Zootaxa 5739 (1): 042–052
https://www.mapress.com/zt/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

https://doi.org/10.11646/zootaxa.5739.1.8
http://zoobank.org/urn:lsid:zoobank.org:pub:17BCE9B8-6011-4371-B4EA-424307FD809A

The oldest representative of sciarid genus *Leptosciarella* (Diptera) from the lowermost Eocene amber of Oise (France)

FLORENCE HEBERT[1], VALERIE NGO MULLER[1,2] & ANDRE NEL[1*]
[1]*Institut de Systématique, Évolution, Biodiversité (ISYEB), MNHN, CNRS, SU, EPHE-PSL, UA, CP50, 57 rue Cuvier, F-75005 Paris, France*
florence.hebert3@gmail.com; https://orcid.org/0009-0007-9053-2412
[2]*UFR Sciences du Vivant, Université Paris-Cité, Paris, France*
vngomuller@gmail.com; https://orcid.org/0000-0002-9456-6667
**Corresponding author: anel@mnhn.fr; https://orcid.org/0000-0002-4241-7651*

Abstract

The sciarid *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.** is described from the lowermost Eocene amber of Oise (France). '*Sciara*' *jucheti* Camier & Nel, 2019, from the same amber, is 'placed here into the genus *Leptosciarella* Tuomikoski and within this, in the subgenus *Leptosciarella sensu stricto*. Both represent the oldest known records of the genus *Leptosciarella*, previously recorded from the middle Eocene Baltic amber. These two fossils show that the Sciaridae were already well diversified during the lowermost Eocene, suggesting that these sciarid flies appeared during the Cretaceous, even if the current Mesozoic record of this family is uncertain.

Key words: Insecta, Sciaridae, Sciarinae, sp. nov., amber

Introduction

The fly family Sciaridae, also named dark-winged fungus gnats or black fungus gnats, are frequent in moist environments, *e.g.*, forests, swamps, and moist meadows. Many live on mushrooms, but also on foliage. Despite a very important literature on this group, it remains poorly known due to the important quantity of taxa that remain to be described (see the Fungus Gnats Online site at https://sciaroidea.myspecies.info/). The oldest putative fossil records of this family are from the Early Cretaceous in Jordan and UK, but these fossils have never been formally described, and their familial attributions are uncertain (Cook et Ross, 1996; Bandel *et al*. 1997; Kaddumi 2005, 2007). Numerous Sciaroidea have been described from Cretaceous (especially in Kachin amber) and Cenozoic (especially in Baltic amber) (*e.g*., Blagoderov et Grimaldi, 2004; Ševčík *et al*., 2020; Zhang *et al*. 2024).

Flies are dominating the insect assemblage of the lowermost Eocene amber of Oise (France), but these are mainly Ceratopogonidae and Chironomidae (Nel & Brasero, 2010). Nevertheless the Oise amber Sciaroidea are rather diverse, even if only three taxa are currently described (Blagoderov *et al*. 2010; Camier & Nel 2019, 2020). Here we describe the second sciarid fly found in this amber, representing a new species.

Material and methods

Oise amber comes from a layer of thick brown sand from the Le Quesnoy outcrop near Creil (Houdancourt village), in Oise Department, Haut-de-France, France (Nel & Brasero, 2010). The vertebrate record from the layer has enabled the correlation of the outcrop with the earliest Eocene reference locality (MP7) of Dormaal in Belgium. The Oise amber is dated as Sparnacian (Ypresian) in the earliest Eocene, c. 53 Ma. Amber from the outcrop might be related to parautochthony and allochthony and it is usually yellow and translucent. It has yielded more than 20000 bioinclusions, rendering an outstanding collection including mites, spiders, pseudoscorpions, at least 17 insect orders,

 Accepted by C.-Y. Cai: 22 Dec. 2025; published: 31 Dec. 2025

mammalian hairs, and bird feathers. The resin-producing tree could be a member of the subfamily Caesalpiniodeae in the angiosperm family Fabaceae after geochemical analyses (Nohra *et al*. 2015), and the structure of the wood with in situ amber is very similar to that of the extant genus *Daniellia* in the tribe Detarieae in Caesalpiniodeae (de Franceschi & de Ploëg 2003; Nel & Brasero 2010). The inferred palaeoenvironment corresponds to a resiniferous forest in a fluvio-lacustrine context with multiple channels and ponds, with no evidence of marine influence, and under a warm and wet seasonal climate (Nel *et al*. 2004).

The identification and classification of discussed species was carried out according to the keys, descriptions and figures by Tuomikoski (1960), Mohrig & Röschmann (1994), Röschmann & Mohrig (1995 a,b), Menzel & Mohrig (1997, 2000), and Mohrig & Menzel (1997).

The terminology of the morphological parts and structures follows Vilkamaa *et al.* (2004: figs 1, 3), Hippa & Vilkamaa (2005: fig. 5), and Menzel & Smith (2017: figs 21.5–21.62).

Nomenclatural acts. This published work and the nomenclatural acts it contains have been registered in ZooBank: urn:lsid:zoobank.org:pub:17BCE9B8-6011-4371-B4EA-424307FD809A

Institutional abbreviations. MNHN, Muséum national d'Histoire naturelle, Paris, France.

Other abbreviations. bm-m basal medial crossvein; M_1 anterior branch of media; M_2 posterior branches of media; r-m radial medial crossvein; R radius; Rs radial sector; R_1 anterior branch of radius; R_{4+5} third branch of radius.

Systematic palaeontology

Class Insecta Linnaeus, 1758
Order Diptera Linnaeus, 1758
Superfamily Sciaroidea Billberg, 1820
Family Sciaridae Billberg, 1820
Subfamily Sciarinae Billberg, 1820

Genus *Leptosciarella* (*Leptosciarella*) Tuomikoski, 1960

Type species. *Sciara elegans* Winnertz, 1867—Monogr. Sciarinen: 27–28 (by original designation) [= *Leptosciarella* (*Leptosciarella*) *scutellata* (Staeger, 1840)].

