Fungus Gnats (Diptera, Mycetophilidae) from the Lower Cretaceous of Mongolia

V. A. Blagoderov

Paleontological Institute, Russian Academy of Sciences, ul. Profsoyuznaya 123, Moscow, 117647 Russia Received July 14, 1997

Abstract—The fauna of the Lower Cretaceous Bon-Tsagan locality includes 17 species of fungus gnats. Thirteen new species and one new subgenus are described from the Lower Cretaceous of Mongolia.

INTRODUCTION

One of the most representative collections of fossil insects housed in the Paleontological Institute was collected at the Bon-Tsagan locality, Mongolia and contains about 240 specimens of fungus gnats. The Bon-Tsagan assemblage of fungus gnats is quite similar to the previously described assemblage of the Baisa locality, Transbaikalia, including 27 species in 14 genera (Blagoderov, 1995, 1997, 1998). Of 12 mycetophilid genera found in the Bon-Tsagan fauna, only the members of the genus Apolephthisa are not recorded from Baisa. Four mycetophilid species (Zazicia innuba, Drepanorzeckia plana, D. extrunculipennis, and Palaecomoptera shcherbakovi) are common for these two localities. The assemblages differ significantly in numerical composition: there are no markedly dominating groups in Baisa, whereas about one third of the Bon-Tsagan mycetophilids is represented by Syntemna species.

A detailed geological description of the Bon-Tsagan locality is given by Sinitsa (1993), who dated it as Early Cretaceous. Ponomarenko (1995) dated the Bon-Tsagan beds more precisely as Late Neocomian or Early Aptian. All the specimens described below originate from the Bon-Tsagan locality (Mongolia, Bayan-Khongor Aimak, northern slopes of the Dund-Ula Range, 8 km south of the Bon-Tsagan Lake; Lower Cretaceous, Khurilt Sequence of the Bon-Tsagan Group). The material is housed in the Paleontological Institute (PIN), Russian Academy of Sciences.

SYSTEMATIC PALEONTOLOGY

Family Mycetophilidae Newman, 1834 Subfamily Sciophilinae Winnertz, 1863 Tribe Sciophilini Winnertz, 1863 Genus *Syntemna* Winnertz, 1863

Syntemna tele Blagoderov, sp. nov. Plate 4, fig. 1

Etymology. From the Tele tribes.

Holotype. PIN, no. 3559/10066, impression of insect; Bon-Tsagan locality, outcrop 87; Bon-Tsagan Group.

Description (Fig. 1*a*). The head is rounded. The flagellomeres are rounded. The mesonotum is convex. The wings are quite broad, 2–2.2 times as long as wide. The wing membranes are pale, beset with macrotrichia. C is only slightly extended beyond R_5 , the latter not reaching the wing tip. Sc enters R near the RS origin. Sc is 0.3–0.35 of the wing length. The radial cell is very small, no longer than *r*-*m* crossvein. The ratio of the RS1, RS2 and RS3 sections is 0.4–0.5 : 1 : 11–16. The M3 section and *r*-*m* crossvein are subequal. The base of the fork of M_{3+4} and CuA is set proximal to the base of the M3 section.

Measurements (mm): body length, 4-4.5 (holotype, 4.5); wing length, 3.1-4 (holotype, 3.5).

Comparison. Distinct from S. mesozoica Blagoderov, 1995 in the smaller radial cell and shorter Sc.

Material. Besides the holotype, specimen (not paratypes) nos. 3559/3627, 3559/4431 (outcrop 88), 3559/3723. 3559/3729. 3559/3730. 3559/3776, (outcrop 35), 3559/3984, 3559/3794 3559/4012, 3559/4023, 3559/4013, 3559/4058. 3559/4064. 3559/4067, 3559/4099, 3559/4103, 3559/4163 (outcrop 45/19), 3559/4172 (outcrop 58), 3559/4178 (outcrop 60), 3559/4375 (outcrop 74/6), 3559/9272 (outcrop 87/8), 3559/9278, 3559/9376 (outcrop 87/10), 3559/10045, 10052 (outcrop 87).

Syntemna zhuzhan Blagoderov, sp. nov.

Plate 4, fig. 2

Et y m o l o g y. From the Zhuzhan people.

Holotype. PIN, no. 3559/10059, impression of insect; Bon-Tsagan locality, outcrop 87; Bon-Tsagan Group.

