WOOD GNATS OF THE GENUS SYLVICOLA
(DIPTERA, ANISOPODIDAE): TAXONOMIC STATUS,
FAMILY ASSIGNMENT, AND REVIEW OF NOMINAL
SPECIES DESCRIBED BY J. C. FABRICIUS


Comments are given on the contents and relationships of Sylvicola Harris, 1780, an important genus of anisopodid gnats. Tonnoirina Amorim & Tozoni, 1994 is sunk as a new junior synonym. At the family-group level aspects of nomenclature, fossils and taxon/lineage definitions are dealt with, and the phylogenetic structure of extant wood gnats discussed. It is preferred to treat them all in a single family and to abandon other formal supra-generic classification. A composite maxillo-labial ‘mentum’ is a remarkable state of the adult mouthparts that seems to combine the Mycetobia- and Olbiogaster-groups. Finally, the identity of three nominal species of Sylvicola has been checked and lectotypes designated on basis of authentic type material. All three are from Europe and were described by J. C. Fabricius. Sylvicola subfuscatus Krivosheina & Menzel, 1998 is a new junior synonym of S. fuscatus (Fabricius, 1775) and S. fiscatusoides sp. n. is proposed for ‘S. fuscatus Fabricius’ of recent authors.

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Wood gnats or Anisopodidae in the sense of Henning (1973) and Peterson (1981), i.e. including Sylvicola Harris, Olbiogaster Osten Sacken, Mycetobia Meigen and related genera, are today a small family of nematocerous Neodiptera (see Michelsen 1996a) with ca. 120 species described. However, a rich fossil record suggests that the direct lineage leading to the modern family can be traced back to early Middle Mesozoic (200+ Myr). The family is rather cosmopolitan, occurring in arboreal habitats ranging from tropical to cold-temperate climates. A few species of Sylvicola, the so-called ‘window gnats’, are very common in domestic situations. Anisopodid larvae are terrestrial saprophages living in decaying organic matter. Rotting wood and sap runs seem favourable to many species of anisopodids, but a much wider range of breeding media, including manure and decaying vegetables, are utilised by the common window gnats.

The purpose of this paper is to discuss and clarify various topics that relate to the systematics of Sylvicola. The nomenclature and synonymy of the genus is considered first, followed by some supra-generic issues (family nomenclature, status of fossil names, relationships and classification of extant genera). Finally, the identity of nominal species of Sylvicola described by J. C. Fabricius (and other 18th century authors) is assessed.

Acronyms for depositories: ZIUL, Zoological Institute, University of Lund; ZMUC, Zoological Museum, University of Copenhagen.
type-species for *Sylvicola* Harris (1780: 100, pl. 31) proposed that generic name for nine newly described British species of the present families Rhagionidae (7), Athericidae (1) and Anisopodidae (1). It was first given as ‘Sylvicola’, but appears in proper singular form in the legend to plate 31 (on p. [4] of the ‘Index’). Knab (1912) was not convinced about the validity of either of the names *Sylvicola* and *Phryne*. Instead, he adopted the name *Anisopus* on grounds that it has priority over *Rhyphus*, a course followed notably by British and American authors. Eventually, the senior name *Sylvicola* gained general acceptance by the early 1960s, probably on the influence of Melville’s (1960) report leading to the suppression of all Meigen-1800 names in 1963. That report (pp. 31-32) clarified the nomenclatorial status of the oldest genus-group names in Anisopodidae.

