

Title: **New species of *Entomobryini* from Russia and Armenia (Collembola, Entomobryomorpha)**

Short title: New *Entomobryini* Russia and Armenia

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Abstract

This paper is part of the results of a systematic study of the specimens of *Entomobrya* and related genera from various European museums and other material obtained from private collections. Various new species from Russia and Armenia were identified: *Entomobrya karasukensis* n. sp., *Entomobrya tuvinica* n. sp., *Entomobrya pseudolanuginosa* n. sp., *Entomobrya stebaevae* n. sp., *Entomobrya kuznetsovae* n. sp., *Entomobrya brinevi* n. sp., *Entomobrya primorica* n. sp., *Entomobrya kabardinica* n. sp., *Entomobrya taigicola* n. sp., *Entomobryoides sotoadamesi* n. sp. and *Prodrepanura altaica* n. sp. from Russia, and *Entomobrya armeniensis* n. sp. from Armenia. For the identification and description of these species we used the set of characters proposed by Jordana and Baquero (2005).

Key words: morphological characters, chaetotaxy.

1. Introduction

During the revision of the genus *Entomobrya* from some collections of Russia and Armenia, new species of *Entomobrya* and related genera were identified.

The combined use of colour and macrochaetotaxy allows the identification of new species and provides a good description. The set of characters proposed by Jordana & Baquero (2005), based on a constant and generally visible set of morphological characters (Christiansen 1958; Christiansen & Bellinger 1980), including the dorsal macrochaetotaxy, has proven very useful for the identification of species within the genus *Entomobrya* (Baquero et al. 2010; Jordana & Baquero 2010a; Jordana & Baquero 2010b).

Abbreviations: Abd = abdominal segment, Ant = antennal segment, asl = altitude sea level, MPGU = Moscow State Pedagogical University (Biology/Chemistry Faculty, Zoology Department), RAS = Siberian Zoological Museum, Institute of Systematics and Ecology of animals, Th = thoracic segment

2. Material and Methods

The specimens were mounted in Hoyer medium, sometimes previously cleared with Nesbitt solution. Observation of the slides was done using an Olympus BX51-TF microscope with a multi-viewing system and phase contrast, and a Zeiss Axio Imager.A1 with differential interference contrast (DIC). For measurements, a UDA drawing attachment UIS (Universal Infinity System) and a scale calibrated with a Graticules Ltd slide (1 mm/0.01 div) were used. Measurements of the species are given in Table 1.

3. Results

Genus *Entomobrya* Rondani, 1861

Entomobrya armeniensis n. sp. (Figs 1A, 4A–D, 16A–D, Tab. 1)

Type locality. Armenia, South Caucasus, Dilizhan District, village of Salakh.

Type material. Holotype and five paratypes (juveniles) on the same slide, broadleaf forest, moss on tree trunks and stones, 27.10.1987. M. Potapov leg. Deposited in MPG.U.

Description

Body length up to 1.9 mm excluding antennae (Tab. 1). Body colour pattern as in Fig. 1A.

Head: Eight ocelli, GH smaller than EF. Antennae length 1420 μm , three or more times the length of the head, Ant IV with simple apical vesicle. Relative length of Ant I/II/III/IV = 1/1.81/1.59/2.04. Labral papillae with a chaeta-like projection (Fig. 16A).

Body: Length ratio Abd IV/III > 4 (8 times longer) (Tab. 1). Claw with 4 internal teeth: first pair at 64% from the base of claw; 2 unpaired teeth, first at 85% from the base, the most distal one minute; dorsal tooth not basal. Empodium spike-like, with smooth external edge on leg III (Figs. 16B–C). Manubrium and dens length 1070 μm . Manubrial plate with 7 chaetae and 2 pseudopores. Mucronal subapical tooth similar to the terminal one; mucronal spine present (Fig. 16D).

Chaetotaxy: Simplified formula: 4-1-0-3-2/2-6/2-7/0(1)-2-2/0-6-3-3-2 (Fig. 1A).

Head chaetotaxy as in figure 4A (S_{4p} present). Thorax chaetotaxy: T1 area on Th II with 2 macrochaetae (m_1 and m_{2i} present); T2 area on Th II with 6 macrochaetae (Fig. 4B). Abdomen chaetotaxy (Figs 4C-D): A1 and A2 areas on Abd II with 2 and 7 macrochaetae respectively. Abd III with 2 macrochaetae on areas A4 and A5. Some times a_1 is present on A3 area. Abd IV macrochaetotaxy as in Fig. 4D.

Biology: Unknown.

Remarks: The remarkable length of Abd IV together with the number and disposition of the macrochaetae of area A7 on Abd IV make it some similar to an *Homidia* species.

Discussion. *Entomobrya armeniensis* n. sp and *E. murrensis* Yosii and Ashraf, 1965 share the same chaetotaxy of Abd II (2-7 macrochaetae on A1 and A2 areas) and Abd III (0-2-2). However they differ from each other by the chaetotaxy of Th II (7-3 in *E. murrensis*; 2-6 in the new species). Other differences between the two species concern the colour pattern and other characters.

Etymology. Named after Armenia, the country where the species was found.

***Entomobrya karasukensis* n. sp.** (Figs 1B, 5A–D, 16E–G, Tab. 1)

Type locality. Russia, 21.06.1991., S-W part of Novosibirsk region, 17 km W of Karasuk, above the flood terrace of Lake Krotovaya Lyaga, steppe, under *Festuca pseudovina*, 400 m asl.

Type material. Holotype on slide and 11 paratypes in ethyl alcohol, steppe, under *Festuca pseudovina*, 400 m asl, 21.VI.1991, Stebaeva leg. and coll. Deposited in RAS.

Description

Body length up to 1.3 mm excluding antennae (Tab. 1). Body colour pattern as in Fig. 1B.

Head: Eight ocelli, GH smaller than EF. Antennae length 600 μm , 2 times (< 3) the length of the head, Ant IV with simple apical vesicle. Relative length of Ant I/II/III/IV = 1/1.87/1.62/3. Labral papillae wrinkled or with some projections (Fig. 16E).

Body: Length ratio Abd IV/III < 4 (Tab. 1). Claw with 4 internal teeth; dorsal tooth not basal. Empodium with smooth external edge on leg III. Manubrium and dens length 550 μm . Manubrial plate with 3 chaetae and 2 pseudopores. Mucronal subapical tooth smaller than terminal one; mucronal spine present (Fig. 16F).

Chaetotaxy: Simplified formula: 4-1-0-2-1a(2)/1-3/1-2/0-1-1/0-0-3-2-2 (Fig. 1B). The numbers in brackets are frequent alternatives, usually represented by one additional mesochaeta.

Head chaetotaxy as in figure 5A. Thorax chaetotaxy: T1 area on Th II with one macrochaeta (m_1 present); T2 area on Th II with three macrochaetae (Fig. 5B). Abdomen chaetotaxy (Figs 5C-D): Abd II with 1 macrochaeta (a_2) on A1 area, and 2 macrochaetae on A2 area (m_{3ep} and m_{3ea}). Abd III with 1 macrochaeta on areas A4 and A5 (a_3 and m_3). Microchaetae of Abd V slightly thickened (Fig. 16G).

Biology: lives in steppe with Gramineaceae.

Discussion. Five palaeartic species have 1–2 macrochaetae on A1 and A2 areas of Abd II and 0-1-1 macrochaetae on Abd III (*E. karasukensis* n. sp., *E. arborea* (Tullberg, 1871), *E. chomolungae* Yosii, 1971, *E. chungseensis* Baquero & Jordana, 2008 and *E. obensis* Linnaniemi, 1919). The new species, however, can be distinguished from the others because of the presence of 1–3 macrochaetae on areas T1 and T2 of Th II, and by differences in colour pattern and head chaetotaxy.

Etymology. The name refers to the city adjacent to the lake where the species was recorded.

***Entomobrya tuvunica* n. sp.** (Figs 1C, 6A–D, 16H–I, Tab. 1)

Type locality. Russia, Tuva Republic, Tuvinskaya Bassin, northern macroslope of Eastern Tannu-Ola Mt. Range, ca. 5-7 km of south bank of Lake Chagy tai, mountain larch forest (with *Larix sibirica*), low part of larch belt, 1300 m asl.

Type material. Holotype on slide and four paratypes in ethyl alcohol, mountain larch forest (with *Larix sibirica*), lower part of larch belt, 1300 m asl., 16.VI.2003, Stebaeva leg. and coll. Deposited in RAS.

Description

Body length up to 1.7 mm excluding antennae (Tab. 1). Body colour pattern as in Fig. 1C.

Head: Eight ocelli, GH smaller than EF. Antennae length 870 μm , less than three times the length of the head, Ant IV with simple apical vesicle. Relative length of Ant I/II/III/IV = 1.00/1.69/1.84/2.15. Labral papillae with a small chaeta-like projection (Fig. 16H).

Body: Length ratio Abd IV/III > 4 (Tab. 1). Claw with four internal teeth: first pair at 50% from the base of claw; 2 odd teeth, first at 69% from the base; the distal one minute; dorsal tooth at internal paired teeth level. Empodium spike-like, with smooth external edge on leg III (the postero-external lamella is serrated and could be visible on the leg) (Fig. 16I). Length of manubrium and dentes 750 μm . Manubrial plate with 4 chaetae and 2 pseudopores. Mucronal subapical tooth similar to the terminal one; mucronal spine present.

Chaetotaxy: Simplified formula: 3-1-0-3-2/2-6/2-4/1-2-1/0-3-3-2-2 (Fig. 1C).

Head chaetotaxy as in figure 6A. Thorax chaetotaxy: T1 area on Th II with 2 macrochaetae (m_1 and m_{2i2} present); T2 area on Th II with 6 macrochaetae (Fig. 6B). Abdomen chaetotaxy (Figs 6C–D): A1 and A2 areas on Abd II with 2 and 4 macrochaetae, respectively. Abd III with 2 macrochaetae on area A4 and 1 macrochaeta on areas A3 and A5.

Discussion. Seven species of *Entomobrya* share the same chaetotaxy on Abd II and III (2-4/1-2-1) (*E. tuvunica* n. sp., *E. arvensis* Latzel, 1918, *E. lindbergi* Stach, 1960, *E. mesopotamica* Rusek, 1971, *E. rothanguensis* Baijal, 1958, sensu Yoshii, 1990, *E. striatella* Börner, 1909 and *E. palmensis* Jordana & Baquero, 2010). Two of them (*E. tuvunica* n. sp.

and *E. mesopotamica*) have the labral papillae with a chaeta-like projection, but *E. mesopotamica* has 3-3 macrochaetae on Th II while the new species has 2-6. In addition, the colour pattern of the two species is very different.

Biology: lives in forests of *Larix sibirica*.

Etymology. The name refers to the region where the species was recorded.

Entomobrya pseudolanuginosa n. sp. (Figs 1D, 7A–D, 16J–L, Tab. 1)

Type locality. Russia, S-E Altai, Bol'shoi Kuraiskii Mt. Range, ca. 7 km of vil. Kurai, E-S-E slope, mountain larch forest with *Larix sibirica*.

Type material. Holotype and nine paratypes on the same slide (previously labelled as *E. lanuginosa*), mountain larch forest with *Larix sibirica*, 1600-1700 m asl., E-S-E slope, 22.vii.1964, Stebaeva leg. Deposited in RAS.

Description

Body length up to 1.9 mm excluding antennae. Body colour pattern completely pale, whitish.

Head: Eight ocelli, GH smaller than EF. Antennae length 865 μm , less than three times the length of the head, Ant IV with simple apical vesicle. Relative length of antennal segments 1/1.98/1.43/2.06. Labral papillae wrinkled or with some projections (Fig. 16J).

Body: Length ratio Abd IV/III < 4. Claw with four internal teeth: first pair at 46% from the base of claw; 2 odd teeth, first at 77% from the base, the most distal one minute; dorsal tooth between the basis and the level of two internal teeth. Empodium spike-like, with smooth external edge on leg III (Fig. 16K). Manubrium and dens length 830 μm . Manubrial plate with 6 chaetae and 2 pseudopores. Mucronal subapical tooth similar to the terminal one; mucronal spine present. Male genital plate as in Fig. 16L.

Chaetotaxy: Simplified formula: 6-1-1-2-2/0-2/1-3/1-1-2/0-4-4-2-2.

Head chaetotaxy as in figure 7A. Thorax chaetotaxy: T1 area on Th. II without macrochaetae; T2 area on Th. II with 2 macrochaetae (Fig. 7B). Abdomen chaetotaxy (Figs. 7C-D): A1 and A2 areas on Abd II with one (some times with a mesochaeta) and three macrochaetae, respectively. Abd III with one macrochaeta on areas A3 and A4 and one macrochaeta on area A5.

Biology: Unknown.

Discussion

Three species of *Entomobrya* (*E. pseudolanuginosa* n. sp. *E. tenkyniensis* Tshelnokov, 1987 and *E. mieheorum* Baquero & Jordana, 2008) have 1-3/1-1-2 macrochaetae on Abd II and III but only *E. pseudolanuginosa* n. sp. has S'0 on the head and 0-2 macrochaetae on T1 and T2 areas of Th. II. Also the colour pattern is different among these species.

