# Species of mosquitoes (Diptera: Culicidae) with published illustrations and/or descriptions of eggs – Summary

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# Abstract

A summary is provided for species of the dipteran family Culicidae, including subfamilies, tribes and genera, with published illustrations and/or descriptions of the egg stage.

Key words: Aedeomyiini, Aedeomyia, Aedes, Aedimorphus, Aedini, Alanstonea, Anopheles, Anophelinae, Armigeres, Bifidistylus, Bironella, Cancraedes, Chagasia, Collessius. Coauillettidia. Culex, Culicidae, Culicinae, Culicini, Culiseta. Culisetini. Dahliana. Deinocerites. Diceromvia. Diptera. Dobrotworskyius, Downsiomvia, Edwardsaedes. Eretmapodites, Ficalbia, Ficalbiini, Finlaya, Fredwardsius, Georgecraigius, Gymnometopa, Haemagogus, Halaedes, Heizmannia, Hodgesiini, Hopkinsius, Howardina, Hulecoeteomyia, Isostomyia, Jarnellius, Levua, Limatus, Lorrainea, Lutzia, Macleava, Mansonia, Mansoniini, Maorigoeldia, Mimomyia, Mucidus, Neomelaniconion, Ochlerotatus, Opifex, Orthopodomyia, Orthopodomyiini, Phagomyia, Psorophora, Rampamyia, Rhinoskusea, Sabethes, Sabethini, Skusea, Stegomyia, Tanakaius, Topomyia, Toxorhynchites, Toxorhynchitini, Trichoprosopon, Tripteroides, Uranotaenia, Uranotaeniini, Verrallina, Wyeomyia, Zavortinkius, mosquito, eggs

## Introduction

A summary of the mosquito species in the dipteran family Culicidae with published illustrations and/or descriptions of eggs is provided below. Many of the publications include descriptive information in addition to the illustrations of the egg; however, some descriptions are very brief. Also, sometimes descriptive information is included in keys. The latest listing of currently valid taxa reported in the Mosquito Taxonomic Inventory (http://mosquito-taxonomic-inventory.info, accessed 27 August 2010) was utilized.

Listings of species with descriptions and/or illustrations of eggs were published previously for tribe Aedini (Reinert, 2005), subfamily Anophelinae (Reinert, 2010a), tribe Mansoniini (Reinert, 2010b), tribes Toxorhynchitini and Uranotaeniini (Reinert, 2010c), tribe Sabethini (Reinert,

2010d), tribes Aedeomyiini and Culisetini (Reinert, 2010e), tribes Ficalbiini, Hodgesiini and Orthopodomyiini (Reinert, 2010f) and tribe Culicini (Reinert, 2010g). The following list provides a revised summary of the percentage of species in each genus and higher-level taxon within the family Culicidae with published illustrations and/or descriptions of eggs. Species represented by more than one subspecies are counted as a single species in the list.

# Percentage of species of family Culicidae with published descriptions and/or illustrations of eggs in each subfamily, tribe and genus

