

## A Revision of the Genus *Atheroides* Haliday, 1839 (Hemiptera: Aphididae: Chaitophorinae)

Karina Wieczorek

Department of Zoology, Faculty of Biology and Environmental Protection, University of Silesia, Bankowa 9, Katowice 40-007, Poland

(Accepted January 19, 2009)

**Karina Wieczorek (2009)** A revision of the genus *Atheroides* Haliday, 1839 (Hemiptera: Aphididae: Chaitophorinae). *Zoological Studies* 48(5): 693-708. The genus *Atheroides* Haliday, 1839 of the tribe Siphini (Aphididae: Chaitophorinae) is revised. *Atheroides brevicornis*, *A. doncasteri*, *A. hirtellus*, *A. karakumi*, and *A. serrulatus* are redescribed and figured. A new species, *A. persianus* sp. nov., is described and figured in detail on the basis of specimens collected in Iran and Turkey. A key to the identification of the known species of the genus *Atheroides* as well as differences with related species are given. Notes about the distribution and host plants are provided. <http://zoolstud.sinica.edu.tw/Journals/48.5/693.pdf>

**Key words:** *Atheroides*, Aphids, Revision, Key, New species.

*Atheroides* Haliday, 1839 is a well-defined aphid genus belonging to the tribe Siphini (Aphididae: Chaitophorinae) comprising 5 monoecious and holocyclic species associated mostly with grasses and rarely with sedges (Blackman and Eastop 2006). Body elongate, slender, nearly linear, and semicircular tergite VIII covering the cauda are the most significant characters for distinguishing the genus.

The genus *Atheroides* is not well studied (Theobald 1929, Hille Ris Lambers 1939, Ivanovskaya 1977, Stroyan 1977, Heie 1982, Szelegiewicz 1985, Nieto Nafria and Mier Durante 1998, Qiao and Zhang 2002). The first mention of the genus, with 2 species, *A. hirtellus* and *A. serrulatus*, was in Curtis's *Guide to an arrangement of British insects* by Haliday (1837). However, the author did not define the genus until 1839, when he gave its short Latin diagnosis on the basis of dry preserved material. In 1848, Walker, also on the basis of dry material, redescribed *A. hirtellus* and *A. serrulatus* and placed these species into the genus *Aphis*. Later, the specimens were

mounted and redescribed by Laing (1920); the author transferred them into the genus *Atheroides*. Moreover among the material of *A. hirtellus*, Laing found and described a new species: *A. brevicornis*. A short description of *A. karakumi* was given by Mordvilko (1948), and *A. doncasteri* was described by Ossiannilsson (1955). Among material stored in the Entomological Collection of Muséum National d'Histoire Naturelle, Paris, France collected by G. Remaudiere (1955 1966) in Iran and Turkey, a new species of this genus, *A. persianus*, was found, and its description is given in this paper.

### MATERIALS AND METHODS

The type specimens of the new species are deposited in the Entomological Collection of the Muséum National d'Histoire Naturelle (Paris, France).

The following abbreviations are used: BMNH, The Natural History Museum, London, UK; LFC, Laurentian Forestry Centre, Quebec, Canada;

\*To whom correspondence and reprint requests should be addressed. Tel: 48-032-3591506. E-mail: karina.wieczorek@us.edu.pl

MNHN, Muséum National d'Histoire Naturelle, Paris, France; RMNH, Nationaal Natuurhistorisch Museum, Leiden, The Netherlands; UASK, Institute of Zoology, Ukrainian Academy of Sciences, Kiev, Ukraine; UL, University of Leon, Leon, Spain; UŚ, University of Silesia, Department of Zoology, Katowice, Poland; ZMAS, Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia; ZMPA, Zoological Institute, Polish Academy of Sciences, Warszawa, Poland; ZMUC, Zoological Museum, University of Copenhagen, Copenhagen, Denmark.

## TAXONOMY

### Genus *Atheroides* Haliday, 1839

Haliday 1837: 218.  
*Corealchnus* Paik 1971: 3-4.

#### *Type species: serrulatus*

Apterous viviparous female: body elongate, slender, nearly linear, or oval (*A. brevicornis*). Head and prothorax not fused. Abdominal tergites II-VII fused (partially fused in *A. karakumi*), sclerotized. Tergite VIII semicircular, covering the cauda (except in *A. hirtellus*). Head + thorax + abdominal segment I almost as long as abdominal segments II-VIII. Antenna short, 5 segmented, rarely 4 segmented (*A. brevicornis*). Frons convex. Eyes normal, ocular tubercles distinct. Rostrum short, reaching to middle coxae. Siphunculi pore-shaped, placed at anterior margin of abdominal segment V. Cauda and anal plate broadly rounded.

#### Key to the species of the genus *Atheroides* (apterous viviparous females):

1. Dorsal hairs pointed ..... 2
- Dorsal hairs with pointed, forked, jagged, or fan-shaped apices ..... 3
2. Spinal hairs very long, as long as or longer than marginal ones. Cauda covered by abdominal tergite VIII. On *Deschampsia caespitosa* ..... *A. doncasteri*
- Marginal hairs very long, longer than spinal ones. Cauda not covered by abdominal tergite VIII. On various grasses ..... *A. hirtellus*
3. Dorsum partially sclerotic without visible sculpture. Antennal segment III with 4-8 (12) long hairs. Apical segment of rostrum stiletto-shaped. On *Festuca ovina* and *Stipa splendens* ..... *A. karakumi*
- Dorsum sclerotic with visible, rugose sculpture. Antennal segment III with 0-4 short hairs. Apical segment of rostrum blunt. On various grasses ..... 4
4. Dorsal hairs arranged in visible rows. Hairs of abdominal

tergite VIII with pointed apices. Empodial hairs spatulate.....

- ..... *A. serrulatus*
- Dorsal hairs not arranged in visible rows. Hairs of abdominal tergite VIII with pointed, jagged, or flabellate apices. Empodial hairs pointed ..... 5
- 5. Body elongate, oval, 1.50-2.40 mm long. Antennae 4- or 5 segmented, 0.12-0.15 times body length. Antennal segment I with 2 pointed and 1 jagged hair. .... *A. brevicornis*
- Body elongate, slender, nearly linear, 1.55-1.72 mm long. Antennae 5 segmented, 0.18-0.25 times body length. Antennal segment I with 1 erect fan-shaped hair.....
- ..... *A. persianus*

### *Atheroides brevicornis* Laing, 1920

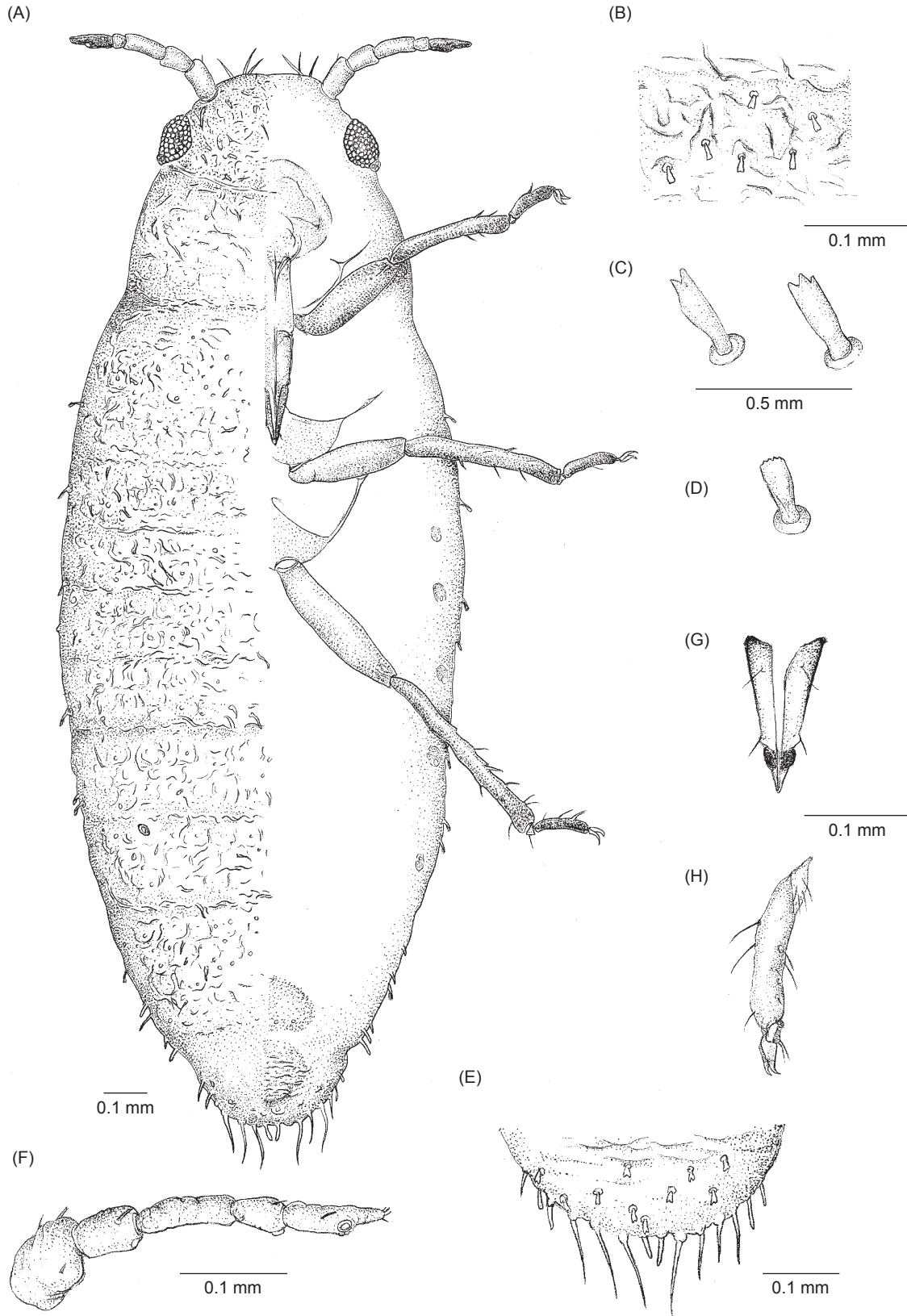
(Fig. 1)

Laing 1920: 41-42.

