The terrestrial isopods (Isopoda: Oniscidea) of Greece.  
25th contribution: The genus Armadillidium (Armadillidiidae) 
in the provinces Macedonia and Thrace

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Abstract

Based on the investigation of new collections, 14 species of Armadillidium are reported from the northern mainland of Greece (provinces of Macedonia and Thrace). Seven species are new to science (A. jerrentrupi n. sp., A. pangaionum n. sp., A. petralonense n. sp., A. phalacronum n. sp., A. pieperi n. sp., A. sfenthourakisi n. sp. and A. tuberculatum n. sp.). Four species were treated in previous contributions of this series. The diagnostic characters of ten species (including the seven new ones) are described and illustrated, most of them by SEM-photographs, and the Greek records of these species are mapped.

Keywords: Isopoda, Oniscidea, Armadillidium, northern Greece.

Zusammenfassung


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1 24th contribution see Stuttgarter Beiträge zur Naturkunde, Serie A (Biologie) 698 (2006).
species described in the present publication the total sum of valid species described from Greece adds up to 57. This number will increase, because the material from the remaining regions of Greece contains more new species.

Abbreviations

A. Armadillidium
AL Albania
BG Bulgaria
ex. example(s), specimen(s)
ex-YU former Yugoslavia
GR Greece
SMNS Staatliches Museum für Naturkunde Stuttgart
TR Turkey

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2 Methods

The material used for the SEM-preparations was, if not stated otherwise, air-dried. In some cases a critical point treatment was used. If the number of specimens was not very limited I tried to find “clean” material for the SEM-preparations and prepared several specimens to be able to choose the cleanest one for the publication. In some species where the number of specimens was very restricted (e.g. A. pieperi) I had to use material covered with mud-particles, which nevertheless shows the relevant characters. Ultrasound treatment did not help to clean mud-covered material. 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 Macedonia and Thrace

3.1 Armadillidium album Dollfuss, 1887

(Figs. 2–12, map Fig. 13)

Literature records

No literature records from Greece. A general treatment of the species is found in Vandel (1962: 841), a complete bibliographic list in Schmalfuss (2003: 27).

Material examined (including first records for Greece)


Figs. 2–3. Armadillidium album (northeastern Greece, SMNS 2421), ♀ with marsupium, 6.4 × 2.3 mm, critical point dried. – 2. Head and pereion-tergite 1, dorsal view. 3. Head, dorsal view. – Scales: 0.5 mm.
Figs. 4–5. Armadillidium album (northeastern Greece, SMNS 2421). – 4. ♂, 5.2 × 2.0 mm, head, frontal view. 5. ♀ with marsupium, 6.4 × 2.3 mm, critical point dried, detail of pereion-tergite 1. – Scales: 0.5 mm (4), 0.1 mm (5).
Figs. 6–7. Armadillidium album (northeastern Greece, SMNS 2421). – 6. ♂, 4.4 × 1.7 mm, critical point dried, antenna. 7. ♂, 5.2 × 2.0 mm, pereiopod 1, frontal view. – Scales: 0.2 mm.
Figs. 8–9. *Armadillidium album* (northeastern Greece, SMNS 2421), ♂, 5.2 × 2.0 mm. – 8. Ischium 7, frontal view. 9. Ischium 7, caudal view. – Scales: 0.2 mm.
Armadillidium album

Maximum dimensions: 7.2 × 3.0 mm.
Coloration: Reduced pigmentation, yellowish with epimeras partly light gray-brown.

Cuticular structures: Tergites slightly granulated, with short upright spiny setae (compare Fig. 5).
Head of duplocarinate type, with the ridge forming the upper edge of the frontal triangle extended to the sides of the head (Fig. 4) as in A. bicurvatum (Schmalfuß 2006a: 22, fig. 42). Frontal shield from behind surpassing frontal margin of head only slightly, upper margin straight, no angles laterally (Figs. 2–3); antennal lobes trapezoidal (Fig. 4). Hind margin of pereion-epimeron 1 completely rounded (Fig. 10). Telson shorter than wide, with straight sides and broadly truncated apex (Fig. 11). Antenna short and stout (Fig. 6), flagellum with distal segment about three times as long as proximal one. Male pereiopod 1 with brush of short spines on carpus and merus (Fig. 7); male pereiopod 7 with ischium ventrally concave, basipodite distally with very conspicuous process (Figs. 8–9). Male pleopod-exopodite 1 with rounded triangular hind-lobe and indented respiratory field (Fig. 12), endopodite 1 with apex bent outwards.

