

Title: **New species of *Entomobrya* from Germany (Collembola, Entomobryini)**

Short title: New German *Entomobrya*

Authors: **Rafael Jordana**¹, **Hans-Jürgen Schulz**² & **Enrique Baquero**¹

¹ *Department of Zoology and Ecology, University of Navarra, Irunlarrea 1, 31008 Pamplona, Navarra, Spain.*

² *Senckenberg Museum of Natural History Görlitz. PF 300154. D-02806 Görlitz, Germany.*

Corresponding author: Rafael Jordana (rjordana@unav.es)

Abstract

The systematic study of specimens of *Entomobrya* from various European museums, private collections and other samplings, allows us to describe several species new of the genus. Specimens from Germany, deposited at the Senckenberg Museum of Natural History Görlitz (SMNG), identified as new species as result of this study, are described: *Entomobrya dungeri* n. sp., *Entomobrya germanica* n. sp., *Entomobrya saxoniensis* n. sp., *Entomobrya schulzi* Jordana & Baquero n. sp. and *Entomobrya dorsolineata* n. sp.

Key words: morphological characters, chaetotaxy.

1. Introduction

During the revision of the genus *Entomobrya* from a loan of Senckenberg Museum für Naturkunde Görlitz (Germany), in view of the publication of the Entomobryini volume of «Synopses on Palaearctic Collembola», new species of *Entomobrya* 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).

Measurements of the specimens studied (Table 1) and a comparative set of character differences among the specimens of various *Entomobrya* species described in this paper (Table 2) are provided.

Abbreviations: Abd = abdominal segment, Ant = antennal segment, m = mesochaeta, Mc = macrochaeta, psp = pseudopore, SMNG = Senckenberg Museum für Naturkunde Görlitz, Th = thoracic segment.

2. Material and Methods

The specimens were mounted in Hoyer medium, sometimes 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.

3. Results

Entomobrya dungeri n. sp. (Figs 1A, 2A–D, 7A–D, Tabs 1–2)

Type locality. Germany, Hiddensee Island (Baltic Sea, northeast Germany).

Type material. Holotype on slide, labelled as “Nat. Mus. Görlitz Hiddensee Island (Baltic Sea, Northeast Germany), Berlese samples (moss layer) 5/2000 leg. Schulz Nat. Mus. Görlitz. *Entomobrya lanuginosa* clearing with Nesbit”; 3 paratypes, one on slide and two in a tube with ethyl alcohol, same data as Holotype. Deposited in SMNG.

Description

Body length up to 1.4 mm excluding antennae (Tab. 1). Body colour whitish or yellowish as in Fig. 1A.

Head: Eight ocelli, GH smaller than EF. Antennae length 1045 μm , three times the length of the head, Ant IV with simple apical vesicle. Relative length of Ant I/II/III/IV = 1/1.9/1.9/2.2. Labral papillae smooth (Fig. 7A).

Body: Length ratio of Abd IV/III < 4 (Tab. 1). Claw with 4 internal teeth: first pair at 55% of distance from base of claw; 2 unpaired teeth, first at 73% of distance from base, with the most distal one minute; dorsal tooth basal. Empodium spike-like, with smooth external edge on leg III (Fig. 7B). Length of manubrium and dentes 800 μm . Manubrial plate with 4 chaetae and 2 pseudopores (Fig. 7C). Mucronal subapical teeth similar in size to the terminal one and mucronal spine present (Fig. 7D).

Chaetotaxy: Simplified formula: 3-1-0-2-2/3-3/2-3/1-2-1/3-1-3-2-2 (Fig. 1A, Tab. 2).

Head chaetotaxy as in Fig. 2A. Thorax chaetotaxy: T1 area on Th II with 3 macrochaetae (m_1 and m_{2i} , and an additional chaetae present); T2 area on Th II with 3 macrochaetae (Fig. 2B). Abdomen chaetotaxy (Figs 2C–D): A1 area on Abd II with 2 macrochaetae and A2 area

on Abd II with 3 macrochaetae (m_3 , m_{3ep} and m_{3e}). Abd III with 2 macrochaetae on area A4 and 1 on areas A3 and A5.

Biology: Unknown.

Discussion. This species has a whitish or yellowish ground colour and can be confused with other species of similar colour that are very common, such as *E. lanuginosa* (Nicolet, 1842). 20 species have the same chaetotaxy on the Abd II (2-3 macrochaetae on areas A1 and A2), a frequent character in *Entomobrya*. However, only six species (*E. melitensis* Stach, 1963, *E. minuta* Lee & Park, 1992, *E. nevadensis* Steiner, 1959, *E. numidica* Jordana, Hamra-Kroua & Baquero, 2008, *E. turcestanica* Stach, 1963 and *E. vergarensis* Baquero, Arbea & Jordana, 2010) have 1-2-1 macrochaetae on the A3, A4 and A5 areas of the Abd III, respectively. If we consider the chaetotaxy of Th II, only *E. minuta* is similar to the new species, although both are very different in the Abd IV chaetotaxy, as well as in colour pattern.

Etymology. The species is dedicated to Prof. Dr. Wolfram Dunger, German specialist on Collembola at Görlitz.

***Entomobrya germanica* n. sp.** (Figs 1B, 3A–D, 7E–I, Tabs 1–2)

Type locality. Germany, Colbitz Magdeburg, Saxony-Anhalt.

Type material. Holotype on slide, labelled as: “Colbitz Magdeburg, Saxony-Anhalt (Germany) heathland 30.8.1995, traps leg. Friedrichs Nat. Mus. Görlitz *Entomobrya multifasciata* Group Clearing with Nesbit”, four paratypes in a tube with ethyl alcohol. Deposited in SMNG.

Description

Body length up to 2.2 mm excluding antennae (Tab. 1). Body colour pattern as in Fig. 1B.

Head: Eight ocelli, GH smaller than EF (Fig. 7E). Antennae length 1350 μm , three times the length of the head, Ant IV with simple apical vesicle. Relative length of Ant I/II/III/IV = 1/2.1/2.0/2.6. Labral papillae wrinkled or with some projections (Fig. 7F).

Body: Length ratio of the Abd IV/III < 4 (Tab. 1). Claw with 4 internal teeth: first pair at 47% of distance from base of claw; 2 unpaired teeth, first at 80% of distance from base and the most distal one minute; dorsal tooth between paired teeth and basal part of the claw. Empodium spike-like, with smooth external edge on leg III (Fig. 7G). Length of manubrium and dentes 710 μm . Manubrial plate with 5 chaetae and 2 pseudopores (Fig. 7H). Mucronal subapical tooth similar to terminal one and mucronal spine present (Fig. 7I).

Chaetotaxy: Simplified formula: 1-1-0-2-2/3-3/1-2/1-0-1/0-0-3-2-2 (Fig. 1B, Tab. 2).