*Atheroides aplangi* Pintera 1965: 283-286.

*Material examined:* Holotype England, 30 X 1919, "found amongst *Atheroides hirtellus*", leg. F. Laing, 1 apterous viviparous female, (BMNH); 32 apterous viviparous females from Quineville (Manche), France (MNHN); 3 apterous viviparous females, 1 alate viviparous female from Goes, the Netherlands, (RMNH); 1 apterous viviparous female from Stenuugsund, Sweden, 17 apterous viviparous females from Kunmadarasi puszta, Fulophaza, Orgovany, Hungary (ZMPA).

*Redescription:* Apterous viviparous female (Fig. 1A): Coloration of live specimens: brown or black (Laing 1920); pigmentation when mounted: yellowish except for apices of antennae and tarsi which are dusky, or body black. Body elongate, oval, 1.50-2.40 mm long and about 0.82 mm wide, with very visible rugose sculpture (Fig. 1B). Proportions of thoracic segments I: II: III, 0.30: 0.25: 0.15. Dorsal chaetotaxy: hairs placed on wart-like bases which look like perforations of dark sclerite, not arranged in visible rows. On margin of thorax and abdominal segments I-V hairs with flattened apices 0.01-0.025 mm long; on margin of abdominal segments VI and VII hairs with forked or flattened apices 0.04 mm long (Fig. 1C). Across dorsal tergites numerous, short fan-shaped hairs 0.01-0.025 mm long (Fig. 1D). Abdominal tergite VIII (Fig. 1E) with 9-13 pointed hairs 0.075-0.1 mm long, in middle, 2 of them much longer at 0.125-0.15 mm; between these long ones 2 short hairs 0.03-0.05 mm long with flattened or forked apices. Head chaetotaxy: 3 hairs pointed, 0.04-0.05 mm long near frontal margin, 1 or 2 hairs with flattened or forked apices, 0.06 mm long close to base of each antenna; all over head, numerous fan-shaped hairs 0.025 mm long. Antenna (Fig. 1F) reaching just to anterior margin of prothorax, 4



**Fig. 1.** *Atheroides brevicornis*, apterous viviparous female. (A) General features; (B) sculpture, (C) marginal hairs of abdominal tergite VI and VII; (D) fan-shaped hairs of abdomen; (E) abdominal tergite VIII; (F) antenna; (G) apical segment of rostrum; (H) hind tarsus.

segmented, rarely 5 segmented, about 0.12-0.13 times body length. Processus terminalis (Vb) very short, stumpy, about 0.6 times base (Va); other antennal ratios: Vb: III 0.20-0.40, V: III 1.60-1.70, V: IV 2.0-2.40. Antennal chaetotaxy: segment I with 3 hairs (2 pointed and 1 jagged); segment II with 1 hair; segment III with 0 hairs; segment IV with 1 hair opposite small primary rhinarium; Va with 1 hair and 4 small sense-hairs at tip of Vb; antennal hairs very short. Apical segment of rostrum (ARS) blunt, 0.06-0.12 mm long, 1.00-1.20 times antennal segment III and 0.70-1.0 times II segment of hind tarsus (HT II) with 2 secondary hairs (Fig. 1G). First tarsal segment with 4 hairs, empodial hairs pointed (Fig. 1H). Cauda with 3 hairs 0.05-0.075 mm long.

Measurements of 1 specimen (in mm): (England, found amongst *Atheroides hirtellus* in the general collection of the B.M, type, 30 X 1919, leg. F. Laing) body: 2.30, antenna: 0.35, proportions of antennal segments III-V: 0.09: 0.04: (0.06+0.03), ARS: 0.11, HT II: 0.13.

*Alate viviparous female*: Differs from apterous viviparous female as follows: pigmentation when mounted: dirty brown except for antennal segment III and tibiae which are pale, abdominal sclerites yellowish. Body about 1.75 mm long. Antennal segment III with 3 or 4 rhinaria. Abdominal segments I-IV with oval, large marginal sclerites and fused pleural and spinal sclerites; segments V-VIII with fused marginal pleural and spinal sclerites. Rugose sculpture less visible than in apterous viviparous female. Dorsal hairs thinner, most with blunt apices. Media with 2 branches.

Measurements of 1 specimen (in mm): (Goes, 30 VI 1936, leg. H.R. Lambers) body: 1.75, antenna: 0.37, proportions of antennal segments III-V: 0.15: 0.05: (0.07+0.03), ARS: 0.10, HT II: 0.14.

*Oviparous female*: Differs from apterous viviparous female by slightly longer antennal segment III and hind tibiae with 4-31 8-shaped scent plates (Pintera 1965).

*Male*: Unknown.

*Distribution*: Type locality: England. Czech Republic (Holman 1995: 193), France (Remaudiere et al. 1980: 350), Germany (Börner 1952: 54), Hungary (Pintera 1965: 283-286), Moldova (Andreev and Verescagin 1993: 16), The Netherlands (Hille Ris Lambers 1939: 79-82), Norway (Tambs-Lyche and Heie 1994: 72), Slovakia (Holman and Pintera 1977: 104), Sweden (Ossiannilsson 1959: 389), Ukraine (Bozhko 1957b: 211), UK (Laing 1920: 41-42,

Shaw 1964: 58, Stroyan 1977: 38). European halophilous species common mostly along the muddy seashores and in more salty coastal (e.g., the North Sea coast).

*Host plants*: *Alopecurus* sp., *Deschampsia caespitosa* (L.) P. Beauv., *Festuca ovina* L., *F. distans* Kunth, *F. thalassica* Kunth, *Phleum phleoides* (L.) H. Karst, *Puccinellia distans* (Jacq) Parl., *P. maritima* (Huds.) Parl. *Carex distans* L., *Juncus compressus* Jacq., *Luzula* sp.

*Life history*: The species lives on the upper-side of leaves, sitting in rows on the narrow leaves (Heie 1982).

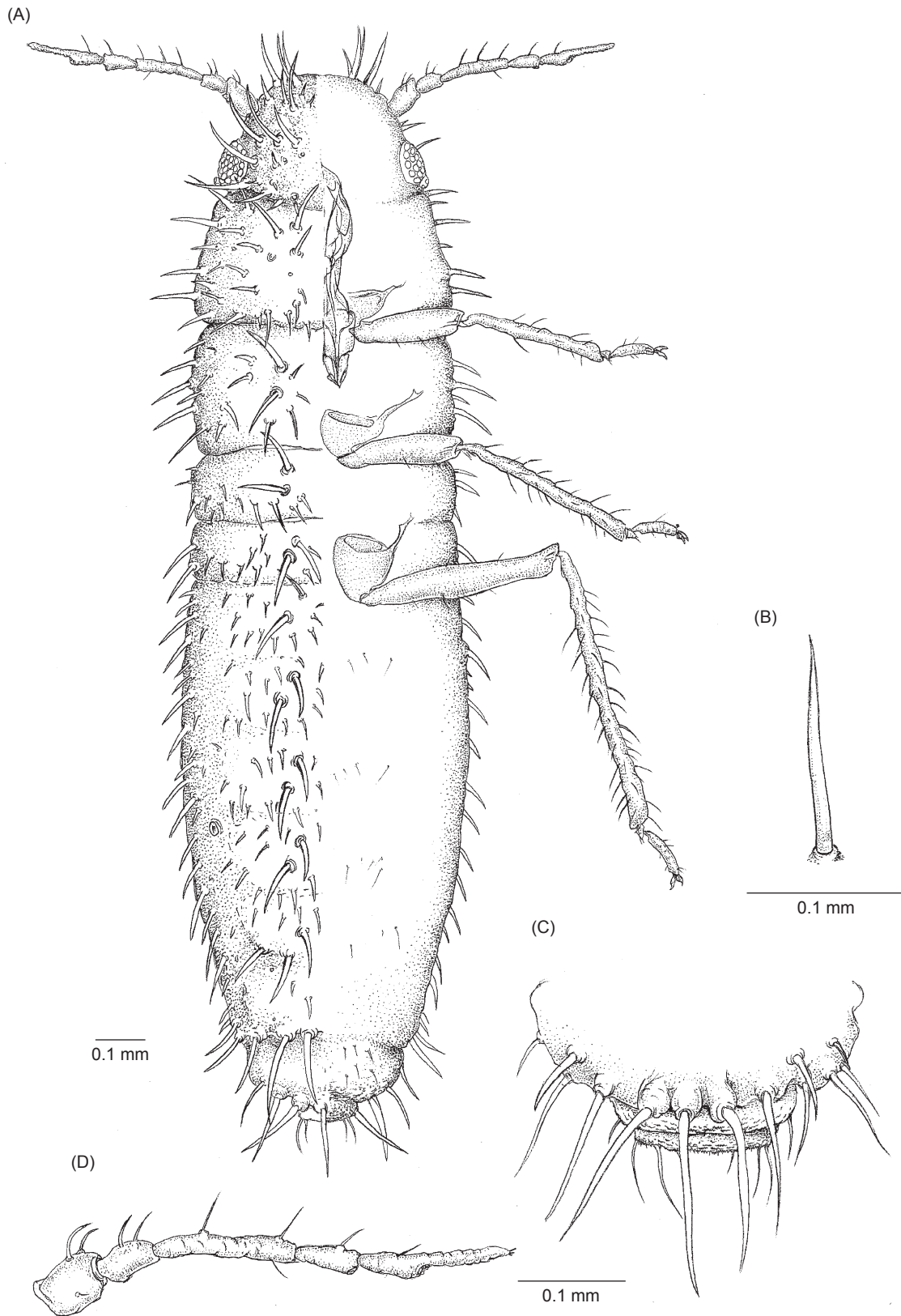
### ***Atheroides doncasteri* Ossiannilsson, 1955**

(Fig. 2)

Ossiannilsson 1955: 128-130.