Distribution

The species is known from the coast of the northern and southwestern Mediterranean (the present paper contains the first records from Greece, see map Fig. 13) and the Atlantic coasts of Europe north to England and the Netherlands. It has also been found on Madeira.

Remarks

In contrast to all other members of the genus the species lives in marine supra-littoral sandy beaches, where it is found on wooden logs and trunks deeply buried in the sand.

3.2 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.

3.3 Armadillidium fossuligerum Verhoeff, 1902

(Figs. 14–23, map Fig. 24)

Literature records (all from Greece)
Verhoeff 1902: 250 (Southern mainland, Timfristós Mountain); Verhoeff 1907: 484; Schmalfuß 1981: 283, figs. 35–41 (Timfristós Mountain); Schmalfuß 1985: 291 (Timfristós Mountain and Parnassós Mountain).

Material examined

Greece: 8 ex., southern mainland, prefecture Viotía, Delfi, 400 m, leg. BARTSCH, 30.VI.2005 (SMNS 2868). – 20 ex., as before, Parnassós Mountain, 1200–1800 m, leg. MÁLICKY,
Stuttgartereiiae zur Naturkunde A

Fig. 13. Greek records of Armadillidium album.


Ex-Yugoslavian Macedonia: 5 ex., southern part, river Vardar, Demir Kapija, leg. Kontschán et al., 17.X.2006 (SMNS 5059). – 9 ex., southeastern part, Belasica Mountains (continuation of the Kerkini Mountains to the west), Kolesíno, ruderal vegetation, 300 m, leg. Kontschán et al., 18.X.2006 (SMNS 5085).

Bulgaria: 11 ex., SW-Bulgaria, Pirin Mountains, 25 km S of
Figs. 16–17. Armadillidium fossuligerum (northern Greece, Vérnio Mountain, SMNS 2413). – 16. ♂, 13.5 × 6.0 mm, head, frontal view. 17. ♀, 11.5 × 4.5 mm, antenna. – Scales: 0.5 mm.
Figs. 18–20. Armadillidium fossuligerum (northern Greece, Vèrmi Mountain, SMNS 2413), ♂, 11.5 × 4.5 mm. – 18. Pereiopod 1, frontal view. 19. Ischium 7, frontal view. 20. Ischium 7, caudal view. – Scales: 0.4 mm.
Frontal shield from behind surpassing frontal margin of head in a varying degree, upper margin nearly straight to rounded, oblique angles laterally (Fig. 15); antennal lobes trapezoidal (Fig. 16). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 21). Telson as wide as long, with nearly straight sides and truncate apex (Fig. 22). Antenna see Fig. 17, distal segment of the flagellum slightly longer than proximal one. Male carpus 1 with brush of short spines (Fig. 18); male ischium 7 ventrally slightly concave, frontally with distal hair-field (Figs. 19–20). Male pleopod-exopodite 1 with triangular hind-lobe which can vary in length (Fig. 23), endopodite 1 with apex straight.

Distribution
Distributed in the mountain regions in southwestern Bulgaria, southeastern ex-Yugoslavian Macedonia and in a central belt through the Greek mainland (map Fig. 24).

Remarks
The species exhibits, according to its rather wide distribution, some morphological variation in the diagnostic characters, there is, however, no evidence for dividing it into different species.

3.4 Armadillidium insulanum Verhoeff, 1907
This species was treated in the 24th contribution of this series (Schmalfuss 2006b). It is known from the Aegean islands (except the Dodekánisa and Crete), the northeastern coast of Asia Minor and the northeastern mainland of Greece (map in Schmalfuss 2006b: 31, fig. 71).