Head chaetotaxy as in Fig. 3A. Thorax chaetotaxy: T1 area on Th II with 3 macrochaetae (m_1 , m_2 and m_{2i} present); T2 area on Th II with 3 macrochaetae (Fig. 3B). Abdomen chaetotaxy (Figs 3C–D): A1 area on Abd II with 1 macrochaeta (a_2) and A2 area on Abd II with 2 macrochaetae (m_3 and m_{3e}). Abd III with 1 macrochaeta each on areas A3 and A5.

Biology: Unknown.

Discussion. According to its colour pattern, this new species could be a form of *E. multifasciata* (Tullberg, 1871) or other similar species with transversal bands on the body. 19 palaeartic species of *Entomobrya* have 1-0-1 macrochaetae on the A3, A4 and A5 areas of Abd III, but only 7 have 1-2 macrochaetae on Abd II (*E. albocincta* (Templeton, 1836), *E. boneti* Jordana & Baquero, 2006, *E. marginata* (Tullberg, 1871), *E. pusilla* Latzel, 1918, *E. pyrenaica* Cassagnau, 1964, *E. schulzi* n. sp. (see below) and *E. transversalis* Baquero, Arbea & Jordana, 2010). Only *E. albocincta* shares the 3-3 macrochaetae on Th II with the new species, but these two species are very different in colour pattern, head and Abd IV chaetotaxy, in addition to other morphological features.

Etymology. The species name is refers to the country.

***Entomobrya saxoniensis* n. sp.** (Figs 1C, 4A–D, 7J–O, Tabs 1–2)

Type locality. Germany, Colbitz near Magdeburg, Saxony-Anhalt.

Type material. Holotype on slide, labelled as: “Colbitz near Magdeburg, Saxony-Anhalt (Germany) heathland, Nat. Mus. Görlitz *Entomobrya* sp”, 30.8.95, and five paratypes (one on slide and four in a tube with ethyl alcohol). Deposited in SMNG.

Description

Body length up to 1.6 mm excluding antennae (Tab. 1). Body colour pattern as Fig. 1C.

Head: Eight ocelli, GH smaller than EF. Antennae length 815 μm , twice the length of the head, Ant IV with simple apical vesicle; Ant III sensory organ in Fig. 7J. Relative length of Ant I/II/III/IV = 1/2/1.9/2.9. Labral papillae wrinkled or with some projections (Fig. 7K).

Body: Length ratio of Abd IV/III > 4 (Tab. 1). Trochanteral organ as in Fig. 7L. Claw with 4 internal teeth: first pair at 56% of distance from base of claw; 2 unpaired teeth, first at 67% of distance from base and the most distal one minute; dorsal tooth in middle position between the internal paired teeth and the base of the claw. Empodium spike-like, with smooth external edge on leg III (Fig. 7M). Manubrium and dens length 680 μm . Manubrial plate with 5 chaetae and 1 pseudopores (perhaps there are 2, but only 1 has been recognized) (Fig. 7N). Mucronal subapical tooth similar in size to terminal one. Mucronal spine present (Fig. 7O).

Chaetotaxy: Simplified formula: 3-1-0-3-2/2-2/2-2/1-2-1/0-5-3-2-2 (Fig. 1C, Tab. 2).

Head chaetotaxy as in Fig. 4A. Thorax chaetotaxy: T1 area on Th II with 2 macrochaetae (m_1 and m_{212} present); T2 area on Th II with 2 macrochaetae (a_5 and m_5 present) (Fig. 4B). Abdomen chaetotaxy (Figs 4C–D): A1 area on Abd II with 2 macrochaetae and A2 area on

Abd II with 2 macrochaetae (m_{3ep} and m_{3e} present). Abd III with 2 macrochaetae on area A4 and 1 on areas A3 and A5.

Biology: Unknown.

Discussion. The colour pattern of this new species is somewhat similar to dark coloured species of *Entomobrya*, but an examination of its chaetotaxy removes all doubt. Only 8 *Entomobrya* species have a similar chaetotaxy (1-2-1 macrochaetae) on the Abd III, and only two of them (*E. vadelli* Jordana & Baquero, 2005 and *E. violaceolineata* Stach, 1963) have 2-2 macrochaetae on the Abd II, but the Th II (2-2 macrochaetae) allows an easy identification.

Etymology. The species name is dedicated to the land of Saxony.

***Entomobrya schulzi* Jordana & Baquero n. sp.** (Figs 1D, 5A–D, 7P–T, Tabs 1–2)

Type locality. Germany, Dubringer Moor.

Type material. Holotype on slide, labelled as: “Dubringer Moor 1986 -1987 leg Voigtländer, traps, pine forest, catalog number 16102 Nat. Mus. Görlitz *Entomobrya multifasciata* det. Schulz”, and 2 paratypes on the same slide as Holotype. Deposited in SMNG.

Description

Body length up to 2.2 mm excluding antennae (Tab. 1). Body colour pattern as in Fig. 1D.

Head: Eight ocelli, GH smaller than EF. Antennae length 925 μ m, twice the length of the head, Ant IV with bilobed apical vesicle (Fig. 7P); Ant III sensory organ as in Fig. 7Q. Relative length of Ant I/II/III/IV = 1/1.9/1.5/2.0. Labral papillae smooth (Fig. 7R).

Body: Length ratio of Abd IV/III > 4 (Tab. 1). Claw with four internal teeth: first pair at 42% of distance from base of claw; two unpaired teeth, first unpaired at 75% of distance from

base and the most distal one minute; dorsal tooth basal (Fig. 7S). Empodium spike-like, with serrate external edge on leg III. Manubrium and dens length 820 µm. Manubrial plate with 4 chaetae and 2 pseudopores. Mucronal subapical tooth similar in size to terminal one. Mucronal spine present (Fig. 7T).

Chaetotaxy: Simplified formula: 2(+1m)-2-0-3-2/2-3/1-2/1-0-1/0-1-1-2-2 (in the head, the formula could be 3-2-0-3-2 if An₂ is considered as macrochaeta) (Fig. 1D, Tab. 2).

Head chaetotaxy in Fig. 5A (An₂ as a mesochaeta). Thorax chaetotaxy: T1 area on Th II with two macrochaetae (m₁ and m_{2i} present); T2 area on Th II with three macrochaetae (Fig. 5B). Abdomen chaetotaxy (Figs 5C–D): A1 area on Abd II with one macrochaeta (a₃) and A2 area on Abd II with two macrochaetae (m_{3ep} and m₃ present). Abd III with one macrochaeta on areas A3 and A5.

Biology: Unknown.

Discussion. This new species could be confused with *E. multifasciata* based on coloration. Only 19 species have the same chaetotaxy on Abd III (1-0-1 macrochaetae); 8 are similar in chaetotaxy of Abd II (1-2 macrochaetae) but only three (*E. boneti*, *E. pusilla* and *E. pyrenaica*) have the same chaetotaxy on Th II; the new species has 0-1-1-2-2 macrochaetae on Abd IV while the other species have a different chaetotaxy on this segment.

Etymology. The specific name is dedicated to Dr. Hans-Jürgen Schulz, Görlitz's taxonomist.