Based on the small Nearctic fauna (five species only), a division of *Sylvicola* into two subgenera, *Sylvicola* s.str. and *Anisopus* was attempted by Pratt & Pratt (1980). However, as argued by Amorim & Tozoni (1994), such action probably leaves *Sylvicola* s.str. paraphyletic in terms of *Anisopus*. These authors proposed instead a division of the former genus *Sylvicola* into a Laurasian and a Gondwana component. *Sylvicola* was maintained for the Laurasian group of about 15 species, and a new genus, *Tonnoirina* was erected to accommodate the Gondwana group (60 Oriental, Australian, Afrotropical and Neotropical species). However, I find that classification equally difficult to accept. The only evidence given in support of the monophyly of *Tonnoirina* is the dorsally contiguous state of the male eyes. Considering the frequent occurrence of extreme male holopticism in the basal groups of Neodiptera, this is not much of an argument. Even among wood gnats, the contiguous state of the male eyes is not confined to *Tonnoirina*. It occurs at least in *Sylvicola punctatus* (Fabricius) and in all *Mesochria* Enderlein. Finally, an examination of material from Terra del Fuego, Argentina (in ZMUC) revealed that the ‘Gondwana’ *Anisopus andinus* Edwards, 1930 is not a species of *Tonnoirina* but a *Sylvicola* in the sense of Amorim & Tozoni: male eyes narrowly separated dorsally; female with a single spermatheca. Edwards (1930: 115) was evidently right in suggesting that a close relationship exists between the ‘Gondwana’ *andinus* and the ‘Laurasian’ *fenestralis* species group.

On the above evidence, I prefer to maintain *Sylvicola* in the accustomed broad sense. The formal synonymy is as follows:

**Genus Sylvicola** Harris, 1780

*Sylvicola* Harris, 1780: 100, index [4]. Type-species *Sylvicola brevitarsis* Harris, 1780 [= *Tipula fenestralis* Scopoli, 1763], by designation of Coquillett (1910: 610).


**Family Assignment of Sylvicola Harris:**

**A Commentary on the supra-generic classification of Wood Gnats**

**Nomenclature**

The following list presents, in chronological order, all the family-group names that have been proposed for extant and fossil (†) groups of anisopodid or alleged ‘anisopodiform’ gnats. Evenhuis (1994) should be consulted for full references to the literature on the fossil names.


†Protorhyphidae Handlirsch, 1906, Fossilien Insekten: 487. Type-genus *Proctorhyphus* Handlirsch, 1906 (Lower Jurassic).

Anisopodidae Knab, 1912: 111 [as Anisopidae]. Type-genus *Anisopus* Meigen, 1803. Replacement name for Rhyphidae.

†Phrynidae Hendel, 1928: 9, 63 [as Phryneidae]. Type-genus *Phryne* Meigen, 1800. Unavailable replacement name for Rhyphidae, type-genus suppressed for the purposes of zoological nomenclature.

†Olbiogastridae Hennig, 1948: 78 [as Olbiogasteridae]. Type-genus *Olbiogaster* Östen-Sacken, 1886.


†Limnorhyphidae Hong, 1983, [Middle Jurassic. Ins. N. China]: 132. Type-genus *Limnorhypo* Hong, 1983 (Middle Jurassic).

The priority principle of the Zoological Code does not in itself suggest that the valid family-group name for wood gnats is indeed Anisopodidae. This follows from another provision of the Code (Article 40, Section b): Knab (1912) replaced the name Rhyphidae Newman, 1834 by Anisopodidae on the ground that Rhyphus Latreille, 1804 is a junior subjective synonym of Anisopus Meigen, 1803. As the name Anisopodidae was introduced before 1961 and has won general acceptance, it takes precedence of the replaced name and is to be maintained with its own author. According to Recommendation 40A of the Code the name is correctly cited as ‘Anisopodidae Knab, 1912 (1834)’.

Alexander (1962) attempted to replace Anisopodidae by Sylvicolidae on the ground that Anisopus Meigen, 1803 is a junior subjective synonym of Sylvicola Harris, 1780. By taking place after 1960, this action was not valid (see the Code, Article 40, Section a). Even if an earlier, pre-1961 use of Sylvicolidae might be found in the literature, this would not make Sylvicolidae a valid family-group name, as it has never won general acceptance.