*Material examined*: 3 paratypes (apterous viviparous females) from Sweden, Orebro, 6 VII 1954, *A. caespitosa*, leg. Ossiannilsson (BMNH, MNHN, ZMPA). 5 apterous viviparous females, 1 alate viviparous female from Swalmen, the Netherlands, 1 apterous viviparous female, 1 oviparous female from Upsala, Suecia (BMNH); 1 apterous viviparous female from Orebro, Sweden (LFC).

*Redescription*: *Apterous viviparous female* (Fig. 2A): Coloration of live specimens: dirty yellowish to brownish (Ossiannilsson 1955), pigmentation when mounted: yellowish. Body elongate, slender, 2.33-2.56 mm long and 0.55 mm wide, sclerotized, without visible sculpture. Proportion of thoracic segments I: II: III 0.25: 0.22: 0.15. Dorsal chaetotaxy: hairs numerous, pointed, arranged in 3 rows. Marginal hairs 0.07-0.10 mm long, pleural hairs 0.05-0.075 mm long, spinal hairs 0.10-0.15 mm long; among them numerous, short, spiny hairs 0.02-0.04 mm long. Marginal and spinal hairs thorn-like, placed on wart-like bases (Fig. 2B). Sometimes dorsal hairs (e.g., specimens from the Netherlands) with forked or flattened apices. Abdominal tergite VIII (Fig. 2C) with 3 pointed hairs 0.15-0.20 mm long. Head chaetotaxy: hairs pointed, thorn-like, placed on wart-like bases, 0.10-0.15 mm long; on all surfaces of head. Antenna (Fig. 2D) reaching just to middle of prothorax, about 0.20 times body length. Vb a bit longer than Va; other antennal ratios of Vb: III 0.50-0.70; V: III 1.10-1.50, V: IV 2.10-2.60. Antennal chaetotaxy: segment I with 3 or 4 hairs,



**Fig. 2.** *Atheroides doncasteri*, apterous viviparous female. (A) General features; (B) marginal and spinal hairs of abdomen; (C) abdominal tergite VIII; (D) antenna.

segment II with 1 or 2 hairs, segment III with 2-4 hairs, segment IV with 1 or 2 hairs, Va with 1 hair; tip of Vb with 3 small sense-hairs. Antennal hairs pointed, about 0.035 mm long; longest antennal hair III about 1.25-2.00 times basal articular diameter of this segment. Apical segment of rostrum blunt, about 0.07 mm long, 0.40 times antennal segment III and 0.50 times HT II, with 2 secondary hairs. First tarsal segment with 4 or 5 hairs, empodial hairs spatulate. Cauda with 4 hairs 0.075-0.10 mm long.

Measurements of 1 specimen (in mm): (Sweden, Orebro, 6 VII 1954, *Deschampsia caespitosa*, leg. Ossiannilsson, paratype) body: 2.56, antenna: 0.54, proportions of antennal segments III-V: 0.16: 0.08: (0.10+0.17), ARS: 0.07, HT II: 0.13.

*Alate viviparous female*: Differs from apterous viviparous female as follows: pigmentation when mounted: yellowish except for apices of antennae which are dusky. Body about 2.35 mm long. Antennal segment III with 3 or 4 rhinaria. Abdominal segments I-IV with large marginal sclerites and pleuro-spinal sclerites; segments V-VIII with fused marginal pleural and spinal sclerites. Media with 3 branches.

Measurements of 1 specimen (in mm): (the Netherlands, Swalmen, 29 VI 1936, *Aira caespitosa*, leg. H.R. Lambers) body: 2.35, antenna: 0.70, proportions of antennal segments III-V: 0.23: 0.11: (0.12+0.15), ARS: 0.08, HT II: 0.40.

*Oviparous female*: Differs from apterous viviparous female by slightly longer hairs on frons and abdominal segment VIII and hind tibiae with 19-21 rounded scent plates.

Measurements of 1 specimen (in mm): (Sweden, Upsala, 11 X 1955, *A. caespitosa* leg. Ossiannilsson) body: 2.00, antenna: 0.42, proportions of antennal segments III-V: 0.10: 0.04: (0.06+0.065), ARS: 0.10, HT II: 0.15.

*Male*: Unknown.

*Distribution*: Type locality: Sweden, Markkärret (Örebro). Hungary (Szelegiewicz 1977: 97-98), the Netherlands (Ossiannilsson 1955: 128-129), Poland (Wieczorek 2006-2007: 21), Russia (Ivanovskaya 1977: 236-237), Slovakia (Holman and Pintera 1977: 104), Sweden (Ossiannilsson 1959: 390). Euro-Siberian species known only from a few localities.

*Host plant*: *Deschampsia caespitosa* (L.) P. Beauv.

*Life history*: The species lives on the underside of leaves; not attended by ants (Szelegiewicz 1985).

### ***Atheroides hirtellus* Haliday, 1839**

(Fig. 3)

Haliday 1839: 189.

*Atheroides hirtellus* Haliday ex Curtis, 1837: 218 nomen nudum.

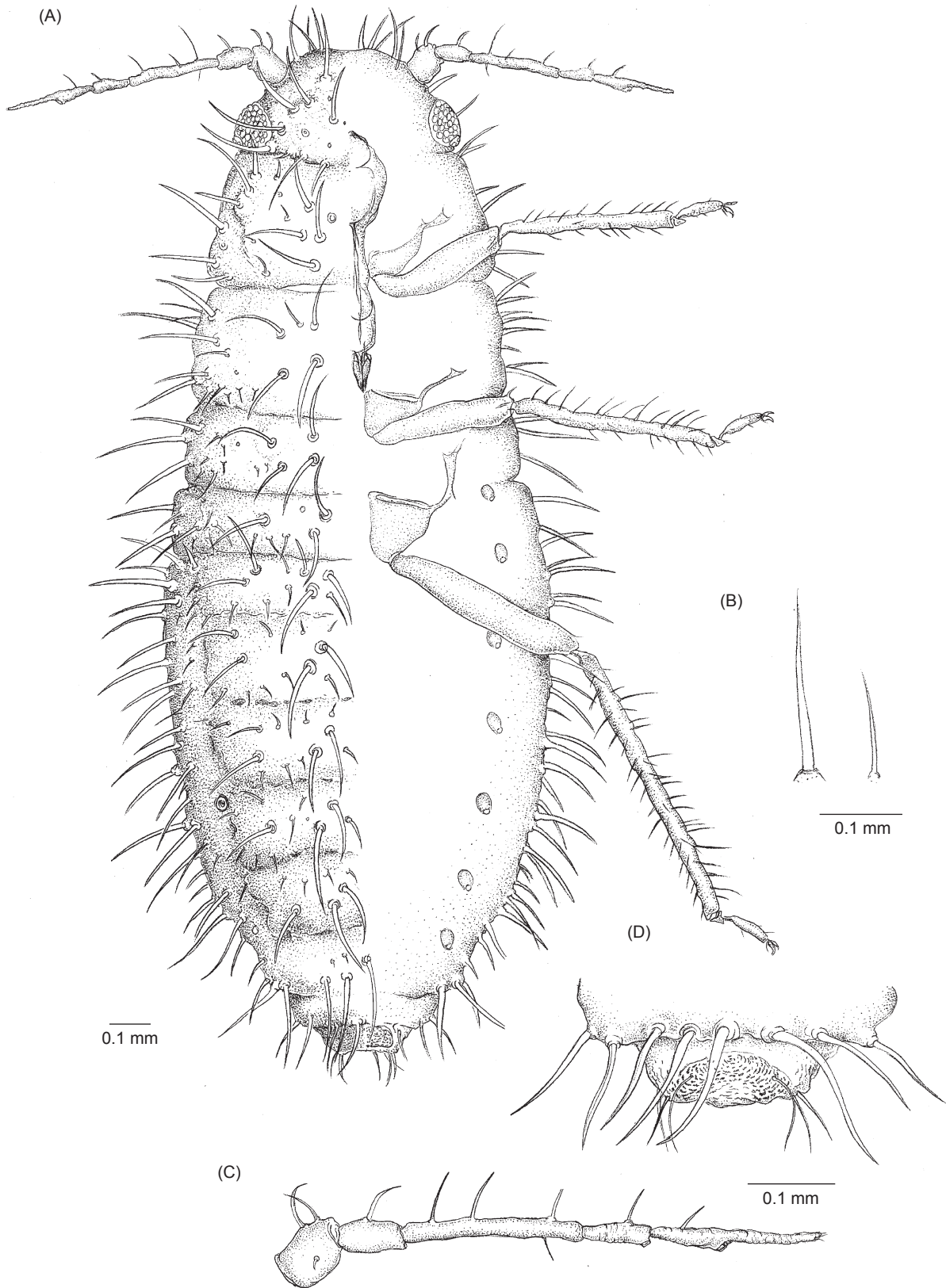
*Aphis hirtellus* Walker, 1848: 45.

*Atheroides junci* Laing 1920: 44-45.

*Atheroides niger* Ossiannilsson 1954: 117-118.

