

New Bibionomorpha from the Triassic of Australia and Jurassic of Central Asia with notes on Paraxymyiidae Rohdendorf (Insecta, Diptera).

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Abstract. BLAGODEROV, V.A. 1999. New Bibionomorpha from the Triassic of Australia and Jurassic of Central Asia with notes on Paraxymyiidae Rohdendorf (Insecta, Diptera). In: AMBA/AM/PFICM98/1.99: 11-15. Five new species of Bibionomorpha are described from three Mesozoic localities. *Austrocramptonomyia minuta* (Procramptonomyiidae) and *Veriplectia handlirschi* (Paraxymyiidae) are from Australian locality Mt. Crosby (Upper Triassic). Three other species of Paraxymyiidae - *Paraxymyia mongolica*, *Complecia clara* (Shara-Teg, Upper Jurassic) and *Paraxymyia bianguliradia* (Say-Sagul, Lower or Middle Jurassic) are described from Central Asian localities. Notes about systematic affinities and composition of the family Paraxymyiidae are given.

Key words: Fossil Diptera, Procramptonomyiidae, Paraxymyiidae, new taxa, Triassic, Jurassic.

Introduction

The recent studies (KRZEMINSKI, 1992, KRZEMINSKI et al., 1994, SHCHERBAKOV et al., 1995) show that in the Triassic the flies were already widespread and diverse. About 80 specimens are known from the Triassic beds: 54 of them are members of a single species, but usually taxa are known from holotypes only. Described species belongs to about 10 families of three infraorders.

Three specimens from the Australian locality Mount Crosby collected by R.J. TILLYARD are housed in BMNH. They represent three different families and two of them have not been previously reported for Triassic beds.

The first specimen belongs to the new family of *Psychodomorpha* (E.LUKASHEVICH, current issue). The second specimen is undoubtedly Procramptonomyiidae. This family was described from the Jurassic of Siberia (KALUGINA, KOVALEV, 1985) and later it was found in the Triassic beds of North America (KRZEMINSKI, 1992). The specimen under discussion is considered among the new genus close to the *Procramptonomyia* KOVALEV from the Middle-Upper Jurassic of Transbaikalia.

The third specimen have three median veins as well as three RS branches and discal cell not closed. If it had been described several years ago, it would have been undoubtedly placed among Mesozoic family Eopleciidae HANDLIRSCH.

Eoplecia primitiva was described by HANDLIRSCH (1920) and placed within the family

Bibionidae. Later, Edwards (1928) placed it into Protorhyphidae. ROHDENDORF (1946) established for the species a new family, which he believed to be close to ancestors of Axymyiidae and Penthetriidae. Simultaneously, ROHDENDORF (1946) described one more family, related to Eopleciidae - Paraxymyiidae, containing, like Eopleciidae, the only species - *Paraxymyia quadriradialis*. He thought the main difference between Paraxymyiidae and Eopleciidae is the absence of M stem.

KOVALEV (1990) described the second species of Eopleciidae - *Eomycetophila asymmetrica*. He suggested Eopleciidae to be a direct ancestor of superfamilies Bibionoidea, Mycetobioidea and Mycetophiloidea, as well as family Paraxymyiidae.

ANSORGE & KRZEMINSKI (1995) revised HANDLIRSCH's types and found the type specimen of *Eoplecia primitiva* to be actually a counterpart of the holotype of *Mesorhyphus areolatus*, so the former became junior objective synonym of the later. Thus, Eopleciidae lost its type genus and disappeared. That is why, ANSORGE (1996) suggested the family name Eomycetophilidae only for KOVALEV's genus.

SHCHERBAKOV et al. (1995) suggested «Eopleciidae» (with exception of Eoplecia) to be equal to Paraxymyiidae i.e. included *Eomycetophila* KOVALEV into the last family de facto. According to previously stated opinion, especially as most of the specimens of Paraxymyiidae from Upper Jurassic Karatau locality studied and which is believed to be conspecific to *Paraxymyia quadriradialis* ROHD., have M stem weakened but not absent.

Unfortunately, not all of the paraxymiids from Karatau including the holotype have base of the wing well preserved. Paraxymiid taxa with very short R4 like *Eomycetophila* should be separated as a subfamily. To determine more precisely the scope of the family the study of Jurassic Paraxymyiidae taxa from the collection of Palaeontological Institute of Russian Academy of Sciences (PIN) together with Triassic one was needed. The taxa described below belong to the both new and nominative subfamilies of Paraxymyiidae. The veins and their sections are designated after Kovalev (KALUGINA, KOVALEV, 1985).