Fossil wood gnats: the lineage Anisopodidae

There are two reasons for the high number of supra-generic names proposed in the small family of wood gnats. First, a rich and varied record of ‘anisopodiform’ fossils (mostly wing impressions) from Mesozoic sediments has given rise to several family-group names. Second, a very elaborate supra-generic classification that formally ranks extant wood gnats as a superfamily (Anisopodoidea) consisting of no less than three families, four subfamilies and four tribes (see below) has been proposed by Amorim & Tozoni (1994).

Precise ideas on the relationships of Mesozoic ‘anisopodiform’ fossils may never be obtained considering the limited number of available characters that almost exclusively refer to aspects of the wing. Therefore, all fossil family-group names of the above list may by necessity be referred incertae sedis to the lineage Anisopodidae. Following Michelsen (1996b), such lineage is defined as the stem-based or ‘most inclusive’ clade that contains only wood gnats among its recent species. The true family or taxon Anisopodidae, according to Michelsen (1996b), is defined as the node-based or ‘least inclusive’ clade that contains all recent species of wood gnats. Evenhuis (1994: 559) gives Lower Jurassic as minimum age for the family Anisopodidae. However, that information is of little use in the absence of criteria for what makes a fossil qualify as an anisopodid. It appears to me that ‘Anisopodidae’ in the sense of Evenhuis is more inclusive than the taxon but less inclusive than the lineage by that name. This concern is surely relevant, considering that the age difference between the lineage and the taxon Anisopodidae could possibly amount to a hundred million years.

Extant wood gnats: the taxon Anisopodidae

It is widely acknowledged that extant wood gnats are monophyletic and can be partitioned into three primary subgroups as follows: (1) a widespread group of Sylvicola only, (2) a pantropical group of Olbiogaster and some smaller genera, and (3) a widespread group of Mycetobia and some smaller genera. Strong synapomorphies for the Anisopodidae are the deep sensory vesicle of palpmere III of the maxilla and the missing male tergite IX (= epandrium). Among the subgroups only the Sylvicola-group and the Mycetobia-group are obviously monophyletic: the first on account of a long, basally coiled aedeagus, the second due to the fusion of palpmeres I-III of the maxilla and the missing cell d and vein M, of the wing. The Mycetobia-group was initially nested within Mycetophilidae (s.lat.) based on resemblance in the wing venation, but Edwards (1916) and Keilin (1919) remedied that mistake on strong morphological evidence from both adults and immatures.

Amorim & Tozoni (1994) considered the Olbiogaster-group as standing outside the Sylvicola + Mycetobia-groups. The presence of maximally two spermathecae in the Sylvicola + Mycetobia-groups (three in the Olbiogaster-group) speaks in favour of this scheme, while additional evidence given by the authors appears subtle or poorly documented. A different scheme, in which the Sylvicola-group stands outside the Olbiogaster + Mycetobia-groups, is favoured here on basis of characters of the adult mouthparts. A remarkable, perhaps plesiomorphic state in wood gnats is the presence of a setose postlabial plate apparently representing the mentum. This structure in Sylvicola and Mycetobia is finely illustrated by Peterson (1916: pl. V, figs. 80 and 90). In Sylvicola the mentum is moderate-sized and unmusculated, lying in a membrane between the maxillary cardines and stipites. In Mycetobia the mentum is enlarged and anterolaterally merged with the maxillary cardines + stipites. Evidence for such fusion comes from my observation that the anterolateral angles of this ‘mentum’ receive two sets of maxillary muscle, the tentorial adductors of cardo and stipites respectively. The ‘mentum’ in Mycetobia further gives rise to a set of...
maxillary muscle, the stipital abductor of palpomeres I-III (in Mycetobia – unlike Sylvicola and Olbiogaster – the three basal-most maxillary palpomeres are joined into a single segment). I have not been able to study specimens of the Olbiogaster-group, but it is obvious from Edwards’ (1916) comparative study that the exceptional fusion of labial and maxillary parts is also characteristic of that group. Additional evidence for the monophyly of the Olbiogaster + Mycetobia-groups is provided by the straight vein R1+2, that distally strongly approaches R3. However, ample support for the monophyly of the Olbiogaster-group is still wanting.