*Material examined*: No type material traced. 2 oviparae females from B.M. Dry Coll. mounted from material named *A. hirtellus* Halid., 25 XI 1919, 8 apterous viviparous females, 4 alate viviparous females from Surrey Richmond Park, Alice Holt forest near Alton, England (BMNH); 1 apterous viviparous female from Abeeredermohre, Scotland (MNH); 2 apterous viviparous females from Sweden, Orebro (LFC); 1 apterous viviparous female, 1 alate viviparous female from Poland, Olsztyn-Kortowo (ZMPA).

*Redescription*: *Apterous viviparous female* (Fig. 3A): Coloration of live specimens: dark brown to black, antennae and legs yellowish (Heie 1982), pigmentation when mounted: dark brown to black; legs, cauda, and antennal segments I-Va pale. Body elongate, slender, 2.15-2.26 mm long and 0.85 mm wide with sculpture visible only on cauda. Proportion of thoracic segments I: II: III, 0.27: 0.25: 0.15. Dorsal chaetotaxy: setae numerous, pointed, thorn-like, placed on wart-like bases. Hairs arranged in 3 rows: marginal ones 0.15-0.20 mm long, pleural and spinal ones 0.10-0.15 mm long (Fig. 3B); among them numerous, short, spiny hairs 0.05-0.075 mm long. Tergite VIII with simple, pointed hairs 0.15-0.19 mm long. Head chaetotaxy: about 6 or 7 pointed, thorn-like hairs 0.10-0.17 mm long on apex and margin of head; towards mid of head numerous thorn-like hairs 0.05-0.07 mm long. Antenna (Fig. 3C) reaching just to anterior margin of prothorax, about 0.20 times body length. Vb about 1.20 times Va; other antennal ratios: Vb: III 0.40-0.50; V: III 0.85-1.00, V: IV 2.40-2.80. Antennal chaetotaxy: segment I with 3 hairs, segment II with 2 hairs, segment III with 3-5 hairs, segment IV with 2 hairs, Va with 1 hair; at tip of Vb with 4 small sense-hairs. Antennal hairs pointed, about 0.03-0.05 mm long; longest antennal hair III about 2.50-3.00 times basal articular diameter of this segment. Apical segment of rostrum blunt 0.08-0.10 mm long, 0.45 times antennal segment III and 0.50 times HT II, without secondary hairs. First tarsal segment with 5 hairs, empodial hairs spatulate. Cauda with 3 hairs 0.075-0.10 mm long, not covered by



**Fig. 3.** *Atheroides hirtellus*, apterous viviparous female; (A) General features; (B) dorsal hairs of abdomen; (C) antenna; (D) abdominal tergite VIII and cauda.

abdominal tergite VIII (Fig. 3D).

Measurements of 1 specimen (in mm): (England, Surrey Richmond Park, 15 VI 1974, *Deschampsia* (Poaceae), leg. V.E. Eastop) body: 2.26, antenna: 0.60, proportions of antennal segments III-V: 0.20: 0.07: (0.07+0.09), ARS: 0.08, HT II: 0.14.

*Alate viviparous female*: Differs from apterous viviparous female as follows: pigmentation when mounted: paler than apterous viviparous female, head, apices of antennae, tibiae, cauda, and abdominal sclerites dusky. Body 1.93-2.01 mm long. Antennal segment III with 6 or 7 rhinaria, antennal segment IV with 0 or 1. Abdominal segments I-IV with large, oval marginal sclerites, small pleural sclerites, and transverse spinal sclerites; segments V and VI with marginal sclerites and pleuro-spinal sclerites, segments VII and VIII with fused marginal and pleuro-spinal sclerites. Media with 2 branches.

Measurements of 1 specimen (in mm): (England, Surrey Richmond Park, 15 VI 1974, *Deschampsia* sp., leg. V.E. Eastop) body: 1.94, antenna: 0.76, proportions of antennal segments III-V: 0.27: 0.09: (0.10+0.11), ARS: 0.08, HT II: 0.14.

*Oviparous female*: Differs from apterous viviparous female by hind tibiae with 19-22 8-shaped scent plates placed in middle part of tibia.

Measurements of 1 specimen (in mm): (B.M. Dry Coll. Mounted from material named *A. hirtellus* Halid., 30 X 1919, Laing) body: 1.86, antenna: 0.53, proportions of antennal segments III-V: 0.17: 0.07: (0.09+0.08), ARS: 0.08, II HT: 0.13.

*Male*: Dark brown to black, apterous (Walker 1848).

*Distribution*: Type locality: England, Holywood. China (Qiao and Zhang 2002: 757), Finland (Albrecht 2007: 7), France (Heie 1982: 148), Germany (Börner 1952: 54), Ireland (Wood-Baker 1943-1944: 140), Latvia (Rupais 1989: 67), Poland (Wieczorek 2006-2007: 22), Russia (Mordvilko 1929: 92), Spain (Nieto Nafria and Mier Durante 1998: 349-351), Sweden (Ossiannilsson 1959: 390), Switzerland (Lampel and Meier 2003: 151), UK (Walker 1848: 45, Shaw 1964: 69, Stroyan 1977: 38). Palaearctic species distributed from China to Spain.

*Host plants*: *Arrhenatherum elatius* (L.) P. Beauv., *Deschampsia caespitosa* (L.) P. Beauv., *Leymus arenarius* (L.) Hochst., *Juncus articulatus* L. em. K. Richt., *Juncus* sp.

*Life history*: Small colonies live between the ribs of a leaf; not attended by ants (Szelegiewicz

1985).

***Atheroides karakumi* Mordvilko, 1948**  
(Fig. 4)

*Atheroides karakum* Mordvilko 1948: 207.

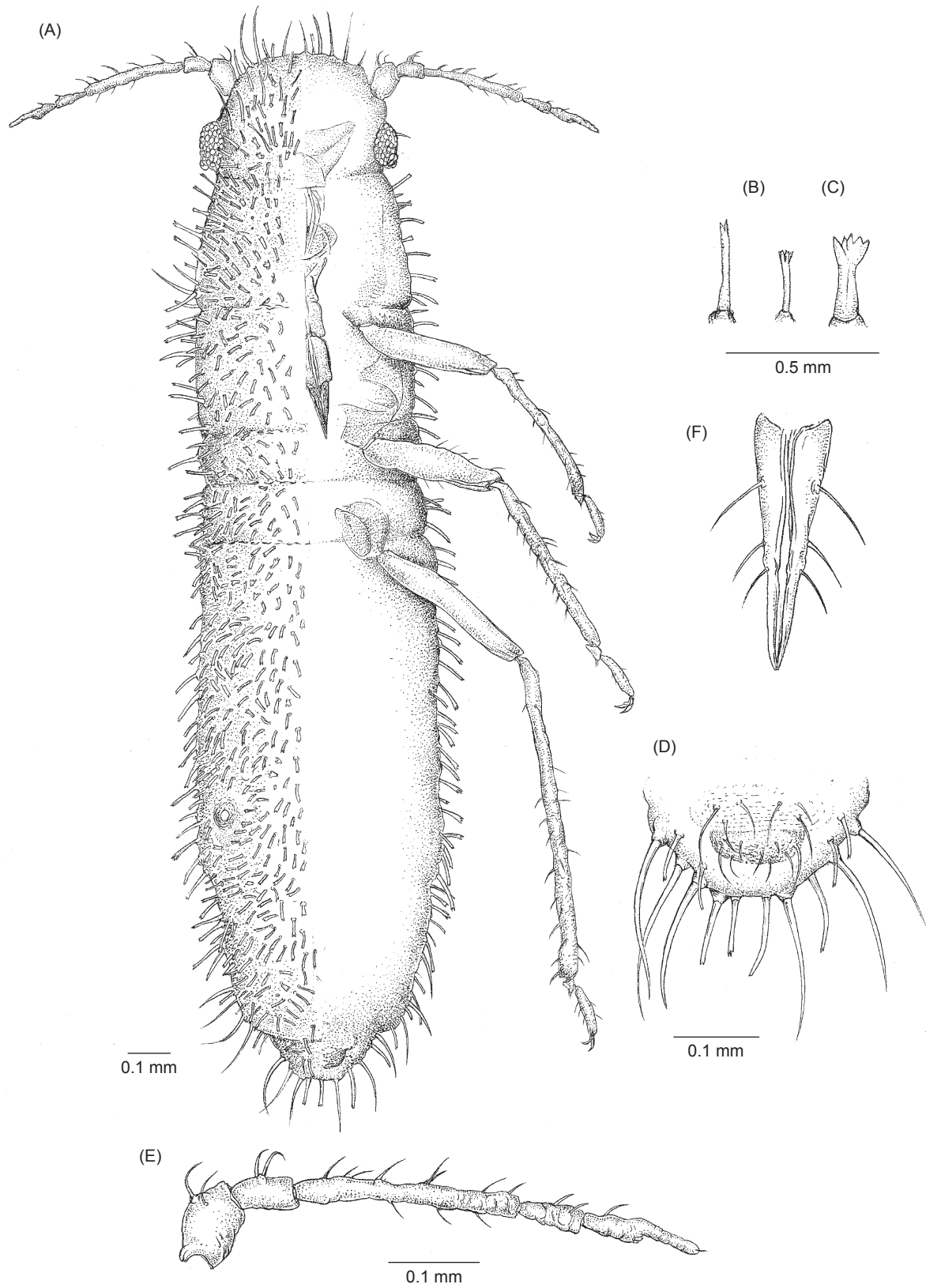
*Atheroides lasiagrostites* Juchnevitch 1960: 218-220.

*Material examined*: Holotype Russia, 23 VIII 1930, leg. E. Lupnova, 5 apterous viviparous females, 6 juveniles (ZMAS); 6 apterous viviparous females, 1 juvenile from Kazakhstan (UASK).

