



<http://dx.doi.org/10.11646/zootaxa.3878.4.5>

<http://zoobank.org/urn:lsid:zoobank.org:pub:08CC020F-7D39-414A-9158-6C42036660EB>

Nomenclature and taxonomy of *Telmatoscopus* Eaton and *Seoda* Enderlein; with a discussion of parameral evolution in Paramormiini and Pericomaini (Diptera: Psychodidae, Psychodinae)

GUNNAR MIKALSEN KVIFTE^{1,2}

¹Department of Limnology, Institute of Biology, University of Kassel. Heinrich-Plett Str. 40, 34132 Kassel–Oberzwehren, Germany

²Department of Natural History, University Museum of Bergen, P.O. Box 7800, University of Bergen, N-5020 Bergen, Norway.

E-mail: Gunnar.Kvifte@um.uib.no

Abstract

Historically, *Telmatoscopus* Eaton, 1904 has been a nomenclaturally and taxonomically problematic taxon as different authors have used different type species to define their concepts of the genus. Here it is shown that *Pericoma advena* Eaton, 1893 is the valid type species rather than *Pericoma morula* Eaton, 1893. Furthermore, the genus *Seoda* Enderlein, 1935 is revived for the genus comprising *Pericoma labeculosa* Eaton, 1893, *P. morula* and their relatives. The differences between *Telmatoscopus* and *Seoda* are described in detail based on historical and freshly collected material of the three putative type species. Four new synonymies are proposed: *Panimerus havelkai* Wagner, 1975 and *Telmatoscopus seguyi* Vaillant, 1990 are synonymized with *Telmatoscopus advena*, and *Telmatoscopus incanus* Nielsen, 1964 and *Telmatoscopus vaillanti* Withers, 1986 are synonymized with *Seoda morula*.

A potential phylogenetic pattern in the male genital sclerites is discussed in detail. In *Telmatoscopus*, the jointed appendages of the gonocoxally derived parameral complex are separate small sclerites found near the bases of the distiphallic lobes of the aedeagus. In *Seoda*, they are fused medially to form a small, moveable triangular or arrow-shaped sclerite. Medial parameral sclerite fusion in Psychodinae is otherwise known to occur only in Pericomaini and the paramormiine genus *Psychomasina* Ježek, 2004; however, many genera of Paramormiini show an apparently intermediate condition where the parameres are fused in one end to form a V- or U-shaped "furca". It is hypothesized that Paramormiini is paraphyletic with respect to Pericomaini, as suggested in a previous phylogenetic hypothesis based on molecular data.

Key words: moth flies, new synonymy, male genitalia, homology

Introduction

Tribe Paramormiini Enderlein, 1935 (=Telmatoscopini Vaillant, 1971, partim) is distributed in all biogeographical regions apart from Antarctica and comprises roughly 300 described species in an uncertain number of genera. Moth flies in this group are recognized by their antennal flagellomeres being asymmetrically nodiform without significant reductions in size of the apical flagellomeres, labella bulbous, apical segment of maxillary palpus striated, R_{2+3} without connection to R_4 , aedeagal complex nearly always symmetrical and dorsal gonocoxal condyles fused medially. Many of these characters are of dubious phylogenetic value as they are widespread in Psychodinae, and no clearly synapomorphic characters have been identified. Thus, the monophyly of Paramormiini may be uncertain.

Some taxa within Paramormiini are readily recognized by means of specialized sensory appendages of the head and antennae, e.g. *Panimerus* and *Jungiella*. The majority of genera, however, are still unsatisfactorily characterized; particularly the group referred to as the "telmatoscopoid group" of genera by Duckhouse (1978). Species in this group typically have paired, unbranched, digitate ascoids and symmetrical genitalia with distally jointed aedeagal appendages.

Much of the confusion regarding the taxonomy of Paramormiini is due to differing opinions about which species constitutes the type species of *Telmatoscopus*. The International Code of Zoological Nomenclature (ICZN

