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Substitute names for three genera of fossil Neuroptera, with taxonomic notes

VLADIMIR N. MAKARKIN[1] & S. BRUCE ARCHIBALD[2]

[1]*Institute of Biology and Soil Sciences, Far East Branch of the Russian Academy of Sciences, Vladivostok, 960022, Russia, vnmakarkin@mail.ru.*

[2]*Department of Organismic and Evolutionary Biology, Harvard University, Museum of Comparative Zoology, 26 Oxford Street, Cambridge, MA 02138, U.S.A., barchibald@oeb.harvard.edu.*

Abstract

The names of three genera of fossil Neuroptera are found to be junior homonyms; we propose the following substitute names: *Glottopteryx* nom. nov. for *Glottidia* Bode, 1953; *Hongosmylites* nom. nov. for *Sinosmylites* Hong, 1996; and *Jurosmylus* nom. nov. for *Mesosmylus* Panfilov, 1980. The family-group name Glottidiidae Bode, 1953 is unavailable and should be considered nomen nudum. The spelling of the family name Osmylopsychopidae Martynova, 1949 (not Osmylopsychopsidae) is grammatically correct and available. The family affinities of these fossil genera are briefly discussed: *Glottopteryx* may belong to Prohemerobiidae or Osmylopsychopidae; *Hongosmylites* to an undetermined psychopsid-like family; *Jurosmylus* with confidence to Osmylidae; *Sinosmylites* Hong, 1983 is most probably a member of Prohemerobiidae.

Key words: Neuroptera, fossils, nomenclature, taxonomy

Introduction

While examining the taxonomy of fossil Neuroptera, we have noted that the three generic names *Glottidia* Bode, 1953, *Sinosmylites* Hong, 1996, and *Mesosmylus* Panfilov, 1980 are junior homonyms. The latter two were originally assigned to the same families as their senior homonyms: *Sinosmylites* Hong, 1983 and *Sinosmylites* Hong, 1996 to Osmylitidae; and *Mesosmylus* Krüger 1913, and *Mesosmylus* Panfilov, 1980 to Osmylidae. In this note we show that these homonyms are not synonyms, but rather that the taxa that they represent are distinct; propose substitute names for them; discuss the availability of the family names Glottidiidae and Osmylopsychopsidae/ Osmylopsychopidae and related taxonomic problems; and consider the family affinities of the fossil genera *Glottopteryx*

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nom. nov., *Jurosmylus* nom. nov., *Hongosmylites* nom. nov. and *Sinosmylites* Hong, 1983. Articles of the International Code of Zoological Nomenclature cited are from the fourth edition (ICZN 1999).

Glottopteryx nom. nov.

Glottidia Bode 1953: 18, 246, 268 [Neuroptera: Glottidiidae (non Dall 1870: 157; Brachiopoda: Inarticulata: Lingulida: Lingulidae)]; Carpenter 1992: 355 [Neuroptera incertae sedis]; Ponomarenko 1995: 85 (as a synonym of *Actinophlebia* Handlirsch, 1906) [Osmylopsychopsidae (sic)]; Makarkin & Archibald 2003: 176 [Neuroptera: Osmylopsychopidae?, Brongniartiellidae?, Prohemerobiidae?]; nomen praeoccupatum.

Type species: *Glottidia multivenosa* Bode, 1953, by original designation.

Etymology. Glotto- (from Greek *glotta*, *glossa* [feminine], tongue) + -pteryx (from Greek *pteryx* [feminine], wing), in reference to the tongue-like shape of the forewing (i.e., long, comparatively narrow, with a rounded apex).

Gender. Feminine, from the gender of the Greek noun *pteryx*, Article 30.1.2.

Included species. Only the type species, *Glottopteryx multivenosa* (Bode, 1953), comb. nov., from the Lower Jurassic (Upper Lias) of Braunschweig, Germany.

Comments. *Glottidia* Dall, 1870 is the available valid name of a brachiopod genus, known from the Eocene to Recent, often cited in neontological and paleontological literature (*e.g.*, Chuang 1964; Emig 1983; Emig & Bitner 2005). Therefore, Article 23.9 may not be applied in this case, and a substitute name is required for the neuropteran genus.

Bode (1953: 18, 246) established the monotypic family Glottidiidae for the neuropteran genus *Glottidia*, but did not provide a diagnosis. We find only one subsequent mention of this family name, as Glottididae [sic] in Makarkin & Archibald (2003: 176), again without diagnosis. Therefore, the family-group name Glottidiidae Bode, 1953 is unavailable (Article 13.1: no description or definition; Article 13.2.1: was not used as valid name before 2000), and so it should be considered as a nomen nudum.

