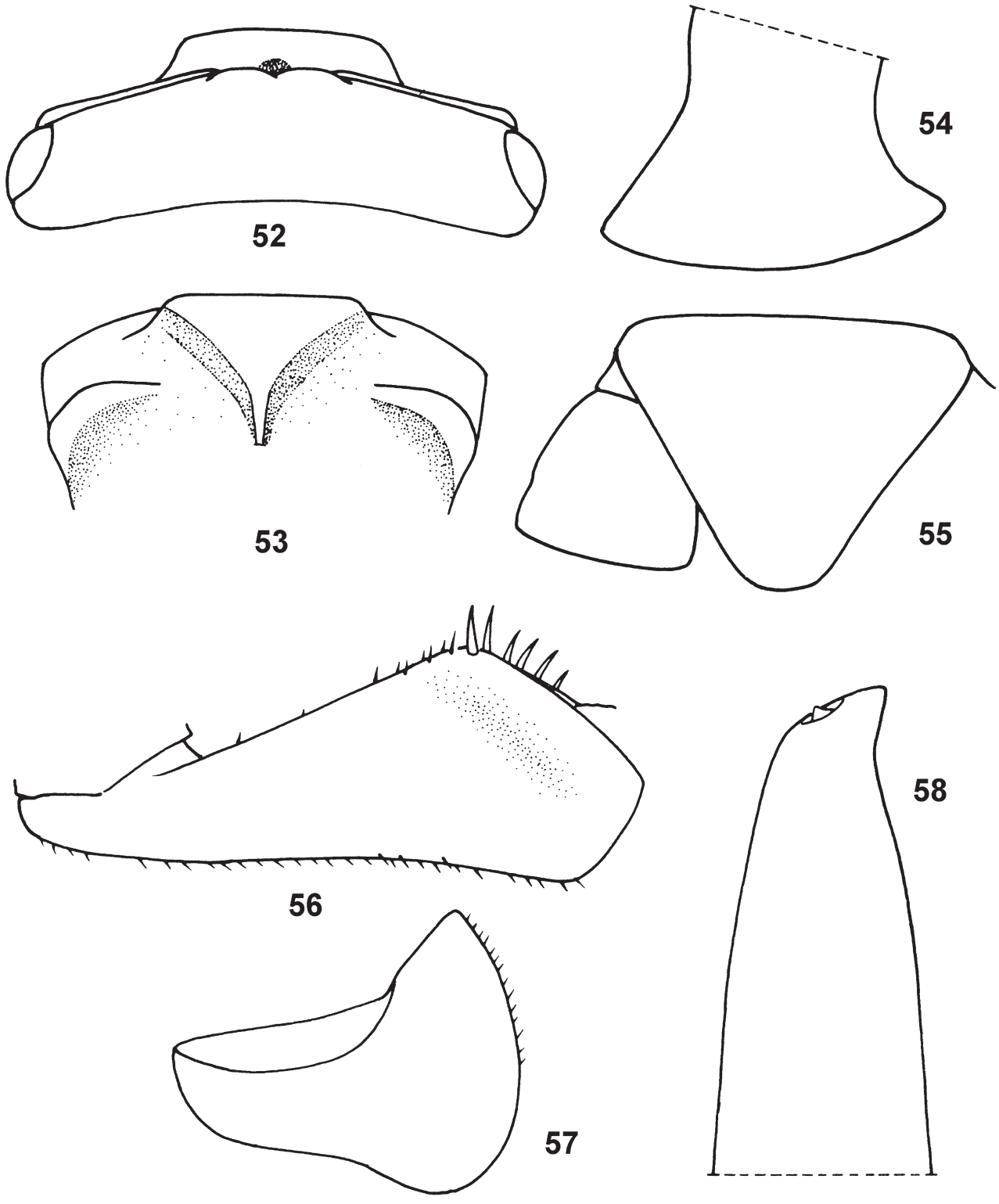
Coloration: Gray, with three conspicuous rows of yellow spots on the pereion-tergites and with yellowish epimera.

Cuticular structures: Tergites smooth.

