

## New Fungus Gnats (Diptera: Mycetophilidae) from the Cretaceous and Paleogene of Asia

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**Abstract**—Five new species belonging to five genera of fungus gnats from the Cretaceous and Paleogene of Transbaikalia, Mongolia, and Russian Far East are described. The names *Mycomyites* and *Exechiites* are proposed for the remains of mycetophilids belonging to the tribe Mycomyiini (Sciophilinae) and subfamily Mycetophilinae, respectively, for which reliable generic assignment is impossible.

### INTRODUCTION

The present paper is based on the collections of fossil insects from different localities of Transbaikalia, Russian Far East, and Mongolia that are housed in the Paleontological Institute, Russian Academy of Sciences (PIN). Although these localities do not yield as many insects as the unique sites of Baissa and Bon-Tsaagan (Blagoderov, 1995, 1997, 1998a, b), each locality yielded terrestrial dipterans, although fungus gnats were very scarce. The Obeshchayushchii locality together with fossil resins from Taimyr and North America is one of the few sources of the information about the Upper Cretaceous mycetophilids (Zherikhin, 1978).

### SYSTEMATIC PALEONTOLOGY

#### Subfamily Sciophilinae Winnertz, 1863

#### Tribe Sciophilini Winnertz, 1863

#### Genus *Polliciator* Blagoderov, 1995

*Polliciator polliciator* Blagoderov, sp. nov.

Plate 10, fig. 1

**Holotype.** PIN, no. 3901/312, part and counterpart of the female; Magadan Region, Ten'kinsk District, Arman' River basin, Obeshchayushchii Creek (right tributary of the Nil River), Obeshchayushchii locality; Upper Cretaceous, Cenomanian, Ola Formation.

**Description** (Fig. 1a). The head is black. The mouthparts are light, their length is somewhat smaller than the head height. The scapus is rounded, the pedicellus is truncated conical. The flagellomeres are cylindrical, as long as wide. The wing membrane is densely covered with macrotrichia. The costal vein is evenly covered with hairs, extended beyond  $R_5$  apex for one quarter of the distance between  $R_5$  and  $M_1$ . The veins Sc,  $R_1$ ,  $R_5$ ,  $M_1$ ,  $M_2$ , and the M3 section bear one row of setae. Sc enters C far beyond  $R_4$ .  $Sc_2$  is before the RS origin.  $R_4$  and  $R_1$  form the right angle. The vein *r-m* is 1.5 times as long as the RS1 section and 2.5 times

shorter than the M3 section. The base of the  $M_{1+2}$  fork is situated at the level of the Sc apex. The M3 section is 2.2 times shorter than the  $M_{1+2}$  fork. The legs are light. The abdomen is brown, covered with short setae (including 8 segment). The cerci are light and very short.

**Measurements** (mm): body length, 9, wing length, 6.5.

**Comparison.** Differs from other species in the longer Sc, ending beyond the level of  $R_4$ , proximal position of  $Sc_2$ , and in the short RS1 section.

**Material.** Holotype.

#### Genus *Sytemna* Winnertz, 1863

*Sytemna zherikhini* Blagoderov, sp. nov.

