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Wojciechaphis andrei gen. et sp. nov. (Hemiptera: Aphidomorpha, Drepanosiphidae, Phyllaphidinae), a new aphid genus from Baltic amber*

PIOTR WEGIEREK[1], IWONA KANIA[2], MARZENA ZMARZŁY[1]

[1]Department of Zoology, University of Silesia, Bankowa 9, 40-007 Katowice, Poland, e-mails: piotr.wegierek@us.edu.pl, marzena.zmarzly@us.edu.pl
[2]Department of Environmental Biology, University of Rzeszów, Zelwerowicza 4, 35-601 Rzeszów, Poland; e-mail: ikania@univ.rzeszow.pl

ABSTRACT. Here we describe a new aphid genus and species *Wojciechaphis andrei* gen. et sp. nov. belonging to the extant family Drepanosiphidae, also known from Baltic amber (Eocene). The first adult apterous viviparous female of *Mengeaphis glandulosa* (MENGE, 1856) is described too.

KEY WORDS: *Wojciechaphis andrei* gen. et sp. nov., *Mengeaphis glandulosa*, Drepanosiphidae, aphids, adult apterous morph, fossil insects, Eocene, Baltic amber.

INTRODUCTION

Eocene aphids represent one of the most thoroughly studied parts in the evolutionary history of this group owing to the exceptional abundance of their inclusions in Baltic amber (HEIE & WEGIEREK 2011). However, the species and morphs are far from being evenly represented as inclusions in amber. There are some taxa, e.g. *Larssonaphis obnubila* HEIE, 1967, that were described on the basis of just a single specimen, even though studies on aphids in Baltic amber have been going on for over 150 years (since GERMAR & BERENDT 1856). On the other hand, representatives of some other species can be found in almost

* The paper is dedicated to Prof. Wacław WOJCIECHOWSKI in recognition of his great contribution to the taxonomy and faunistics of Hemiptera.

every museum and amateur collection of Baltic amber, e.g. *Mindarus magnus* BAKER, 1922 (only alate morphs) and *Germaraphis dryoides* (GERMAR & BERENDT, 1856) (only apterous morphs). Another example is the species *Mengeaphis glandulosa* (MENGE, 1856), specimens of which are quite common among aphid inclusions in Baltic amber. This species has been described on the basis of the larval stage, and only juvenile forms morphs are available for study (HEIE 1967). While examining the collections of Dr. Carsten GRÖHN (Hamburg, Germany) and Andrzej GÓRSKI (Bielsko-Biała, Poland), we found an apterous virginoparae morph of *Mengeaphis glandulosa* as well as representatives of a new genus and species – *Wojciechaphis andrei* gen. et sp. nov. Both taxa share a similar body shape and characteristic chaetotaxy but differ in many morphological details.

MATERIAL AND METHODS

The specimens were examined using the typical methods of palaeoentomological research (ZHERIKHIN et al. 2008). All the photographs were taken using a SMZ1500 and Nikon Eclipse-E600 microscope.

The specimens are deposited in the amber collection of the Geological-Palaeontological Institute, University of Hamburg [GPIH] GPIH 4456, coll. GRÖHN No. 1686 Aphidoidea *Wojciechaphis andrei* holotype and GPIH 4574, coll. GRÖHN No. 3407 Aphidoidea *Mengeaphis glandulosa*. The paratype of *Wojciechaphis andrei* No. MP/3492, coll. Andrzej GÓRSKI, Bielsko-Biała, Poland, will be deposited in the collection of the Institute of Systematics and Evolution of Animals, Polish Academy of Sciences (ISEA PAS), Kraków, Poland.

All measurements are given in mm.

