Zootaxa 5739 (1): 053–059
https://www.mapress.com/zt/

Article

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

https://doi.org/10.11646/zootaxa.5739.1.9
http://zoobank.org/urn:lsid:zoobank.org:pub:BABDBE07-39AC-4C57-B4B2-D31133FA61AE

First Keroplatidae Robsonomyiini (Diptera: Sciaroidea) from the Lowermost Eocene Oise amber (France)

FLORENCE HEBERT[1], VALERIE NGÔ 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*
[2]*UFR Sciences du Vivant, Université Paris-Cité, Paris, France*
florence.hebert@gmail.com; https://orcid.org/0009-0007-9053-2412
vngomuller@gmail.com; https://orcid.org/0000-0002-9456-6667
anel@mnhn.fr; https://orcid.org/0000-0002-4241-7651

Abstract

Eokelneria oisensis **gen. et sp. nov.** a new genus and species of Keroplatidae: Macrocerinae, Robsonomyiini Matile, 1990, is described from the Lowermost Eocene Oise amber. It is the oldest accurate record of this tribe, previously only known by several Middle Eocene Baltic amber species in the genera *Kelneria* Matile, 1979, *Micrepimera* Matile, 1990, and *Robsonomyia* Matile & Vockeroth, 1980.

Key words: Insecta, Sciaroidea, Robsonomyiini, gen. et sp. nov., oldest record

Introduction

The sciaroid family Keroplatidae Rondani, 1856 is one of the largest and most diverse families of the dipteran infraorder Bibionomorpha. These flies are distributed worldwide and exhibit a wide diversity of biological and ecological strategies. The oldest Keroplatidae are recorded from the Lower Cretaceous of the UK and Lebanon, but the majority of fossil taxa are known from the Middle Eocene Baltic amber (Pełczyńska *et al*., 2024). A sciarid and a lygistorrhine Keroplatidae have been previously described from the Lowermost Oise amber (Blagoderov *et al*., 2010; Camier & Nel, 2019, 2020). Here we describe a new fossil belonging to this family in a new genus and species attributed to the tribe Robsonomyiini of the Macrocerinae. To date, only the three genera of this tribe, *Robsonomyia* Matile & Vockeroth, 1980, *Micrepimera* Matile, 1990, and *Kelneria* Matile, 1979 are known in the fossil record, all by fossils from the Middle Eocene Baltic amber (Matile, 1979; Blagoderov *et al*., 2019; Pełczyńska *et al*., 2024). These are: *Kelneria abundare* (Meunier, 1904), *Kelneria ciliata* (Meunier, 1904), *Kelneria filiformis* (Meunier, 1904), *Kelneria setosa* Matile, 1979, *Robsonomyia baltica* Pełczyńska, Krzemiński & Blagoderov, 2024, *Robsonomyia henningseni* Pełczyńska, Krzemiński & Blagoderov, 2024, *Micrepimera elegantissima* (Meunier, 1904), and *Micrepimera neli* Blagoderov & Skibińska, 2019.

Material and methods

Oise amber comes from a layer of thick brown sand from the Le Quesnoy outcrop near Creil (Houdancourt village), 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, *ca*. 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 20,000 bioinclusions, rendering an outstanding collection including mites, spiders, pseudoscorpions, at least 17 insect orders, mammalian hairs, and bird feathers. Its resin-producing tree could be a member of the subfamily Caesalpinioideae

Accepted by C.-Y. Cai: 16 Dec. 2025; published: 31 Dec. 2025

in the angiosperm family Fabaceae according to 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 Caesalpinioideae (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 specimen was examined using a LEICA MC205 stereomicroscope and photographed with a Nikon ZII camera. Photographs were exported in NEF format and processed with Nikon NX Studio software. All images were digitally stacked, photomicrographic composites of several individual focal planes were obtained using Helicon Focus 6.7 software.

We follow the terminology of Cumming & Wood (2017) and Blagoderov & Ševcík (2017).

AbbreviationS: bm-m, crossvein between M_4 and M_{1+2}; br+bm, basal cell; C, costa; CuA, cubitus anterior; M_{1+2}, first branch of media; M_4, second branch of media; R_1, first branch of radius; Rs, second branch of radius; R_{2+3}, anterior branch of Rs; R_{4+5}, posterior part of Rs; Sc, subcostal.