We consider *Glottopteryx* to be a valid genus, not a synonym of *Actinophlebia* as proposed by Ponomarenko (1995). The forewing of *Actinophlebia* is triangular, with a distinct tornus, and with a dichotomously branched CuP; in *Glottopteryx* it is elongate, without a tornus, and CuP is pectinately branched.

The systematic position of *Glottopteryx* is not clear. It belongs to the psychopsid-like neuropterans, the taxonomy of which remains poorly resolved. This group is sometimes treated as a separate taxon, either as the superfamily Psychopsidoidea (Martynova 1949) or as the suborder Psychopsiformia (Krivokhatsky 1998). It is considered to contain seven families: Psychopsidae, Osmylopsychopidae, Brongniartiellidae, Kalligrammatidae, Prohemerobiidae, Panfiloviidae, and Grammolingiidae, a recently established family treated as closely related to Grammolingiidae (Ren 2002). In our opinion, however, the

monophyly of Psychopsiformia (Psychopsidoidea) is doubtful. At least, the Prohemerobiidae probably does not belong to this suborder, judging by the forewing venation of *Prohemerobius dilaroides* Handlirsch, 1906 (the type species of the type genus of this family), which is clearly more similar to Hemerobiidae than Psychopsidae; the wing characters of Panfiloviidae and Grammolingiidae are more similar to those of Osmylidae than Psychopsidae. We therefore find the Psychopsiformia, as currently defined, to be most likely paraphyletic, and so consider those families placed within it to be "psychopsid-like neuropterans" of unknown suborder/superfamily affinity. All of these families are in strong need of revision.

Families other than the Prohemerobiidae or the Osmylopsychopidae are excluded by venation. The elongate forewing lacking any trace of the tornus found in *Glottopteryx* is not characteristic of the wings of the great majority of psychopsid-like genera (if we exclude Prohemerobiidae, see above). By these features its forewing resembles that of Prohemerobiidae, rather than Osmylopsychopidae. Other forewing character states of *Glottopteryx* are not useful in separation between these families. For example, Sc and R1 fused apically (*Osmylopsychops* Tillyard, 1923 among Osmylopsychopidae; *Prohemerobius alysius* (Whaley, 1988) among Prohemerobiidae) or not (*Actinophlebia* among Osmylopsychopidae; most species of *Prohemerobius* Handlirsch, 1906 among Prohemerobiidae); CuP is dichotomously branched (*Osmylopsychops*, *Actinophlebia* among Osmylopsychopidae; *Prohemerobius dilaroides* Handlirsch, 1906 among Prohemerobiidae) or pectinately branched (*Parhemerobius* Bode, 1953 among Osmylopsychopidae; *Prohemerobius septemvirgatus* Bode, 1953 among Prohemerobiidae). Thus, at present this genus cannot be assigned with confidence to either of these families (and see below).

We previously discussed the possibility that this genus could belong to the Brongniartiellidae (Makarkin & Archibald 2003), however, we find by our subsequent examination of its type species *Brongniartiella gigas* (Weyenbergh, 1869) that it differs from *Glottopteryx* in significant ways. For example, contrary to the forewings of *Glottopteryx*, those of *B. gigas* are (1) very large and deeply-triangular; (2) the branches of Rs are dichotomously branched; (3) CuP is dichotomously branched; (4) the outer gradate series of crossveins (preserved in the posterior portion of the radial space to the cubital space) is regular, and (5) scarce crossveins in the radial space proximal to this series are present. However, the fore- and hind wings of the holotype of *B. gigas* are overlapping, and portions of these are very hard to separate; characters (3) and (4) belong most probably to the hind wing.

There is disagreement concerning the spelling of the family name Osmylopsychopidae/ Osmylopsychopsidae. Both spellings have appeared numerous times in the literature: as Osmylopsychopsidae by Martynova (1949), Whalley (1988), New (1989), Ponomarenko (1995), and Grimaldi (2000); and as Osmylopsychopidae by Riek (1955), Martynova (1962), Carpenter (1992), and Makarkin & Archibald (2003).

The etymology of *Osmylopsychops* (the type genus of the family) was not explained by Tillyard (1923), however, it is probably Osmylo- (from *Osmylus*, an osmylid genus-group name) + -psych- (from Greek *psyche* [feminine], breath, soul, life, butterfly) + -ops (from Greek *ops* [feminine], look, countenance), in reference to general appearance of the type species forewing possessing some osmylid and psychopsid traits. The genitive case of the Greek noun *ops* is *op-os*, and its stem is *op*. Thus, the correct spelling is Osmylopsychopidae (Articles 29.1, 29.3.1). This spelling should be considered as an available name for this family, as no name was in prevailing usage (therefore, Article 29.5 may be applied to this case), and the name Osmylopsychopsidae is unavailable.