SYSTEMATICS

Order: Hemiptera LINNAEUS, 1758
Suborder: Sternorrhyncha AMYOT & SERVILLE, 1843
Infraorder: Aphidomorpha BECKER-MIGDISOVA & AIZENBERG, 1962
Superfamily: Aphidoidea LATREILLE, 1802
Family: Drepanosiphidae HERRICH-SCHAEFFER, 1857
Subfamily: Phyllaphidinae HERRICH-SCHÄFFER, 1857

Genus: *Wojciechaphis* WEGIEREK & KANIA gen. nov.

Type species. *Wojciechaphis andrei* sp. nov.; by present designation and monotypy.

Etymology. This genus is named in honour of Professor Wacław WOJCIECHOWSKI, the eminent teacher of generations of Polish aphidologists, and the Latin name of aphids – aphis.

Gender. Feminine.

Diagnosis. Body oval, evenly covered with short, capitate bristles dorsally. Rostrum reaching posterior margin of the body. Pronotum well defined. Head and thorax with wax glands arranged in four rows along the body. Siphunculi stump-shaped without reticular microsculpture. Cauda finger-shaped. Anal plate deeply indented.

Species: *Wojciechaphis andrei* WEGIEREK & KANIA sp. nov. (Figs 1, 2, 3)

Etymology. The species name is devoted to Andrzej GÓRSKI, who first noticed this representative of a new species, and who decided that it should be scientifically examined.

Holotype GPIH 4456, coll. GRÖHN No. 1686 (apterous viviparous female); paratype ISEA PAS No. MP/3492, coll. GÓRSKI 2982 (larva).

Type locality. Baltic amber (Eocene).

Diagnosis. As for the genus.

Description. Body almost 1.4x as long (2.00-2.18) as wide (1.50-1.67). Bristles (0.03-0.05) covering the whole body dorsally, at most as long as 1/2 of the last antennal segment, reaching only 1/2 of siphunculi height. Head short (0.10) and wide (0.46, without eyes), more than 4x wider than long, with a pair of large wax gland plates. Pronotum (length 0.17, width 0.67) rectangular. Protuberance (ocular tubercle) bearing large triommatidium, equal to 1/2 of compound eye diameter. Antennae short (0.33, 0.46 [larva]), as long as hind femur. Length of antennal segments: I 0.04-0.06, II 0.06, III 0.14-0.18, IV 0.06, V 0.11. Processus terminalis very short (0.02), as long as the last antennal segment width, or shorter (larva). Apical rostral segment dagger-shaped (width 0.05). Except for the prothorax, body segments of similar shape, segmental margins defined, wax glands occurring on the