Literature: Tuomikoski (1960: 17, 20) [as *Trichosia* (*Leptosciarella*); key and original description as subgenus]; Evenhuis (1994: 176) [as *Trichosia* (*Leptosciarella*); catalogue of fossil species]; Röschmann & Mohrig (1994: 127, 130) [as *Trichosia* (*Leptosciarella*); checklist of species in Baltic amber]; Mohrig & Röschmann (1994 84) [as *Trichosia* (*Leptosciarella*); revision of species in Baltic amber]; Röschmann & Mohrig (1995a): 22, 23 [as *Trichosia* and *Trichosia* (*Leptosciarella*); revision of species in Saxonian amber]; Röschmann and Mohrig (1995b: 162) [as *Trichosia* (*Leptosciarella*); additional records in Saxonian amber]; Menzel & Mohrig (1997: 4, 5) [as *Leptosciarella*; key and genus rank of *Leptosciarella*]; Mohrig and Menzel (1997: 44) [as *Leptosciarella*; key and revision of Palaearctic subgenera and species]; Menzel & Mohrig (2000: 88, 353) [as *Leptosciarella*; key, genus diagnosis and redescription]; Shin *et al*. (2013: 840, 842); Shin *et al*. (2019: 134); Vilkamaa *et al*. (2023: 13) [all as *Leptosciarella*; suprageneric classification of *Leptosciarella*].

Leptosciarella (*Leptosciarella*) *menzeli* sp. nov.

urn:lsid:zoobank.org:act:A73B561A-F94F-48E3-87A9-55176E63B3A2
Figures 1–7

Holotype. MNHN-F.A97855 (male, well preserved), stored in the Palaeontological Collection, Muséum national d'Histoire naturelle, Paris.

Etymology. The species name 'menzeli' is dedicated to Dr Frank Menzel, in recognition to his great help in producing this paper and his impressive work on the Sciaridae.

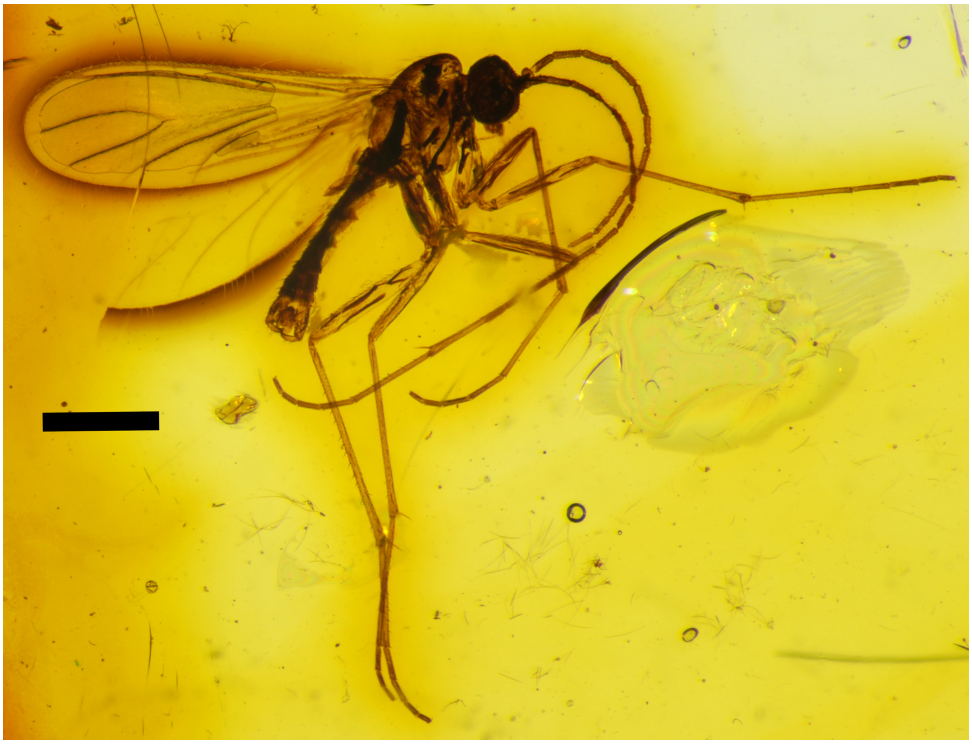

FIGURE 1. *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.**, holotype MNHN-F.A97855. Habitus. Scale bar: 0.5 mm.

Diagnosis. Male characters only. Eyes dichoptic with a bridge; gonocoxite distinctly longer than wide; gonostylus shorter than gonocoxite, three times longer than wide; without prominent edge in middle of inner side; gonostylus tip straight, with a combination of curved, slender setae and very sharp longer setae, with a beak-shaped terminal tooth (megaseta sensu Hippa & Vilkamaa 1991: fig. 4) at inner angle; inner surface of stylus under tooth with awl-shaped setae.

Locality and horizon. The locality of amber origin (deposit of Oise) is located in the département de l'Oise, région Hauts-de-France, France; Lowermost Eocene (Ypresian) (Nel & Brasero, 2010).

Description. Male. Head capsule roundish. Eye dichoptic, with closed eye bridge three facets wide. All three ocelli well developed. Antennae light brown, without any contrast between scape, pedicel and flagellum; pedicel roundish and slightly wider than high, not cylindrically elongated; 11 flagellomeres, first to seventh basal flagellomeres 5.3 times longer than wide, more distal ones 4.5 times longer than wide; necks of flagellomeres naked, wider than high, with an edge between basal portion and neck; surface of flagellomeres rough with deep pits, sensilla of two different lengths; setae on flagellomeres as long as flagellomere widths. Maxillary palp pale with three palpomeres, first and third palpomeres slender, second palpomere oval thickened; third palpomere very long, 1.6 times as long as the first and 2.7 times as long as the second palpomere; palpal sensilla on the first segment simple, without noticeable margin or depression; first palpomere with two bristles; second palpomere with two bristles, third with a longitudinal row of setae of unequal lengths and strong bristles at apex. Prefrons and clypeus slightly bulging. Thorax flatly arched, pale brown. Posterior pronotum apparently bare. Anterior pronotum with at least two setae. Mesonotum with setae in lateral, dorsocentral, and acrostichal rows with bare spaces between, but with very small setae in anterior part. Scutellum with four robust setae and few smaller and weaker setae. Anepimeron not expanded ventrally. Katepisternum triangular, as long as high, and without setae. Mesothoracic epimeron with its anterior margin ending at anterodorsal margin of episternum 3. Wing narrow, well developed, 1.6 mm long; length/width ratio 3.0. 'C' (length of part of C distal to apex of R_{4+5}) = 0.75x 'W' (distance between apex of R_{4+5} and wing apex). Wing membrane transparent and with numerous trichia, all posterior veins distinct; r-m and bm-m equal in length, without macrotrichia; Rs very short and perpendicular to R and r-m, situated in proximal wing half, about in 2/5 of total wing length; R_1 and R_{4+5} with macrotrichia on dorsal side only, disposed in two rows except in one row near apex of R_{4+5}; R_1 approximately 0.5 times as long as R, ending in C well before branching point of M-fork; r-m

