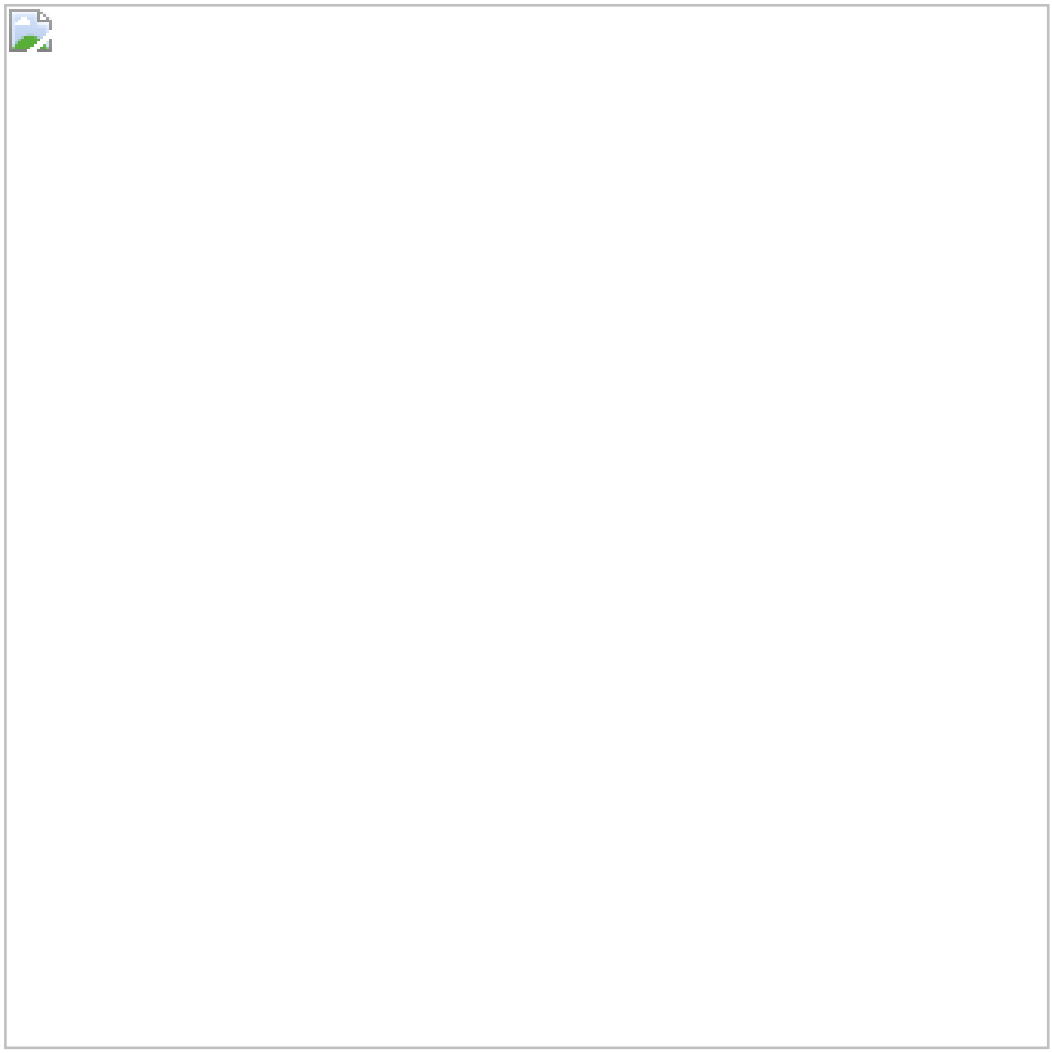

A New Fossil Lacewing Genus and Species from the Middle Jurassic of Inner Mongolia, China

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Brief report

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A new fossil lacewing genus and species from the Middle Jurassic of Inner Mongolia, China

YONGJIE WANG, ZHIQI LIU, and DONG REN

A new fossil lacewing, *Tenuosmylus brevineurus* gen. et sp. nov., was collected from an outcrop of Middle Jurassic strata in the village of Daohugou, Inner Mongolia, China. The new genus is assigned to Gumillinae based on eleven defining characteristics of the subfamily. The affiliation of *Tenuosmylus* including other five genera of the subfamily is discussed. Our result supports the opinion that Epiosmylinae was a junior synonym of Gumillinae, which is likely a relic of ancient osmylids based on similarity of forewing venation. Veins Mp_2 and Cu_2 have complicated branches that are generally present in extinct as well as some extant subfamilies (Poriminae, Eidoporisminae, Stenosmylinae). A key is given to differentiate six known genera within Gumillinae.