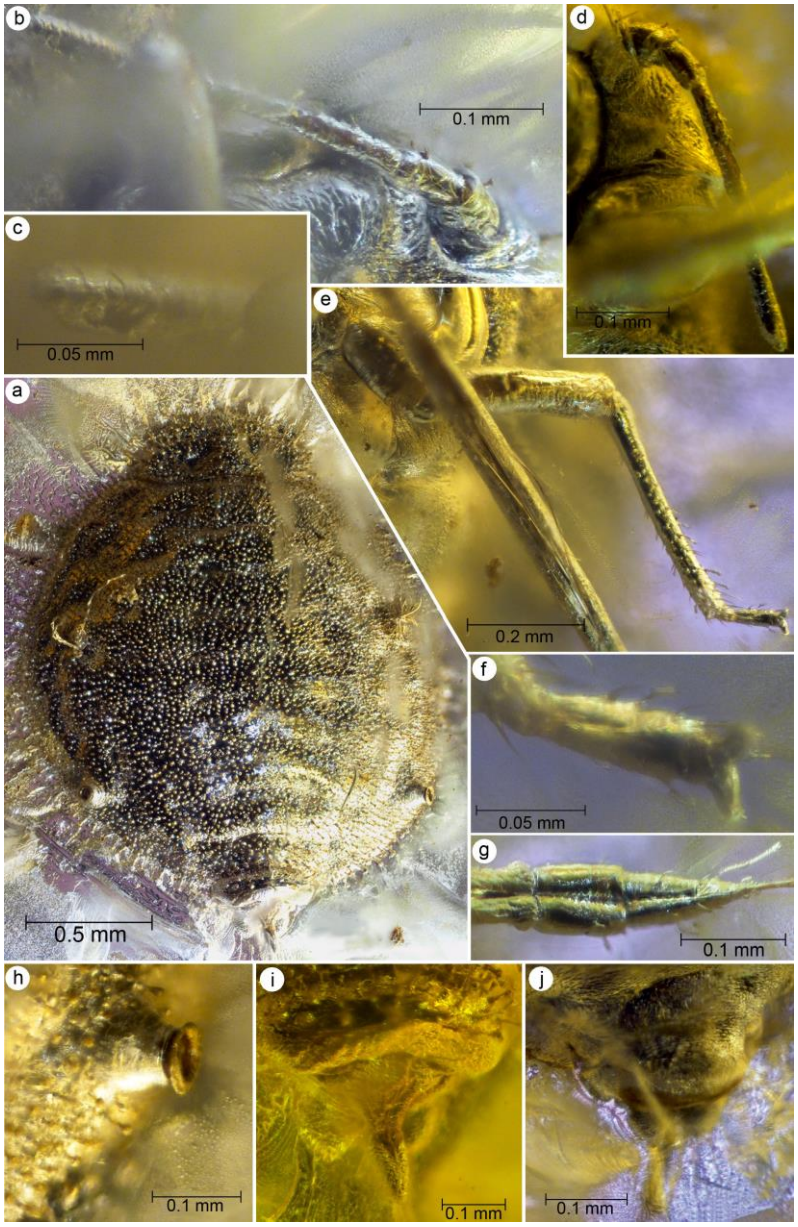

Fig. 1. *Wojciechaphis andrei* sp. nov. GPIH 4456, coll. GRÖHN No. 1686 (holotype apterous viviparous female): a. body – dorsal view, b. right antenna – ventral view, c. apical part of right antenna, d. left antenna – ventral view, e. left hind leg, f. left hind tarsus, g. apical part of rostrum, h. siphunculus, i. apical part of body – dorsal view, j. apical part of body – ventral view.