Systematics

Family Procramptonomyiidae KOVALEV, 1985

Austrocramptonomyia minuta gen. et sp. nov.

Holotype BMNH No In 44896 (=44907), positive and negative impressions of wing, Australia, Queensland, New Ipswich, Mt. Crosby; Upper Triassic.

Description (figs. 1, 6). Wing 3 mm long. Vein Sc ends at the level of R2+3 base, its length is 0.44 wing length. The base RS at 0.3 wing length. The length ratio of RS1 (from base of RS to r-m), RS2 (from r-m to R4 base) and RS3 (from R4 base to the tip of R5) sections is 1.8:1:5. Veins R2+3 and R4 curved S-like. Crossvein r-m located between R2+3 and R4 bases, closer to R4 ones. Veins R5, M1, M2 and M3 curved back, M4 almost straight. The stem of M1 and M2 fork looks like continuation of M1 section. Crossvein m-m connected M2 and M3 veins. Base of M3 and M4 fork is beyond crossvein r-m level. Crossvein tb is very short. Crossvein m-cu two times shorter than M3+4 fork stem. CuA tip at 0.56 wing length.

Comparison. It differs from *Procramptonomyia* KOVALEV in having R4 curved forward, short tb, m-m connecting M2 and M3 veins. It differs from *Yala* KRZEMINSKI in having short Sc and tb, R4 curved forward, r-m running into R4 and R5 fork stem, M3 and M4 fork located beyond crossvein r-m level.

Family Paraxymyiidae ROHDENDORF, 1946

Subfamily Paraxymyiinae ROHDENDORF, 1946

Veriplecia handlirschi gen. et sp. nov.

Holotype BMNH No In 44962, impression of wing, Australia, Queensland, New Ipswich, Mt. Crosby; Upper Triassic.

Description (figs. 2, 7, 8). Wing 3.3 mm long. Costa ends well beyond R5 tip. Sc ends at the level of M3+4 base, slightly before RS base, its length is 0.4 wing length. Sc2 located terminally. R1 length is 0.8 wing length. The base of RS at 0.22 wing length. The length ratio of RS1, RS2 and RS3 sections is 2:1:4.6. Vein r-m located between R2+3 and R4 bases, closer to R4 ones. Vein R2+3 curved forward, R4 curved slightly back. The length ratio of M1, M2 and M3 sections is 5.5:1.5:1. Section M1 strong at tb and weaker to wing base. The length ratio of M3 section to M1+2 fork is 1:6. Crossvein tb is rather long, 3.5 times shorter than M3 section. Vein M3+4 slightly curved forward.

Comparison. It differs from *Eomycetophila* KOVALEV in having Sc short, R2+3 base before r-m, R4 long, distinct tb crossvein. It differs from *Paraxymia* ROHDENDORF in having Sc tip at the level of M3+4 base, R4 long and curved back, part of RS2 section from R2+3 base to r-m greater than from r-m to R4 one.