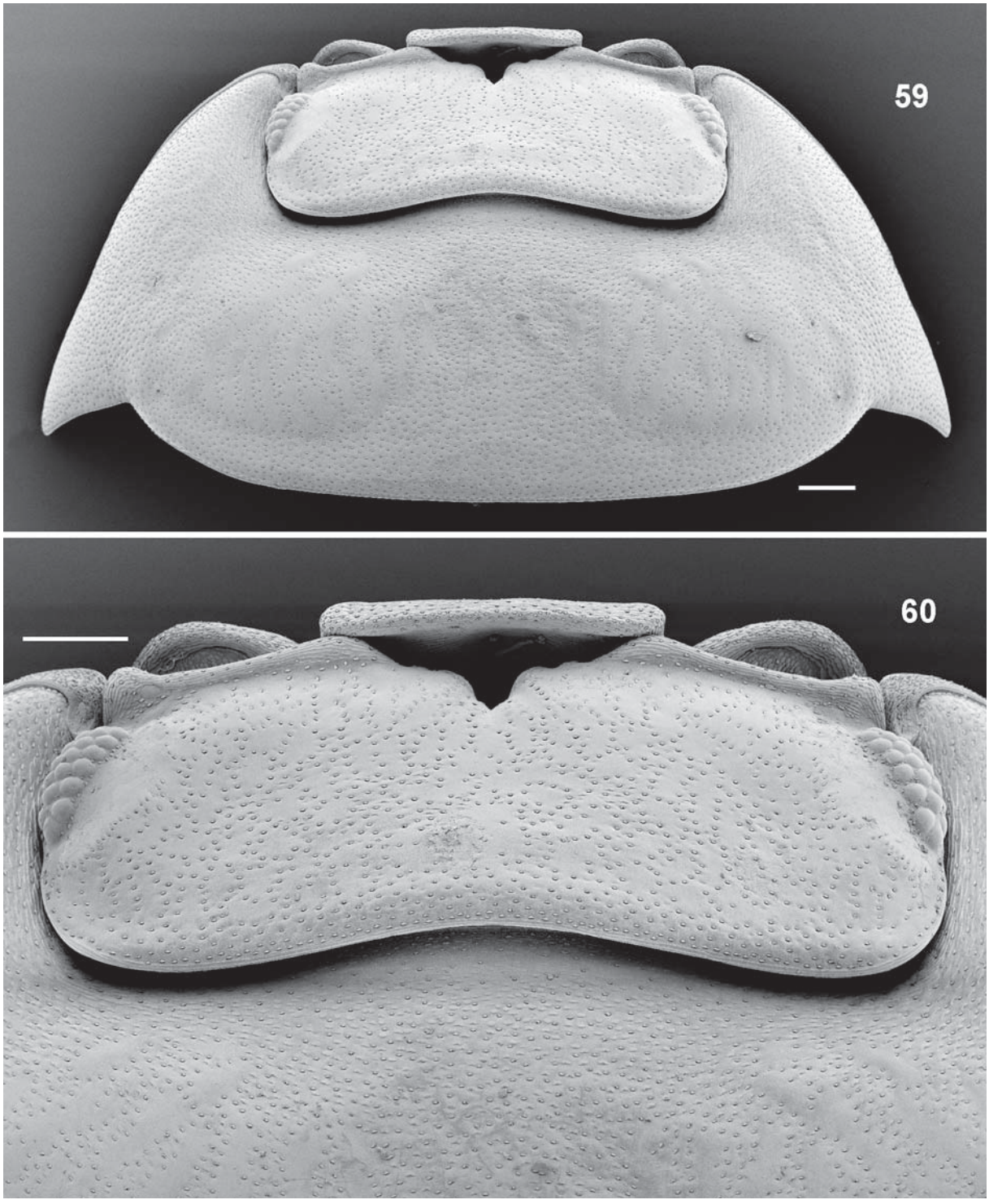
Frontal shield from behind considerably surpassing frontal margin, upper margin straight, laterally with rounded angles (Fig. 52); antennal lobes trapezoidal (Fig. 53). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 54). Telson wider than long, with straight sides and broadly rounded apex (Fig. 55). Male ischium 7 ventrally nearly straight (Fig. 56). Male pleopod-exopodite 1 with pointed triangular hind-lobe (Fig. 57), endopodite 1 with apex straight (Fig. 58).

Distribution

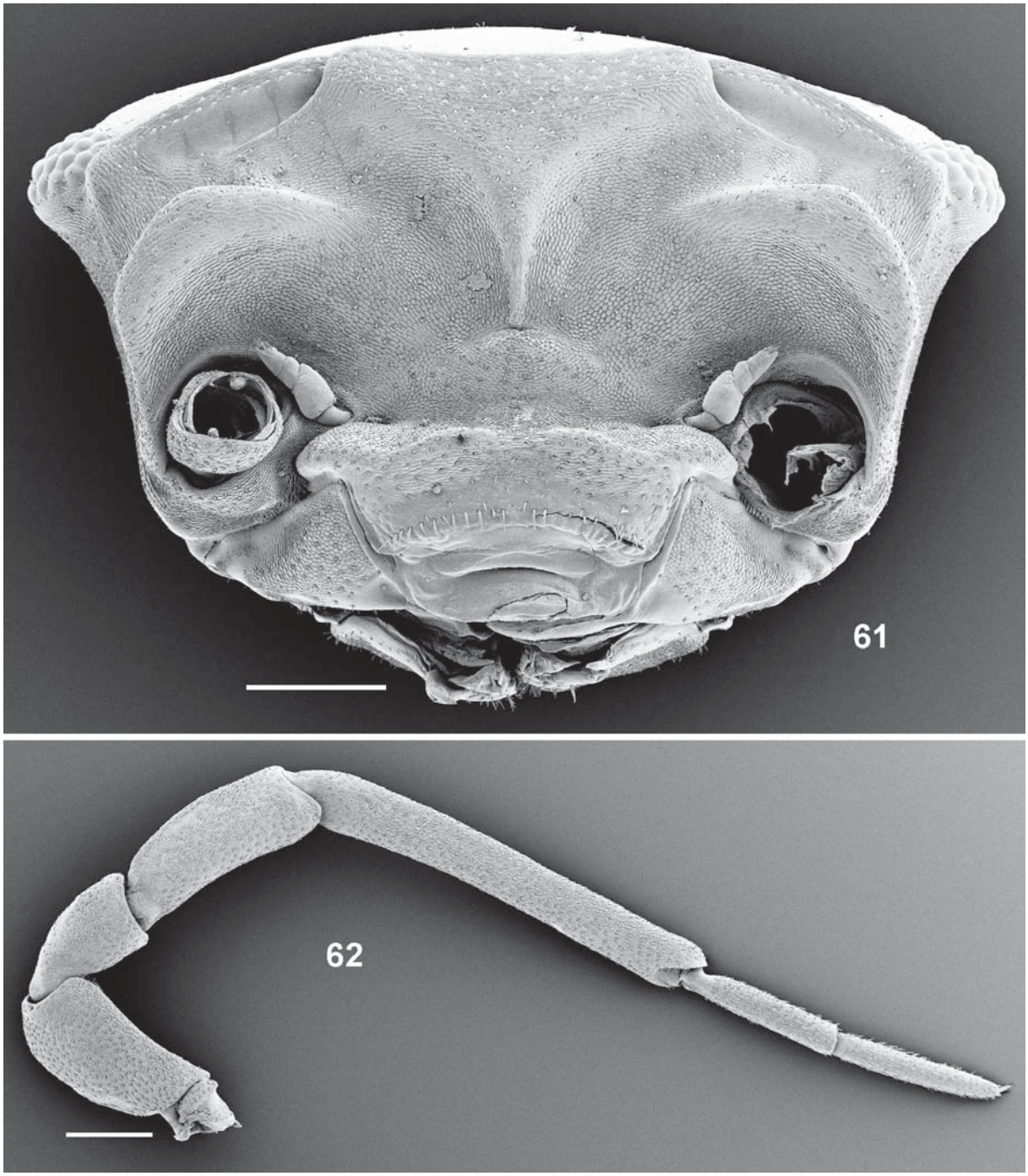
Greece, province Epirus. The holotype from "Epirus" without detailed locality is the only record of this species.