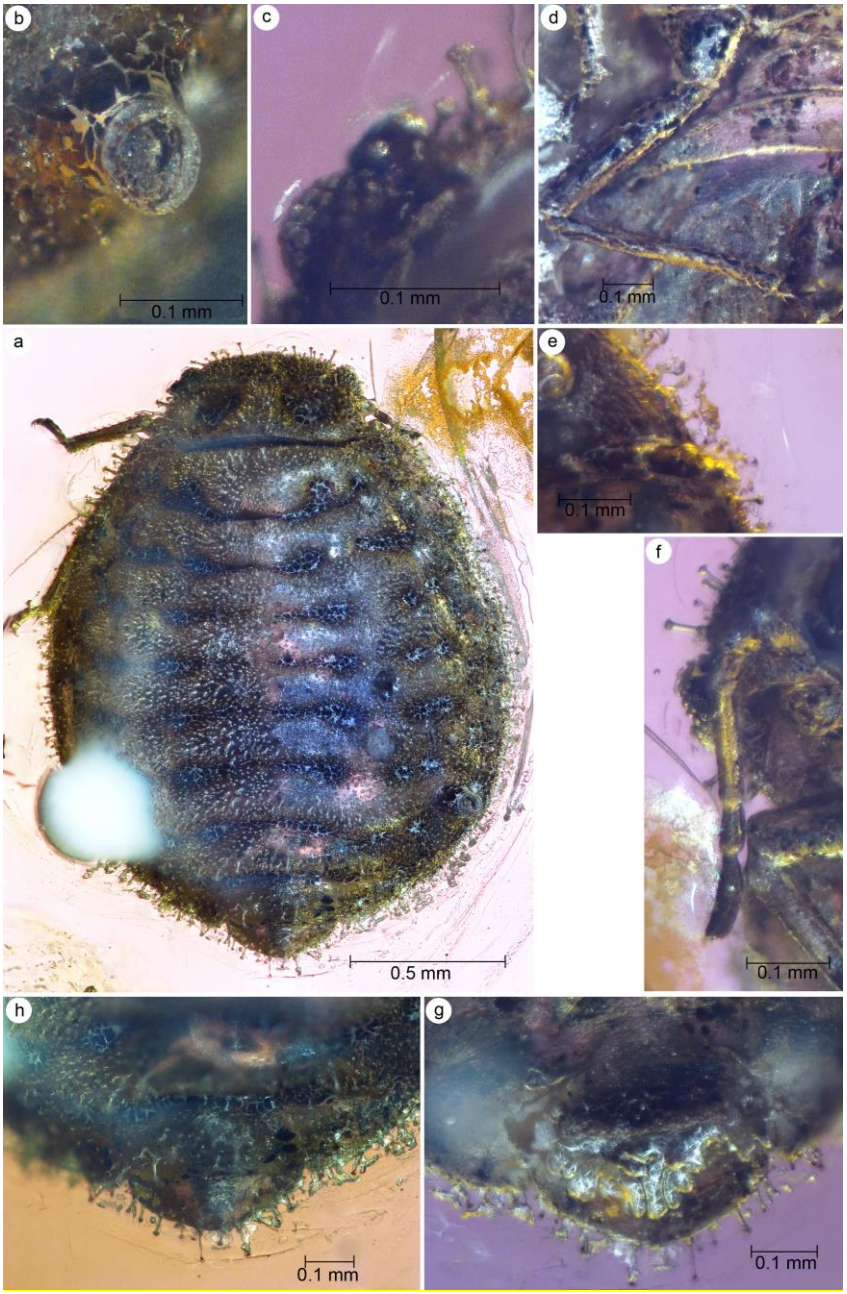

Fig. 2. *Wojciechaphis andrei* sp. nov. ISEA PAS No. MP/3492, coll. GÓRSKI 2982 (paratype, larva): a. body – dorsal view, b. siphunculus, c. eye, d. right hind leg, e. apical part of rostrum, f. right antenna – ventral view, g. apical part of body – ventral view, h. apical part of body – dorsal view.

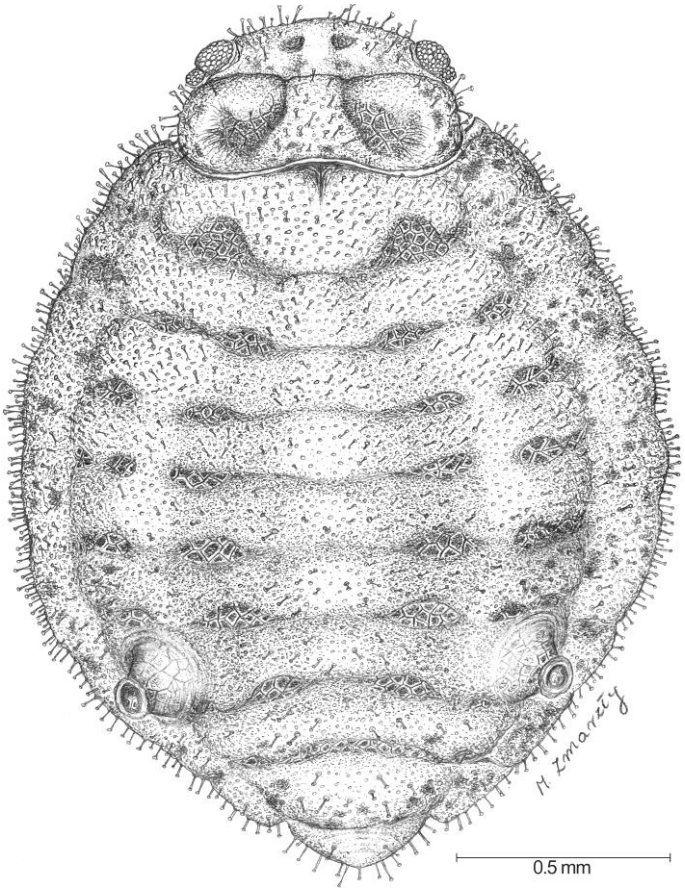

Fig. 3. *Wojciechaphis andrei* sp. nov. – reconstruction – dorsal view.