Cladistic ambiguity, especially with respect to the Olbiogaster-group, makes me prefer to recognise but a single family of extant wood gnats. This contrasts with the opinion of Russian dipterists (see Krivosheina 1997a, 1997b) and Amorim & Tozoni (1994) that the Mycetobia-group, or the Mycetobia- and Olbiogaster-groups, should be ranked as families. Under the circumstances I also see no point in adopting any formalised supra-generic classification.

The nominal species of Sylvicola described by J. C. Fabricius

Wood gnats of the genus Sylvicola Harris include several species that are common throughout most parts of North and Middle Europe. The modern era of taxonomic treatment of the genus started with Edwards (1923), who identified five European species (in Anisopus) on the basis of diagnostic characters of the male terminalia: fenestralis Scopoli, cinctus Fabricius, zetterstedti Edwards, limpidus Edwards and punctatus Fabricius. In a subsequent treatment of the world fauna of Anisopodidae, Edwards (1928) added a sixth species, fusculus Fabricius, from continental Europe. Lindner (1930) recognised the same species (in Phryne) in a review of the Palearctic species, while Freeman (1950) gave an illustrated key to the four British species (in Anisopus). In a review of the Nearctic species of Sylvicola, Stone (1965) concluded that three out of five species (S. punctatus, S. fusculus and S. fenestralis) are Holarctic and were first described from Europe. Pratt & Pratt (1980) gave a taxonomic up-date of the same species. Pedersen (1968), in a review of Danish Sylvicola, added differences in the female terminalia as a means of species separation. Hancock (1989) and Söli (1992) reviewed the taxonomy and faunistics of the Scottish and Norwegian species. Haenni (1997), in a paper on Swiss Sylvicola, described a new species (S. baechlii) from Switzerland and France. Finally, in a Palaearctic revision of Sylvicola, Krivosheina & Menzel (1998) added two new species to the European list (S. stackelbergi, S. subfuscatus) but missed, for obvious reasons, the species described by Haenni (1997). Thus, a total of nine species of Sylvicola are presently recorded from Europe.

Despite the impressive amount of recent systematic work on European wood gnats, a newly introduced misconception needs to be remedied. It concerns the misidentification of Tipula fuscata Fabricius, 1775, a name always considered valid in the Anisopodidae. The opportunity is taken also to report on two other nominal species of wood gnats described by Fabricius and both currently assigned to Sylvicola.

The identity of Tipula fuscata Fabricius

Sylvicola fuscatus (Fabricius, 1775)

[Musca nigricans; alis antice albo nigroque variis Linnaeus, 1746: 314, 1761: 553. Unavailable, non-binominal.]


Musca fuscata (Fabricius): Gmelin 1790: 2865.

Anisopus fuscus Meigen, 1804: 103, pl. 6 (4). Synonymized by Meigen 1818: 322.

Sciara fuscata (Fabricius): Fabricius 1805: 58.

Rhypbus fuscus (Fabricius): Meigen 1818: 321, pl. 11(18); Meigen in Morge 1975: 395, 486, pl. 25 (1a-g).


Note. – In the second edition of ‘Fauna Svecica’, Linnaeus (1761: 545-556) gave a list of insect and other invertebrate species cited verbatim from his non-binominal first edition of ‘Fauna Svecica’ (Linnaeus 1746). The list contains species that he could no longer identify and thus intentionally excluded from further systematic treatment (see Thompson & Pont 1993: 12-13). Fabricius (1775: 755), when describing Tipula fuscata, evidently attempted to resurrect one of the Linnean species of that list (‘2310. MUSCA nigricans; alis antice albo nigroque variis’, p. 553), but for unknown reasons he emended the original diagnosis in his reference to Linnaeus: ‘Musca fuscata nigricans... Linn. Fn. St. 2310.’ The name Musca nigricans appears subsequently as a proper binomen in the third edition of ‘Fauna Svecica’ by Villers (1789: 509).