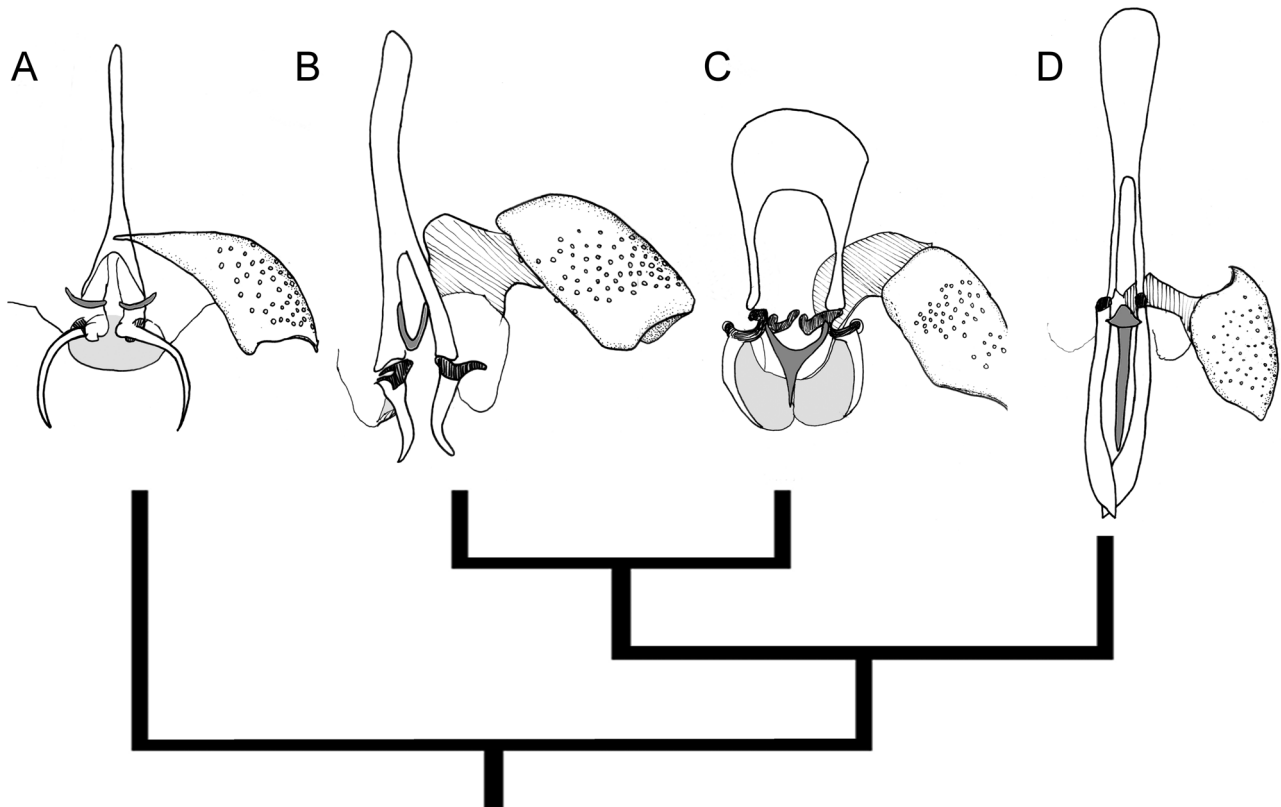


FIGURE 3. Proposed evolutionary sequence of parameral sclerites in Paramormiini. Cladogram modified from Espindola *et al.* (2012). A, *Telmatoscopus advena*, B, *Parajungiella longicornis* (Tonnoir, 1922), C, *Seoda labeculosa* and D, *Pneumia stammeri* (Jung, 1954)

The presence of an evolutionary trend within Paramormiini from paired lateral parameral sclerites to a single median appendage may indicate that Pericomaini is derived from within Paramormiini. The hypothesised evolutionary sequence is illustrated in figure 3. Interestingly, this idea also matches very well with the general pattern in the molecular phylogeny of Espindola *et al.* (2012): This study resolved Paramormiini as paraphyletic with respect to Pericomaini, and found those taxa who have a single median sclerite, such as *Parajungiella*, *Jungiella* and *Seoda britteni*, to be closer to Pericomaini than to the separate-sclerite taxa such as *Telmatoscopus advena* and *Paramormia* Enderlein, 1935 (fig. 3). This possible paraphyly of Paramormiini may explain the problems earlier authors have had with defining convincing synapomorphies for the taxon (Vaillant 1990, Curler & Courtney 2009).

Acknowledgements

I am grateful to Rüdiger Wagner for granting me access to his research collection and to him and Gregory Curler for valuable discussions and comments to the manuscript. I am furthermore indebted to Peter Chandler, who suggested the synonymy of *Telmatoscopus vaillanti* with *Seoda morula*. Finally I wish to thank Zoe Adams at the Natural History Museum, London for the loan of valuable historical specimens.