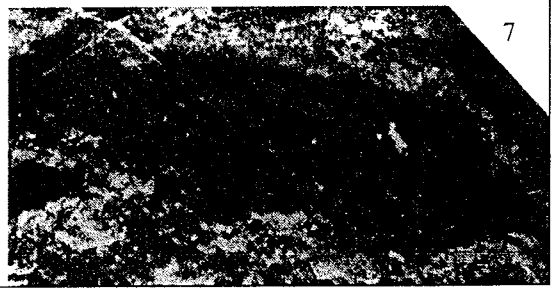
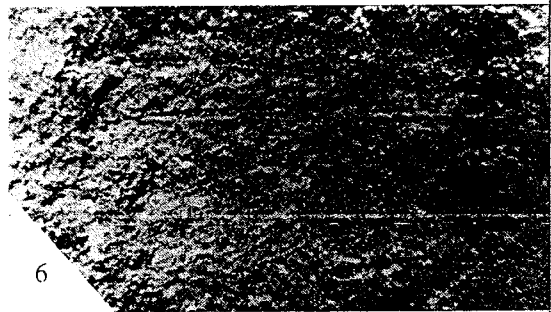
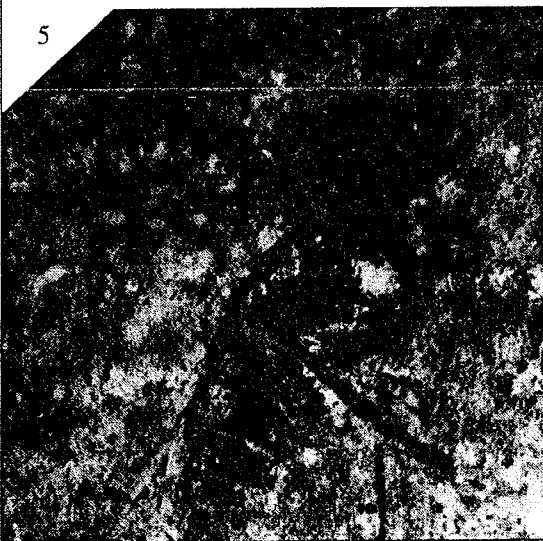
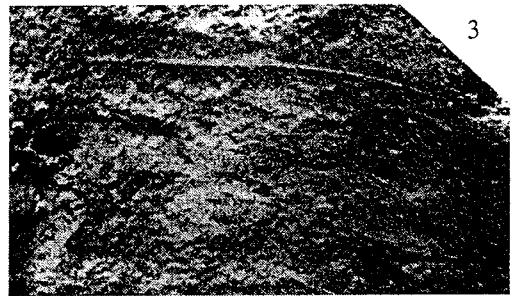
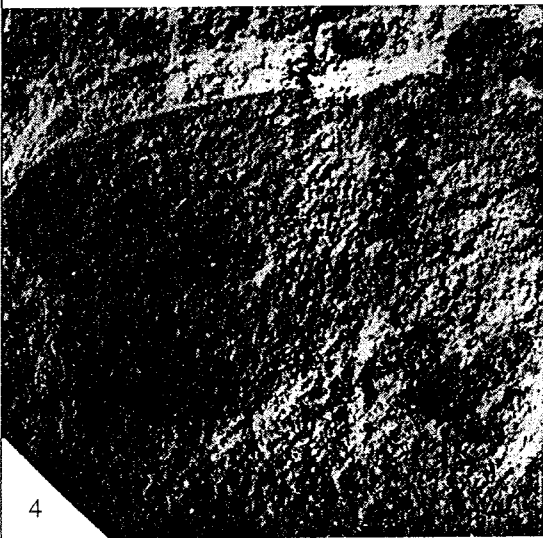
Plate 10, fig. 2

**Etymology.** In honor of the paleoentomologist V.V. Zherikhin.

**Holotype.** PIN, no. 3901/1140, insect impression; Magadan Region, Ten'kinsk District, Arman' River basin, Obeshchayushchii Creek (right tributary of the Nil River), Obeshchayushchii locality; Upper Cretaceous, Cenomanian, Ola Formation.

**Description** (Fig. 1b). The body is brown. The head is dark. The flagellum consists of 13 cylindrical flagellomeres, their length is somewhat less than their width. The mesonotum is slightly convex, covered with small bristles. The laterotergite has hairs. The wing membrane is transparent, macrotrichose. Sc enters R before the RS origin, at the level of the  $M_{3+4}$  and CuA fork base. The ratio of the RS1 and RS2 sections is 0.7–0.9 : 1. The M3 section is 10 times shorter than the  $M_{1+2}$  fork. The base of the  $M_{3+4}$  and CuA fork is proximal to the M3 section base. The tibiae have long apical spurs, which are 1.5–3 times as long as tibia width. The abdomen is densely covered with hairs.