Macrochaeta is defined as a large seta inserted into a very distinct socket. In our case, the sockets are visible under very high magnification but could not be photographed due to the relative opacity of the resin.

Systematic palaeontology

Order Diptera Linnaeus, 1758

Family Keroplatidae Rondani, 1856

Subfamily Macrocerinae Rondani, 1856

Tribe Robsonomyiini Matile, 1990

Genus *Eokelneria* gen. nov.
urn:lsid:zoobank.org:act:D027287A-5A86-4EC4-B3E2-2245A0544BC6

Type species. *Eokelneria oisensis* **gen. et sp. nov.**

Etymology. Named after the Eocene period and the genus name *Kelneria*. Gender feminine.

Diagnosis. Three ocelli; first six flagellomeres much longer than wide; long setae on scutellum and scutum; tibial spurs distinctly longer than width of tibia; hind tibial spurs of equal lengths and more than twice as long as tibial width; dorsal tibial macrochaetae regularly distributed and rather erect; two rows of ventral macrochaetae on hind basitarsomere; basitarsi not very long; hind pulvilli twice as long as claws; vein Sc strong, very long and ending on C; vein R_{2+3} present; CuP sigmoidal.

***Eokelneria oisensis* sp. nov.**
urn:lsid:zoobank.org:act:5C1A9D63-B22F-4722-B3BE-E7104246B5AF
(Figs 1, 2)

Type material. Holotype MNHN.F.C02457 (PA2, a nearly complete adult, female), stored in the Palaeontological collection, Muséum National d'Histoire Naturelle, Paris.

Etymology. Named after the Oise department.

Diagnosis. As for the genus. Wings hyaline without dark patterning; flagellomeres with setae as long as width of flagellomere.

Locality and horizon. Le Quesnoy outcrop near Creil (Houdancourt village), in Oise Department, Hauts-de-France, France, lowermost Eocene (Ypresian) (Nel & Brasero, 2010).

FIGURE 1. *Eokelneria oisensis* **gen. et sp. nov.**, holotype MNHN.F.C02457 (PA2). Photograph of habitus. Scale bar = 1 mm.

Description. Body *ca*. 2.5 mm; head 0.3 mm long; antenna long, slender, with 14 flagellomeres, basal ones well-separated but separations between distal-most ones hardly visible; first six flagellomeres much longer than wide; last flagellomere apiculate at apex; flagellomeres with setae as long as width of flagellomere; three ocelli arranged in an equilateral triangle, with median ocellus same size as the lateral ones; a cerebral sclerite present, apparently separated from rest of cerebral capsule by a membranous zone; maxillary palp with four elongate palpomeres; thorax 0.8 mm long; scutum without a V-shaped suture, with long setae; scutellum rounded, smooth, with long setae; midpleural suture straight to slightly oblique; metepisternum higher than wide; a clear demarcation between thorax and abdomen; legs long and thin; fore coxa with long setae on the antero-outer margin; no fore tibial combs; mid and hind tibiae without distal combs, but tibial spurs more than twice as long as tibial width; tibial spur formula 1-2-2; all femora with a series of long setae on ventral margin; hind coxa with sparse long setae on posterior margin of outer surface; hind tibial spurs of same size; tibial macrochaetae regularly disposed and erected; two regular ventral rows of macrochaetae on hind basitarsomere; pulvillus of hind leg twice as long as claws; distal part of