References

- Barendrecht, G. (1934) Preliminary note on Dutch Psychodidae. *Entomologische Berichten*, 9, 78–81.
 Beran, B., Doczkal, D., Pfister, K. & Wagner, R. (2010) Two new species of Psychodidae (subfamilies Trichomyiinae and Psychodinae) from Germany associated with decaying wood. *Zootaxa*, 2386, 59–64.
 Bernotienė, R. (2002) Moth flies (Diptera, Psychodidae) new for Lithuanian fauna. *Ekologija (Vilnius)*, 2, 4–8.

- Bravo, F., Souza, I., Santos, C.B.d. & Ferreira, A.L. (2011) Three new species of *Telmatoscopus* Eaton, 1904 (Diptera, Psychodidae) from Brazil. *Zootaxa*, 2802, 34–40.
- Caspers, N. & Wagner, R. (1980) Emergenz-Untersuchungen an einem Mittelgebirgsbach bei Bonn. II. Psychodiden-Emergenz 1976–1977. *Archiv für Hydrobiologie*, 88, 73–95.
- Curler, G.R. & Courtney, G. (2009) A revision of the world species of the genus *Neotelmatoscopus* Tonnoir (Diptera: Psychodidae). *Systematic Entomology*, 34, 63–92.
<http://dx.doi.org/10.1111/j.1365-3113.2008.00439.x>
- Duckhouse, D.A. (1966) Psychodidae (Diptera, Nematocera) of Southern Australia: subfamily Psychodinae. *Transactions of the Royal Entomological Society of London*, 118, 153–220.
<http://dx.doi.org/10.1111/j.1365-2311.1966.tb00837.x>
- Duckhouse, D.A. (1978) Non-phlebotomine Psychodidae (Diptera, Nematocera) of southern Africa. II. *Neoariseumus* and the brunettoid and telmatoscopoid genera. *Annals of the Natal Museum*, 23, 305–359.
- Eaton, A.E. (1893) A synopsis of British Psychodidae. *Entomologist's Monthly Magazine*, 29, 5–8, 31–34, 120–130.
- Eaton, A.E. (1894) A synopsis of British Psychodidae [part 4]. *Entomologist's Monthly Magazine*, 30, 22–28.
- Eaton, A.E. (1904) New genera of European Psychodidae. *Entomologist's Monthly Magazine*, 40, 55–59.
- Eaton, A.E. (1912) *Telmatoscopus rothschildii*, a new species of psychodid Diptera found in London. *Entomologist's Monthly Magazine*, 48, 7–9.
- Enderlein, G. (1935) Zur Klassifikation der Psychodinen. *Sitzungsberichte der Gesellschaft Naturforschender Freunde zu Berlin*, 1935, 246–249.
- Enderlein, G. (1937) Klassifikation der Psychodiden (Dipt.). *Deutsche Entomologische Zeitschrift*, 1936, 81–112.
- Espindola, A., Buerki, S., Jacquier, A., Ježek, J. & Alvarez, N. (2012) Phylogenetic relationships in the subfamily Psychodinae (Diptera, Psychodidae). *Zoologica Scripta*, 41, 489–498.
<http://dx.doi.org/10.1111/j.1463-6409.2012.00544.x>
- Freeman, P. (1953) Two new species of Psychodidae (Diptera: Nematocera) from Britain. *Proceedings of the Royal Entomological Society of London*, 22, 69–71. [B]
- International Commission for Zoological Nomenclature (1999) *International Code of Zoological Nomenclature 4th edition*. The International Trust for Zoological Nomenclature, London. Available from <http://iczn.org/iczn/index.jsp> (accessed 19.iv.2014)