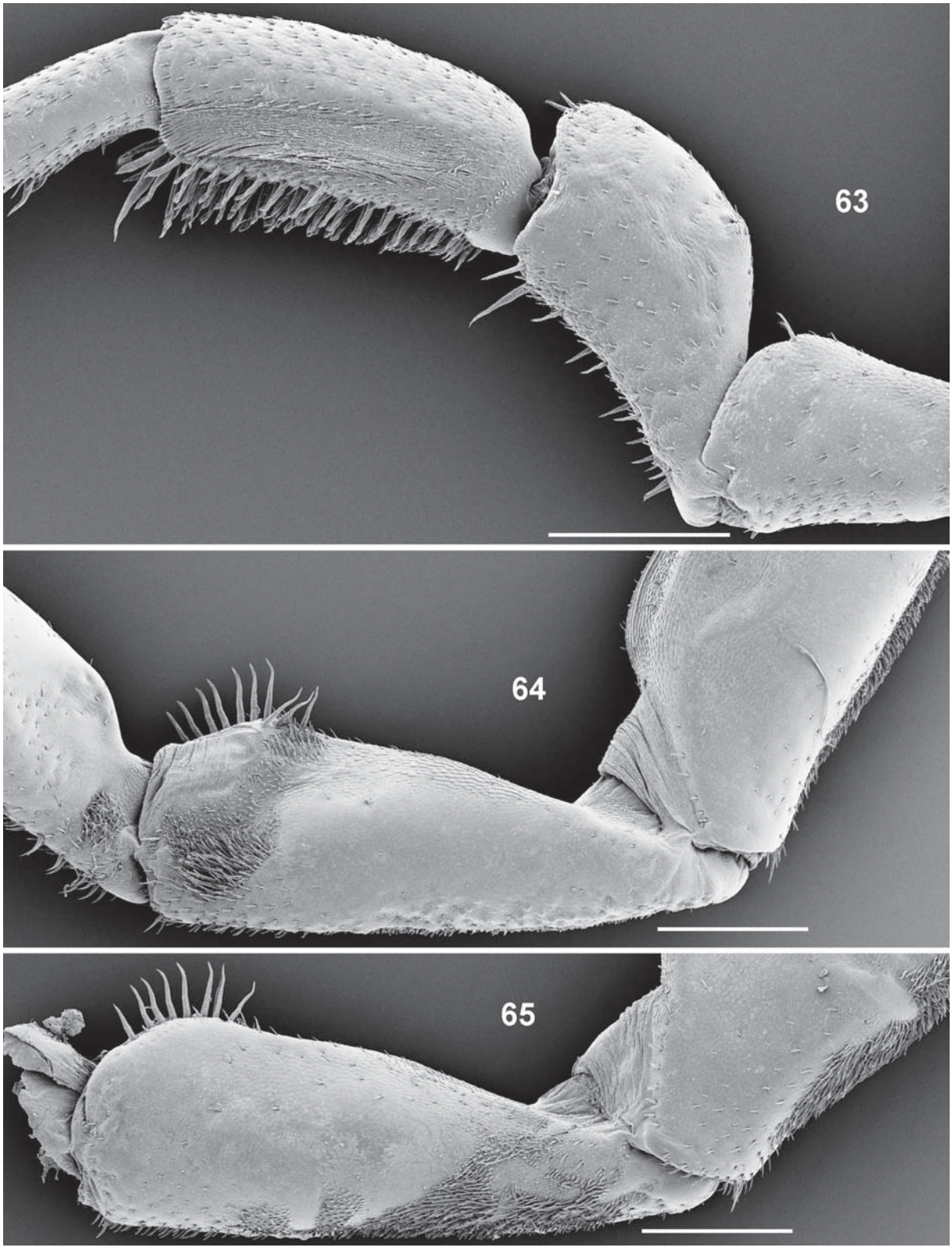

**Figs. 52–58.** *Armadillidium inflatum*, ♂, 11.0 × 6.0 mm, holotype (from SCHMALFUSS 1981). – **52**. Head, dorsocaudal view. **53**. Head, frontal view. **54**. Pereion-epimeron 1, lateral view. **55**. Telson and uropod in situ, dorsal view. **56**. Ischium 7, frontal view. **57**. Pleopod-exopodite 1, dorsal view. **58**. Apex of pleopod-endopodite 1.




**Figs. 59–60.** *Armadillidium irmengardis* (Tímfi Mountain, SMNS 2861), ♂, 19.5 × 9.0 mm. – **59**. Head and pereion-tergite 1, dorsal view. **60**. Head, dorsal view. – Scales: 0.5 mm.




