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THE SECOND CRETACEOUS GALL MIDGE GENUS OF THE TRIBE DIALLACTIINI (DIPTERA, CECIDOMYIIDAE) FROM THE LATE CRETACEOUS BURMESE AMBER

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The Second Cretaceous Gall Midge Genus of the Tribe Diallactiini (Diptera, Cecidomyiidae) from the Late Cretaceous Burmese Amber. Perkovsky, E. E., Fedotova, Z. A. — *Ganseriella pankowskiorum* Fedotova et Perkovsky, gen. et sp. n. has been described from the Late Cretaceous Burmese amber. The new genus is closely related to the genus *Chastomera* Skuse, 1888 **stat. resurr.**, which was considered a synonym of *Haplusia* Karsch, 1877. Earlier, only *Winnertzia burmitica* (Cockerell) (Winnertziini) was described from Burmese amber. The new species is the first described Cretaceous representative of the tribe Diallactiini from Asia. Three species of fossil Diallactiini were described earlier: *Cretohaplusia ortunoi* Arillo et Nel, *Palaeocolpodia eocenica* Meunier and *Diallactia bifurcata* (Fedotova, 2004). The genera and species compositions of Cretaceous gall midges and fossil Diallactiini are reviewed.
Key words: Late Cretaceous, Burmese amber, Cecidomyiidae, gall midges, new genus, new species.

This publication continues a series of descriptions of new genera and species of gall midges from amber. Herein we describe a new genus and species from Cretaceous Burmese amber. Fossil gall midges are very poorly understood, although they are widespread in amber. We have described 30 genera and 104 species of gall midges in samples of different ambers: Late Eocene Rovno amber (21 genus, 90 species; Fedotova and Perkovsky, 2017), Late Eocene Baltic amber (5 species), Santonian Taimyr amber (8 genera, 8 species) and Middle Eocene Sakhalinian amber (1 genus and 1 species). The bibliography list has been given by Fedotova, Perkovsky (2016 a, b) and Perkovsky, Fedotova (2016). The highest diversity of gall midges is characteristic for Late Eocene Rovno amber (overview of Lagerstätte is given in Perkovsky et al., 2010). Taxonomic overview of gall midges from Rovno amber was provided by Fedotova, Perkovsky (2009).

Information on Mesozoic gall midges is scarce. The only presently known Jurassic gall midge, *Catotricha mesozoica* Kovalev (Kovalev, 1990) (Lestremiidae, Catotrichinae), is represented by an imprint in Late Jurassic deposits (Glushkovo Formation, Transbaikalia); this species was later attributed to a monotypic genus *Mesotrichoca* Jaschhof et Jaschhof, 2008 (Jaschhof, Jaschhof, 2008). Genera and species of Cretaceous gall midges (16 species of 14 genera) were listed earlier (Fedotova, Perkovsky, 2016 a).

Lestremiidae and Porricondylinae (Cecidomyiidae) occur in the following Cretaceous ambers:

Burmese amber, earliest Cenomanian (Cockerell, 1917, Evenhuis, 1994, 2014). Only two species of gall midges are known from two genera of Porricondylinae, including the first Cretaceous species, *Winnertzia burmitica* (Cockerell, 1917) (Winnertziini) and *Ganseriella pankowskiorum* Fedotova et Perkovsky gen. n. sp. n. (Diallactiini).

Spanish amber, Early Albian (Arillo, Nel, 2000). Two species from two genera were described from Álava amber: *Eltxo cretaceus* Arillo et Nel (Lestremiidae, Strobliellini), *Cretohaplusia ortunoi* Arillo et Nel (Porricondylinae, Diallactiini).

Taimyr amber (Yantardakh), Santonian (Fedotova, Perkovsky, 2016 a) has a very diverse fauna. Gall midges of eight species from eight genera been recorded: Lestremiidae, Micromyinae: *Caputmunda yantardakhica* Fedotova et Perkovsky (Catochini), *Cretoperomyia dmitrii* Fedotova et Perkovsky (Peromyiini), *Palaeostrobliella zherikhini* Fedotova et Perkovsky, *Yantardakhiella pusilla* Fedotova et Perkovsky, *Zherikhiniella*

pedicellata Fedotova et Perkovsky (Strobliellini), *Menssana norilsk* Fedotova et Perkovsky (Micromyini), *Cretomycophila ekaterinae* Fedotova et Perkovsky, *Corporesana khatanga* Fedotova et Perkovsky (Aprionini). Two Porricondylinae (Cecidomyiidae) fragments not identified to genus have been recorded (Fedotova, Perkovsky, 2016 a). Species belonging to the subfamily Micromyinae of the family Lestremiidae prevail in the fauna. The tribe Strobliellini is represented by three species of three genera. Species of this tribe are very rare in the modern fauna, with only seven species of five genera described to date.