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Family Culicidae Meigen, 1818: 630 of 3,528 species = 17.9\%
Subfamily Anophelinae Grassi, 1900: 287 of 475 species = 60.4%
       Genus Anopheles Meigen, 1818: 283 of 462 species = 61.3%
       Genus Bironella Theobald, 1905: 1 of 8 species = 12.5%
       Genus Chagasia Cruz, 1906: 3 of 5 species = 60.6%
Subfamily Culicinae Meigen, 1818: 343 of 3,053 species = 11.2%
       Tribe Aedeomyiini Theobald, 1901: 1 of 6 species = 16.7%
              Genus Aedeomyia Theobald, 1901: 1 of 6 species = 16.7%
       Tribe Aedini Neveu-Lemaire, 1902: 199 of 1,254 species = 15.9%
              Genus Aedes Meigen, 1818: 1 of 12 species = 8.3%
              Genus Aedimorphus Theobald, 1903: 7 of 67 species = 10.4%
              Genus Alanstonea Mattingly, 1960: 1 of 2 species = 50.0%
              Genus Armigeres Theobald, 1901: 12 of 59 species = 20.3%
              Genus Bifidistylus Reinert, Harbach & Kitching, 2009: 1 of 2 species = 50.0%
              Genus Cancraedes Edwards, 1929: 2 of 10 species = 20.0%
              Genus Collessius Reinert, Harbach & Kitching, 2006: 1 of 9 species = 11.1%
              Genus Dahliana Reinert, Harbach & Kitching, 2006: 1 of 3 species = 33.3%
              Genus Diceromyia Theobald, 1911: 2 of 14 species = 14.3%
             Genus Dobrotworskyius Reinert, Harbach & Kitching, 2006: 3 of 7 species =
                     42.9%
              Genus Downsiomvia Vargas, 1950: 1 of 30 species = 3.3%
              Genus Edwardsaedes Belkin, 1962: 2 of 3 species = 66.7%
              Genus Eretmapodites Theobald, 1901: 2 of 48 species = 4.2%
              Genus Finlava Theobald, 1903: 2 of 36 species = 5.6%
              Genus Fredwardsius Reinert, 2000: 1 of 1 species = 100%
              Genus Georgecraigius Reinert, Harbach & Kitching, 2006: 3 of 3 species = 100%
              Genus Gymnometopa Coquillett, 1906: 1 of 1 species = 100%
              Genus Haemagogus Williston, 1896: 7 of 28 species = 25.0%
              Genus Halaedes Belkin, 1962: 1 of 3 species = 33.3%
              Genus Heizmannia Ludlow, 1905: 2 of 40 species = 5.0%
              Genus Hopkinsius Reinert, Harbach & Kitching, 2008: 2 of 7 species = 28.6%
              Genus Howardina Theobald, 1903: 4 of 34 species = 11.8%
              Genus Hulecoeteomyia Theobald, 1904: 2 of 13 species = 15.4%
              Genus Jarnellius Reinert, Harbach & Kitching, 2006: 2 of 5 species = 40.0%
              Genus Levua Stone & Bohart, 1944: 1 of 3 species = 33.3%
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Genus Lorrainea Belkin, 1962: 1 of 5 species = 20.0% Genus *Macleaya* Theobald, 1903: 1 of 11 species = 9.1% Genus Mucidus Theobald, 1901: 5 of 14 species = 35.7% Genus Neomelaniconion Newstead, 1907: 4 of 28 species = 14.3% Genus Ochlerotatus Lynch Arribálzaga, 1891: 71 of 264 species = 26.9% Genus Opifex Hutton, 1902: 1 of 2 species = 50.0% Genus *Phagomyia* Theobald, 1905: 1 of 16 species = 6.3%Genus *Psorophora* Robineau-Desvoidy, 1827: 16 of 48 species = 33.3% Genus Rampamyia Reinert, Harbach & Kitching, 2006: 1 of 3 species = 33.3% Genus Rhinoskusea Edwards, 1929: 1 of 4 species = 25.0% Genus Skusea Theobald, 1903: 1 of 4 species = 25.0% Genus Stegomyia Theobald, 1901: 23 of 127 species = 18.1% Genus *Tanakaius* Reinert, Harbach & Kitching, 2004: 1 of 2 species = 50.0% Genus Verrallina Theobald, 1903: 7 of 95 species = 7.4% Genus Zavortinkius Reinert, 1999: 1 of 11 species = 9.1% Tribe Culicini Meigen, 1818: 45 of 795 species = 5.7%Genus *Culex* Linnaeus, 1758: 40 of 768 species = 5.2%Genus Deinocerites Theobald, 1901: 3 of 18 species = 16.7% Genus Lutzia Theobald, 1903: 2 of 8 species = 25.0% Tribe Culisetini Belkin, 1962: 15 of 37 species = 40.5% Genus *Culiseta* Felt, 1904: 15 of 37 species = 40.5%Tribe Ficalbiini Belkin, 1962: 4 of 53 species = 7.5%Genus *Ficalbia* Theobald, 1903: 1 of 8 species = 12.5% Genus Mimomyia Theobald, 1903: 3 of 45 species = 6.7% Tribe Hodgesiini Belkin, 1962: 0 of 11 species = 0%Tribe Mansoniini Belkin, 1962: 33 of 82 species = 40.2% Genus Coquillettidia Dyar, 1905: 19 of 57 species = 33.3% Genus Mansonia Blanchard, 1901: 14 of 25 species = 56.0% Tribe Orthopodomyiini Belkin & Heinemann, 1970: 6 of 37 species = 16.2%Genus Orthopodomvia Theobald, 1904: 6 of 37 species = 16.2% Tribe Sabethini Blanchard, 1905: 23 of 423 species = 5.4% Genus *Isostomvia* Coquillett, 1906: 1 of 4 species = 25.0% Genus *Limatus* Theobald, 1901: 2 of 8 species = 25.0% Genus *Maorigoeldia* Edwards, 1930: 1 of 1 species = 100% Genus Sabethes Robineau-Desvoidy, 1827: 2 of 39 species = 5.1% Genus *Topomvia* Leicester, 1908: 1 of 59 species = 1.7% Genus Trichoprosopon Theobald, 1901: 2 of 13 species = 15.4% Genus *Tripteroides* Giles, 1904: 8 of 123 species = 6.5% Genus Wyeomyia Theobald, 1901: 6 of 139 species = 4.3% Tribe Toxorhynchitini Lahille, 1904: 8 of 90 species = 8.9%Genus *Toxorhynchites* Theobald, 1901: 8 of 90 species = 8.9% Tribe Uranotaeniini Lahille, 1904: 9 of 265 species = 3.4% Genus Uranotaenia Lynch Arribálzaga, 1891: 9 of 265 species = 3.4%

#### Discussion

Since the list of species of tribe Aedini with egg descriptions was published (Reinert, 2005) the following additional species are added: *Armigeres (Leicesteria) annulitarsis* (Leicester) (Bailey *et al.*, 1975), *Haemagogus tropicalis* Cerqueira & Antunes (Alencar *et al.*, 2008) and *Ochlerotatus albifasciatus* (Macquart) (dos Santos-Mallet *et al.*, 2009). Three other articles provide useful information on: *Hulecoeteomyia japonica japonica* (Theobald) (Haddow *et al.*, 2009); *Ochlerotatus scapularis* (Rondani) (dos Santos-Mallet *et al.*, 2010); and *Ochlerotatus triseriatus* (Say), *Stegomyia albopicta* (Skuse) and *Stegomyia aegypti* (Linnaeus) (Obenauer *et al.*, 2009). Reinert *et al.* (2004, 2006, 2008 and 2009) included some characters of aedine eggs for several additional species not included in Reinert (2005).

The eggs of subfamily Anophelinae (60.4%) are better known than those in subfamily Culicinae (11.2%). The largest tribe of mosquitoes in subfamily Culicinae, tribe Aedini, has only 15.9% of the species with published illustrations and/or descriptions. The small tribe Hodgesiini does not have any identified species with published eggs. Overall, much additional work needs to be accomplished in publication of detailed illustrations and descriptions of mosquito eggs, especially utilizing scanning electron microscopy.

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