**Measurements** (mm): body length, 5.5 (holotype) 10, wing length, 4 (holotype).



## Explanation of Plate 10

- Fig. 1. *Pollicitator pollicitator* Blagoderov, sp. nov., holotype PIN, no. 3901/312,  $\times 6$ .  
 Fig. 2. *Sytemna zherikhini* Blagoderov, sp. nov., holotype PIN, no. 3901/1140,  $\times 12$ .  
 Fig. 3. *Prospeolepta brevicubita* Blagoderov, sp. nov., holotype PIN, no. 4271/1481,  $\times 15$ .  
 Fig. 4. *Polylepta (Lyptolape) olenguiensis* Blagoderov, sp. nov., holotype PIN, no. 2328/2366,  $\times 10$ .  
 Fig. 5. *Palaeodocosia magadanica* Blagoderov, sp. nov., holotype PIN, no. 3901/987,  $\times 15$ .  
 Fig. 6. *Mycomyites tadushensis* Blagoderov, sp. nov., holotype PIN, no. 3364/3603,  $\times 19$ .  
 Fig. 7. *Exechiites tadushensis* Blagoderov, sp. nov., holotype PIN, no. 3364/3687,  $\times 20$ .

**Comparison.** Differs from other species of the genus in the short  $Sc$ , not reaching far the  $RS$  base.

**Material.** Holotype and specimen PIN, no. 3901/301, not a paratype (part and counterpart of insect impression that differs from the holotype in larger size and may represent a separate species).

*Sytemna tele* Blagoderov, 1998

The species was described based on the material from the Mongolian locality of Bon-Tsagaan (Blagoderov, 1998b). Specimen PIN, no. 3901/395(520) from the Obeshchayushchii locality and specimen PIN, no. 3147/699 from the Holbotu-Gol locality (Mongolia, Bayan-Hongor Aymag, the Bayan-Tsagaan-Uul Range north of Tsetsen-Uul, Sair Holbotu-Gol; Lower Cretaceous, ?Barremian-Aptian; Hurilt Sequence) belong to the same species.

*Sytemna zhuzhan* Blagoderov, 1998

The species was described on the material from the Mongolian locality of Bon-Tsagaan (Blagoderov, 1998b). Specimen PIN, no. 3901/616 from the Obeshchayushchii locality belongs to the same species.

**Genus *Prospeolepta* Blagoderov, 1995**

*Prospeolepta brevicubita* Blagoderov, sp. nov.

Plate 10, fig. 3

**Etymology.** From Latin *brevis* (short) and cubital vein.

**Holotype.** PIN, no. 4271/1481, part and counterpart of the wing; Mongolia, Bayan-Hongor Aymag, 33 km north of Bayan-Log Somon, south-eastern of Ih-Bogdo, south-western of Tsagaan-Ovo, Shar-Tolgoy locality, outcrop 385/5; Lower Cretaceous, ?Barremian-Aptian, Shar-Tolgoy Sequence.

**Description** (Fig. 1c).  $Sc$  enters  $C$  before the level of the  $M3$  base. The  $RS2$  section is very short, so that the small cell is nearly triangular. The ratio of the  $RS1$  and  $RS3$  sections is 1 : 8.5. The vein  $r-m$  is 1.2 times longer than the  $RS1$  section and 1.2 times shorter than the  $M3$  section. The  $M3$  section is 5.5 times shorter than the  $M_{1+2}$  fork. The base of the  $M_{3+4}$  and  $CuA$  fork is situated at the level of  $Sc_2$ . The ratio of the sections between the  $R_1$ ,  $R_5$ ,  $M_1$ ,  $M_2$ ,  $M_{3+4}$ , and  $CuA$  apices along the wing margin is 1.2 : 0.8 : 1 : 1.2 : 1.7.

**Measurements** (mm): wing length, 3–4.

**Comparison.** Differs from *P. trapezia* in  $Sc$ , being shorter and not reaching the  $M3$  section base, and proximal  $Sc_2$ . Differs from *P. parallelimedia* in the short  $M_{3+4}$  and  $CuA$  fork (in *P. parallelimedia* the  $M3$  section is 7.5 times shorter than the  $M_{1+2}$  fork), and different arrangement of the vein apices at the wing margin.

**Material.** Besides the holotype, specimen PIN, no. 4271/1482, incomplete impression of the wing.

**Genus *Polylepta* Winnertz, 1863**

*Polylepta (Lyptolape) olenguiensis* Blagoderov, sp. nov.

Plate 10, fig. 4

**Etymology.** From the Olengui River.

**Holotype.** PIN, no. 2328/2366, part and counterpart of insect; Chita Region, Karymsk District, Olengui River, Semen Creek near the village of Elizavetino, outcrop 1, bed 7; Lower Cretaceous, Semen Sequence of the Turga Group.

