

# The terrestrial isopods (Isopoda: Oniscidea) of Greece. 28<sup>th</sup> contribution: The genus *Armadillidium* (Armadillidiidae) on the central Greek mainland<sup>1</sup>

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## Abstract

Based on the revision of the literature, the reinvestigation of type material and the investigation of new collections, 20 species of *Armadillidium* are reported from the central mainland of Greece (provinces Thessalía, Stereá Elláda and Atiki). Two species are new to science (*A. gionum* n. sp., *A. meteorensis* n. sp.), 13 species were treated in previous contributions of this series. The diagnostic characters of eight species (including the two new ones) are described and illustrated, mostly by SEM-photographs, and the Greek records of these species are mapped.

**Key words:** Isopoda, Oniscidea, *Armadillidium*, Greece, central Greek mainland.

## Zusammenfassung

Die Untersuchung neuer Aufsammlungen, die Durchsicht der Literatur und die Nachuntersuchung von Typenmaterial ergaben 20 *Armadillidium*-Arten für das zentrale griechische Festland (Provinzen Thessalía, Stereá Elláda und Atiki). Zwei Arten sind neu für die Wissenschaft (*A. gionum* n. sp., *A. meteorensis* n. sp.), 13 Arten wurden in vorangehenden Beiträgen dieser Serie behandelt. Die diagnostischen Merkmale von acht Arten (einschließlich der zwei neuen) werden beschrieben und illustriert, meist mit Hilfe von REM-Aufnahmen, und die griechischen Nachweise dieser Arten werden kartiert.

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<sup>1</sup> 27<sup>th</sup> contribution see Stuttgarter Beiträge zur Naturkunde A, Neue Serie 4: 1–42 (2011).

## 1 Introduction

The present publication is the last part of six papers in which the species of *Armadillidium* in Greece are revised and redescribed. This publication series treats the species of this genus from the following regions of Greece:

Part 1 (SCHMALFUSS 2006a): Peloponnese, with 18 species (5 species new to science).

Part 2 (SCHMALFUSS 2006b): Aegean islands, with 13 species (6 species treated in part 1).

Part 3 (SCHMALFUSS 2008): Northern Greek mainland, provinces of Macedonia (Makedonía) and Thrace (Thráki)



**Fig. 1.** Map of the treated area, the central Greek mainland (provinces Thessalía, Sterea Elláda and Atikí). The numbers indicate the old political prefectures (nomoi) which are used to localize the collecting data: 26 = Tríkala; 27 = Kardítsa; 28 = Lárisa; 29 = Magníssiá; 30 = Etolía Akarnanía; 31 = Evritanía; 32 = Fthiótida; 33 = Fokída; 34 = Viotía; 35 = Atikí-Piréas; 36 = Évia.

with 14 species (7 species new to science, 4 species treated in previous parts).

Part 4 (SCHMALFUSS 2010): Northwestern Greek mainland, province Epirus (= Ìpiros) with 14 species (6 species treated in previous parts).

Part 5 (SCHMALFUSS 2011): Greek Ionian islands, with 21 species (11 species treated in previous parts).

Part 6 (present paper): Central Greek mainland, provinces Thessalía, Stereá Elláda and Atikí (Fig. 1), with 20 species (2 species new to science, 13 species treated in previous parts).

Altogether this adds up to 60 species of *Armadillidium* known from Greece, which have been described and illustrated in the six parts of the present revision. This is certainly not the final number, further additional species will be discovered (two of them are already waiting to be described in a first supplement) or will be detected by more detailed investigations, especially if molecular techniques are involved. Nevertheless a summarizing survey of the species treated up to now is planned in an additional publication, with a detailed taxonomic list, an identification key, and an outline of biogeography and phylogeny.

#### Abbreviations

<i>A.</i>	<i>Armadillidium</i>
BMNH	Natural History Museum London
ex.	example(s), specimen(s)
NMW	Naturhistorisches Museum Wien
SMNS	Staatliches Museum für Naturkunde Stuttgart

#### Acknowledgments

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Dr. K. WOLF-SCHWENNINGER and S. LEIDENROTH (both SMNS) operated the scanning electron microscope, and J. REIBNITZ (SMNS) edited the SEM-photographs and the maps.

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* on the central Greek mainland

### 3.1 *Armadillidium atticum* Strouhal, 1929

This species was treated in the 24<sup>th</sup> contribution of this series (SCHMALFUSS 2006b). It is known from the south-eastern part of the central mainland (province Atikí/Attica around Athens) and the Aegean islands Évia, Salamína, Égina and Kíthnos.

### 3.2 *Armadillidium bicurvatum* Verhoeff, 1901

This species was treated in the 23<sup>rd</sup> 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.

### 3.3 *Armadillidium fossuligerum* Verhoeff, 1902 (Figs. 2–15, map Fig. 16)

This species was treated in the 25<sup>th</sup> contribution of this series (SCHMALFUSS 2008), where samples from the southern central Greek mainland north to southwestern Bulgaria were lumped together under this species name. In the meantime I have investigated further material from central Greece and a number of type specimens, which lead to the conclusion that *A. fossuligerum* sensu SCHMALFUSS (2008) is a sort of superspecies which can be divided in a number of very similar species that can be separated by slight but consistent differences. The geographical distribution of these forms is also in congruence with their separation into different species. According to this interpretation of the systematic situation the following changes have to be envisaged:

1. *A. fossuligerum* sensu stricto occurs only in the Timfristós and Panetolikó Mountains in forest biotopes above 1000 m.

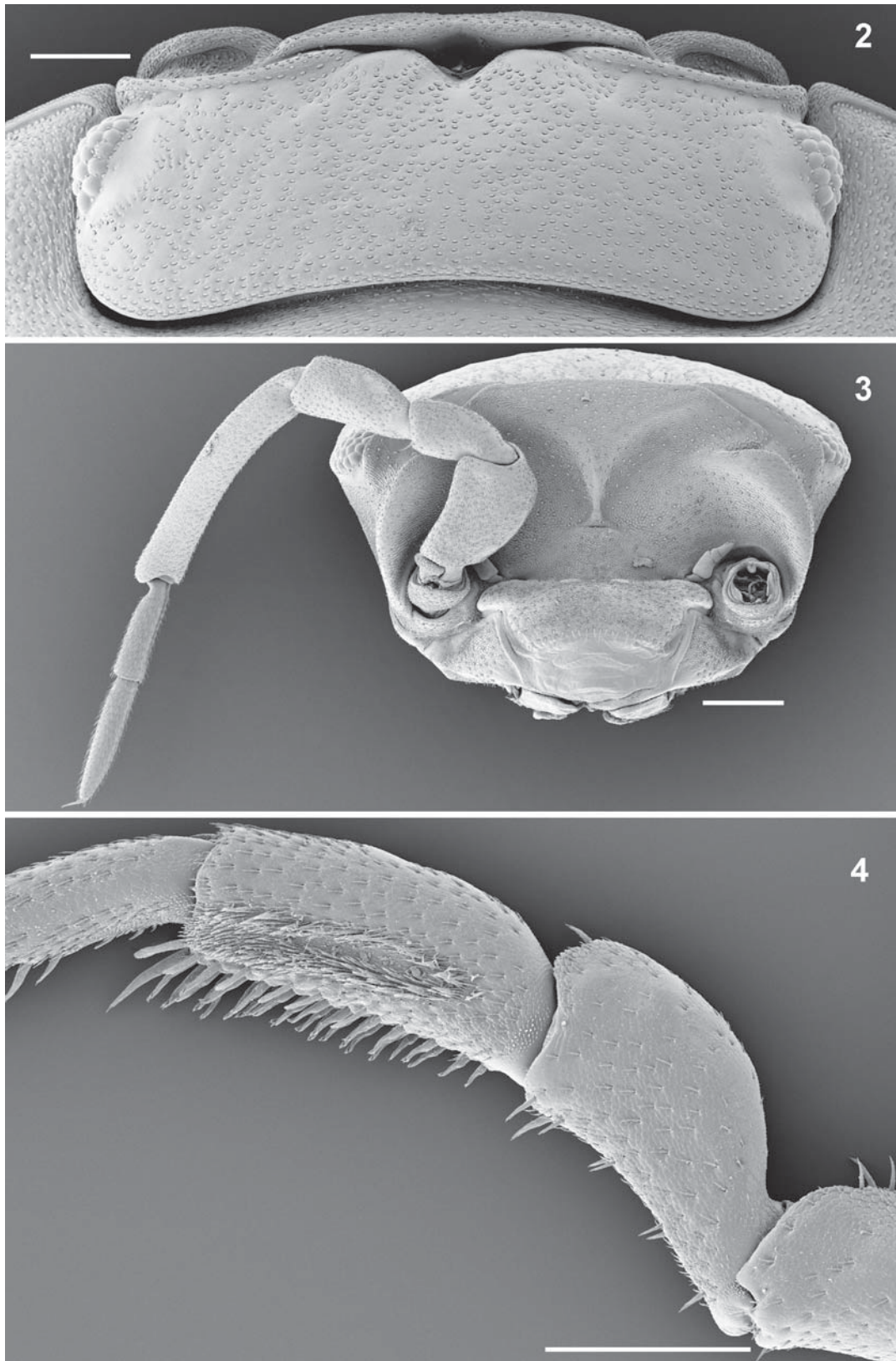
2. The specimen from Lake Trichonída (Pámfi) belongs to *A. laminigerum*, which is a lowland species (see below).

3. All samples from the Parnasós Mountain pertain to *A. versluyysi* (see below).

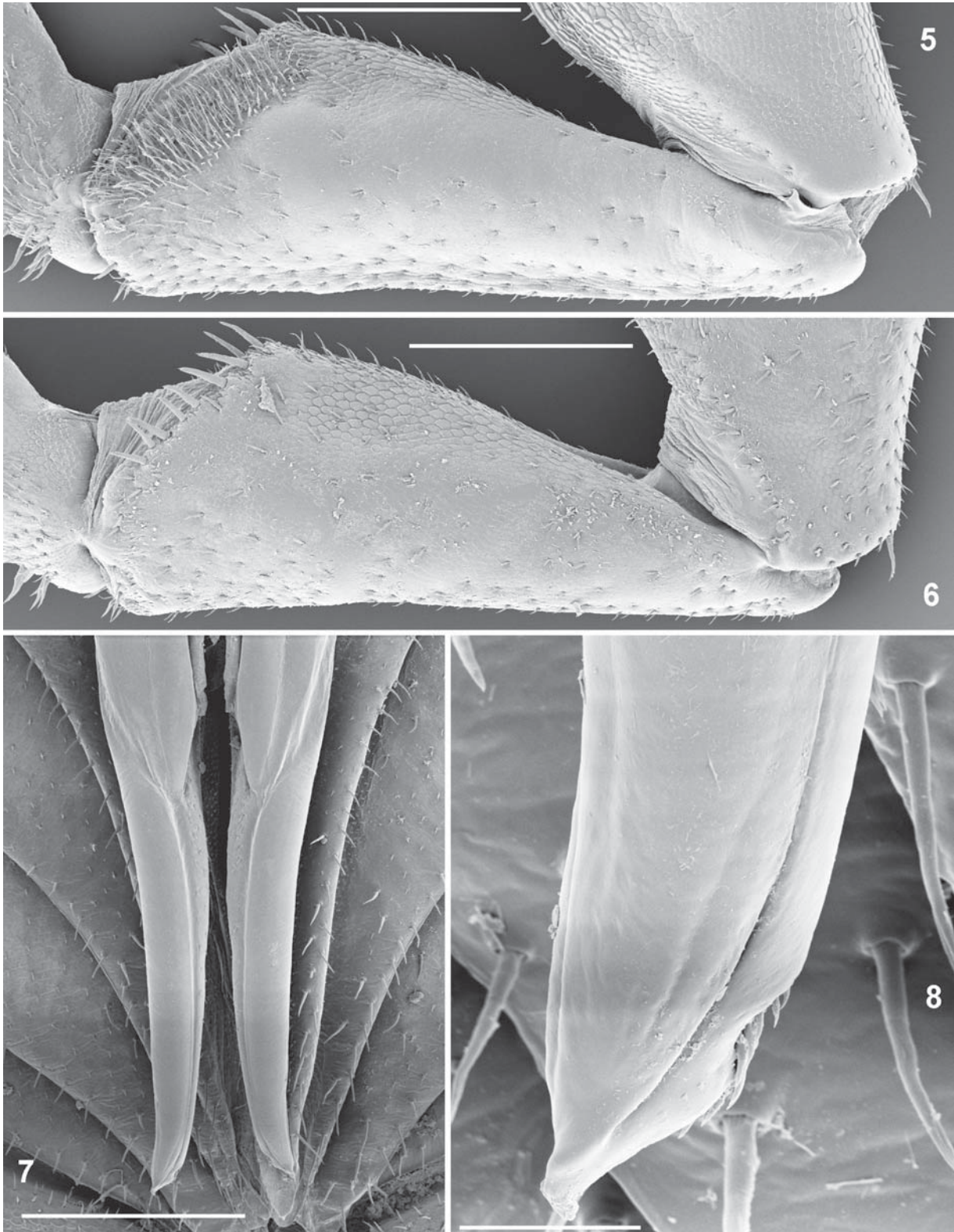
4. The sample from Kalambáka in Thessalía turned out to be a slightly aberrant variation of *A. irmengardis* which is otherwise known from the Epirus, rather than a variant of *A. fossuligerum*.