***Entomobrya dorsolineata* n. sp.** (Figs 1E, 6A–D, 7U–W, Tabs 1–2)

Type locality. Germany, Kyffhäuser.

Type material. Holotype on slide (clearing), Deutsch. Entomol. Institut. Coll. Carl Börner - Kyffhäuser 1920 July, pilgrim house, previously identified as *Entomobrya corticalis*. Deposited in SMNG.

Description

Body length up to 2.8 mm excluding antennae (Tab. 1). Body colour pattern as in Fig. 1E.

Head: Eight ocelli, GH smaller than EF. Antennae length 2260 μm , four times the length of the head, Ant IV with simple apical vesicle. Relative length of Ant I/II/III/IV = 1/1.4/1.1/2.2. Labral papillae very small, with a chaeta-like projection (Fig. 7U).

Body: Length ratio of Abd IV/III > 4 (Tab. 1). Claw with 4 internal teeth: first pair at 52% of distance from base of claw; 2 unpaired teeth, first unpaired at 78% of distance from base and the most distal one minute; dorsal tooth basal. Empodium spike-like, with serrate inner edge on leg III (Fig. 7V). Length of manubrium and dens 1610 μm . Mucronal subapical teeth bigger than terminal one, and mucronal spine present (Fig. 7W).

Chaetotaxy: Simplified formula: 4-2-0-3-1b(+2m)/2-4/2-5/1-2-1/0-1₀7-0-3-3 (Fig. 1E, Tab. 2). Ps₂ always macrochaeta, but Ps₃ and Ps₅ (mesochaetae) would be considered as macrochaetae.

Head chaetotaxy in Fig. 6A. Thorax chaetotaxy: T1 area on Th II with 2 macrochaetae (m₁ and m_{2i} present); T2 area on Th II with 4 macrochaetae (Fig. 6B). Abdomen chaetotaxy (Figs 6C–D): A1 area on Abd II with 2 macrochaetae and A2 area on Abd II with 5 macrochaetae (m₃, m_{3ep}, m_{3e}, m_{3ei} and m_{3ea} present). Abd III with 2 macrochaetae on area A4 and 1 each on areas A3 and A5. Abd IV with a macrochaetotaxy distribution similar to an *Homidia* (A7 with 15 macrochaetae), and A8 without Mc.

Biology: Unknown.

Discussion. The colour pattern is very characteristic in this species, similar to the species with longitudinal bands as *E. quinquelineata* Börner, 1901. 23 species have 1-2-1 macrochaetae on Abd III, but only *E. dorsalis* Uzel, 1891 has the same chaetotaxy on Abd II (2-5 macrochaetae). The new species differs from the latter in having 2-4 macrochaetae on Th II instead of the 4–8 in *E. dorsalis*, and they are very different in colour pattern. Despite being a single specimen from an ancient collection, we describe it here as a new species, because it is still in a good state of preservation after nearly 100 years.

Etymology. The species name is referred to the colour pattern.

4. Acknowledgements

We wish to express our gratitude to the Senckenberg Museum für Naturkunde Görlitz (Germany) and its researchers, for the loan of the specimens and comments to improve the ms, and to Jim Dickerson for the English correction.

5. References

- Baquero, E., J. Arbea, & R. Jordana (2010): New species of Entomobryni from the Mediterranean Palaearctic (Collembola, Entomobryidae) and a new name for *Folsomia potapovi* (Collembola, Isotomidae). – *Soil Organisms* **82** (3): 285–300.
- Christiansen, K. (1958): The Nearctic members of the genus *Entomobrya* (Collembola). – *Bulletin of the Museum of Comparative Zoology* **118** (7): 1–545.
- Christiansen, K. & P. Bellinger (1980): Family Entomobryidae. – *The Collembola of North America North of the Rio Grande*, Grinnell College, Iowa **3**: 785–1042.
- Jordana, R. & E. Baquero (2005): A proposal of characters for taxonomic identification of *Entomobrya* species (Collembola, Entomobryomorpha), with description of a new species. – *Abhandlungen und Berichte des Naturkundemuseums, Görlitz* **76** (2): 117–134.
- Jordana, R. & E. Baquero (2010a): A new species of *Entomobrya* from Iraq (Collembola, Entomobryidae). – *Soil Organisms* **82** (3): 351–356.
- Jordana, R. & E. Baquero (2010b): A new species of *Entomobrya* (Collembola, Entomobryidae) from La Caldera de Taburiente National Park (La Palma Island, Canary Islands) and its associated collembolan fauna. – *Soil Organisms* **82** (3): 357–365.

Figure captions

Fig. 1 Colour pattern of some *Entomobrya* species described in this paper. A: *E. dungeri* n. sp. (bleached); B: *E. germanica* n. sp.; C: *E. saxoniensis* n. sp.; D: *E. schulzi* Jordana & Baquero n. sp.; E: *E. dorsolineata* n. sp. (a, leg).

Fig. 2 *Entomobrya dungeri* n. sp. macrochaetotaxy. A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

Fig. 3 *E. germanica* n. sp. macrochaetotaxy. A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

Fig. 4 *E. saxoniensis* n. sp. macrochaetotaxy. A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

Fig. 5 *E. schulzi* Jordana & Baquero n. sp. macrochaetotaxy. A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

Fig. 6 *E. dorsolineata* n. sp. macrochaetotaxy (Holotype, specimen from SMNG). A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

Fig. 7 *Entomobrya dungeri* n. sp. A: labral papillae; B: claw; C: manubrial plate; D: mucro and tip of dentes.

Entomobrya germanica n. sp. E: ocelli; F: labral papillae; G: claw; H: manubrial plate; I: mucro and tip of dentes.

Entomobrya saxoniensis n. sp. J: Ant III sensory organ; K: labral papillae; L: trocanteral organ; M: claw; N: manubrial plate; O: mucro and tip of dentes.

E. schulzi Jordana & Baquero n. sp. P: Ant IV apical vesicle; Q: Ant III sensory organ; R: labral papillae; S: claw; T: mucro and tip of dentes.

E. dorsolineata n. sp. U: labral papillae; V: claw; W: manubrial plate.

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

	<i>E. dunger</i> n. sp.	<i>E. germanica</i> n. sp.	<i>E. saxoniensis</i> n. sp.	<i>E. schulzi</i> Jordana & Baquero n. sp.	<i>E. dorsolineata</i> n. sp.
Ant I	150	175	105	150	400
Ant II	280	375	210	277	570
Ant III	280	350	200	225	430
Ant IV	325	450?	300	300	860
Antenna	1045	1350	815	925	2260
Head	325	425	400	450	550
Ant/head ratio	3.22	3.2	2.03	2.1	4.1
Th II	230	275	225	350	330
Th III	150	200	200	200	250
Abd I	100	150	150	160	180
Abd II	162	150	55	170	230
Abd III	140	175	75	120	200
Abd IV	430	600	400	525	820
Abd IV/III ratio	3.07	3.42	5.33	4.4	4.1
Abd V	160	125	50	150	170
Abd VI	70	75	25	75	70
Body	1372	2175	1580	2200	2800
Manubrium	310/350	-	320	-	740
Dens	385/450	-	360	-	870
Claw	35	40	40	35/40	52
Empodium	24	25	22	25/25	30
Tenent hair	50	45	50	45/45	56

TABLE 2. Comparative set of character between specimens of the different *Entomobrya* species described in this paper. Number of specimens studied: *E. dungeri* n. sp. (2), *E. germanica* n. sp. (1), *E. saxoniensis* n. sp. (2), *E. schulzi* Jordana & Baquero n. sp. (1), *E. dorsolineata* n. sp. (1). -, means “no data”.