Introduction

The Osmylidae is a relatively primitive family in Neuroptera that represents great diversity in the Old World (Ren 2002). The Osmylidae consists of both extant species and extinct fossil members. The studies of fossil Osmylidae have been hampered due to poor and fragmentary preservation and the material was restricted largery to incomplete wings (Panfilov 1980; Ponomarenko 2003; Makarkin 1990; Ren and Yin 2003). Therefore, even though many osmylid-like fossil genera have been described, their detailed taxonomic status is poorly constituted. A good example is Gumillinae, an extant subfamily in Osmylidae, which has been originally described by Navás (1912) as the tribe "Gumillini", but subsequently was elevated to its current status by Krüger (1913, 1915). The peculiar appearance of members of this subfamily includes: excessively long antennae and absence of ocelli, both regarded as important characters that define the extant Osmylidae. Menon and Makarkin (2008) established a new genus, *Nuddsia,* from the Lower Cretaceous of Brazil and redefined the subfamily. After comparison of Epiosmylinae and Gumillinae they stated that Epiosmylinae is a junior synonym of Gumillinae as already suggested by Lambkin (1988). This also concurs with our observations based on comparative wing studies. Gumillinae is likely a relic of ancient osmylids as can be deduced from the similarity of forewing venation. Veins Mp2 and Cu2 have complicated branches that are generally present in extinct as well as some extant subfamilies (Poriminae, Eidoporisminae, Stenosmylinae).

Herein we describe a new genus and species *Tenuiosmylus brevineurus* gen. et sp. nov. from the Jiulongshan Formation in Daohugou, Inner Mongolia, China (Fig 1). This locality has yielded a great diversity of lacewings, especially members of Osmylidae or osmylid-like lacewings (Ren 2002; Ren and Oswald 2002; Ren and Yin 2002, 2003; Ren and Engel 2007).

Institutional abbreviation.—CNU, Capital Normal University, Beijing, China.

Other abbreviations.—A1, A2, A3, anal vein; Cu, cubitus; Cu1, the first branch of cubitus; Cu2, the second branch of cubitus; Ma, anterior medial; Mp, posterior medial; Mp2, the second branch of the posterior medial; R1, the first branch of radius; Rs, radial sector; Sc, subcosta; sc-r, cross-vein between Sc. Basic terminology follows New (1983).

Systematic paleontology

Family Osmylidae Leach, 1815

Subfamily Gumillinae Navás, 1912

Genus *Tenuosmylus* nov.

Etymology: The new genus name is a combination of the Latin tenuis (meaning, "narrow, slim") and osmylus (type genus of Osmylidae). The gender is masculine.

Type species: *Tenuosmylus brevineurus* sp. nov.

Diagnosis.—Forewing elongated, trichosors present at outer and posterior margins. Costal cross-veins simple and unforked distally, veinlets dense near the apex. Radial cross-veins numerous, arranged irregularly and not forming a gradate cross-veins. Presence of at least four presectoral cross-veins, however, probably more existing. Separation of Ma at approximately one-third of wing length with first branch of Rs nearly at middle of wing. Rs with 6–7 branches. Mp forks close to wing base. Cu1 with pectinate branches from middle to terminal end, interlinked by veinlets. Cu2 shorter than Cu1, nearly half as long as Cu1 and with four pectinate branches. Hind wing resembles forewing, but Cu single branch, originating at wing base and bearing many pectinate branches.

Remarks.—The new genus is most similar to *Enodinympha* regarding comparison of forewing venation. The two genera are also from the same locality and are of the same geological age. However, the new genus can easily be differentiated by the short Cu2 in its forewings. Venation is generally fixed in Osmylidae and substantial variation is usually present in only higher taxa.