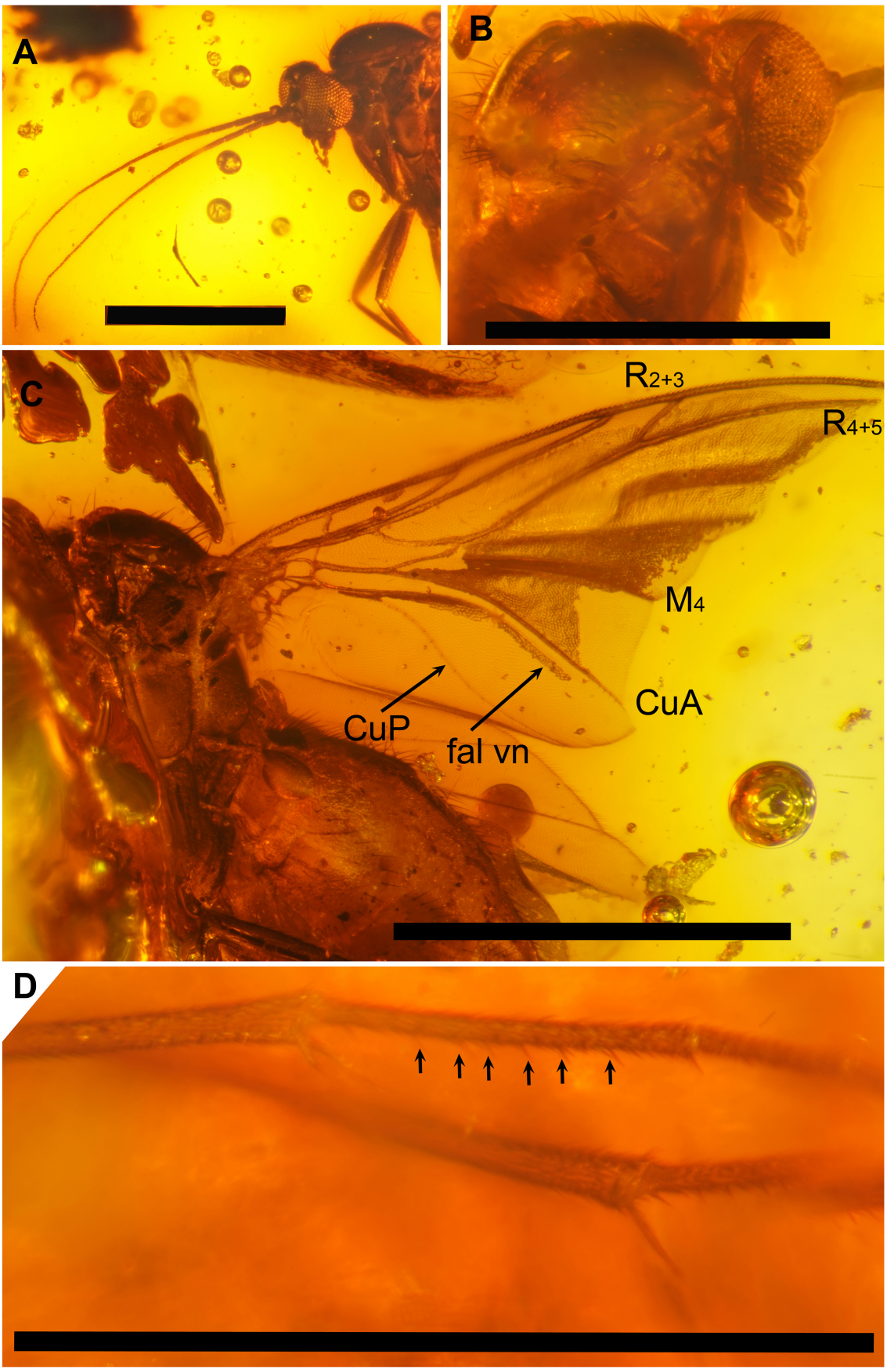

FIGURE 2. *Eokelneria oisensis* **gen. et sp. nov.**, holotype MNHN.F.C02457 (PA2). **A**, Head. **B**, Thorax and head. **C**, Wing. **D**, hind tibia spurs; arrows: ventral macrochaetae on basitarsomere. Scale bars = 1 mm.

wing missing, wing 0.76 mm wide; membrane hyaline; false vein between CuA and CuP well discernable; CuP vein sigmoidal, reaching wing margin. vein A_1 absent; bm-m vein present between M_4 and M_{1+2}; cua cell open; closed distal cells absent; stem of M_{1+2} short; at most five veins emerging from basal cell br+bm; R+M fusion present; R_{2+3} present, rather long and oblique; R_{4+5} curved and parallel to C; M_4 curved at base towards vein CuA; abdomen 1.4 mm long, 0.6 mm wide, progressively narrowing; terminalia not preserved except for a cercus (female).