as long as basal part of median vein; M_1 and M_2 diverging; numerous macrotrichia on M and CuA; anal area distinct, slightly wedge-shaped reduced. Halter brownish; with a short stalk; knob of halter distinctly longer than stalk. Legs yellowish brown, long and slender. Coxae with very few setae. Femora with dorsal parts covered with long setae and ventral parts almost bare. Fore tibia with anteroapical tibial organ and posteroapical spur, no conspicuously spine-like differentiated setae recognizable in the remaining setosity; tibial organ as a dark patch situated at the widest point about 3/4 times as wide as apex of fore tibia and weakly differentiated, only denser with stronger and darker setae (not depressed and without strongly curved margin). Pretarsus on the foreleg long, as long as the following four tarsal segments together. Apex of mid tibia with three robust setae. Apex of hind tibia with a posterodorsal row of eight setae and additional robust setae on ventral and posterior sides. Tibial spurs long and strong; both spurs on apex of mid and hind tibiae of equal lengths. Claws simple. Abdomen dark brown, tergites and sternites dense, strong, and long setose. Hypopygium about 1.6 times as high as wide at base, slightly paler than abdominal segments. Gonocoxites about as long as wide, inner side of gonocoxites with few short setae, outer side with long and robust setae; ventral, inner side of gonocoxites v-shaped and basally widely separated; base of gonocoxites

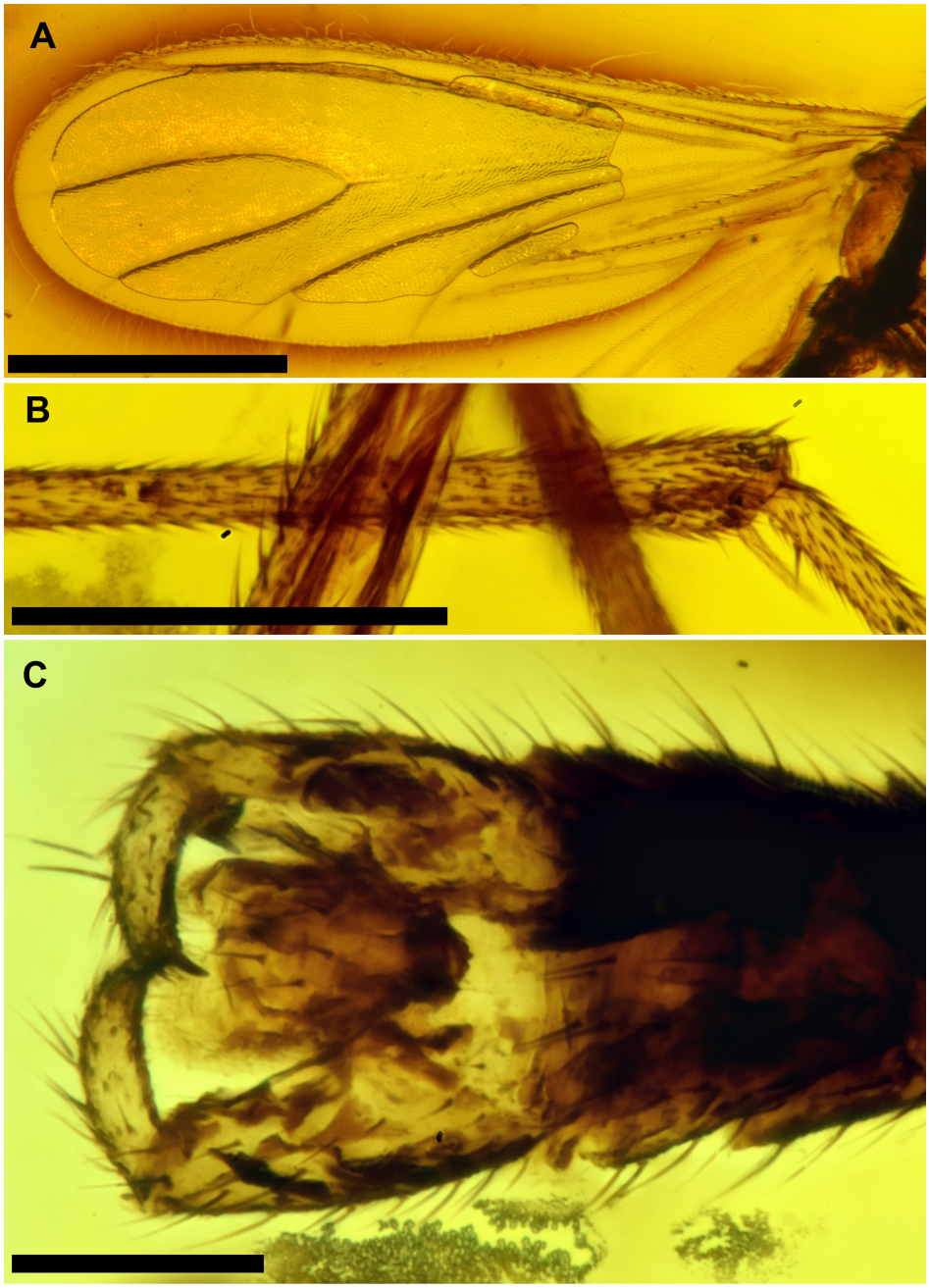

FIGURE 2. *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.**, holotype MNHN-F.A97855. A, Wing, ventral view. **B**, Fore tibia, lateral view. C, Terminalia, dorsal view. Scale bars: 0.5 mm (**A**), 0.1 mm (**B**, **C**).

ventrally without intercoxal bristle groups or lobe(s). Gonostylus shorter than gonocoxite, three times longer than wide, narrow, evenly curved, narrowed in apical third and with flattened gonostylar apex, apex straight; inner side of gonostylus closed, without hollows or lobes; gonostylar apex with a strong, beak-shaped tooth subapically on ventral side, above with coarse setae shorter than tooth; near tooth with two stronger megasetae at same level, below tooth with three to four hyaline, awl-like megasetae in upper third of gonostylar inner side. Tegmen wider than high, with flattened apex. Aedeagus short.