**Description** (Fig. 1d). Wing is broad, 2.1 times as long as wide.  $Sc_2$  is situated before the  $RS$  origin. The ratio of the  $RS1$ ,  $RS2$ , and  $RS3$  sections is 1 : 1.3–1.5 : 21–24. The vein  $r-m$  is 1.2 times longer than the  $RS1$  section and 6.5–7 times as short as the  $M3$  section. The  $M3$  section is 1.8–1.9 times shorter than the  $M_{1+2}$  fork. The base of the  $M_{3+4}$  and  $CuA$  fork is situated at the level of the  $RS$  origin.

**Measurements** (mm): wing length, 4.7.

**Comparison.** Differs from *P. lyptolape* in  $Sc_2$  being proximal and  $M_{3+4}$  and  $CuA$  fork base being distal.

**Material.** Holotype.

**Tribe Gnoristini Edwards, 1925****Genus *Palaeodocosia* Meunier, 1904**

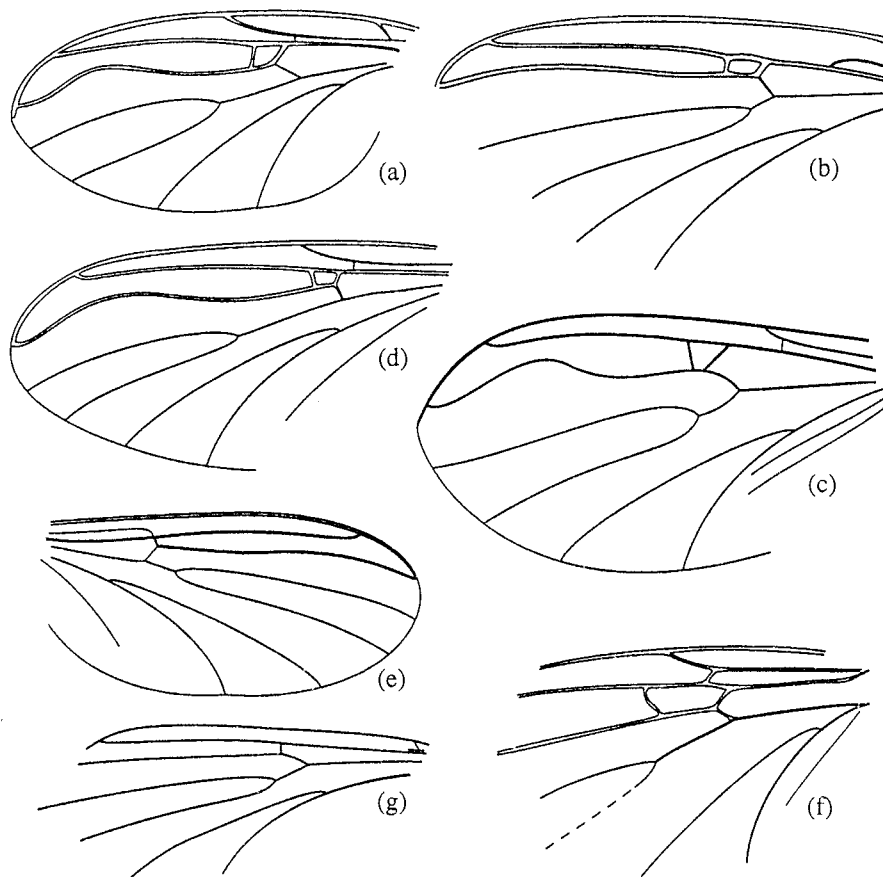
*Palaeodocosia magadanica* Blagoderov, sp. nov.

Plate 10, fig. 5

From the town of Magadan.

**Holotype.** PIN, no. 3901/987, insect impression (part and counterpart); Magadan Region, Ten'kinsk District, Arman' River basin, Obeshchayushchii Creek (right tributary of the Nil River), Obeshchayushchii locality; Upper Cretaceous, Cenomanian, Ola Formation.