3.5 Armadillidium janinense Verhoeff, 1902
(Figs. 25–33, map Fig. 34)


Literature records (all from Greece)
Verhoeff 1902: 252 (Northwestern mainland, Ioánnina);

Material examined

Diagnostic characters

Maximum dimensions: $16.0 \times 7.7$ mm.

Coloration: Light brown with epimera lighter, big males uniformly blackish.

Cuticular structures: Tergites smooth or very slightly granulated (Fig. 25).

Frontal shield from behind surpassing frontal margin of head, upper margin rounded, no angles laterally, caudally with conspicuous groove (Fig. 25); antennal lobes trapezoidal (Fig. 26). Hind margin of pereion-epimeron 1 completely rounded (Fig. 31). Telson wider than long and with broadly rounded apex (Fig. 32). Antenna see Fig. 27, distal segment of the flagellum slightly longer than proximal one. Male pereiopod 1 with dense brush of spines on carpus and merus (Fig. 28); male ischium 7 ventrally slightly concave, frontally with large S-shaped distal hair-field, caudal side with ventral and proximal hair-fields, basipodite 7 with hairy setae along medial margin (Figs. 29–30). Male pleopod-exopodite 1 with short hind-lobe,
Figs. 27–28. Armadillidium janinense (northwestern Greece, Timfi Mountain, SMNS 2751), ♂, 15.2 × 7.0 mm. – 27. Antenna. 28. Pereiopod 1, frontal view. – Scales: 0.5 mm.
Figs. 29–30. *Armadillidium janinense* (northwestern Greece, Timfi Mountain, SMNS 2751), ♂, 15.2 × 7.0 mm. – 29. Ischium 7, frontal view. 30. Ischium 7, caudal view. – Scales: 0.5 mm.
medial edge slightly concave (Fig. 33), endopodite 1 with apex straight. Uropod-exopodite terminally conspicuously straight-cut with sharp angles (Fig. 32).

**Distribution**

Known from the western Greek mainland (map Fig. 34), perhaps also occurring in southwestern ex-Yugoslavian Macedonia (see under Remarks).

**Remarks**

From the illustrations given by Frankenberg (1941: 12) for *A. storkani* n.sp. from the Galicica Mountain in southwestern ex-Yugoslavian Macedonia this species seems to be identical with *A. janinense*. To be sure about this synonymy the type material of *A. storkani* should be re-investigated, the types are, however, not available.

All diagnostic characters of *A. janinense* show conspicuous similarities with the characters of *A. bensei* Schmalfuss, 2006 from the Peloponnese (compare Schmalfuss 2006a: 18ff.). The characters of the male pereiopod 7 are certainly common derived characters (synapomorphies) suggesting the two taxa to be sister species. Another species possessing the same derived hairfield structures is *A. granulatum* Brandt, 1833 (compare Schmalfuss 2006a: 29), so the three species possibly form a monophyletic group.

### 3.6 *Armadillidium jerrentrupi* n.sp.

(Figs. 35–46, map Fig. 47)

**Material examined**

**Holotype:** ♂, 18.5 × 8.5 mm, Greece, northern mainland, prefecture Xanthi, Nestos Gorge N of Toxotes, among boulders on the steep side of the river shore, high maquis vegetation, leg. Schmalfuss, 30.IV.1990 (SMNS T597).

Derivatio nominis

The species is dedicated to Hans Jerrentrup (Avramiliá, prefecture Kavála/Greece), who introduced me to the Néstos Gorge and to other fascinating biotopes in Greece.

Diagnostic characters

Maximum dimensions: 17.0 × 7.3 mm.

Coloration: Dark gray, the specimens from the Néstos Gorge with yellowish epimera and hind margins of tergites, the other samples uniformly gray.

Cuticular structures: Tergites smooth (Fig. 37).

Live animals see Figs. 35–36. Frontal shield from behind surpassing frontal margin of head, upper margin nearly straight, laterally with oblique rounded angles (Fig. 38); antennal lobes semicircular (Fig. 39). Hind margin of pereion-epimeron 1 with pronounced angle (Fig. 44). Telson longer than wide, with nearly straight sides and broadly truncate apex (Fig. 45). Antenna see Fig. 40, segments of the flagellum more or less the same length. Male carpus 1 with brush of short spines (Fig. 41); male ischium 7 ventrally straight, frontally with distal hair-field (Figs. 42–43). Male pleopod-exopodite 1 with short triangular hind-lobe (Fig. 46), endopodite 1 with apex straight. Uropod-exopodite with strongly rounded inner angle (Fig. 45).