Canadian amber (Medicine Hat), Campanian (Gagné, 1977). Four species from four genera: Lestremiidae: Micromyinae: *Cretocatocha mcalpinei* Gagné (Catochini); *Cretocordylomyia quadriseries* Gagné (Campylomyzini); Cecidomyiidae, Porricondylinae: *Cretowinnertzia angustata* Gagné (Winnertziini); Lasiopterinae: *Cretomiastor ferejunctus* Gagné (Heteropezidi, Miastorini).

Vendean amber. Recently, in the Late Cretaceous amber from the north-western France four specimens of gall midges have been identified; their taxonomic position is not specified (Perrichot, Néraudeau, 2014).

The new genus belongs to the tribe Diallactiini Jaschhof, 2013. The world fauna of Diallactiini includes 45 species from 13 genera, which occur in all zoogeographic regions, with the highest generic and specific diversity found in the tropics — although Afrotropical diallactiines are poorly studied (Jaschhof, 2016).

Fossil Dialactiini were found in many amber deposits: Early Albian Spanish amber (Álava, see above, El Soplao, 1 undescribed), earliest Cenomanian Burmese amber (this paper; 1 undescribed), Early Eocene Fushun amber (1 undescribed) (table 1). There is one named species from Late Eocene Rovno Amber and one from Late Eocene Baltic amber (table 1). Six additional undescribed species of the gall midges from four Dialactiini genera are currently deposited in the amber collection of the Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine (Kiev), referred to as SIZK below, thus making a total of seven Dialactiini out of more than 650 gall midges of SIZK.

Other undescribed species are listed (table 1) according to the reports and photos from different papers. In the study of fossil insects, Eocene Fushun amber from China has been largely overlooked. The study by Ross (2014) reveals a highly diverse biota and provides a

Table 1. Records of fossil Diallactini

Species	References	Origin	Locality
Cretohaplusia ortunoi Arillo et Nel, 2000, male	Arillo, Nel, 2000; *Jonsonomyia* ? or *Gynapteromyia* ? (Jaschhof, 2016)	Lower Cretaceous, Lower Albian, Álava amber	Peñacerrada, Northern Spain
Cecidomyiidae sp. 1, male, photo	Unplaced sp. (Pérez de la Fuente et al., 2009, plate 1 A; Najarro et al., 2009, fig. 12 C)	Lower Cretaceous, Lower Albian, El Soplao amber	El Soplao, Cantabria, Basque-Cantabrian Basin, Northern Spain
Ganseriella pankovskiorum Fedotova et Perkovsky, gen. et sp. n., male	This paper	Upper Cretaceous, lowest Cenomanian, Burmese amber (99 mya)	Hukawng Valley mines of Myanmar
Diallactini sp., male, photo	*Johnsonomyia* ? (Jaschhof, 2016, fig. 1)	Upper Cretaceous, lowest Cenomanian, Burmese amber (99 mya)	Hukawng Valley mines of Myanmar
Cecidomyiidae sp. 2, female, photo	Unplaced sp. (Ross, 2014, fig. 2)	Lower Eocene, Guchenzi Formation, Fushun amber (50–53 mya)	opencast coal-mine, south of Fushun City, Liaoning Province, China (Wang et al., 2014; Ross, 2014)
Palaeocolpodia eocenica Meunier, 1904, sex is questionable	Meunier, 1904; *Chastomera*?, *Johnsonomyia*?, *Diallactes*? (Mamaev, 1964, 1968); *Haplusia* (Gagné, 1978); unclear, nomina dubia (Jaschhof, 2016)	Upper Eocene, Baltic amber	Gdańsk bay
Diallactia bifurcata (Fedotova, 2004), female (SIZK UA-1372)	*Diadocidia bifurcata* Fedotova, 2004 (Fedotova, Perkovsky, 2004, 2007)	Upper Eocene, Rovno amber	Rovno Region, Ukraine (Perkovsky et al., 2010, text, fig. 5)

wealth of new information on the past Asian insect fauna reported. The photo of an unidentified female Cecidomyiidae, the first gall midge recorded in Fushun amber, belongs to Diallactiini (table 1). The short review of fossil Diallactiini and photo of the undescribed gall midge from Burmese amber are also presented in article by Jaschhof (2016).