posterior margin of each segment. Body segments between mesothorax and siphunculi with wax glands arranged in four rows; mesothorax with only one pair of wax glands; a similar number of wax gland plates between siphunculi. Penultimate segment with wax glands arranged along the posterior tergite margin. Siphunculi: height 0.10, base diameter 0.11-0.15, diameter of flange at the apex: 0.06-0.07 inside, 0.08-0.09 outside. Distance between fore and middle coxae of the same size as between middle and hind coxae. Legs short. Length of fore leg segments: coxa 0.08, trochanter 0.05, femur 0.35, tibia 0.31, tarsus: I 0.03, II 0.08. Length of middle leg segments: coxa 0.12, femur 0.39, tibia 0.40, tarsus: I 0.05, II 0.10. Length of hind leg segments: coxa 0.15, trochanter 0.06, femur 0.37, tibiae 0.45 (0.50 larva), equal to 1/4 of the body length, tarsus: I 0.04, II 0.08-0.12. Posterior margin of anal plate curved anteriorly, reaching 1/2 of the plate length. Width of cauda base 0.11, length of cauda 0.18. Cauda slightly narrowed (0.05 mm in width) at its basal 1/3.

Genus: *Mengeaphis* HEIE, 1967

Type species: *Lachnus glandulosa* MENGE, 1856.

Species: *Mengeaphis glandulosa* (MENGE, 1856) (Figs 4, 5)

Type locality. Baltic amber (Eocene).

Material. GPIH 4574, coll. Gröhn No. 3407 (apterous viviparous female).

Description. Body oval, 1.5x as long (1.45) as wide (1.00), covered with very numerous, long, capitate bristles (0.11-0.13). Bristles almost as long as the last antennal segment, and longer than siphunculi height. Head wide (0.37), more than 2x as wide as long (0.19). Protuberance (ocular tubercle) bearing large triommatidium, equal to 1/3 of compound eye diameter. Rostrum long (1.85), almost 1/2 extends beyond the body. Length of rostral segments III and IV 0.10 and 0.15, respectively. Antennae short as long as hind tibiae (0.47). Antennae segments: II 0.06, III 0.14, IV 0.07, V 0.12 [(width 0.03), Vb 0.01]. Processus terminalis very short, equal to 1/2 of the last antennal segment width. Pronotum (length 0.17, width 0.53) rectangular. Thoracic and abdominal segments similar in structure, covered with numerous rows of bristles. Siphunculi stump-shaped, diameter of the apex: 0.04 inside, 0.06 outside. Cauda triangular with a broad base (0.17), more than 1.5x as wide as long (0.10). Anal plate uniform, V-curved (length 0.05, width 0.19), 1/2 of cauda length.

DISCUSSION

The aphids of the new genus and species share a similar oval body shape with apterous viviparous *Mengeaphis glandulosa*. The dorsal part of the body of both aphid taxa is covered with capitate bristles, which, however, differ in their length. In *Mengeaphis*, the bristles are much longer (almost as long as the last antennal segment and longer than the height of the siphunculi), whereas in *Wojciechaphis* they are at most as long as 1/2 of the last antennal segment and equal to 1/3 of the height of the siphunculi. Another discriminatory feature is that there are no wax glands on the body tergites in *Mengeaphis*, whereas they are well developed in *Wojciechaphis*. The siphunculi of the new genus are probably also higher than those in *Mengeaphis.* Moreover, the new genus and *Mengeaphis* differ in the structure of the rostrum and cauda. Larvae of *Mengeaphis* have a very long