Etymology

Similar to *E. lanuginosa* (Nicolet, 1842) Rondani, 1861 in colouration.

***Entomobrya stebaevae* n. sp.**

Type locality. Russia, Tuva Republic, Ubsunurskaya Basin (=hollow), north slope of Tsuger-Eliss sand massive, ca. 15-20 km from Erzin, under *Salix*, 1000 m asl.

Type material. Holotype and 2 paratypes in ethyl alcohol, under *Salix*, 1000 m asl, 29.VII.2001, Stebaeva leg. Deposited in RAS.

Description

Body length up to 1.1 mm excluding antennae. Body colour pattern as in figure 1D.

Head: Eight ocelli, GH smaller than EF (Fig. 16M). Antennae length 480 µm, 2 times the length of the head. Relative length of antennal segments 1/1.57/2/2.28. Labral papillae smooth.

Body: Length ratio Abd IV/III < 4. Claw with 4 internal teeth: first pair at 50% from the base of claw; 2 odd teeth, first at 75% from the base; the most distal one minute; dorsal tooth not basal. Empodium spike-like, with smooth external edge on leg III (Fig. 16N). Manubrium and dens length 440 µm. Manubrial plate with 3 chaetae and 2 pseudopores. Mucronal subapical tooth similar to the terminal one; mucronal spine present (Fig. 16O).

Chaetotaxy: Simplified formula: 4-1-1-3-2/1-2/1-2/1-1/0-0-3-3-2.

Head chaetotaxy as in figure 8A. Thorax chaetotaxy: T1 area on Th. II with 1 macrochaeta (m_1 present); T2 area on Th. II with 2 macrochaetae (Fig. 8B). Abdomen chaetotaxy (Figs. 8C-D): A1 and A2 areas on Abd II with 1 and 2 macrochaetae, respectively. Abd III with 1 macrochaeta on areas A3, A4 and A5.

Biology: Unknown.

Discussion

Only two species of Palearctic *Entomobrya* have 1-2/1-1-1 macrochaetae on Abd II and III: the new species and *E. nigrocincta* Denis, 1923. *E. nigrocincta*, however, has 2-3 macrochaetae on T1 and T2 areas on Th. II and the colour pattern is quite different.

Etymology

The species is dedicated to Sofia Stebaeva, an esteemed expert on Collembola from southern Siberia.

***Entomobrya kuznetsovae* n. sp.**

Type locality. Russia, N Caucasus, Krasnodarsky Krai, Kabardino-Balkaria (Prielbrusye), near Mt. Elbrus, 1800 m asl.

Type material. Holotype on slide and paratype in ethyl alcohol, sample 47R, steep north slope, pine-wood, in moss on stone, 22.09.1999, M. Potapov leg. Deposited in MPGU.

Other material. **Russia:** N Caucasus, Krasnodarsky Krai, Kabardino-Balkaria (Prielbrusye), Irik Canyon, 2000 m asl, 10 specimens in ethyl alcohol in the sample 27R, pasture, 23.09.1999, M. Potapov leg.; N Caucasus, Krasnodarsky Krai, Kabardino-Balkaria (Prielbrusye), Irik Canion, 2500 m asl, about 2 km from the Irik Glacier, five specimens in ethyl alcohol in the sample 34R, in moss on soil, 23.09.1999, M. Potapov leg. All in Potapov Coll.

Description.

Body length up to 1.7 mm, excluding antennae. Body ground colour yellowish, pattern as in figure 2A.

Head: Eight ocelli, GH smaller than EF. Antennae length 900 μm , 2.8 times the length of the head. Relative length of antennal segments 1/1.5/1.42/2.5. Labral papillae with a chaeta-like projection (Fig. 17A).

Body: Length ratio Abd IV/III < 4. Tibiotarsus sub-segmented. Claw with four internal teeth: first pair at 60% from the base of claw; 2 odd teeth, first at 75% from the base; the most distal one minute; dorsal tooth not basal. Empodium spike-like, with smooth external edge on leg III (Fig. 17B). Manubrium and dens length 680 μm . Manubrial plate with 7 chaetae and 2 pseudopores (Fig. 17C). Mucronal subapical tooth similar to the terminal one; mucronal spine present.

Chaetotaxy: Simplified formula: 3-1-0-3-2/6(+2m)-6/2-5/0-2-2/3-4-3-4-2.

Head chaetotaxy as in figure 9A. Thorax chaetotaxy: T1 area on Th. II with six macrochaetae (m_1 , m_2 , m_{2i} and m_{2i2} present, in addition to 2 additional chaetae); T2 area on Th. II with six macrochaetae (Fig. 9B). Abdomen chaetotaxy (Fig. 9C-D): A1 and A2 areas on Abd II with 2 and five macrochaetae, respectively. Abd III with 2 macrochaetae on areas A4 and A5.

Biology. Found in pine-wood, in moss on stone.

Discussion: *Entomobrya taigicola* shares the same chaetotaxy with Th. II and Abd II and III as in the new species, but differing in the head and Abd IV chaetotaxy. Also the colour pattern is different in the two species.

Derivatio nominis: Named after our Russian colleague Natalia Kuznetsova.

***Entomobrya brinevi* n. sp.**

Type locality. Southern Russian Far East, Khabarovsk Krai, Lower reaches of the Bureya River.

Type material. Holotype on slide and five paratypes in ethyl alcohol, Sample 06 R, station Medvez'ye, taiga, in the canopy of *Larix*, 09.07.06, A. Brinev & A. Polyakov leg. M. Potapov collected together with *E. taigicola* n. sp. Deposited in MPGU.

Description.

Body length up to 2.2 mm excluding antennae. Body colour pattern as in figure 2B.

Head: Eight ocelli, GH smaller than EF. Antennae length 800 μ m, 2.42 times the length of the head. Relative length of antennal segments 1/2/2/2.27. Labral papillae smooth.

Body: Length ratio Abd IV/ III > 4. Claw with four internal teeth: first pair at 50% from the base of claw; 2 odd teeth, first at 75% from the base; the most distal one minute; dorsal tooth apparently absent. Empodium spike-like, with smooth external edge on leg III (Fig.

17D). Manubrium and dens length 820 µm. Manubrial plate with 3 chaetae and 2 pseudopores. Mucronal subapical tooth similar to the terminal one; mucronal spine present (Fig. 17E).

Chaetotaxy: Simplified formula: 3-1-0-3-2/4-4/1-3/0-1-1/0-1-2-2-2.

Head chaetotaxy as in figure 10A. Thorax chaetotaxy: T1 area on Th. II with four macrochaetae (m1, m2, m2i and an additional chaetae present); T2 area on Th. II with four macrochaetae (Fig. 10B). Abdomen chaetotaxy (Figs. 10C-D): A1 and A2 areas on Abd II with one and three macrochaetae, respectively. Abd III with one macrochaeta on areas A4 and A5.

Biology: Found in the canopy of *Larix*.

Discussion: *E. lhotsae* has the same chaetotaxy on Abd II and III as the new species, however they differ from each other in the macro-chaetotaxy of Th. II; 2-3 in *E. lhotsae*, 4-4 in *E. brinovi* n. sp..

Derivatio nominis: The specie is dedicated to Alexey Brinev, who collected the specimens in the mountains of the Russian Far East.

***Entomobrya primorica* n. sp.**

Type locality. Southern Russian Far East, Shkotovsky area, Anisimovka. Western part of Anisimovka ("Stroika").

Type material. Holotype on slide and paratype in ethyl alcohol, Sample R 8, between stones. Rails, 20.09.2004, M. Potapov leg., Potapov Coll. Deposited in MPGU.

Description.

Body length up to 1.8 mm excluding antennae. Body colour pattern as in figure 2C.

Head: Eight ocelli, GH smaller than EF. Antennae length 920 μm , 2.4 times the length of the head. Relative length of antennal segments 1/1.9/1.8/2.3. Labral papillae with a chaeta-like projection (Fig. 17F).

Body: Length ratio Abd IV/III > 4 (5.56). Claw with four internal teeth. Manubrium and dens length 870 μm . Manubrial plate with 7 chaetae and 2 pseudopores (Fig. 17H). Mucronal subapical tooth similar to the terminal one; mucronal spine present.

Chaetotaxy: Simplified formula: 3-1-0-3-2/4-5(+2m)/2-2/0-2-1/0-1₀3-1₀2-1₀3-2(+1m) (1₀ indicates there is an unpaired chaeta in addition to the paired ones).

Head chaetotaxy as in figure 11A. Thorax chaetotaxy: T1 area on Th. II with four macrochaetae (m_1 , m_2 , m_{2i} and m_{2i2} present); T2 area on Th. II with five macrochaetae (in addition to 2 additional chaetae that could be present) (Fig. 11B). Abdomen chaetotaxy (Figs. 11C-D): A1 and A2 areas on Abd II with 2 macrochaetae. Abd III with 2 macrochaetae on area A4 and one macrochaeta on area A5.

Biology: Found among stones.

Discussion. It is the only known Palearctic species with 2-2/0-2-1 macrochaetae on Abd II and III.

Derivatio nominis: Primorye is another name of southern part of the Russian Far East where the species was collected.

***Entomobrya kabardinica* n. sp.**

Type locality. Russia, N Caucasus, Krasnodarsky Krai, Kabardino-Balkaria (Prielbrusye), Adylsu Canyon, 2300 m asl., near MVTU station.

Type material. Holotype on slide and three paratypes in ethyl alcohol, Sample 49R, pine-wood, under loose bark, 25.09.1999, M. Potapov leg and coll. Deposited in MPGU.

Description.

Body length up to 1.4 mm excluding antennae. Body colour pattern as in figure 2D.

Head: Eight ocelli, GH smaller than EF. Antennae length 630 μm , almost 2 times the length of the head. Relative length of antennal segments 1/2/1.7/2.2. Labral papillae smooth.

Body: Length ratio Abd IV/III < 4. Claw with four internal teeth: first pair at 65% from the base of claw; 2 odd teeth, first at 85% from the base, the most distal one minute; dorsal tooth basal. Empodium spike-like, with smooth external edge on leg III (Fig. 17I). Manubrium and dens length 550 μm . Manubrial plate with 3 chaetae and 2 pseudopores (Fig. 17J). Mucronal subapical tooth similar to the terminal one; mucronal spine present (Fig. 17K).

Chaetotaxy: Simplified formula: 3-1-0-2-3/3-5/1-2/0-0-1/0-0-0-2-2.

Head chaetotaxy as in figure 12A. Thorax chaetotaxy: T1 area on Th. II with three macrochaetae (m_1 , m_{2i} and another chaeta present); T2 area on Th. II with five macrochaetae (Fig. 12B). Abdomen chaetotaxy (Figs. 12C-D): A1 and A2 areas on Abd II with one and 2 macrochaetae, respectively. Abd III showing only one macrochaeta on area A5.

Biology. Found in pine-wood, under loose bark.

Discussion: *Entomobrya kabardinica* n. sp. and *E. nigrina* Latzel, 1918 share the same macro chaetotaxy on Abd II and III (1-2/0-0-1) but they differ in the chaetotaxy of Th II, Abd IV and head.

Derivatio nominis. Name refers to the name of both the republic where the species was found and its inhabitants.

***Entomobrya taigicola* n. sp.**

Type locality. Russia, southern Russian Far East, Khabarovsk Krai, Lower reaches of Bureya River.

Type material. Holotype on slide and three paratypes in ethyl alcohol, Sample 06 R, station Medvezeye, taiga, from canopy of *Larix*, 09.07.06, A. Brinev & A. Polyakov leg. M. Potapov collected together with *E. brinevi* n. sp. Deposited in MPGU.

Description.

Body length up to 2.1 mm excluding antennae. Body colour pattern uniformly yellow, without pigment except the eye patches.

Head: Eight ocelli, GH smaller than EF. Antennae length 1300 μm , almost three times the length of the head. Relative length of antennal segments 1/1.75/1.5/2.25.

Body: Length ratio Abd IV/III > 4. Claw with 4 internal teeth: first pair at 55% from the base of claw; 2 odd teeth, first at 80% from the base, the most distal one minute. Empodium spike-like, with smooth external edge on leg III. Manubrium and dens length 1120 μm . Manubrial plate with 5 chaetae and 2 pseudopores. Mucronal subapical tooth similar to the terminal one; mucronal spine present (Fig. 17L).

Chaetotaxy: Simplified formula: 3-3-0-3-2/6-6/2-5/0-2-2/0-6-1-5-3.

Head chaetotaxy as in figure 13A. Thorax chaetotaxy: T1 and T2 areas on Th. II with six macrochaetae (Fig. 13B). Abdomen chaetotaxy (Figs. 13C-D): A1 and A2 areas on Abd II with 2 and five macrochaetae, respectively. Abd III with 2 macrochaetae on areas A4 and A5.

Biology: Found in taiga, in the canopy of *Larix*.

Discussion: For the differences between this species and *E. kuznetsovae*, refer to the discussion of this species.