Larvae of some species of Diallactiini are xylobiont and mycophagous; adults have been reared from rotting wood; some species reared from the forest and meadow soil are associated with fungal fruiting bodies or rotting tissue (Mamaev, Krivosheina, 1965; Spungis, 1985). Adults of *Diallactia croceus* (Kieffer, 1894) were reared from larvae living in mouldering food in a forest (Kieffer, 1894).

The holotype is deposited in the amber collection of SIZK. Photographs have been taken by Huarong Chen (Toronto) and the authors using a AxioCam MRc5 T2-C ZEISS camera attached to a ZEISS Imager M1 "Axio Imager".

Superfamily CECIDOMYIOIDEA Newman, 1834
Family CECIDOMYIIDAE Newman, 1834
Subfamily PORRICONDYLINAE Kieffer, 1913
Tribe Diallactiini Jaschhof, 2013

Genus *Ganseriella* Fedotova et Perkovsky**, gen. n.**

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Type species: *Ganseriella pankowskiorum* Fedotova et Perkovsky, **sp. n.**

Description (figs 1, *1–3*; 2, *1–8*; 3, *1–10*). Male. Body slightly longer than wings. Head elongate; eyes fused, positioned around head, without narrow bridge, occiput wide, rounded. Antennae 2+14-segmented, scape very long, slightly enlarged distally, basally narrower than round pedicel. All flagellomeres with distinct very narrow and long necks, but basal enlargements have different forms. Basal enlargement on proximal flagellomeres almost parallel-sided, on medial flagellomeres prolonged swollen, on distal flagellomeres slightly swollen or almost round. Basal enlargement of 1st and 2nd flagellomeres slightly narrowed medially. Proximal flagellomeres much wider and longer than distal ones. Basal enlargement of flagellomeres with basal whorls of very short dense setae and medial crenulate whorls of very long setae strongly curved basally. Distal part of basal enlargement with apical whorl of very long setae reaching of next flagellomere. Necks of flagellomeres always longer than basal enlargement, especially in middle flagellomeres. Mouthparts strongly elongate and wide. Palpi much longer than height of head, 4-segmented, the 3rd and 4th ones longest. Wing evenly and very strongly widened medially, vein *m+rm* slightly curved medially, R_5 slightly curved apically, joining margin of wing behind wing tip; *rs* very strong; *Cu* simple, positioned far from margin of wing, reaching wing edge, forming large lobe. Anal vein clear. Cell between veins *C* and R_{1+2} distinctly sclerotized. Costal vein with break beyond its joining point with R_5. Legs completely densely covered with short setae and sparse long setae. Fore and hind femora longer than their tibia, middle femur and tibia. Middle femora shorter than tibia. All tibia subequal in length. Abdomen slightly swollen near middle (2nd–4th segments) and narrowed distally. Abdominal segments covered by very long setae. Genitalia transverse. Gonocoxite wide, slightly rounded on outside margin, with dense long setae and almost rectangular on inner margin. Gonostylus long and strongly enlarged basally, with long apical dent. Tegmen very long, pointed apically, much longer than gonocoxites (lateral view, fig. 3, *9*).