*Redescription*: *Apterous viviparous female* (Fig. 4A): Coloration of live specimens: brownish (Ivanovskaya 1977), pigmentation when mounted: yellowish, antennal segment Va and hind legs light brown. Body elongate, slender, 1.80-2.22 mm long and 0.55 mm wide. Abdominal tergites sclerotized, partially fused, with distinct membranous intersegmental lines between segments I/II, without visible sculpture. Proportion of thoracic segments I: II: III 0.30: 0.22: 0.15. Dorsal chaetotaxy: hairs numerous, not arranged in visible rows. Marginal hairs on thorax and abdominal segments I-V with forked and jagged apices, 0.05-0.06 mm long, on margin of segments VI and VII pointed or forked hairs, 0.08-0.10 mm long (Fig. 4B); across abdominal tergites hairs very short, fan-shaped, 0.01-0.02 mm long (Fig. 4C). Abdominal tergite VIII (Fig. 4D) with 6-8 pointed, thorn-like hairs 0.10-0.15 mm long, middle 2 with forked apices 0.075 mm long. Head chaetotaxy: pointed hairs 0.09-0.15 mm long on apex of head, towards to the mid of head row of pointed and forked hairs 0.10-0.12 mm long; numerous, short, fan-shaped hairs 0.025-0.03 mm long in middle part of head. Antenna (Fig. 4E) reaching just to anterior margin of prothorax, about 0.18 times body length. Vb about 0.50 times Va; other antennal ratios: Vb: III 0.25; V: III 0.75, V: IV 1.50. Antennal chaetotaxy: segment I with 3 hairs, segment II with 2 hairs, segment III with 3-8 (12) hairs, segment IV with 1 or 2 hairs, Va with 1 hair; at tip of Vb with 4 small sense-hairs. Antennal hairs pointed, about 0.035 mm long; the longest antennal hair III about 1.40 times basal articular diameter of this segment. Apical segment of rostrum (Fig. 4F) stiletto-shaped, about 0.11-0.125 mm long, 0.76 times antennal segment III and 0.90 times HT II, with 2 secondary hairs. First tarsal segment with 5 hairs, empodial hairs pointed. Cauda with 3 hairs 0.05-0.075 mm long.

Measurements of 1 specimen (in mm): (Russia, 23 VIII 1930) body: 1.98, antenna: 0.36,





**Fig. 4.** *Atheroides karakumi*, apterous viviparous female. (A) General features; (B) marginal hairs of abdominal tergites VI and VII; (C) fan-shaped hairs of abdomen; (D) abdominal tergite VIII; (E) antenna; (F) apical segment of rostrum.

proportions of antennal segments III-V: 0.12: 0.05: (0.05+0.03), ARS: 0.11, HT II: 0.14.

*Alate viviparous female*: Differs from apterous viviparous female as follows: body about 1.78 mm long. Antennal segment III with 4-6 rhinaria (Ivanovskaya 1977).

*Sexuales*: Unknown.

*Distribution*: Type locality: Kazakhstan, north seaside of Aralskie Sea. Kazakhstan (Juchnevitch 1960: 218-220, Smailova, 1971: 21), Russia (Bozhko 1957a: 47, Ivanovskaya 1977: 237-238). Very local species, known only from a few localities in Central Asia.

*Host Plants*: *Festuca ovina* L., *Stipa (Lasiagrostis) splendens* Trin.

*Life history*: These aphids live in colonies on the underside of leaves; attended by ants (Ivanovskaya 1977).

#### ***Atheroides persianus* Wieczorek sp. nov.**

(Fig. 5)

*Material examined*: *Holotype*: Iran, 80 km south of Ghazvin 1500 m, 16 VIII 1955, leg. G. Remaudiere, 1 apterous viviparous female, 4043 (MNHN). *Paratypes*: Iran, 80 km south of Ghazvin 1500 m, 16 VIII 1955, leg. G. Remaudiere, 1 apterous viviparous female, 4042 (MNHN), Iran, 80 km south of Ghazvin 1500 m, 16 VIII 1955, leg. G. Remaudiere, 1 apterous viviparous female, 4044 (MNHN).

Other material: About 25 apterous viviparous females, 4 juveniles from Firuz kuh and vicinity of Ghazvin, Iran, 1 apterous viviparous female from Karapinar, Konya, Turquie (MNHN).

*Etymology*: The name refers to the former name of Iran where this species was collected for the first time.

*Diagnosis*: The new species can be distinguished from other species of the genus *Atheroides* by the small size of the body as well as the dorsal, head, and antennal chaetotaxy.

*Description*: *Apterous viviparous female* (Fig. 5A): Coloration of live specimens: unknown, pigmentation when mounted: yellowish to light brown except for antennal segments I and V, and tarsi which are dusky. Body elongate, slender, nearly linear, 1.55-1.72 mm long and about 0.45-0.60 mm wide, with very visible, rugose sculpture (Fig. 5B). Proportion of thoracic segments I: II: III, 0.25: 0.19: 0.12. Dorsal chaetotaxy: hairs numerous, placed on wart-like bases which look like perforations of sclerite, not

arranged in visible rows. On margin of thorax and abdominal segments I-V hairs with fan-shaped and flattened apices 0.015-0.025 mm long; on margin of abdominal segments VI and VII, hairs with forked or flattened apices 0.035-0.045 mm long (Fig. 5C). Across dorsal tergites numerous, short fan-shaped hairs 0.01-0.02 mm long (Fig. 5D), in middle of tergite VII 2 forked hairs 0.035-0.04 mm long. Abdominal tergite VIII (Fig. 5E) with about 8-12 pointed and forked hairs 0.03-0.005 mm long, in middle 2 pointed hairs 0.09-0.1 mm long; between these long ones are 2 shorter hairs about 0.05 mm long with pointed or forked apices. Head chaetotaxy: 2 hairs, pointed, 0.09-0.10 mm long near frontal margin; all over head numerous fan-shaped hairs present 0.025-0.035 mm long. Antennae (Fig. 5F) reaching to middle of prothorax, 0.18-0.25 times body length. Vb short, 0.75-0.83 times Va; other antennal ratios: Vb: III 0.45-0.66, V: III 1.10-1.53, V: IV 1.90-2.20. Antennal chaetotaxy: segment I with 1 short, erected forked hair; segment II with 0 hairs; segment III with 0 or 1 hair; segment IV with 0 or 1 hair; Va with 0 hairs and 4 small sense-hairs at tip of Vb. Apical segment of rostrum blunt 0.07-0.09 mm long, 0.75-1.10 times antennal segment III and 0.58-0.77 times HT II, with 2 secondary hairs. First tarsal segment with 4 hairs, empodial hairs pointed. Cauda with 2 hairs 0.04-0.05 mm long.

Measurements of 1 specimen (in mm): (80 km south of Ghazvin, 1500 m, 16 VIII 1955, leg. G. Remaudiere, holotype) body: 1.70, antenna: 0.43, proportions of antennal segments III-V: 0.10: 0.05: (0.06+0.045), ARS: 0.09, HT II: 0.12.

*Alate viviparous female and sexuales*: Unknown.

*Distribution*: Type locality: Iran, vicinity of Ghazvin. Iran (Firuz kuh: MNHM Collection); Turkey (Karapinar, Konya Province: MNHM Collection). Local, known from only few localities.

*Host plant and life history*: Unknown; collected by sweeping from Cyperaceae.

#### ***Atheroides serrulatus* Haliday, 1839**

(Fig. 6)

Haliday 1839: 189.

*Atheroides serrulatus* Haliday ex Curtis 1837: 218 nomen nudum.

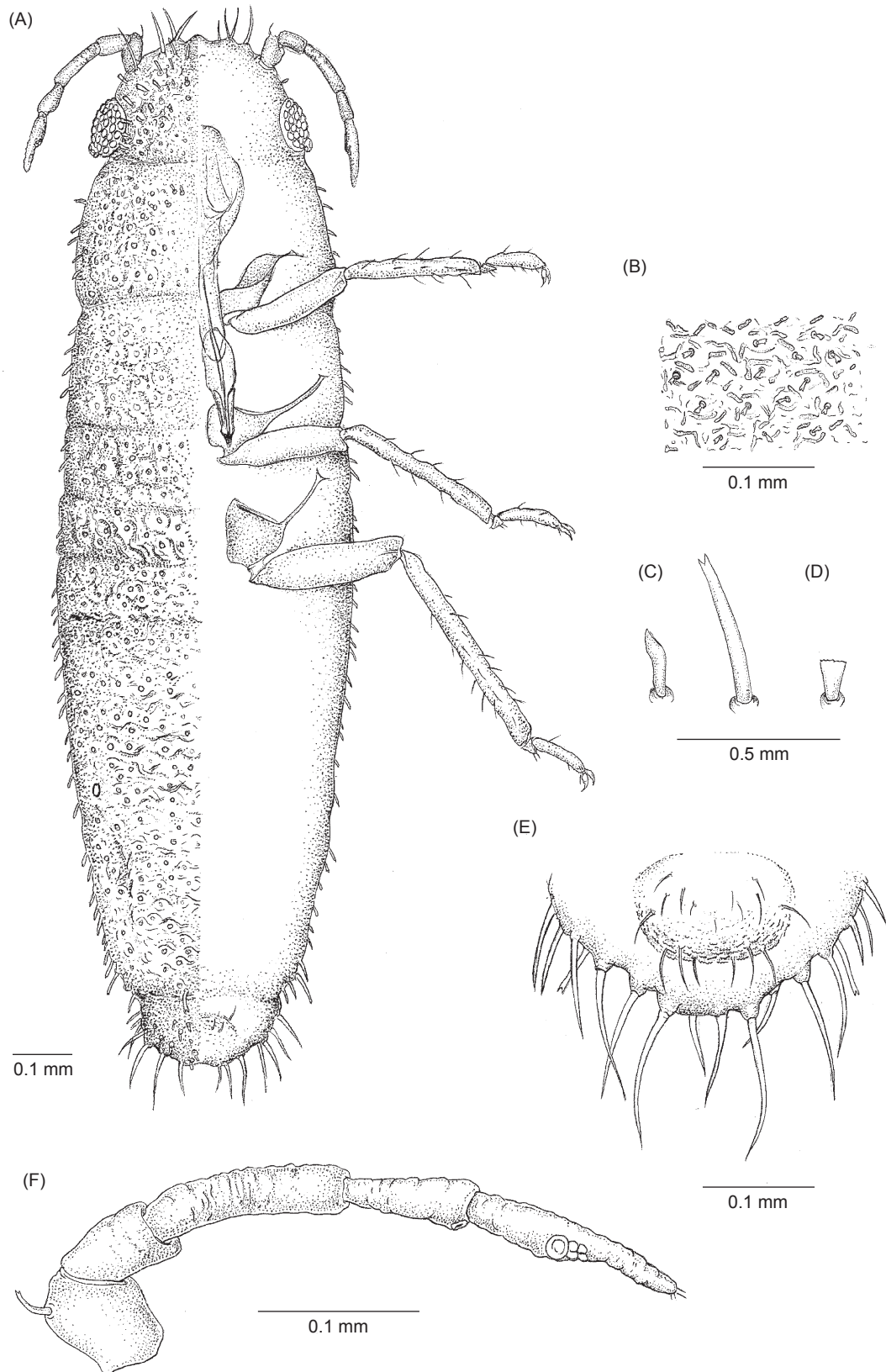
*Aphis serrulatus* Walker 1848: 47.