Distribution

Northern Greek mainland, lower Néstos river system (map Fig. 47).

Remarks

The new species seems to be a close relative of *A. fossuligerum*, considering the morphology of head, telson and male pleopods, it shows however clear differences indicating a separate species status. The coloration is different, the antenna is much more slender, the male ischium 7 is ventrally straight, not concave as in *A. fossuligerum*, and the uropod-exopodite is longer and has a strongly rounded inner angle. The allopatric distribution is further evidence for a sister group relationship.

3.7 Armadillidium marmoratum Strouhal, 1929

This species was treated in the 23rd contribution of this series (Schmalfuss 2006a). It is known from the coasts of Greece (Ionian island Lefkáda, Peloponnese, Aegean islands, northern Aegean coast), western Turkey including Black Sea coast, Cyprus, Israel and Egypt. A map of the overall distribution is found in Schmalfuss (2000: 79, fig. 4), for safe Greek records see map fig. 153 in Schmalfuss (2006a).
Figs. 39–40. Armadillidium jerrentrupi n. sp., paratypes from type locality (Néstos Gorge, SMNS 2283). – 39. ♂, 16.0 × 7.5 mm, head, frontal view. 40. ♂, 18.3 × 9.2 mm, antenna. – Scales: 1 mm.
Figs. 41–43. Armadillidium jerrentrupi n.sp., ♂, 18.3 × 9.2 mm, paratype from type locality (Néstos Gorge, SMNS 2283). – 41. Pereiopod 1, frontal view. 42. Ischium 7, frontal view. 43. Ischium 7, caudal view. – Scales: 0.5 mm.
3.8 Armadillidium pangaionum n. sp.
(Figs. 48–57, map Fig. 88)

Material examined

Holotype: ♀, 13.5 × 5.8 mm, Greece, northern mainland, prefecture Sérres, Pangéo Mountain, northern side, monastery Ikosifinisi, 500 m, mixed forest, leg. SchMALFuss, 4.V.1990 (SMNS T600).


Derivatio nominis

The species is named after its main distribution area, the Pangéo Mountain in the eastern part of the province Macedonia.

Diagnostic characters

Maximum dimensions: 13.5 × 5.8 mm.

Coloration: Tergites dark gray with small light muscle-spots.

Cuticular structures: Tergites smooth with a very faint rugosity (Fig. 48).

Frontal shield from behind surpassing frontal margin of head, upper margin slightly rounded, with obtuse angles laterally, caudally with conspicuous groove (Fig. 49); antennal lobes semicircular (Fig. 50). Hind margin of pereion-epimeron 1 with pronounced obtuse angle (Fig. 44). Telson slightly longer than wide, with nearly straight sides and rounded apex (Fig. 45). Antenna see Fig 40, distal segment of the flagellum slightly longer than proximal one. Male carpus 1 with brush of short spines (Fig. 52); male ischium 7 ventrally concave, frontally with distal and ventral hair-fields (Figs. 53–54). Male pleopod-exopodite 1 with hind-lobe elongated to a narrow pointed apex (Fig. 57), endopodite 1 with apex straight.

Distribution

Northern Greece, seems to be restricted to the region of the Pangéo Mountain (map Fig. 88).