Derivatio nominis: The name refers to the biotope (taiga) where the species was collected.

Genus *Entomobryoides* Maynard, 1951

***Entomobryoides sotoadamesi* n. sp.**

Type locality. Russia, southern Russian Far East, Shkotovsky area, Anisimovka. western part of Anisimovka ("Stroika").

Type material. Holotype and 2 paratypes on slide; three paratypes in ethyl alcohol, sample R 8, between stones, 20.09.2004, M. Potapov leg., Potapov Coll. Deposited in MPGU.

Other material. Russia, three specimens from southern Russian Far East, Partizansky area, not far from Ekaterinovka. Przhevalskogo Range, near entrance of Geographicheskogo Obschestva Cave (sample R 24). 25.09.2004, leg. M.Potapov.

Description.

Body length up to 2.7 mm excluding antennae. Body colour pattern on Fig. 3A.

Head: Eight ocelli, GH similar in size to EF. Antennae length 1400 μ m, up to 2.6 times the length of the head, antennal III sensory organ rod-like; external labial papilla with the external spine-like chaeta about twice as thick at its base as the base of the normal chaeta on the same papilla; spine-like chaeta up to half the length of normal chaeta (Fig. 17M); Ant IV without apical vesicle (Fig. 17N). Relative length of antennal segments 1/2.11/2.11/2.17. Labral papillae very small, with a minute terminal projection (Fig. 17O).

Body: Length ratio Abd IV/III > 4 (between 4.9 to 6.6). Some inner tibiotarsal chaetae much more finely ciliated (nearly smooth) than others species within this genus. Claw with 4 internal teeth: first pair at 55% from the base of claw; 2 odd teeth, first at 80% from the base; the most distal one minute; dorsal tooth not basal (Fig. 17P). Empodium spike-like, with serrate external edge on leg III. Manubrium and dens length between 1280 to 1360 μ m. Manubrial plate with 11 chaetae and 2 pseudopores (Fig. 17Q). Dens conical, with crenulation on the distal half. Mucronal subapical tooth slightly larger than the terminal one; mucronal basal spine present (Fig. 17R).

Chaetotaxy: Simplified formula: 4-1-0-2-1/4-6/2-5/0-3-0/0-2-0-2-3.

Head chaetotaxy as in figure 14A. Thorax chaetotaxy: T1 area on Th. II with four macrochaetae (m_1 , m_2 , m_{2i} and m_{2i2} present); T2 area on Th. II with six macrochaetae (Fig. 14B). Abdomen chaetotaxy (Figs. 14C-D): A1 and A2 areas on Abd II with 2 and five macrochaetae respectively. Abd III has only three macrochaetae on area A4.

Biology: Unknown.

Discussion: The colour pattern of the new species is quite different from that of other known species of *Entomobryoides*. *E. sotoadamesis* n. sp. shares the same chaetotaxy as Abd II (2-5 macrochaetae on areas A1 and A2) as *E. puakea* Christiansen & Bellinger, 1992 and *E. melena* Christiansen & Bellinger, 1992, both from Hawaii. However, it differs from both in the chaetotaxy of Abd III, which is 0-2-1 in the Hawaiian species and 0-3-0 in the new species. Other differences are found in the colour pattern, and the head and Abd IV chaetotaxy.

Derivatio nominis: The species is dedicated to Felipe Soto-Adames, the American specialist in Entomobryoidea.

Genus *Prodrepanura* Stach, 1963

***Prodrepanura altaica* n. sp.**

Type locality. Russia, S-E Altai, Bol'shoi Kuraiskii Mt. Range, ca. 7 km of vil, Kurai, 3100 m asl., polygonal tundra.

Type material. Holotype and five paratypes on the same slide (labelled 3021), 27.07.1964. Ten paratypes on another slide, 7.08.1964. Leg. Stebaeva, Stebaeva Coll. Deposited in RAS.

Description.

Body length up to 1.8 mm (between 1.6 to 1.9 mm, $n = 7$ specimens) (Fig. 3B) excluding antennae. Body colour: ground colour yellowish without any additional pigmentation.

Head: Eight ocelli, GH similar in size to EF (Fig. 17S). Antennae length 670 μm , less than twice the length of the head. Relative length of antennal segments 1/1.93/1.63/2.39.

Body: Length ratio Abd IV/ III < 4 (2.38 to 3.80; n = 7). Claw with three internal teeth: first pair at 55% from the base of claw; unpaired tooth at 66% from the base. Empodium spike-like, with serrate external edge on leg III (Fig. 17T). Manubrium and dens length 620 μm (550 to 770 μm ; n = 6). Manubrial plate with 6 chaetae and 2 pseudopores. Mucro with a single tooth and without mucronal spine.

Chaetotaxy: Simplified formula: 3-1-0-3-2/3-5/2-4(5)/0-2-1/0-3-1-1-2.

Head chaetotaxy as in figure 15A. Thorax chaetotaxy: T1 and T2 areas on Th. II with three and five macrochaetae, respectively (Fig. 15B). Abdomen chaetotaxy (Figs. 15C-D): A1 and A2 areas on Abd II with 2 and four (sometimes five) macrochaetae, respectively. Abd III with 2 macrochaetae on area A4 and one on area A5. Aspect of a macrochaetae as in figure 17U.

Biology: Found in polygonal tundra.

Discussion: The new species is the only one within the genus *Prodrepanura* with 2-4(5)/0-2-1 macrochaetae on areas A1-A5 of Abd II and III.

Derivatio nominis: The name refers to the mountains where the new species was collected.

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Accepted 25 January 2011

Figure captions

Fig. 1. - Colour pattern of some *Entomobrya* species described in this paper: **A**, *E. armeniensis* n. sp.; **B**, *E. karasukensis* n. sp.; **C**, *E. tuvinica* n. sp.; **D**, *E. stebaevae* n. sp.

Fig. 2. - Colour pattern (cont.): **A**, *E. kuznetsovae* n. sp.; **B**, *E. brinevi* n. sp.; **C**, *E. primorica* n. sp.; **D**, *E. kabardinica* n. sp.

Fig. 3. - Colour pattern (cont.): **A**, *Entomobryoides sotoadamesi* n. sp.; **B**, *Prodrepanura altaica* n. sp.

Fig. 4. - *E. armeniensis* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 5. - *E. karasukensis* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 6. - *E. tuvinica* n. sp. macrochaetotaxy (Holotype, specimen from MNCN). **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 7. - *E. pseudolanuginosa* n. sp. macrochaetotaxy (specimen from Arbea Coll.). **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 8. - *E. stebaevae* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 9. - *E. kuznetsovae* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 10. - *E. brinevi* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 11. - *E. primorica* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 12. - *E. kabardinica* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 13. - *E. taigicola* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 14. - *Entomobryoides sotoadamesi* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 15. - *Prodrepanura altaica* n. sp. macrochaetotaxy. **A**, head; **B**, Th II; **C**, Abd II-III; **D**, Abd IV.

Fig. 16. - *Entomobrya armeniensis* n. sp. **A**, labral papillae; **B-C**, claw, and detail of claw in dorsal view; **D**, mucro and tip of dentes.

E. karasukensis n. sp. **E**, labral papillae; **F**, mucro and tip of dentes; **G**, microchaetae of Abd V.

E. tuvunica n. sp. **H**, labral papillae; **I**, claw (the arrow points, probably, the postero-external lamella).

E. pseudolanuginosa n. sp. **J**, labral papillae; **K**, claw; **L**, male genital plate.

E. stebaevae n. sp. **M**, ocelli; **N**, claw; **O**, mucro and tip of dentes.

Fig. 17. - *E. kuznetsovae* n. sp. **A**, labral papillae; **B**, claw; **C**, manubrial plate.

E. brinevi n. sp. **D**, claw; **E**, mucro and tip of dentes.

E. primorica n. sp. **F**, labral papillae; **G**, mucro and tip of dentes; **H**, manubrial plate.

E. kabardinica n. sp. **I**, claw; **J**, manubrial plate; **K**, mucro and tip of dentes.

E. taigicola n. sp. **L**, mucro and tip of dentes.

Entomobryoides sotoadamesi n. sp. **M**, external labial papilla with the external spine-like differentiated chaeta; **N**, antennal tip; **O**, labral papillae; **P**, claw; **Q**, manubrial plate; **R**, mucro and tip of dentes.

Prodrepanura altaica n. sp. **S**, ocelli; **T**, claw; **U**, macrochaetae.

TABLE 1. Measurements of the studied specimens, in micrometers. "-": no data.

	<i>E. armeniensis</i> n. sp.	<i>E. karasukensis</i> n. sp.	<i>E. tuvina</i> n. sp.	<i>E. pseudolanuginosa</i> n. sp.*	<i>E. stebaevae</i> n. sp.	<i>E. kuznetsovae</i> n. sp.	<i>E. brinevi</i> n. sp.	<i>E. primorica</i> n. sp.	<i>E. kabardinica</i> n. sp.	<i>E. taigicola</i> n. sp.
Ant I	220	80	130	138	70	140	150	130	90	200
Ant II	400	150	220	274	110	210	300	250	180	350
Ant III	350	130	240	198	140	200	-	240	160	300
Ant IV	450	240	280	285	160	350	-	300	200	450
Antenna	1420	600	870	863	480	900	-	920	630	1300
Head	410	250	370	398	240	320	430	380	320	440
Antenna/head ratio	3.46	2.40	2.35	2.37	2.00	2.81	-	2.42	1.97	2.95
Th II	260	160	200	241	120	200	300	250	190	300
Th III	100	110	100	155	90	120	200	200	90	150
Abd I	80	90	110	110	70	100	150	120	80	100
Abd II	100	110	150	138	90	150	200	80	110	120
Abd III	80	110	100	143	90	150	140	90	110	140
Abd IV	690	340	500	522	290	500	590	500	350	630
Abd IV/III ratio	8.63	3.09	5.00	3.70	3.22	3.33	4.21	5.56	3.18	4.50
Abd V	90	90	80	154	60	100	130	100	100	150
Abd VI	80	70	80	99	40	80	100	70	70	80
Body	1890	1330	1690	1960	1090	1720	2240	1790	1420	2110
Manubrium	450	280	350	381	240	320	350	400	220	520
Dens	620	270	400	450	200	360	470	470	330	600
Claw	40	27	42	45	30	34	-	-	30	36
Empodium	24	14	24	29	19	24	-	-	20	26
Tenent hair	42	32	26	55	36	46	-	-	40	50

*(Mean of 10 specimens, except for antennae: 3 specimens)

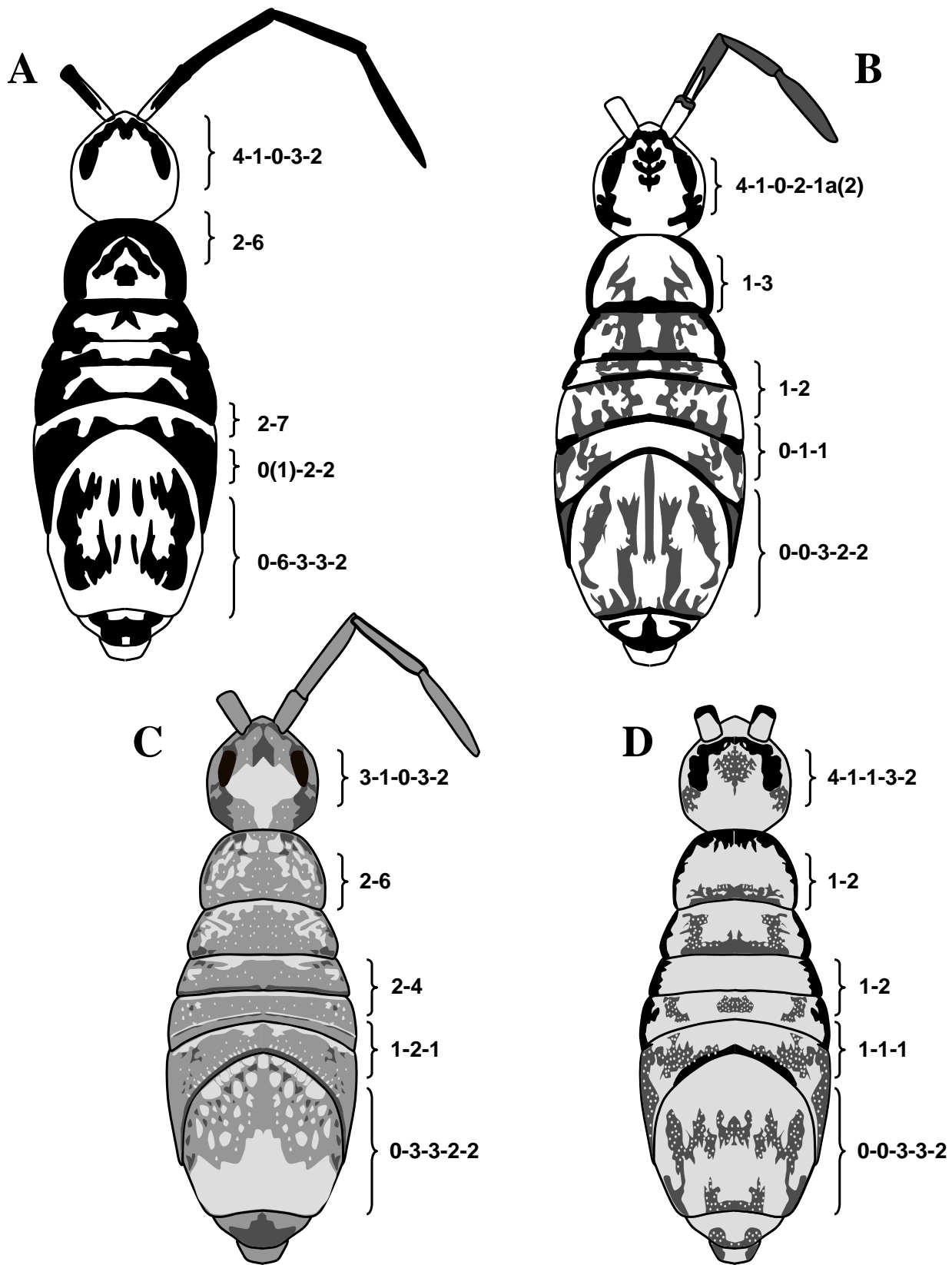


Fig. 1. - Colour pattern of some *Entomobrya* species described in this paper: A, *E. armeniensis* n. sp.; B, *E. karasukensis* n. sp.; C, *E. tuvinica* n. sp.; D, *E. stebaevae* n. sp.