Type material. – Lectotype, ♀, by present designation, ‘Suecia [= Sweden]’, in Coll. Fabricius [= ‘Kiel’ of Zimsen 1964: 453] (ZMUC). The lectotype, on a
short pin with a Fabrician label reading ‘fuscata’, is in bad shape due to an old dermestid attack: only parts of the thorax, most of the wings, basal half of the abdomen, left mid tibia and most of left hind leg remain. The alleged origin from Sweden and the reference to Linnaeus suggest that the lectotype could be an authentic Linnaean specimen that Fabricius obtained during his visit to Uppsala in 1762.

Identity. – The remains of the lectotype belong to a species of Sylvicola. The slender proportions of the abdomen and the inflated 1st tarsomere of hind leg show that it is a male. The thick 1st tarsomere of the hind leg, absence of dark markings behind and distal to vein R₃₄, common origin of M₁ and M₂ from the discal cell, and large size (wing 8.2 mm, hind tibia 4.2 mm) leave no doubt that this species was correctly identified by Meigen (1818) and most subsequent European authors. Unfortunately, when Krivosheina & Menzel (1998) realised that two additional species with a fuscat-like wing pattern occur in the northern outskirts of Europe, they followed Andersson (1967) in misapplying the name fuscat for a species recorded only once from northern Sweden and elsewhere found only in the Far East of Russia. The well-known Central and East European species – for which the Fabrician name fuscat had been correctly applied since Meigen (1818) – was described as a new species, S. subfuscatus, by Krivosheina & Menzel (1998). A hasty action indeed, considering the existence of another available name, Anisopus fuscus Meigen, 1804 (type locality: Germany, Stolberg).

It is strange though that the occurrence of true S. fuscat (Fabricius) in Sweden, as evidenced by the identity of the lectotype, has not subsequently been confirmed. Also, Pedersen (1968) did not know the species from Denmark. Both circumstances might suggest that Fabricius (1775) gave the type locality ‘Suecia’ by mistake. However, I am able to confirm that the distribution of S. fuscat – at least today – covers the southernmost parts of Scandinavia. First, on searching through the collections of Swedish Anisopodidae in the ZIUL, I found 1 ♂ of this species collected 3.vii.1995 in Lund (Scania) by H. Andersson. Second, based on own observations I consider that S. fuscat in recent years has become a fairly common insect in gardens and parks in the Copenhagen area (NE Zealand), where from I first discovered it in April 1990.

Distribution. – Europe, ranging from France and Italy to southern Scandinavia, eastward to Russian Transcaucasia. A record from Finland (Hackman 1980) almost certainly refer to either S. stackelbergi Krivosheina & Menzel or S. fuscatoides sp. n. (see below). North American records (Stone 1965, Pratt & Pratt 1980) might either refer to S. stackelbergi or some undescribed, endemic species.

Sylvicola fuscatoides sp. n.


Description. – For a detailed description of the present species, I refer to ‘Sylvicola fusca’ of Krivosheina & Menzel (1998). The absence of dark wing markings behind and distal to vein R₃₄, combined with the simple, acutely pointed male hypoproct will serve to identify males the present species. Females cannot presently be reliably separated from the very similar S. fusca (Fabricius) and S. stackelbergi Krivosheina & Menzel.


The identity of Rhagio punctatus Fabricius

Sylvicola punctatus (Fabricius, 1787)
Sciara punctata (Fabricius): Fabricius 1805: 59.

Type material. – Lectotype, ♀, by present designation, ‘Kiliae’ [= Kiel, Germany], ‘Daldorf’ [= D. K. Daldorff], in Coll. Fabricius [= ‘Kiel’ of Zimsen 1964: 453] (ZMUC). Only the left wing remains, mounted upside down on a piece of cardboard on a short pin with a Fabrician label reading ‘punctatus’.