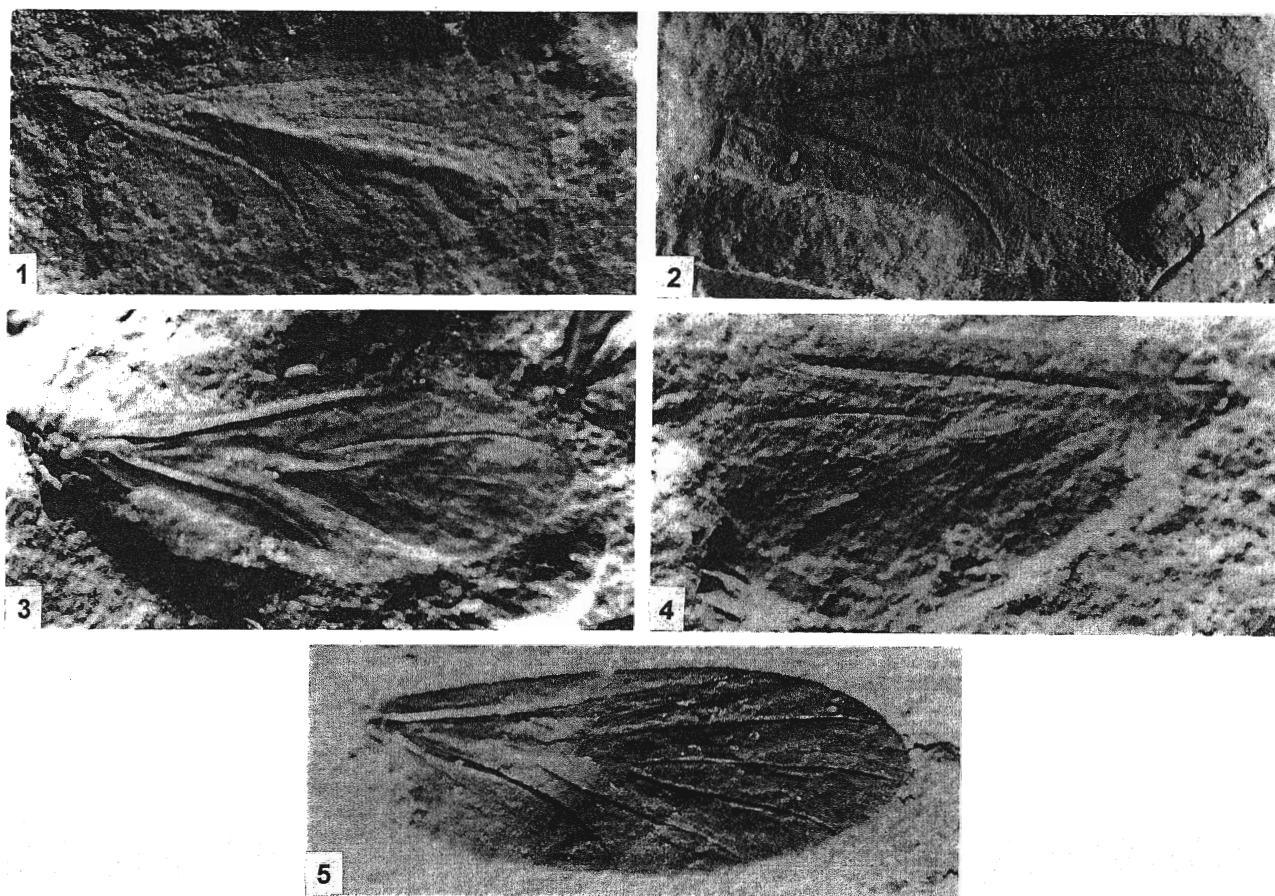
Paraxymia mongolica sp. nov.

Holotype PIN No 4270/2173, positive and negative impressions of wing, Mongolia, Goby-Altay aymak, east to Atas-Bogt, 5-6 km west to Mt. Shara-Teg; Upper Jurassic. **Paratype** PIN No 4210/2174, impression of wing 2.6 mm long, the same locality.

Description (figs. 3, 9). Wing 2.7 mm long. Vein Sc ended at Costa at the level of tb, its length about 0.35 of wing length. Length of R1 vein is 0.6 of wing length. Dark stigma is at the apexes of R1 and R2+3. Apex of R2+3 closer to R1 than R4 tip. The length ratio of costa sections between R1 and R2+3 half as long as between R2+3 and R4. The length ratio of RS1, RS2 and RS3 sections is 1:1.2-1.5:2.2-3. Crossvein r-m 1.5 times shorter than section of RS between R2+3 and r-m bases and 2.3 times shorter than M2 section. Section M1 weakened, well developed only at tb. The length ratio of M2 and M3 sections is 1:1.4-1.7. The fork of M1 and M2 veins three times as long as M3 section.

Comparison. Differs from *P. quadriradialis* ROHD. in position of R1, R2+3, and R4 tips and length ratio of M2 and M3 sections.

Paraxymia bianguliradia sp. nov.



Figs. 1-5. Mesozoic Bibionomorpha, wings (holotypes): 1. *Austrocramptonomyia minuta* gen. et sp. nov. (Mt. Crosby, Upper Triassic) 2. *Veriplecia handlirschi*, sp. nov. (Mt. Crosby, Upper Triassic) 3. *Paraxymyia mongolica*, sp. nov. (Shara-Teg, Upper Jurassic) 4. *P. bianguliradia*, sp. nov. (Say-Sagul, Lower or Middle Jurassic) 5. *Complecia clara* gen. et sp. nov. (Shara-Teg, Upper Jurassic)

Holotype PIN No 3073/755 (=3275/748), positive and negative impressions of wing, partly preserved, Kirgizstan, Osh region, Batken district, Shurab-3 (Say-Sagul); Lower or Middle Jurassic.

Description (figs.4, 10). Wing rather broad.. The length ratio of RS1 (from base of RS to r-m) and RS2 (from r-m to R4 base) sections is 1:1.2. Section RS1 with two strong kinks at the bases of R2+3 and r-m. Crossvein r-m 1.5 times longer than part of of RS1 section between R2+3 and r-m bases and 2.5 times shorter than M2 section. The length ratio of M2 and M3 sections is 1:1.7. Section M1 not developed. Crossvein tb very short

Comparison. Differs from all other species of *Paraxymyia* in having two distinct kinks on RS. Differ from *P. mongolica* in having R2+3 and r-m bases closer to each other.