**Figs. 61–62.** *Armadillidium irmengardis* (Tímfi Mountain, SMNS 2861). – **61**. ♂, 15.0 × 6.7 mm, head, frontal view. **62**. ♂, 19.5 × 9.0 mm, antenna. – Scales: 0.5 mm.




**Figs. 63–65.** *Armadillidium irmengardis* (Tímfi Mountain, SMNS 2861), ♂, 19.5 × 9.0 mm. – **63**. Pereiopod 1, frontal view. **64**. Ischium 7, frontal view. **65**. Ischium 7, caudal view. – Scales: 0.5 mm.

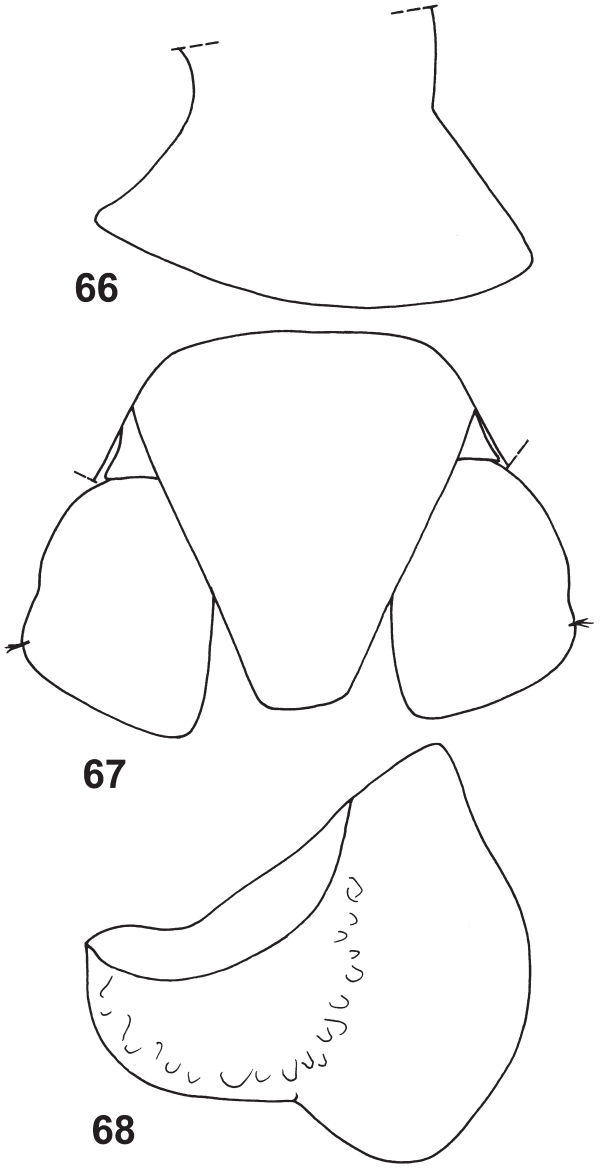
### 3.10 *Armadillidium irmengardis* Strouhal, 1956 (Figs. 59–68, map Fig. 69)

#### Literature records

STROUHAL 1942: 149 (*A. irmengardae*, nomen nudum; GR, western mainland, province Epirus, southern part of the prefecture Ioánnina); STROUHAL 1956: 608, figs. 36–42 (*A. irmengardis* n. sp.; localities as before); SFENTHOURAKIS 1992: 159 (prefecture Ioánnina, Tímfi Mountain, 600 m).

#### Material examined

**Greece**: 14 ex., province Epirus, prefecture Ioánnina, Tímfi Mountain, Pápingo, leg. KÜHNELT, 20.–22.VII.1968 (SMNS 1806, 1822). – 1 ex., as before, 1700–2000 m, leg. OSELLA, 1.VII.1982 (SMNS 1925). – 2 ex., as before, Tímfi Mountain, Orakólimni, 2250 m, leg. SFENTHOURAKIS, 19.V.1990 (SMNS 2309). – 2 ex., as before, Tímfi Mountain, Víkos Gorge, leg. SFENTHOURAKIS, 19.V.1990 (SMNS 2312). – 12 ex., as before, Tímfi Mountain, N of Skamnéli, 2000 m, leg. BARTSCH, 24.VI.2005 (SMNS 2870). – 3 ex., as before, Tímfi Mountain, Klidoniá, 400 m, leg. SFENTHOURAKIS, 30.V.2003 (SMNS 2861). – 2 ex., as before, Smolikás Mountain, Drakólimni, 2000–2500 m, leg. BELLO & OSELLA, 10.VII.1983 (SMNS 2088). – 15 ex. (syntypes), southeastern part of prefecture Ioánnina, Xerovúni Mountain, Platanúsa, 800 m, leg. BEIER, 5.VI.1933 (NMW).




**Figs. 66–68.** *Armadillidium irmengardis* (Tímfi Mountain, SMNS 2861), ♂, 19.5 × 9.0 mm. – **66**. Pereion-epimeron 1, lateral view. **67**. Telson and uropods in situ. **68**. Pleopod-exopodite 1, dorsal view.

#### Diagnostic characters

Maximum dimensions: 19.5 × 9.2 mm (STROUHAL 1956).

Coloration: Dark gray, juveniles brownish, small yellowish spots on tergites.

Cuticular structures: Tergites smooth.

Frontal shield from behind slightly surpassing frontal margin, upper margin straight (Figs. 59–60); antennal lobes trapezoidal (Fig. 61). Hind margin of pereion-epimeron 1 with sharp angle (Fig. 66). Telson slightly longer than wide, with straight sides and truncate apex (Fig. 67). Flagellum of antenna in adults with segments of equal length (Fig. 62). Male pereiopod 1 with ventral brush of spines only on carpus (Fig. 63). Male ischium 7 ventrally very slightly convex, frontal side with distal hair-field, caudal side with proximal hairy areas, the same on medial margin of basipodite 7 (Figs. 64–65). Male pleopod-exopodite 1 with short triangular hind-lobe, medial margin slightly concave (Fig. 68), endopodite 1 with apex straight.