*Glyphina aculeata* Dahl 1912: 434.

*Sipha paradoxa* Theobald 1918: 26-28.

*Atheroides festucae* Mordvilko 1934: 29.

*Corealchnus suwonensis* Paik 1971: 4-5.



**Fig. 5.** *Atheroides persianus* sp. nov., apterous viviparous female. (A) General features; (B) sculpture, (C) marginal hairs of abdominal tergite VI and VII; (D) fan-shaped hairs of abdomen; (E) abdominal tergite VIII; (F) antenna.

**Material examined:** No type material traced. About 17 apterous viviparous females, 6 oviparous females, 3 males from Fatfield, Harpenden, Somerset, Invernarer, Derbys, Sussex, Seaford Head, Berks, Wallingford, England (BMNH); 15 apterous viviparous females, 8 oviparous females, 4 males from Dunes de Lourdes, Gironde, H. Savoie, Villeneuve, France (MNHN); 6 apterous viviparous females, 1 alate viviparous female from Mogueurt, the Netherlands (RMNH); 3 alate viviparous females from Gambleaux, Belgium (MNHN); 6 apterous viviparous females, 2 alate viviparous females from Villa de Buey, Huesca, Spain (UL); 3 apterous viviparous females, 1 alate viviparous female from Olsztyn-Kortowo, Poland (ZMPA); 4 apterous viviparous females, 6 oviparous females, 5 males from Dąbrowa Górnicza, Poland (UŚ); 2 apterous viviparous females, 1 oviparous female from Copenhagen Botanical Garden, Skallingen Jutland, Denmark (ZMUC); 10 apterous viviparous females, 1 oviparous female, 7 males from Tatrán and vicinity of Bingöl, Turkey, 3 apterous viviparous females, 2 alate viviparous females from Iran (MNHN).

**Redescription: Apterous viviparous female** (Fig. 6A): Coloration of live specimens: yellow to yellowish-brown (pers. observ.), pigmentation when mounted: yellowish. Body elongate, slender, 1.70-2.20 mm long and 0.66 mm wide with visible, rugose sculpture (Fig. 6B). Proportion of thoracic segments I: II: III, 0.22: 0.22: 0.125. Dorsal chaetotaxy: thorax with fan-shaped hairs 0.015-0.025 mm long. Abdominal hairs arranged in 3 rows - marginal hairs of segments I-V 0.02-0.04 mm long, with forked and flattened apices; segments VI-VII with pointed, forked, and jagged hairs 0.045-0.075 mm long (Fig. 6C). Pleural and spinal hairs fan-shaped, about 0.015 mm long (Fig. 6D). Abdominal tergite VIII (Fig. 6E) with 11-16 pointed, thorn-like hairs 0.10-0.15 mm long. Head chaetotaxy: row of pointed, thorn-like and forked hairs 0.091-0.11 mm long present in middle part of head; numerous, short, pointed and forked hairs 0.025-0.03 mm long in middle part of head. Antennae (Fig. 6F) reaching just to anterior margin of prothorax, about 0.19 times body length. Vb 1.10-1.30 times Va; other antennal ratios: Vb: III 0.50-0.70; V: III 1.10-1.30, V: IV 2.20-3.50. Antennal chaetotaxy: segment I with 2 or 3 hairs, segment II with 1 or 2 hairs, segment III with 0-4 hairs, segment IV with 0 or 1 hair, Va with 0 or 1 hair; tip of Vb with 4 small sense-hairs. Antennal hairs pointed, short. Apical segment of rostrum blunt, about 0.07-0.10 mm long, 0.69 times

antennal segment III and 0.75 times HT II, with 2 secondary hairs. First tarsal segment with 4 or 5 hairs, empodial hairs spatulate (Fig. 6G). Cauda with 4 hairs 0.05-0.10 mm long.

Measurements of 1 specimen (in mm): (England, Berks, Wallingford, 6 VI 1993, *Juncus* sp., leg. J.H. Martin) body: 1.87, antenna: 0.39, proportions of antennal segments III-V: 0.11: 0.05: (0.06+0.07), ARS: 0.09, HT II: 0.12.

**Alate viviparous female:** Differs from apterous viviparous female as follows: body about 1.70-1.84 mm long. Antennal segment III with 5 or 6 rhinaria. Abdominal segments I-IV with large marginal sclerites and fused pleural and spinal sclerites; segments V-VIII with fused marginal and pleuro-spinal sclerites. Media with 3 branches.

Measurements of 1 specimen (in mm): (Iran, 16 IV 1963, Poaceae, leg. Remaudiere) body: 1.84, antenna: 0.75, proportions of antennal segments III-V 0.23: 0.11: (0.14+0.10), ARS: 0.07, HT II: 0.14.

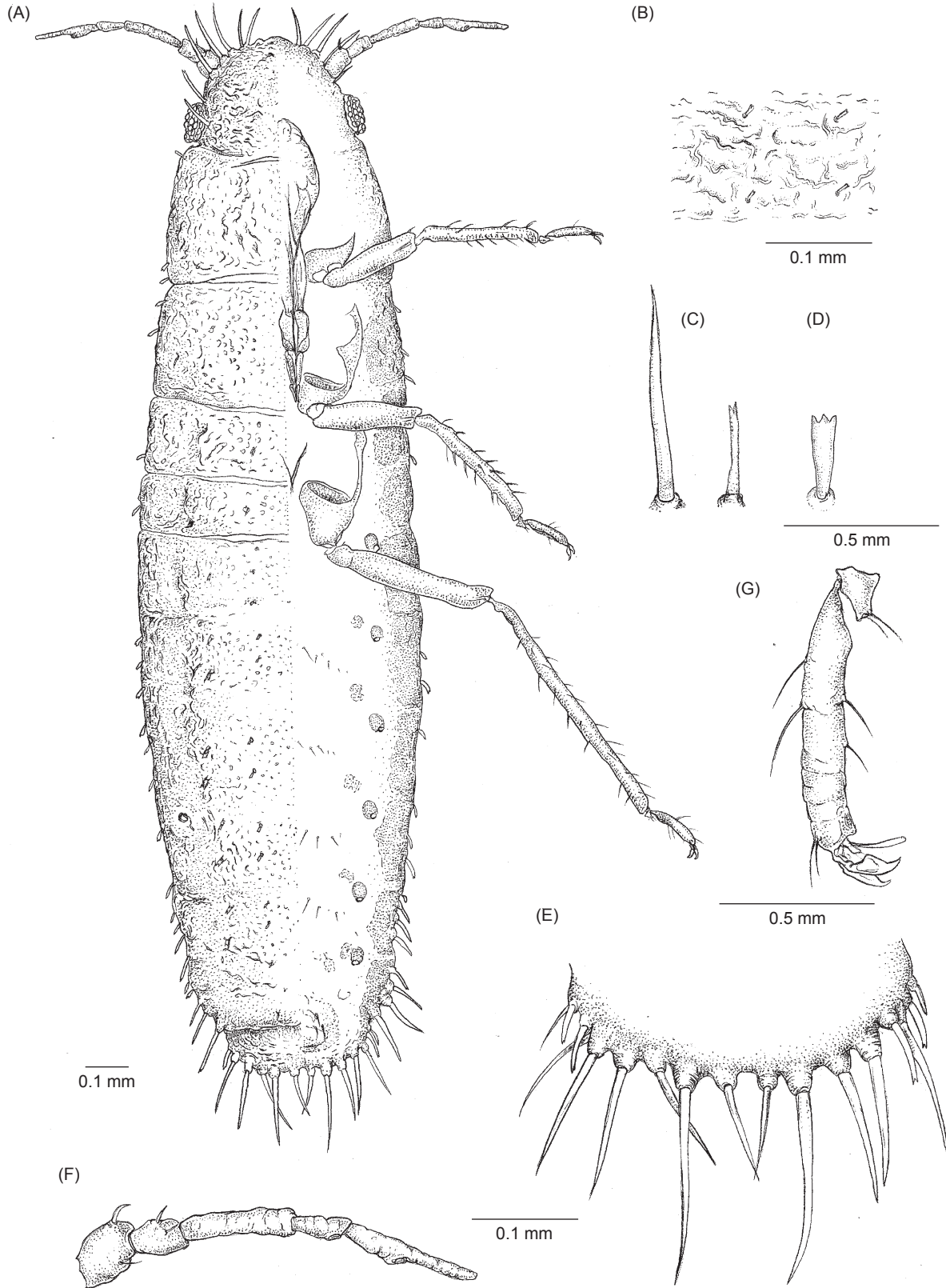
**Oviparous female:** Differs from apterous viviparous female by hind tibiae with 42-45 8-shaped scent plates covering almost all surface of tibia. Darker than apterous female.