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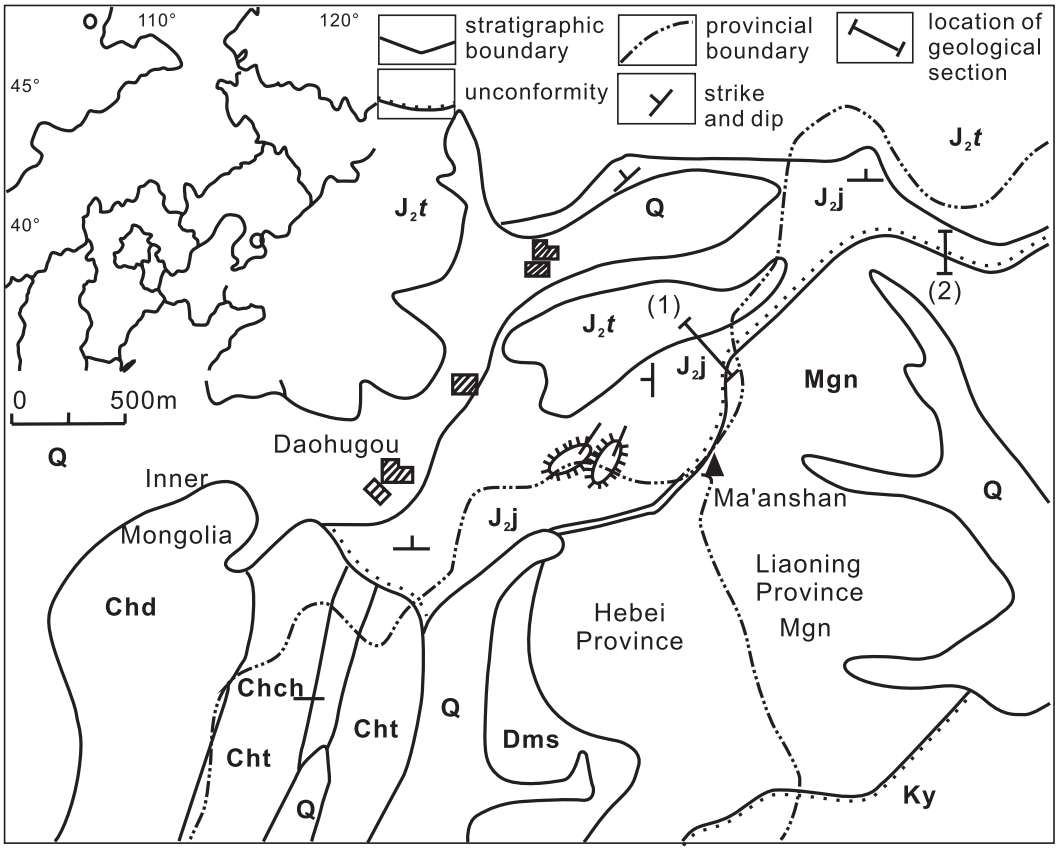

Fig 1. Location of the type locality of lacewing fly *Tenuosmylus brevineurus* gen. et sp. nov. Daohugou Village, Shantou Township, Ningcheng County, Inner Mongolia, China. Abbreviations: Chc, Changchougou Formation; Chch, Chuanlinggou Formation; Chd, Dahongyu Formation; Cht, Tuanshanzi Formation; J2j, Jiulongshan Formation; J2t, Tiaojishan Formation; Ky, Yixian Formation; Q, Quaternary; Dms, Dalaiyingzi erosion surface; Mgn, Maanshan gneiss. After Ren et al.(2002).

Therefore, we consider it reasonable to erect a new genus for this fossil osmylid instead of merely treating it as a new species of previously described genera.

Stratigraphic and geographic range.—The genus is from the Middle Jurassic of Inner Mongolia, China.

Key to the fossil genera of Gumillinae

Hindwing: presectoral cross-veins less than three and separation of Ma from Rs close to wing base ..... *Nilionympha*

Hindwing: presectoral cross-veins more than three or separation of Ma from Rs at one-third of wing length 2

Rs branches number less than 10, generally 5–7 3

Rs branches more numerous, greater than 10 5

Forewing: Cu branches of equal length, Cu1 forming bifurcate forks without pectinate branches ..... *Nuddsia*

Forewing: Cu branches of unequal length, Cu1 forming pectinate branches 4

Forewing: Cu1 branches deeply forked and interlinked by veinlets. Hindwing: Cu long and of equal length to Mp2 ..... *Epiosmylus*

Forewing: Cu1 branches simple and without interlinking veinlets. Hindwing: Cu short, only half the length of Mp2 .... *Tenuosmylus* gen. nov.

Forewing: narrow costal space near apex, Cu1 with complicated branches distally, interlinked by veinlets ..... *Enodinympha*

Forewing: broad costal space near apex, Cu1 with pectinate branches, without interlinking veinlets ..... *Nymphites*

Tenuosmylus brevineurus sp. nov.

Figs. 2, 3.

Etymology: The name is a combination of the Latin *brevis* (meaning, "short") and *neurus* (meaning, "vein") referring to the short Cu2 in the forewing.

Holotype: CNU-NN99030. Specimen consists of a relatively complete body with four wings spread out. Only the left forewing provides discernable venation.