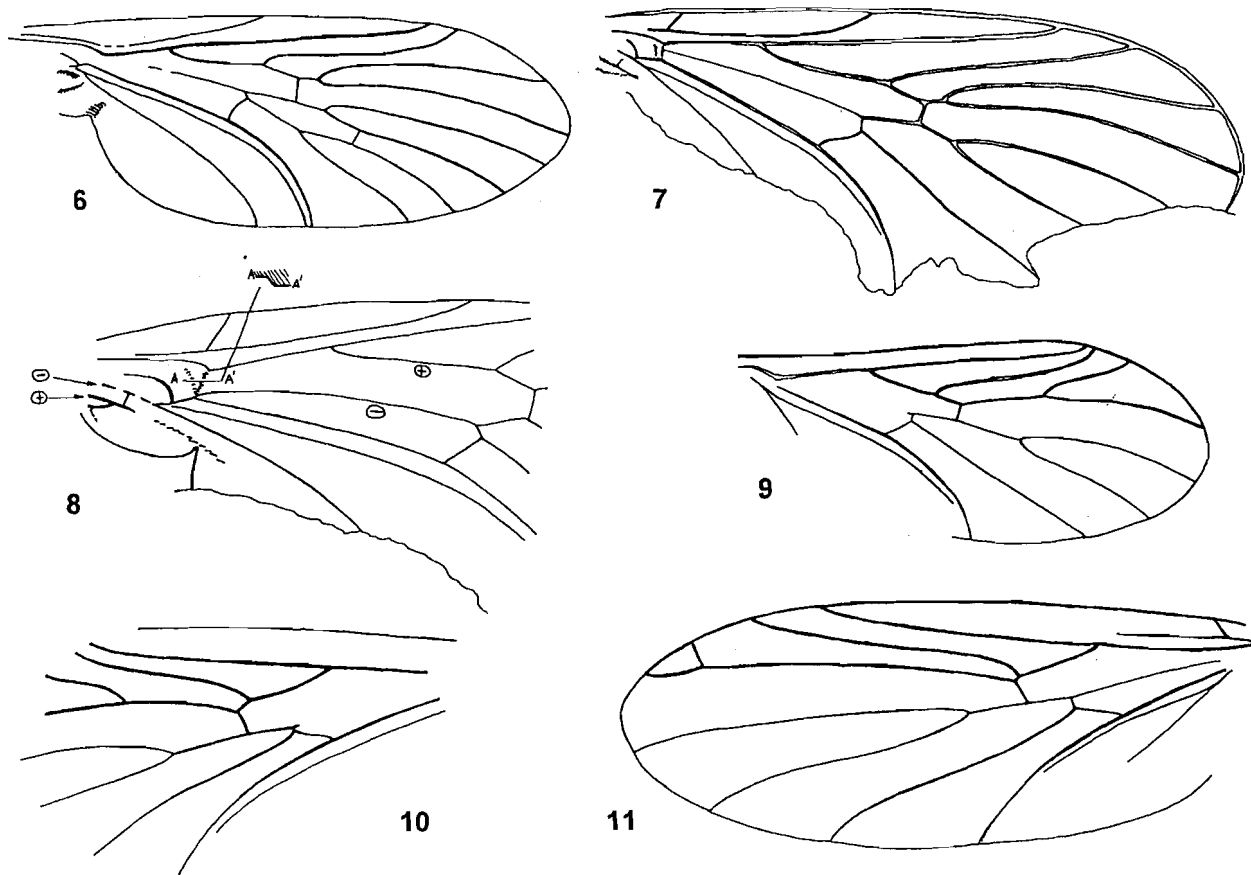
Subfamily Eomycetophilinae ANSORGE, 1996, stat. nov.

Complecia clara gen. et sp. nov.

Holotype PIN No 4270/2176, positive and negative impressions of wing, Mongolia, Goby-Altay aymak, east to Atas-Bogt, 5-6 km west to Mt. Shara-Teg; Upper Jurassic.

