Paleontological Journal, Vol. 32, No. 1, 1998, pp. 54–59. Translated from Paleontologicheskii Zhurnal, No. 1, 1998, pp. 58–62.

Fungus Gnats of the Tribes Gnoristini and Leiini (Diptera, Mycetophilidae) from the Early Cretaceous of Transbaikalia

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Received September 19, 1996

Abstract—Two new genera with five new species of fungus gnats of the tribe Gnoristini and two new genera with four new species of the tribe Leiini are described from the Lower Cretaceous of Transbaikalia.

INTRODUCTION

This paper continues the study of the fauna from the richest Lower Cretaceous insect locality (Blagoderov, 1995, 1997). All the mycetophilid specimens described below were collected in the Baisa locality: Buryatia, Eravnenskii District, left bank of the Vitim River downstream of the mouth of the Baisa River; Lower Cretaceous, Zaza Formation. The material is housed in the collection of the Paleontological Institute, Russian Academy of Sciences (PIN). The veins and their sections are designated after Blagoderov (1993). The numeration of layers of the locality is given after Martinson (1961).

SYSTEMATIC PALEONTOLOGY

Family Mycetophilidae Newman, 1834

Subfamily Sciophilinae Winnertz, 1863

Tribe Gnoristini Edwards, 1925

Genus *Ipsaneusidalys* Blagoderov, gen. nov.

Etymology. Anagram from *Pseudalysiinia*.

Type species. *I. communis* sp. nov.

Diagnosis. Dark colored gnats of medium and small size. Costal vein with two rows of setae, R, R_1, R_5 and *r-m* with one row each, remaining veins bare. Sc entering C. Sc_2 close to Sc apex. R_4 absent. Main R stem (up to *r-m*) longer than R_1 (distal R section beyond *r-m*). Crossvein *r-m* at least twice longer than RS1 and less than twice shorter than M3. Base of M_{3+4} + CuA fork more proximal than M_1 and M_2 fork. Pleurotergite and mediotergite pilose. Mesonotum strongly arched.

Composition. Three species from the Lower Cretaceous of Transbaikalia.

Comparison. Distinct from the extant genus *Pseudalysiinia* Tonnoir, 1929 in the pilose body, setal rows on legs, and Sc entering C. From the other Mesozoic genera of the tribe Gnoristini distinct in the absence of R_4.

Ipsaneusidalys communis Blagoderov, sp. nov.

Plate 4, fig. 1

Etymology. Latin *communis* (common).

Holotype. PIN, no. 3064/9760, part and counterpart of complete insect; Baisa; Zaza Formation, bed 31.

Description (Fig. 1a). Small, dark colored gnats. The scape and pedicel are rounded; The 1st flagellomere is trapezoidal, remaining ones cylindrical. The flagellum is 14-segmented. The length of mouthparts is subequal to the head height. The wing is moderately broad, 2.2–2.5 times as long as wide. The setae on C long, as long as, or (proximally) longer than, the diameter of C. The C is extended beyond the R_5 for 1/3 distance between R_5 and M_1. The Sc enters the C at the level of junction of *r-m* and M stem. The Sc_2 is situated at the level of the M_{3+4} + CuA fork. The R_1 is 0.8 as long as the wing. The length ratio of the RS1 and RS2 sections is 1 : 12–14, that of the RS1 section and *r-m* 1 : 2.5. The *r-m* crossvein is as long as, or a little shorter than, the M3 section. The M_1 and M_2 fork is 5–6 times longer than the M3 section. The middle and hind tibiae bear, besides the hairs, several rows of black setae which are as long as the tibia width. The setae on the fore tibiae are more sparse and much shorter. The middle and hind tarsi bear black setae, mainly at the apices of the tarsomeres. The abdomen of seven visible segments is widest at the level of the third segment and covered with quite long hairs.

Measurements (mm): body length, 3–4 (4 in the holotype); wing length, 3–3.8 (3.8 in the holotype).

Material. Besides the holotype, paratypes PIN, no. 3064/9867 and 3064/9894, females (part and counterpart), and 3064/9881, sex unknown (negative impression); all from bed 31.

