Eur. J. Entomol. **91**: 451–454, 1994
ISSN 1210–5759

Revision of the Miocene genus *Lithobibio* (Diptera: Bibionidae)

ANDRÉ NEL

8 Avenue Gassion, F-13600 La Ciotat, France

Diptera, Bibionidae, fossil, Miocene, *Lithobibio*, revision

Abstract. The fossil Miocene genus *Lithobibio* Beier, 1952 (containing single species *L. styriacus* Beier, 1952) is redescribed and synonymized with the genus *Bibio* Geoffroy, 1762. *Bibio styriacus* (Beier, 1952) is a new combination.

Beier (1952) described a new genus and species of Miocene Bibionidae from Parschlug (Steiermark, Austria) after a wing. Since the figure he gave is unusual for a Bibionidae [absence of vein Sc, no pterostigma, R4+5 and M1 (M1 and Ma sensu Beier, 1952) with an apical fork], the position of that genus was uncertain. The re-examination of the holotype indicates that Beier's interpretation was false and that a redescription is necessary. Hardy's (1981: 220, Fig. 13.9–10) interpretation of wing venation is used.

Infraorder: Bibionomorpha
Family: Bibionidae
Genus: *Bibio* Geoffroy, 1762

Lithobibio Beier, 1952, syn. n.

Bibio styriacus (Beier, 1952) comb. n.

Lithobibio styriacus Beier, 1952

HOLOTYPE: Specimen 1878. VI. 2641 K. K. Naturhistorisches Hofmuseum in Wien (coll. Ettingshausen, Nr. 638).

Locus typicus: Parschlug, Steiermark, Austria.

Stratum typicum: Lower Miocene, Carpatian-Lower Badenian.

Preservation: Only one wing is preserved. It is fossilised near a coleopterous elytron, labelled 'Elateridae', determined by Beier (1952: 131). The wing appears to be hyaline.

Redescription: Wing length: 8.5 mm, width: 3.8 mm. Presence of a darker pterostigma, 0.9 mm long and 0.4 mm wide, at the apex of R1. Sc and R1 simple and parallel. Sc reaches wing margin 4.5 mm before wing apex and 4.5 mm after wing base. R1 reaches wing margin 4 mm before apex and 5 mm after wing base (at the 44% of wing length). Length of basal portion of Rs, before r-m: 1.1 mm, length of r-m: 0.4 mm, r-m is oblique (angle between r-m and distal portion of M1+2: 75°). R4+5 simple, without any fork, reaching wing margin 0.5 mm before wing apex. C terminating at the point of fusion between R4+5 and wing margin. Distance from the point of division of M1+2 (into M1 and M2) and wing apex: 3.7 mm. Length of M1: 3.7 mm, of M2: 3 mm. M1 and M2 are simple. Width of the field between M1 and M2 at wing margin: 1.3 mm. M2 is angulate at

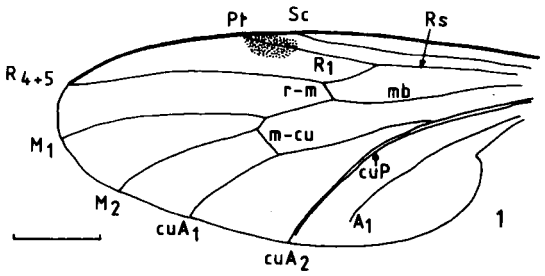
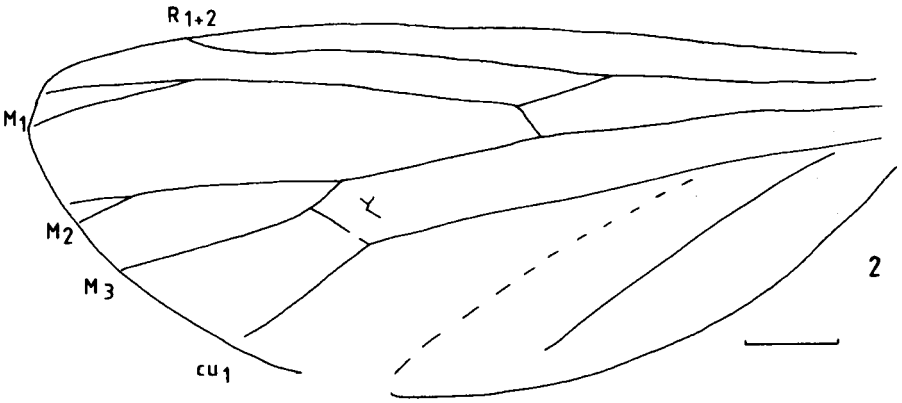