Description (figs.5, 11). Wing 3.3 mm long, narrow, width 3.2 times as length. Sc free, ends proximad of RS base level. Vien R1 slightly curved forward in distal part, its length is 0.68 of wing length. Vein R5 slightly curved back. The length ratio of wing margin sections between R1, R2+3, R4 and R5 tips are approximately equal. Vein R2+3 base slightly proximad of r-m crossvein. Section RS2 with distinct break at the r-m. The length ratio of RS1, RS2 and RS3 segments is 1:4:0.7. M base weakened, but distinct. The length ratio of M1, M2 and M3 sections is 3.5:1:1.3. The fork of M1 and M2 is 5.5 times as long as M3 section. Vein M3+4 slightly curved S-like.

Comparison. Differs from *Eomycetophila*



Figs. 6-11. Mesozoic Bibionomorpha, venation 6. 6. *Austrocramptonomyia minuta* gen. et sp. nov. 7. *Veriplecia handlirschi*, sp. nov. 8. *V. handlirschi*, sp. n., schematic drawing of wing base 9. *Paraxymyia mongolica*, sp. nov. 10. *P. bianguliradia*, sp. nov. 11. *Complecia clara* gen. et sp. nov.

KOVALEV in having Sc ending free, R2+3 base before r-m, and long M1 and M2 fork.

Discussion

On the Mesozoic dipteran family Paraxymyiidae

The position of Paraxymyiidae within Bibionomorpha s.l. is a subject of discussion till now. Since Middle-Late Triassic Bibionomorpha s.l. have been divided on two main lineages - protorhaphid and procramptonomiid (SCHERBAKOV et al., 1995). Anisopodoidea sensu HENNIG and KOVALEV (HENNIG, 1954, KALUGINA, KOVALEV, 1985), comprising families of the both lineages, seem to be rather grade than clade, united by plesiomorphy - presence of discal cell. Meantime, Anisopodoidea s.str. (including Anisopodidae and Protorhaphidae) and Brachycera have a synapomorphy - distinct oblique vein-like MA (or arculus).

All Paraxymyiidae described have wing basalia (fig. 8) bibionomorph-like (see SCHERBAKOV et al., 1995 for details). Thus, we have no reason to bring together Paraxymyiidae and Protorhaphidae like EDWARDS (1928) but must relate the first with Procramptonomyiidae. Moreover, we may doubt in anisopodoid affinity with *Crosaphis anomala* Kovalev. The only reason why Crosaphidae were suggested to be the ancestor of Mycetobiidae is the same vein set of the families. Paraxymyiidae of the subfamilies Eomycetophilinae, especially *Complecia clara*, have not only the same veins composition but also their veins structure very similar to *Crosaphis* and differ only in having very short R4. It is interesting, that the specimen of *C. clara* had had the collection label «Crosaphidae» and R4 was found only after a thorough examination. So, the position of *Crosaphis* is doubtful now - it might be a representative of the ancestors of Mycetobiidae as well as the descendant of Paraxymyiidae, and as a result of

it may be considered within the Anisopodiformia or Bibioniformia sensu SCHERBAKOV et al. (1995).

There are several extinct groups of Bibionomorpha which have three branches both in radial and medial sectors. Boholdoyidae differ by weak Sc, rather straight R4 parallel to R5, long and oblique M3 base, short R1, minimal costalization (long veins are of equal thickness and evenly distributed over the wing). Such body characters as well as developed transversal suture, long postnotum, short coxae relate Boholdoyidae rather to Perissommatidae (KALUGINA, KOVALEV, 1985, SCHERBAKOV et al., 1995) than to any other Bibionomorpha s.l. Besides, the structure of median veins of *Boholdoyia* KOVALEV remains still unknown, and it is possible that representatives of the genus have discal cell developed like *Daiamyia* KOVALEV. Thus, we have no evidence to affiliate Paraxymyiidae with Boholdoyidae-Perissommatidae line.

Compared to Paraxymyiidae, Eoditomyiidae ANSORGE, 1996 have more advanced venation and seem to be derived form the first: Sc ends free, crossveins r-m and tb aligned together, M2 reduced. Nevertheless, the wing characters may be not sufficient for establishing direct affinities when we compare taxa with so few species.

Long and curved back R4 of *Veriplecia* is undoubtedly plesiomorphic character state that could be found in Procramptonomyiidae. Advanced Paraxymyiidae have R4 oblique and curved forward at the tip (like Paraxymyia) or very short and placed near R5 tip (like Eomycetophila). This state confirm an ancestral position of *Veriplecia* within Paraxymyiidae.

The place of Paraxymyiidae in the phylogeny of Bibionomorpha is very significant. They connected the most primitive Bibionomorpha, Procramptonomyiidae, with their mycetophiloid descendants. The findings of Paraxymyiidae and other Bibionomorpha in several Triassic localities over the world are evidence for the very rapid initial radiation and wide distribution of the oldest Diptera.

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