Character	Location	Description	Value	<i>E. dungeri</i> n. sp.	<i>E. germanica</i> n. sp.	<i>E. saxoniensis</i> n. sp.	<i>E. schulzi</i> Jordana & Baquero n. sp.	<i>E. dorsolineata</i> n. sp.
Ch.1	H1 (Head)	An ₂ -An ₃	1-6	3	1	3	2	4
Ch.2	H2	A ₅ -A ₇	1-3	1	1	1	2	2
Ch.3	H3	S' ₀	0-1	0	0	0	0	0
Ch.4	H4	S ₁ -S ₃ -S ₄	0-3	2	2	3	3	3
Ch.5	H5	Ps ₂ -Ps ₃ -Ps ₅	0-3	2	2	2	2	1b(2m)
Ch.6	labral papillae	simple and smooth papillae (1) wrinkled or with some projections (2) a chaeta-like projection (3)	1-3	1	2	2	1	3
Ch.7	ocelli G&H size	= E&F (1), <E&F (2)	1-2	2	2	2	2	2
Ch.8	apical antennal retractile bulb	no bulb (0), lobe simple (1), bilobate (2), trilobate (3)	0-3	1	1	1	2	1
Ch.9	ratio Ant/Head	> or = 3 (1), > or = 2 < 3 (2), < 2 (3)	1-3	1	1	2	2	1
Ch.10	anterior dorsal mane Th II Mc	with Mc type 1 (1), without Mc or type 2 (2)	1-2	1	1	1	1	1
Ch.11	T1	chaetae number m ₁ -m ₂₁₂ or >4 (5)	0-5	3	3	2	2	2
Ch.12	T2	chaetae number a ₅ , m ₄ -m ₅ or >8 (9)	0-9	3	3	2	3	4
Ch.13	smooth chaetae on tibiotarsi	not or 1 in tibiotarsi III = 0, double file = 1	0-1	0	0	0	0	0
Ch.14	claw internal teeth	1(1), 2(2), 3(3), 4(4)	1-4	4	4	4	4	4
	paired teeth of claw	distance from claw base, in %	-	55	47	56	42	52
	first unpaired teeth of claw	distance from claw base, in %	-	73	78	67	75	78
Ch.15	claw dorsal tooth	basal = 1, internal teeth level = 2, between pair teeth and basis = 3	1-3	1	3	3	1	1
Ch.16	claw internal edge	without ciliation (0), with ciliation (1)	0-1	0	0	0	0	0
Ch.17	external empodium	smooth (0), serrate (1)	0-1	0	0	0	1	1
Ch.18	A1 Abd II	a ₂ -a ₃	0-2	2	1	2	1	2
Ch.19	A2 Abd II	m ₃ series chaetae number	0-7	3	2	2	2	5
Ch.20	A3 Abd III	a ₁	0-1	1	1	1	1	1
Ch.21	A4 Abd III	above m ₂ chaetae number	0-3	2	0	2	0	2
Ch.22	A5 Abd III	m ₃ -m ₄ series chaetae number	0-4	1	1	1	1	1
Ch.23	A6 Abd IV	a ₁ -a ₅ (A ₁ -D ₁) chaetae number; >8 (9)	0-9	3	0	0	0	0
Ch.24	A7 unpair chaeta	ma ₀ (A ₀₃)	0-1	0	0	0	0	1
Ch.25	A7 Abd IV	ma ₁ -ma ₄ (A ₂ -E ₁) chaetae number; >9 (10)	0-10	1	0	5	1	7
Ch.26	A8 unpaired chaeta	m ₀ (A ₀₄)	0-1	0	0	0	0	0
Ch.27	A8 Abd IV	m ₁ -m ₃ (A _{4a} -C _{2a}) chaetae number; >5 (6)	0-6	3	3	3	1	0
Ch.28	A9 unpaired chaeta	mp ₀ (A ₀₅)	0-1	0	0	0	0	0
Ch.29	A9 Abd IV	mp ₁ -mp ₃ (A ₅ -B ₅) chaetae number; >6 (7)	0-7	2	2	2	2	3
Ch.30	A10 Abd IV	p _{1a} -p ₃ (A ₆ -B ₆) chaetae number; >5 (6)	0-6	2	2	2	2	3
Ch.31	A11 Abd IV	T ₁ (ma _{4e}) as trichobothrium	0-1	0	0	0	0	0
Ch.32	A12 Abd IV	T ₂ (m ₄) as trichobothrium	0-1	1	1	1	1	1
Ch.33	A13 Abd IV	T ₄ (mp ₄) as trichobothrium	0-1	1	1	1	1	1
Ch.34	A14 Abd IV	T ₆ (p ₄) as trichobothrium	0-1	0	0	0	0	0
Ch.35	ratio Abd IV/III	2 < R < 4 (1), R > 4 (2)	1-2	1	1	2	2	2
	manubrium and dens	total length	-	800	710	680	820	1610
Ch.36	manubrial plate	chaetae number; >10 (11)	0-11	4	5	5	4	-
Ch.37	manubrial plate	pseudopores 1-2	1-2	2	2	1	2	-
Ch.38	mucro	sub-apical tooth, without (0), normal (1), big (2), smaller (3)	0-1	1	1	1	1	2
Ch.39	mucro	basal spine, absent (0), present (1)	0-1	1	1	1	1	1