Description (Fig. 1b). The head is rounded. The scutellum is covered with fine hairs. Sc enters R at the level of or a little before RS origin. The RS1 section is no more than 1.6 times shorter than RS2, so that the radial cell is relatively short and wide. The M3 section



Fig. 1. New species of Early Cretaceous mycetophilids, wings: (a) Syntemna tele sp. nov., holotype PIN, no. 3559/10066; (b) S. zhuzhan sp. nov., holotype PIN, no. 3559/10059; (c) Baisodicrana mongolica sp. nov., holotype PIN, no. 3559/3982; (d) Polylepta (Lyptolape) lyptolape sp. nov., holotype PIN, no. 3559/3650; (e) Pollicitator bontsaganicus sp. nov., holotype PIN, no. 3559/4019; (f) Prospeolepta parallelimedia sp. nov., holotype PIN, no. 3559/10132. Scale bar 1 mm in Figs. 1 and 2.

and *r*-*m* crossvein are subequal. The base of the fork of M_{3+4} and CuA is level with the base of the M3 section.

Measurements (mm): body length, 6.2; wing length, 3.5-4 (holotype, 4).

C o m p a r i s o n. Distinct from S. tele sp. nov. in the shorter and broader radial cell, and distal position of the base of M^{3+4} and the CuA fork.

Material. Besides the holotype, specimen (not paratypes) nos. 3559/3651, 3559/3680, 3559/3718, 3559/3794, 3559/3797 (outcrop 35), 3559/3981, 3559/3988, 3559/4102, 3559/4124, 3559/4147, 3559/4160 (outcrop 45/19), 3559/4178 (outcrop 60), 3559/427 (outcrop 88), 3559/9094, 3559/9095, 3559/10105 (outcrop 87/8), 3559/10057(10068), 3559/10069, 3559/10071 (outcrop 87).

Specimens 3559/3559, 3559/3572, 3559/3692, 3559/3723, 3559/3739 (outcrop 35), 3559/3981, 3559/3992. 3559/4006. 3559/4016, 3559/4027, 3559/4038. 3559/4047. 3559/4065, 3559/4125. 3559/4133 (outcrop 45/19), 3559/4173(outcrop 58), 3559/10048, 3559/10073, 3559/10083 (outcrop 87) could not be attributed to any Syntemna species due to imperfect preservation.

Genus Baisodicrana Blagoderov, 1995 Baisodicrana mongolica Blagoderov, sp. nov. Plate 4, fig. 3

Etymology. From Mongolia.

Holotype. PIN, no. 3559/3982, wing (part and counterpart); Bon-Tsagan locality, outcrop 45/19; Bon-Tsagan Group.

Description (Fig. 1c). C is extended beyond R_5 for 1/3 of the distance between R_5 and M_1 . Sc enters C at the level of or a little beyond R_4 . Sc₂ is set a little distal to the RS origin. R_4 is straight. The radial cell is relatively long. *r-m* crossvein is no longer than the M3 section. The M3 section is 2.3–3.5 times shorter than the M_{1+2} fork.

Measurements (mm): wing length, 4-6.2 (holotype, 4).

C o m p a r i s o n. Distinct from the closely related *B. secunda* Blagoderov, 1995 in the relatively longer radial cell and M3 section, and shorter *r*-*m* crossvein.

R e m a r k s. Possibly *B. incompleta* Blagoderov, 1995 and *B. secunda* also possess Sc_2 , apparently untraceable due to poor preservation of the material. At any rate, the proximal position of the fork base of M_{3+4} and CuA and the long M3 section distinguish this genus clearly from the recent *Eudicrana* Loew, 1869.



.

M a t e r i a l. Besides the holotype, specimen nos. 3559/4086(4081), wing part and counterpart (outcrop 45/19), 3559/3686, wing (outcrop 35).

Genus *Polylepta* Winnertz, 1863 Subgenus *Lyptolape* Blagoderov, subgen. nov.

Etymology. Anagram from *Polylepta*.

Type species. L. lyptolape sp. nov.

Diagnosis. Wing membrane with both macroand microtrichia. Sc long, entering C beyond R_4 . Radial cell short, situated in basal wing third. Base of M_{3+4} and CuA fork proximal to R_4 .