5. The material from the region around Mount Ólympos (including the specimens from Mount Vémio which are illustrated in SCHMALFUSS 2008) is clearly different from *A. fossuligerum* sensu stricto, from which it is separated by a gap of 150 km. It will be treated in a supplement on Macedonia, as well as the material subsumed under *A. fos-*

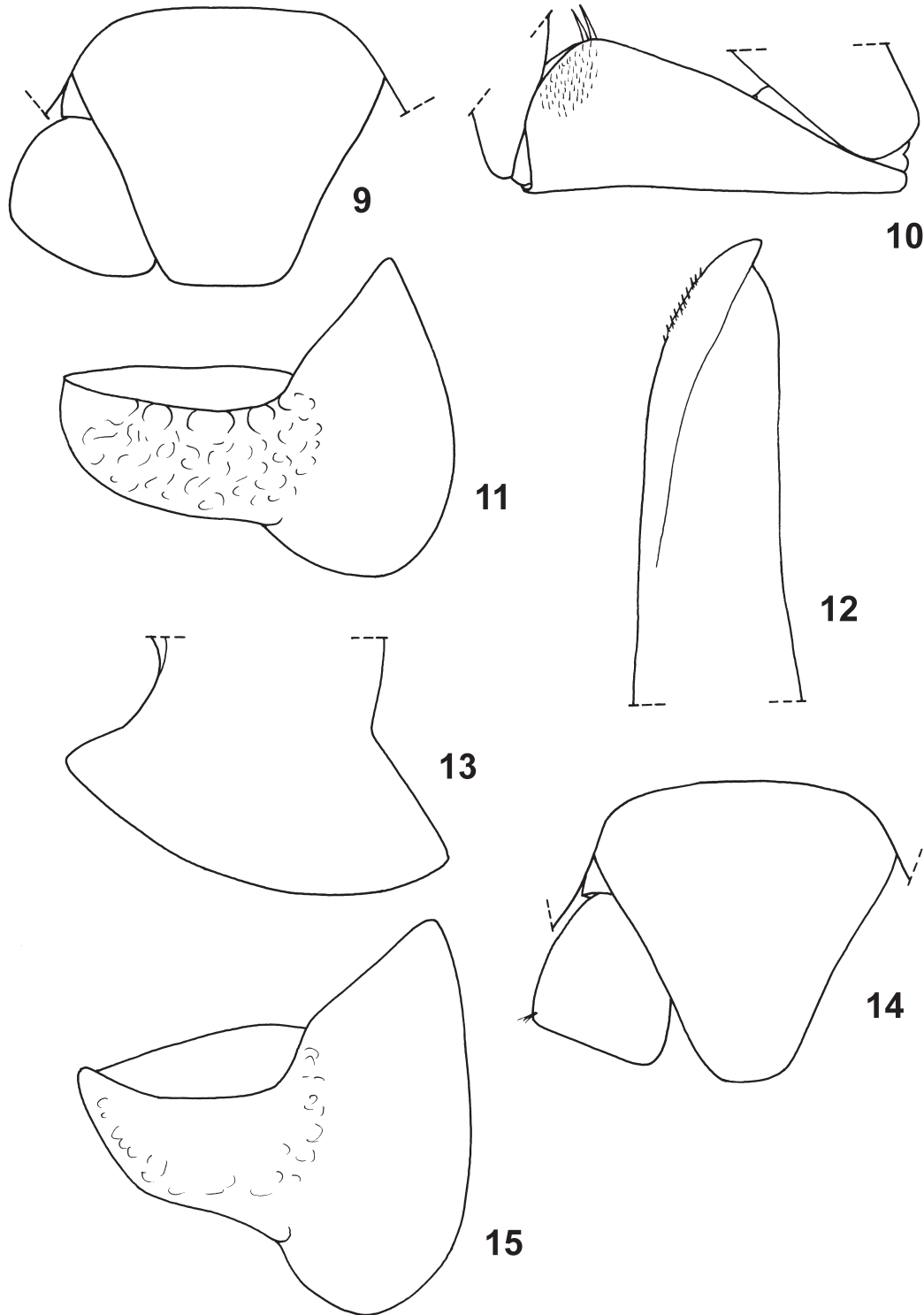




**Figs. 2–4.** *Armadillidium fossuligerum* (Timfristós Mountain, SMNS 2219). – 2. ♂, 15.5×6.7 mm, head, dorsal view. 3. ♂, 12.5×5.8 mm, head, frontal view. 4. ♂, 15.5×6.7 mm, pereopod 1, frontal view. – Scales: 0.5 mm.



**Figs. 5–8.** *Armadillidium fossuligerum* (Timfristós Mountain, SMNS 2219, ♂, 15.5 × 6.7 mm). – **5.** Ischium 7, frontal view. **6.** Ischium 7, caudal view. **7.** Pleon, ventral view, with pleopods in situ. **8.** Apex of pleopod-endopodite 1. – Scales: 0.5 mm (5–7), 50 μm (8).



**Figs. 9–14.** *Armadillidium fossuligerum*, lectotype ♂, 9.6 × 4.3 mm (9–12), Timfristós Mountain, SMNS 2219, ♂, 15.5 × 6.7 mm (13, 14). – 9. Telson and uropod in situ, dorsal view. 10. Ischium 7, frontal view. 11. Pleopod-exopodite 1, dorsal view. 12. Apex of pleopod-endopodite 1. 13. Pereion-epimeron 1, lateral view. 14. Telson and uropod in situ, dorsal view. 15. Pleopod-exopodite 1, dorsal view.





**Fig. 16.** Records of *Armadillidium fossuligerum* sensu stricto (●), *A. gionum* n. sp. (■) and *A. irmengardis* (▲).

*suligerum* from northern Greek Macedonia, ex-Yugoslavian Macedonia and southwestern Bulgaria.

#### Material reexamined

**Greece:** ♂ lectotype (9.6 × 4.3 mm, designated by SCHMALFUSS 1981), central mainland, prefecture Evritanía, Timfristós Mountain, near Karpenísi, leg. V. APFELBECK [no date] (SMNS T35). – 38 ex., central mainland, prefecture Evritanía, Timfristós Mountain, above Karpenísi, 1000–1600 m, *Abies* forest, leg. SCHMALFUSS, 28.–29.IX.1989 and 10.X.2000 (SMNS 2219, 2221, 2678). – 1 ♂, central mainland, prefecture Evritanía, Panetolikó Mountain, near Prussós, 1000 m, leg. MALICKY, 25.V.1987 (SMNS 2474).

#### Diagnostic characters

Maximum dimensions: 16.5 × 7.7 mm.

Coloration: Dark brownish gray, juveniles lighter brownish.

Cuticular structures: Tergites smooth.

Frontal shield from behind not surpassing frontal margin, upper margin straight, with conspicuous groove caudally (Fig. 2); antennal lobes trapezoidal (Fig. 3). Hind margin of pereion-epimeron 1 with pronounced acute angle (Fig. 13). Telson slightly wider than long, with straight sides and broadly truncate apex, which becomes narrower and more rounded in big specimens (Figs. 9, 14). Flagellum of antenna in adults with distal segment slightly longer than proximal one (Fig. 3). Male carpus 1 with weakly developed ventral brush of spiny setae (Fig. 4). Male ischium 7 ventrally straight, frontal side with distal hair-

field (Figs. 5, 6, 10). Male pleopod-exopodite 1 with pointed triangular hind-lobe (Figs. 11, 15), endopodite 1 with apex straight (Figs. 7, 8, 12).

#### Distribution (map Fig. 16)

*A. fossuligerum* sensu stricto (as defined in the present paper) is known from the mountains of the prefecture Evritanía, central mainland of Greece.

#### Remarks

In the lectotype ♂ (9.6 × 4.3 mm) the ischium 7 and the pleopod-exopodite 1 have not yet attained the adult shape, but represent rather a juvenile form, intermediate between those of ♀♀ and adult ♂♂.

### 3.4 *Armadillidium gionum* n. sp.

(Figs. 17–26, map Fig. 16)

#### Material examined

**Holotype:** ♂, 16.0 × 7.0 mm, Greece, province Stereá Eláda, prefecture Fokída, Gióna Mountains, Sikéa, river shore, *Platanus*, *Abies*, limestone, 700–800 m, leg. SCHMALFUSS, 5.X.2000 (SMNS T607).

**Paratypes:** 14 ex., collecting data as holotype (SMNS 2663). – 3 ex., prefecture Fokída, W of Ámfissa, leg. MALICKY, 22.IV.1984 (SMNS 2110). – 3 ex., prefecture Fokída, Gióna Mountains, Sikéa, 1200–1500 m, leg. OSELLA, 20.VII.1984 (SMNS 2095). – 2 ex., Gióna Mountains, 3 km N of Kaloskopí, *Abies*, limestone, around 1000 m, leg. SCHMALFUSS, 5.X.2000 (SMNS 2665). – 16 ex., Gióna Mountains, 2 km W of Kaloskopí, *Abies*, around 1500 m, leg. SCHMALFUSS, 5.X.2000 (SMNS 2666).

#### Diagnostic characters

Maximum dimensions: 18.2 × 8.2 mm.

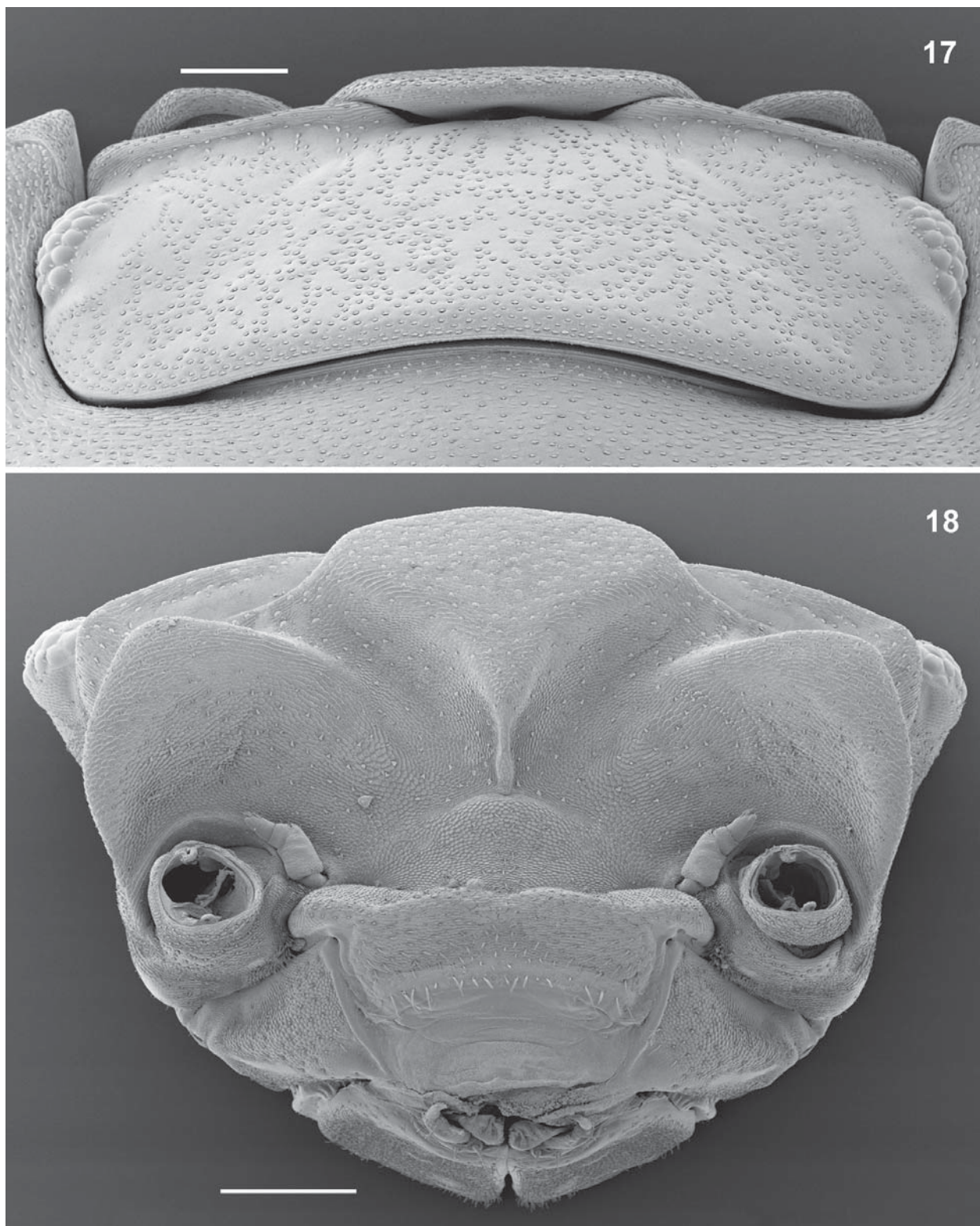
Coloration: Dark brownish gray.

Cuticular structures: Tergites smooth.

Frontal shield from behind slightly surpassing frontal margin, upper margin straight (Fig. 17); antennal lobes triangular (Fig. 18). Hind margin of pereion-epimeron 1 with rounded angle (Fig. 24). Telson as wide as long, with straight sides and truncate apex (Fig. 25). Flagellum of antenna in adults with distal segment slightly longer than proximal one (Fig. 19). Male carpus 1 with weakly developed ventral brush of spiny setae (Fig. 20). Male ischium 7 ventrally straight, frontal side with distal hair-field (Figs. 21, 22). Male pleopod-exopodite 1 with narrow elongated hind-lobe (Fig. 26), endopodite 1 with apex bent outwards at a right angle (Fig. 23).