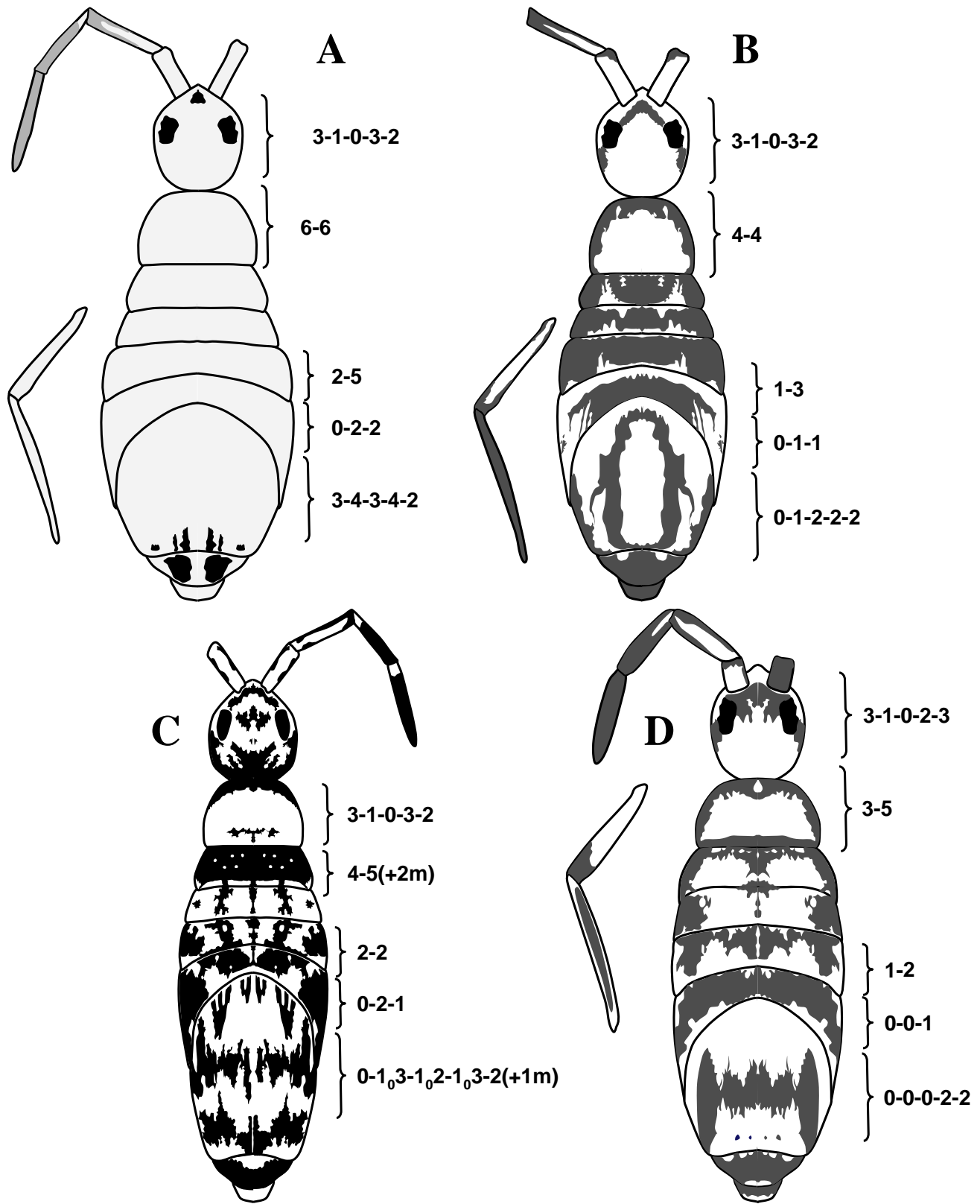


Fig. 2. - Colour pattern (cont.): A, *E. kuznetsovae* n. sp.; B, *E. brinevi* n. sp.; C, *E. primorica* n. sp.; D, *E. kabardinica* n. sp.

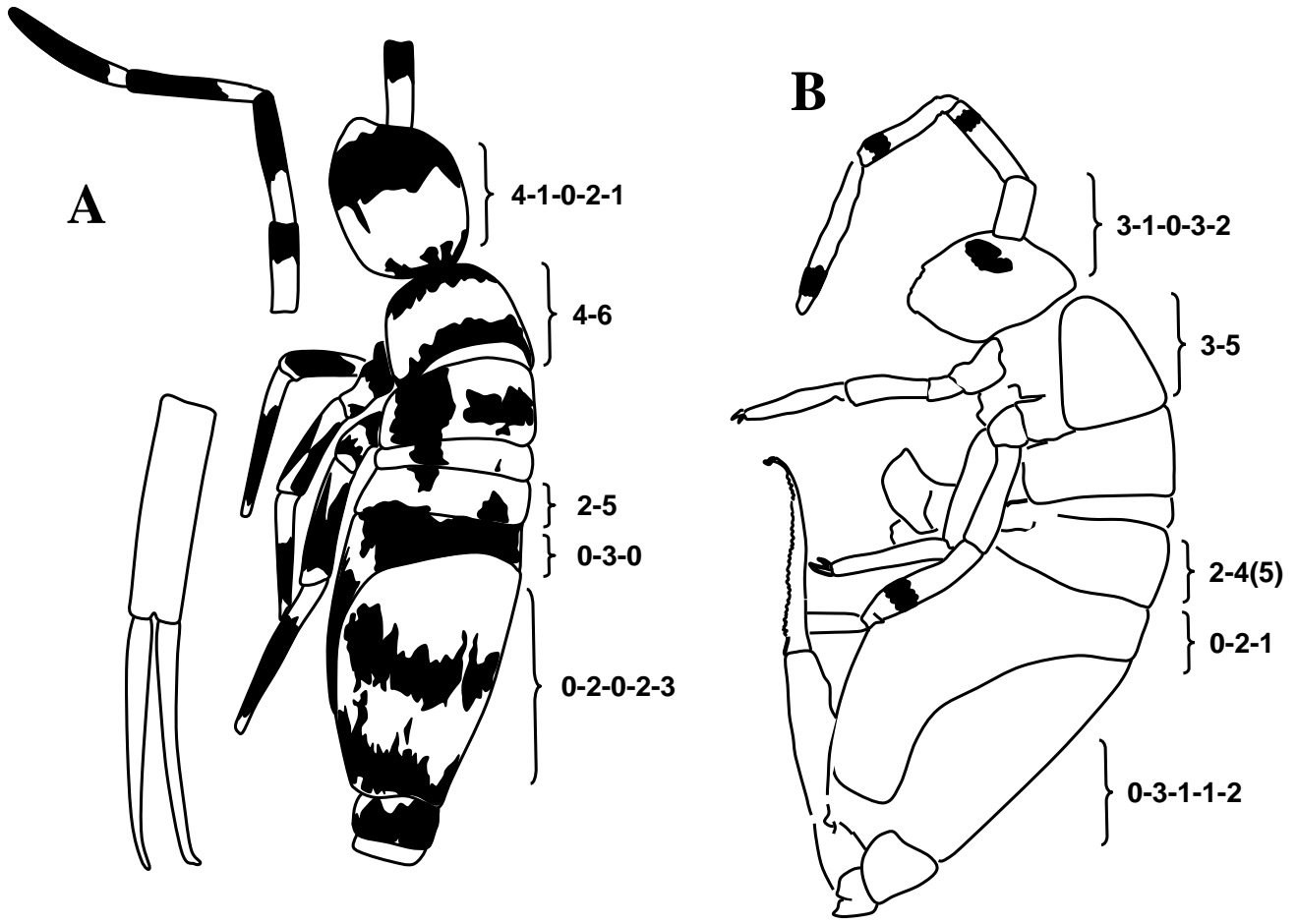


Fig. 3. - Colour pattern (cont.): A, *Entomobryoides sotoadamesi* n. sp.; B, *Prodrepanura altaica* n. sp.