C o m p o s i t i o n. Type species. A recently discovered specimen from the Baisa locality (no. 3064/9888) belongs to this subgenus as well.

C o m p a r i s o n. Distinct from the nominate subgenus in the longer fork of M_{3+4} and CuA.

R e m a r k s. All the recent species belong to the nominate subgenus. 10 specimens are indeterminable to species level due to imperfect preservation (5 from outcrop 35, 3 from outcrop 45/19, 1 from outcrop 87, 1 from outcrop 87/10).

Polylepta (Lyptolape) lyptolape Blagodcrov, sp. nov.

Etymology. From the subgenus name.

Holotype. PIN, no. 3559/3650, wing (part and counterpart); Bon-Tsagan locality, outcrop 35; Bon-Tsagan Group.

Description (Fig. 1*d*). C is slightly extended beyond R_5 . Sc_2 is set about midlength of the radial cell. The ratio of the RS1, RS2 and RS3 sections is 1 : 1.7-2 : 21-28. M3 section is 1.6-2 times shorter than M_{1+2} fork. The base of the fork of M_{3+4} and CuA is set near the base of the M3 section.

Measurements (mm): wing length, 2.7-4 (holotype, 4).

M a t e r i a l. Besides the holotype, specimens nos. 3559/3681, wing part and counterpart, 3559/3677, 3559/3689, 3559/3712, wings (outcrop 35), 3559/4056, wing part and counterpart (outcrop 45/19), 3559/8826, wing (outcrop 35/3,4,6), 3559/9373, wing (outcrop 87/10).

Genus Pollicitator Blagoderov, 1995 Pollicitator bontsaganicus Blagoderov, sp. nov. Plate 4, fig. 4

Etymology. From Bon-Tsagan.

Holotype. PIN, no. 3559/4019, wing; Bon-Tsagan locality, outcrop 45/19; Bon-Tsagan Group.

D e s c r i p t i o n (Fig. 1*e*). C is extended beyond R_5 for 1/3 of the distance between R_5 and M_1 . Sc enters C a little before the level of R_4 . Sc₂ is set at the level of RS origin. The ratio of the RS1, RS2 and RS3 sections is 1 : 1.9–2.5 : 15. The M3 section is 3.5 times shorter than the M_{1+2} fork. The base of the fork of M_{3+4} and CuA is set proximal to the base of the M3 section.

Measurements (mm): wing length, 4.5.

C o m p a r i s o n. Distinct from *P. baisae* Blagoderov, 1995 in that both Sc and the M3 section are shorter (in *P. baisae* the M3 section being no more than 2.5 times shorter than the M_{1+2} fork) and in the proximal position of both Sc₂ and the base of the fork of M_{3+4} and CuA.

Material. Besides the holotype, specimen no. 3559/4085, wing (outcrop 45/19).

Genus Zazicia Blagoderov, 1995

Zazicia innuba Blagoderov, 1995

Three specimens of this species are known from the Bon-Tsagan beds: nos. 3559/4177 (outcrop 60) and 3559/4008(4046), wings (part and counterpart of each), and 3559/4033, wing (the two latter from outcrop 45/19).

Genus Prospeolepta Blagoderov, 1995 Prospeolepta parallelimedia Blagoderov, sp. nov. Plate 4, fig. 5

Et y mology. From medial vein and Latin *parallelos* (parallel).

Holotype. PIN, no. 3559/10132, impression of insect; Bon-Tsagan locality, outcrop 188/18; Bon-Tsagan Group.

D e s c r i p t i o n (Fig. 1f). The wing membrane and veins are pale. Sc enters C before the level of the M3 section base. Sc₂ is terminal. The ratio of the RS1, RS2

Explanation of Plate4

Fig. 1. Syntemna tele Blagoderov, sp. nov., holotype PIN, no. 3559/10066 (×13).

Fig. 2. Syntemna zhuzhan Blagoderov, sp. nov., holotype PIN, no. 3559/10059 (×13).

Fig. 3. Baisodicrana mongolica Blagoderov, sp. nov., holotype PIN, no. 3559/3982 (×17.5).

Fig. 4. Pollicitator bontsaganicus Blagoderov, sp. nov., holotype PIN, no. 3559/4019 (×15).

Fig. 5. Prospeolepta parallelimedia Blagoderov, sp. nov., holotype PIN, no. 3559/10132 (×7).