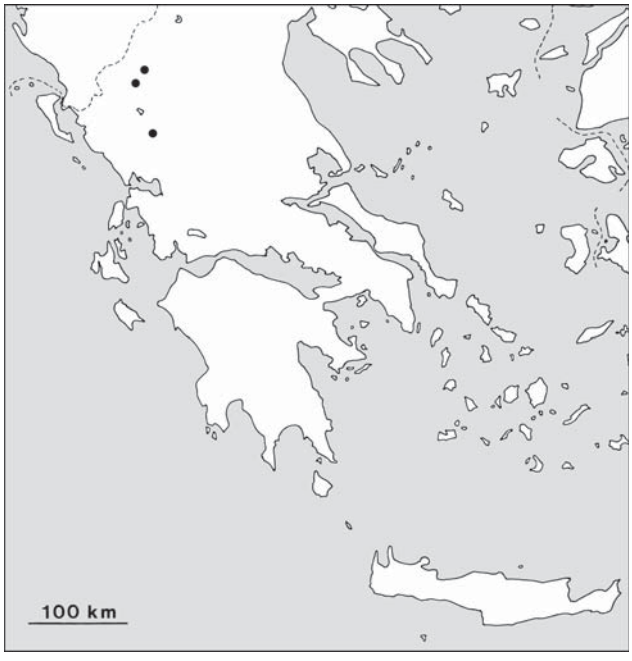
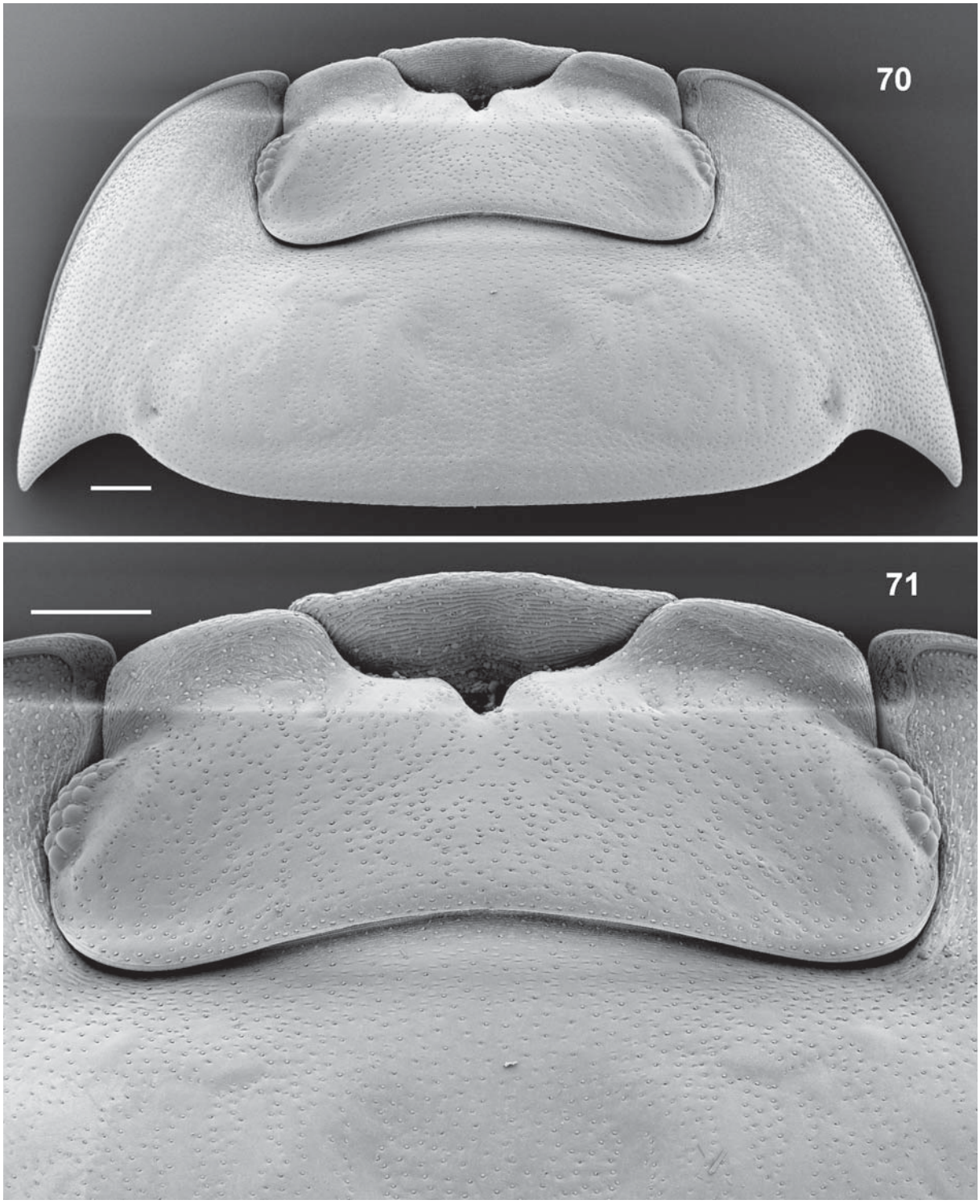