Discussion

According to the key to fly families in Marshall *et al*. (2017), this fossil keys to the Keroplatidae because of the following characters: wings present, longer than thorax, with membranes lacking a pattern of folds between true veins; antenna with more than six distinct flagellomeres, all similar, clearly separated from each other; wings lacking closed distal cells; cua cell opened; ocelli present; vein CuP reaching wing margin; vein A_1 absent; scutum lacking a V-shaped suture; hind and mid legs with apical tibial spurs; wing without closed central cell; antenna long; at most five veins emerging from basal cell br+bm; stem of M_{1+2} short; a clear demarcation between thorax and abdomen; a transverse bm-m vein between M_4 and M_{1+2}; CuP vein reaching wing margin.

Using the key to African Keroplatidae of Blagoderov & Ševčík (2017) and the key to Keroplatidae of Matile (1990), it keys to the subfamily Macrocerinae because of the following characters: R+M fusion; head with a distinct cerebral sclerite; no distal combs on mid and hind tibiae; M_4 curved at base towards vein CuA. Papp & Ševčík (2005: 120, fig. 1) erected the subfamily Sciarokeroplatinae for the genus *Sciarokeroplatus* Papp & Ševčík, 2005, not treated in their published key. They compared it to the Macrocerinae because it has a cerebral sclerite 'unique, but comparable though much different from that of Macrocerinae'. This sclerite also is strongly different from the cerebral sclerite of the new fossil. *Sciarokeroplatus* also has no ocelli and a 'crossvein M–Cu, connecting common trunk of Rs and M_{1+2} stem vein with base of common trunk of M_3 and Cu_1, discernible only as a colourless fold', unlike the situation in the new fossil.

Mantič *et al*. (2020) grouped together the Macrocerinae *sensu stricto*, the Sciarokeroplatinae, plus *Burmacrocera* Cockerell, 1917 (mid-Cretaceous amber), *Paleoplatyura* Meunier, 1899 (mid-Cretaceous amber to extant), and *Schizocyttara* Matile, 1974. Ševčík (2024) confirmed this result, adding the genus *Davimacrocera* Ševčík, 2024 to this group.

Paleoplatyura differs from the new fossil in the presence of a r-m crossvein (Ševčík *et al*., 2022). The exact relationships of *Burmacrocera* remain uncertain (Ševčík, 2024), but if it seems to have long flagellomeres, its tibial spurs are nearly as long as the tibial width (Cockerell, 1917: fig. 5). *Davimacrocera* and *Schizocyttara* also have tibial spurs nearly as long as the tibial width (Matile, 1974; Ševčík, 2024).

According to the key to macrocerine tribes of Matile (1990), the new fossil would key to the Robsonomyiini because its midpleural suture subrectilinear and subvertical; metepisternum higher wide; fore tibial combs absent. Also, it seems that the cerebral sclerite is separated from the rest of the cerebral capsule by a membranous zone.

Schlueterimyia Matile, 1981 has a venation similar to that of the new fossil, and a regular row of macrochaetae on dorsal part of hind tibiae (Matile, 1981, 1990), but its pulvilli are four time longer than the claws *vs*. only two times in the new fossil, and the CuP vein is straight *vs*. distinctly sigmoidal in the new fossil. Note that Papp & Ševčík (2005) and Ševčík & Papp (2011) doubted the position of this genus in the Macrocerinae. The presence of ocelli excludes the Robsonomyiini *Srilankana* Matile, 1990 (Sri Lanka). *Hesperodes* Coquillett, 1900 also lacks ocelli and is also excluded by the presence of long setae on the scutum *vs.* short in the latter. The tibial spurs distinctly longer than the width of the tibia excludes *Vockerothia* Matile, 1990 and the Robsonomyiini genus *Micrepimera* Matile, 1990 (Afrotropical, Oriental, Australasia, and Baltic amber) (Ševčík & Papp, 2011; Blagoderov *et al*., 2019). The presence of tibial macrochaetae is a character of *Robsonomyia* but the vein R_{2+3} is absent in this genus *vs*. present in the new fossil, and vein Sc is very short and ending on the radius in this genus unlike in the new fossil (see also Pełczyńska *et al*., 2024). Furthermore, the tibial macrochaetae are irregularly disposed and not erected in *Robsonomyia*, *vs* regularly disposed and rather erected in the new fossil (Matile & Vockeroth, 1980).