Female unknown.

FIGURE 3. *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.**, holotype MNHN-F. A97855. Head, lateral view, arrows: palpomeres. Scale bar: 0.1 mm.

Discussion

The new fossil can be attributed to the Sciaridae because of the following characters, sensu Menzel & Mohrig (2000); Hippa & Vilkamaa (2005), and Menzel & Smith (2017) with partially adapted terminology: notal setae in lateral, dorsocentral and acrostichal rows with bare spaces between (not evenly setose); pleurotergite flat not bulging; tibial spurs present; wing venation without radial, medial and cubital cells, with two typical vein forks, M_1/M_2 and M_4/CuA; no R_2; Rs near middle of wing; divergent M_4 and CuA; Rs perpendicular to r-m and R_{4+5}; bm-m converging with R towards the base of wing, not parallel; M_{1+2} phantomlike distal of base of r-m; and costal break absent.

The new fossil strongly differs from '*Sciara*' *jucheti* Camier & Nel, 2019 from the same amber in the much longer flagellomeres, some being more than six times longer than wide vs. only three times in the latter, presence of a dense patch of setae at apex of fore tibia in the former vs much less dense setae in the latter, and tip of gonostylus straight vs acute in the latter (Camier & Nel 2019).

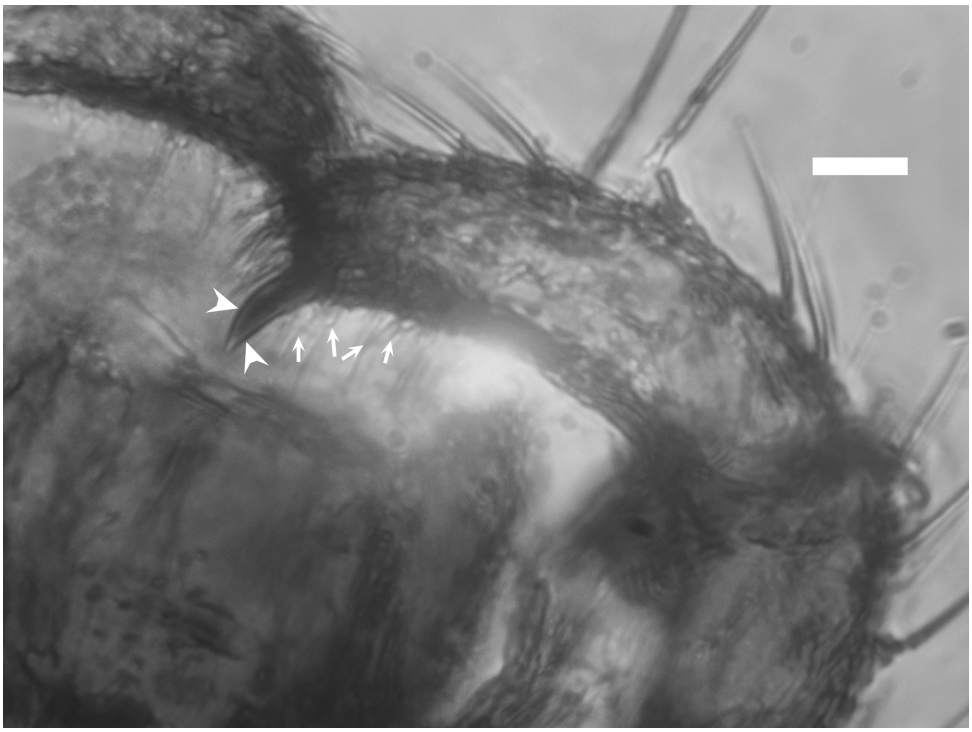

FIGURE 4. *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.**, holotype MNHN-F. A97855. Gonostylus dorsal view, arrows: awl-like megasetae, arrowheads: strong subapical tooth. Scale bar: 0.01 mm.