Measurements of 1 specimen (in mm): (Denmark, Copenhagen Bot. Garden, 10 IX 1972, leg. O. Heie) body: 2.10, antenna: 0.46, proportions of antennal segments III-V: 0.15: 0.04: (0.07+0.07), ARS: 0.08, HT II: 0.12.

**Male:** Differs from apterous viviparous female as follows: coloration of live specimens: yellowish-brown (pers. observ.), pigmentation when mounted: yellowish with antennal segments III-V and tarsi dusky. Body elongate, slender, about 1.54 mm long. Dorsum with small marginal, pleural, and spinal sclerites. Antennae about 0.45 times body length. Vb 1.50 times Va. Segment III with 20-35, segment IV with 6-11 rounded secondary rhinaria. Genitalia well developed, strongly sclerotized, dark.

Measurements of 1 specimen (in mm): (England UK, Harpenden, 29 IX 1950, *F. ovina*, leg. V.E. Eastop) body: 1.54, antenna: 1.03, proportions of antennal segments III-V 0.39: 0.21: (0.13+0.30), ARS: 0.07, HT II: 0.11.

**Distribution:** Type locality: England, seacoast at Holywood. Austria (Börner and Franz 1956: 313), Belgium (MNHM Collection), Canada (Maw et al. 2000: 29 introduced), China (Qiao and Zhang 2002: 757-759), Czech Republic (Holman and Pintera 1977: 104), Denmark (Heie 1982: 149), Finland (Albrecht 2007: 7), France (MNHM Collection), Germany (Börner 1952: 54), Greece (Tsitsipis et al. 2007: 33), Hungary (Szelegiewicz



**Fig. 6.** *Atheroides serrulatus*, apterous viviparous female. (A) General features; (B) sculpture, (C) marginal hairs of abdominal tergite VI and VII; (D) pleural and spinal hairs of abdomen; (E) abdominal tergite VIII; (F) antenna; (G) hind tarsus.

1977: 98), Iran (MNHM Collection), Ireland (Wood-Baker 1943-1944: 140), Italy (Patti and Barbagallo 1998: 398), Kazakhstan (Smailova 1980: 44), Korea (Paik 1971: 4-5), Madeira (Aguar and Ilharco 2001: 324-325), Norway (Tamb-Lyche and Heie 1994: 72), Poland (Wieczorek 2006-2007: 22), Portugal (Rodrigues et al. 2006: 118), Romania (Holman and Pintera 1981: 31), Russia (Mordvilko 1948: 207, Ivanovskaya 1977: 238), Serbia (Petrovic 1998: 31); Slovakia (Holman and Pintera 1977: 104), Slovenia (Eastop and Tanasijevic 1966: 55), Spain (Nieto Nafria and Mier Durante 1998: 351-354), Sweden (Ossiannilsson 1959: 390), Switzerland (Lampel and Meier 2003: 152), Turkey (Tuatay and Remaudiere 1964: 247), Ukraine (Bozhko, 1957b: 211, Mamontova-Solucha 1964 :62), UK (Walker 1848: 47, Shaw 1964: 82, Stroyan 1977: 38). In the genus *Atheroides* the most common species, widely distributed in the Palaearctic as well as introduced into Canada.

*Host plants:* *Agrostis curtisii* Kerguelen, *A. stolonifera* L., *Alopecurus geniculatus* L., *Ammophila arenaria* (L.) Link, *Brachypodium retusum* (Pers.) Beauv., *Bromus sterilis* L., *Cynosurus cristatus* L., *Dactylis glomerata* L., *Deschampsia caespitosa* (L.) P. Beauv., *D. flexuosa* (L.) Trin., *Festuca ovina* L., *F. rubra* L., *F. trachyphylla* (Hack.) Krajina, *Holcus lanatus* L., *Hordeum murinum* Huds., *Leymus arenarius* (L.) Hochst., *Lolium perenne* L., *Nardus* sp., *Phalaris arundinacea* L., *Puccinellia maritima* (Huds.) Parl., *Poa annua* L., *P. angustifolia* L., *P. compressa* L., *P. pratensis* L., *Carex disticha* Huds., *C. goodenowii* Gay, *C. gracilis* Curtis, *C. hirta* L., *C. recta* Boot, *C. vesicaria* L., *Juncus gerardii* Loisel., *J. inflexus* L.; prefers species of grasses with narrow leaves.

*Life history:* The species lives, usually singly, on leaves of various grasses or sedges; attended by ants (pers. observ.).

## DISCUSSION

The grasses (Poaceae) are one of the largest families of flowering plants, with approximately 600 genera and 10,000 species in the world (Türe and Böcük 2007). Among aphids, about 60 genera and 240 species are connected with grasses (Blackman and Eastop 2006). Aphids belonging to Siphini are known to be monoecious and holocyclic, and they are all monophagous or strictly oligophagous and connected with grasses and sedges (Poacea and Cyeparaceae). The commonly accepted view is that during their development, aphids moved from

phylogenetically older host plants (arborescent) to plants which were phylogenetically younger (herbaceous plants, grasses, and sedges) (Mordvilko 1934). The Siphini is regarded as the youngest branch of the Chaitophorinae, considering the reduced number of antennal segments to 5 or 4 (*A. brevicornis*), sclerotization of the abdominal tergites and porous siphunculi without reticulations placed at the anterior margin of abdominal segment V. They probably appeared in the Miocene, when grasses, an important part of steppe ecosystems, became widespread (Dixon 1998).

Aphids representing the genus *Atheroides* of the tribe Siphini are very well adapted to leaves of grasses. Almost all species have a relatively short and blunt apical segment of the rostrum (which is a special adaptation for aphids on grasses belonging to different subfamilies; Heie 1987); only in *A. karakumi* is the apical segment of the rostrum stiletto-shaped, but probably this shape is an adaptation to grasses with narrow, folded leaves like *Festuca* spp. and *Stipa* spp. The shape of the body (elongate and slender) and the rather long, smooth legs are also typical of species associated with grasses or sedges. Aphids of this genus usually live in small colonies or singly on leaves of their host plants, preferring species of grasses with narrow leaves. Most species are local, only *A. serrulatus* is widely distributed and the most common. Alatae are rare (most commonly occurring in the 1st wk of July); sexuales of some species (e.g., *A. karakumi* and *A. persianus*) are still unknown.

Among species of this genus, we can distinguished 2 groups: aphids with visible, rugose sculpture and rather short dorsal hairs, with fan-shaped and flattened apices (*A. persianus* and *A. serrulatus*), and species the body of which is not rugose but has numerous long, pointed thorn-like hairs (*A. doncasteri* and *A. hirtellus*). Moreover, in these characters, *A. hirtellus* resembles *Chaetosiphella stipae* from which it differs by the apical segment of the rostrum (short and blunt) and the length and color of the hind legs which in *Ch. stipae* are black and very long. From other representatives of the genus *Atheroides* differs by a visible cauda which is not covered by abdominal tergite VIII. Also *A. karakumi* resembles aphids of the genus *Chaetosiphella* by the stiletto-shaped apical segment of the rostrum. *A. brevicornis* shares visible, rugose sculpture with *A. persianus* sp. nov. and *A. serrulatus* but differs from other representatives of the genus *Atheroides* by the

oval shape of the body, the dorsal chaetotaxy, the short antennae (often 4 segmented), and the very short, stumpy processus terminalis.

**Acknowledgments:** The author is sincerely grateful to J.H. Martin (BMNH, London, UK), G. Remaudiere, T. Bourgoïn (MNHN, Paris, France), J.M. Nieto Nafria (Univ. of Leon, Leon, Spain), F.W. Quednau (LFC, Sainte-Foy, Quebec, Canada), R. De Vries (RMNH, Leiden, The Netherlands), A. Stekolschikov (ZMAS, St. Petersburg, Russia), and V. Zhuravlev (UASK, Kiev, Ukraine) for the opportunity to examine the materials. Dr. D. Matile-Ferrero (MNHN, Paris, France) arranged the loan of materials which included the new species, and Ł. Junkiert for the drawings. The author also wants to thank Prof. O.E. Heie and an anonymous reviewer for all suggestions and comments which improved the manuscript. This research received support from the SYNTHESYS Project (<http://www.synthesys.info/>) DK – TAF nr. 1086 which is financed by European Community Research Infrastructure Action under the FP6 “Structuring the European Research Area” Programme.

