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Definition of the families of mosquitoes and flies of the suborder Bibionomorpha (Insecta: Diptera).

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Family Bolitophilidae

Bolitophila melaleucas Polevoi 1996.

The Encyclopedia of Life (EOL): Bolitophilidae has the following attributes: Body symmetry: bilaterally symmetric. Cellularity: Multicellular. Development mode: Holometabolous. Feeding structure: sucking mouthparts. Geographic distribution includes Serbia. Habitat: City. The Bolitophilidae are a family of nematoceran dipterous insects. Small to medium-sized mosquitoes (4-8 mm), very slender, with long, slender legs and long antennae. The Bolitophilidae have a mainly Holarctic distribution and almost half (31) of the world's 64 species are known from the Nordic region. *Bolitophila*, Meigen, 1818, is a genus of Diptera in the family Bolitophilidae (Figure 1) [1-3].

Figure 1. *Bolitophila dubia* Siebke, 1863, is a typical member of the family Bolitophilidae with a slender body and long legs. **S**ources: http://www.online-eys.net/sciaroidea/add01/Rindal_et_al_2008_Bolitophilidae_Norway.pdf .

Family Canthyloscelididae

The Canthyloscelidae is a small family of mosquitoes closely related to the Scatopsidae. Adults are relatively robust, small to medium-sized flies, usually dark-colored Nematocera with robust legs. They are associated with old-growth forests. Only two very similar and rarely encountered species occur in Europe, including the Nordic region, here represented by a female of *Hyperoscelis vetternosa* Mamaev & Krivosheina, 1986, from northern Sweden. *Hyperoscelis vetternosa* belongs to the genus Hardy & Nagatomi, 1960 (Figure 2) [4].

Figure 2. *Acanthiophilus helianthi* (Rossi, 1794). Source: https://ukrbin.com/compare.php?imageid=205216.

Family Diadocidiidae

Diadocidiidae is one of the smallest families of Bibionomorpha, with one genus and 24 species. The family is known from the Nearctic, Palearctic, Oriental, Australian Oceanian, and Neotropical regions. For the Neotropical Region, the species *Diadocidia nigripalpis* Edwards, 1940, was mentioned for southern Brazil Santa Catarina and a species not yet described for Chile. *Diadocidianigripalpis* expanded its distribution, which reached Costa Rica, indicating the species is widely distributed in the Neotropical Region (Figure 3) [5-6].

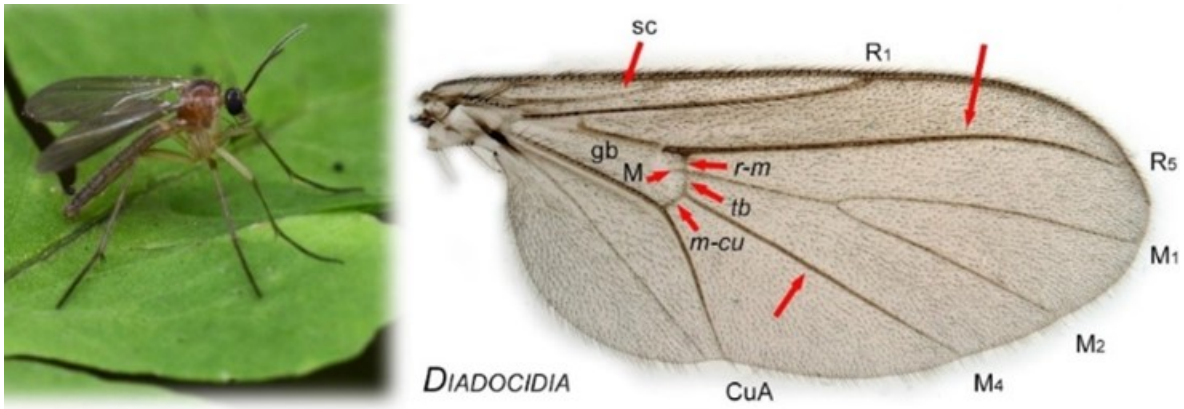

Figure 3. Their wing venation is unique with all the crossveins (r-m, tb, m-cu) in line at the basal third of the wing and with vein M4 strait. Source: ttps://uit.no/forskning/forskningsgrupper/sub?sub_id=489491&p_document_id=488838.