Type locality: Daohugou Village, Shantou Township, Ningcheng County, Inner Mongolia, China.

Type horizon: Jiulongshan Formation, Aalenian–Bajocian, Middle Jurassic.

Material.—Holotype CNU-NN99030 and paratype CNU-NN99031 (specimen with head and thorax anamorphic. Four wings folded posteriorly).

Diagnosis.—The same as for the genus (monotypic at present).

Description.—Eyes distinctly dark. Antennae filiform but length uncertain due to poor preservation, scape slightly bulky. Prothorax trapezoid. Meso- and metathorax dilated. Mesonotum equipped with complete sclerites, prescutum small and semicircular, scutellum triangular. Metanotum with fully-developed sclerites. Abdomen poorly preserved with only an inconspicuous trace.

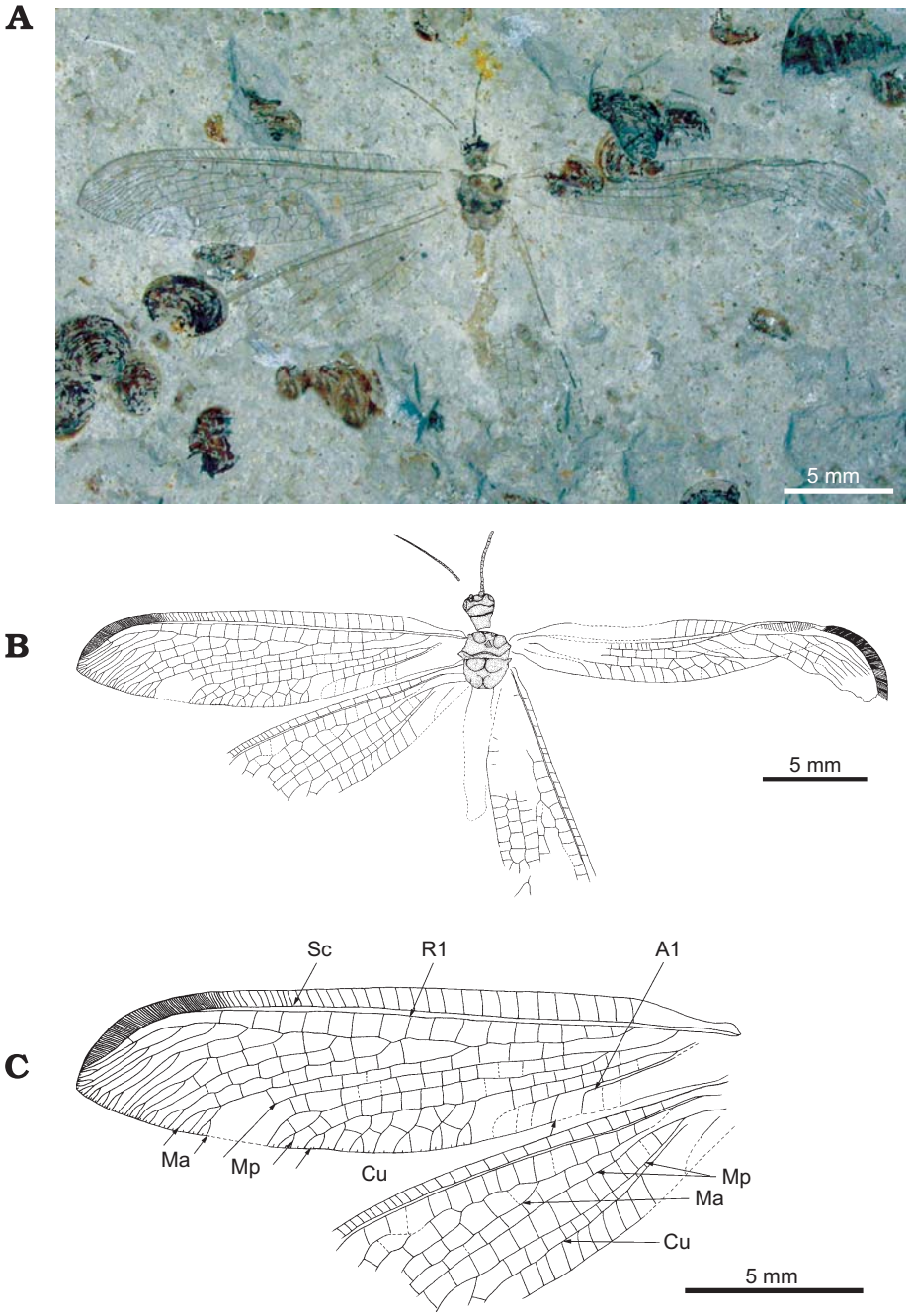

Fig 2. Lacewing fly *Tenuosmylus brevineurus* gen. et sp. nov. Holotype. CNU-NN99030. Photograph (**A**) and explanatory drawings of the body (**B**) and details of details of left forewing and hindwing (**C**).