Hongosmylites nom. nov.

Sinosmylites Hong, 1996: 57, 60, 61 [Neuroptera: Osmylitidae] (non *Sinosmylites* Hong, 1983: 94, 199; Neuroptera: Osmylitidae); Makarkin & Archibald 2003: 176 [Neuroptera: uncertain family]; nomen praeoccupatum.

Type species: *Sinosmylites longus* Hong, 1996, by original designation.

In Hong's (1996) original description the species epithet appears as (1) *Sinosmylites longus*: pp. 57, 58, 61, 62 [caption for pl. 1, Figs 1–2]; (2) *Sinosmylites longuse*: p. 56; (3) *Sinosmylites Longus*: p. 61. The spelling *Sinosmylites longus* Hong, 1996 is here accepted as the correct original spelling, according to Article 32.2.1.

Etymology. Hong- (from the surname of Prof. Hong Youchong, Chinese paleoentomologist) + - osmylites (from *Osmylites*, a neuropteran genus-group name: osmyl- [from *Osmylus*, an osmylid genus-group name] + -ites [a traditional ending of generic names of fossils]), in reference to the author of both homonyms (Hong Youchong) and osmylitid taxonomic affinities of their type species supposed by him.

Gender. Masculine, Article 30.1.4.4.

Included species. Only the type species *Hongosmylites longus* (Hong, 1996), comb. nov., from the Upper Jurassic/ Lower Cretaceous of Laiyang Formation, Shandong Province, China.

Comments. *Sinosmylites* Hong, 1983 is known from the single species *S. pectinatus* Hong, 1983 (Middle Jurassic of Haifanggou, China), and *Sinosmylites* Hong, 1996 from the single species *S. longus*. These species are clearly not congeneric. Both were referred by Hong to the family Osmylitidae, however, we find that they belong to different families. The Osmylitidae seems to be a valid fossil taxon, most closely related to Mesochrysopidae (whose taxonomic composition, however, is still poorly known: Makarkin & Menon 2005), but neither *Sinosmylites* Hong, 1983 nor *Sinosmylites* Hong, 1996 can be assigned to it. Makarkin & Menon (2005) based the validity of Osmylitidae on the re-description of the type species of *Osmylites* Haase, 1890 (the type genus of the family) by Ponomarenko (2003: 91, Figs. 7, 8). However, the holotype of this species is

very poorly preserved, and so the possibility remains that Osmylitidae is a grab bag taxon (Makarkin & Archibald 2003).

The venation of *Sinosmylites* Hong, 1983 resembles that of *Osmylites*, mainly by the structure of M and Cu and by the presence of simple subcostal veinlets. Other character states, however, are strongly dissimilar. Particularly, the forewing of *Osmylites* is much longer and somewhat narrower, branches of Rs are rather short and run at a considerable angle to the hind margin of the wing, the costal space is extended basally (not at 1/3 of wing length as in *Sinosmylites* Hong, 1983), and Sc+R1enters the margin at or near the wing apex (not well proximad as in *Sinosmylites* Hong, 1983). The forewing of *Sinosmylites* Hong 1983 is most similar to that of *Prohemerobius* (the type genus of Prohemerobiidae), particularly by its relatively small size [forewing 5.5-8 mm long: Hong 1983: 199], similar structure of M and Cu, few branches of Rs directed nearly parallel to hind margin, broad-rounded wing apex, and scarce crossveins. However, all subcostal veinlets of *Sinosmylites* Hong, 1983 are simple and Sc fused apically with R1, unlike to those of most species of *Prohemerobius*, in which the subcostal veinlets are mainly forked (at least in the basal half of the wing of the type species), and Sc is normally not fused apically with R1. In any case, the prohemerobiid affinity of *Sinosmylites* Hong, 1983 seems likely, by its similarity with some species of *Prohemerobius*. For example, the subcostal veinlets are simple in basal half of the forewing in *Prohemerobius septemvirgatus* Bode, 1953, and Sc and R1 are fused apically in *P. alysius* (Whalley, 1988; Ponomarenko, 1995).