Family Ditomyiidae

It is a small family with 15 genera and around 107 species, known in all biogeographic regions, except the Afrotropical. There are 32 species described for the Neotropical Region, distributed in nine genera. Four of the genera described occur in Brazil, with around 14 species. The number of new species in tropical forest areas, belonging to the genera: *Rhipidita* Edwards, 1940, *Calliceratomyia* Lane, 1946 and *Australosymmerus* Munroe, 1974 (Figure 4) [7-8].

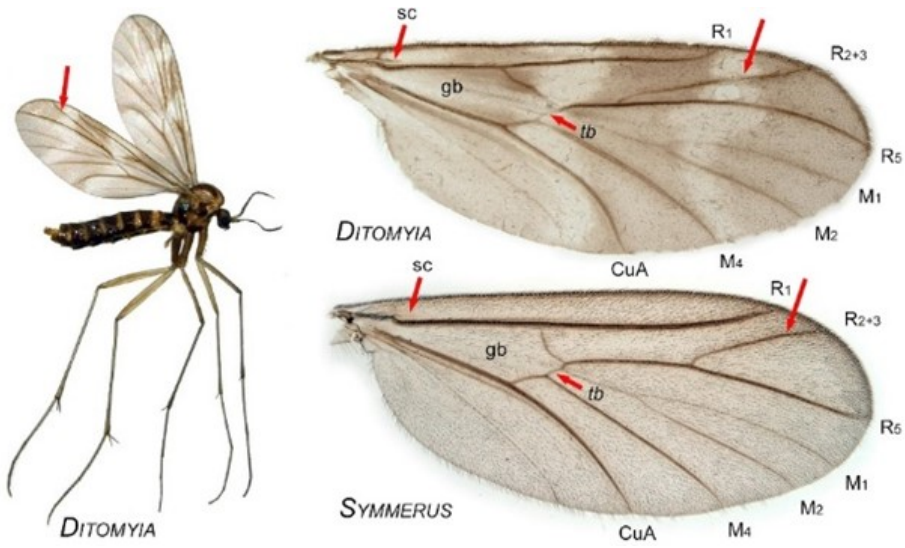

Figure 4. A very short sc, a long R2+3 that is ending free and hence forming a third fork in front of the anterior fork (M1 + M2), and crossvein tb connected to the posterior fork (M4). Source: https://uit.no/forskning/forskningsgrupper/sub?sub_id=489491&p_document_id=488838.

Family Hesperinidae

The larvae of *Hesperinus* Walker, 1848, superficially resemble partly the larvae of the Bibionidae and those of the Mycetophilidae. The head capsule is heavily sclerotized, almost black. The following features are characteristic of the *Hesperinus* imago: 12-segmented antennae are long, significantly exceeding the length of the head and thorax. The male's eyes are circular, separated by a wide front. They are simple, that is, they consist of uniform facets. The legs are thin and common. The subtype is poorly represented in recent fauna and only one representative of the family Hesperinidae (*Hesperinus*) is a residue of this once-abundant subtype. Specialization is an interesting relic: Females don't have wings (Figure 5) [9-10].

Figure 5. *Hesperinus imbecillus* (Loew, 1858) male, habitus, Source: https://www.researchgate.net/figure/Hesperinus-imbecillus-male-habitus_fig1_263925579 an Photo 173418181, (c) Michael Caterino.

Family Lygistorrhinidae

The family Lygistorrhinidae living fauna is divided into eight genera and 32 species throughout the world, especially in tropical and subtropical areas. In the Neotropical Region, there is only one genus and nine species, of which five are known from Brazil. The presence of *Lygistorrhina (Probolaeus)* Williston, 1896, in Mato Grosso do Sul is practically certain. Lygistorrhininae, commonly called long-beaked fungus gnats is a subfamily of flies in the Diptera family Keroplatidae. The groups were long treated as a separate family, but molecular phylogenetic analysis has shown it to belong to Keroplatidae [11].

Docosia adusta sp. nov.