- Ježek, J. (1984) Nomenclatorial changes of some higher taxa of palaeartic Psychodinae (Diptera, Psychodidae). *Acta Faunistica Entomologica Musei Nationalis Pragae*, 17, 155–170.
- Ježek, J. (1989) Contribution to the taxonomy of the genus *Telmatoscopus* Eat. (Diptera, Psychodidae). *Acta Musei Nationalis Pragae*, 46, 75–104.
- Ježek, J. (1997) New and interesting taxa of moth flies (Diptera, Psychodidae) from different moist biotopes in the Palearctic region. *Časopis Národního muzea, Řada přírodovědná*, 166, 105–122.
- Ježek, J. (1998) Psychodidae. In: Rozkošný, R. & Vaňhara, J. (Eds.), *Diptera of the Pálava Biosphere Reserve of UNESCO, I. Folia Facultatis Scientiarum Naturalium Universitatis Masarykianae Brunensis, Biologia*, 99, 71–77.
- Ježek, J. (2001) New Palearctic taxa of moth flies (Diptera: Psychodidae) from very small accidental spiritous samples of insects. *Acta Universitatis Carolinae Biologica*, 45, 53–66.
- Ježek, J. (2003) New faunistic data and check list of non Phlebotomine moth flies (Diptera, Psychodidae) from the Czech and Slovak republics. *Časopis Národního muzea, Řada přírodovědná*, 172, 121–132.
- Ježek, J. (2004) New taxa of non-biting moth flies (Diptera, Psychodidae, Psychodinae, Paramormiini) from Madagascar. *Acta Facultatis Ecologiae*, 12, (supplement 1), 57–68.
- Ježek, J. & Goutner, V. (1993) Two interesting species of moth flies (Diptera: Psychodidae) from Greece. *Aquatic Insects*, 15, 185–191.
<http://dx.doi.org/10.1080/01650429309361516>
- Ježek, J. & Mogi, M. (1995) Two new moth flies (Diptera, Psychodidae) from Japan. *Japanese Journal of Sanitary Zoology*, 46, 59–66.
- Krek, S. (1971) Les *Telmatoscopini* de la Bosnie (Diptera, Psychodidae, Psychodinae). *Travaux du Laboratoire d'Hydrobiologie et de Pisciculture de l'Université de Grenoble*, 62, 169–188.
- Krek, S. (1978) Tri nove vrste Psychodinae iz Bosne (Psychodidae, Diptera). *Godišnjaka Biološkog Instituta Univerziteta u Sarajevu*, 30 (1977), 105–112.
- Krek, S. (1999) *Psychodidae (Diptera: Insecta) Balkanskog Poluotoka*. Studentska Stamparija Univerziteta Sarajevo, Sarajevo, 417 pp.
- Kvifte, G.M. (2012) Catalogue and bibliography of Afrotropical Psychodidae: Bruchomyiinae, Psychodinae, Sycoracinae and Trichomyiinae. *Zootaxa*, 3231, 29–52.
- Kvifte, G.M. & Boumans, L. (2014) Further records and DNA barcodes of Norwegian moth flies (Diptera, Psychodidae). *Norwegian Journal of Entomology*, 61, 11–14.
- Kvifte, G.M., Ivković, M. & Klarić, A. (2013) New records of moth flies (Diptera: Psychodidae) from Croatia, with the description of *Berdeniella keroveci* sp.nov. *Zootaxa*, 3737, 57–67.
<http://dx.doi.org/10.11646/zootaxa.3737.1.4>
- Nielsen, B.O. (1964) Studies on the Danish Psychodidae (Diptera: Nematocera) II. *Natura Jutlandica*, 12, 149–161.