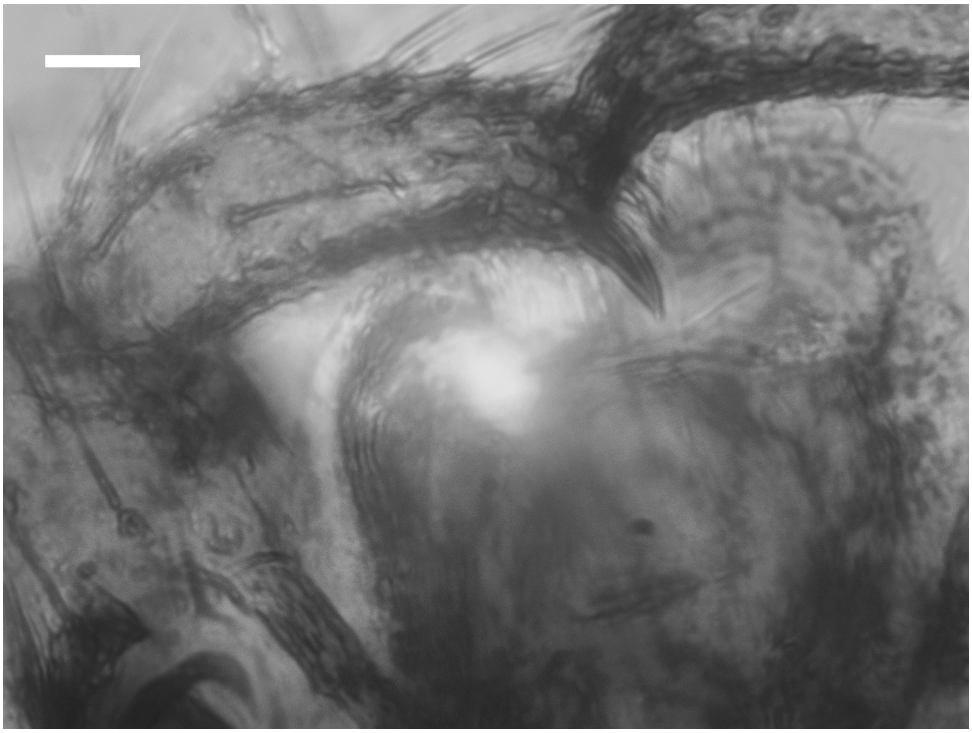

FIGURE 5. *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.**, holotype MNHN-F. A97855. Gonostylus ventral view. Scale bar: 0.01 mm.

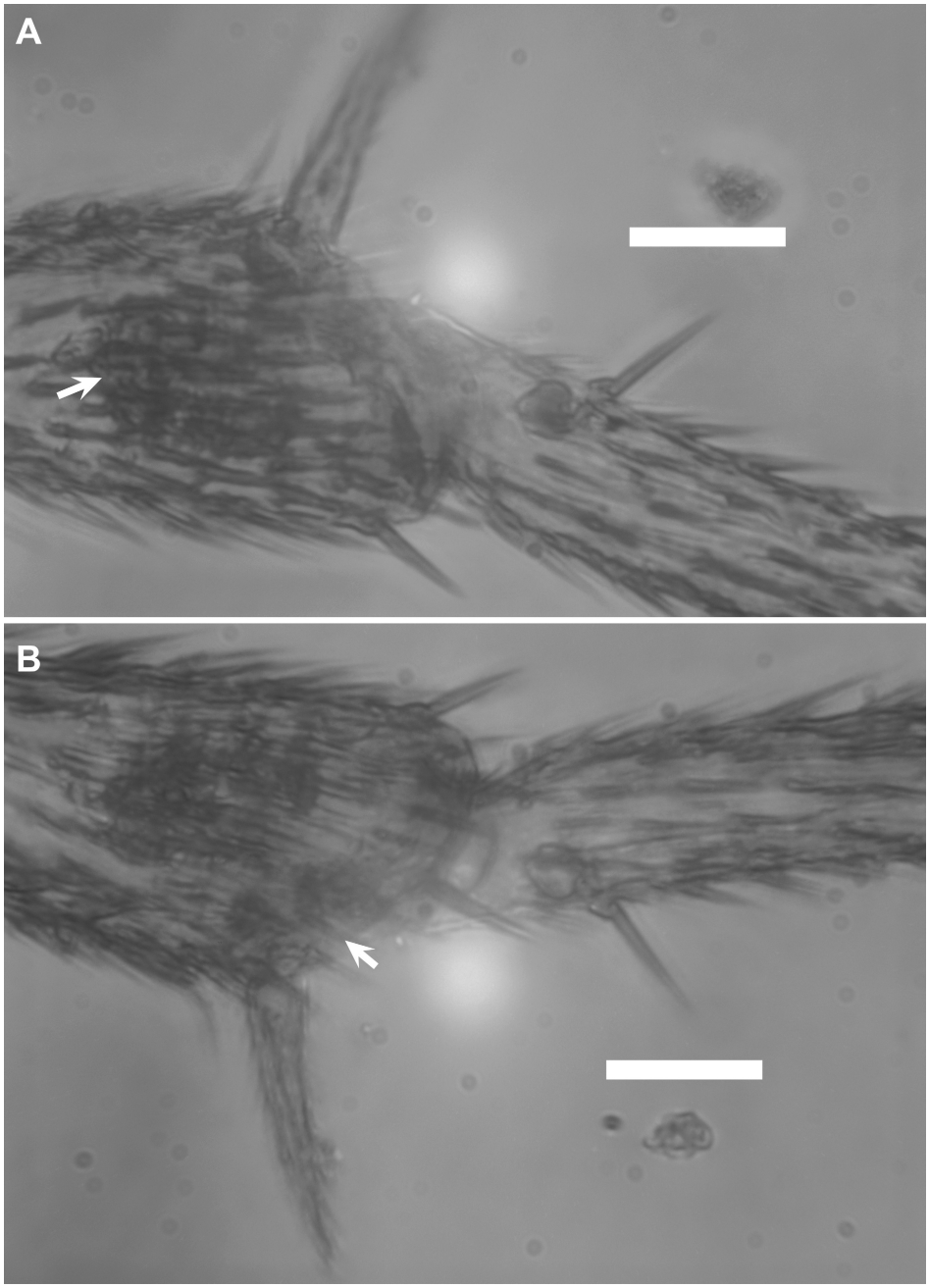

FIGURE 6. *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.**, holotype MNHN-F. A97855. Apex of fore tibia. A, Dorsal, arrow: tibial organ. B, Ventral, arrow: irregular row of setae. Scale bars: 0.01 mm.

Hippa & Vilkamaa (2005: 136) mainly separated the Sciarinae from the other subfamilies by the 'mesothoracic epimeron with its anterior margin ending at anterodorsal margin of episternum 3', which is the case in this fossil. Shin *et al*. (2013: 843) characterized the Sciarinae on the basis of the presence of 'densely placed bristles on the apex of the fore tibia'. There are rather dense patches of setae in the new fossil. Thus, we consider that it belongs to Sciarinae.

Menzel & Mohrig (2000) indicated that, in extant species of the genera *Trichosia*, *Trichodapus*, *Leptosciarella*, *Cratyna*, *Bradysia*, etc., bilateral setae on radial vein segments (R_{4+5} and/or R_1) are usually still detectable distally, which is the case for R_{4+5} in the new fossil. They also added that the Palaearctic species of *Trichosia* and *Leptosciarella* have macrotrichia on the wing membrane and the posterior veins, but that some *Leptosciarella*, *Trichosia*, and *Phytosciara* have lost the macrotrichia on wing membrane. In the new fossil, macrotrichia are present on the wing membrane and on the posterior veins.