The species epithet is feminine, derived from the Latin adustus, for ‘‘brown’’, and refers to the brown wing membrane (especially along the anterior margin) and the general body color (Figure 6) [11].

Figure 6. *Docosia adusta* sp. nov. Source: https://fr.wikipedia.org/wiki/Docosia.

Family Manotinae

Results of the different analyses all support Manotinae as a monophyletic group, with Leiinae as the sister group. The sister group of the Sciaridae as newly defined is the Mycetophilidae group, in the extant analysis includes the Mycetophilidae, Manotidae, and Lygistorrhinidae. These include the genus Manota Williston, 1896, characterized by having the head inserted at the anterior end of the thorax and with a row of strong posteriorly directed (Figure 7) [12].

Figure 7. *Manotoba tunoae* Hippa & Kjaerandsen, 2020. Source: https://sciaroidea.myspecies.info/taxonomy/42710.

Family Pachyneuridae

Pachyneuridae is a family of flies in the infraorder Bibionomorpha, order Diptera. There are at least 8 species described in 7 genera in Pachyneuridae. The larvae live in rotten wood. Mosquitoes with a slender body and elongated legs, reaching a length of 9 to 13 mm. Larvae of the species *Pachyneura oculata* Krivosheina & Mamaev, 1972, develop in relatively dry

wood from stumps and dead trunks affected by light rot. Larvae of the species *Pachyneura fasciata* Zetterstedt, 1838, develop in the damp wood of trunks that have fallen to the ground and are affected by black rot. Often found together with larvae of the fungus gnat Aglaomyia ingrica (Stackelberg, 1948). The pupae transformed into soil containing wood. Adults are common in early summer on tree trunks, particularly on birch *Betula* L. (Betulaceae) (Figure 8) [1-12].

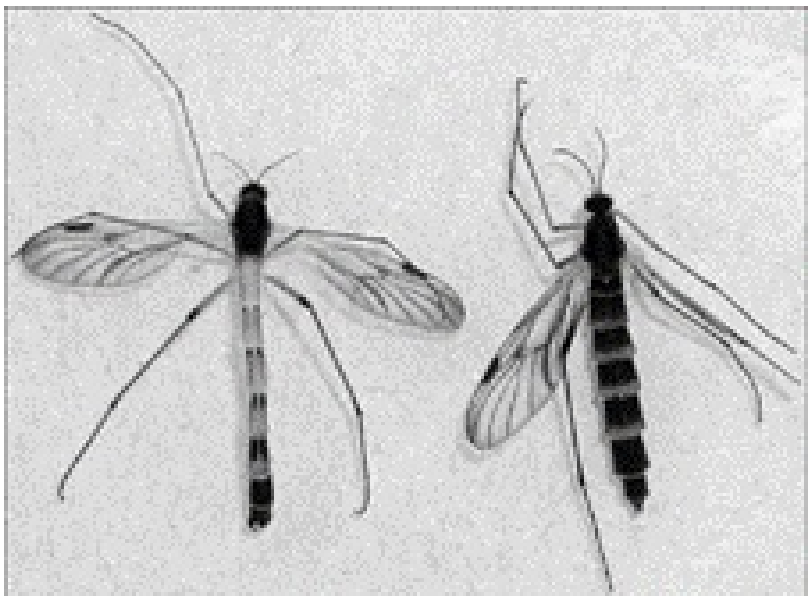

Figure 8. Male (left) and female (right) of *Pachyneura fasciata* Zetterstedt, 1838. Source: https://www.researchgate.net/figure/Male-left-and-female-right-of-Pachyneura-fasciata_fig1_283713756.

Family Perissommatidae

Perissommatidae are unusual in that they have four eyes. They have a small, slender body. Its wings are large compared to its body and subsequently, its flight is weak. Preferring high-altitude forest environments, adults only fly in winter. The larvae live in decaying leaves in moist sclerophyll or cold tropical forests. Some species are suspected of being associated with fungi. The family contains five species, four from Australia and one from Chile (Figure 9) [13-15].

Figure 9. *Perissomma mcalpinei* Colless, 1969. Source: https://en.wikipedia.org/wiki/Perissommatidae.

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