

**Generic changes affecting European aedine mosquitoes
(Diptera: Culicidae: Aedini) with a checklist of species**

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Abstract

A list of European species of tribe Aedini with their current generic combinations is provided. Its purpose is to enable entomologists, public health personnel and mosquito control workers to more quickly become familiar with recent formal taxonomic changes within the tribe.

Introduction

Recent studies have resulted in a number of generic and subgeneric changes to the classification of tribe Aedini in Europe and other regions of the world. Changes affecting the classification of Aedini outside of Europe included the restoration of *Verrallina* Theobald (essentially Australian and Oriental) and *Ayurakitia* Thurman (Oriental) to generic status (Reinert 1999, 2000a, respectively). The resurrection of *Ochlerotatus* Lynch Arribálzaga to generic status from the composite genus *Aedes* Meigen (Reinert, 2000b) has had an impact on aedine fauna worldwide. Recently, Reinert *et al.* (2004) revised the generic classification of Aedini based on cladistic analyses of all previously recognized genera, subgenera and major species groups of the tribe. This extensive study included 172 morphological characters of all life stages and resulted in the recognition of 46 genera for most of the species previously included in 12 genera and 56 subgenera.

Snow & Ramsdale (1999) provided a distribution chart for European mosquitoes, Ramsdale & Snow (1999) and Snow & Ramsdale (2003) provided recent checklists, and Becker *et al.* (2003) summarized the taxonomy of the mosquitoes occurring in Europe. However, the recent generic-level combinations introduced by Reinert *et al.* (2004) necessitate a revised list. Herein we summarize the taxonomic changes that apply to the aedine mosquitoes of Europe, which comprises the geographical area and countries recognized by Snow & Ramsdale (2003). As required by the *International Code of Zoological Nomenclature* (International Commission on Zoological Nomenclature, 1999), the endings of adjectival species names were changed to agree in gender with newly recognized genera, but for European species this applies only to two species, i.e. *Stegomyia albopicta* (Skuse) and *St. cretina* (Edwards), both previously included in genus *Aedes*.

Four genera and 55 species (one with subspecies and three each with a variety) of Aedini occur in Europe, but only 15 species are now classified in one or other of the genera. European species previously included in subgenera *Finlaya* Theobald and *Ochlerotatus* (except subgenus *Rusticoides* Shevehenko & Prudkina) of *Ochlerotatus* and subgenus *Aedimorphus* Theobald of *Aedes* cannot be placed in newly recognized genera and are regarded as *incertae sedis* (a Latin term meaning “of uncertain taxonomic position”) within Aedini. These species are indicated in the list below as belonging to genus (subgenus) of authors, e.g. *Aedes (Aedimorphus) sensu auctorum*. The *incertae sedis* generic-level designations are not to be interpreted as having formal status. They are merely temporary repositories for the species listed below them. However, we recommend continued use of the accustomed combinations until the generic placement of these species is resolved. By doing so, minimal disruption will occur in the continuity of species names with their associated generic-level (genus and subgenus) names. As an example, *Aedes (Aedimorphus) vexans* Meigen is a valid species of uncertain generic and subgeneric placement that was previously placed in subgenus *Aedimorphus* of *Aedes*. Once the phylogenetic relationships of *incertae sedis* species have been analyzed, either they will be retained in their current genera, assigned to new genera, or placed in genera resurrected from synonymy with the genera in which they were previously assigned. However, we emphasize that until such studies have been accomplished, *incertae sedis* species should continue to be cited with their accustomed generic and subgeneric affiliations. Studies are currently underway to revolve the taxonomy of the *incertae sedis* taxa.

The new classification of European species is indicated in the checklist below. An asterisk following a species indicates the species was relatively recently introduced. Species in genus *Aedes* are restricted to those formerly in subgenus *Aedes*. *Stegomyia* Theobald and *Fredwardsius* Reinert, formerly subgenera of *Aedes*, are now recognized as genera that include three species and one species, respectively. Genus *Ochlerotatus* is restricted at present to subgenus *Rusticoidus* and two species unassigned to subgenus. The other species that were previously included in subgenera *Ochlerotatus* and *Finlaya* have *incertae sedis* status. Abbreviations used for genera and subgenera follow Reinert (2001) and Reinert *et al.* (2004).

Several taxonomic changes made prior to Reinert *et al.* (2004) are noteworthy. Dahl & White (1978) synonymized *Oc. rostochiensis* (Martini) with *Oc. cataphylla* (Dyar). Lambert *et al.* (1990), using morphological and genetic analyses, demonstrated the validity of *Oc. caspius* (Pallas) and *Oc. dorsalis* (Meigen). Ramsdale & Snow (1999) discussed the status of *Oc. gilcolladoi* (Sanchez-Covica Villa, Rodriguez Rodriguez & Guillen Llera). Snow & Ramsdale (2003) provided the rationale for including *Oc. eatoni* Edwards in the European fauna. Becker *et al.* (2003) discussed the status of *Oc. duplex* (Martini). Gornostaeva (2004) clarified the status of European species of *Aedes* (as subgenus *Aedes*) and raised *Ae. rossicus* Dolbeskin, Gorickaja & Mitrofanova to species status.