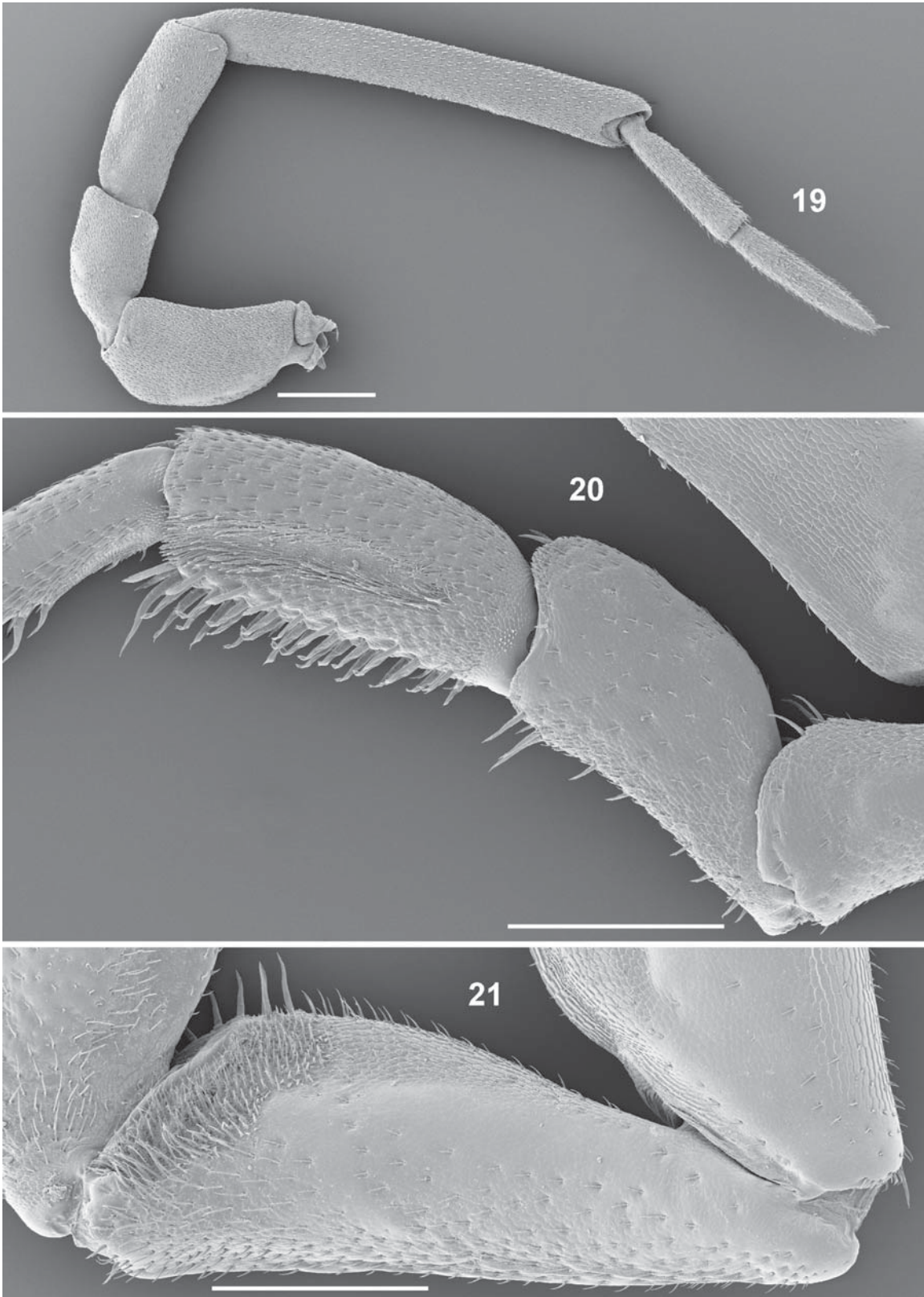
#### Distribution (map Fig. 16)

Known only from the Gióna Mountains, central Greek mainland, prefecture Fokída.

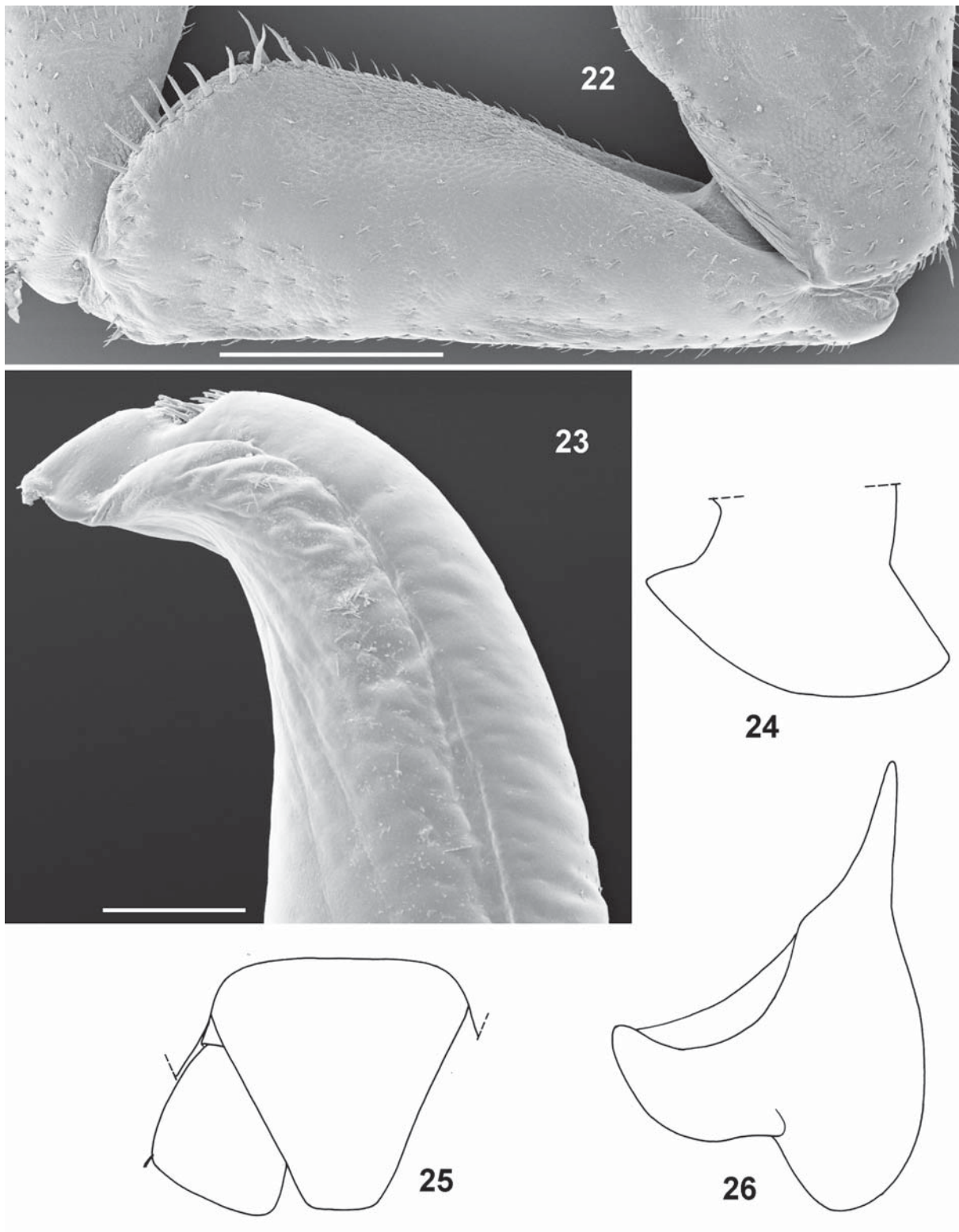


**Figs. 17–18.** *Armadillidium gionum* n. sp. (Gióna Mountains, SMNS 2663), paratypes. – 17. ♀, 16.5×8.4 mm, head, dorsal view. 18. ♂, 13.5×7.2 mm, head, frontal view. – Scales: 0.5 mm.





**Figs. 19–21.** *Armadillidium gionum* n. sp. (Gióna Mountains, SMNS 2663), paratype ♂, 13.5 × 7.2 mm. – 19. Antenna. 20. Pereiopod 1, frontal view. 21. Ischium 7, frontal view. – Scales: 0.5 mm.



**Figs. 22–26.** *Armadillidium gionum* n. sp., paratype ♂ (Gióna Mountains, SMNS 2663), 13.5 × 7.2 mm (22, 23), holotype ♂, 16.0 × 7.0 mm (24–26). – 22. Ischium 7, caudal view. 23. Apex of pleopod-endopodite 1. 24. Pereion-epimeron 1, lateral view. 25. Telson and uropod in situ, dorsal view. 26. Pleopod-exopodite 1, dorsal view. – Scales: 0.5 mm (22), 50 μm (23).

## Remarks

The new species belongs to the *A. fossuligerum*-group. It differs from all other members of this group by the acutely prolonged hind-lobe of the male pleopod-exopodite 1. This character it has in common with *A. meteorensis* n. sp., from which it differs by triangular (against trapezoidal) antennal lobes, hind margin of pereion-epimeron 1 with pronounced angle (against hind margin rounded), ventrally straight (against slightly concave) male ischium 7, and male pleopod-endopodite 1 with apex bent outwards at a right angle (against apex straight).

3.5 *Armadillidium humectum* Strouhal, 1937

The species has been treated in the 23<sup>rd</sup> contribution of this series (SCHMALFUSS 2006a), with additional material reported in SCHMALFUSS (2010). It is known from the western part of Greece (Ionian islands, western mainland and northern Peloponnese).

3.6 *Armadillidium irmengardis* Strouhal, 1956  
(map Fig. 16)

This species was described in the 26<sup>th</sup> contribution of this series (SCHMALFUSS 2010). Up to now it was known from the northwestern Greek mainland (Epirus). The additional material reported below enlarges its distribution area to the central Greek mainland (Thessalia). These specimens show some differences towards the Epirus samples concerning the head morphology and therefore they were ascribed to *A. fossuligerum* in the 26<sup>th</sup> contribution. Other specific characters as the morphology of the male ischium 7 are, however, identical with those in the Epirus material, so for the time being they are considered as conspecific with *A. irmengardis*.

## Additional material examined

**Greece:** 7 ex., Thessalia, prefecture Trikala, Kalambáka, Kastaniá, 1300–1500 m, leg. A. & F. RIEDEL, 26.V.2001 (SMNS 2705).

3.7 *Armadillidium janinense* Verhoeff, 1902

Synonyms: *A. epirensis* Strouhal, 1956, *A. holtzi* Strouhal, 1929.

The species has been treated in the 25<sup>th</sup> contribution of this series (SCHMALFUSS 2008). It is known from the western Greek mainland. A reinvestigation of the male type specimen of *A. holtzi* (NMW, see STROUHAL 1929: 71, figs. 46–48) proved this to be a junior synonym of *A. janinense*.

3.8 *Armadillidium laminigerum* Verhoeff, 1907  
(Figs. 27–33, map Fig. 34)

## Literature records

VERHOEFF 1907: 481, 497 (central Greece, “Stoliko” which seems to be a misreading or misspelling for Etolikó); SCHMALFUSS 1982: 219, figs. 8–14.

## Material examined

**Greece:** ♂ lectotype (7.5 × 3.5 mm), central mainland, prefecture Etolia Akarnania, “Stoliko” [very probably a misreading or misspelling of Etolikó NW of Mesolóngi], sea level, leg. ?LEONIS, 10.II.[no year] (BMNH). – 1 ♂ (smaller than lectotype), central mainland, prefecture Etolia Akarnania, Lake Trichonida, Pámfi, leg. SCHMALFUSS, 7.X.2000 (SMNS 2671).

## Diagnostic characters

Maximum dimensions: 10 × 5 mm (♀, paralectotype, SCHMALFUSS 1982).

Coloration: Violet gray.

Cuticular structures: Tergites very slightly granulated.

Frontal shield from behind surpassing frontal margin, upper margin straight, laterally with oblique angles (Fig. 27); antennal lobes rounded trapezoidal (Fig. 28). Hind margin of pereion-epimeron 1 rounded (Fig. 29). Telson wider than long, with straight sides and broadly rounded apex (Fig. 30). Flagellum of antenna in adults with distal segment longer than proximal one (see Remarks). Male carpus 1 with ventral brush of spines. Male ischium 7 ventrally slightly concave, frontal side with distal hairfield (Fig. 31). Male pleopod-exopodite 1 with pointed triangular hind-lobe, without angle between lateral margin of hind-lobe and respiratory field (Fig. 32, see Remarks), endopodite 1 with apex very slightly bent outwards (Fig. 33).

## Distribution (map Fig. 34)

Greece, central mainland, prefecture Etolia Akarnania.

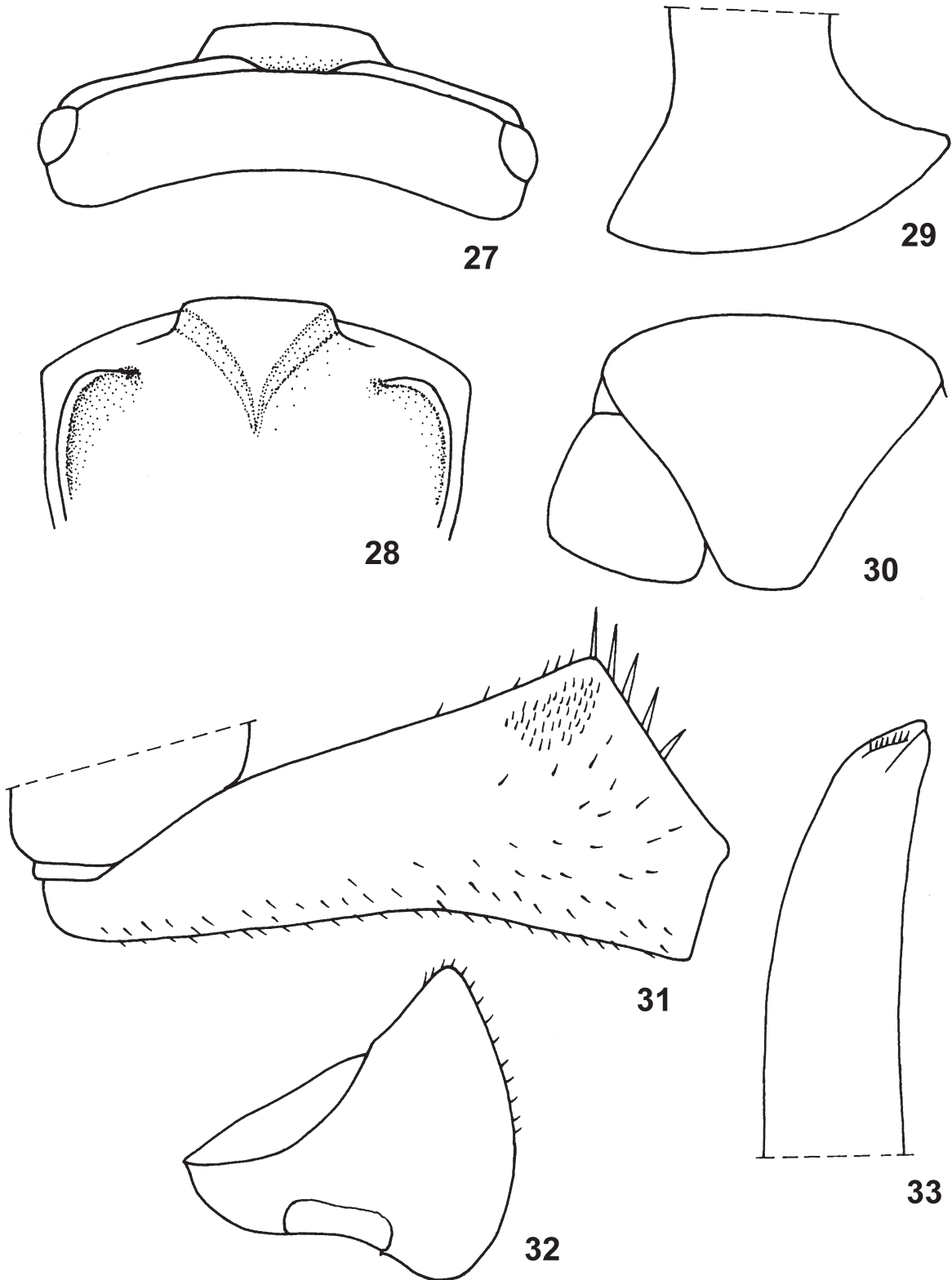
## Remarks

In the light of the systematic interpretation presented in the present paper *A. laminigerum koelbeli* Verhoeff, 1907 from southern Croatia, Ombla valley (VERHOEFF 1907: 482, 497, ROGENHOFER 1908: 120, KARAMAN 1966: 394) is by all probability a different species, as it is the case with the record of *A. laminigerum* from Albania (ARCANGELI 1952: 11).