The fossil shares with the other Robsonomyiini genus Eocene Baltic amber *Kelneria* the hind tibial spurs more than twice as long as the tibial width, the pulvilli longer than the claws, the first six flagellomeres much longer than wide, the last flagellomere apiculate at apex, the vein Sc of similar length and shape, and more generally similar wing venation. But *Kelneria* has no tibial macrochaetae even if it has irregular long setae irregularly disposed which is not the case in the new fossil (Matile, 1979, 1990). Matile (1979: 38) stated 'on peut

cependant constater qu'une rangée dorsale de microchètes pas plus longs, mais plus épais et plus sombres, s'etend sur la moitié apicale du tibia posterieur [However, it can be observed that a dorsal row of microchetae, no longer but thicker and darker, extends over the apical half of the posterior tibia]'. Matile (1979) also indicated that the hind tarsi have long setae irregularly disposed on the hind tarsus *vs*. presence of two regular ventral rows of macrochaetae on hind basal tarsomere of the new fossil.

Paramacrocera Edwards in Tonnoir & Edwards, 1927 differs from the new fossil in the majority of flagellomeres at most twice as long as wide. The other Macrocerinae genera keyed in Matile (1990) have the hind apical tibial spurs at most as long as the tibial width.

We have compared the new fossil with the genera of Robsonomyiini described since 1990 (Evenhuis, 2006; Pełczyńska *et al*., 2024). It differs from the genus *Langkawiana* Ševčík, 2009 (Malaysia) in the wings without dark bands, and the presence of three ocelli (*vs*. none) (Ševčík, 2011). The genus *Calusamyia* Coher, 2011 (Nearctic) differs from the new fossil in the very short apical tibial spurs and weak Sc (*vs*. strong), and basitarsi very long (Coher, 2011).

Conclusion

The extant Robsonomyiini are widely distributed in the Nearctic, Oriental, Afrotropical, and Australasian regions. *Eokelneria oisensis* **gen. et sp. nov.** is the oldest Cenozoic representative of this tribe.

Acknowledgements

We thank two anonymous referees for the useful comments on the first version of the paper. We also thank Gael De Ploëg for his crucial help in the collect and study of the fossil insects of Oise amber. We 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

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

Blagoderov, V., Krzemiński, W. & Skibińska, K. (2019) A new species of Micrepimera Matile (Diptera: Keroplatidae) from Baltic amber. *Palaeoentomology*, 2 (6), 643–649. https://doi.org/10.11646/palaeoentomology.2.6.15

Blagoderov, V. & Ševčík, J. (2017) Keroplatidae (predaceous fungus gnats). *In*: Kirk-Spriggs, A.H. & Sinclair, B.J. (Eds), Manual of Afrotropical Diptera, Volume 2. Nematocerous Diptera and lower Brachycera. *Suricata*, 5, 505–525.

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

Cumming, J.M. & Wood, D.M. (2017) Adult morphology and terminology. *In*: Kirk-Spriggs, A.H. & Sinclair, B.J. (Eds), Manual of Afrotropical Diptera, Volume 1. Introductory chapters and keys to Diptera families. *Suricata*, 4, 89–134.

Cockerell, T.D.A. (1917) Insects in Burmese amber. *Annals of the Entomological Society of America*, 10, 323–329. https://doi.org/10.1093/aesa/10.4.323

Coher, E.I. (2011) A new genus and species of North American Robsonomyiini (Diptera: Sciaroidea: Keroplatidae: Macrocerinae) from the Florida Keys. *Insecta Mundi*, 198, 1–6.

Coquillett, D.W. (1900) Two new genera of Diptera. *Entomological News*, 11, 429–430.

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. (2006) Catalog of the Keroplatidae of the world (Insecta: Diptera). *Bishop Museum Bulletin in Entomology*, 13, 1–179.

Linnaeus, C. von (1758) *Systema Naturae per regna tria naturae secundum classes, ordines, genera, species cum characteribus, differentiis, synonymis, locis*. Tome I. Ed. decima reformata. Laur. Salvii, Holmiae, 824 pp.
https://doi.org/10.5962/bhl.title.559

Mantič, M., Sikora, T., Burdíková, N., Blagoderov, V., Kjærandsen, J., Kurina, O. & Ševčík, J. (2020) Hidden in plain sight: comprehensive molecular phylogeny of Keroplatidae and Lygistorrhinidae (Diptera) reveals parallel evolution and leads to a revised family classification. *Insects*, 11 (6), 348.
https://doi.org/10.3390/insects11060348

Marshall, S.A., Kirk-Spriggs, A.H., Muller, B.S., Paiero, S.M., Yau, T. & Jackson, M.D. (2017) Chapter 12: Key to Diptera families – adults. *In*: Kirk-Spriggs, A.H. & Sinclair, B.J. (Eds), Manual of Afrotropical Diptera, Volume 1. Introductory chapters and keys to Diptera families. *Suricata*, 4, 267–355.