Fig. 1. Wing of specimen 1878. VI. 2641, holotype, *Lithobibio styriacus* Beier, 1952 [*Bibio styriacus* (Beier, 1952) comb. n.]. Scale 2 mm.

Fig. 2. Beier's (1952) interpretation of venation of *Bibio styriacus* (Beier, 1952) comb. n. (after Beier, 1952). Scale 1 mm. Venation terminology after Beier (1952).



the point of junction with the vein m-cu. Distance between the point of separation of M1+2 and the point of junction of M2 to m-cu: 0.2 mm. Length of m-cu: 0.6 mm. CuA1 simple, reaching wing margin and not evanescent proximally. Length of portion of CuA1 after bm-cu: 2 mm. Distance between M2 and CuA1 at wing margin: 1.2 mm, between CuA1 and CuA2 at wing margin: 1.8 mm. The vein CuP is parallel and nearly coalescent with CuA2. A1 is visible, evanescent and not reaching wing margin, as is found in modern *Bibio* sp. All the characters agree with the venation of a species of *Bibio.*

DISCUSSION

Beier's interpretation of venation is incorrect. The Rs unbranched (vein R2+3 lacking) affirms its attribution to Bibioninae. In that group, genus *Philia* Meigen, 1800 (= *Dilophus* Meigen, 1803) [Holarctic] has some venational characteristics not present in that fossil: the basal portion of the Rs is very short, about 1/5 to 1/2 as long as the r-m cross-vein (Hardy, 1961; 1967) and the costa is produced much beyond tip of R4+5. The second character seems to be uncertain [cf. *Philia strigilata* (McAtee, 1921); Hardy, 1961].

The genus *Bibiodes* Coquillet, 1904 [Nearctic] is characterised by the coalescence of the posterior branch of the radius with the vein M1+2 for a short distance in the middle of the wing (Hardy, 1961; Melander, 1912). Thus, the fossil cannot belong to this genus.

The fossil genus *Bibiodites* Cockerell, 1915 [Eocene, Gurnet bay, Isles of Wight, England] has the same feature as *Bibiodes* but the coalescence of Rs with M1+2 is shorter than in *Bibiodes* (Cockerell, 1915: 493).

The genus *Enicoscolus* Hardy, 1961 [Mexico, Papua New Guinea, Australia] has some venational characteristics not present in the fossil: the R4+5 is short, thickened at apex and parallel with R1, the basal section of the radial sector is very short compared with the r-m cross-vein, no vein m-cu, the vein CuA1 is evanescent at base and apex (Hardy, 1962; 1968).

The genus *Bibionellus* Edwards, 1935 [Neotropical] presents a costa strongly produced, extending about half-way from R4+5 to M1 (Hardy, 1945).

The fossil genus *Lithosomyia* Carpenter, 1985 (= *Mesomyia* Pongracz, 1928) [Miocene of Croatia, Radoboj, *Mesomyia brevis* (Heer, 1849)] is, after Pongracz (1928: 174), characterized by the fork of M1+2 shorter than in *Bibio*: "... die Gabel der M viel kürzer, und geräumiger, ...". *Lithobibio styriacus* does not possess this character. *Lithosomyia* requires redescription since Pongracz's figures are usually false or uncertain. In the case of *Lithosomyia*, Pongracz (1928: 175, Fig. 42) has figured numerous transverse cross-veins between R4+5, MA1, MA2 and CuA1 which do not exist in a genuine species of Bibionidae.

The venational characters of *L. styriacus* are in agreement with those of a species of *Bibio*.

The attribution of that fossil species to *Bibio* and the synonymy of *Lithobibio* with *Bibio* are certain. Unfortunately, it is impossible to be more precise and to compare *Bibio styriacus* with extant species of *Bibio*, due to the lack of genital and body characters on the fossil specimen.