Comparison. The shape of the body, 2+14-segmented antennae, wing venation, long legs and forms of gonocoxites and gonostyles of the new genus imply its close relation to *Johnsonomyia* Felt, 1908 (Felt, 1908; Mamaev, 1964, 1966; Spungis, 1985; Jaschhof, Jaschhof, 2013; Jaschhof, 2016), but the new genus differs from it in the elongated segments of palpi, very large eyes, absence of narrow eye bridge, different shape of flagellomeres, very

long necks of flagellomeres, presence of very dense long setae of apical whorl of the basal enlargement of flagellomeres, wider and shorter wing, vein R_5 joining the wing margin far behind the wing tip, presence of sclerotisation of the wing cell between veins *C* and R_{1+2};

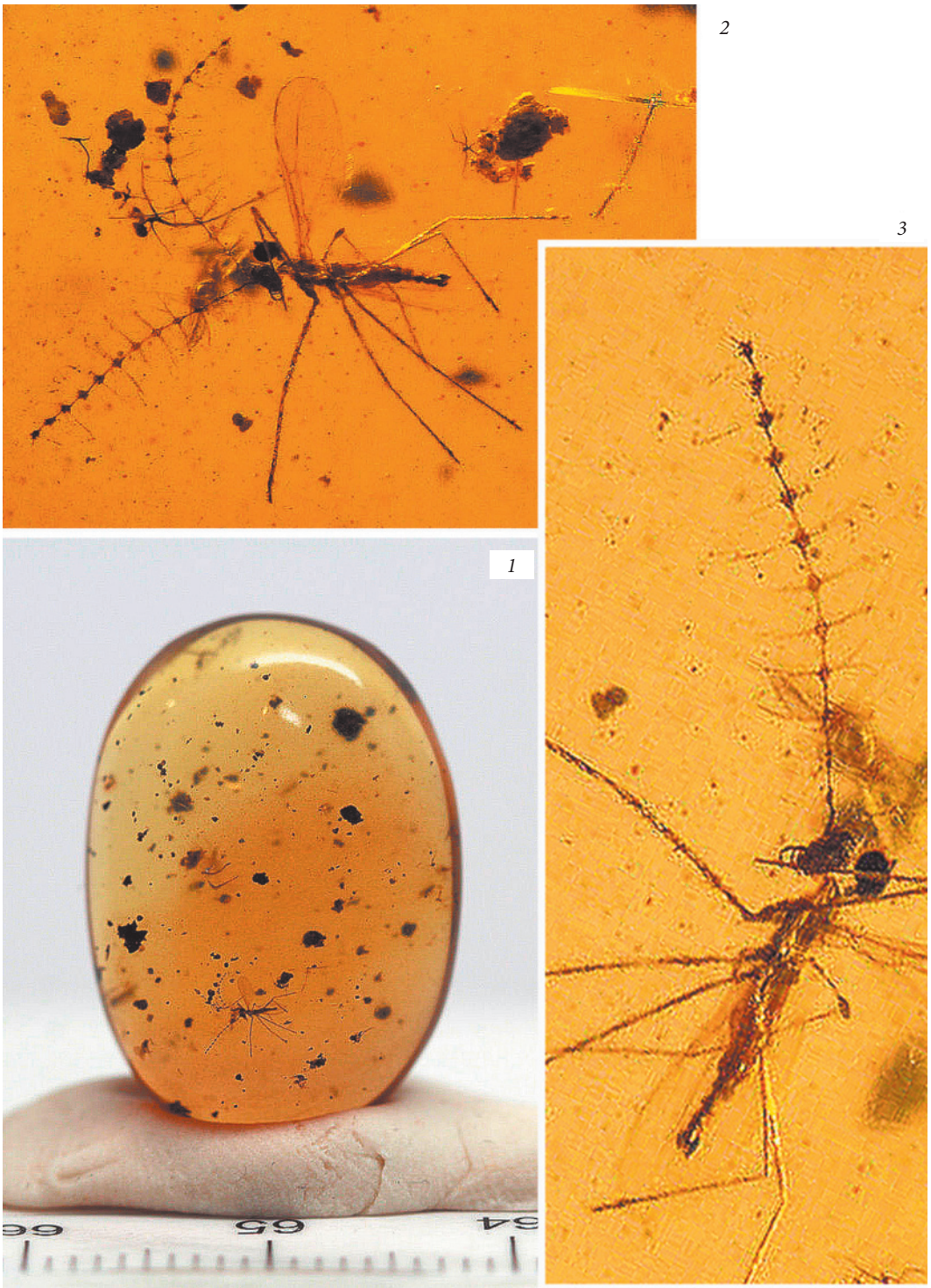

Fig. 1. *Ganseriella pankowskiorum*, male, holotype SIZK, Bu–1: *1* — amber with holotype (×3.3); *2* — general appearance (×22); *3* — body and antennae (×29).