Checklist of European genera and species of Aedini

Species with taxonomically valid generic and subgeneric placement

Tribe Aedini Belkin, 1962

Genus *Aedes* Meigen, 1818

Ae. cinereus Meigen, 1818

Ae. geminus Peus, 1970

Ae. rossicus Dolbeskin, Gorickaja & Mitrofanova, 1930

Genus *Fredwardsius* Reinert, 2000

Fr. vittatus (Bigot, 1861)

Genus *Ochlerotatus* Lynch Arribálzaga, 1891

Subgenus *Rusticoidus* Shevchenko & Prudkina, 1973

Oc. (Rus.) krymmontanus (Alekseev, 1989)

Oc. (Rus.) lepidonotus (Edwards, 1920)

Oc. (Rus.) quasirusticus (Torres Cañamares, 1951)

Oc. (Rus.) refiki (Medschid, 1928)

Oc. (Rus.) rusticus (Rossi, 1790)

var. *subtrichurus* (Martini, 1927)

Oc. (Rus.) subdiversus (Martini, 1926)

Unassigned to subgenus

Oc. communis (de Geer, 1776)

Oc. dorsalis (Meigen, 1830)

Genus *Stegomyia* Theobald, 1901

St. aegypti (Linnaeus, 1762)

St. albopicta (Skuse, 1895)*

St. cretina (Edwards, 1921)

***Incertae sedis* species with provisional generic and subgeneric placement**

Genus *Aedes*, *sensu auctorum*

Subgenus *Aedimorphus* Theobald, 1903 *sensu auctorum*

Ae. (Adm.) vexans (Meigen, 1830)

Genus *Ochlerotatus*, *sensu auctorum*

Subgenus *Finlaya* Theobald, 1903 *sensu auctorum*

Oc. (Fin.) eatoni Edwards, 1916

Oc. (Fin.) echinus Edwards, 1920

Oc. (Fin.) geniculatus (Olivier, 1791)

Oc. (Fin.) gilcolladoi (Sanchez-Covica Villa, Rodriguez Rodriguez & Guillen Llera, 1985)

Oc. (Fin.) japonicus japonicus (Theobald, 1901)*

Subgenus *Ochlerotatus*, *sensu auctorum*

Oc. (Och.) annulipes (Meigen, 1830)

Oc. (Och.) atropalpus (Coquillett, 1902)*

Oc. (Och.) behningi (Martini, 1926)

Oc. (Och.) berlandi (Seguy, 1921)

Oc. (Och.) cantans (Meigen, 1818)

var. *subvexans* (Martini, 1922)

Oc. (Och.) caspius (Pallas, 1771)

ssp. *meirai* Ribeiro, Ramos, Capela & Pires, 1980

var. *hargreavesi* (Edwards, 1920)

Oc. (Och.) cataphylla (Dyar, 1916)

Oc. (Och.) coluzzii (Rioux, Guilvard & Pasteur, 1998)

Oc. (Och.) cyprius (Ludlow, 1920)

Oc. (Och.) detritus (Haliday, 1833)

Oc. (Och.) diantaeus (Howard, Dyar & Knab, 1913)

Oc. (Och.) duplex (Martini, 1926)

Oc. (Och.) euedes (Howard, Dyar & Knab, 1913)

Oc. (Och.) excrucians (Walker, 1856)

Oc. (Och.) flavescens (Mueller, 1764)

Oc. (Och.) hexodontus (Dyar, 1916)

Oc. (Och.) hungaricus (Mihalyi, 1955)

Oc. (Och.) impiger (Walker, 1848)

Oc. (Och.) intrudens (Dyar, 1919)

Oc. (Och.) leucomelas (Meigen, 1804)

Oc. (Och.) mariae (Sergent & Sergent, 1903)

Oc. (Och.) nigrinus (Eckstein, 1918)

Oc. (Och.) nigripes (Zetterstedt, 1838)

Oc. (Och.) phoeniciae (Coluzzi & Sabatini, 1968)

Oc. (Och.) pionops (Dyar, 1919)

Oc. (Och.) pulcritarsis (Rondani, 1872)

Oc. (Och.) pullatus (Coquillett, 1904)

Oc. (Och.) punctodes (Dyar, 1922)

Oc. (Och.) punctor (Kirby, 1837)

Oc. (Och.) riparius (Dyar & Knab, 1907)

Oc. (Och.) sticticus (Meigen, 1838)

Oc. (Och.) surcoufi (Theobald, 1912)

Oc. (Och.) thibaulti (Dyar & Knab, 1910)

Oc. (Och.) zammitii (Theobald, 1903)

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