



## Revision of the stiletto fly genus *Neodialineura* Mann (Diptera: Therevidae): an empirical example of cybertaxonomy

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## Abstract

The endemic Australian genus *Neodialineura* Mann is revised to include 13 species. Three species are previously described: *N. nitens* (White) and *N. saxatilis* (White) from southern mainland Australia and Tasmania, and *N. striatithorax* Mann from eastern Australia. Ten species are described as new, including *N. ataxia* **sp. nov.**, *N. atmis* **sp. nov.**, *N. bagdad* **sp. nov.**, *N. bifaria* **sp. nov.**, *N. litura* **sp. nov.**, *N. polygramma* **sp. nov.**, *N. signum* **sp. nov.**, *N. spinosa* **sp. nov.**, *N. tessella* **sp. nov.** and *N. trichidion* **sp. nov.** This revision serves as an empirical example for modernising the process of documenting global biodiversity by making taxonomic description and key development more efficient by avoiding redundancy in data handling and using digital media. Complete taxonomic descriptions were generated using online specimen and image databases, and a character matrix in Structured Descriptive Data (SDD) format developed in Lucid Builder to simultaneously generate natural language descriptions and an interactive key. Numerous web resources are provided with taxonomic descriptions throughout the document including: a) links to archived images of all species on Morphbank, b) registration of authors, publications, taxon names and other nomenclatural acts in Zoobank, with assignment of Life Science Identifiers (LSIDs) for each, c) links to Genbank accession records for DNA sequences, and d) assignment of LSIDs to specimen records with links to respective records in an online Therevidae specimen database. Colour images of male and female specimens of all *Neodialineura* species are included, along with a traditional dichotomous key to species.

**Keywords:** Asiloidea, natural language description, cybertaxonomy, Life Science Identifier, Lucid.

## Introduction

Stiletto flies (Diptera: Asiloidea: Therevidae) are a moderately sized group of lower brachyceran flies that along with Scenopinidae (window flies), Apsilocephalidae and Evocoidae, comprise the therevoid clade. The Australasian region contains the greatest number of stiletto fly species of any biogeographical region, with an estimated 700+ described and undescribed species. This represents over 40% of the world stiletto fly fauna. Therevidae of Australasian are completely endemic at the genus level except for *Irwiniella* Lyneborg, a single Old World genus with representatives in the Papuan and Indonesian archipelago. Australasian Therevidae comprises only two of the recognised subfamilies: the cosmopolitan Therevinae (represented by three genera), and the largely endemic Agapophytinae (represented by approximately 25 genera). The latter subfamily is represented outside this biogeographical region only by three genera found in South America (Winterton 2006). Winterton (2006, 2007) recently proposed an expanded concept of Agapophytinae to also include all members of the poorly defined and likely paraphyletic *Taenogera* Kröber genus-group, an informal grouping in which *Neodialineura* Mann was previously placed by Winterton *et al.* (1999).

*Neodialineura* was originally described for a single, highly distinctive species (*N. striatithorax* Mann) (Fig. 1) with a swollen antennal scape and enlarged frons with a glossy callus laterally (Mann 1928). Based on these distinctive but highly autapomorphic characters, Mann (1928) incorrectly related the genus to therevine genera *Tabuda* Walker and *Dialineura* Rondani. White (1915) described two species of *Psilocephala* Zetterstedt (*P. saxatilis* White and *P. nitens* White (Fig. 2)) from Tasmania that Irwin & Lyneborg (1989) subsequently listed as unplaced within Therevidae. In their revision of *Psilocephala*, Metz *et al.* (2003) transferred both species to *Neodialineura*, increasing the total number of species to three. In this revision of *Neodialineura*, all three previously described species are treated, with an additional ten new species described for the first time. A dichotomous key to species is provided and photographic images are presented for both sexes (where known) of all species, with links to corresponding Morphbank images.

The process of traditional taxonomic description has many time-consuming aspects, with numerous instances of redundancy in data handling (e.g. character and specimen metadata) so that today descriptions are still manually crafted in a word processor. The result is that we have described only a small fraction of the estimated global biodiversity. What is needed to revitalise this process is a dramatic paradigm shift in methodology used to describe species from tedious traditional methods to rapid, semi-automated ones that also utilise the numerous web resources available in online databases. In the online edition of their seminal