The lectotype is probably juvenile, which would mean that in adult ♂♂ the ischium 7 and perhaps the pleopod 1 should exhibit different proportions (allometric growth). Future collections from the type locality can clarify these questions.

The species is very similar to *A. fossuligerum*, it shows, however, clear differences in the shape of the head (without groove behind frontal shield), the hind margin of epimeron





**Figs. 27–33.** *Armadillidium laminigerum*, lectotype ♂, 7.5 × 3.5 mm (from SCHMALFUSS 1982). – 27. Head, dorsal view. 28. Head, frontal view. 29. Pereion-epimeron 1, lateral view. 30. Telson and uropod in situ, dorsal view. 31. Ischium 7, frontal view. 32. Pleopod-exopodite 1. 33. Apex of pleopod-endopodite 1.



Fig. 34. Records of *Armadillidium laminigerum* (●), *A. meteorensis* n. sp. (■) and *A. pelionense* (▲).

1 (rounded) and male ischium 7 (ventrally concave). Additionally, *A. laminigerum* has been collected in lowland biotopes around sea level, while *A. fossuligerum* seems to be restricted to mountain biotopes with coniferous forest.

### 3.9 *Armadillidium lobocurvum* Verhoeff, 1902

This species was treated in the 23<sup>rd</sup> contribution of this series (SCHMALFUSS 2006a). It is known from the Peloponnese and from one locality at the northern coast of the Gulf of Corinth (2 ex., central Greek mainland, prefecture Fokída, NE of Náfpaktos, 5 km NE of Efpálio, leg. BAEHR, 20.IV.1983 (SMNS 1763) (published in SCHMALFUSS 1985: 295).

### 3.10 *Armadillidium marmoratum* Strouhal, 1929

This species was treated in the 23<sup>rd</sup> contribution of this series (SCHMALFUSS 2006a). It is known from the coasts of the eastern Mediterranean (Greece, Turkey, Cyprus, Israel, Egypt) and the southern Black Sea. A map of the Greek records is given in SCHMALFUSS (2006a: 72, fig. 153).

### 3.11 *Armadillidium meteorensis* n. sp. (Figs. 35–45, map Fig. 34)

#### Literature records

VANDEL 1946: 181 (misidentified as *A. atticum*, Greece, province Thessalia, prefecture Trikala, Metéora); SCHMALFUSS 1981: 281 (misidentified as *A. corcyraeum*, prefecture Trikala, Metéora).

#### Material examined

**Holotype:** ♂, 11.8 × 5.6 mm, Greece, province Thessalia, prefecture Trikala, Metéora, maquis around the monasteries, leg. SCHMALFUSS, 3.VI.1976 (SMNS T608).

**Paratypes:** 3 ♀♀, collecting data as holotype (SMNS 1721). – 4 ♂♂, 1 ♀, as before, but 22.IV.1978 (SMNS 1843).

#### Diagnostic characters

Maximum dimensions: 12.6 × 6.0 mm.

Coloration: Tergites brownish gray.

Cuticular structures: Tergites slightly granulated.

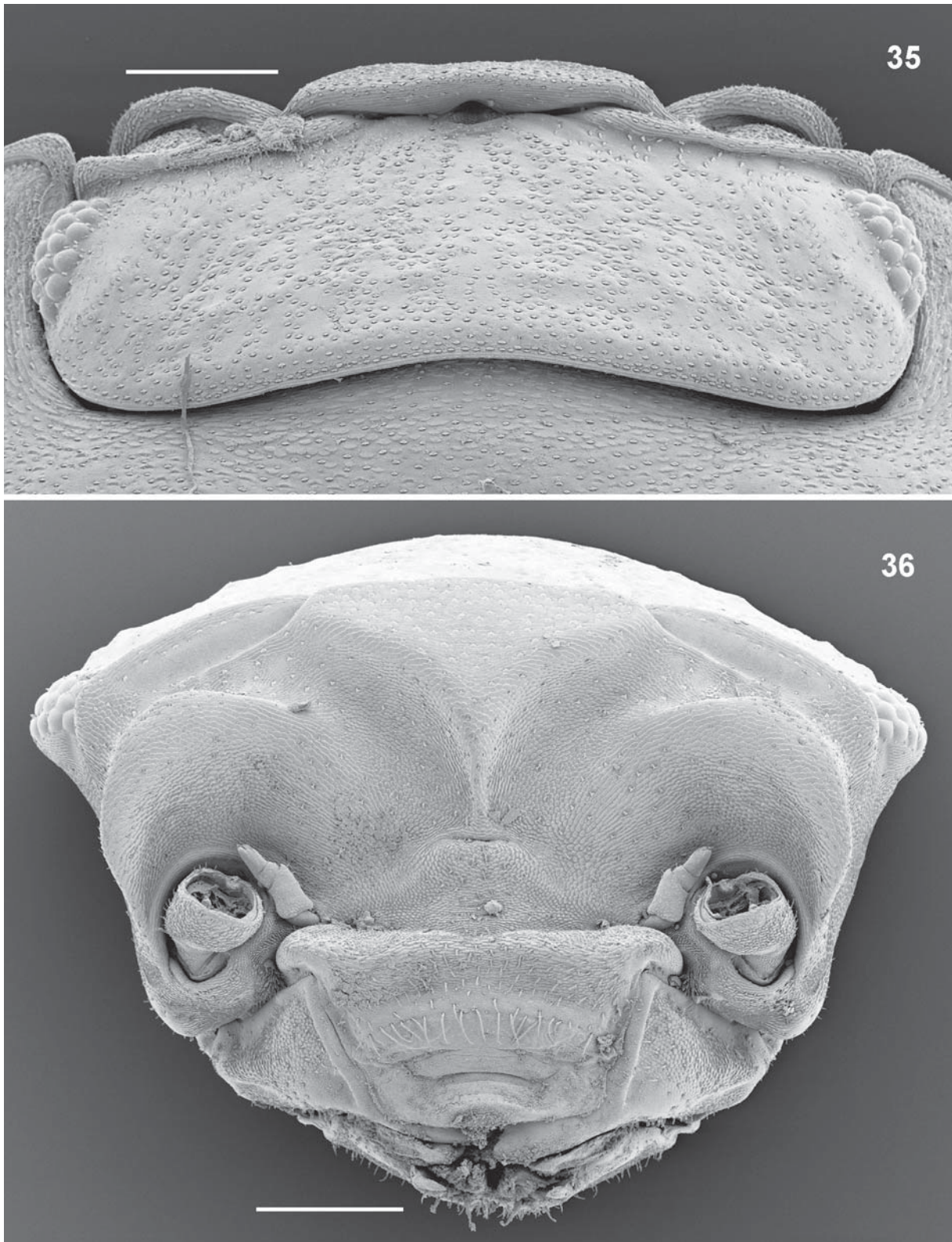
Frontal shield from behind slightly surpassing frontal margin, upper margin straight (Fig. 35); antennal lobes trapezoidal (Fig. 36). Hind margin of pereion-epimeron 1 with sharp angle (Fig. 43). Telson nearly as wide as long, with straight sides and rounded apex (Fig. 44). Flagellum of antenna in adults with distal segment slightly shorter than proximal one (Fig. 37). Male carpus 1 with weakly developed ventral brush of spiny setae (Fig. 38). Male ischium 7 ventrally very slightly indented, frontal side with distal hair-field (Figs. 39, 40). Male pleopod-exopodite 1 with pointed triangular hind-lobe (Figs. 41, 45), endopodite 1 with apex straight (Figs. 41, 42).

#### Distribution (map Fig. 34)

Known only from the Metéora monasteries above the town of Kalambáka in Thessalia.

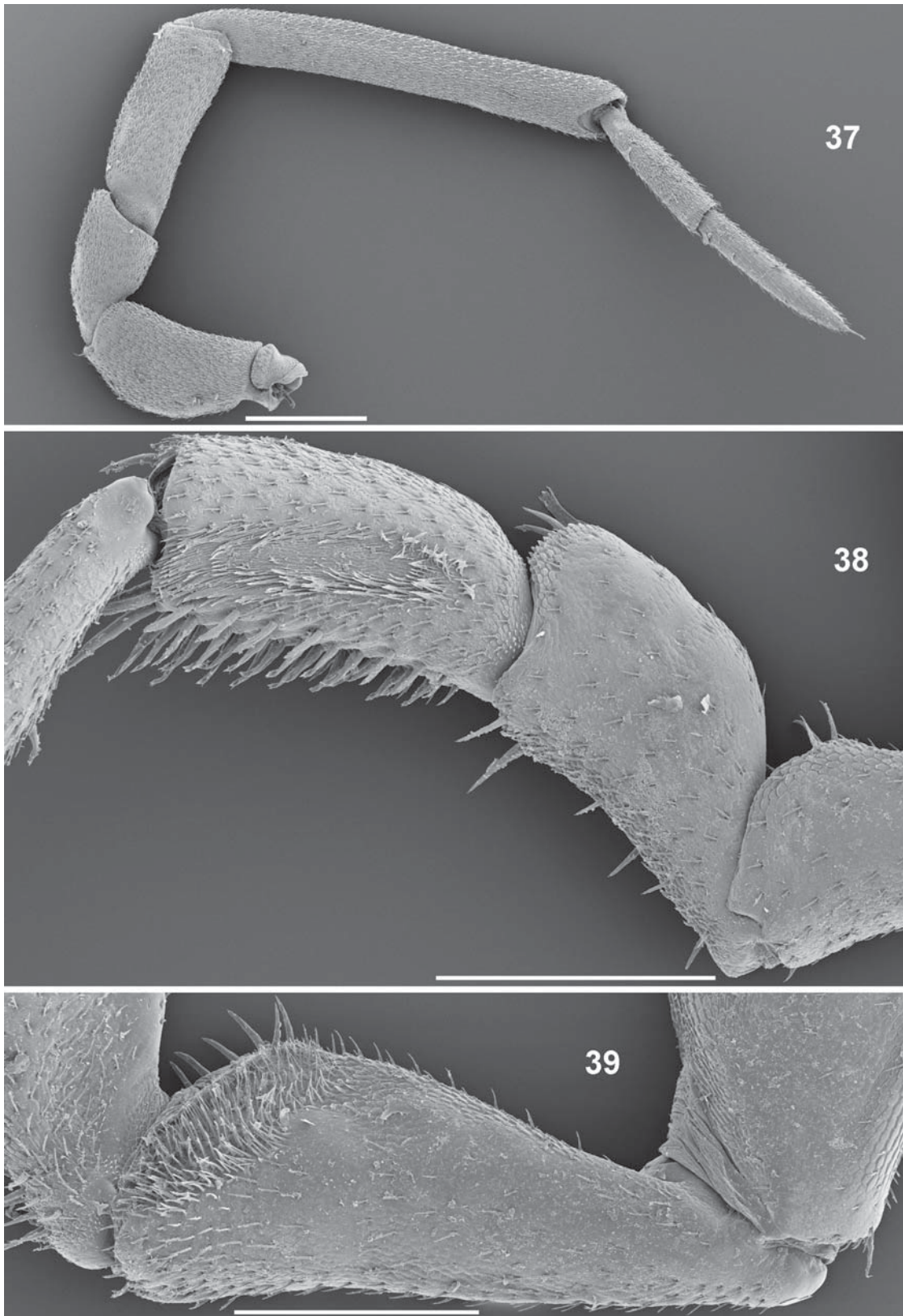
#### Remarks

VANDEL (1946: 181) identified a sample of *Armadillidium* from Metéora as *A. atticum*. It was obviously the new species described herein, which is similar to *A. atticum* especially concerning the elongated medial lobe of the male pleopod-exopodite 1. The new species differs, however, clearly from *A. atticum* in the shape of the frontal part of the head, the pereion-epimeron 1, and especially the male ischium 7 (compare figures in SCHMALFUSS 2006b). In SCHMALFUSS (1981: 281) the specimens from Metéora were ascribed to *A. corcyraeum*, but also this ascription does not seem justified because of a number of differences (*A. corcyraeum*: frontal shield with lateral angles, hind margin of pereion-epimeron 1 with pronounced angle, male ischium 7 ventrally concave, dorsal coloration with conspicuous white spots; *A. meteorensis*: frontal shield laterally rounded, hind margin of pereion-epimeron 1 rounded, male ischium 7 ventrally only indented, dorsal coloration without conspicuous white spots). For differences between *A. meteorensis* and *A. gionum* see above under *A. gionum*. So at the moment all evidence pleads for the description of a new species.