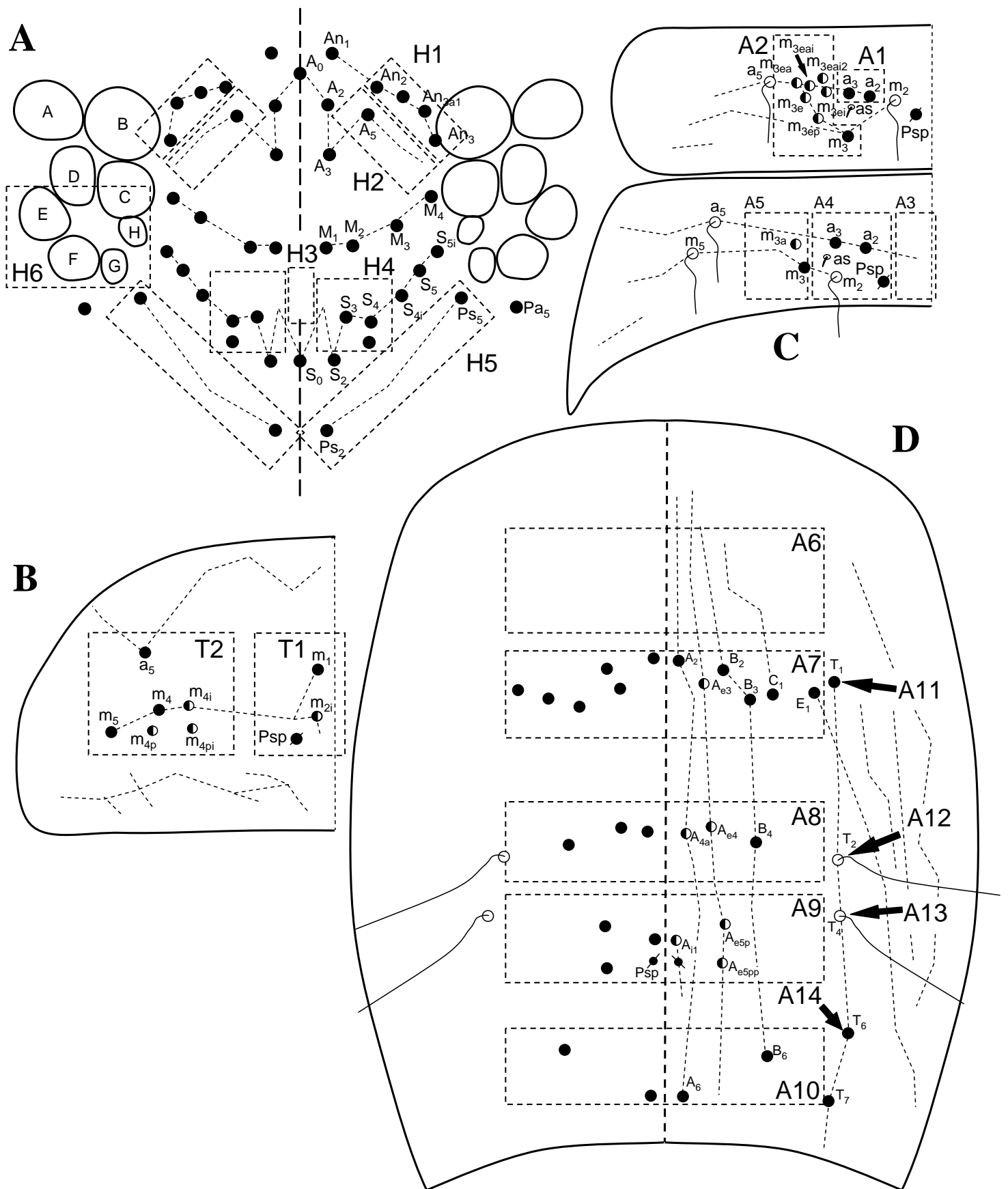


Fig. 4. - *E. armeniensis* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

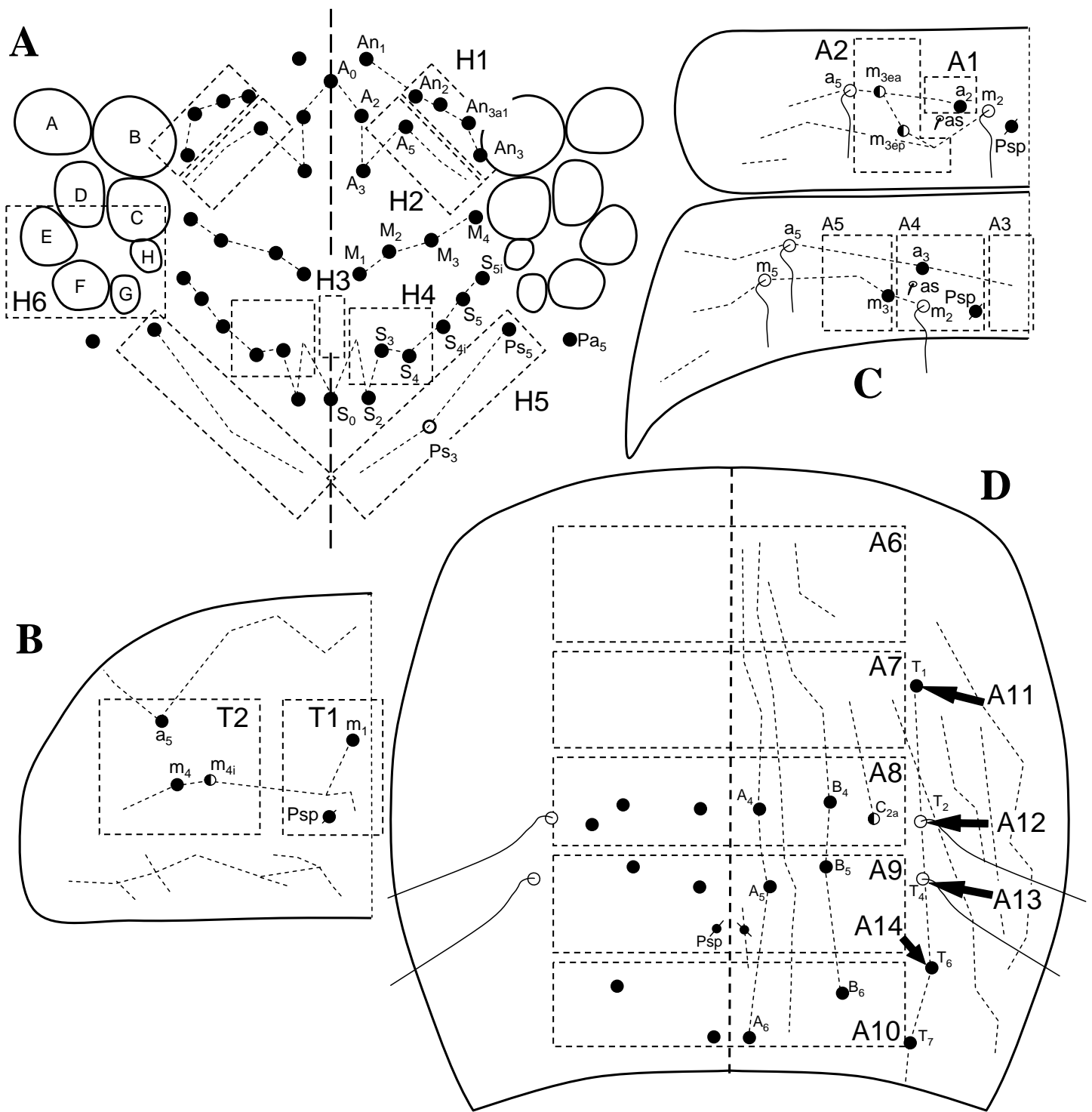


Fig. 5. - *E. karasukensis* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

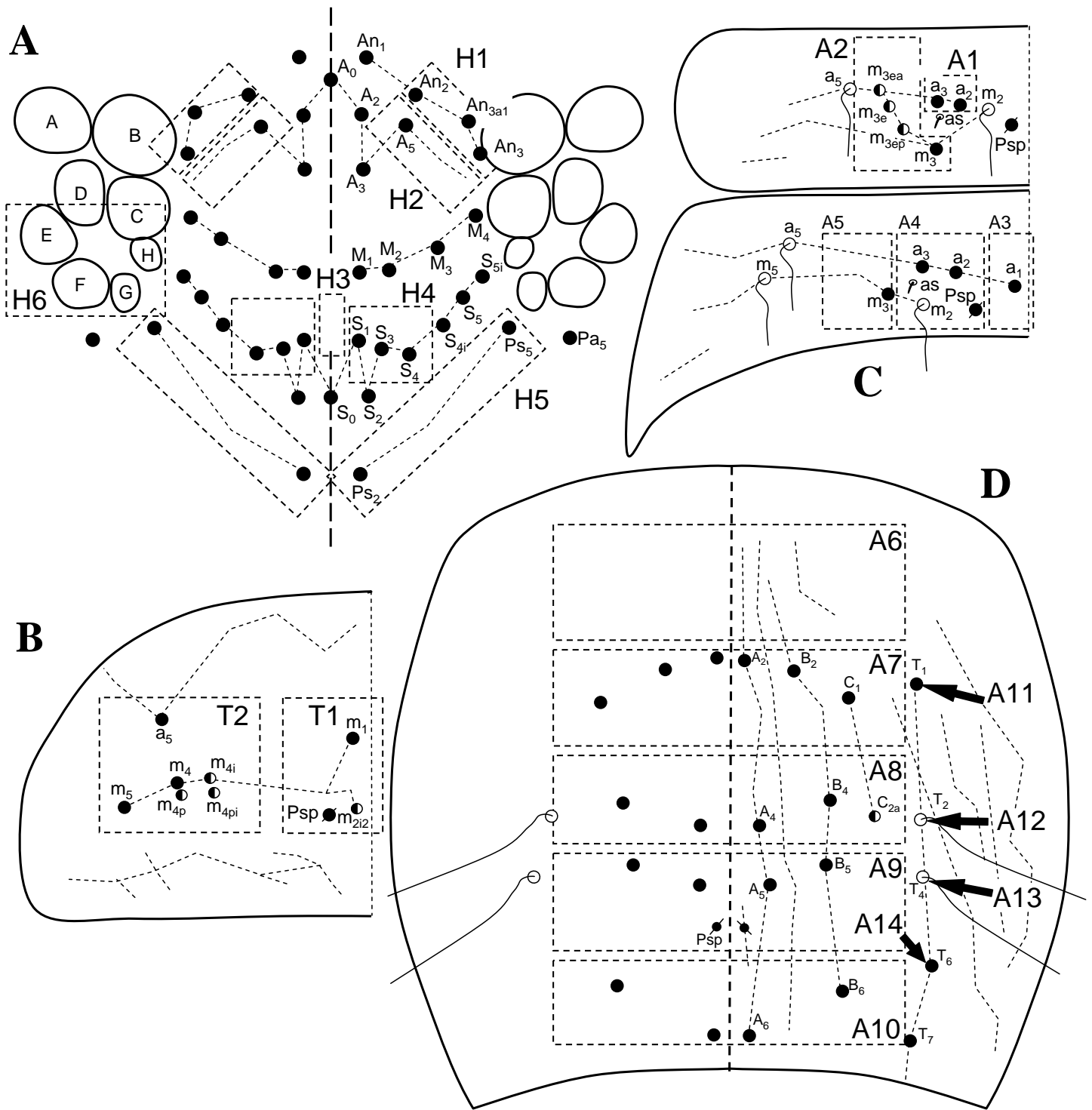


Fig. 6. - *E. tuvinica* n. sp. macrochaetotaxy (Holotype, specimen from MNCN). A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

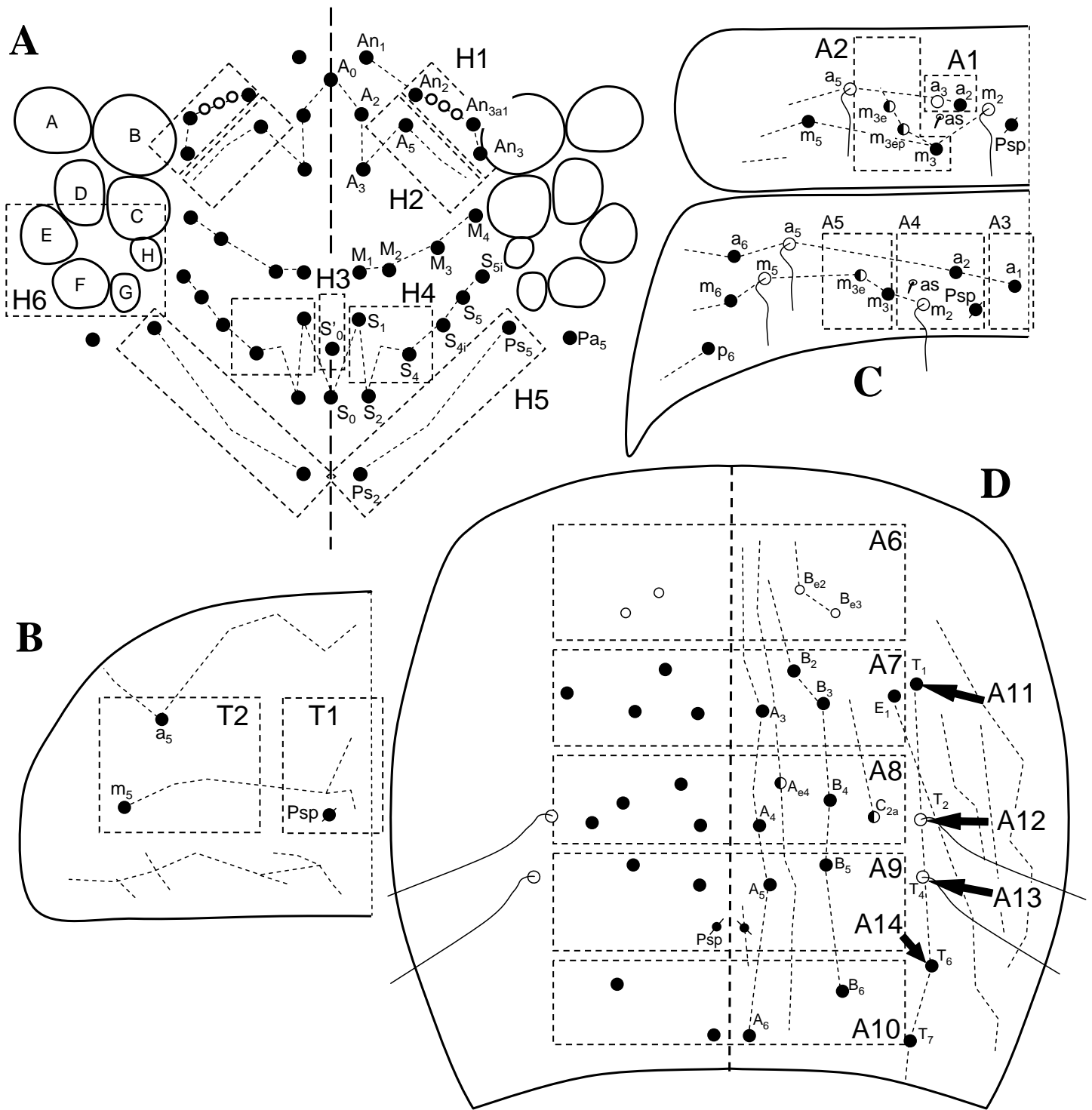


Fig. 7. - *E. pseudolanuginosa* n. sp. macrochaetotaxy (specimen from Arbea Coll.).
 A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