Identity. – The lectotype belongs to a species of Sylvicola. The length:width ratio of the existing wing (<2.9) indicates that it belongs to a female. The characteristic dark pattern of the wing also confirms that Meigen (1818) and subsequent authors have identified this species correctly.
The identity of *Rhagio cinctus* Fabricius

*Sylvicola cinctus* (Fabricius, 1787)


*Sicrina cincta* (Fabricius): Fabricius 1805: 60.

Type material. – Lectotype, ♂: by present designation, 'Kiliae' [= Kiel, Germany], 'Daldorf' [= D. K. Daldorff], in Coll. Fabricius [= 'Kiel' of Zimsen 1964: 453] (ZMUC). Only the wings and some leg fragments remain of the lectotype, attached to a short pin with a Fabrician label reading 'cinctus'.

Identity. – The lectotype belongs to a species of *Sylvicola*. The length:width ratio (> 3.0) indicates that the wings are of a male. The wing pattern fits either of two common and widespread European species presently known as *Sylvicola fenestralis* (Scopoli, 1763) and *S. cinctus* (Fabricius, 1787). These species are very similar and cannot be reliably separated on external facies. Accordingly, *cinctus* was considered a junior synonym of *fenestralis* during the first half of the nineteenth century. Zetterstedt (1850: 3437) reinstated *cinctus* as a valid species and distinguished it from *fenestralis* on smaller size and lighter colouring. Subsequent authors accepted this course. Actual proof of the existence of two species came first with Edwards (1923) who found stable differences in the male terminalia (females remained inseparable until the work of Pedersen 1968). Edwards also noted that light-coloured specimens were generally males of one species while dark-coloured males might belong to either of the two. His use of the name *cinctus* for the overall smaller and more lightly coloured species gains support from what is left of the lectotype combined with a sentence of the original description: 'Thorax testaceus, immaculatus.' (Fabricius 1787: 333).

The current identity of *fenestralis*, as established by Edwards (1923) will remain a matter of convention. Scopoli (1763: 322) described *Tipula fenestralis* from 'Carniolica' [= Carniola, = Crain], an ancient duchy that equals the present Slovenia. All that can be deduced from the name and description is that of a species of *Sylvicola*. The same goes for another old name, *Sylvicola brevis*, described and illustrated by Harris (1780: 104, pl. 31). It has, since Kertész (1902: 304), been treated conveniently as a junior synonym of *fenestralis*.

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References


Fabricius, J. C., 1775. Systema entomologiae etc. – Flensburgi et Lipsiae [= Flensburg & Leipzig], 832 pp.

Fabricius, J. C., 1781. Species insectorum etc., vol. 2. – Hamburgi et Kilonii [= Hamburg & Kiel], 494 pp.

Fabricius, J. C., 1787. Mantissa insectorum etc., vol. 2. – Hafniae [= Copenhagen], 282 pp.


Michelsen, V., 1996b. First reliable record of a fossil species of Anthomyiidae (Diptera), with comments on the definition of recent and fossil clades in phylogenetic classification.


Linnaeus, C., 1746. Fauna scevca, etc. – Stockholmiæ [= Stockholm], [xxviii] + 411 pp., 2 pls.
Linnaeus, C., 1761. Fauna scevca, etc. Editio altera, auctor. – Stockholmiæ [= Stockholm], [48] + 578 pp., 2 pls.

Harris, M., [1780]. An exposition of British insects, etc., ‘decads’ 4-5. – London, ’1776’, pp. 73-166 + [4], pls. 21-50.


Linnaeus, C., 1746. Fauna scevca, etc. – Stockholmiæ [= Stockholm], [xxviii] + 411 pp., 2 pls.
Linnaeus, C., 1761. Fauna scevca, etc. Editio altera, auctor. – Stockholmiæ [= Stockholm], [48] + 578 pp., 2 pls.

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