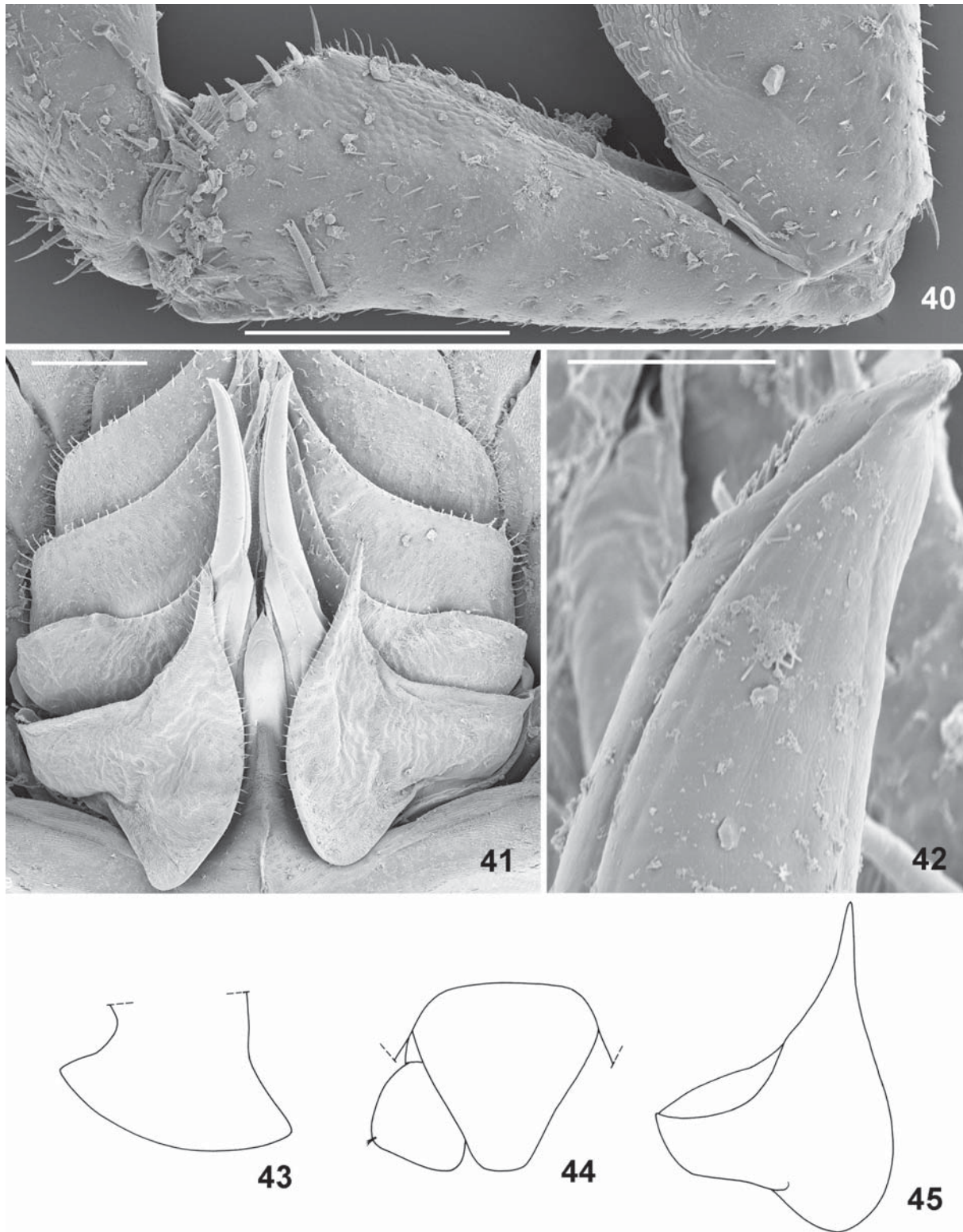


**Figs. 35–36.** *Armadillidium meteorense* n. sp., paratypes. – 35. ♂ (SMNS 1843), 12.0 × 5.5 mm, head, dorsal view. 36. ♀ (SMNS 1721), 12.6 × 6.0 mm, head, frontal view. – Scales: 0.5 mm.



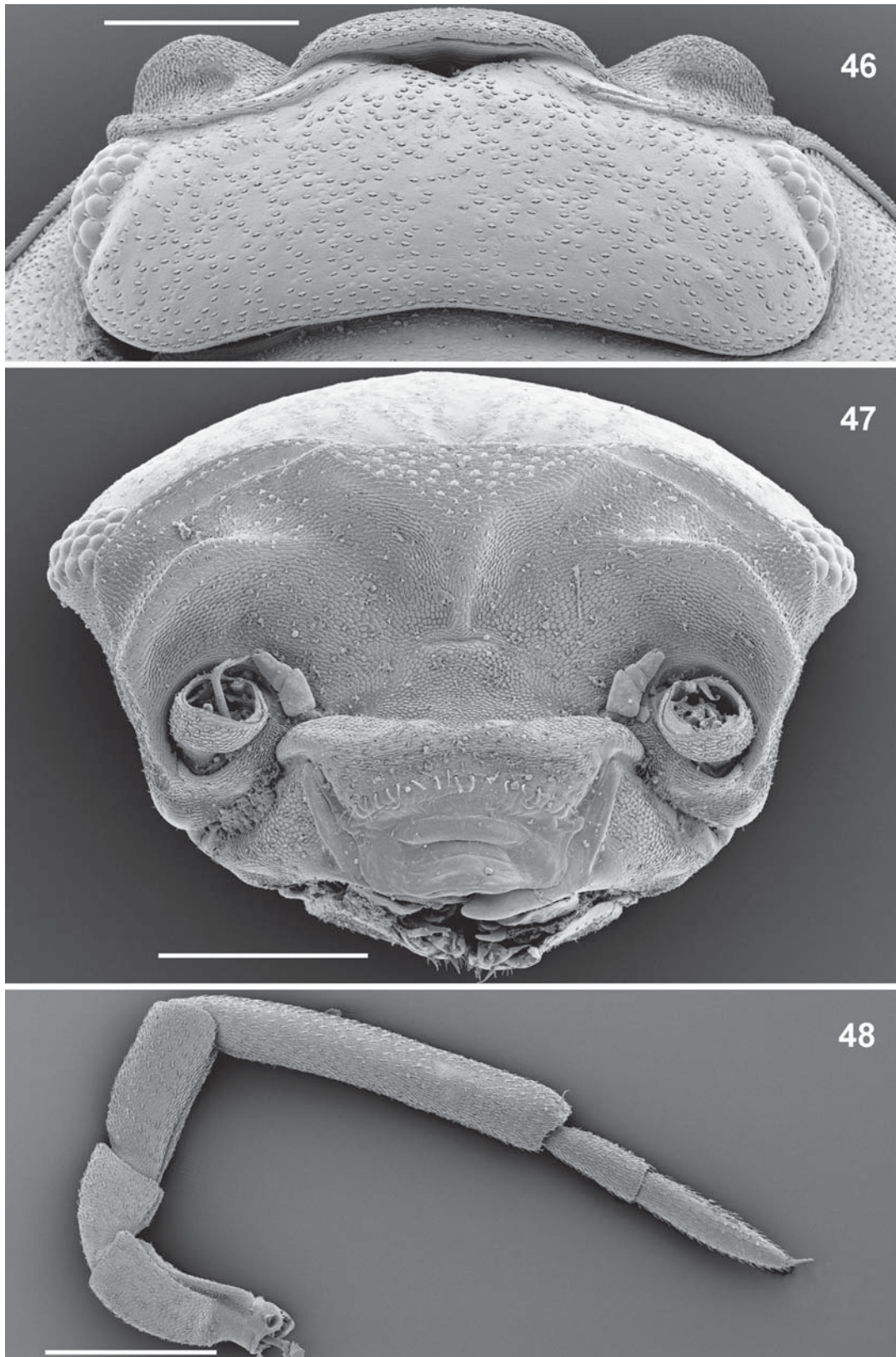


**Figs. 37–39.** *Armadillidium meteorense* n. sp. (SMNS 1843), paratype ♂, 12.0 × 5.5 mm. – 37. Antenna. 38. Pereiopod 1, frontal view. 39. Ischium 7, frontal view. – Scales: 0.5 mm.



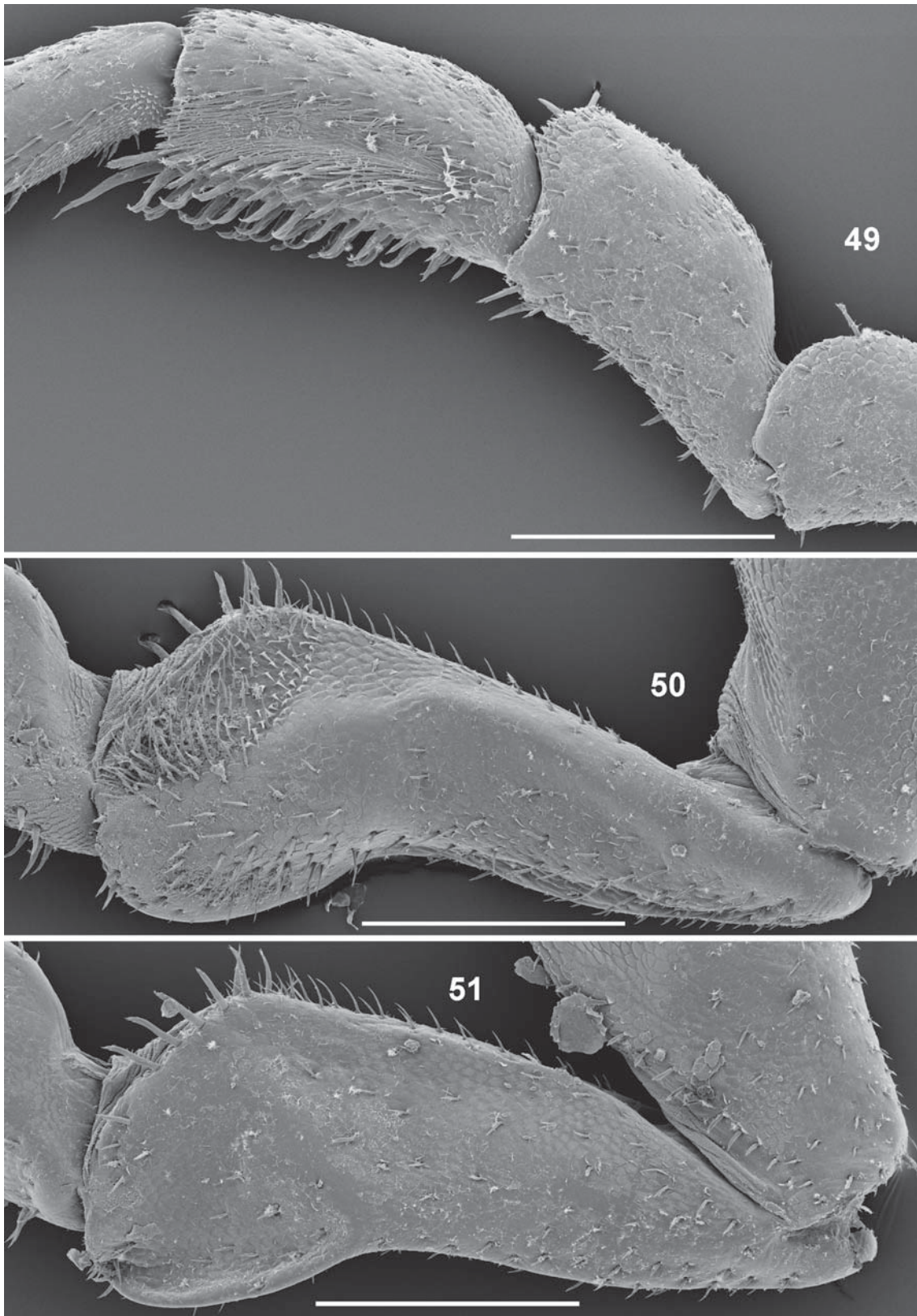
**Figs. 40–45.** *Armadillidium meteorense* n. sp. (SMNS 1843), paratype ♂, 12.0 × 5.5 mm (40–42), holotype ♂, 11.8 × 5.6 mm (43–45). – 40. Ischium 7, caudal view. 41. Pleopods in situ, ventral view. 42. Apex of pleopod-endopodite 1. 43. Pereion-epimeron 1, lateral view. 44. Telson and uropod in situ, dorsal view. 45. Pleopod-exopodite 1, dorsal view. – Scales: 0.5 mm (40, 41), 50 μm (42).



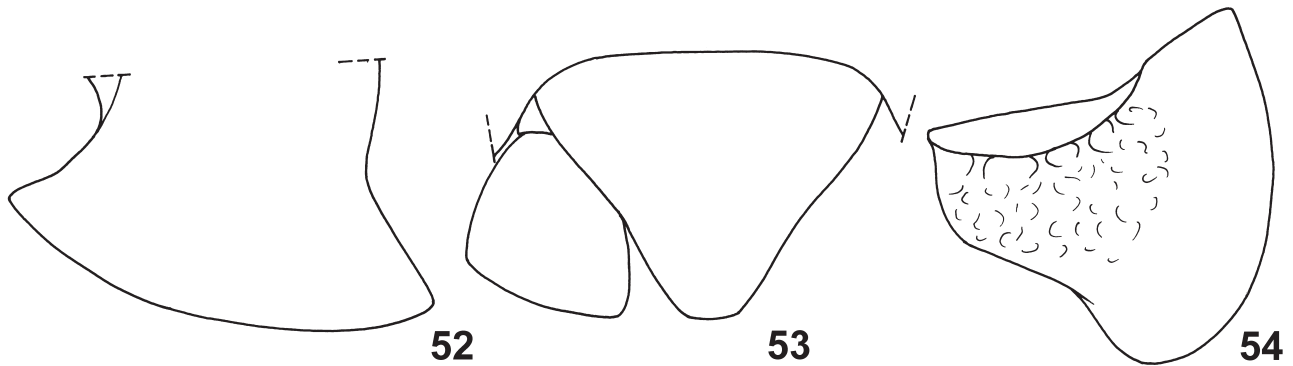


**Figs. 46–48.** *Armadillidium pelionense* (Pilio Mountains, SMNS 1891), ♂, 10.0 × 3.6 mm (46, 48), ♀, 9.0 × 3.9 mm (47). – 46. Head, dorsal view. 47. Head, frontal view. 48. Antenna. – Scales: 0.5 mm.





**Figs. 49–51.** *Armadillidium pelionense* (Pilio Mountains, SMNS 1891), ♂, 10.0 × 3.6 mm. – 49. Pereiopod 1, frontal view. 50. Ischium 7, frontal view. 51. Ischium 7, caudal view. – Scales: 0.3 mm.



**Figs. 52–54.** *Armadillidium pelionense* (Pilio Mountains, SMNS 1891), ♀, 9.0 × 3.9 mm (52, 53), ♂, 10.0 × 3.6 mm (54). – 52. Pereion-epimeron 1, lateral view. 53. Telson and uropods in situ, dorsal view. 54. Pleopod-exopodite 1, dorsal view.

3.12 *Armadillidium pelionense* Strouhal, 1928  
(Figs. 46–54, map Fig. 34)

Literature records

STROUHAL 1928: 103, figs. 10–14 (Greece, province Thessalía, prefecture Magnissía, Pilio Mountains); STROUHAL 1929: 72.