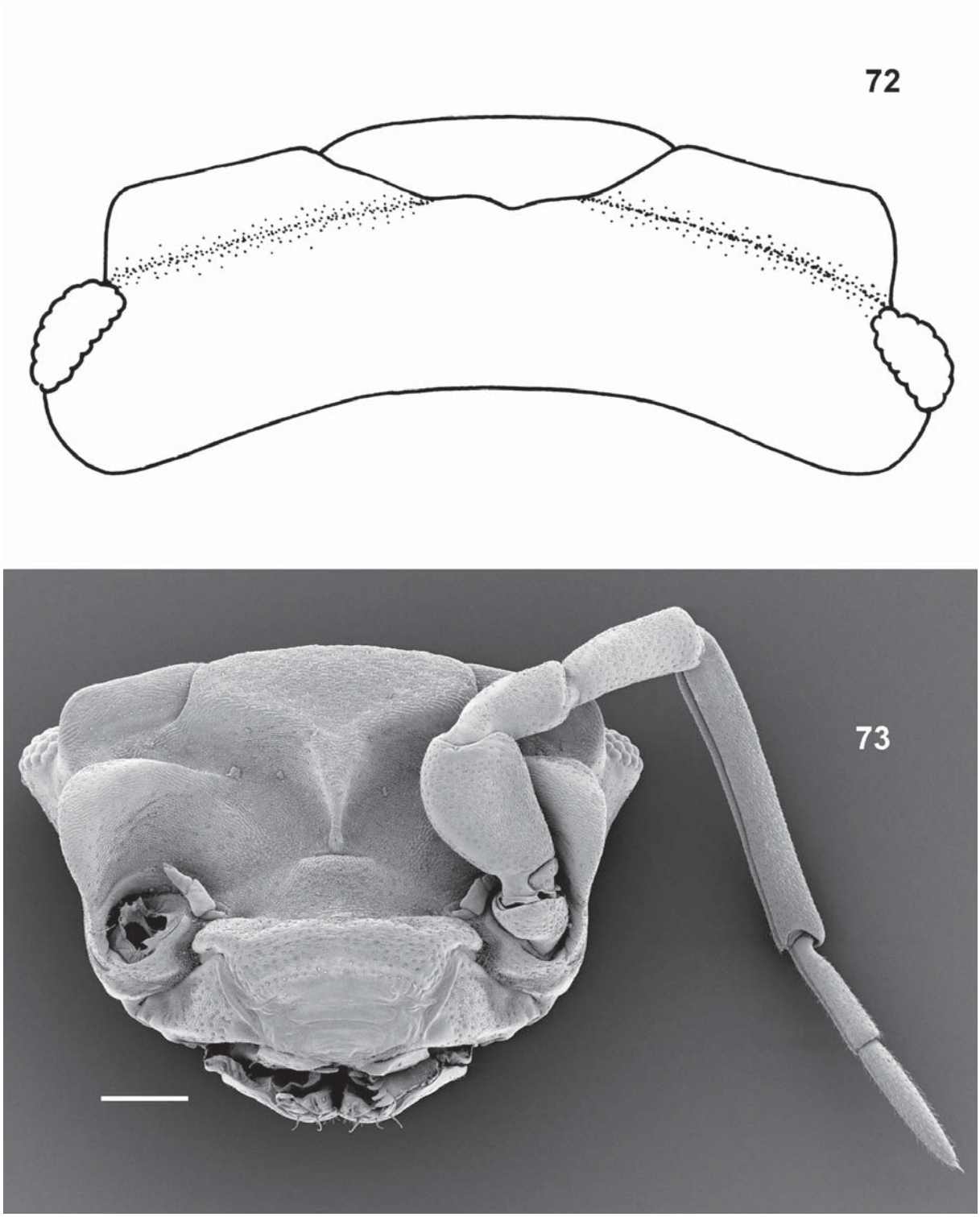