The genus *Sinosmylites* Hong, 1996 is known from a single forewing (?), the shape and venation of which are most similar to *Glottopteryx*, excepting the quite unusual basal branches of Rs (which appear to be fused distally with the most proximal branch of Rs, or possibly with MA), the complete absence of end-twigging of the preserved veins [well-developed in *Glottopteryx*], and the simple subcostal veinlets [mostly forked in *Glottopteryx*]. However, the apparent unusual basal branching of Rs may be a post mortem artefact in this specimen. Numerous wings from the Lower Cretaceous Baissa locality (Russia, Transbaikalia) with otherwise similar venation do not possess these character states: in these all branches of Rs run freely until the wing margin (Makarkin, pers. obs.). The branches of Rs, CuA and CuP are numerous and closely spaced in *Sinosmylites* Hong, 1996, unlike those of *Sinosmylites* Hong, 1983. It seems most likely that the genus *Sinosmylites* Hong, 1996 belongs to a psychopsid-like family, perhaps the same family as *Glottopteryx*, and possibly one not yet described. In any case, *Sinosmylites* Hong, 1996 and *Sinosmylites* Hong, 1983 are clearly not synonymous.

***Jurosmylus* nom. nov.**

Mesosmylus Panfilov, 1980: 99 [Neuroptera: Osmylidae] (non *Mesosmylus* Krüger, 1913: 280; Neuroptera: Osmylidae); Lambkin 1988: 457; Makarkin 1990a: 101 (as *Mesosmylus atalan-*

tus); Ren *et al*. 1995: 101; Ren & Guo 1996: 466; Ponomarenko 2002: fig. 255 (as *Mesosmylus atalantus*); nomen praeoccupatum.

Type species: *Mesosmylus atalantus* Panfilov, 1980, by original designation.

Etymology. Jur- (from the Jurassic Period of the Mesozoic Era) + -osmylus (from *Osmylus*, an osmylid genus-group name), in reference to the age and osmylid taxonomic affinity of its type species.

Gender. Masculine, from the gender appropriate to the Latin suffix -us, Article 30.1.3.

Included species. Only the type species, *Jurosmylus atalantus* (Panfilov, 1980), comb. n., from the Upper Jurassic of Karatau, Kazakhstan.

Comments. Both *Mesosmylus* Krüger, 1913 and *Mesosmylus* Panfilov, 1980 belong with confidence to the family Osmylidae. The genus *Mesosmylus* Krüger was created for the single extant species *Osmylus naevius* Navás 1912 described from India: "Sikkim, India, 9000', 1895, J. G. Pilcher (Mus. De Londres)". *Mesosmylus* Krüger, 1913 was synonymized shortly after with another Indian genus, *Parosmylus* Needham, 1909, and *Mesosmylus naevius* with its type species *Parosmylus prominens* Needham, 1909 (Krüger 1914: 126). The genus-group name *Mesosmylus* Krüger is available according to Article 23.3.6 and was considered valid by Oswald & Penny (1991: 36). The original and only description of *O. naevius* is incomplete and lacks illustrations (Navás 1912: 184). We examined good photographs of the wings of the holotype, and found that the venation of this species is characteristic of both the genus *Osmylus* and *Parosmylus*; these do not differ significantly by their venation, and are separated by their genitalia. *Mesosmylus* Krüger could also represent a third genus in this group, as its genitalia are not known.

Mesosmylus atalantus Panfilov, 1980 is represented by a rather well-preserved, but incomplete specimen, the forewings of which are clearly preserved with easily visible venation, although the hind wings are crumpled and incomplete. Panfilov's drawing of this species (1980: fig. 103) is imprecise; fortunately, the venation is more clearly discernable in a photograph provided by Ponomarenko (2002: Fig. 255).

Mesosmylus atalantus greatly differs from *M. naevius*, mainly in the following ways: (1) MP has few branches, with only one long branch [pectinately branched, with four long regular branches in *M. naevius*]; (2) CuA is pectinately branched, with four irregular branches [not pectinately branched, with one branch in *M. naevius*]; (3) CuP is pectinately branched, with three irregular branches [with 10 regular branches in *M. naevius*]; (4) the crossveins in the radial space distal to the inner series are few and arranged mostly in a distinct series [numerous and not arranged in a series in *M. naevius*]. Thus, the venation of *Mesosmylus atalantus* is not characteristic of *Osmylus* and *Parosmylus*; both species obviously belong to different genera, and a substitute name for *Mesosmylus* Panfilov, 1980 is required.

Of the seven genera referred to the Osmylidae by Panfilov (1980) only *Jurosmylus* [=*Mesosmylus* Panfilov, 1980] actually belongs to this family; the others belong to Polystoechotidae (*Kasachstania* Panfilov, *Pterocalla* Panfilov, *Osmyloides* Panfilov:

Archibald & Makarkin 2005) or Neuroptera incertae sedis (*Scapoptera* Panfilov, *Pronymphytes* Panfilov, *Karosmylus* Makarkin, 1990b [=*Parosmylus* Panfilov]: current research).

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