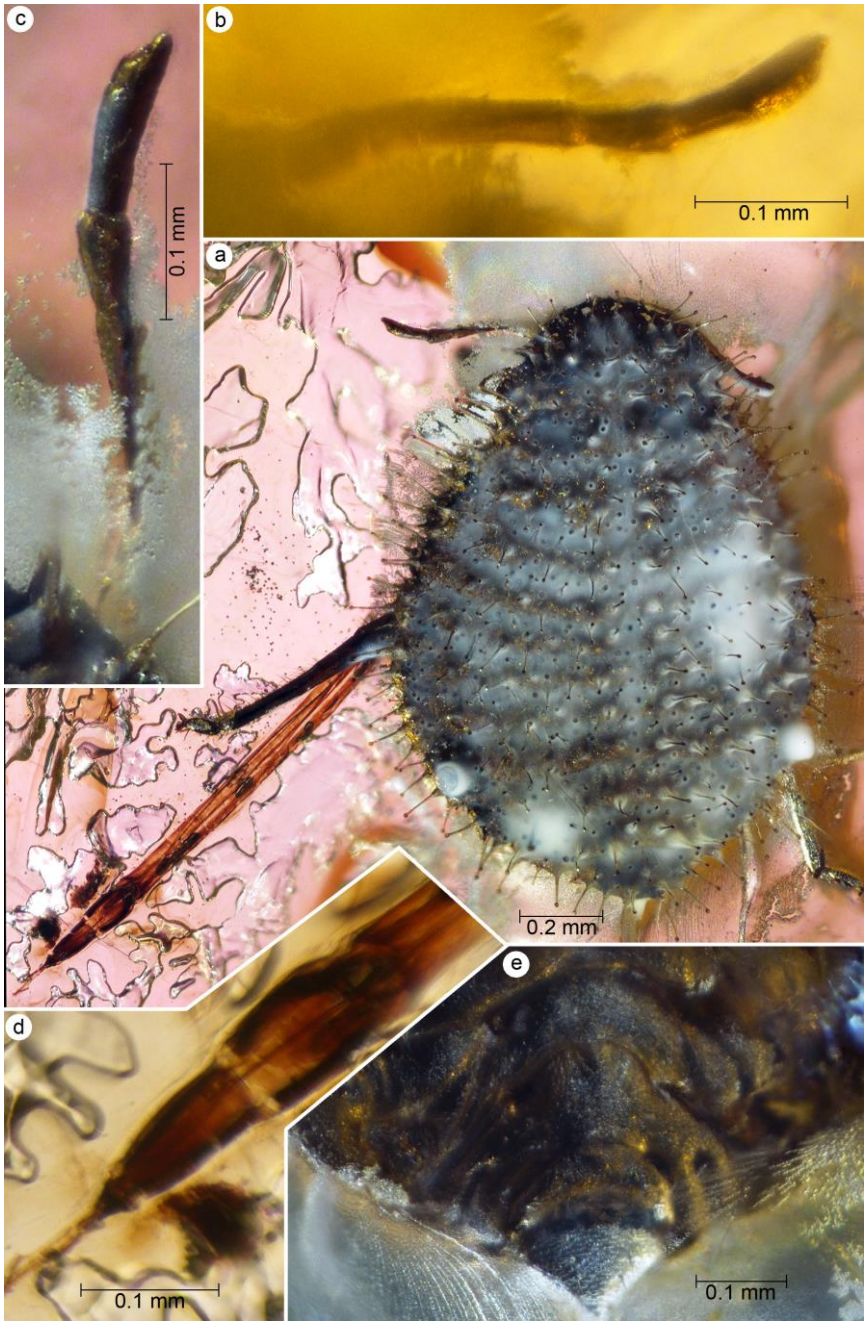

Fig. 4. *Mengeaphis glandulosa* GPIH 4574, coll. GRÖHN No. 3407 (apterous viviparous female): a. body – dorsal view, b. left antenna – ventral view, c. apical part of left antenna – dorsal view, d. apical part of rostrum, e. apical part of body – dorsal view.