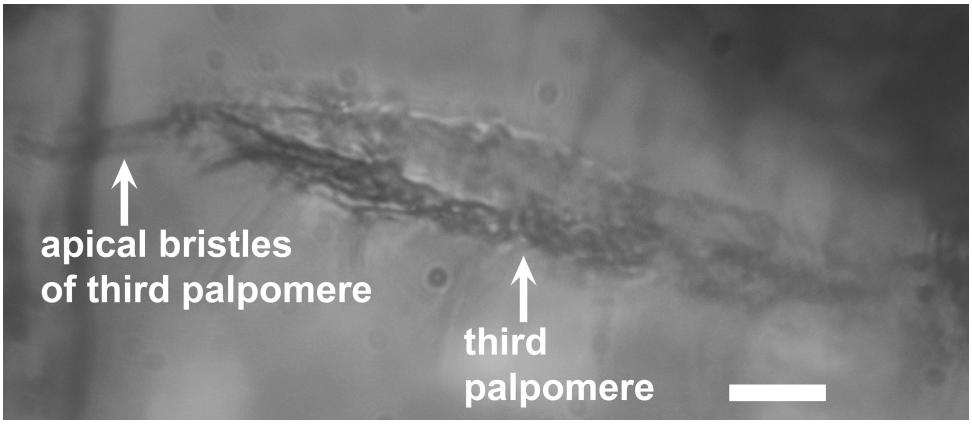

FIGURE 7. *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.**, holotype MNHN-F. A97855. Third maxillary palpomere. Scale bar: 0.01 mm.

After Mohrig & Menzel (1997: 5, 6) and Menzel & Mohrig (2000: 87, 88), the shape of the gonostylus tip with a fine, awl-shaped group of setae, and often with a beak-shaped terminal tooth at inner angle is a character of the two genera *Trichodapus* Mohrig & Menzel, 1997 and *Leptosciarella*. *Trichodapus* has no beak-shaped terminal tooth at inner angle of the gonostylus tip, only two palpomeres, a reduced anal area, vs presence of beak-shaped terminal tooth at inner angle of the gonostylus tip, a broad anal area, and wing membrane and posterior wing veins with extensive macrotrichous covering in *Leptosciarella*, as in the new fossil (Mohrig & Menzel 1997; Menzel & Mohrig 2000).

The antennal neck well defined and naked, the gonostylus tip straight, with a combination of curved, slender setae and very sharp setae, the fore tibia with a dark patch, inner surface of the stylus under the tooth with awl-shaped setae, posterior wing veins with macrotrichia are characters of the subgenus *Leptosciarella* (Menzel & Mohrig 2000: 355, 356; Mohrig 2003). Indeed, the gonostylus shape and ornamentation, the wing shape and ornamentation are very similar to those of the extant *Leptosciarella* (*Leptosciarella*) *truncata* (Tuomikoski 1960) or *Leptosciarella* (*Leptosciarella*) *zanti* Heller, 2012 (Tuomikoski 1960: fig. 5c; Heller 2012: fig. 1).

Among the Baltic and/or Saxonian amber *Leptosciarella*, the new fossil differs from *Leptosciarella botuli* (Meunier 1904), *Leptosciarella orientalis* (Meunier 1904), *Leptosciarella infausta* Mohrig and Röschmann, 1994, *Leptosciarella macrociliata* Mohrig and Röschmann, 1994, *Leptosciarella microciliata* Mohrig and Röschmann, 1994, *Leptosciarella pseudorecens* Röschmann & Mohrig, 1995a, and *Leptosciarella protorotunda* Mohrig & Röschmann, 1994 in the straight gonostylus tip vs rounded or acute (Mohrig & Röschmann 1994; Röschmann & Mohrig 1995). *Leptosciarella botuli* shares with the new fossil the apical ornamentation of the gonostylus tip and elongate flagellomeres.

Leptosciarella microacantha Röschmann & Mohrig, 1995a has a strongly reduced tooth at tip of gonostylus (Röschmann & Mohrig 1995a). The Dominican amber *Leptosciarella manifesta* Mohrig and Röschmann, 2005 also has a rounded to acute tip of the gonostylus (Mohrig & Röschmann 2005). *Leptosciarella tertiaria* (Meunier 1904) has a shape of gonostylus more similar to that of the new fossil, but its flagellomeres are much shorter compared to their widths than in the new fossil. The Dominican amber *Leptosciarella nudinervosa* Mohrig & Röschmann in Mohrig *et al.*, 2004 and *Leptosciarella ampullocera* Mohrig & Röschmann in Mohrig *et al*. 2004 also have a rather straight gonostylus tip (Mohrig & Röschmann 2005). But Mohrig *et al.* (2004: 269) indicated that 'In amber fossil species of *Leptosciarella* we find only short bristles above the tooth' of the apex of the gonostylus, while in the new fossil, the megasetae above the tooth are nearly as long as the tooth itself.

Remarks. '*Sciara*' *jucheti* Camier & Nel, 2019 (male holotype MNHN.F.A71243) also belongs to the genus *Leptosciarella*. Mohrig & Röschmann (1994: 135) and Röschmann & Mohrig (1995a: 51) stated that the Recent species-rich genus *Sciara* Meigen has not yet been found in fossil resins. The recently described '*Sciara' jucheti* Camier & Nel, 2019 from the Eocene amber of Oise is not a representative of *Sciara* (misidentification). Following the taxonomic concept of Mohrig & Menzel (1997), '*Sciara' jucheti* is a member of *Leptosciarella* Tuomikoski, 1960. On the basis of the comprehensive genus redescription by Menzel & Mohrig (2000: 354), '*Sciara' jucheti* is

placed here into the genus *Leptosciarella* Tuomikoski and within this in the subgenus *Leptosciarella s. str. sensu* Menzel & Mohrig (2000: 356). If compare *Leptosciarella* (*Leptosciarella*) *jucheti* (Camier & Nel 2019) comb. nov. with the other *Leptosciarella* species in fossil resins, it is found to be morphologically very similar to *Leptosciarella* (*Leptosciarella*) *macrociliata* with which it shares very similar gonostylus (especially the shape of the tip, tooth and megasetae situated posterior to the tooth, size and shape of the flagellomeres, and apex of the fore tibia (Mohrig & Röschmann 1994; Camier & Nel 2019). A significant difference is in the much longer part of C distal of apex of R_{4+5} in *Leptosciarella* (*Leptosciarella*) *macrociliata*, viz. 'C' (length of part of C distal to apex of R_{4+5}) = 0.9x 'W' (distance between apex of R_{4+5} and wing apex) *vs*. 0.5 in *Leptosciarella* (*Leptosciarella*) *jucheti*.

