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Definition of the family Scatopsidae (Insecta: Diptera).

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The **Culicomorpha** is an **infraorder of Nematocera**, including mosquitoes and black flies, with characteristics such as blood feeding by adult females, day or night feeding by adult females, and the occurrence of immature stages in aquatic habitats. Most of the time, adult females lay their eggs in bodies of water. Some are restricted to very clean waters, but others can tolerate highly polluted environments. Many adults transmit parasites of veterinary importance to humans [1-3].

Approximately 400 species of the **superfamily Scatopsoidea** have been found and described around the world, so there are still many awaiting description or discovery, and the biology of these insects is only partially known. Their larvae inhabit places rich in decomposing organic matter. They are morphologically similar to small specimens of the two Bibionidae family. Scatopsoidea in general are insects, whose biology is only partially known, associated with the carbon cycle as larvae colonize habitats rich in decomposing organic matter. Morphologically they are similar to mosquitoes (Dixidae and Trammaulidae) of the Bibionidae family [4-6].

The **Scatopsidae** are a family of **Nematocera Diptera** that includes around 380 species described worldwide, of which there are just over 110 in Europe. They are small mosquitoes, generally found in very diverse environments, often in flowers. The larval stages are saprophagous, developing in decomposing material. *Coboldia fuscipes* (Meigen, 1830, are the species most frequently observed in practically all environments. Unintentionally transported by trade, it has colonized all continents. Its larvae can develop in a wide variety of decomposing organic matter, of animal or vegetable origin [7-10].

The Scatopsidae make up a small group of tiny flies, from 0.6 to 4.1 mm, with the majority being less than 1.5 mm. Generally blackish in color. Most of the genera in this family have holoptic species. The flagellum is quite short, consisting of 5 to 10 short flagellomeres. The maxillary palps are always 1 segmented and the labella is short. Characteristically the anterior thoracic spiracle is on a plate; in most genera, their species have a row of supra-wing setae (Figure 1) [11-12].

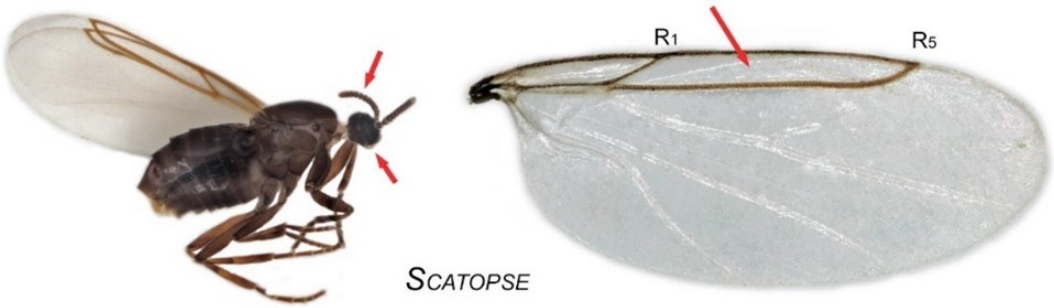

Figure 1. Small compact flies with short untapered antennae, only one-segmented palpi, and characteristic wing venation where only the costa, C, and the radial sector, R, are sclerotized and form a prominent closed cell frame anteriorly on the wing. Some 100 species in Europe are exemplified here with a male *Scatopse notata* L. 1758, from Swede. Source: https://uit.no/forskning/forskningsgrupper/sub?sub_id=489491&p_document_id=488838

The wings show considerably reduced venation: the Sc vein is always incomplete and short; only R1, R5, r-m, and m-cu are well sclerotized. These last two veins occupy a longitudinal position on the wing. The medial system is reduced to the medial anterior bifurcation (M1 and M2) and the ulnar system bifurcates very basally on the wing. A1 is absent in most of the family. The posterior veins are always very weak. The terminalia of the male is very complex and shows striking differences between the different genera of the family [13-14].

Other species are associated with remains of wood and rotten trees. In a few genera of the Colobostematini tribe their species appear to be associated with ant nests. A species is associated with ants and presumably feeds on debris in ant nests. Some Scatopsinae are even aquatic, living in forest springs and presumably feeding on waterlogged dead leaves [12-13].

Eggs of Scatopsidae are laid on moist substrates in crescent-shaped masses of about 50-300 eggs. Females shortly after laying. The eggs take about 35 days to hatch, though it depends on temperature. The life cycle takes 3-4 weeks to complete. The adult stage is generally short, usually 2-3 or 4-5 days (Figure 2) [14-15].