Material examined

**Greece:** 3 ex., province Thessalía, prefecture Magnissía, Pilio Mountains, pass above Portariá, leg. PIEPER & RUNZE, 28.IX.1978 (SMNS 1891). – 1 ex., Pilio Mountains, 3 km E of Portariá, maquis, 800 m, leg. SCHMALFUSS, 21.VI.2006 (SMNS 2885). – 2 ex., Pilio Mountains, 8 km NW of Khánia, *Fagus*, 1500 m, leg. SCHMALFUSS, 21.VI.2006 (SMNS 2886). – 1 ex., Pilio Mountains, 2 km E of Khánia, *Fagus*, 1300–1400 m, leg. SCHMALFUSS, 21.VI.2006 (SMNS 2888).

Diagnostic characters

Maximum dimensions: 11.0 × 5.2 mm.

Coloration: Brownish gray.

Cuticular structures: Tergites completely smooth.

Frontal shield from behind slightly surpassing frontal margin, upper margin rounded (Fig. 46); antennal lobes trapezoidal (Fig. 47). Hind margin of pereion-epimeron 1 with rounded angle (Fig. 52). Telson wider than long, with slightly concave sides and broadly rounded apex (Fig. 53). Flagellum of antenna in adults with distal segment 1.5 times as long as proximal one (Fig. 48). Male carpus 1 with weakly developed ventral brush of spiny setae (Fig. 49). Male ischium 7 ventrally strongly concave, frontal side with distal hair-field (Figs. 50, 51). Male pleopod-exopodite 1 with short pointed triangular hind-lobe (Fig. 54), endopodite 1 with apex straight.

Distribution (map Fig. 34)

Greece, eastern mainland, province Thessalía, prefecture Magnissía, Pilio (= Pelion) Mountains.

Remarks

The species is obviously a representative of the *A. insulanum*-group which populates the islands and coastal regions of the northern Aegean Sea. The form from the Pilio Mountains shows consistent morphological differences towards the populations from the adjacent Northern Sporades, so it seems justified to separate it on the species level. It also differs ecologically, *A. insulanum* from the Aegean islands lives in dry maquis biotopes, *A. pelionense* inhabits rather wet mountainous *Fagus* forests.

3.13 *Armadillidium peloponnesiacum* Verhoeff, 1901

This species was treated in the 23<sup>rd</sup> contribution of this series (SCHMALFUSS 2006a). It is known from western, central and southern Greece.

3.14 *Armadillidium pseudovulgare* Verhoeff, 1902  
(Figs. 55–65, map Fig. 66)

Synonym: *A. veluchiense* Verhoeff, 1902 (see SCHMALFUSS 1982: 225).

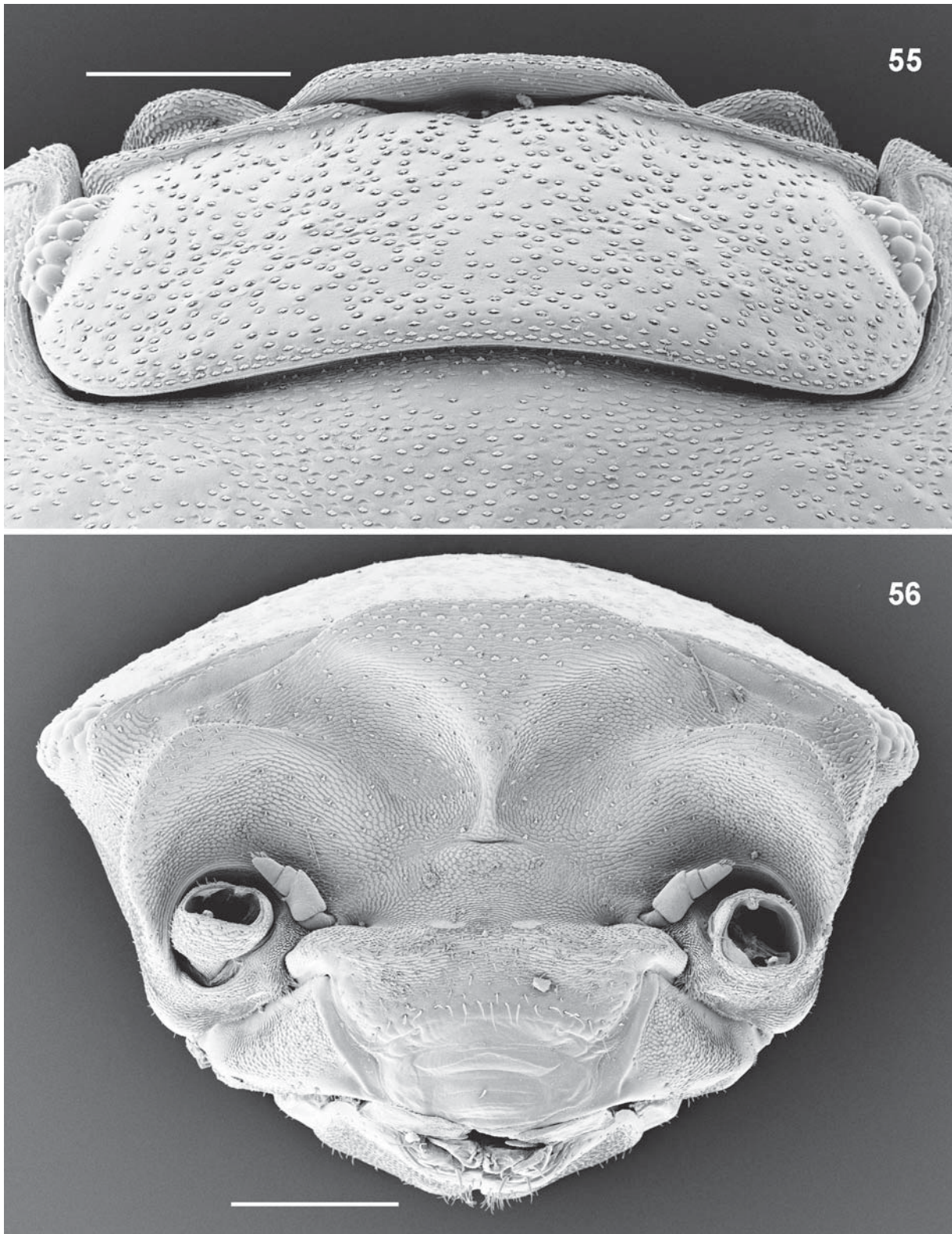
Literature records

VERHOEFF 1902: 251 (Greece, central mainland, prefecture Fthiótida, eastern foot of the Timfristós Mountain); VERHOEFF 1902: 253 (*A. veluchiense*, central mainland, prefecture Evritanía, “Veluchi, alpin am Schnee” = Timfristós Mountain); VERHOEFF 1907: 488; VERHOEFF 1936: 6, figs. 3–5; SCHMALFUSS 1975: 51, figs. 6–10 (additional records are misidentifications and belong to other species); SCHMALFUSS 1982: 223, figs. 35–41 (central mainland, prefecture Evritanía, Timfristós Mountain).

Material examined

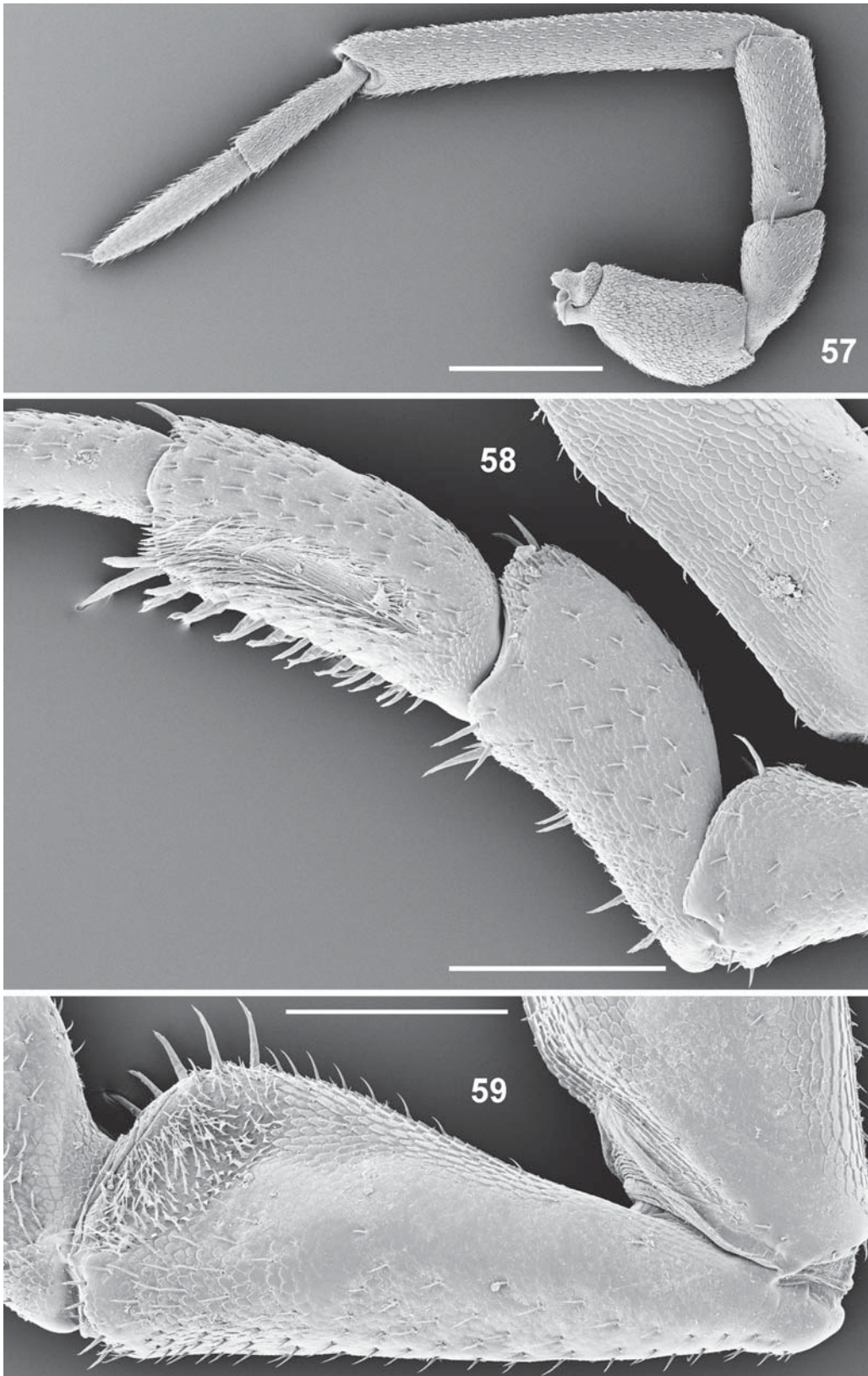
**Greece:** 1 ♀ paralectotype (see SCHMALFUSS 1982), central mainland, prefecture Fthiótida (close to the border of prefec-



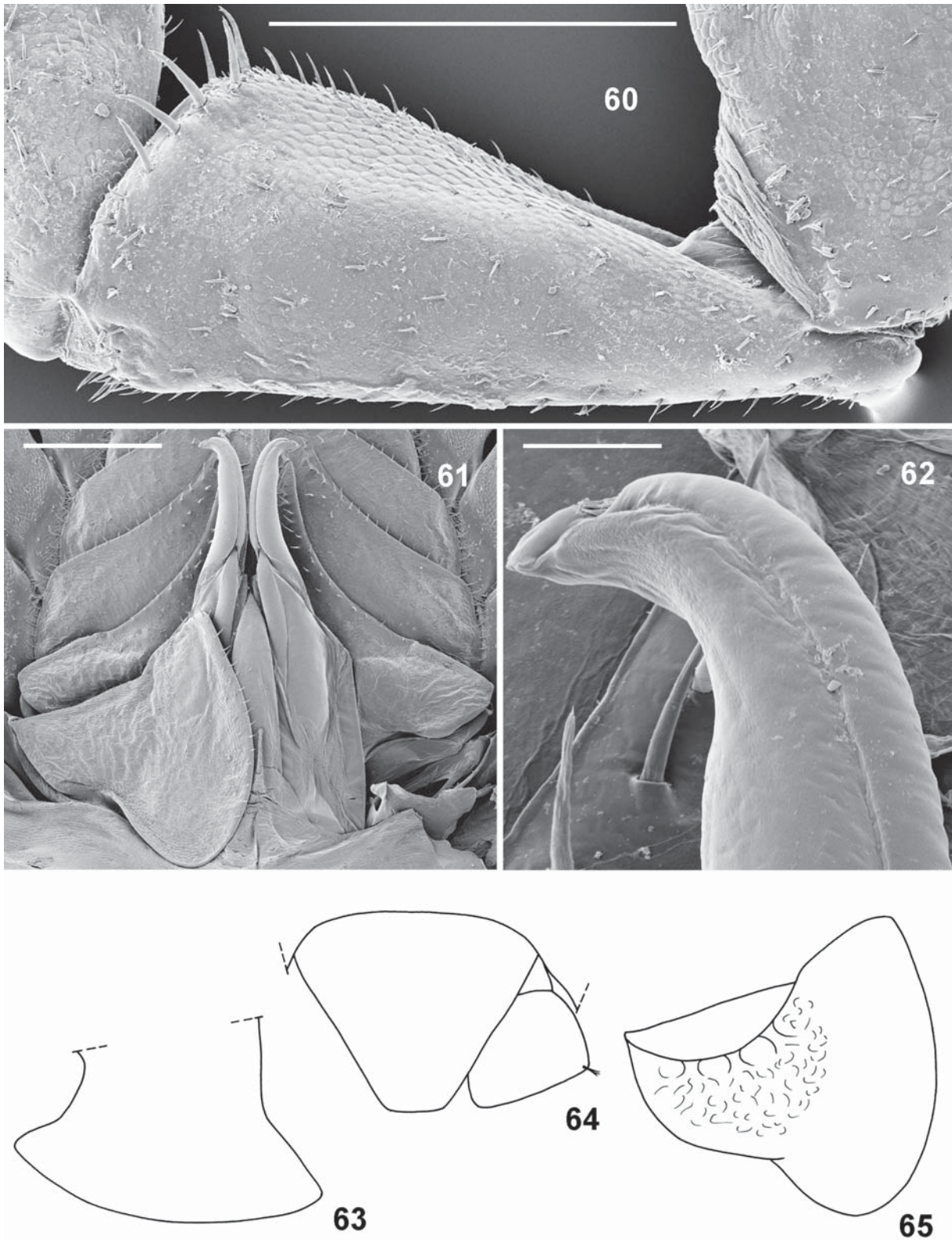


**Figs. 55–56.** *Armadillidium pseudovulgare* (Timfristós Mountain, SMNS 2678). – 55. ♂, 9.0 × 3.8 mm, head, dorsal view. 56. ♀, 9.5 × 3.9 mm, head, frontal view. – Scales: 0.5 mm.