Conclusion

'*Sciara*' *jucheti* Camier & Nel, 2019 is placed here into the genus *Leptosciarella* Tuomikoski and within this in the subgenus *Leptosciarella* sensu stricto. Together with *Leptosciarella* (*Leptosciarella*) *menzeli* **sp. nov.**, they are among the oldest records of the Sciaridae, showing that their diversification probably took place during the Cretaceous, even if there is still no accurate Mesozoic record for this family.

Acknowledgments

We thank a lot Frank Menzel for his very useful remarks on the initial version of the paper. We thank Gael De Ploëg for his crucial help in the collect and study of the fossil insects of Oise amber. We also thank the Lafarge-Granulat company for help with the fossil sampling and the Langlois-Meurinne family for the authorization of working on its property.

References

Bandel, K., Shinaq, R. & Weitschat, W. (1997) First insect inclusions from the amber of Jordan. *Mitteilungen aus dem Geologisch-Paäontologische Institute der Universität Hamburg*, 80, 213–223.

Billberg, G.J. (1820) *Enumeratio Insectorum in Museo Gustav Johan Billberg*. Gadelianis, Holmiæ, 138 pp. https://doi.org/10.5962/bhl.title.49763

Blagoderov, V.A. & Grimaldi, D. (2004) Fossil Sciaroidea (Diptera) in Cretaceous ambers, exclusive of Cecidomyidae, Sciaridae, and Keroplatidae. *American Museum Novitates*, 3433, 1–76. https://doi.org/10.1206/0003-0082(2004)433<0001:FSDICA>2.0.CO;2

Blagoderov, V., Hippa, H. & Nel, A. (2010) *Parisognoriste*, a new genus of Lygistorrhinidae (Diptera, Sciaroidea) from the Oise amber with redescription of *Palaeognoriste* Meunier. *ZooKeys*, 50, 79–90. https://doi.org/10.3897/zookeys.50.506

Camier, M. & Nel, A. (2019) A fossil black fungus gnat from the lowermost Eocene amber of France (Diptera: Sciaridae). *Palaeoentomology*, 2 (4), 316–321. https://doi.org/10.11646/palaeoentomology.2.4.3

Camier, M. & Nel, A. (2020) The oldest fungus gnat of the tribe Exechiini in the lowermost Eocene Oise amber (Diptera: Mycetophilidae). *Zootaxa*, 4722 (1), 91–98. https://doi.org/10.11646/zootaxa.4722.1.9

Cook, E. & Ross, A.J. (1996) The stratigraphy, sedimentology and palaeontology of the Lower Weald Clay (Hauterivian) at Keymer Tileworks, West Sussex, southern England. *Proceedings of the Geologists' Association*, 107 (3), 231–239. https://doi.org/10.1016/S0016-7878(96)80031-9

de Franceschi, D. & de Ploëg, G. (2003) Origine de l'ambre des faciès sparnaciens (Eocène inférieur) du Bassin de Paris: le bois de l'arbre producteur. *Geodiversitas*, 25, 633–647.

Evenhuis, N.L. (1994) *Catalogue of the fossil flies of the World (Insecta: Diptera).* Backhuys Publishers, Leiden, viii + 600 pp.

Fungus Gnats Online (2024) Internet site. Available from: https://sciaroidea.myspecies.info/ (accessed 17 December 2025)

Heller, K. (2012) Fünf neue europäische Arten von Trauermücken aus dem Artenkreis um *Leptosciarella pilosa* (Diptera: Sciaridae). *Veröffentlichungen des Museums für Naturkunde Chemnitz*, 35, 93–104.

Hippa, H. & Vilkamaa, P. (1991) The genus *Prosciara* Frey (Diptera, Sciaridae). *Entomologica Fennica*, 2, 113–155. https://doi.org/10.33338/ef.83544

Hippa, H. & Vilkamaa, P. (2005) The genus *Sciarotricha* gen. n. (Sciaridae) and the phylogeny of recent and fossil Sciaroidea