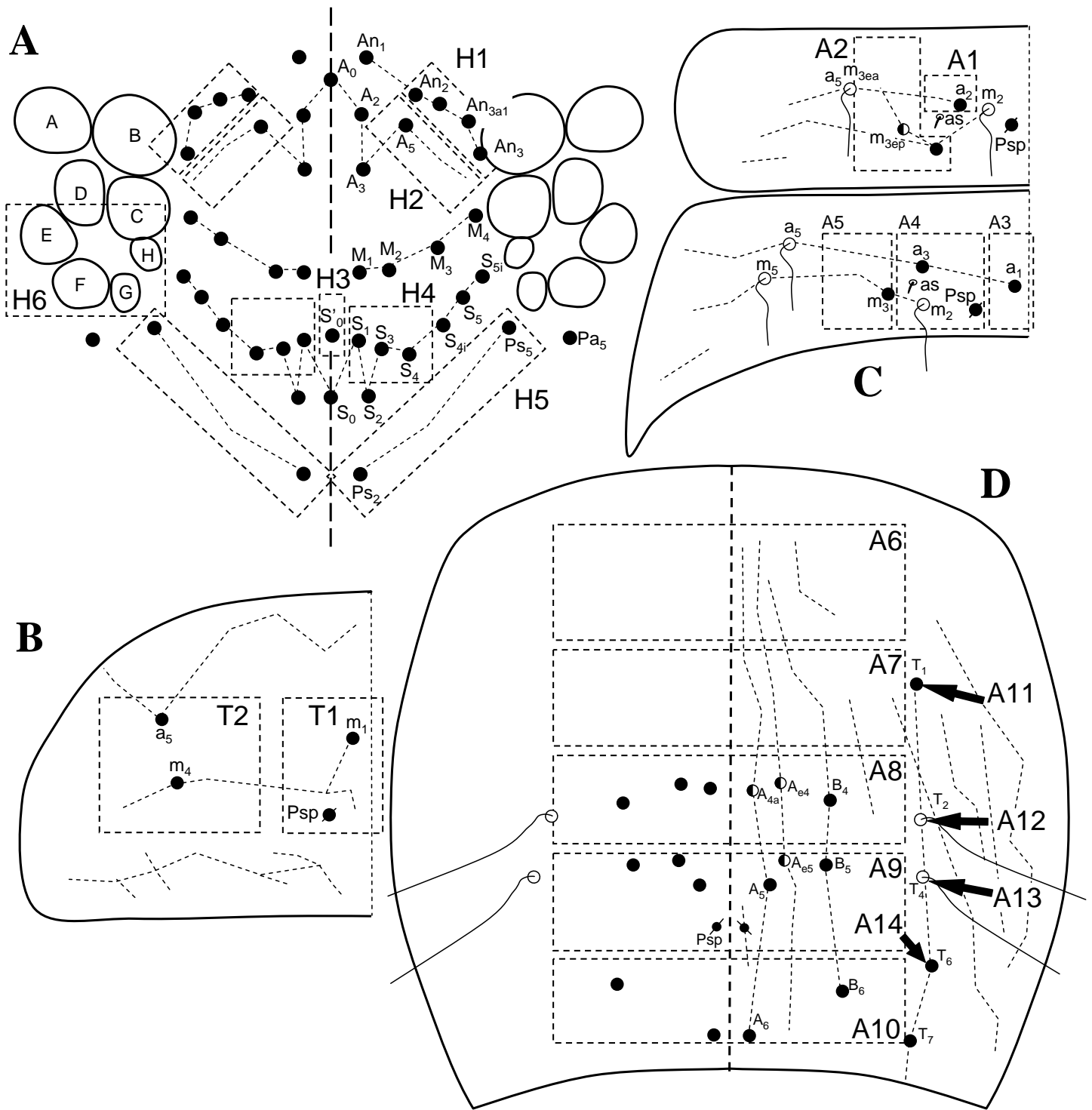


Fig. 8. - *E. stebaevae* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

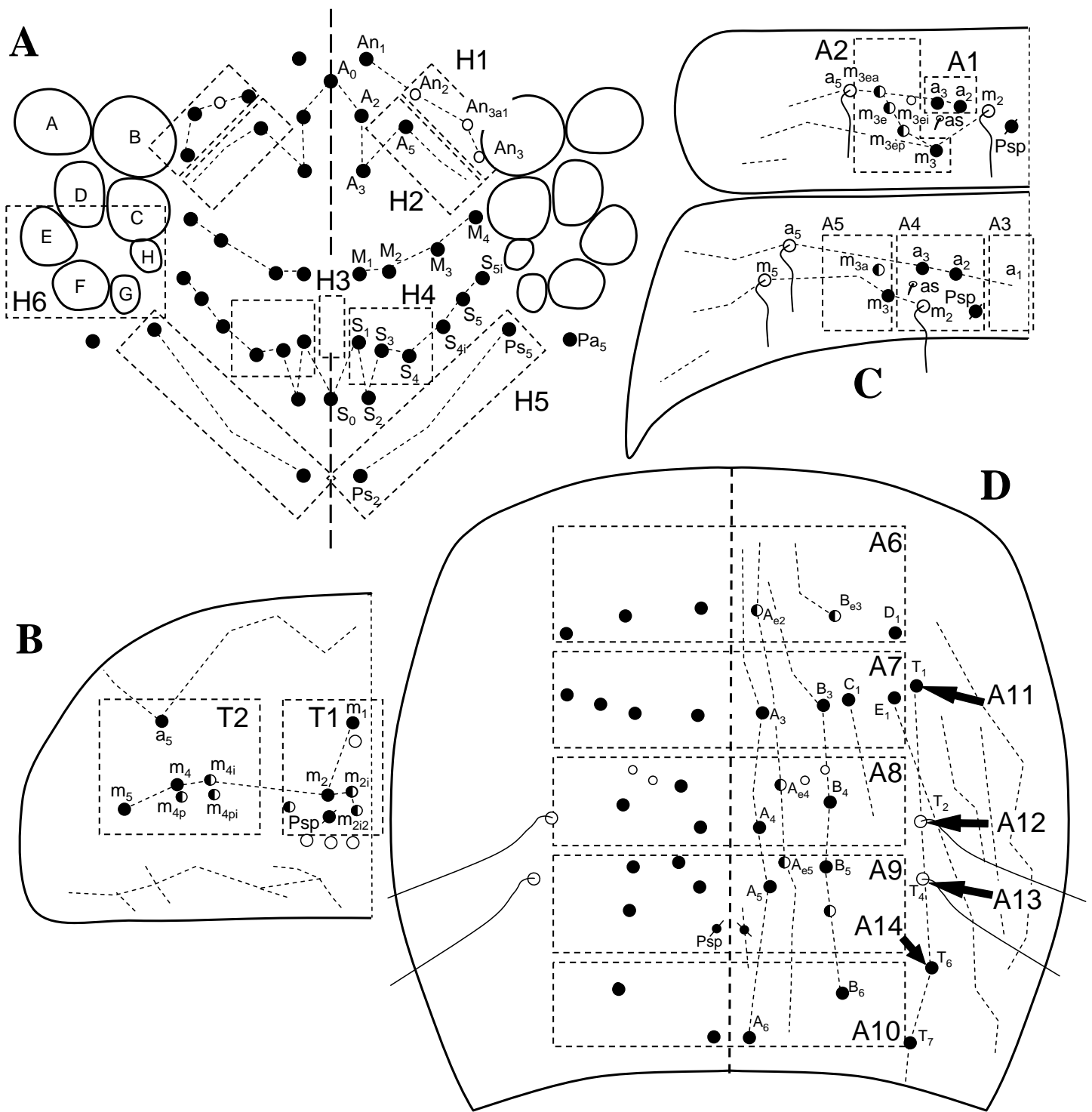


Fig. 9. - *E. kuznetsovae* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

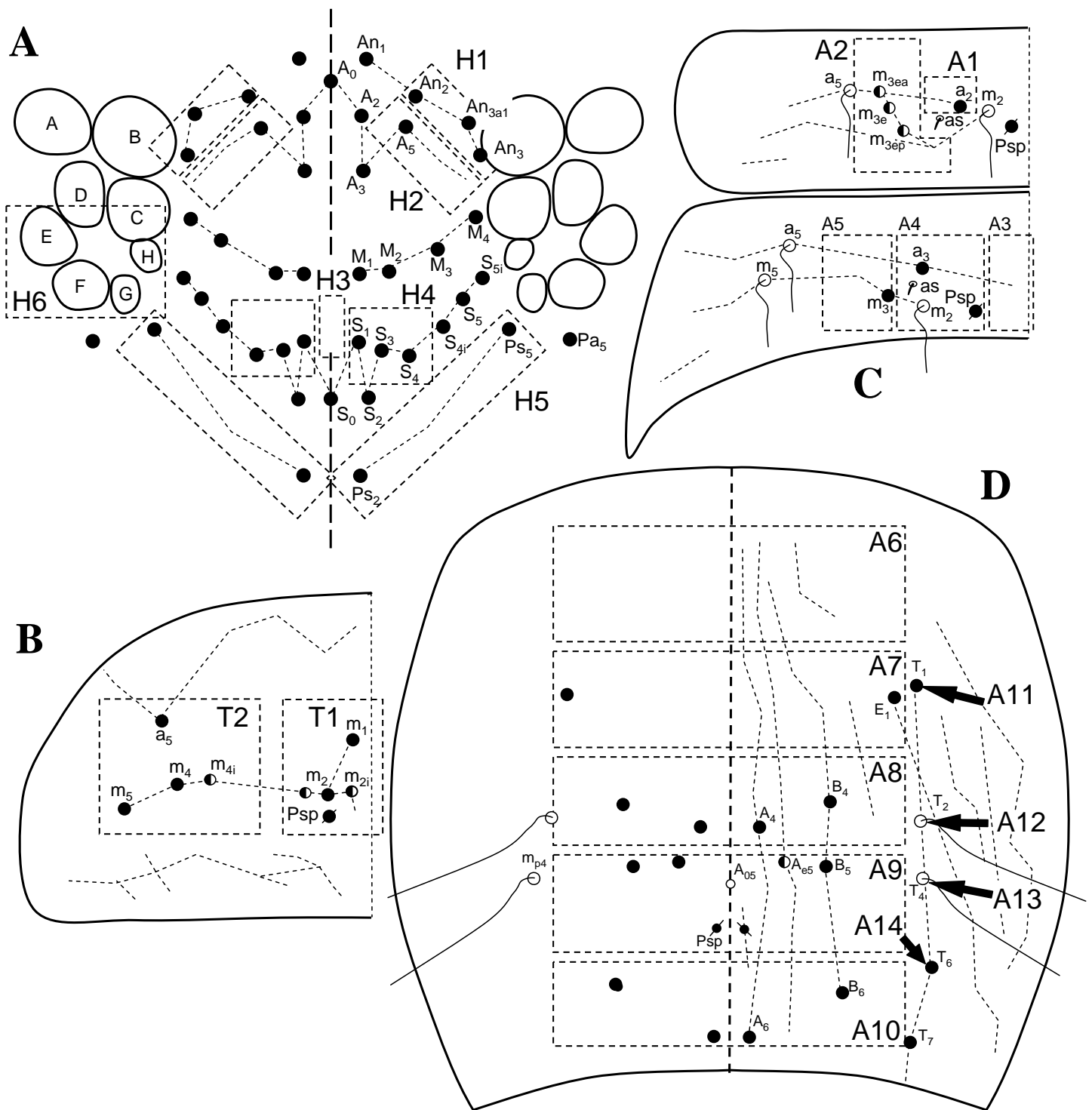


Fig. 10. - *E. brinevi* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

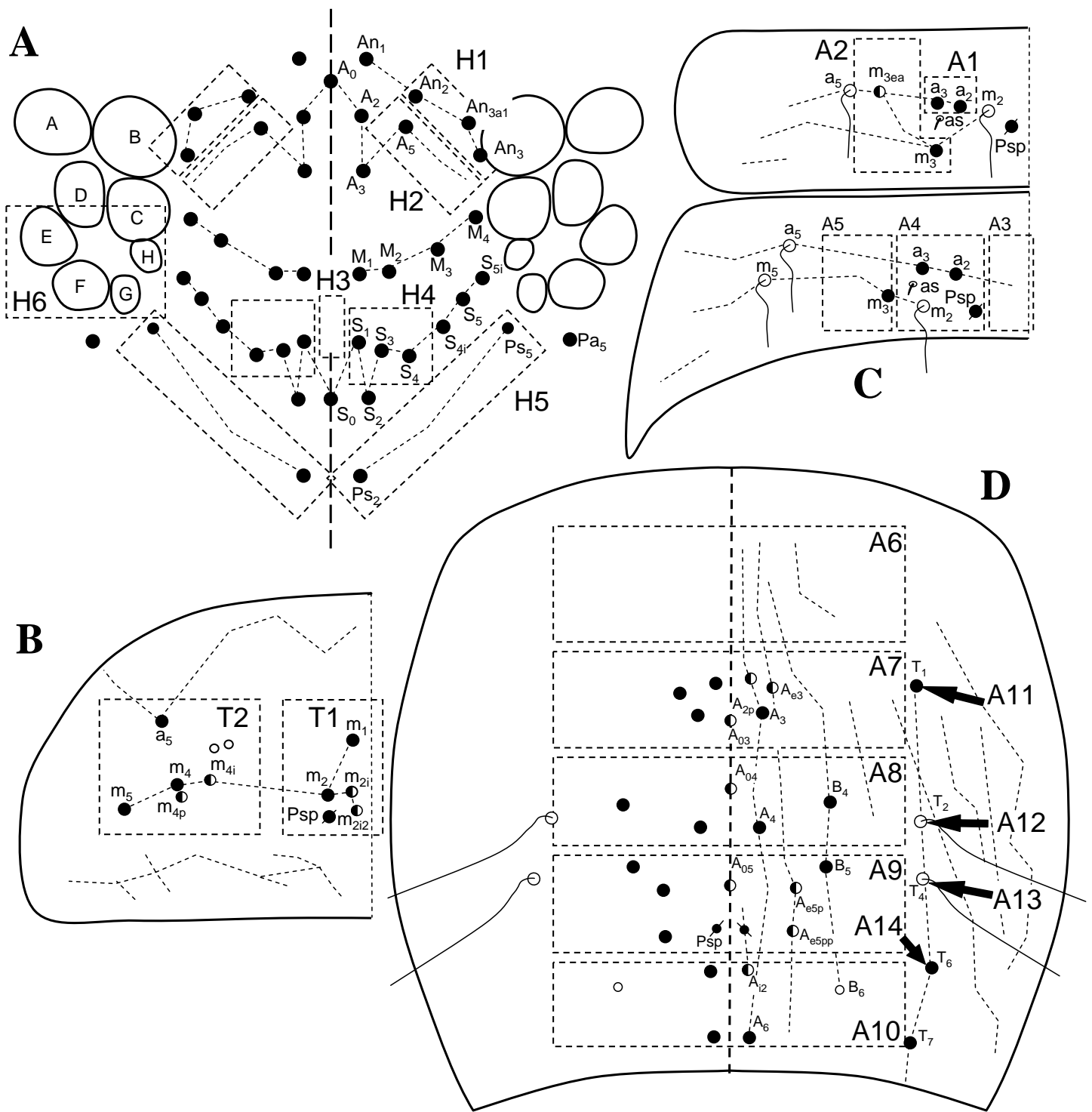