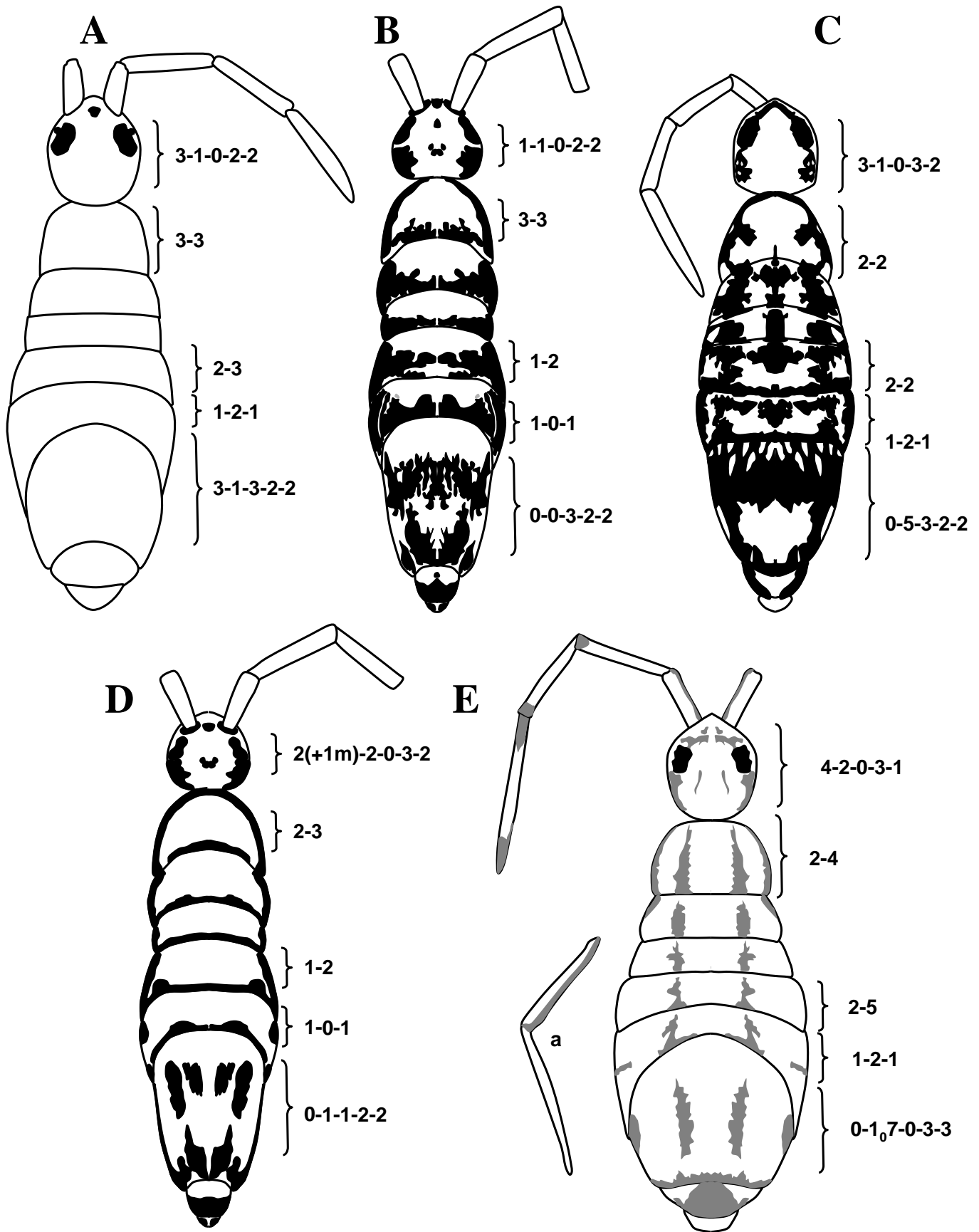


Fig. 1 Colour pattern of some *Entomobrya* species described in this paper. A: *E. dungeri* n. sp. (bleached); B: *E. germanica* n. sp.; C: *E. saxoniensis* n. sp.; D: *E. schulzi* Jordana & Baquero n. sp.; E: *E. dorsolineata* n. sp. (a, leg).

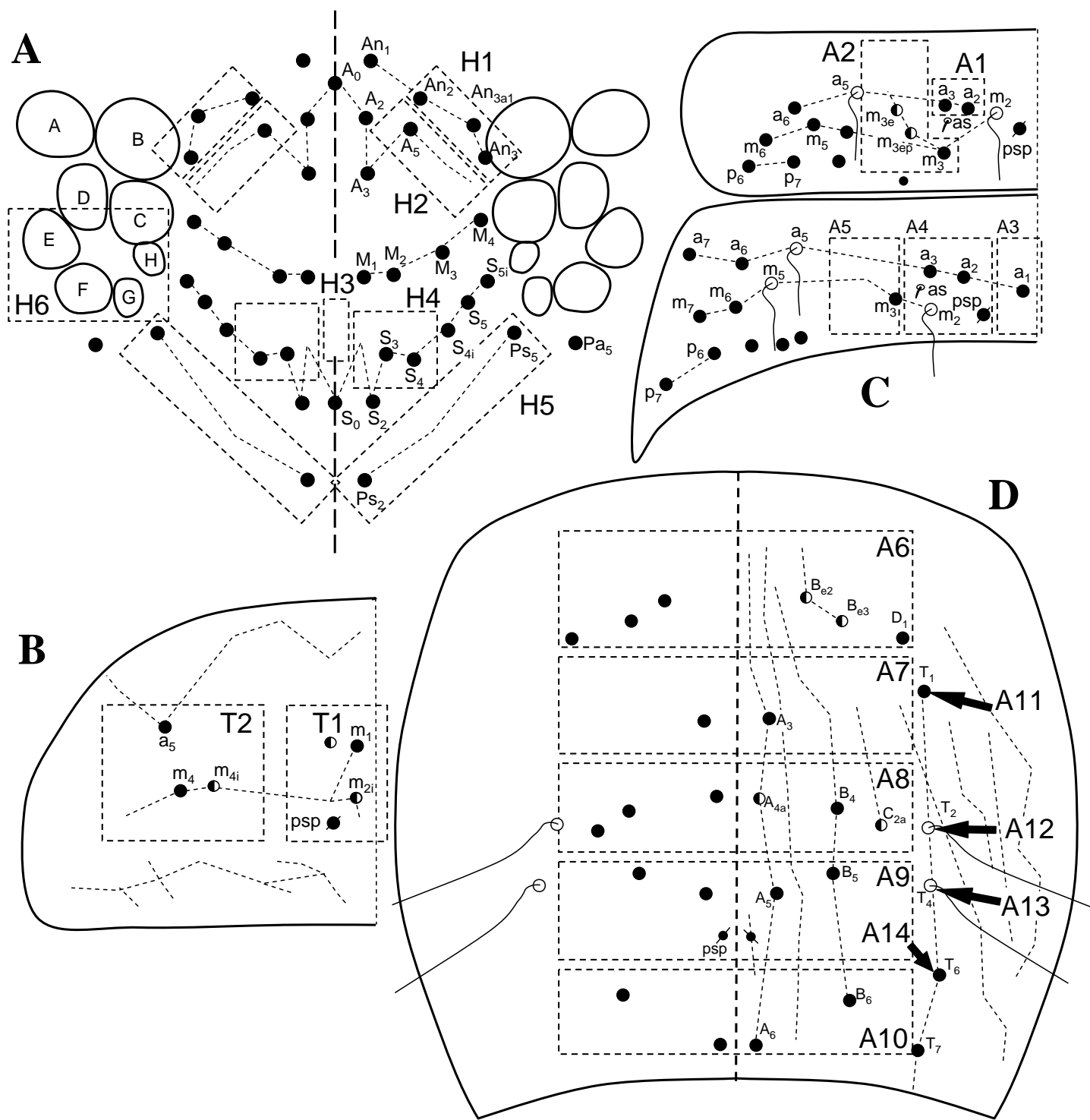


Fig. 2 *Entomobrya dungeri* n. sp. macrochaetotaxy. A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