very long pointed tegmen, and smaller body size. The new genus is closely related to *Chastomera* Skuse, 1889, which is currently considered a synonym of *Haplusia* Karsch, 1877, but differs from it in a longer *rs* and part of R_{1+2} from *rs* to fusing with *C*, in the very long

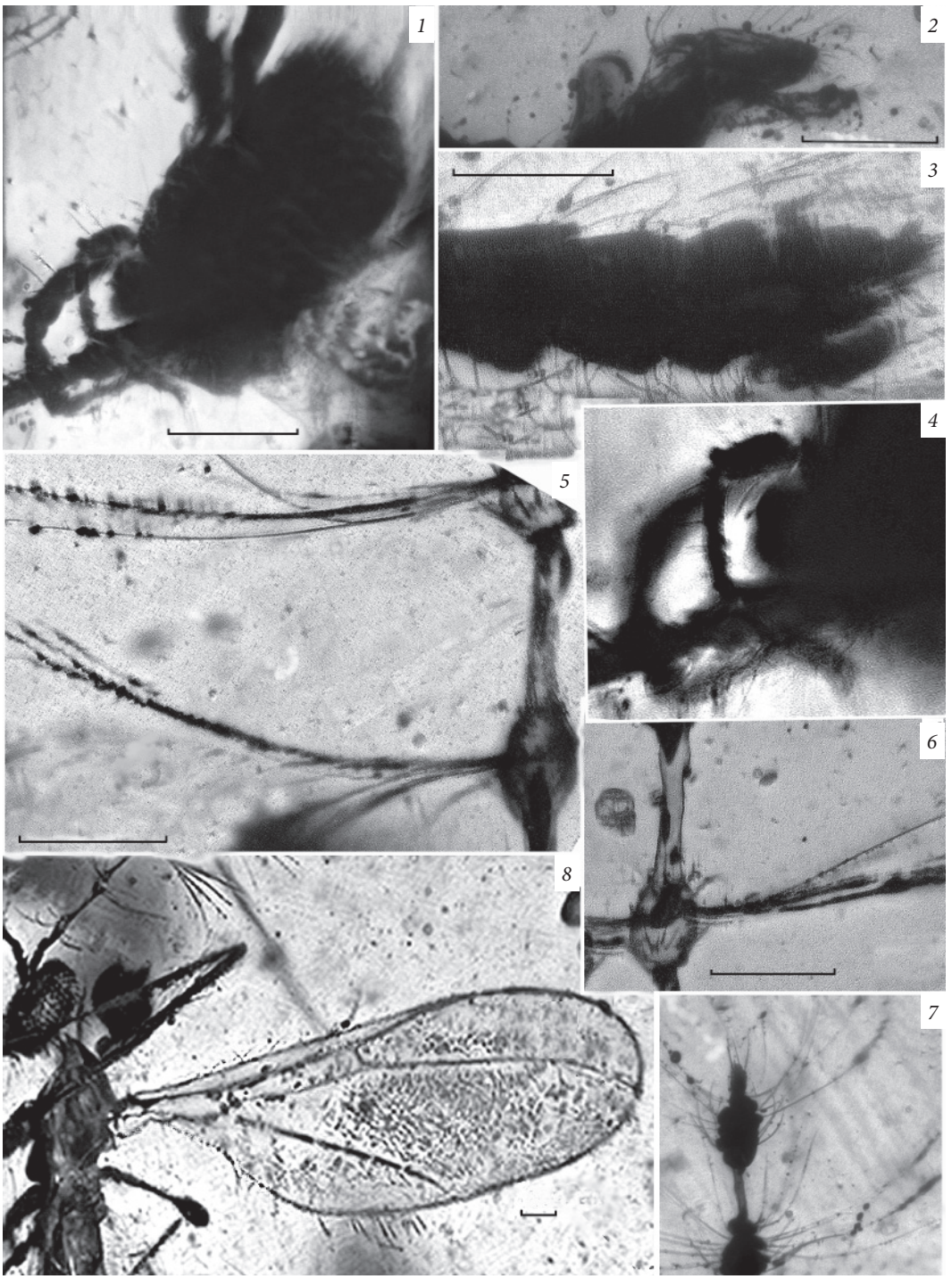

Fig. 2. *Ganseriella pankowskiorum*, male, holotype SIZK, Bu–1: *1* — head and palpi (×189); *2, 3* — genitalia (*2* — lateral view, ×422; *3* — ventral view, ×256); *4* — palpi (×247); *5* — flagellomere 5 (×215); *6* — flagellomere 9 (×180); *7* — flagellomere 13 and 14 (×162); *8* — scape, pedicel, flagellomere 1 and 2, head, thorax, wing and base of abdomen (×56). Scale bar 0.1 mm.

palpi, in absence of dorso-apical projection on medial surface of gonocoxite, in the presence of long pointed tegmen, and in the smaller body size. *Chastomera* Skuse, 1888 **stat. resurr.** is obviously a separate genus, distinct from *Haplusia*, as the redescription of the holotype of type species *Ch. bella* Skuse shows (Skuse, 1888; Kolesik, Gagné, 2016) and does not meet the original diagnosis of *Haplusia* (Karsch, 1877) and the numerous diagnoses