**Description** (Fig. 1e). The head and body are brown, the tarsi are black. The flagellomeres are barrel-shaped, their length is hardly shorter than width.  $Sc$  enters  $R$  at the level of the  $RS$  origin. The costal vein



**Fig. 1.** Wing venation in fungus gnats: (a) *Pollicitator pollicitator* sp. nov., holotype PIN, no. 3901/312; (b) *Syntemna zherikhini* sp. nov., holotype PIN, no. 3901/1140; (c) *Prospeolepta brevicubita* sp. nov., holotype PIN, no. 4271/1481; (d) *Polylepta (Lyptolape) olenguiensis* sp. nov., holotype PIN, no. 2328/2366; (e) *Palaedocosia magadanica* sp. nov., holotype PIN, no. 3901/987; (f) *Mycomyites tadushensis* sp. nov., holotype PIN, no. 3364/3603; (g) *Exechiites tadushensis* sp. nov., holotype PIN, no. 3364/3687.

bears fine black setae. other veins have not any setae. The basal section of R (before the RS origin) is 1.7 times shorter than  $R_1$ . The vein  $r-m$  is 2 times longer than the RS1 section and 1.8 times shorter than the M3 section. The M3 section is 7 times shorter than the  $M_{1+2}$  fork. The base of the  $M_{3+4}$  and CuA fork is situated proximal to the base of the M3 section. The thoracic sclerites are bare. The hind tibiae have long apical spurs, which are 3 times as long as the tibia width. The abdomen is covered with numerous hairs.

**Measurements** (mm): body length, 4, wing length, 3.

**Comparison.** Differs from other species in longer Sc and the vein  $r-m$ , being shorter than the M3 section.

**Material.** Holotype.

#### **Formal genus *Mycomyites* Blagoderov, gen. nov.**

The name is proposed for mycetophiloid gnats, belonging to the tribe Mycomyiini. It is used for specimens that are insufficiently preserved for the reliable generic attribution.

#### *Mycomyites tadushensis* Blagoderov, sp. nov.

Plate 10, fig. 6

**Etymology.** From the Tadushi locality.

**Holotype.** PIN, no. 3364/3603, impression of an incomplete wing; Primorye, lower reaches of the Pestrushka River, Ugol'nyi Spring, and right tributaries of the Zerkal'naya River near the village of Suvorovo, Tadushi locality; Paleocene, Tadushi Formation.

**Description** (Fig. 1f). Sc enters C beyond the middle of the small cell.  $Sc_2$  is situated before the middle of the small cell.  $R_4$  is S-like curved. The vein  $r-m$  is 1.5 times shorter than the RS1 section and 2.5 times shorter than the RS2 section. The M3 section is more than 1.5 times longer than the RS2 section. The base of the  $M_{3+4}$  and CuA fork is situated proximal to the M3 base.

**Measurements** (mm): length of the fragment, 3.

**Remarks.** Differs from the members of other extinct genera in the unique combination of features: peculiar position of  $Sc_2$  near the middle of the small cell, the long M3 section, proximal position of the  $M_{3+4}$  and CuA fork base.

**Material.** Holotype.

**Formal genus *Exechiites* Blagoderov, gen. nov.**

The name is proposed for mycetophiloid gnats, belonging to the subfamily Mycetophilinae. It is used for specimens that are insufficiently preserved for reliable generic assignment.

*Exechiites tadushensis* Blagoderov, sp. nov.

Plate 10, fig. 7

**E t y m o l o g y.** From the Tadushi locality.

**H o l o t y p e.** PIN, no. 3364/3687, wing impression; Primorye, lower reaches of the Pestrushka River, Ugol'nyi Spring, and right tributaries of the Zerkal'naya River near the village of Suvorovo, Tadushi locality; Paleocene, Tadushi Formation.

**D e s c r i p t i o n** (Fig. 1g). The wing membrane bears regular rows of microtrichia. Sc is very short, ending freely. The veins  $R_1$  and  $R_5$  are parallel. The RS1 section is 3 times shorter than the vein  $r-m$ . The M3 section is equal to the vein  $r-m$ . The base of the  $M_{3+4}$  and CuA fork is situated slightly proximal to the M3 base.

**M e a s u r e m e n t s** (mm): wing length, 3.

**R e m a r k s.** Comparison with members of recent genera are difficult, since the wing venation features is

rarely used in the taxonomy of the subfamily Mycetophilinae.

**M a t e r i a l.** Holotype.

**ACKNOWLEDGMENTS**

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