Matile, L. (1974) Diptera: Mycetophilidae Keroplatinae. *South African Animal Life,* 15, 511–532.

Matile, L. (1979) Un nouveau genre de Keroplatidae de l'ambre oligocène de la Baltique (Diptera: Mycetophiloidea). *Revue Française d'Entomologie, (N.S.)*, 1 (1), 36–41.

Matile, L. (1981) Description d'un Keroplatidae du Crétacé moyen et données morphologiques et taxonomiques sur les Mycetophiloidea. *Annales de la Société Entomologique de France, (N.S.)*, 17 (1), 99–123.
https://doi.org/10.1080/21686351.1981.12278265

Matile, L. (1990) Recherche sur la systématique et l'évolution des Keroplatidae (Diptera: Mycetophiloidea). *Mémoires du Muséum National d'Histoire Naturelle, Zoologie*, 148, 1–682.

Matile, L. & Vockeroth, J.R. (1980) Description d'un genre nouveau de Keroplatidae de l'Ouest nord-américain (Diptera: Mycetophiloidea). *The Canadian Entomologist*, 112 (6), 545–548.
https://doi.org/10.4039/Ent112545-6

Meunier, F. (1899) Révision des Diptères fossiles types de Loew conservés au Musée Provincial de Königsberg. *Miscellanea Entomologica*, 7 (10-11), 161–165.

Nel, A. & Brasero, N. (2010) Oise amber. 137–148. *In*: Penney, D. (Ed.) *Biodiversity of fossils in amber from the major world deposits*. Siri Scientific Press, Manchester, 303 pp.

Nel, A., de Ploëg, G., Millet, 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

Papp, L. & Ševčík, J. (2005) Sciarokeroplatinae, a new subfamily of Keroplatidae (Diptera). *Acta Zoologica Academiae Scientiarum Hungaricae*, 51 (2), 113–123.

Pełczyńska, A., Krzemiński, W., Blagoderov, V., Vilhelmsen, L. & Soszyńska, A. (2024) Eocene amber provides the first fossil record and bridges distributional gap in the rare genus *Robsonomyia* (Diptera: Keroplatidae). *Scientific Reports*, 14 (1), 9252.
https://doi.org/10.1038/s41598-024-59448-y

Rondani, C. (1856) *Dipterologiae Italicae prodromus. Vol 1: Genera Italica ordinis dipterorum ordinatim disposita et distincta et i familias et stirpes aggregata*. Parma, 228 pp.

Ševčík, J. (2009) *Langkawiana maculata* gen. et sp. n. from Malaysia and its systematic position in the tribe Robsonomyiini (Diptera: Keroplatidae). *Zootaxa*, 2221 (1), 58–66.
https://doi.org/10.11646/zootaxa.2221.1.4

Ševčík, J. (2024) *Davimacrocera*, a new extant genus of Keroplatidae, with notes on the fossil genus *Burmacrocera* (Diptera). *Insects*, 15, 1018.
https://doi.org/10.3390/insects15121018

Ševčík, J., Krzemiński, W. & Skibińska, K. (2022) Extant genus in the Mesozoic: *Paleoplatyura* Meunier (Diptera: Keroplatidae) found in the Cretaceous amber of Myanmar. *Insects*, 13, 24.
https://doi.org/10.3390/insects13010024

Ševčík, J. & Papp, L. (2011) New Afrotropical and Oriental species of *Micrepimera* Matile (Diptera: Keroplatidae). *Zootaxa*, 3128 (1), 58–66.
https://doi.org/10.11646/zootaxa.3128.1.3

Tonnoir, A.L. & Edwards, F.W. (1927) New Zealand fungus gnats (Diptera, Mycetophilidae). *Transactions of the New Zealand Institute*, 57, 747–878.