Nevertheless, in *Bibio styriacus*, the basal portion of Rs is distinctly longer than the r-m transverse vein. After Duda (1930), this character would correspond to his *B. hortulanus* group of species. Since Duda's key is typological and not phylogenetic, the polarity of this character is still not clear. In genera placed close to *Bibio*, two opposite states of this character occur: in *Bibiodes*, r-m is evanescent but in *Philia*, basal portion of Rs is very short. Therefore, it is difficult to use an out-group method to determine the polarity of this character. If the state of this character present in *Bibio styriacus* was plesiomorphic, it would be of little use in order to determine its phylogenetic position within the genus *Bibio*. However, if this state of character is apomorphic, *Bibio styriacus* would be placed near *Bibio hortulanus*. The main problem is that a phylogenetic study of the genus *Bibio* is awaited and thus, it is not possible to determine the polarity of this character.

It is still impossible to compare *Bibio styriacus* with the numerous but badly-known Tertiary fossil species of *Bibio* described by Heer (1849), Théobald (1937) and others because of the lack of recent revision of those taxa.

ACKNOWLEDGEMENTS. We thank Prof. Dr H.A. Kollman (Direktor, Naturhistorisches Hofmuseum in Wien) and Dr J. Gaudant (University of Paris 6, Jussieu) for the loan of the type material and for other help.

REFERENCES

BEIER M. 1952: Miozäne und oligozäne Insekten aus Österreich und den unmittelbar angrenzenden Gebieten. *Sber. Öst. Akad. Wiss. (Math.-Natur. Klasse, Abt. 1)* **161**: 129–134.

CARPENTER F.M. 1985: Substitute names for some extinct genera of fossil insects. *Psyche* **92**: 575–583.

COCKERELL T.D.A. 1915: British fossil insects. *Proc. U.S. Natn. Mus.* **49**: 469–499.
DUDA O. 1930: Bibionidae. In Lindner E. (ed.): *Die Fliegen der Palaearktischen Region. 4.* Schweizerbart's Verlagsbuchhandlung (E. Nägele) G.N.B.H., Stuttgart, pp. 1–75.
HARDY E. 1945: Revision of Nearctic Bibionidae including Neotropical Plecia and Penthetria (Diptera). *Univ. Kansas Sci. Bull.* **30**: 367–547.
HARDY E. 1961: The Bibionidae of California. *Bull. Calif. Insect Surv.* **6**: 179–196.
HARDY E. 1962: A remarkable new bibionid fly from Australia. *Pacif. Insects* **4**: 783–785.
HARDY E. 1967: The Bibionidae (Diptera) of Nepal, results of the Australian and the B.P. Bishop Museum expeditions, 1961 and 1965. *Pacif. Insects* **9**: 519–536.
HARDY E. 1968: Bibionidae of New Guinea. *Pacif. Insects* **10**: 443–514.
HARDY E. 1981: Bibionidae. Chap. 13. In McAlpine J.F. (ed.): *Manual of Nearctic Diptera 1. Canadian Agricultural Monograph* 27. Agriculture Canada, Ottawa, pp. 217–222.
HEER O. 1849: Die Insektenfauna der Tertiärgebilde von Oeingen und Radoboj. 2. Heuschrecken, Florfliegen, aderflügen Schmetterlinge und Fliegen. *Neue Denkschriften Allgemeinen Schweizerischen Gesselschaft Gesamten Naturwissenschaften*. W. Engelmann, Leipzig, 264 pp.
MELANDER A.L. 1912: The dipterous genus Bibiodes. *Bull. Am. Mus. Nat. Hist.* **31**: 337–341.
PONGRACZ A. 1928: Die fossilen Insekten von Ungarn, mit besonderen Berücksichtigung der Entwicklung der Europäischen Insekten-fauna. *Annls Hist.-Nat. Mus. Natn. Hung.* **20**: 197–228.
THÉOBALD N. 1937: Les insectes fossiles des terrains oligocènes de France. *Mém. Soc. Sci. Nancy* **7**: 1–473.

Received November 9, 1993; accepted March 28, 1994