Remarks

The species seems to be another member of the insulanum-group, which includes the species insulanum, atticum and pelionense (see SchMALFuss 2006b: 18, 32). The elongated hind-lobe of the male pleopod-exopodite 1 and a number of other differences (pereion-epimeron 1, telson, male ischium 7) indicate a separation on the species level.
Fig. 47. Known records of *Armadillidium jerrentrupi* n. sp. (●) and *A. pieperi* n. sp. (■).
Figs. 48–49. *Armadillidium pangaionum* n. sp., ♂, 12.0 × 4.7 mm, paratype from Pangéo Mountain (SMNS 2414). – 48. Head and pereion-tergite 1, dorsal view. 49. Head, dorsal view. – Scales: 0.5 mm.
Figs. 50–51. Armadillidium pangaionum n. sp., paratypes from Pangéo Mountain (SMNS 2414). – 50. ♂, 11.2 × 4.4 mm, head, frontal view. 51. ♂, 12.0 × 4.7 mm, antenna. – Scales: 0.5 mm.
Figs. 52–54. *Armadillidium pangaionum* n. sp., ♀, 12.0 × 4.7 mm, paratype from Pangéo Mountain (SMNS 2414). – 52. Pereiopod 1, frontal view. 53. Ischium 7, frontal view. 54. Ischium 7, caudal view. – Scales: 0.4 mm.
3.9 Armadillidium petralonense n.sp.
(Figs. 58–67, map Fig. 68)

Material examined
Holotype: ♂, 15.0 × 7.2 mm, northern Greece, prefecture Khalkidiki, Petrálona, leg. Martens, 15.III.1963 (SMNS T601).
Paratypes: 2 ex., same data as holotype (SMNS 1500).

Derivatio nominis
The species’ name refers to the locus typicus Petrálona (northern Greece, prefecture Khalkidiki).

Diagnostic characters
Maximum dimensions: 15 × 7 mm.
Coloration: Tergites gray with small yellowish muscle-spots, epimera yellowish gray.
Cuticular structures: Tergites smooth with a very faint rugosity (Fig. 58).
Frontal shield from behind surpassing frontal margin of head, upper margin completely rounded, no angles laterally, caudally with conspicuous groove (Fig. 59); antennal lobes semicircular (Fig. 60). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 65). Telson slightly longer than wide, with nearly straight sides and broadly rounded apex (Fig. 66). Antenna see Fig. 61, distal segment of the flagellum slightly longer than proximal one. Male carpus 1 with brush of short spines (Fig. 62); male ischium 7 ventrally straight, frontally with distal hair-field (Figs. 63–64). Male pleopod-exopodite 1 with triangular hind-lobe (Fig. 67), endopodite 1 with apex straight.

Distribution
Northern Greece, Khalkidiki and region east of Thessaloníki (map Fig. 68).

Remarks
The species is very similar to A. pieperi n.sp., the differences in the shape of the male ischium 7 (ventrally strongly concave in petralonense, straight in pieperi) suggest, however, that we have to treat the two forms as separate species. The two species seem to belong to the fossuligerum-complex including fossuligerum and jerrentrupi, differing from the latter species of this group by the shape of the telson (pointed instead of truncate).

Figs. 55–57. Armadillidium pangaionum n.sp., ♂, 13.5 × 5.8 mm, holotype (SMNS T600). – 55. Pereion-epimeron 1, lateral view. 56. Telson and uropods in situ, dorsal view. 57. Pleopod-exopodite 1, dorsal view.
Figs. 58–59. *Armadillidium petralonense* n. sp., male, 15.2 × 7.0 mm, paratype from type locality (Petrálona, SMNS 1500). – 58. Head and pereion-tergite 1, dorsal view. 59. Head, dorsal view. – Scales: 1 mm.
Figs. 60–61. Armadillidium petralonense n.sp., ♂, 15.2 × 7.0 mm, paratypes from type locality (Petrálon, SMNS 1500). – 60. ♂, 14.0 × 6.7 mm, head, frontal view. 61. ♂, 15.2 × 7.0 mm, antenna. – Scales: 1 mm.
Figs. 62–64. Armadillidium petralonense n. sp., ♂, 15.2 × 7.0 mm, paratype from type locality (Petrálona, SMNS 1500). – 62. Pereiopod 1, frontal view. 63. Ischium 7, frontal view. 64. Ischium 7, caudal view. – Scales: 0.5 mm.
3.10 Armadillidium phalacronum n. sp.  
(Figs. 69–79, map Fig. 68)

Material examined

**H o l o t y p e:** ♂, 11 × 5 mm, Greece, northern mainland, prefecture Dráma, Falakró Mountain, western flank, 1300 m, *Fagus, Pinus*, leg. **SCHALFUSS,** 30.IV.1990 (SMNS T598).