Ipsaneusidalys latipennis Blagoderov, sp. nov.

Plate 4, fig. 2

Etymology. From Latin *latus* (broad) and *penna* (wing).

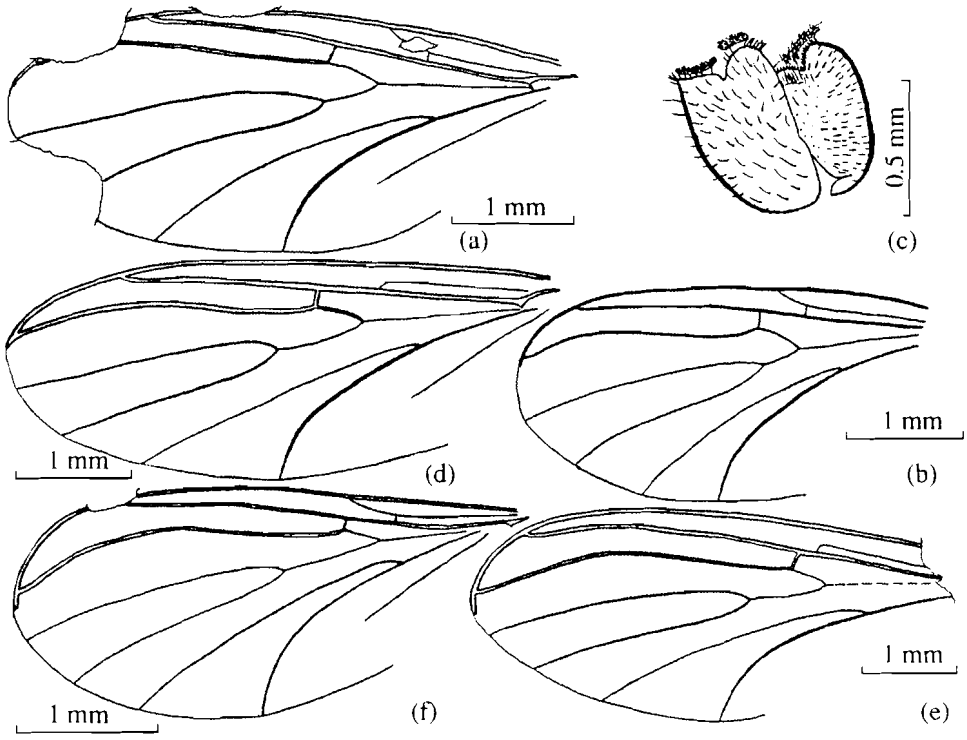

Fig. 1. Species of the genera *Ipsaneusidalys* and *Metahadroneura*: (a) *I. communis* sp. nov., holotype PIN, no. 3064/9760, wing; (b–c) *I. latipennis* sp. nov., holotype PIN, no. 4210/2938: (b) wing, (c) genital complex; (d) *I. longipennis* sp. nov., holotype PIN, no. 3064/9872, wing; (e) *M. major* sp. nov., holotype PIN, no. 3064/9780, wing; (f) *M. minor* sp. nov., holotype PIN, no. 3064/9794, wing.

Holotype. PIN, no. 4210/2938, part and counterpart of the male; Baisa; Zaza Formation, bed 22.

Description (Figs. 1b, 1c). Small, dark colored gnats. The flagellum is 11-segmented. The flagellomeres are cylindrical, slender and short. The antennae are dark, as long as the thorax. The wing is broad, twice as long as wide. The C is extended beyond the R_5 for 1/3 distance between the R_5 and M_1. The Sc enters the C a little before the RS level. The Sc_2 is situated at the level of the junction of the *r-m* and M stem. The R_1 is 0.9 as long as the wing. The R_5 is arched proximally. The length ratio of the RS1 and RS2 sections is 1 : 14, that of the RS1 section and *r-m* 1 : 2.7. The *r-m* crossvein is 1.4 times as long as the M3 section. The base of the M_{3+4} + CuA fork is a little proximad of both Sc_2 and the junction of the *r-m* and M stem. The M_1 and M_2 fork is 6.5 times longer than the M3 section. The distances between the apices of R_5, M_1, M_2, M_{3+4} and CuA are subequal. The 9th male tergum has an incision and is covered (as well as the gonocoxites) with long hairs. The gonostyli are rounded. The cerci have a brush of short dark setae.