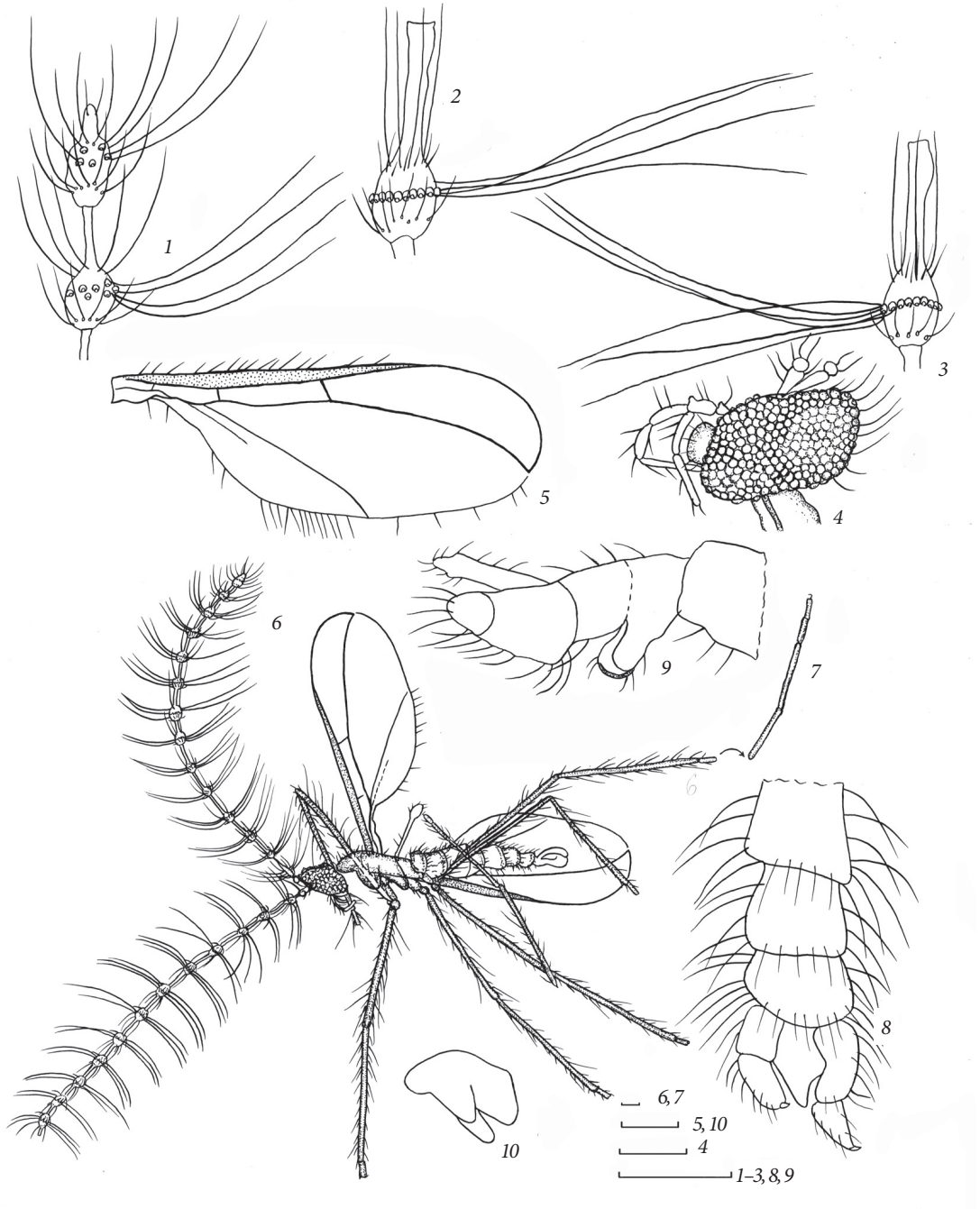

Fig. 3. *Ganseriella pankowskiorum*, male, holotype SIZK, Bu–1 (*1–10*): *1* — flagellomere 13 and 14; *2* — flagellomere 5; 3 — flagellomere 9; *4* — head, scapus, pedicel and palpi; *5* — wing; *6* — general appearance; *7* — 2nd–5th tarsomeres; *8*, *9* — abdominal segments 6–8 and genitalia (*8* — view dorsally and *9* — laterally); *10* — thorax.

of the genus *Haplusia* given earlier (Mamaev, 1964, 1966; Gagné, 1978; Jaschhof, 2016; Kolesik, Gagné, 2016). The new genus differs from *Haplusia* in very long pointed tegmen, very wide cell of wing between veins *C* and R_{4+5}, and also *CuA* and wing margin, very long and short dense setae in apical whorl of basal enlargement of flagellomeres (only short in *Haplusia*) and very long neck of middle flagellomeres, additionally.in the absence of a dark spot around vein *rs* and on vein *CuA* and in the not banded legs.

E t y m o l o g y . The generic name is an arbitrary combination of letters. Gender feminine.

Ganseriella pankowskiorum Fedotova et Perkovsky, **sp. n.**

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M a t e r i a l . Holotype. SIZK Bu–1, well preserved inclusion of male with tarsi missing, Burmese amber, earliest Cenomanian (fig. 3, *1–10*).

D e s c r i p t i o n . Male (fig. 3, *1–10*). Body (with genitalia) is 1.3 times shorter than antennae. Antenna 1.5 times as long as wing. Head with large eyes that laterally cover all width of head. Scape 1.8 times as long as round pedicel. 