**Figs. 57–59.** *Armadillidium pseudovulgare* (Timfristós Mountain, SMNS 2678), ♂, 9.0 × 3.8 mm. – 57. Antenna. 58. Pereiopod 1, frontal view. 59. Ischium 7, frontal view. – Scales: 0.3 mm.



**Figs. 60–65.** *Armadillidium pseudovulgare* (Timfristós Mountain, SMNS 2678), ♂, 9.0×3.8 mm. – **60.** Ischium 7, caudal view. **61.** Pleopods in situ, ventral view. **62.** Apex of pleopod-endopodite 1. **63.** Pereion-epimeron 1, lateral view. **64.** Telson and uropods in situ, dorsal view. **65.** Pleopod-exopodite 1, dorsal view. – Scales: 0.5 mm (60, 61), 50 µm (62).





**Fig. 66.** Records of *Armadillidium pseudovulgare* (●), *A. sfenthourakisi* (■) and *A. stolikanum* (▲).

ture Evritanía), “Chani Panetsu” [= an old hostel at the eastern foot of the Timfristós Mountain], leg. V. APFELBECK [no date] (SMNS T45). – 10 ex., central mainland, prefecture Evritanía, Timfristós Mountain, alpine zone (= “Veluchi, hochalpin”), leg. KÜHNELT, 12.V.1961 (SMNS 1869). – 5 ex., Timfristós Mountain, eastern flank, 1700 m, leg. BAEHR, 24.IV.1983 (SMNS 2013). – 12 ex., Timfristós Mountain, western flank, 2000–2200 m, leg. BAEHR, 25.IV.1983 (SMNS 2032). – 26 ex., Timfristós Mountain, southern flank, *Abies* forest, around 1600 m, leg. SCHMALFUSS, 28.IX.1989 and 10.X.2000 (SMNS 2220, 2678). – 24 ex., prefecture Evritanía, Panetolikó Mountain, 5 km W of Prussós, *Abies* forest, around 1200 m, leg. SCHMALFUSS, 10.X.2000 (SMNS 2679).

#### Diagnostic characters

Maximum dimensions: 14.0 × 6.3 mm.

Coloration: Brownish gray, bigger specimens blackish.

Cuticular structures: Tergites with very slight granulation.

Frontal shield from behind clearly surpassing frontal margin, upper margin slightly curved, without conspicuous groove caudally (Fig. 55); antennal lobes trapezoidal (Fig. 56). Hind margin of pereion-epimeron 1 with rounded angle (Fig. 63). Telson slightly wider than long, with straight sides and truncate apex (Fig. 64). Flagellum of antenna in adults with distal segment slightly longer than proximal one (Fig. 57). Male carpus 1 with weakly developed ventral brush of spiny setae (Fig. 58). Male ischium 7 ventrally straight, frontal side with distal hairfield (Figs. 59, 60). Male pleopod-exopodite 1 with short

triangular hind-lobe (Figs. 61, 65), endopodite 1 with apex clearly bent outwards (Figs. 61, 62).

#### Distribution (map Fig. 66)

Greece, central mainland, prefecture Evritanía, Timfristós Mountain and Panetolikó Mountain.

#### Remarks

This species occurs in sympatry with *A. fossuligerum*. The two species are, at first sight, similar, but *A. pseudovulgare* can be clearly separated by the frontal shield clearly surpassing frontal margin, the rounded angle on hind margin of pereion-epimeron 1, and the male pleopod-endopodite 1 with apex conspicuously bent outwards.

#### 3.15 *Armadillidium sfenthourakisi* Schmalfluss, 2008 (map Fig. 66)

This species was described in the 25<sup>th</sup> contribution of this series (SCHMALFUSS 2008). It was known up to now from the region around the Olympus mountain. Additional material is reported here from eastern Thessalía. The sample mentioned below was misidentified as *A. pseudovulgare* in SCHMALFUSS (1975: 51).

#### Additional material examined

**Greece:** 11 ex., eastern Thessalía, valley of Témpi, leg. MARTENS, 21.III.1963 (SMNS 1580).

#### 3.16 *Armadillidium stolikanum* Verhoeff, 1907 (Figs. 67–70, map Fig. 66)

#### Literature records

VERHOEFF 1907: 469, 492 (central Greece, “Stoliko” which seems to be a misreading or misspelling for Etolikó); SCHMALFUSS 1982: 225, figs. 42–45.

#### Diagnostic characters

Maximum dimensions: 13.0 × 7.0 mm (SCHMALFUSS 1982).

Coloration: ? (long conservation).

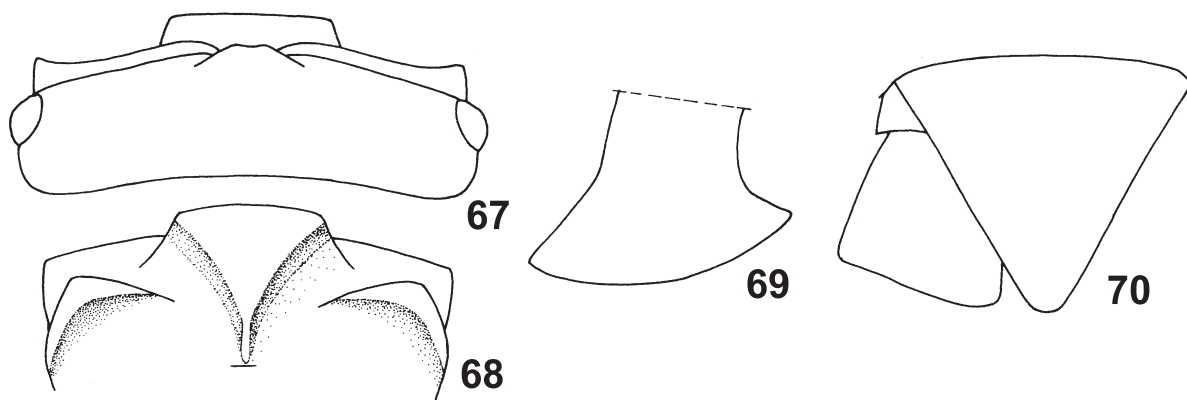
Cuticular structures: Tergites strongly granulated.

Frontal shield from behind surpassing frontal margin, upper margin straight (Fig. 67); antennal lobes trapezoidal (Fig. 68). Hind margin of pereion-epimeron 1 with rounded angle (Fig. 69). Telson slightly wider than long, with straight sides and narrowly rounded apex (Fig. 70). Male characters unknown.

#### Distribution (map Fig. 66)

Greece, central mainland, only known from type locality “Stoliko” which seems to be a misreading or misspell-





**Figs. 67–70.** *Armadillidium stolikanum*, lectotype ♀, 13.0 × 7.0 mm (from SCHMALFUSS 1982). – 67. Head, dorsal view. 68. Head, frontal view. 69. Pereion-epimeron 1, lateral view. 70. Telson and uropod in situ, dorsal view.

ing of Etolikó NW of Mesolóngi (sea level), prefecture Etolía Akarnanía.

#### Remarks

This species is known only from the two type specimens (both ♀♀, one of them was designated as lectotype by SCHMALFUSS 1982). The illustrations which I published in 1982 are included in the present paper, the male characters are still unknown.

#### 3.17 *Armadillidium tripolitzense* Verhoeff, 1902

This species was treated in the 23<sup>rd</sup> contribution of this series (SCHMALFUSS 2006a). It is known from the mountains of Attica and the Peloponnese.



**Fig. 71.** Records of *Armadillidium tuberculatum* (●) and *A. versluysi* (■).

#### 3.18 *Armadillidium tuberculatum* Schmalfluss, 2008 (map Fig. 71)

This species was described in the 25<sup>th</sup> contribution of this series (SCHMALFUSS 2008). Up to now it was known only from the northeastern Greek mainland (eastern Makedonía). The additional material reported below enlarges its distribution area to the central-eastern Greek mainland (see map Fig. 71) and it appears probable that it also populates the area between these records. The sample from Thessalía was published, with a question mark, as *A. pseudovulgare* in SCHMALFUSS (1975: 53), the material from Lake Kerkíni was tentatively ascribed to *A. fossuligerum* in SCHMALFUSS (2008: 160).

#### Material reexamined

**Greece:** 27 ex., eastern Makedonía, prefecture Sérres, Lake Kerkíni, surroundings of Lithótopos, 400 m, *Quercus*, *Carpinus*, *Platanus*, leg. STEINBRÜCK, 24.V.1988 and leg. SCHMALFUSS, 23.X.2005 (SMNS 2186, 2871, 2872). – 7 ex., northeastern Thessalía, prefecture Lárissa, 5 km S of Elassóna, rocky hillside with *Pinus*, leg. HUBER & SCHMALFUSS, 3.IX.1972 (SMNS 1583).

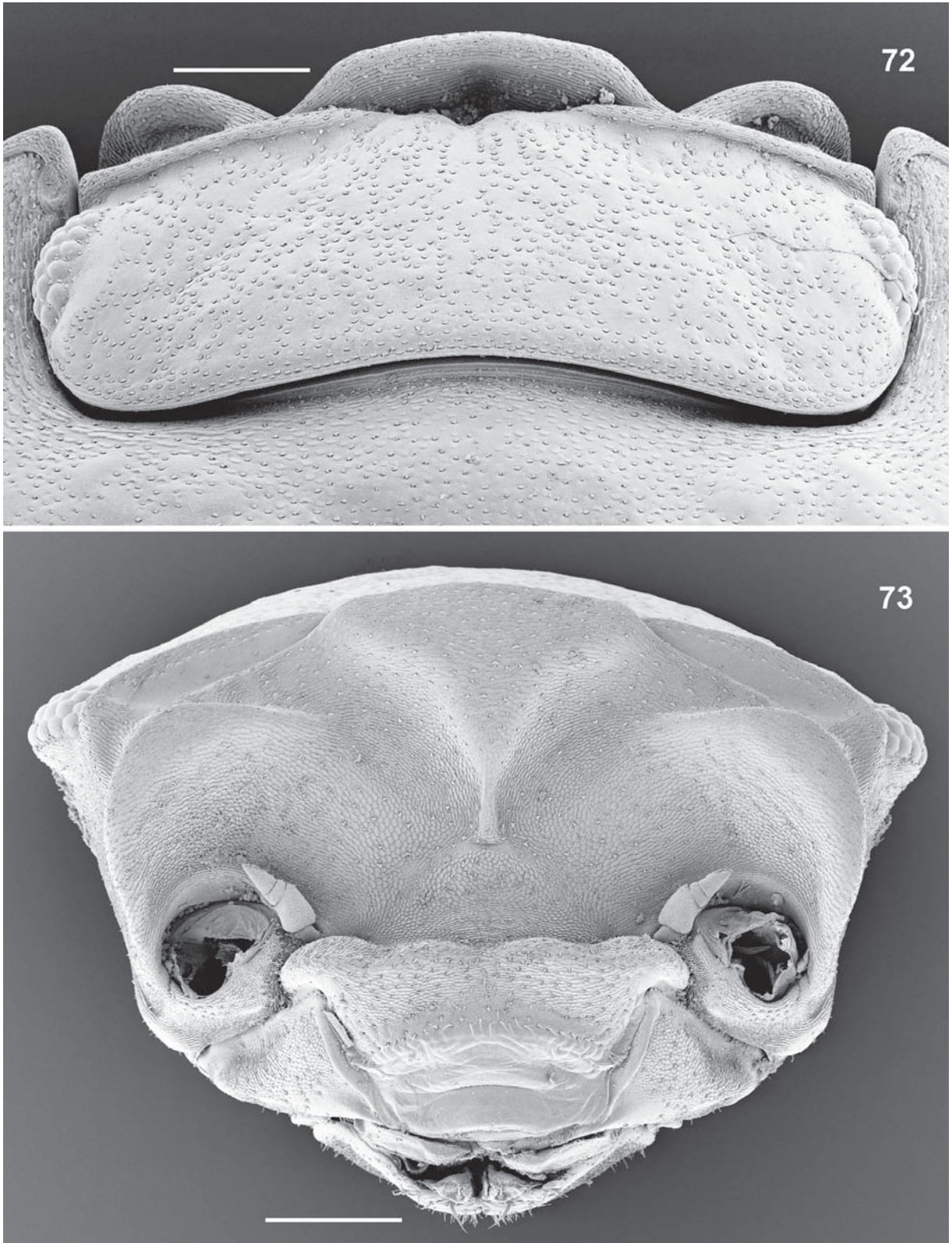
#### 3.19 *Armadillidium versluysi* Strouhal, 1937 (Figs. 72–82, map Fig. 71)

#### Literature records

STROUHAL 1937: 121, figs. 7–11 (Greece, central mainland, prefecture Viotía, surroundings of Arákhova).