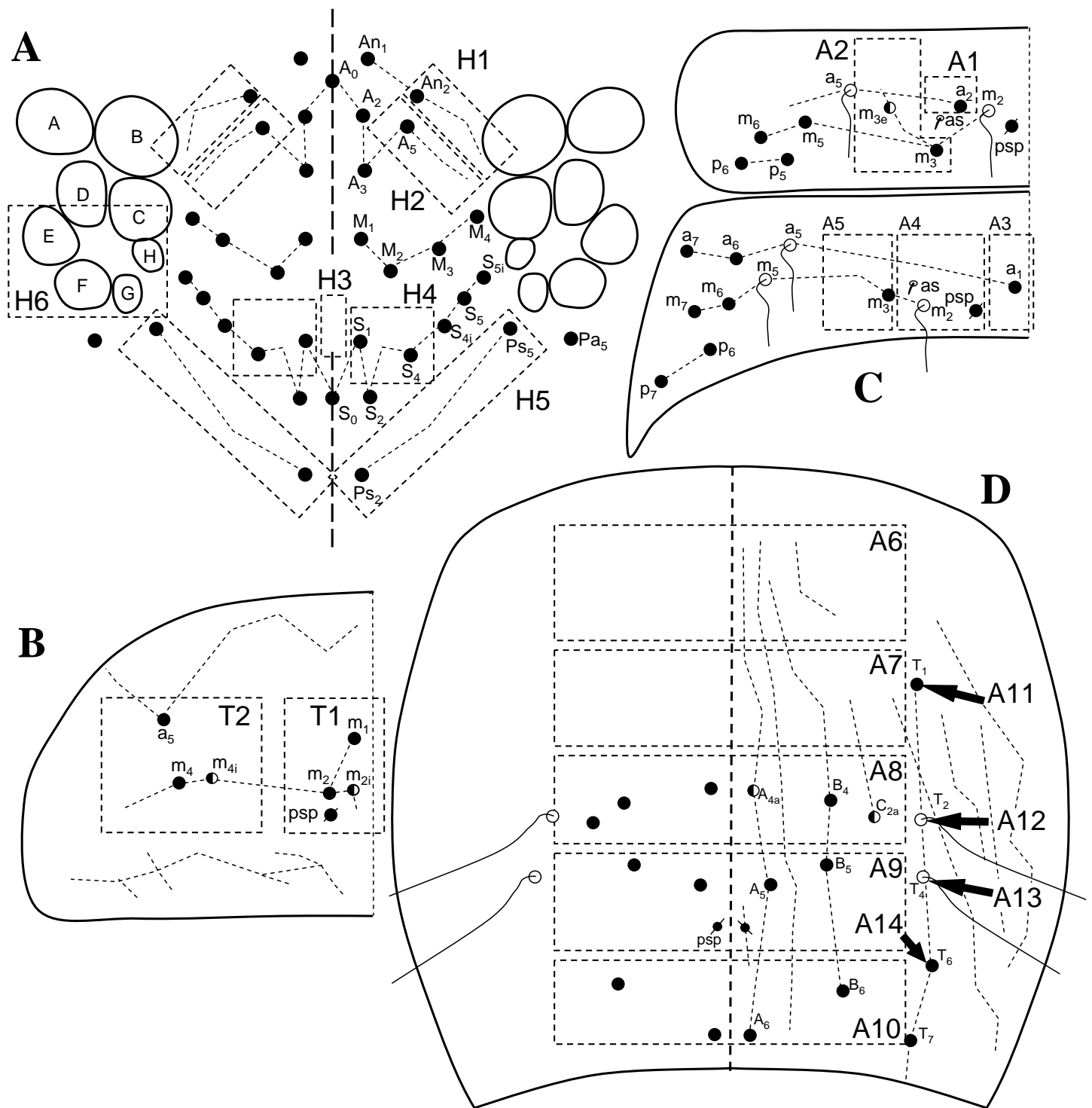


Fig. 3 *E. germanica* n. sp. macrochaetotaxy. A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