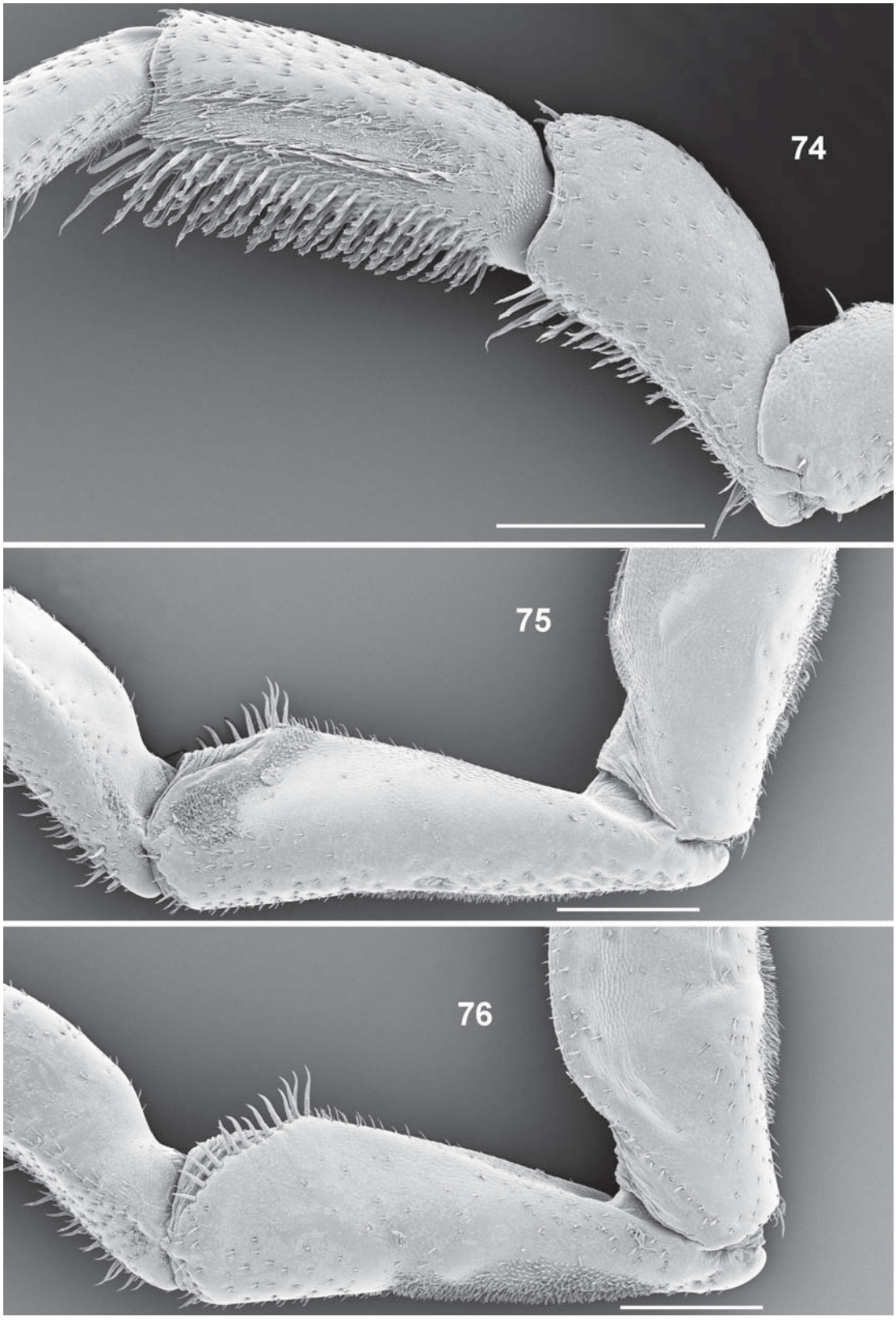

**Fig. 69.** Records of *Armadillidium irmengardis*.




**Figs. 70–71.** *Armadillidium xerovunense* (Tímfi Mountain, SMNS 2870), ♂, 18.2 × 7.8 mm. – **70**. Head and pereion-tergite 1, dorsal view. **71**. Head, dorsal view. – Scales: 0.5 mm.




**Figs. 72–73.** *Armadillidium xerovunense*. – **72**. Nisísta, syntype (NMW), ♂, 13.5 × 7.0 mm, head, dorsal view. **73**. Tímfi Mountain (SMNS 2870), ♂, 16.3 × 7.5 mm, head, frontal view. – Scale: 0.5 mm.




**Figs. 74–76.** *Armadillidium xerovunense* (Tímfi Mountain, SMNS 2870), ♂, 18.2 × 7.8 mm. – **74**. Pereiopod 1, frontal view. **75**. Ischium 7, frontal view. **76**. Ischium 7, caudal view. – Scales: 0.5 mm.

Distribution (map Fig. 69)

Greece, western mainland, Epirus, prefecture Ioánnina.

### 3.11 *Armadillidium janinense* Verhoeff, 1902

The species has been treated in the 25th contribution of this series (SCHMALFUSS 2008). It is known from the western Greek mainland (SCHMALFUSS 2008: map fig. 34).

### 3.12 *Armadillidium peloponnesiacum* Verhoeff, 1901

This species was treated in the 23rd contribution of this series (SCHMALFUSS 2006a). It is known from western, central and southern Greece (SCHMALFUSS 2006a: map fig. 172).

### 3.13 *Armadillidium vulgare* (Latreille, 1804)

This species was again treated in the 23rd contribution of this series (SCHMALFUSS 2006a). It originated with great probability in southeastern Europe and has been transported by human activities to all parts of the world, where it thrives mostly in disturbed biotopes where the indigenous fauna was destroyed together with the original vegetation for agricultural reasons. A map of all Greek records is given in SCHMALFUSS (2006a).

### 3.14 *Armadillidium xerovunense* Strouhal, 1956 (Figs. 70–79, map Fig. 80)

Literature records

STROUHAL 1942: 148 (*A. xerovunense*, nomen nudum; GR, western mainland, province Epirus, prefectures Ioánnina and Árta); STROUHAL 1956: 587, figs. 3–8 (localities as before); SFENTHOURAKIS 1992: 159 (prefecture Ioánnina, Tímfi Mountain, 1100–1900 m).