Measurements (mm): body length, 4.5; wing length, 3.5.

Comparison. Distinct from *I. communis* in the longer Sc and R_1 veins, more distal position of Sc_2, and shorter M3 section.

Material. Besides the holotype, paratype PIN, nos. 3064/8670, male (bed 4).

***Ipsaneusidalys longipennis* Blagoderov, sp. nov.**

Plate 4, fig. 3

Etymology. From Latin *longus* (long) and *penna* (wing).

Holotype. PIN, no. 3064/9872, positive impression of the female; Baisa; Zaza Formation, bed 31.

Description (Fig. 1d). Middle-sized gnats. The head and thorax are dark, almost black. The abdomen is fuscous, its 8th segment as well as the cerci and antennal segments are pale fuscous. The wing is narrow, 2.7 times as long as wide. The C is only slightly extended beyond the R_5. The Sc enters the R a little before the junction of the *r-m* and M stem. The R_1 is 0.8 as long as the wing. The R_5 is S-shaped. The length ratio of the RS1 and RS2 is 1 : 14, that of the RS1 section and *r-m* 1 : 2.5. The *r-m* crossvein is 1.8 times shorter than the M3 section. The M_1 and M_2 fork is 8 times longer than the M3 section. The veins R_5 and M_1 converge distally, the M_2, M_{3+4} and CuA diverge. The distance between the M_{3+4} and CuA apices is 1.8 times longer than that between the M_1 and M_2 apices. The base of the M_{3+4} + CuA fork is situated proximad of the junction of the *r-m* and M stem. The abdomen is covered with sparse pale hairs, widest at the 3rd and 4th

Plate 4


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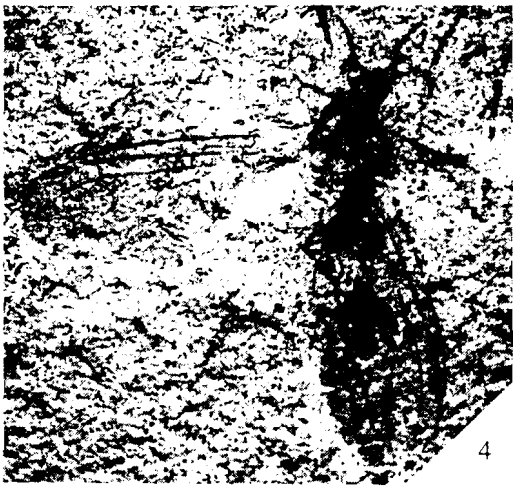
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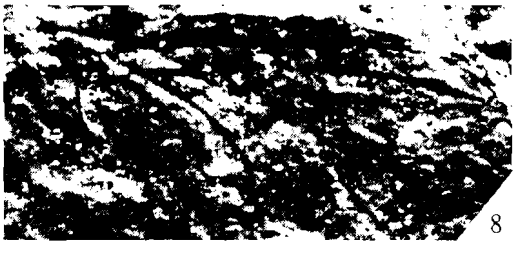
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segments. The 8th abdominal segment is twice shorter than the 7th one. The cerci are two-segmented, with the basal segment conical and basally as wide as the length of the 8th segment, and the distal segment is globular. The cerci are as long as the 7th abdominal segment.

Measurements (mm): body length (with head), 5.7; wing length, 4.7.

Comparison. Distinct from the other species in the relatively narrower wing, Sc entering R, and position of the R_5, M_1, M_2, M_{3+4} and CuA apices.

Remarks. In the venation this species is similar to the recent genus *Aglaomyia* Vockeroth, 1980, being distinct in the more proximal position of the M_{3+4} + CuA fork relative to Sc_2.

Material. Holotype.

Genus *Metahadroneura* Blagoderov, gen. nov.

Etymology. From Greek *meta* (beyond) and the genus *Hadroneura*.

Type species. *M. major* sp. nov.