Fig. 6. Paradzickia morwen Blagoderov, sp. nov., holotype PIN, no. 3559/4376 (×10).

Fig. 7. Paradzickia hador Blagoderov, sp. nov., holotype PIN, no. 3559/4004 (×14).

Fig. 8. Apolephthisa mesozoica Blagoderov, sp. nov., holotype PIN, no. 3559/4035 (×29).

Fig. 9. Ipsaneusidalys shato Blagoderov, sp. nov., holotype PIN, no. 3559/10047 (×13).

Fig. 10. Palaecomoptera subcosta Blagoderov, sp. nov., holotype PIN, no. 3559/10051 (×17).

Fig. 11. Palaeothoracotropis dundulensis Blagoderov, sp. nov., holotype PIN, no. 3559/4050 (×15).



Fig. 2. New species of Early Cretaceous mycetophilids, wings: (a) Paradzickia morwen sp. nov., holotype PIN, no. 3559/4376; (b) P. hador sp. nov., holotype PIN, no. 3559/4004; (c) Apolephthisa mesozoica sp. nov., holotype PIN, no. 3559/4035; (d) Ipsaneusidalys shato sp. nov., holotype PIN, no. 3559/10047; (e) Palaecomoptera subcosta sp. nov., holotype PIN, no. 3559/10051; (f) P. curvicosta sp. nov., holotype PIN, no. 3559/3751; (g) Palaeothoracotropis dundulensis sp. nov., holotype PIN, no. 3559/4050.

and RS3 sections is 1:0.6:8-9. The radial cell is large. *r-m* crossvein is 1.5 times longer than the RS1 section, being equal to the M3 section. The ratio of the sections between the R₁, R₅, M₁, M₂, M₃₊₄ and CuA apices along the wing margin is 1.7:1.4:1:1.8:2.5.

Measurements (mm): body length, 6.5; wing length, 5.6.

C o m p a r i s o n. Distinct from the closely related species *P. trapezia* Blagoderov, 1995 in the larger radial cell and approximated veins M_1 and M_2 .

Material. Holotype.

Tribe Gnoristini Edwards, 1925 Genus Paradzickia Blagoderov, 1997 Paradzickia morwen Blagoderov, sp. nov. Plate 4, fig. 6

E t y m o l o g y. After the character in the books of J.R.R. Tolkien.

Holotype. PIN, no. 3559/4376, insect (part and counterpart); Bon-Tsagan locality, outcrop 74/6; Bon-Tsagan Group.

Description (Fig. 2a). Scenters R at the level of the RS origin. The ratio of the RS1, RS2 and RS3 sections is 1:2.3:12. *r*-*m* crossvein is 4 times shorter than

the M3 section. The M3 section is 1.7 times longer than the RS2 section, and thrice shorter than the M_{1+2} fork. The abdomen is covered with hairs.

Measurements (mm): wing length, 5.5.

Comparison. Distinct from *P. hurin* Blagoderov, 1997 in that both the radial cell and M3 section are longer, from *P. turin* Blagoderov, 1997 in that the M3 section is relatively longer, from other species in the shorter Sc.

Material. Holotype.

Paradzickia hador Blagoderov, sp. nov.

Plate 4, fig. 7

E t y m o l o g y. After the character in the books of J.R.R. Tolkien.

Holotype. PIN, no. 3559/4004, wing; Bon-Tsagan locality, outcrop 45/19; Bon-Tsagan Group.

Description (Fig. 2b). Sc enters R beyond the RS origin. The ratio of the RS1, RS2 and RS3 sections is 1 : 1.1 : 8.5. *r-m* crossvein is 1.5 times shorter than the RS2 section, and 2.8 times shorter than the M3 section. The M3 section is 4 times shorter than the M₁₊₂ fork. The distance along the wing margin between the R₁ and R₅ apices is 1.6 times greater than that between the R₅ and M₁ apices.

Measurements (mm): wing length, 5.

C o m p a r i s o n. Distinct from *P. hour* Blagoderov, 1997 in the shorter radial cell and longer M3 section, from *P. tuor* Blagoderov, 1997 in the longer M3 section, from other species in the longer Sc.

Material. Holotype.

Genus Apolephthisa Grzegorzek, 1885

Apolephthisa mesozoica Blagoderov, sp. nov.