- Oboňa, J. & Ježek, J. (2012) First records of dendrolimnetic moth flies (Diptera: Psychodidae) from Slovakia. *Klapalekiana*, 48, 279–287.
- Quate, L.W. (1955) A revision of the Psychodidae (Diptera) in America North of Mexico. *University of California Publications in Entomology*, 10, 103–273.
- Quate, L.W. (1965) Family Psychodidae. In: Stone, A., Sabrosky, C.W., Wirth, W.W., Foote, R.H. & Coulson, J.R. (Eds.), *A Catalog of the Diptera of America North of Mexico*. U.S. Government Printing Office, Washington, pp. 91–97.
- Quate, L.W. & Brown, B.V. (2004) Revision of Neotropical Setomimini (Diptera: Psychodidae: Psychodinae). *Contributions in Science*, 500, 1–117.
- Salamanna, G. (1982) Psychodinae of Sardinia. I. Psychodini and Telmatoscopini, with descriptions of three new species (Diptera Psychodidae). *Bollettino della Società Entomologica Italiana*, 114, 183–192.
- Salmela, J. (2005) New moth flies for eastern Fennoscandia (Diptera: Psychodidae). *Sahlbergia*, 10, 1–3.
- Sarà, M. (1960) Nuove osservazioni su Psicodini italiani (Dipt.). *Annuario dell'Istituto e Museo di Zoologia della Università di Napoli*, 12 (5), 1–8.
- Svensson, B.W. (2009) Fjärilsmygga-faunan i ett hagmarksområde och en ladugård i östra Blekinges skogsland. Med en översikt av familjen Psychodidae:s morfologi, systematik och utforskande, samt särskilt de svenska *Psychoda* s.l.-arternas biologi. *Entomologisk Tidskrift*, 130, 185–208.
- Tonnoir, A.L. (1919) Contribution à l'étude des Psychodidae de Belgique. Note préliminaire. *Annales de la Société Entomologique de Belgique*, 59, 8–17.
- Tonnoir, A.L. (1922) Nouvelle Contribution à l'étude des Psychodidae (Diptera) et description de dix espèces nouvelles d'Europe. *Annales de la Société Entomologique de Belgique*, 62, 153–181.
- Tonnoir, A.L. (1933) Descriptions of remarkable Indian Psychodidae and their early stages, with a theory of the evolution of the ventral suckers of dipterous larvae. *Records of the Indian Museum*, 35, 53–75.
- Tonnoir, A.L. (1940) A synopsis of the British Psychodidae (Dipt.) with descriptions of new species. *Transactions of the Society for British Entomology*, 7, 21–64.
- Vaillant, F. (1964) Nouvelle contribution à l'étude des Psychodidae (Diptera) de la France. *Travaux du Laboratoire d'Hydrobiologie et de Pisciculture de l'Université de Grenoble*, 56, 61–76.
- Vaillant, F. (1971) Psychodidae - Psychodinae. In: Lindner, E. (Ed.), *Die Fliegen Der Palearktischen Region. Lieferung 287*. E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart. pp. 1–48.
- Vaillant, F. (1972) Psychodidae - Psychodinae. In: Lindner, E. (Eds.), *Die Fliegen Der Palearktischen Region. Lieferung 291*. E. Schweizerbart'sche Verlagsbuchhandlung, Stuttgart. pp. 49–78.
- Vaillant, F. (1982) Homologies entre les pièces génitales mâles de quelques Diptères Nématocères. *Annales de la Société Entomologique de France (N. S.)*, 18, 419–425.
- Vaillant, F. (1983) Some Nearctic Psychodidae Psychodinae of the tribe Telmatoscopini (Diptera). *Annales de la Société Entomologique de France (N. S.)*, 19, 117–125.
- Vaillant, F. (1989) Les Psychodidae dendrolimnophiles et dendrolimnobiontes paléarctiques et néarctiques (Insecta, Diptera, Nematocera, Psychodidae). *Spixiana*, 12, 193–208.
- Vaillant, F. (1990) Les diptères Psychodidae dendrolimnobiontes du sud-est de la France, et leur microendémisme. *Annales de la Société Entomologique de France (N. S.)*, 26, 371–379.
- Wagner, R. (1975) Sechs neue Psychodidenarten aus Deutschland und Österreich (Diptera, Psychodidae). *Mitteilungen der Deutschen Entomologischen Gesellschaft*, 34, 1–9.
- Wagner, R. (1978) Neue europäische Psychodiden (Diptera: Psychodidae). *Senckenbergiana Biologica*, 58, 157–170.
- Wagner, R. (1979) Über einige Psychodiden-arten aus Afghanistan (Diptera: Psychodidae). *Acta Zoologica Academiae Scientiarum Hungarica*, 25, 441–448.
- Wagner, R. (1980) Lunzer Psychodiden (Diptera, Nematocera). Schlitzer produktionsbiologische Studien (21). *Limnologica (Berlin)*, 12, 109–119.
- Wagner, R. (1990) Family Psychodidae. In: Soós, Á. & Papp, L. (Eds.), *Catalogue of Palearctic Diptera: Psychodidae–Chironomidae*. Akadémiai Kiadó, Budapest. pp. 11–65.
- Wagner, R., Koç, H., Özgül, O. & Tonguç, A. (2013) New moth flies (Diptera: Psychodidae: Psychodinae) from Turkey. *Zoology of the Middle East*, 59, 152–167.
<http://dx.doi.org/10.1080/09397140.2013.810880>
- Withers, P. (1986) Recent records of moth flies in Norfolk, including a species new to science and five species new to Britain. *Transactions of the Norfolk and Norwich Naturalists' Society*, 27, 227–231.
- Withers, P. (2004) Diptères nouveaux ou peu connus pour la faune de France. *Bulletin Mensuel de la Société Linnéenne de Lyon*, 73, 39–45.
- Withers, P. & O'Connor, J.P. (1992) A preliminary account of the Irish species of moth fly (Diptera: Psychodidae). *Proceedings of the Royal Irish Academy*, 92, 61–77. [B]