**D e r i v a t i o n o m i n i s**

The species’ name refers to its distribution area, which is the Falakró Mountain and its immediate neighborhood to the north.

**D i a g n o s t i c c h a r a c t e r s**

- Maximum dimensions: 12.5 × 5.5 mm.
- Coloration: Brownish gray, sometimes light spots at bases of epimera.
- Cuticular structures: Tergites nearly completely smooth (Fig. 69).
- Frontal shield from behind surpassing frontal margin of head, upper margin nearly straight, obtuse angles laterally, caudally with conspicuous groove (Fig. 70); anten nal lobes semicircular (Figs. 71–72). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 77). Tel son wider than long, with straight sides and rounded apex (Fig. 78). Antenna see Fig. 73, distal segment of the flagellum somewhat longer than proximal one. Male carpus 1 with faintly developed brush of short spines (Fig. 74); male ischium 7 ventrally slightly concave, frontally with distal hair-field (Figs. 75–76). Male pleopod-exopodite 1 with triangular hind-lobe (Fig. 79), endopodite 1 with apex straight.

**D i s t r i b u t i o n**

Northern Greece, Falakró Mountain and southern slope of western Rodópi Mountains (map Fig. 66).

**R e m a r k s**

The species is very close to *A. insulanum*. Because of slight morphological differences (*phalacronum*: rounded instead of straight upper margin of frontal triangle, rounded instead of trapezoidal antennal lobes, male pleopod-exopodite 1 with a conspicuously longer hind-lobe) I consider *A. phalacronum* a different taxon on the species level,
Fig. 68. Known records of *Armadillidium petralonense* n. sp. (●) and *A. phalacronum* n. sp. (■).
Figs. 69–70. Armadillidium phalacronum n. sp., ♂, 10.5 × 4.7 mm, paratype from type locality (Falakrò Mountain, SMNS 2426). – 69. Head and pereion-tergite 1, dorsal view. 70. Head, dorsal view. – Scales: 0.5 mm.
Figs. 71–72. Armadillidium phalacronum n.sp., paratypes from type locality (Falakró Mountain, SMNS 2426). – 71. ♀, 11.2 × 5.2 mm, head, frontal view. 72. ♂, 13.0 × 5.5 mm, head, oblique frontal view. – Scales: 0.5 mm.
Fig. 73. Armadillidium phalacronum n. sp., ♂, 10.5 × 4.7 mm, paratype from type locality (Falakró Mountain, SMNS 2426), antenna. – Scale: 0.5 mm.
Figs. 74–76. *Armadillidium phalacronum* n. sp., ♂, 10.5 × 4.7 mm, paratype from type locality (Falakró Mountain, SMNS 2426). – 74. Pereiopod 1, frontal view. 75. Ischium 7, frontal view. 76. Ischium 7, caudal view. – Scales: 0.4 mm.
further investigations including molecular data should clarify this questionable point.

3.11 Armadillidium pieperi n.sp.
(Figs. 80–87, map Fig. 47)

Material examined

Holotype: ♂, 12.2 × 5.5 mm, Greece, northern mainland, prefecture Khalkidiki, peninsula Sithonia, 1 km S of Porto Kufos, leg. PIEPER, 26.IX.1995 (SMNS T603).
Paratypes: 2 ex., same data as holotype (SMNS 2531).
– 3 ex., as before, peninsula Kassandra, 12 km W of Paliuri, leg. R. GRIMM, 30.VII.1980 (SMNS 1900).

Derivatio nominis
The species is named after Dr. HARALD PIEPER (Kiel/Germany), whose extensive isopod collections have considerably enlarged our knowledge on the distribution of these animals in Greece.

Diagnostic characters
Maximum dimensions: 17.0 × 6.7 mm.
Coloration: Tergites grayish brown, epimera lighter.
Cuticular structures: Tergites faintly tuberculated (Fig. 80).
Frontal shield from behind surpassing frontal margin of head, upper margin completely rounded, no angles laterally, caudally with conspicuous groove (Fig. 80); antennal lobes trapezoidal (Fig. 81). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 85). Telson as wide as long, with nearly straight sides and rounded apex (Fig. 86). Antenna see Fig. 82, distal segment of the flagellum slightly longer than proximal one. Male carpus 1 with very few short spines (Fig. 83); male ischium 7 ventrally concave, frontally with distal hair-field (Fig. 84). Male pleopod-exopodite 1 with triangular hind-lobe (Fig. 87), endopodite 1 with apex straight.