Diagnosis. Gnats of medium and small size. Mesonotum moderately convex. Costal vein with three rows of setae, R, R_1 and *r-m* with one row each. C extended beyond R_5 for no less than 1/3 of distance between R_5 and M_1. The Sc entering C or R_1. R_4 absent. Crossvein *r-m* proximal, so that main R stem (up to *r-m*) shorter than R_1 (distal R section beyond *r-m*). Crossvein *r-m* longer than RS1 section, but more than twice shorter than M3 section. R_5 S-shaped, reaching wing tip. Base of M_{3+4} + CuA fork more proximal than junction of *r-m* and M stem.

Composition. Two species from the Lower Cretaceous of Transbaikalia.

Comparison. Distinct from *Ipsaneusidalys* in the longer M3 section and proximal *r-m* position. From the other Mesozoic genera of Gnoristini and from the recent *Hadroneura* Lundstrom, 1906, *Dziedzickia* Johansen, 1909 and *Acomoptera* Vockeroth, 1980 distinct in the absence of R_4, and from the latter genus also in the longer M_{3+4} + CuA fork. From the genera *Palaeodocosia* Meunier, 1904 and *Pseudalysiinia* Tonnoir, 1929 distinct in the longer M3 section and the R_5 reaching the wing tip.

Metahadroneura major Blagoderov, sp. nov.

Plate 4, fig. 4

Etymology. From Latin *major* (greater).

Holotype. PIN, no. 3064/9780, sex unknown (part and counterpart); Baisa; Zaza Formation, bed 31.

Description (Fig. 1e). The rostrum is shorter than the head. Three close-set ocelli are situated at the apex of the head. The wing is moderately broad, 2.2 times as long as wide. The Sc enters R_1 a little before the RS origin. The R_1 is 0.9 as long as the wing. The C is extended beyond the R_5 up to 1/2 of the distance between the R_5 and M_1. The length ratio of RS1 and RS2 sections is 1 : 15. The *r-m* crossvein is 1.7 times as long as the RS1 section, and twice shorter than the M3 section. The M_1 and M_2 fork is 3.5 times shorter than the M3 section. The veins R_5 and M_1 converge, the medial veins weakly diverge. The mesonotum is hairy. The tarsi are dark, with numerous small irregular black setae. The abdomen is dark, hairy, widest at the 4th and 5th segments.

Measurements (mm): body length, 7; wing length, 5.5.

Material. Holotype.

Metahadroneura minor Blagoderov, sp. nov.

Plate 4, fig. 5

Etymology. From Latin *minor* (smaller).

Holotype. PIN, no. 3064/9794(9797), female (part and counterpart); Baisa; Zaza Formation, bed 31.

Description (Fig. 1f). The wing is moderately broad, 2.2 times as long as wide. The Sc enters C a little beyond the RS origin. The Sc_2 is situated in the distal third of the Sc. The C is extended beyond the R_5 up to 1/3 of the distance between the R_5 and M_1. The length ratio of RS1 and RS2 sections is 1 : 18–20. The *r-m* crossvein is twice longer than the RS1 section, and 2.5 times shorter than the M3 section. The veins R_5 and M_1 converge, the medial veins diverge. The abdomen is dark, covered with sparse hairs of moderate length, widest at the 4th segment. The cerci are pale, clavate.

Measurements (mm): body length, 4.7; wing length, 3.7.

Comparison. Distinct from *M. major* in the longer Sc entering C, and smaller size.

Material. Holotype.

Explanation of Plate 4

Fig. 1. *Ipsaneusidalys communis* Blagoderov, sp. nov.; holotype PIN, no. 3064/9760, ×11.
Fig. 2. *Ipsaneusidalys latipennis* Blagoderov, sp. nov.; holotype PIN, no. 4210/2938, ×13.
Fig. 3. *Ipsaneusidalys longipennis* Blagoderov, sp. nov.; holotype PIN, no. 3064/9872, ×10.5.
Fig. 4. *Metahadroneura major* Blagoderov, sp. nov.; holotype PIN, no. 3064/9780, ×8.
Fig. 5. *Metahadroneura minor* Blagoderov, sp. nov.; holotype PIN, no. 3064/9794, ×10.
Fig. 6. *Docosia baisae* Blagoderov, sp. nov.; holotype PIN, no. 4210/2967, ×14.
Fig. 7. *Docosia zaza* Blagoderov, sp. nov.; holotype PIN, no. 4210/2963, ×14.
Fig. 8. *Baisepesthoneura mesozoica* Blagoderov, sp. nov.; holotype PIN, no. 4210/2860, ×21.
Fig. 9. *Palaeothoracotropis truculentus* Blagoderov, sp. nov.; holotype PIN, no. 1668/2120, ×9.5.