1st flagellomere 6.0 times as long as wide. 2nd flagellomere as long as 1st. 5th flagellomere 3.8 times as long as wide, slightly shorter than 1st flagellomere; basal enlargement 1.8 times shorter than neck. 13th flagellomere 1.2 times as long as 14th and 0.56 times as long as 5th; 14th flagellomere with long projection and rounded apically. Palpi very narrow, parallel-sided laterally. 2nd, 3rd and 4th segments strongly prolonged, more than 2.0–2.5 times as long as 1st. Wing is 2.7 times as long as wide. Vein R_{1+2} 0.63 times as long as wing length. Hind femur 1.2 times as long as profemur. Ratio of hind tarsi 1:7.8:5.8:2.3:1.3. Gonostylus wide and almost parallel-sided distally, 1.7 times as long as gonocoxites. Tegmen wide, narrowed near apex, reaching short of gonostylus.

M e a s u r e m e n t s (mm): body length, 1.60; antennal length, 2.13; head length, 0.26; width of lateral side of head, 0.15; palpi length, 0.23; thorax length, 0.38; wing length, 1.43; wing width, 0.53; vein R_{1+2}, 0.90; halter length, 0.21; length of fore: coxa, 0.20; trochanter, 0.05, femur, 0.77, tibia, 0.71; metatarsus, 0.11; length of middle: femur, 0.69, tibia, 0.74, length of hind: femur, 0.93; tibia, 0.85; abdomen length, 0.98; genitalia length, 0.09.

E t y m o l o g y . The species is named after Mark A. Pankowski and his father Mark S. Pankowski (Rockville, Maryland, USA) for donating the holotype to the amber collection of the Schmalhausen Institute of Zoology, the National Academy of Sciences of Ukraine.

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