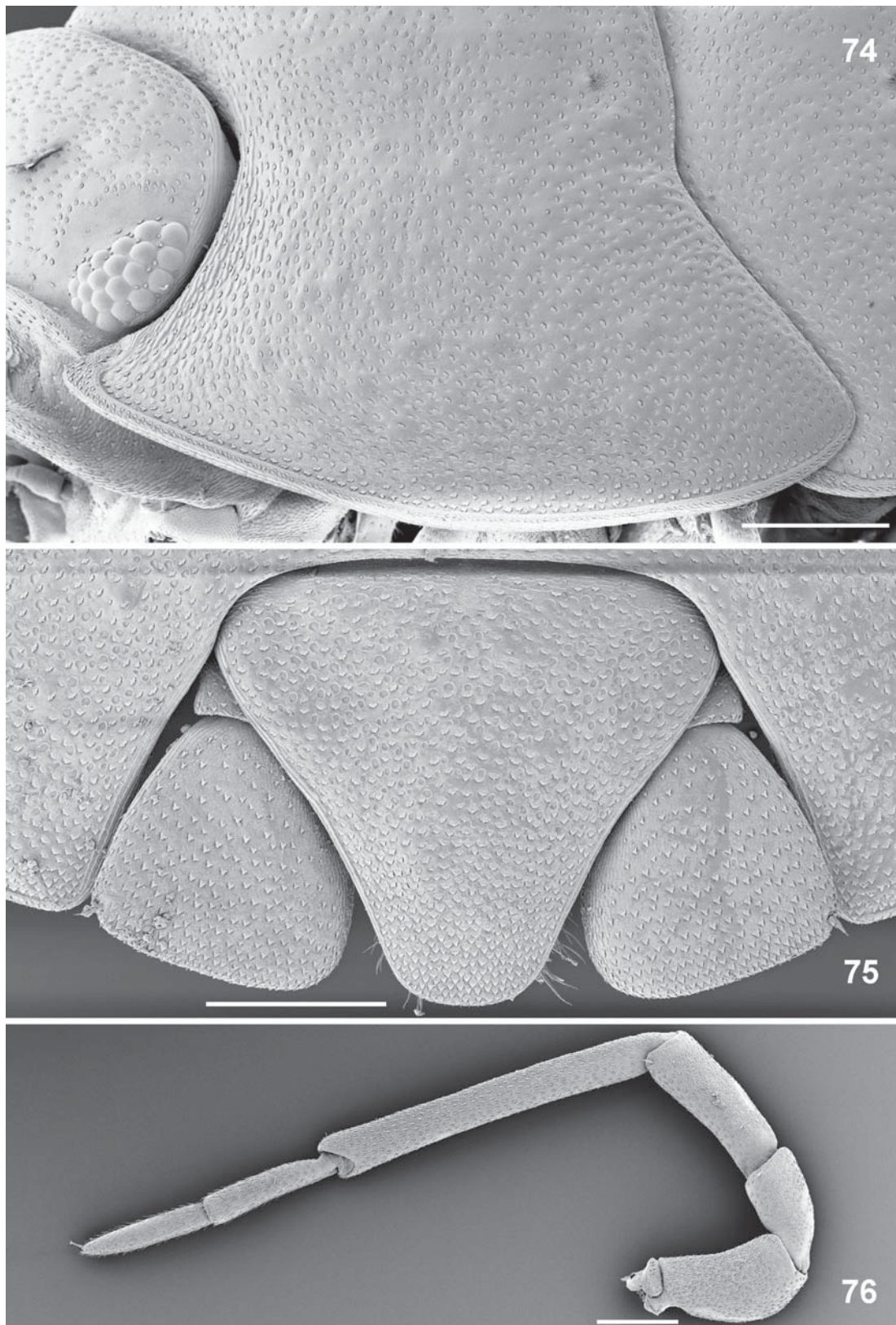
#### Material examined

**Greece:** Preparations of 2 ♂♂ (syntypes), central mainland, prefecture Viotía, “Arachova-Delfi”, leg. 6. Wiener Universitätsreise, 20.IV.1933 (NMW). – 15 ex., central mainland, prefecture Fthiótida, Parnasós Mountain, 2000–2400 m, leg. OSSELLA, 11.–12.VII.1982 (SMNS 1921, 1922). – 44 ex., prefecture Fthiótida, Parnasós Mountain, ski centre Fterólaka, 1700–1800 m, above timber line, leg. SCHMALFUSS, 7.V.1983 and 11.X.2000 (SMNS 1987, 1988, 2680). – 2 ex., prefecture Fthiótida, Parnasós Mountain, Neromána, leg. KANELLIS, 20.IV.1952 (SMNS 2097).



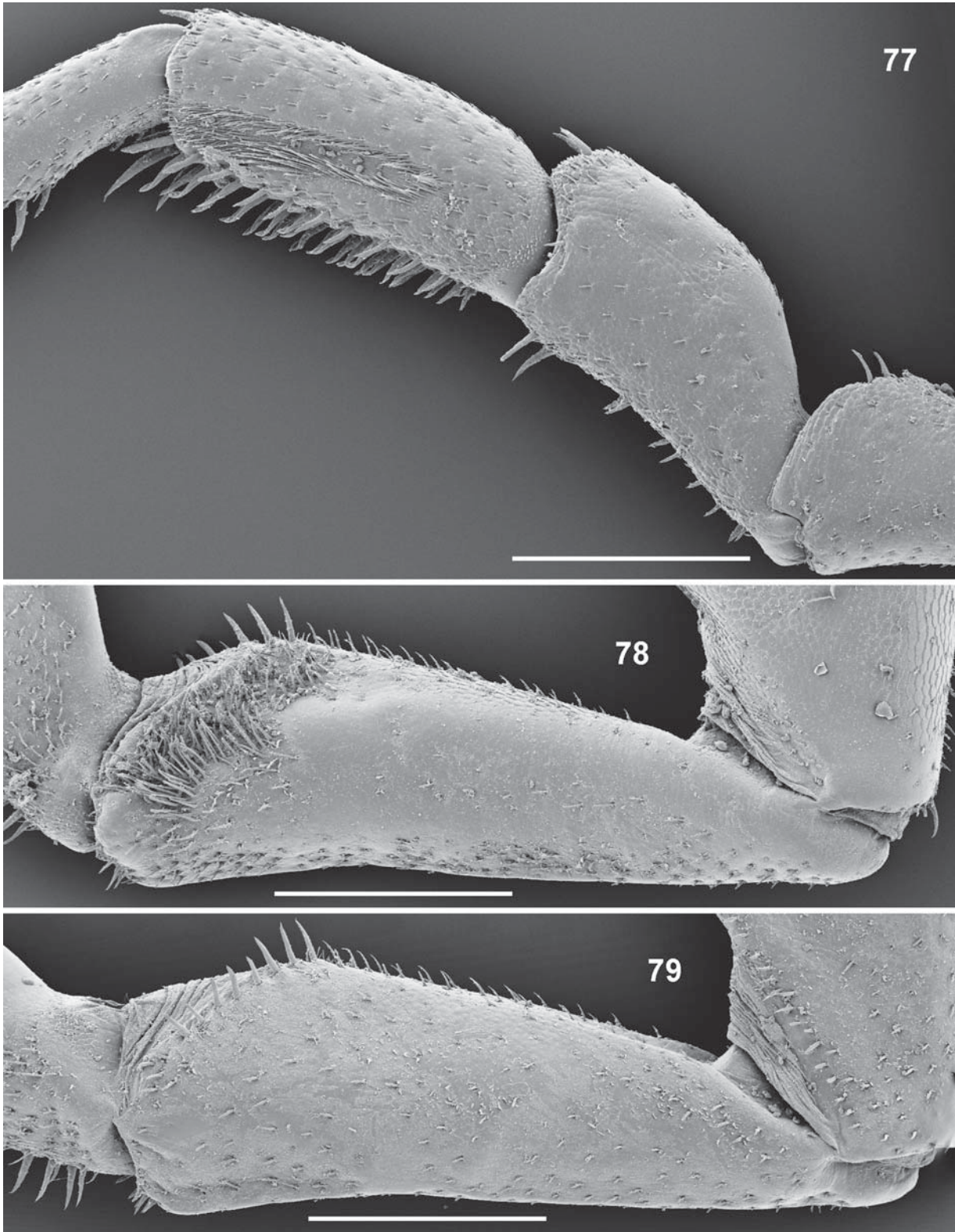
**Figs. 72–73.** *Armadillidium vershuyisi* (Parnasós Mountain, SMNS 1922). – **72.** ♂, 14.5 × 6.0 mm, head, dorsal view. **73.** ♀, 13.5 × 6.3 mm, head, frontal view. – Scales: 0.5 mm.





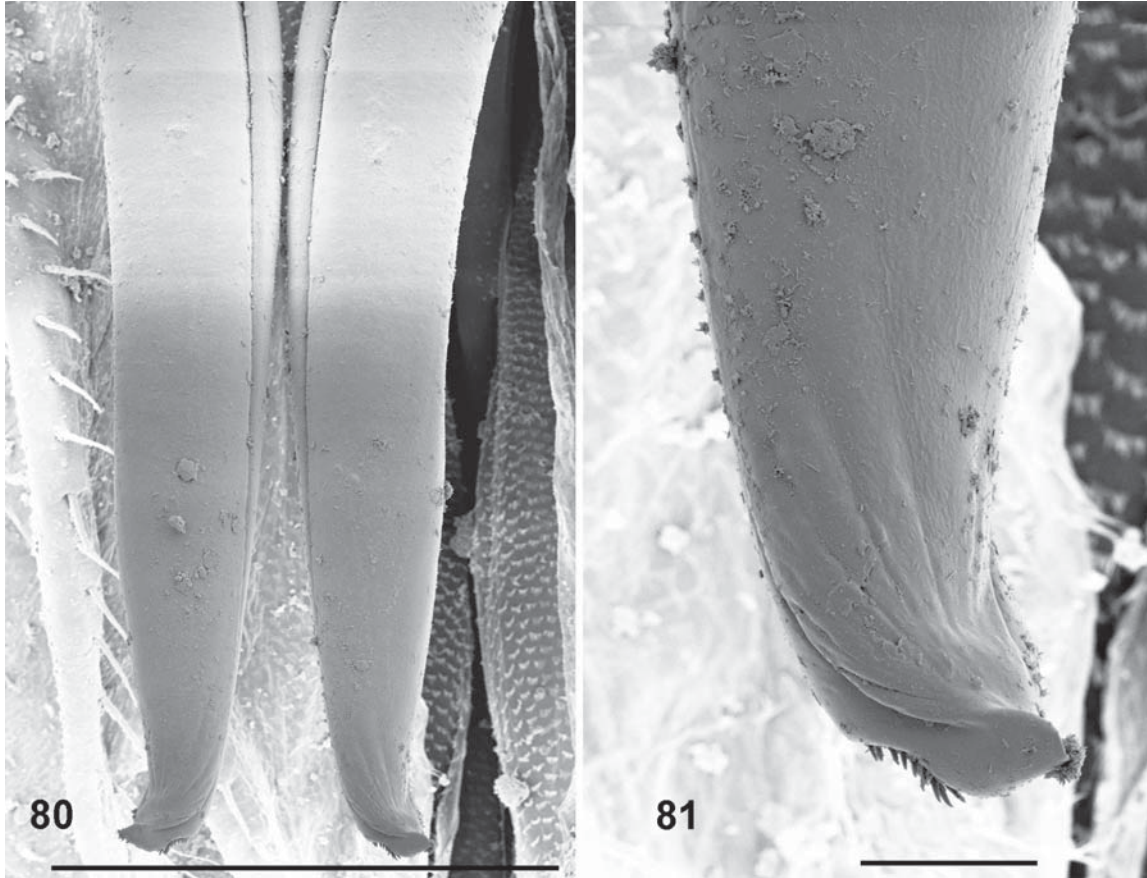
**Figs. 74–76.** *Armadillidium vershuyi* (Parnasós Mountain, SMNS 1922). – 74. ♂, 12.0 × 5.3 mm, pereion-epimeron 1, lateral view. 75. ♀, 13.5 × 6.3 mm, telson and uropods in situ, dorsal view. 76. ♂, 14.5 × 6.0 mm, antenna. – Scales: 0.5 mm.





**Figs. 77–79.** *Armadillidium versluysi* (Parnasós Mountain, SMNS 1922), ♂, 14.5 × 6.0 mm. – 77. Pereiopod 1, frontal view. 78. Ischium 7, frontal view. 79. Ischium 7, caudal view. – Scales: 0.5 mm.

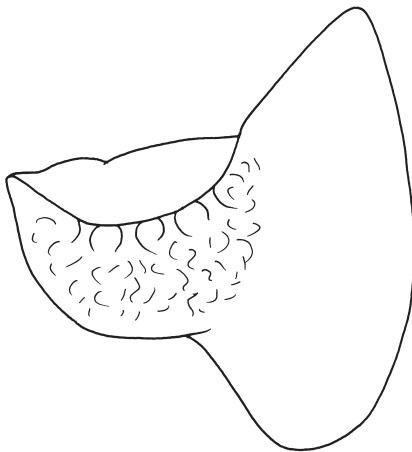




**Figs. 80–81.** *Armadillidium vershuyisi* (Parnasós Mountain, SMNS 1922), ♂, 14.5 × 6.0 mm. – **80.** Pleopod-endopodites 1 in situ, ventral view. **81.** Apex of pleopod-endopodite 1. – Scales: 0.5 mm (80), 50 µm (81).

– 7 ex., prefecture Fthiótida, Parnasós Mountain, 1700–1900 m, leg. BAEHR, 21.IV.1983 (SMNS 2027, 2029). – 1 ex., prefecture Fthiótida, Parnasós Mountain, 2100–2300 m, leg. BAEHR,

22.IV.1983 (SMNS 2007). – 9 ex., prefecture Viotía, Parnasós Mountain, southern flank, 1200 m, *Abies* forest, leg. SCHMALFUSS, 11.X.2000 (SMNS 2681). – 2 ex., prefecture Viotía, Parnasós Mountain, 1300 m, leg. MALICKY, 22.IV.1984 (SMNS 2101). – 8 ex., prefecture Fokída, Delfi, 400 m, leg. BARSCH, 30.VI.2005 (SMNS 2868).



**Fig. 82.** *Armadillidium vershuyisi* (Parnasós Mountain, SMNS 1922), ♂, 12.0 × 5.3 mm, pleopod-exopodite 1, dorsal view.

#### Diagnostic characters

Maximum dimensions: ♂ 14.5 × 6.0 mm, ♀ 16.5 × 7.6 mm.

Coloration: Tergites dark brownish gray with yellowish muscle spots.

Cuticular structures: Tergites very faintly granulated.

Frontal shield from behind surpassing frontal margin, upper margin slightly curved (Fig. 72); antennal lobes trapezoidal (Fig. 73). Hind margin of pereion-epimeron 1 with pronounced acute angle (Fig. 74). Telson wider than long, with near-straight sides and rounded to truncate apex (Fig. 75). Flagellum of antenna in adults with proximal segment slightly longer than distal one (Fig. 76). Male carpus 1 with weakly developed ventral brush of spiny setae (Fig. 77). Male ischium 7 ventrally very slightly con-

cave, frontal side with distal hair-field (Figs. 78, 79). Male pleopod-exopodite 1 with pointed triangular hind-lobe (Fig. 82), endopodite 1 with apex slightly bent outwards (Figs. 80, 81).

#### Distribution (map Fig. 71)

Greece, central mainland, seems to be restricted to the region of the Parnasós Mountain.

#### Remarks

The species is very similar to *A. fossuligerum* and has been reported as this species in SCHMALFUSS (1985: 291 and 2006a: 159). Detailed investigations of additional samples and of type specimens of *A. versluyisi* showed, however, that all the samples from the Parnasós Mountain belong to the latter species. It differs from *A. fossuligerum* in the shape of the frontal shield, the male ischium 7 and the apex of the male pleopod-endopodite 1.

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

This species was treated in the 23<sup>rd</sup> 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.

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