Forewing elongated with subacute apex, 18.1 mm long, 4.5 mm wide. Trichosors present but inapparent at costal margin, perhaps due to poor preservation. Pterostigma distinctly fuscous. Membrane colorless, and nygmata undetected. Costal space narrow at base and then dilated. Subcostal space very narrow. Sc and R1 fused distally and entering the margin before the apex, sc-r absent. Rs originating close to wing base. Numerous cross-veins present between R1 and Rs. Rs with seven branches, each forked distally. Mp forked near wing base with two parallel branches that are each distally bifurcated. A1 not well preserved but also with pectinate branches. A2 and A3 inapparent.

Hindwing poorly preserved with trichosors inapparent. Costal space narrow with simple veinlets lacking distal forks. Subcostal space extremely narrow, sc-r not visible. Cross-veins between R1 and Rs numerous. Separation of Ma and first branch of Rs similar to in forewing. Mp forked close to wing base, the distance between the two branches slightly dilated in middle. Mp2 bifurcated distally. Anal veins not well preserved, only a single fragmentary one is apparent.

Discussion.—Our newly described genus is being assigned to Gumillinae based on defining characteristics of the subfamily. This includes the following combination of characters: exces-

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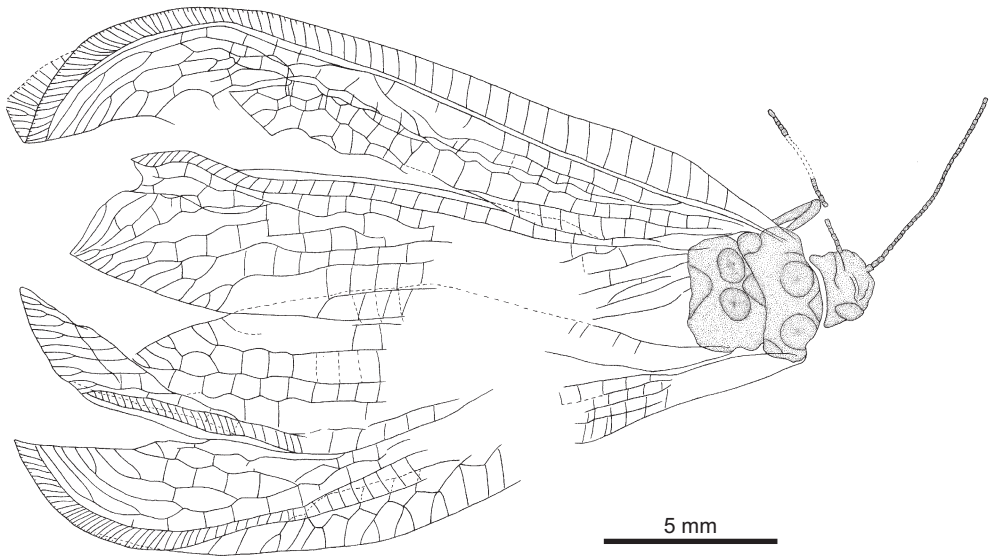

Fig 3. Lacewing fly *Tenuosmylus brevineurus* gen. et sp. nov. Drawing of the body and wings of paratype CNU-NN99031.

sively long antennae (poorly preserved in the specimens); greatly elongated wings; trichosors limited at outer and posterior margins and partly at costal margin; narrow costal space with simple costal cross-veins; separation of Ma from Rs generally distant from wing base (at nearly one-third of wing length); first branch of Rs near middle of wing; presence of more than three presectoral cross-veins; branches of Mp distally forking as they enter outer wing margin; distal branches of Cu1 pectinate or deeply forked, branches of Cu2 pectinate from middle to terminal end; A1 parallel with Cu in forewing; hind wing with a single Cu branch. We also concur with Menon and Makarkin (2008) in the placement of four other genera (*Nymphites* Hasse, 1890; *Epiosmylus* Panfilov, 1980; *Enodinympha* Ren and Engel, 2007; *Nilionympha* Ren and Engel, 2007) into this subfamily.

Stratigraphic and geographic range.—Daohugou Village, Shantou Township, Ningcheng County, Inner Mongolia, China. Jiulongshan Formation, Middle Jurassic.

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