Fig. 11. - *E. primorica* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

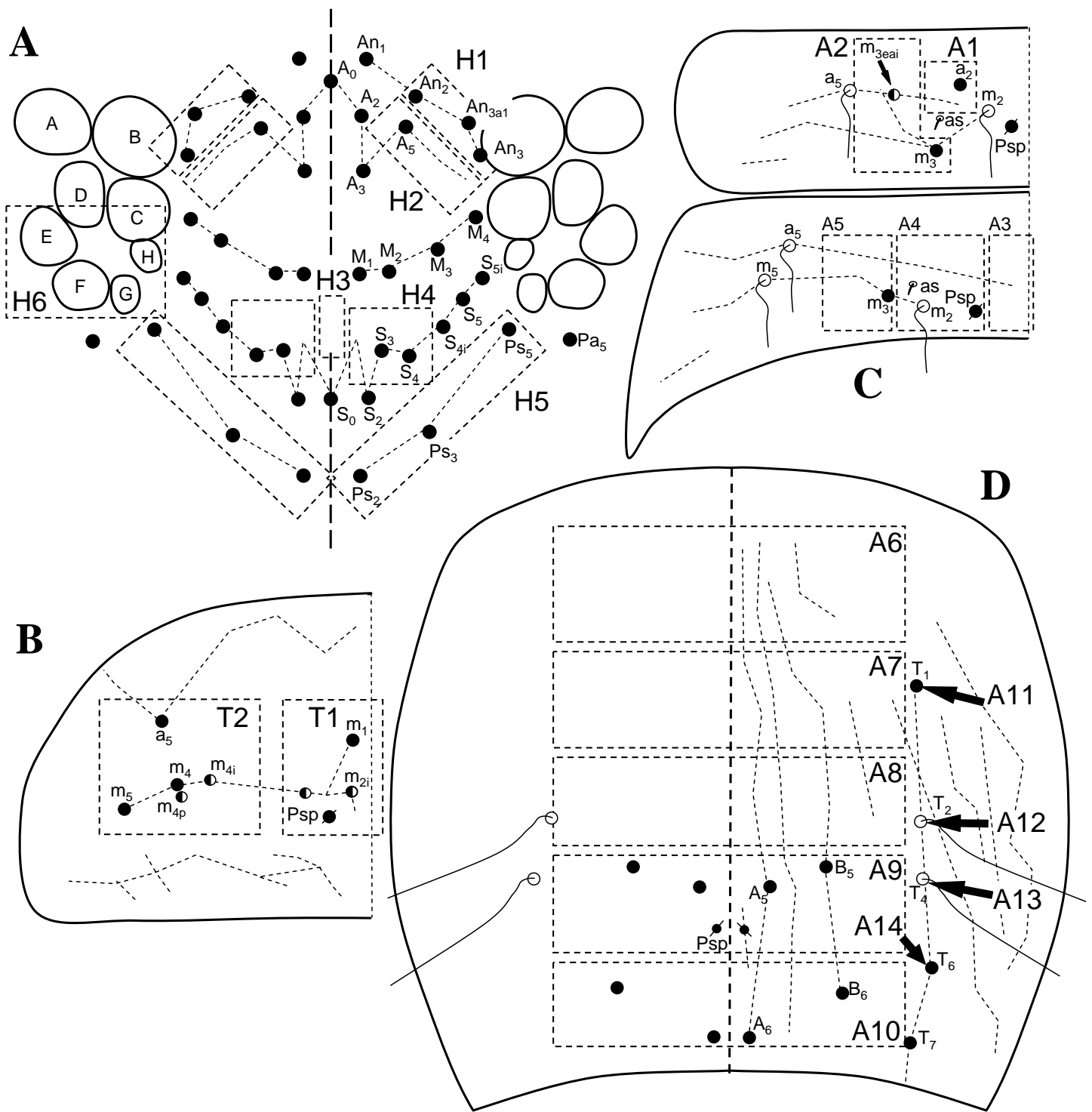


Fig. 12. - *E. kabardinica* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

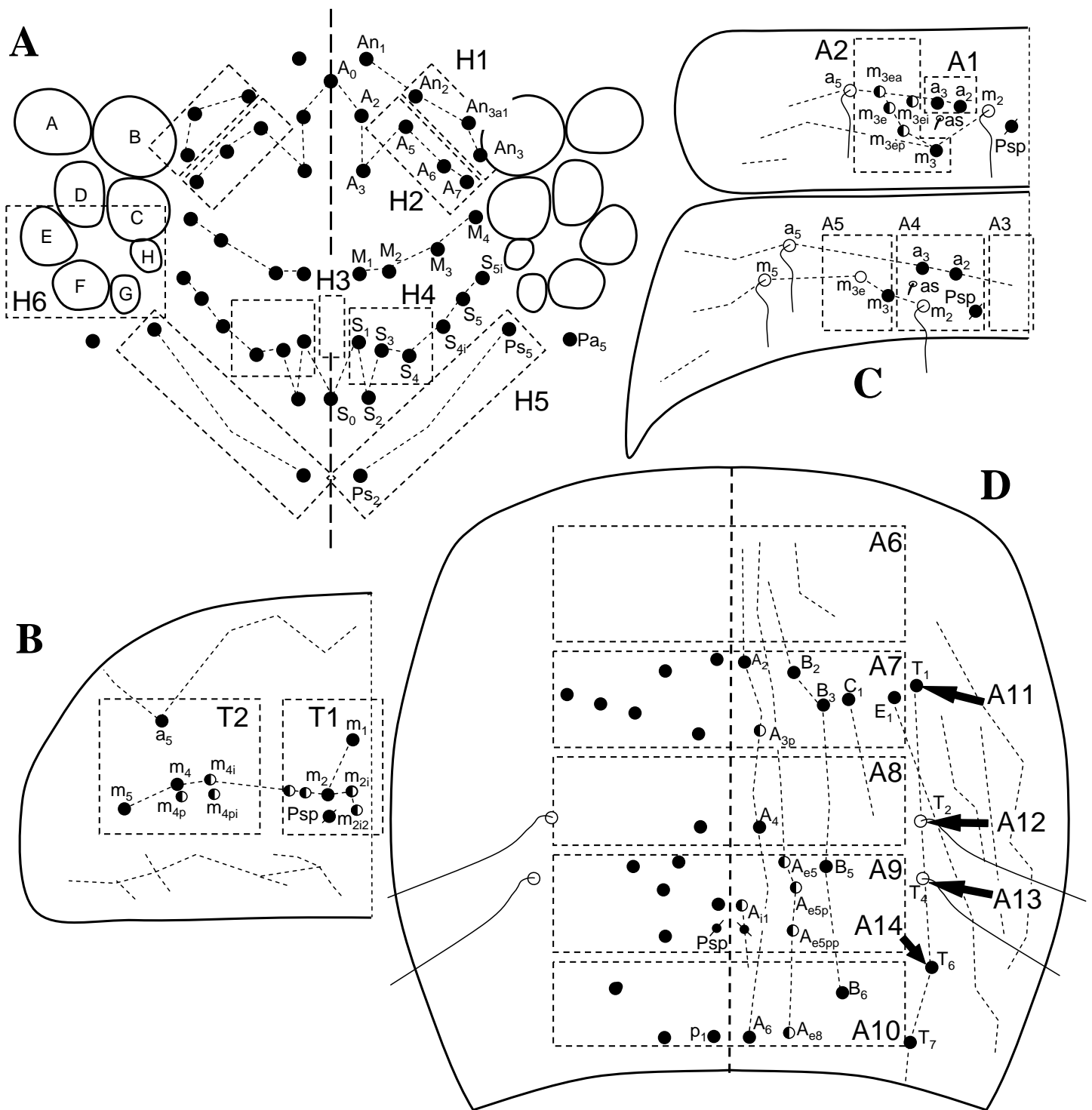


Fig. 13. - *E. taigicola* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

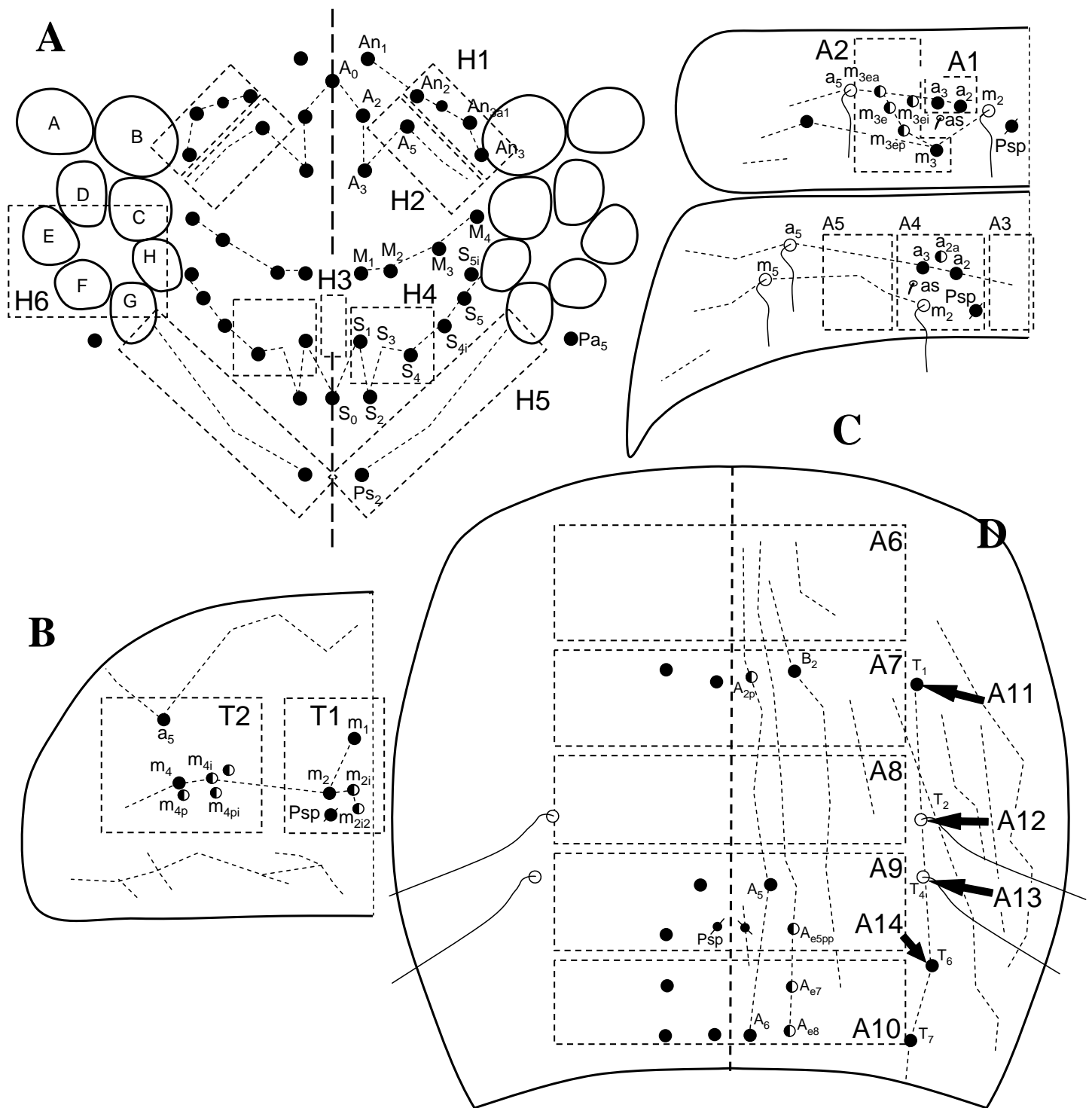


Fig. 14. - *Entomobryoides sotoadamesi* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