Distribution
Northern Greece, Khalkidiki, peninsulas Kassandra and Sithonia (map Fig. 47).

Remarks
The species is very close to the allopatric A. petralonense, conspicuous differences in the morphology of the male ischium 7 (see under petralonense) plead, however, for a separate species status.

3.12 Armadillidium sfenthourakisi n.sp.
(Figs. 89–97, map Fig. 88)

Material examined

Holotype: ♂, 18.0 × 7.8 mm, Greece, north-central mainland, prefecture Pieria, E of Olympos Mountain, Litokhor, leg. KOHNET, 1.V.1960 (SMNS T605).
Figs. 80–81. Armadillidium pieperi n.sp., paratype from peninsula Kassandra (SMNS 1900). – 80. ♀, 11.2 × 5.0 mm, head, dorsal view. 81. ♂, 9.5 × 4.2 mm, head, frontal view. – Scales: 0.5 mm.
Figs. 82–84. *Armadillidium pieperi* n. sp. – 82. Paratype from peninsula Kassándra (SMNS 1900), 11.2 × 5.0 mm, antenna. 83. ♂, 12.2 × 5.5 mm, holotype (SMNS T603), pereiopod 1, frontal view. 84. As before, ischium 7, frontal view. – Scales: 0.5 mm.

Derivatio nominis
Named after Dr. Spyros SFenTHOuRAKIS (Pátra/Greece), whose detailed investigations led to a first comprehensive overview of the terrestrial isopod fauna of the central Aegean islands and to the discovery of a considerable number of island endemisms.

Diagnostic characters
Maximum dimensions: 17.0 × 6.7 mm.
Coloration: Adult specimens blackish gray, smaller specimens lighter and brownish.
Cuticular structures: Tergites granulated (Fig. 89).
Frontal shield from behind surpassing frontal margin of head, upper margin straight, obtuse angles laterally (Fig. 89); antennal lobes triangular (Fig. 90). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 95). Telson conspicuously longer than wide, with straight sides and broadly rounded apex (Fig. 96). Antenna very slender, segments of the flagellum more or less the same length (Fig. 91). Male carpus 1 with brush of short spines (Fig. 92); male ischium 7 ventrally straight, frontally with distal hair-field (Figs. 93–94). Male pleopod-exopodite 1 with triangular pointed hind-lobe (Fig. 97), endopodite 1 with apex straight.

Distribution
North-central Greek mainland, seems to be restricted to the Olimpos Mountain massive (map Fig. 88).

Remarks
This species does not exhibit any clear affinities to other species of the region. Perhaps the next relatives are the species of the jonicum-group (jonicum and epiroticum) from the western part of Greece, but it is only the shape of the telson that points in this direction.

Figs. 85–87. Armadillidium pieperi n. sp., ♂, 12.2 × 5.5 mm, holotype (SMNS T603). – 85. Pereion-epimeron 1, lateral view. 86. Telson and uropods in situ, dorsal view. 87. Pleopod-exopodite 1, dorsal view.
Fig. 88. Known records of Armadillidium pangaionum n. sp. (●) and A. sfenthourakisi n. sp. (■).
Figs. 89–91. *Armadillidium sfenthourakisi* n. sp., paratypes from type locality (Litókhoros, SMNS 1701). – 89. ♂, 16.5 × 7.8 mm, head, dorsal view. 90. ♂, 16.5 × 8.0 mm, head, frontal view. 91. ♂, 16.5 × 8.0 mm, antenna. – Scales: 1 mm.
Figs. 92–94. Armadillidium sfenthourakisi n. sp., paratype from type locality (Litókhoro, SMNS 1701). – 92. Pereiopod 1, frontal view. 93. Ischium 7, frontal view. 94. Ischium 7, caudal view. – Scales: 0.5 mm.
3.13 *Armadillidium tuberculatum* **n.sp.**  
(Figs. 98–107, map Fig. 108)