E t y m o l o g y. From the Mesozoic.

Holotype. PIN, no. 3559/4035, wing; Bon-Tsagan locality, outcrop 45/19; Bon-Tsagan Group.

Description (Fig. 2c). Sc₂ is present and set a little proximal to the base of the M3 section. C is slightly extended beyond R_5 . The ratio of the RS1, RS2 and RS3 sections is 1 : 1.3 : 12.5. *r-m* crossvein is 1.5 times shorter than the M3 section, being equal to the RS1 section. M3 section is 9 times shorter than the M₁₊₂ fork. M₃₊₄ base is not developed.

Measurements (mm): wing length, 2.4.

C o m p a r i s o n. Distinct from the recent species in the shorter M3 and the presence of Sc_2 .

Material. Holotype.

PALEONTOLOGICAL JOURNAL

Genus Ipsaneusidalys Blagoderov, 1998

Ipsaneusidalys shato Blagoderov, sp. nov.

Plate 4, fig. 9

Et y molog y. From the Turkish tribe Shato.

No. 6

1998

Vol. 32

H o l o t y p e. PIN, no. 3559/10047, insect (part and counterpart); Bon-Tsagan locality, outcrop 87; Bon-Tsagan Group.

Description (Fig. 2d). The head is rounded. The antennae are 14-segmented; the barrel-shaped flagellomeres are 1.5-2 times as long as wide. The mesonotum is weakly convex, covered with minute hairs. The tibiae and tarsi, especially the middle and hind ones, bear numerous, evenly distributed, black setae. The wing is moderately broad, 2.2-2.4 times as long as wide. C is extended beyond R_5 for 1/4 of the distance between R_5 and M_1 . Sc enters R at the level of the RS origin. Sc₂ is set proximal to the base of the M3 section. R_1 is 0.78 as long as the whole wing. The ratio of the RS1 and RS2 sections is 1 : 14-18. *r-m* crossvein is 2.5-3.0 times longer than the RS1 section and no longer than the M3 section. M3 section is 4.5-6 times shorter than M_{1+2} fork.

Measurements (mm): body length, 4; wing length, 3.5-4.5 (holotype, 4).

C o m p a r i s o n. Distinct from *I. communis* Blagoderov, 1998 in the longer Sc and evenly spaced tibial setae, from *I. latipennis* Blagoderov, 1998 in the narrower wing, proximal position of Sc₂, shorter R₁ and longer M3, from *I. longipennis* Blagoderov, 1998 in the longer M3.

Material. Besides the holotype, specimen (not paratypes) nos. 3559/3671, 3559/3704, 3559/3705, 3559/3792, 3559/3798 (outcrop 35), 3559/3983, 3559/3994, 3559/3990, 3559/3993, 3559/3995, 3559/4007. 3559/4009. 3559/4021, 3559/4024, 3559/4032, 3559/4036, 3559/4055, 3559/4068, 3559/4075, 3559/4076, 3559/4087, 3559/4104 (outcrop 45/19), 3559/9196, 3559/9200, 3559/9246, 3559/9247 (outcrop 87/8).

Genus Drepanorzeckia Blagoderov, 1997

Drepanorzeckia plana Blagoderov, 1997

Several specimens of this species are known from the Bon-Tsagan beds: nos. 3559/3675, wing (part and counterpart; outcrop 35), 3559/4015, 3559/4066, 3559/4089, 3559/4110, 3559/4113, 3559/4165 (outcrop 45/19) and 3559/9070, 3559/9076 (outcrop 87/8), wings.

Drepanorzeckia extrunculipennis Blagoderov, 1997

Several specimens of this species are known from Bon-Tsagan beds: nos. 3559/3710, wing (outcrop 35), 3559/4017, 3559/4091, wings (outcrop 45/19), 3559/9113(9123), part and counterpart of insect (outcrop 87/8), 3559/9338, insect (outcrop 87/10).

Genus Palaecomoptera Blagoderov, 1997

Palaecomoptera shcherbakovi Blagoderov, 1997

One specimen is found in the Bon-Tsagan beds: no. 3559/3999(4151), wing (part and counterpart; outcrop 45/19).

Palaecomoptera subcosta Blagoderov, sp. nov. Plate 4, fig. 10

Etymology. From subcostal vein.