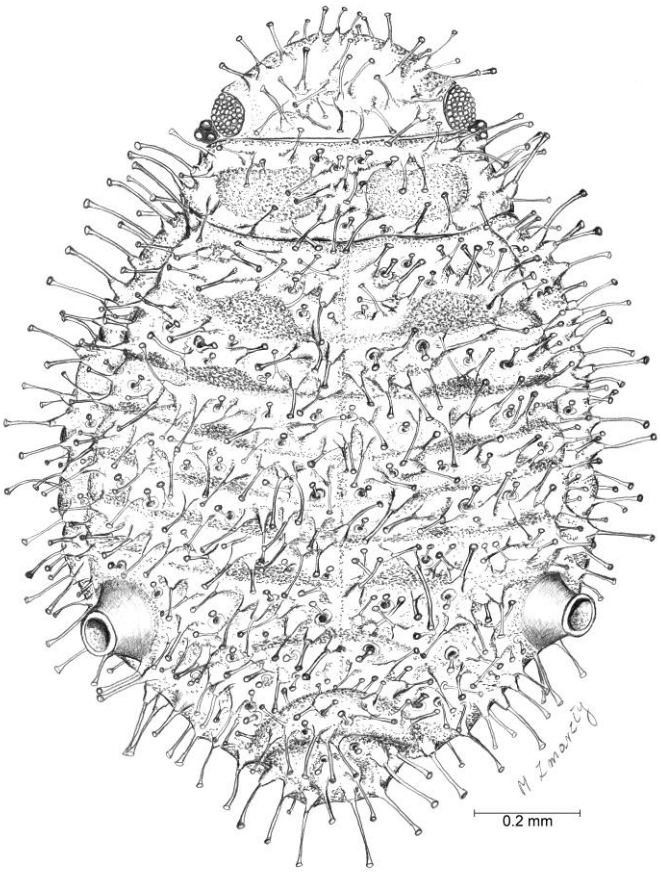

Fig. 5. *Mengeaphis glandulosa* – reconstruction – dorsal view.

rostrum, almost twice as long as the body length, and in their mature morphs almost half of the rostrum extends beyond the body. In contrast, the rostrum of *Wojciechaphis* is not longer than the body length, although it does reach its posterior margin. As mentioned above, these genera differ substantially from each other in the shape of the cauda: in *Mengeaphis* this is broadly positioned and triangular, while in *Wojciechaphis* it is finger-shaped. The shape of the cauda in *Mengeaphis* is similar to the cauda of the recent genus *Betulaphis* GLENDENNING, 1926, and both genera have a similar type of bristle covering the body dorsally. However, the bristles of *Betulaphis* are much shorter and more sparsely distributed over the body. Additionally, the representatives of *Betulaphi*s have a very short rostrum with a short and wide apical rostral segment ("[…] rostrum rather short and thick, reaching just past fore coxae […]") (HEIE 1982), and different antennae with a clearly

longer processus terminalis. Many extant (BLACKMAN & EASTOP 2000) and extinct aphid genera of different groups have a similar structure of both siphunculi (e.g. *Neuquenaphis* BLANCHARD, 1939, *Betacallis* MATSUMURA, 1919, *Calaphis* WALSH, (1862) 1863) and cauda (e.g. *Calaphis*, *Clethrobius* MORDIVLKO, 1928, *Neobetulaphis* A.N. BASU, 1964 and *Neuquenaphis*) to those that occur in *Wojciechaphis*. Nevertheless, the unique combination of features, such as chaetotaxy, stump-shaped siphunculi, short antennae, long rostrum, and deeply indented anal plate allow us to create a new aphid genus.

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