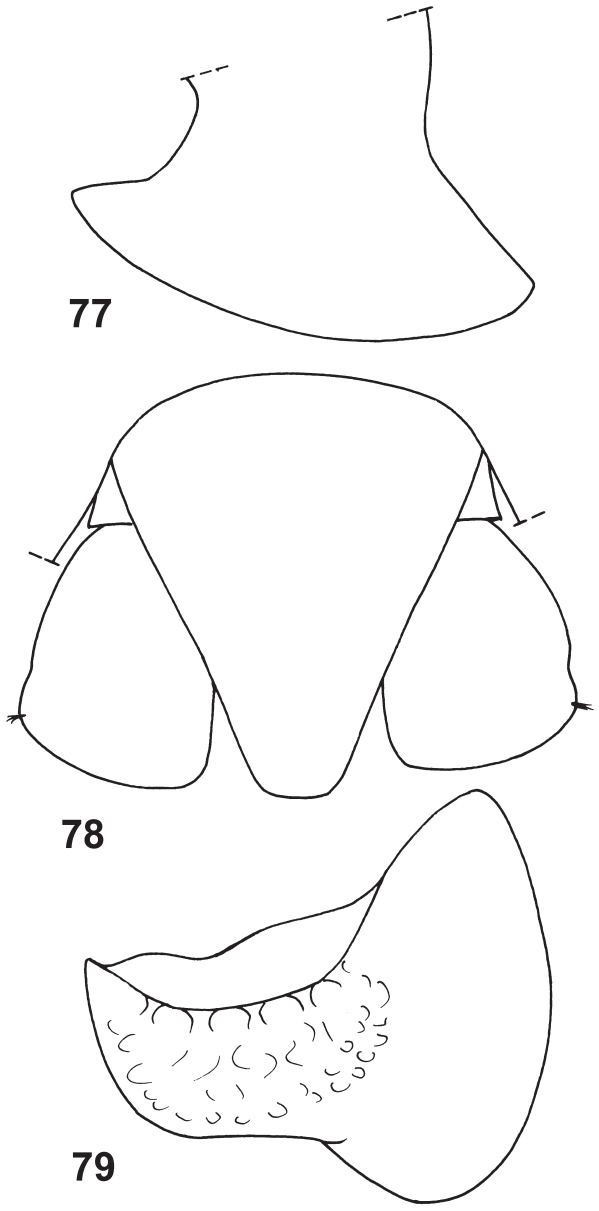
Material examined

**Greece**: 2 ex. (syntypes), province Epirus, northwestern prefecture Árta, Nisísta, 800 m, leg. BEIER, 1.VI.1933 (NMW). – 2 ex., appendage preparations, southeastern prefecture Ioánnina, Platanúsa, 800 m, leg. BEIER, 5.VI.1933 (NMW). – 3 ex., province Epirus, prefecture Ioánnina, Kalpáki, Véllas monastery, 400 m, leg. KONTSCHÁN, 12.V.2006 (SMNS 1390). – 2 ex., prefecture Ioánnina, Tímfi Mountain, 1500 m, leg. SFENTHOURAKIS, V.1990 (SMNS 2310). – 3 ex., Tímfi Mountain, Pápingo, leg. KÜHNELT, 20.VII.1968 (SMNS 1822). – 14 ex., as before, 1700–2100 m, leg. OSELLA, VII.1982 (SMNS 1924, 1925). – 4 ex., Tímfi Mountain, Skamnélli, 2000 m, leg. BARTSCH, 24.VI.2005 (SMNS 2870). – 1 ex., prefecture Ioánnina, Smolikás Mountain, Drakolímni, 2000 m, leg. BELLO, 8.VII.1983 (SMNS 2086).

Diagnostic characters

Maximum dimensions: 19.0 × 9.5 mm.

Coloration: Dark gray, with a central and two lateral rows of small whitish dots on tergites. Juveniles light brown. The type specimens from the southern Epirus (Xerovuni) are without pigmentation, but this may be due to long conservation.




**Figs. 77–79.** *Armadillidium xerovunense* (Tímfi Mountain, SMNS 2870), ♂, 18.2 × 7.8 mm. – **77**. Pereion-epimeron 1, lateral view. **78**. Telson and uropods in situ. **79**. Pleopod-exopodite 1, dorsal view.

Cuticular structures: Tergites very slightly granulated.

Frontal shield and lateral frontal lines forming a high ledge in caudal view (Figs. 70–72); antennal lobes semicircular (Fig. 73). Hind margin of pereion-epimeron 1 with rounded angle (Fig. 77). Telson longer than wide, with straight sides and truncate apex (Fig. 78). Flagellum of antenna in adults with distal segment slightly longer than proximal one (Fig. 73). Male pereiopod 1 ventrally with dense brush of spines only on carpus (Fig. 74). Male ischium 7 ventrally very slightly concave, frontal side with usual distal hair-field and with hair-field proximally on ventral part, basipodite 7 with dense hairy setae on medial side (Figs. 75–76, see also Remarks). Male pleopod-exopodite 1 with triangular hind-lobe (Fig. 79), endopodite 1 with apex straight.

Distribution (map Fig. 80)

Greece, western mainland, Epirus, prefectures Ioánnina and Árta.

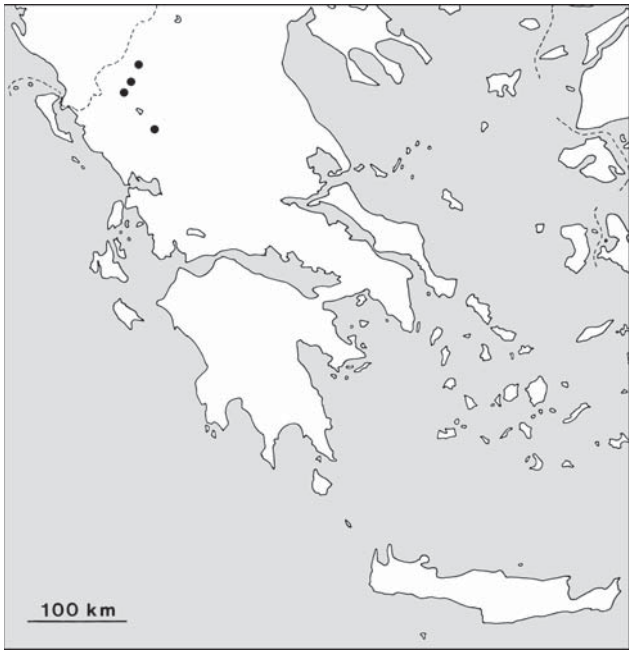



**Fig. 80.** Records of *Armadillidium xerovunense*.

Remarks

In the appendage preparation of the type specimens from the southern Epirus (Xerovúni region) the ventral and medial hair-fields in the ischium and basipodite of pereiopod 7 cannot be recognized (compare fig. 6, p. 588 in STROUHAL 1956). Also in the males from the Tímfi Mountain these structures are difficult to see with the light microscope. Future SEM-investigations of new collections from the type localities should clarify the situation.

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