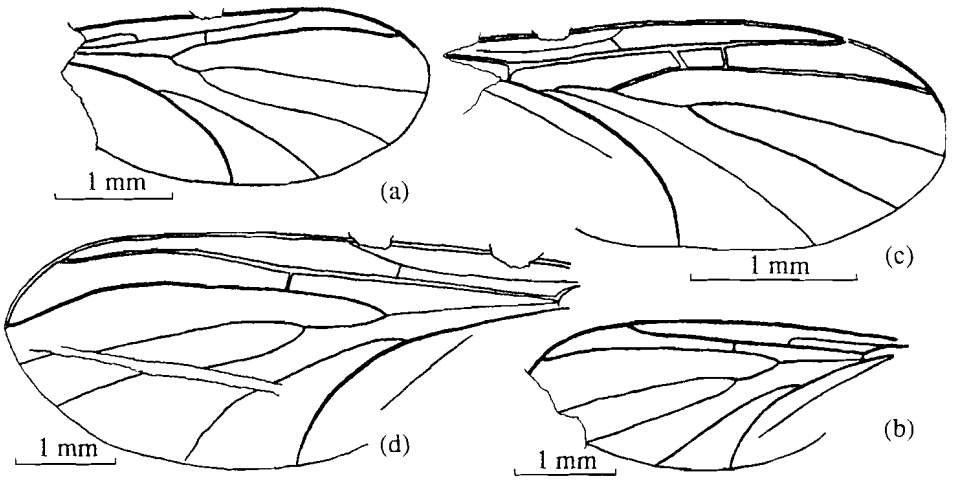

Fig. 2. Species of the genera *Docosia*, *Baisepesthoneura* and *Palaeothoracotropis*: (a) *D. baisae* sp. nov., holotype PIN, no. 4210/2967, wing; (b) *D. zaza* sp. nov., holotype PIN, no. 4210/2963, wing, (c) *B. mesozoica* sp. nov., holotype PIN, no. 4210/2860, wing; (d) *P. truculentus* sp. nov., holotype PIN, no. 1668/2120, wing.

Tribe Leiini Edwards, 1925

Genus *Docosia* Winnertz, 1863

***Docosia baisae* Blagoderov, sp. nov.**

Plate 4, fig. 6

Etymology. From the Baisa locality.

Holotype. PIN, no. 4210/2967, sex unknown (part and counterpart); Baisa; Zaza Formation, bed 31.

Description (Fig. 2a). The mesonotum is weakly convex, hairy. The costal vein bears two rows of setae, the R_1, R_5 and *r-m* one row each. The C is extended beyond the R_5 up to 1/3 of the distance between the R_5 and M_1. The Sc enters the R proximad of the base of M_{3+4} + CuA fork. The *r-m* crossvein is 2.5 times shorter than the R_1 and a little longer than the M3. The M_1 and M_2 fork is 6.5 times shorter than the M3 section. The base of the M_{3+4} + CuA fork is situated a little proximad of the M3 base.

Measurements (mm): body length, 2.5–3.5 (3.5 in holotype); wing length, 1.7–2.5 (2.5 in holotype).

Comparison. Distinct from the other *Docosia* species in the proximal position of the base of the M_{3+4} + CuA fork.

Remarks. In the specimens from the beds 15–20 the Sc enters the R at the level of the base of the M_{3+4} + CuA fork. It can not be excluded that they may belong to a separate species.

Material. Besides the holotype, paratype PIN, no. 4210/2859 (bed 2; sex unknown) and specimens nos. 3064/8784 (bed 15) and 4210/2891, 4210/2915 (part and counterpart; bed 18–20).