## REFERENCES

- Aguiar F, FA Ilharco. 2001. Aphids (Homoptera: Aphidoidea) from Madeira Island – new records and corrections. *Bol. San. Veg. Plagas* **27**: 325-336.
- Albrecht A. 2007. Atlas of the aphids of Finland. Available at <http://www.fmnh.helsinki.fi/atlas.htm>
- Andreev AB, GB Verescagin. 1993. Dopolnene k faune tlej (Homoptera, Aphidoidea) Respubliki Moldova, karakteristika i sostojanija w redkie widy. *Vest. Zool.* **4**: 16-19.
- Blackman RL, VF Eastop. 2006. Aphids on the world's herbaceous plants and shrubs. Vol. 1 Host lists and keys/Vol. 2. The aphids. 8 + 1439 pp. Chichester, UK: J. Wiley.
- Börner C. 1952. Europae centralis Aphides. Die Blattläuse Mitteleuropas. Namen, Synonyme, Wirtspflanzen, Generationszyklen. *Mitt. Thur. Bot. Ges.* **3**: 488.
- Börner C, H Franz. 1956. Überfamilie Aphidoidea. *In* Die Blattläuse des Nordostalpengebietes und seines Vorlandes. *Osterreichische Zool. Z.* **6**: 1-411.
- Bozhko MP. 1957a. K charakteristike fauny tlej (Aphidoidea) vostochnovo predkavkaza. *Trudy* **27**: 39-50.
- Bozhko MP. 1957b. Materialy k izuczenu fauny tlej (Aphidoidea) Kryma. *Trudy Nauczno Inst. Biol. Kharkovsk. Gos. Univ.* **30**: 207-222.
- Dahl F. 1912. Über die Faune des Plagefenngebietes: Schnabelkerfe, Beiträge zur Naturdenkmalpflege, Berlin **3**: 434.
- Dixon AFG. 1998. Aphid ecology. 2nd ed. London: Chapman and Hall, 300 pp.
- Eastop VF, N Tanasijevic. 1966. Aphid records from Yugoslavia. *Entomol. Mon. Mag.* **102**: 55-57.
- Haliday AH. 1837. A guide to an arrangement of British insects; being a catalogue of all the named species hitherto discovered in Great Britain and Ireland. *In* J Curtis, ed. *British entomology*, 2nd ed. London, J. Pigot and Co., 294 pp.
- Haliday AH. 1839. New British insects indicated in Mr. Curtis Guide. *Ann. Nat. Hist.* **2**: 161-240.
- Heie OE. 1982. The Aphidoidea (Hemiptera) of Fennoscandia and Denmark. II. The family Drepanosiphidae. *Fauna Entomologica Scandinavica*. Klampenborg, Denmark: Scandianavian Science Press, Vol.11, 175 pp.
- Heie OE. 1987. Morphological structures and adaptations. Chapter 6.2. *In* AK Minks, P Harrewijn, eds. *Aphids, their biology, natural enemies and control*. Amsterdam: Elsevier, pp. 392-400.
- Hille Ris Lambers D. 1939. On some western European Aphids. *Zool. Med.* **22**: 81-120.
- Holman J. 1995. Sternorrhyncha: Aphidinea. *In* R Rozkosny, Vanhara, eds. *Terrestrial invertebrates of the Palava Biosphere Reserve of UNESCO*, I. Folia. Fac. Sci. Nat. Univ. Masaryk. Brun. Biol. **92**: 189-200.
- Holman J, A Pintera. 1977. Aphidoidea. *Acta Funistica Entomol. Mus. Nat. Pragae* **4**: 101-116.
- Holman J, A Pintera. 1981. Übersicht der Blattläuse (Homoptera, Aphidoidea) der Rumanischen Sozialistischen Republik. *Studie CSAV, Praha*, : Academia, 125 pp.
- Ivanovskaja OI. 1977. Tli zapadnoj Sibiri. I. Adelgidae-Chaitophoridae. Novosibirsk, U.S.S.R.: Nauka, 272 pp.
- Juchnevitch LA. 1960. Nowye vidy tlej (Homoptera, Aphidoidea) z Yugo-Vostoka Kazakhstana. *Trudy In-ta zool. Kaz CCP* **9**: 218-222.
- Laing F. 1920. On the genus *Atheroides* Haliday (Aphidae). *Entomol. Mon. Mag.* **6**: 38-45.
- Lampel G, W Meier. 2003. *Fauna Helvetica* 8. Hemiptera: Sternorrhyncha-Aphidina, Teil1: Non-Aphididae.: Centre suisse de cartographie de la faune Schweizerische Entomologische Gesellschaft, 312 pp.
- Mamontova-Solucha BO. 1964. Popielici Ykrainskovo Polissja. *Naukova Dumka Kiev* **20**: 52-71.
- Maw HEL, RG Fottit, KGA Hamilton, GGE Scudder. 2000. Checklist of the Hemiptera of Canada and Alaska. Ottawa: NRC Research Press, 220 pp.
- Mordvilko AK. 1929. Food plant catalogue of the Aphididae of U.S.S.R. *Works Appl. Entomol. Leningr.* **14**: 1-101.
- Mordvilko AK. 1934. On the evolution of Aphids. *Arch. Nat. Zeitschrift wissenschaftliche Zool. Abt. B Leipzig* **3**: 1-58.
- Mordvilko AK. 1948. Aphidoidea-tli ili rastitelnye wszi. *In* A Tarbinski, ed. *Opredelitel nasekomych evropejskoy casti CCCP.*, Moskva: Selxozgiz, pp. 187-226.
- Nieto Nafria JM, MP Mier Durante. 1998. *Fauna Iberica*. Vol. 11. Madrid: Museo Nacional de Ciencias Naturales, 425 pp.
- Ossiannilsson F. 1954. Four new Swedish Aphids (Hem. Hom) with description of a new genus. *Entomol. Tidskrif Arg.* **75**: 117-127.
- Ossiannilsson F. 1955. A new European *Atheroides* (Hem., Hom., Aphid.) with synonymic notes on *Atheroides hirtellus* Hal. *Entomol. Tidskrif Arg.* **76**: 128-130.
- Ossiannilsson F. 1959. Contributions to the knowledge of Swedish aphids. List of species with find records and ecological notes. *Lantbrukshogsk. Ann.* **25**: 375-527.
- Paik WH. 1971. *Corealachnus* gen. nov. (Homoptera, Aphididae). *Kor. J. Entomol.* **1**: 3-5.

- Patti I, S Barbagallo. 1998. An approach to the knowledge on the Italian aphid fauna. In JM Nieto Nafria, AFG Dixon, eds. Aphids in natural and managed ecosystems. Leon, Spain: Univ. de Leon (Secretariado de Publicaciones), pp. 397-405.
- Petrovic O. 1998. Checklist of aphids (Homoptera, Aphididae) in Serbia. Acta entomol. Serb **3**: 9-42.
- Pintera A. 1965. New aphid species from Pannonian Region (Homoptera). Acta entomol. Bohemoslov **62**: 283-286.
- Qiao GX, GX Zhang. 2002. Taxonomic study of the Chinese subfamily Atheroidinae (Homoptera: Aphidoidea). Acta Zool. Sin. **27**: 756-767.
- Remaudiere G, JP Latge, MF Michel. 1980. Evolution des populations de pucerons du littoral de Basse-Normandie. Acta Ecol./Ecol. Appl. **1**: 341-355.
- Rodrigues P, FA Ilharco, EB da Silva, J Carlos. 2006. Interactions between ground cover management, hedges and aphids in lemon orchards. Integr. Control Citrus Fruit Crops **29**: 117-125.
- Rupais A. 1989. The aphids (Aphidoidea) of Latvia. Riga and Zinatne, Latvia: Latvian SSR Academy of Sciences Botanical Garden, 331 pp.
- Shaw MW. 1964. A basic list of the Scottish Aphididae. Trans. Br. Entomol. Nat. Hist. **16**: 49-92.
- Smailova NE. 1971. Stacialnoe razpriedelenie tlej w Centralnom Kazakhsatnie. Trudy Inst. Zool. **22**: 21-23.
- Smailova NE. 1980. Dopolnene k faune tlej (Homoptera, Aphididae) zapadnovo Kazakhstana. Trudy Inst. Zool. **39**: 44-48.
- Stroyan HLG. 1977. Homoptera Aphidoidea, Chaitophoridae and Callaphididae. Handbooks for the identification of British insects. Vol. 2(4a). London; Royal Entomological Society of London, 130 pp.
- Szelegiewicz H. 1977. Leveltetvek I.- Aphidinea I. Chaitophorinae, Callaphidinae. Fauna Hung. **17**: 1-175.
- Szelegiewicz H. 1985. Klucze do oznaczania owadów Polski (Homoptera, Aphidoidea), Chaitophoridae. PWN Warszawa **17**: 1-57.
- Tams-Lyche H, OE Heie. 1994. Studies on Norwegian aphids (Homoptera, Aphidoidea) III. Fauna norv. Ser. B. **41**: 65-84.
- Theobald FV. 1918. Notes on new and little known British aphides. IV. Entomologist **51**: 25-29.
- Theobald FV. 1929. The plant lice of aphidoidea of Great Britain. Ashford and London: Headley Bros., Vol.3, 26-34, 364 pp.
- Tsitsipis JA, NI Katis, JT Margaritopoulos, DP Lykouressis, AD Angelis, I Gargalianou, KD Zarpas, DCh Perdakis, A Papanayotou. 2007. A contribution to the aphid fauna of Greece. Bull. Insect **60**: 31-38.
- Tuatay N, G Remaudiere. 1964. Premiere contribution au catalogue des Aphididae (Hom.) de la Turquie. Rev. Pathol. Veg. Entomol. Agric. Fr. **43**: 243-278.
- Türe C, H Böcük. 2007. An investigation on the diversity, distribution and conservation of Poaceae species growing naturally in Eskisehir Province (Central Anatolia-Turkey). Pak. J. Bot. **39**: 1055-1070.
- Walker FLS. 1848. Description of Aphides. Ann. Mag. Nat. Hist. **2**: 1-50.
- Wieczorek K. 2006-2007. The faunistic review of the Polish species of the subfamily Chaitophorinae (Hemiptera, Aphidoidea,) – part 2 – tribe Atheroidini. Acta entomol. silesiana **14-15**: 21-27.
- Wood-Baker CS. 1943-1944. A new species of Irish aphid *Trilobaphis rhodolestes* sp. nov., with artificial key (partial) to apterae of Irish Aphididae. Proc. Roy. Irish Acad. **49**: 121-141.