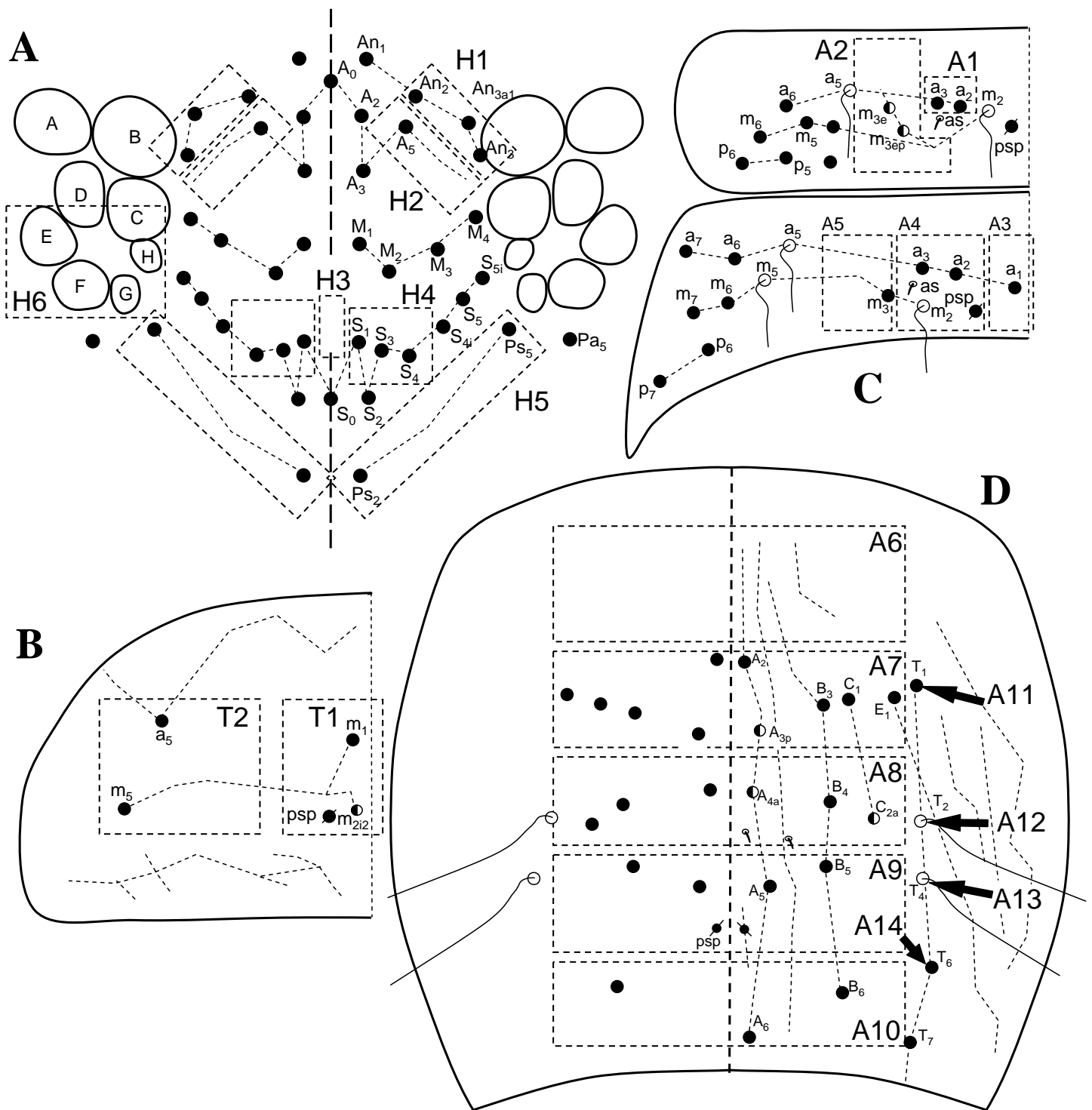


Fig. 4 *E. saxoniensis* n. sp. macrochaetotaxy. A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

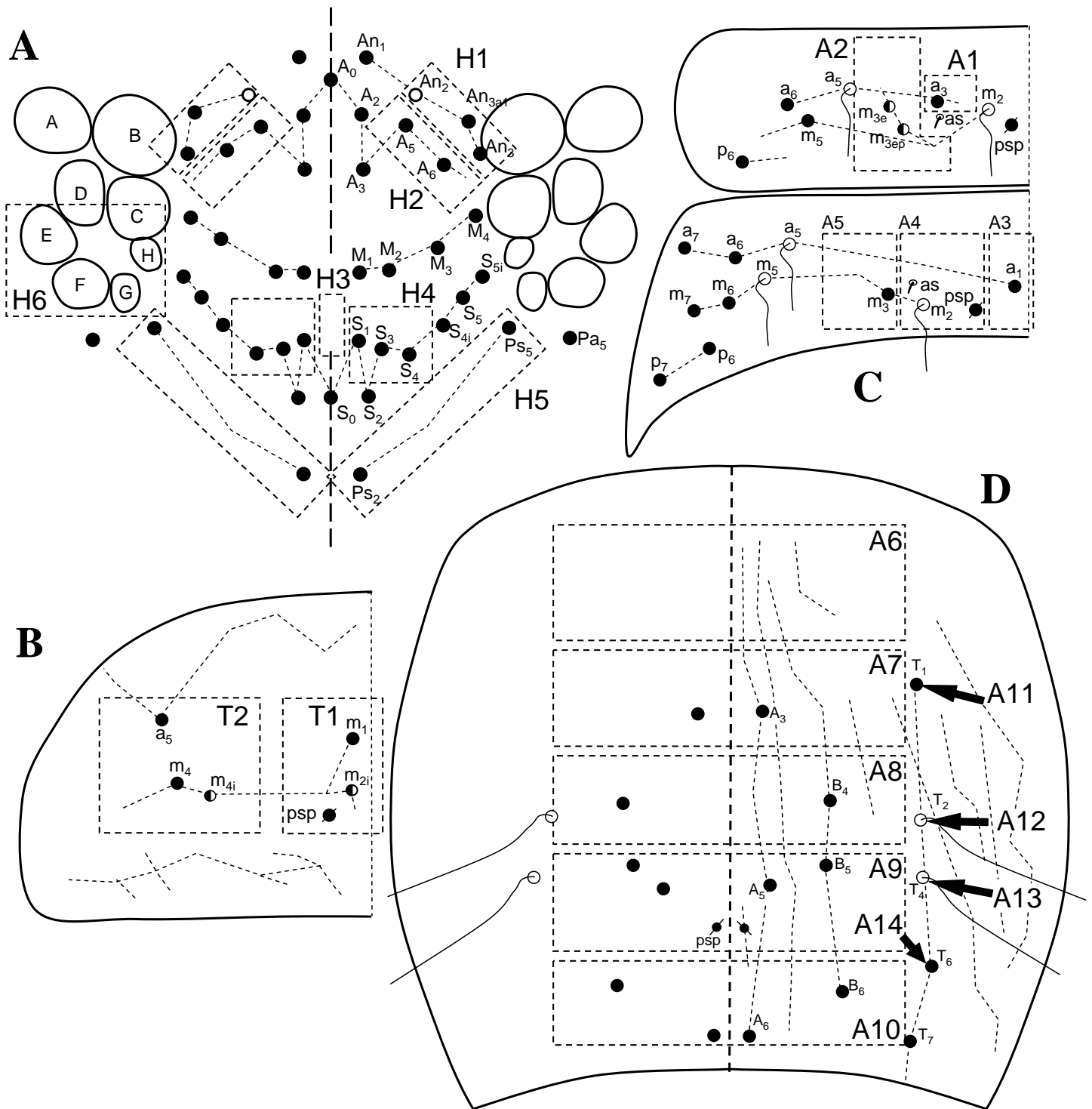


Fig. 5 *E. schulzi* Jordana & Baquero n. sp. macrochaetotaxy. A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