***Docosia zaza* Blagoderov, sp. nov.**

Plate 4, fig. 7

Etymology. From the Zaza River.

Holotype. PIN, no. 4210/2963, female (part and counterpart); Baisa; Zaza Formation, bed 31.

Description (Fig. 2b). The flagellomeres are rounded. The mesonotum is strongly convex and hairy. The costal vein bears three rows of setae, the R_1, R_5 and *r-m* one row each. The C is extended beyond the R_5 up to 1/3 of the distance between the R_5 and M_1. The Sc enters the R a little proximad of the base of the M3. The *r-m* crossvein is 2.2 times shorter than the R_1 and subequal to the M3. The M_1 and M_2 fork is 4 times shorter than the M3 section. The base of M_{3+4} + CuA fork is situated proximad of the Sc apex.

Measurements (mm): body length, 3.5–4 (3.5 in the holotype); wing length, 3–3.5 (3 in the holotype).

Comparison. Distinct from *D. baisae* in the larger size and longer Sc and M3.

Material. Besides the holotype, paratype PIN, no. 3064/9848, female (bed 31).

Genus *Baisepesthoneura* Blagoderov, gen. nov.

Etymology. From the Baisa locality and the genus *Ectrepesthoneura*.

Type species. *B. mesozoica* sp. nov.

Diagnosis. Sc entering C. Sc_2 present and situated terminally. R_1 2–3 times longer than *r-m*. R_4 present. Base of M stem fused to M_{3+4} + CuA fork.

Composition. Monobasic.

Comparison. Distinct from *Ectrepesthoneura* Enderlein, 1911 in the Sc entering the C.

***Baisepesthoneura mesozoica* Blagoderov, sp. nov.**

Plate 4, fig. 8

Etymology. From the Mesozoic.

Holotype. PIN, no. 4210/2860, part and counterpart of the wing; Baisa; Zaza Formation, bed 31.

Description (Fig. 2c). The costal vein bears three rows of setae, the R_1, R_5 and *r-m* one row each. The C is extended beyond the R_5 up to more than 1/3 of the distance between the R_5 and M_1. The Sc enters the C at the level of the *r-m* midlength. The *r-m* crossvein is 2.2 times shorter than the R_1. The length ratio of the RS1, RS2 and RS3 sections is 1 : 2 : 9. The M_1 and M_2 fork is 3.5 times shorter than the M3 section.

Measurements (mm): wing length, 2–3 (3 in holotype).

Material. Besides the holotype, paratype PIN, no. 4210/2858, wing (part and counterpart; bed 2).

Genus *Palaeothoracotropis* Blagoderov, gen. nov.

Etymology. From the genus *Thoracotropis*.

Type species. *P. truculentus* sp. nov.

Diagnosis. Sc long, entering C. Sc_2 situated at level of M3 base. R_5 reaching wing tip. C not extended beyond R_5. *r-m* long, no more than 2.5 times shorter than R_1. Base of M_{3+4} + CuA fork is situated proximad of M3 base.

Composition. Monobasic.

Comparison. Distinct from *Thoracotropis* Freeman, 1951 in the long Sc entering the C, the R_5 reaching wing tip, and proximal position of the M_{3+4} + CuA fork.

***Palaeothoracotropis truculentus* Blagoderov, sp. nov.**

Plate 4, fig. 9

Etymology. Latin *truculentus* (moody).

Holotype. PIN, no. 1668/2120, female (part and counterpart); Baisa; Zaza Formation, bed 25.

Description (Fig. 2d). The costal vein and R stem bear setae. The Sc enters the C at the level of the *r-m* midlength. The R_1 is 0.9 of wing length. The *r-m* crossvein is 2.3 times shorter than the R_1 and 1.3 times longer than the M3. The M_1 and M_2 fork is 3.5 times shorter than the M3 section. The thorax and abdomen are bare. The cerci are two-segmented, with the 2nd segment several times shorter than the basal one.

Measurements (mm): body length, 6.5; wing length, 6.

Material. Holotype.

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