Material examined  
**H o l o t y p e :** ♂, 9.0 × 3.8 mm, Greece, northern mainland, prefecture Kavála, SW of Pangéo Mountain, Galípsós, maquis, leg. **S c h m a l f ü s s , 5.V.1990** (SMNS T604).  
**P a r a t y p e s :** 13 ex., same data as holotype (SMNS 2273). – 21 ex., prefecture Kavála, 15 km SW of Kavála, Néa Iraklítsa, beach, leg. **S c h m a l f ü s s , 5.V.1990** (SMNS 2272). – 3 ex., prefecture Kavála, Pangéo Mountain, southern side, 2 km W of Podokhóri, leg. **P i e p e r , 19.IV.1987** (SMNS 2233). – 8 ex., prefecture Kavála, Pangéo Mountain, southern side, 550 m, maquis, leg. **S c h m a l f ü s s , 3.V.1990** (SMNS 2276). – 13 ex., prefecture Kavála, 5 km W of Eleftherúpoli, maquis, *Quercus, Platanus*, leg. **S c h m a l f ü s s , 29.IV.1994** (SMNS 2432). – 16 ex., prefecture Kavála, SW of Kavála, Sinvolo Mountain, 700 m, maquis, leg. **S c h m a l f ü s s , 2.V.2002** (SMNS 2734).  

**Derivatio nominis**  
The name of the species is derived from the very conspicuous tuberculation of the tergal parts.

**Diagnostic characters**  
Maximum dimensions: 10.0 × 3.8 mm.  
Coloration: Tergites light brown, epimera yellowish.  
Cuticular structures: Tergites conspicuously tuberculated (Figs. 98, 100).  
Frontal shield from behind surpassing frontal margin of head, upper margin straight, rounded obtuse angles laterally, caudally with conspicuous groove (Fig. 99); antennal lobes trapezoidal (Fig. 100). Hind margin of pereion-epimeron 1 with obtuse angle (Fig. 105). Telson wider than long, with nearly straight sides and truncate apex (Fig. 106). Antenna see Fig. 101, distal segment of the flagellum slightly longer than proximal one. Male carpus 1 with brush of short spines (Fig. 102); male ischium 7 ventrally very slightly concave, frontally with distal field of tiny setae (Figs. 103–104). Male pleopod-exopodite 1 with short rounded triangular hind-lobe (Fig. 107), endopodite 1 with apex straight.

**Distribution**  
Northern Greece, coastal region in the prefecture Kavála (map Fig. 108).

**Remarks**  
The species shows affinities to *A. bicurvatum* and *A. peloponnesiacum* (compare **S c h m a l f ü s s 2006a**). The main differences towards *A. bicurvatum* are: lack of a duplocarinate frons, posterior margin of epimeron 1 with pronounced angle, proximal segment of antennal flagellum two thirds as long as distal segment. *A. peloponnesiacum* exhibits a very different morphology of the male ischium 7 (ventrally strongly concave with a peculiar ventral-proximal scale field, see **S c h m a l f ü s s 2006a**: 77–78, figs. 169–170).
Figs. 98–99. *Armadillidium tuberculatum* n. sp., ♂, 7.8 × 3.5 mm, paratype from type locality (Pangéo Mountain, SMNS 2273). – 98. Head and pereion-tergite 1, dorsal view. 99. Head, dorsal view. – Scales: 0.5 mm.
Figs. 100–101. *Armadillidium tuberculatum* n.sp., paratypes from type locality (Pangéo Mountain, SMNS 2273). – 100. ♀, 10.2 × 4.0 mm, head, frontal view. 101. ♂, 7.8 × 3.5 mm, antenna. – Scales: 0.5 mm.
Figs. 102–104. *Armadillidium tuberculatum* n. sp., ♂, 7.8 × 3.5 mm, paratype from type locality (Pangéo Mountain, SMNS 2273). – 102. Pereiopod 1, frontal view. 103. Ischium 7, frontal view. 104. Ischium 7, caudal view. – Scales: 0.2 mm.
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).

4 References


**Fig. 108.** Known records of *Armadillidium tuberculatum* n.sp.

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