(Diptera). *Insect Systematics and Evolution*, 36 (2), 121–143.
https://doi.org/10.1163/187631205788838492
Kaddumi, H.F. (2005) *Amber of Jordan. The oldest prehistoric insects in fossilised resins.* Eternal River Museum of Natural History, Jordan, 168 pp.
Kaddumi, H.F. (2007) *Amber of Jordan. The oldest prehistoric insects in fossilised resins. Third Edition.* Eternal River Museum of Natural History, Jordan, 298 pp.
Linnaeus, C. von (1758) *Systema Naturae per regna tria naturae secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis. Ed. decima reformata.* Laur. Salvii, Holmiae, Typis Ioannis Thomae nob. De Trattnern, Vindobonae, 1, 1–823.
https://doi.org/10.5962/bhl.title.542
Menzel, F. & Mohrig, W. (1997) Revision der palärktischen Arten von *Trichosia* Winnertz sensu Tuomikoski, 1960 (Diptera, Sciaridae). - Teil 1. Gattung *Trichosia* Winnertz, 1867. *Studia Dipterologica*, 4 (1), 3–40.
Menzel, F. & Mohrig, W. (2000) Revision der paläarktischen Trauermücken (Diptera: Sciaridae). *Studia Dipterologica Supplement*, 6, 1–761.
Menzel, F. & Smith, J.E. (2017 Chapter 21. Sciaridae (black fungus gnats). *In*: Kirk-Spriggs, A.H. & Sinclair, B.J. (Eds.), Manual of Afrotropical Diptera, Volume 2. Nematocerous Diptera and lower Brachycera. *Suricata*, 5, pp. 557–651.
Mohrig, W. (2003) Black fungus gnats of Central America. Part 1. (Diptera: Sciaridae). *Beiträge zur Entomologie*, 53 (1), 1–69.
https://doi.org/10.21248/contrib.entomol.53.1.1-69
Mohrig, W. & Menzel, F. (1997) Revision der paläarktischen Arten von *Trichosia* Winnertz *sensu* Tuomikoski, 1960 (Diptera, Sciaridae). - Teil 2. Gattungen *Leptosciarella* Tuomikoski, 1960 und *Trichodapus* gen. nov. *Studia Dipterologica*, 4 (1), 41–98.
Mohrig, W. & Röschmann, F. (1994) Revision der Trauermücken-Typen von Loew und Meunier aus dem Baltischen Bernstein (Diptera: Sciaridae). *Deutsche Entomologische Zeitschrift* (N.F.), 41 (1), 79–136.
https://doi.org/10.1002/mmnd.19940410109
Mohrig, W. & Röschmann, F. (2005) Sciarid flies from Dominican amber (Diptera: Sciaridae). *Beiträge zur Entomologie*, 55 (2), 319–361.
https://doi.org/10.21248/contrib.entomol.55.2.319-361
Mohrig, W., Röschmann, F. & Rulik, B. (2004) The fauna of sciarid flies from the Dominican Republic (Diptera, Sciaridae). *Beiträge zur Entomologie*, 54 (2), 267–331.
https://doi.org/10.21248/contrib.entomol.54.2.267-331
Nel, A. & Brasero, N. (2010) Oise amber. *In*: Penney, D. (Ed.), *Biodiversity of fossils in amber from the major world deposits.* Siri Scientific Press, Manchester, pp. 137–148.
Nel, A., de Ploëg, G., Milliet, J., Menier, J.-J. & Waller, A. (2004) The French ambers: a general conspectus and the lowermost Eocene amber deposit of Le Quesnoy in the Paris Basin. *Geologica Acta*, 2, 3–8.
https://doi.org/10.1344/105.000001628
Nohra, Y.A., Perrichot, V., Jeanneau, L., Le Pollès, L. & Azar, D. (2015) Chemical characterization and botanical origin of French ambers. *Journal of Natural Products*, 78 (6), 1284–1293.
https://doi.org/10.1021/acs.jnatprod.5b00093
Röschmann, F. & Mohrig, W. (1994) Checklist of fossil sciarids from Baltic amber. *Studia Dipterologica*, 1 (1), 126–138.
Röschmann, F. & Mohrig, W. (1995a) Die Trauermücken des Sächsischen Bernsteins aus dem Untermiozän von Bitterfeld/ Deutschland (Diptera, Sciaridae). *Deutsche Entomologische Zeitschrift* (N.F.), 42 (1), 17–54.
https://doi.org/10.1002/mmnd.19950420103
Röschmann, F. & Mohrig, W. (1995b) Beitrage zur Kenntnis fossiler Trauermucken aus Sachsischem Bernstein. Teil 2. Drei neue Sciariden aus Tertiär-Harzen des Bitterfelder Braunkohlereviers (Insecta, Diptera, Sciaridae). *Paläontologische Zeitschrift*, 69 (1–2), 153–166.
https://doi.org/10.1007/BF02985981
Ševčík, J., Krzeminski, W. & Skibińska, K. (2020) Intriguing and beautiful: *Adamacrocera adami* gen. et sp. nov. from the Upper Cretaceous amber of Myanmar represents a new subfamily of Keroplatidae (Diptera: Bibionomorpha). *Insects*, 11 (9), 552.
https://doi.org/10.3390/insects11090552
Shin, S., Jung, S., Menzel, F., Heller, K., Lee, H. & Lee, S. (2013) Molecular phylogeny of black fungus gnats (Diptera: Sciaroidea: Sciaridae) and the evolution of larval habitats. *Molecular Phylogenetics and Evolution*, 66 (3), 833–846.
https://doi.org/10.1016/j.ympev.2012.11.008
Shin, S., Lee, H. & Lee, S. (2019) Proposal of a new subfamily of Sciaridae (Diptera: Sciaridae), with description of one new species from South Korea. *Zootaxa*, 4543 (1), 127–136.
https://doi.org/10.11646/zootaxa.4543.1.8
Staeger, R.C. (1840) Systematisk Fortegnelse over de i Danmark hidtil fundne Diptera. 3die Stamme, Tipulariae Fungicolae. *Naturhistorisk Tidsskrift*, 3, 228–288.
Tuomikoski, R. (1960) Zur Kenntnis der Sciariden (Dipt.) Finnlands. *Annales Zoologici Societatis Zoologicae Botanicae Fennicae "Vanamo"*, 21 (4), 1–164.

Vilkamaa, P., Burdíková, N. & Ševčík, J. (2023) The genus *Spinopygina* gen. nov. (Diptera, Sciaridae) from Western North America: preliminary molecular phylogeny and description of seven new species. *Insects*, 14 (2), 173. https://doi.org/10.3390/insects14020173

Vilkamaa, P., Hippa, H. & Komarova, L.A. (2004) The genus *Dichopygina* gen. n. (Diptera: Sciaridae). *Insect Systematics and Evolution*, 35 (1), 107–120. https://doi.org/10.1163/187631204788964691

Winnertz, J. (1867) Beitrag zu einer Monographie der Sciarinen. *Herausgegeben von der k. k. zoologisch- botanischen Gesellschaft in Wien*, 1–187. https://doi.org/10.5962/bhl.title.14230

Zhang, Q., Krzemiński, W., Ševčík, J., Blagoderov, V., Soszyńska, A. & Skibińska, K. (2024) Flat-footed females and missing males: a new genus and species of Pleciofungivoridae (Diptera: Bibionomorpha) represents the first record of the family from Mid-Cretaceous Kachin amber. *Acta Geologica Sinica (English Edition)*, 98 (3), 541–547. https://doi.org/10.1111/1755-6724.15173