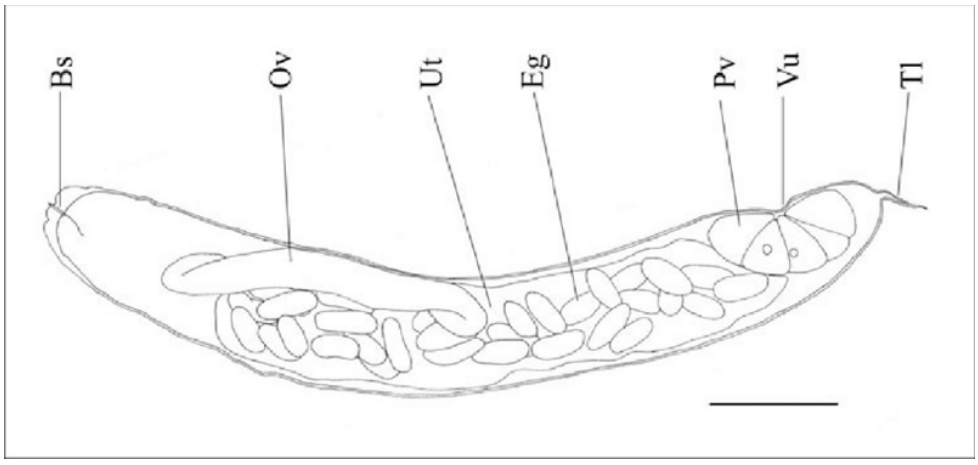

Figure 2. *Scatonema wuelkeri* Bovien, 1932. Adult parasitic female, ovary filled with eggs, lateral view. Abbreviations: Bs

= buccal stylet; eg = egg; Ov = ovary; Pv = perivaginal cell; Tl = tail; ut = uterus; vu = vulva.

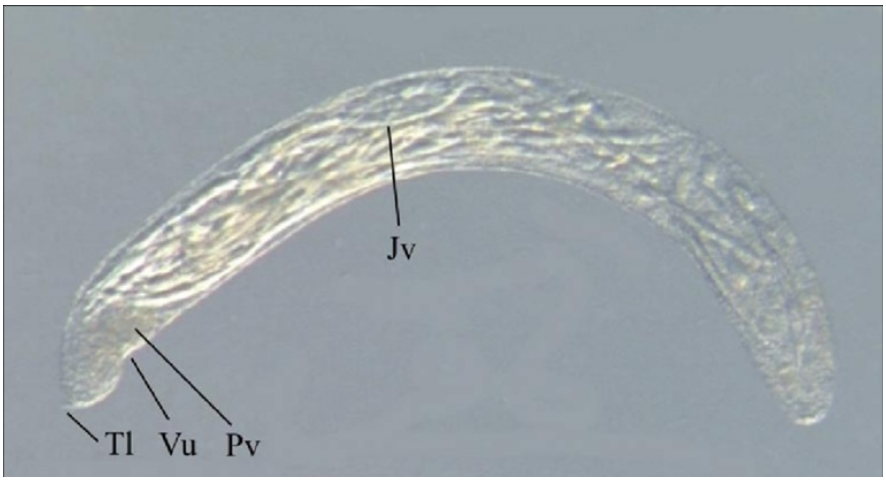

Figure 3. *Scatonema wuelkeri* Bovien, 1932. Adult parasitic female, ovary filled with juveniles, lateral view, body length approximately 1 mm. Abbreviations: Jv = juvenile; Pv = perivaginal cell; Tl = tail; Vu = vulva.
Sources: https://www.researchgate.net/figure/Scatonema-wuelkeri-BOVIEN-Adult-parasitic-female-ovary-filled-with-juveniles-lateral_fig4_271443564.

Figure 4. Geral view of the larva ventral view. General view of the pupa*Coboldia fuscipes* (Meigen, 1830).
Sources: https://en.wikipedia.org/wiki/Scatopsidae, Source: https://bugguide.net/node/view/806769 and https://bugtracks.wordpress.com/2021/12/08/an-underexplored-microhabitat/.

Coboldia fuscipes **(Meigen, 1830) (Diptera: Scatopsidae)**

Coboldia fuscipes is one of the most important pests of oyster mushrooms. This species of fly is cosmopolitan and closely associated with human life, and its larvae are usually found in decaying plant or animal materials. *Coboldia fuscipes* larvae

can ingest the mycelium, mushroom bed, and sporophore of mushrooms, resulting in reduced quality and productivity. Secondary damage to the mushroom is also introduced through transported pathogens, mites, and nematodes [16-18].

Adults: Tiny, black, shiny flies (usually 1-4 mm) appearing somewhat laterally flattened; head moderately compressed laterally; eyes forming a dorsal bridge; antennae somewhat short and robust; wings milky, with reduced venation - only 2 veins heavily sclerotized, other veins mostly inconspicuous. **Head**: Head moderately compressed laterally; eyes forming a dorsal bridge; antennae somewhat short and robust. **Wing**: Wings with reduced venation - only C and R veins are heavily sclerotized, other veins being inconspicuous [16-18].

Male abdomen: Males with produced spatulate process on 7th tergite.**Larva**: Eucephalic, peripneustic and legless; body compressed dorso-ventrally with spiracles elevated on short processes [16-18].

The larvae feed in the mushroom mycelium and/or on decaying fungal, animal, or plant tissue. Adults are not known to feed, but likely imbibe liquids from environmental substrates. They can be found mating near situations where the larvae dwell. Adults are often seen coupled and may crawl around, attached, for a while [16-18].

These flies have been used in laboratory studies of developmental gene expression economic Impact: A pest of oyster mushrooms and other commercially grown mushrooms [16-18].

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