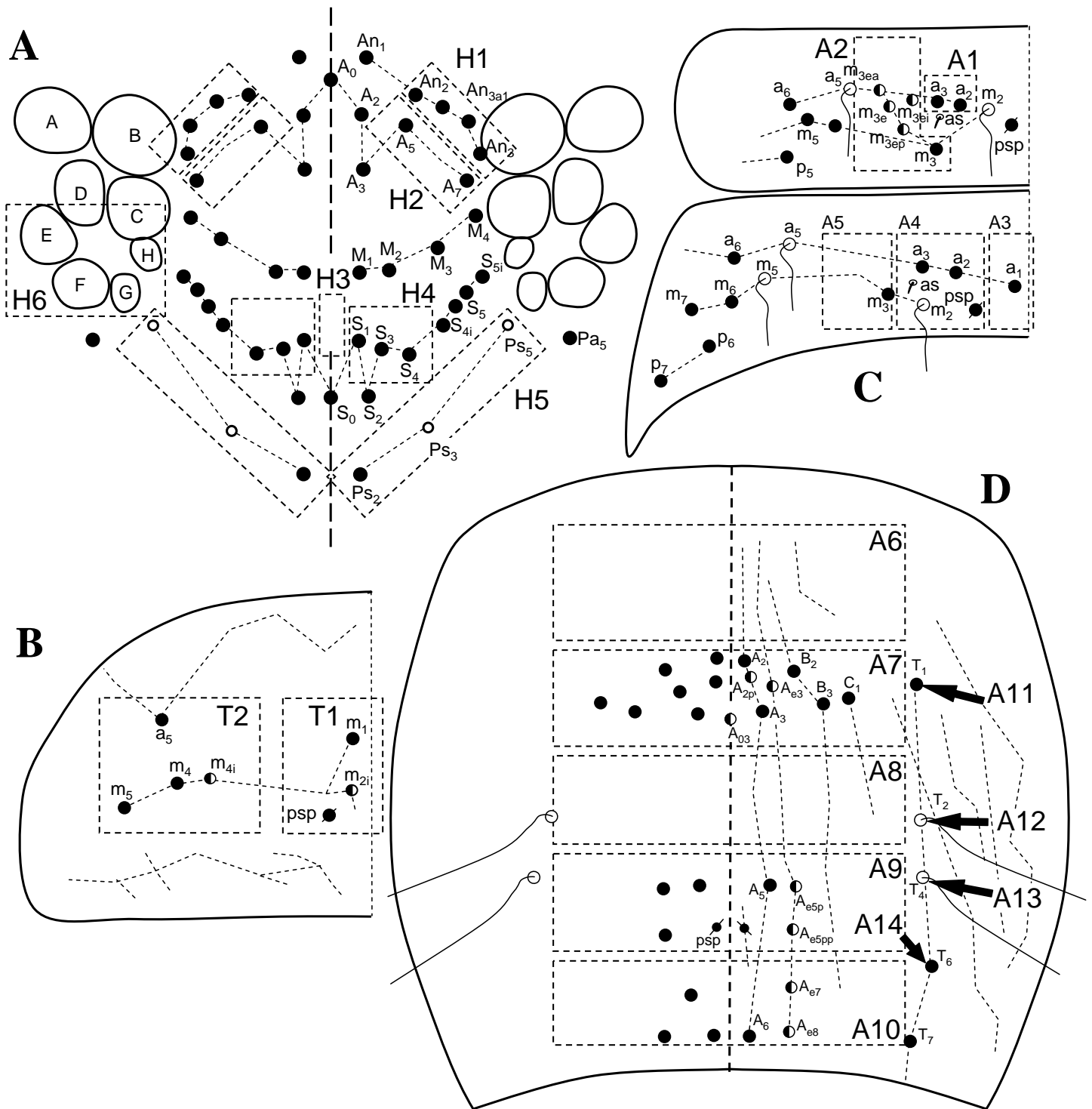


Fig. 6 *E. dorsolineata* n. sp. macrochaetotaxy (Holotype, specimen from SMNG). A: head; B: Th II; C: Abd II–III; D: Abd IV (the arrows point to the trichobothria insertions).

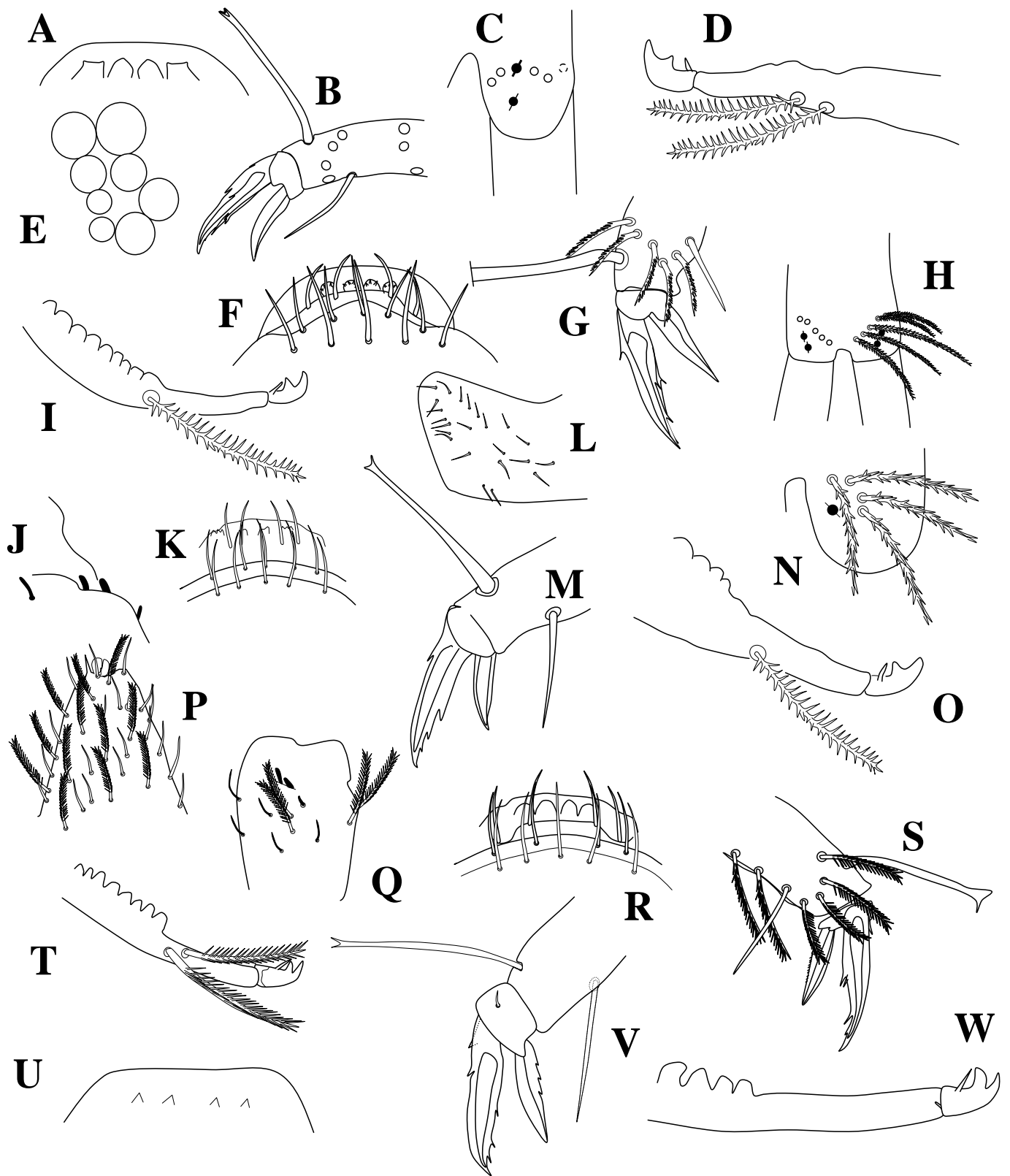


Fig. 7 *Entomobrya dungeri* n. sp. A: labral papillae; B: claw; C: manubrial plate; D: mucro and tip of dentes. *Entomobrya germanica* n. sp. E: ocelli; F: labral papillae; G: claw; H: manubrial plate; I: mucro and tip of dentes. *Entomobrya saxoniensis* n. sp. J: Ant III sensory organ; K: labral papillae; L: trocanteral organ; M: claw; N: manubrial plate; O: mucro and tip of dentes. *E. schulzi* Jordana & Baquero n. sp. P: Ant IV apical vesicle; Q: Ant III sensory organ; R: labral papillae; S: claw; T: mucro and tip of dentes. *E. dorsolineata* n. sp. U: labral papillae; V: claw; W: manubrial plate.