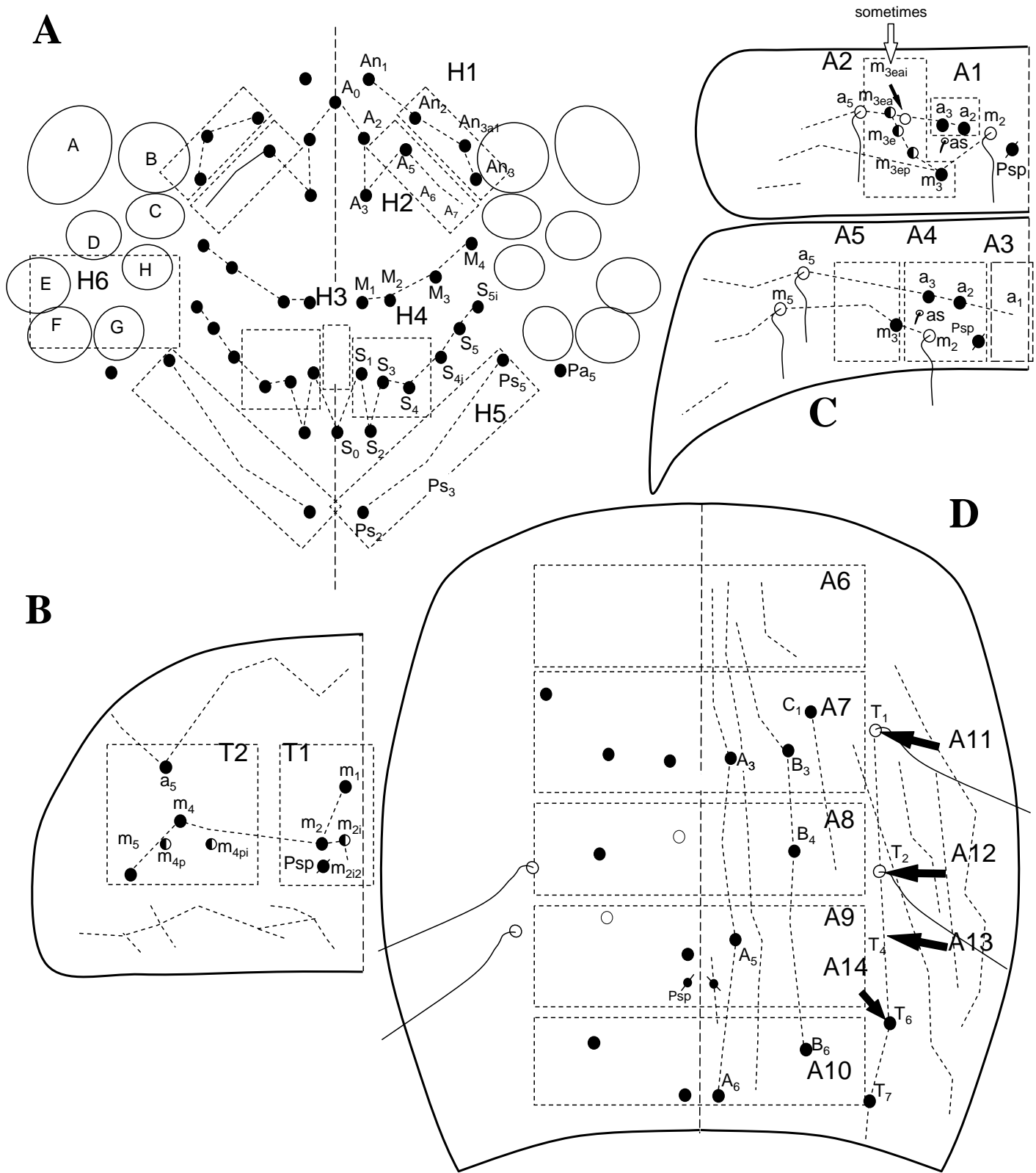


Fig. 15. - *Prodrepanura altaica* n. sp. macrochaetotaxy. A, head; B, thoracic tergite II; C, abdominal tergites II-III; D, abdominal tergite IV.

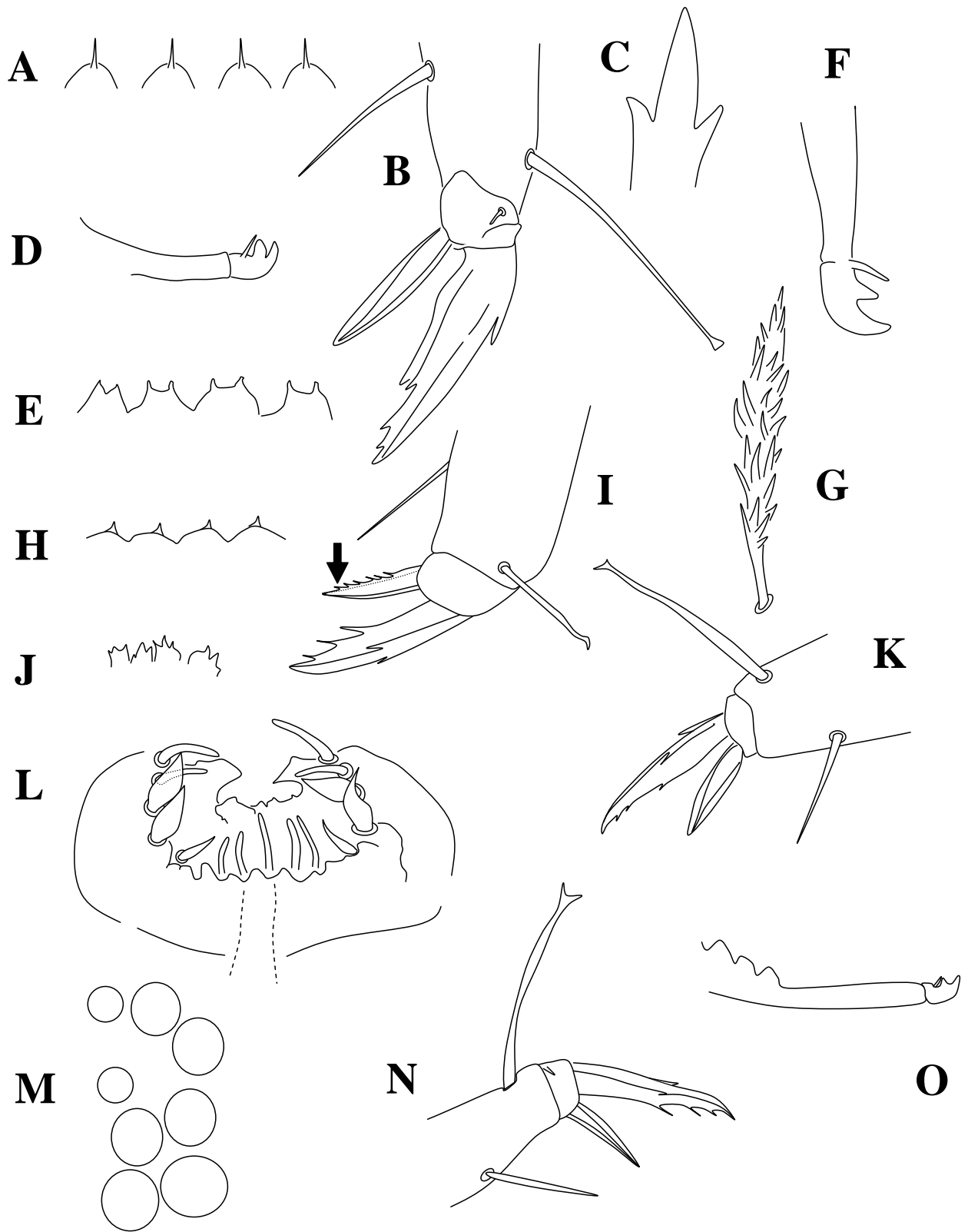


Fig. 16. A-D, *Entomobrya armeniensis* n. sp. A, labral papillae; B-C, claw, and detail of claw in dorsal view; D, mucro and tip of dentes.
 E-G, *E. karasukensis* n. sp. E, labral papillae; F, mucro and tip of dentes; G, microchaetae of abdominal segment V.
 H-I, *E. tuvinica* n. sp. H, labral papillae; I, claw (the arrow points, probably, the postero-external lamelle).
 J-L, *E. pseudolanuginosa* n. sp. J, labral papillae; K, claw; L, male genital plate.
 M-O, *E. stebaevae* n. sp. M, eyes; N, claw; O, mucro and tip of dentes.

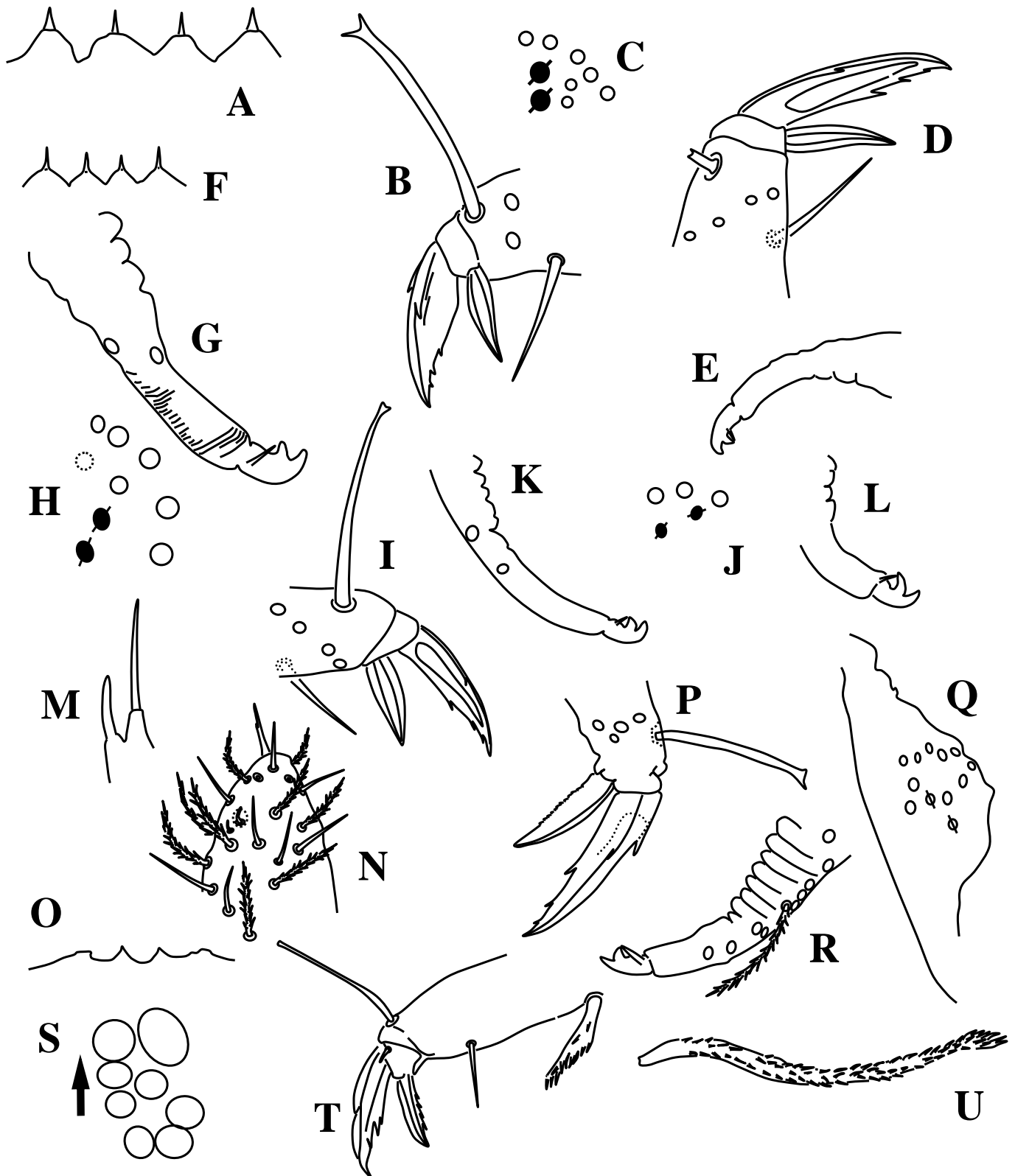


Fig. 17. A-C, *E. kuznetsovae* n. sp. A, labral papillae; B, claw; C, manubrial plate.

D-E, *-E. brinevi* n. sp. D, claw; E, mucro and tip of dentes.

F-H, *E. primorica* n. sp. F, labral papillae; G, mucro and tip of dentes; H, manubrial plate.

I- K, *E. kabardinica* n. sp. I, claw; J, manubrial plate; K, mucro and tip of dentes.

E. taigicola n. sp. L, mucro and tip of dentes.

M-R, *Entomobryoides sotoadamesi* n. sp. M, external labial papilla with the external spine-like

differentiated seta; N, antennal tip; O, labral papillae; P, claw; Q, manubrial plate; R, mucro and tip of dentes.

S-U, *Prodrepanura altaica* n. sp. S, eyes; T, claw; U, macrosetae.