Holotype. PIN, no. 3559/10051, wing (part and counterpart); Bon-Tsagan locality, outcrop 87; Bon-Tsagan Group.

D e s c r i p t i o n (Fig. 2e). C is extended beyond R_5 for 1/4 of the distance between R_5 and M_1 . Sc enters C beyond the midlength of the radial cell. Sc₂ is set level with the base of the M_{3+4} and CuA fork. The ratio of the RS1, RS2 and RS3 sections is 1 : 2.5 : 16. *r-m* crossvein is 1.5 times shorter than the RS2 section and 4.2 times shorter than the M3 section. The M3 section is 1.7 times shorter than the M_{1+2} fork. 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 2.2 : 1 : 1.2 : 1.7 : 2.4. The base of the fork of M_{3+4} and CuA is level with the M3 base.

Measurements (mm): wing length, 3.7.

C o m p a r i s o n. Distinct from *P. longimedia* Blagoderov, 1997 in that both Sc and the radial cell are longer, and in the distal position of the base of the M_{3+4} and CuA fork.

Material. Holotype.

Palaecomoptera curvicosta Blagoderov, sp. nov.

Etymology. From costal vein and Latin *curvus* (curved).

Holotype. PIN, no. 3559/3751, wing; Bon-Tsagan locality, outcrop 35; Bon-Tsagan Group.

Description (Fig. 2f). The costal margin is slightly arched forwards. Sc enters R at the level of, or a little distal to, the RS origin. The ratio of the RS1, RS2 and RS3 sections is 1 : 1.1-1.6 : 10-13. The ratio of *r-m* crossvein and the M3 section is 1 : 0.8-1. The M3 section is 6-8 times shorter than the M₁₊₂ fork.

Measurements (mm): wing length, 3.5-6.5 (holotype, 3.5).

C o m p a r i s o n. Distinct from other species in that the crossvein r-m is no shorter than the M3 section.

R e m a r k s. Specimen no. 3559/4429 differs in the larger size and somewhat longer Sc and could belong to a separate species.

Material. Besides the holotype, specimens nos. 3559/3725, 3559/3765 (outcrop 35), 3559/8831 (outcrop 35/3,4,6), wings, and possibly also no. 3559/4429, wing (part and counterpart; outcrop 45/19).

Tribe Leiini Edwards, 1925

Genus Palaeothoracotropis Blagoderov, 1998 Palaeothoracotropis dundulensis Blagoderov, sp. nov. Plate 4, fig. 11

Et y mology. From the Dund-Ula Range.

Holotype. PIN, no. 3559/4050, wing (part and counterpart); Bon-Tsagan locality, outcrop 45/19; Bon-Tsagan Group.

Description (Fig. 2g). Sc enters C beyond the midlength of *r*-m. R_1 is 0.83 as long as the whole wing. *r*-m crossvein is 2.5 times shorter than R_1 and 1.2 times longer than the M3 section. The M3 section is 4.5 times shorter than M_{1+2} fork.

Measurements (mm): wing length, 4.6.

C o m p a r i s o n. Distinct from *P. truculentus* Blagoderov, 1998 in the smaller size, shorter R_1 , longer Sc and other venation details.

Material. Holotype.

REFERENCES

Blagoderov, V.A., Fungus Gnats of the Tribe Sciophilini (Diptera, Mycetophilidae) from the Early Cretaceous of Transbaikalia, *Paleontol. Zh.*, 1995, no. 1, pp. 55–63.

Blagoderov, V.A., Fungus Gnats of the Tribe Gnoristini (Diptera, Mycetophilidae) from the Early Cretaceous of Transbaikalia, *Paleontol. Zh.*, 1997, no. 6, pp. 44–49.

Blagoderov, V.A., Fungus Gnats of the Tribes Gnoristini and Leiini (Diptera, Mycetophilidae) from the Early Cretaceous of Transbaikalia, *Paleontol. Zh.*, 1998, no. 1, pp. 58–62.

Ponomarenko, A.G., The Geological History of Beetles, in *Biology, Phylogeny and Classification of Coleoptera*, 1995, Warsaw, pp. 155–171.

Sinitsa, S.M., The Jurassic and the Lower Cretaceous of Central Mongolia, in *Tr. Sovmest. Ross.-Mongol. Paleontol. Eksped.*, 1993, vol. 42, pp. 1–240.