

Case 3407***Drosophila* Fallén, 1832 (Insecta, Diptera): proposed conservation of usage**

Kim van der Linde

Department of Biological Science, Florida State University, Tallahassee, Florida 32306–1100, U.S.A.

(e-mail: kim@kimvdlinde.com)

Gerhard Bächli

Zoological Museum, Winterthurerstraße 190, 8057 Zürich, Switzerland

(e-mail: baechli@zm.uzh.ch)

Masanori J. Toda

Institute of Low Temperature Science, Hokkaido University, N19 W8, Kita-ku, Sapporo 060–0819, Japan

Wen-Xia Zhang

College of Life Sciences, Peking University, Beijing, 100871, China

Toru Katoh

COE for Neo-Science of Natural History, Hokkaido University, N10 W8, Kita-ku, Sapporo 060–0810, Japan

Yao-Guang Hu

Institute of Low Temperature Science, Hokkaido University, N19 W8, Kita-ku, Sapporo 060–0819, Japan

Greg S. Spicer

Department of Biology, San Francisco State University, 1600 Holloway Avenue, San Francisco, California 94132–1722, U.S.A.

Abstract. The purpose of this application, under Article 70.2 of the Code, is to conserve the current usage of the widely used name *Drosophila* Fallén, 1832 (a genus of flies widely used in biological research, particularly in genetics and developmental biology) by the designation of *Drosophila melanogaster* Meigen, 1830 as the type species of *Drosophila*. Detailed phylogenetic studies show that the genus *Drosophila* as currently defined is paraphyletic. Splitting the genus requires that the subgenus *Sophophora* Sturtevant, 1939 must be ranked as a separate genus. The type species of *Sophophora* is by original designation *Drosophila melanogaster* Meigen, 1830. Ranking *Sophophora* as a genus and changing the name of *Drosophila melanogaster* to *Sophophora melanogaster* would result in major nomenclatural instability due to the breadth and vast number of publications, using this combination. In addition, many refer to '*Drosophila*' when '*Drosophila melanogaster*' is actually meant; the two

names are used interchangeably. It is therefore proposed that *Drosophila melanogaster* Meigen, 1830 is designated as the type species of *Drosophila*.

Keywords. Nomenclature; taxonomy; DROSOPHILIDAE; *Drosophila*; *Sophophora*; *Drosophila melanogaster*; *Drosophila funebris*; fruit flies.

1. The genus *Drosophila* was established by Fallén (1823, p. 4) with the following included species: *Musca funebris* Fabricius, 1787 (p. 345) (the type species, by subsequent designation by Macquart, 1835 (p. 548)), *Drosophila cinerella* Fallén, 1823 (p. 7), *Drosophila curvipennis* Fallén, 1823 (p. 4), *Drosophila fenestrarum* Fallén, 1823 (p. 6), *Drosophila flava* Fallén, 1823 (p. 7), *Drosophila fuscula* Fallén, 1823 (p. 7), *Drosophila glabra* Fallén, 1823 (p. 8), *Drosophila graminum* Fallén, 1823 (p. 8), *Drosophila obscura* Fallén, 1823 (p. 6), *Drosophila transversa* Fallén, 1823 (p. 6), *Drosophila tristis* Fallén, 1823 (p. 7) and *Drosophila variegata* Fallén, 1823 (p. 5).

2. The genus *Drosophila*, currently containing about 1500 species (all taxa counts based on Bächli, 1999–2007), has been split into 8 (sometimes 9) accepted subgenera, predominantly based on morphological characters. In the last 20 years, a large series of phylogenetic studies has been undertaken, mainly based on molecular biological data. Published studies are largely in agreement that the genus *Drosophila* as presently defined is paraphyletic. At least some species of the following genera are positioned within *Drosophila* sensu lato: *Dichaetophora* Duda, 1940 (p. 19), *Hirtodrosophila* Duda, 1923 (p. 41), *Liodrosophila* Duda, 1922 (p. 153), *Mycodrosophila* Oldenberg, 1914 (p. 4), *Samoaia* Malloch, 1934 (p. 270), *Scaptomyza* Hardy, 1849 (p. 361) and *Zaprionus* Coquillett, 1901 (p. 31) (20 references are held by the Secretariat).

3. The genus *Drosophila* consists of four distinct major clades: the subgenus *Sophophora* Sturtevant, 1939 (p. 139) (type species by original designation *Drosophila melanogaster* Meigen, 1830 (p. 85)) (332 species), the *immigrans-tripunctata* radiation of the subgenus *Drosophila* (304 species), the *virilis-repleta* radiation of the subgenus *Drosophila* (247 species) and the Hawaiian *Drosophila* of the subgenus *Drosophila* (379 species). Splitting the genus requires that each of the four major clades is designated the rank of genus. In case of a ruling by the Commission to make *Drosophila melanogaster* Meigen the type species of *Drosophila*, the four clades would be named *Drosophila* Fallén, 1823 (p. 4), *Chaetodrosophilella* Duda, 1923 (p. 40), *Siphlodora* Patterson & Mainland, 1944 (p. 25) and *Idiomya* Grimshaw, 1901 (p. 50), respectively, and the name *Sophophora* Sturtevant, 1939 would become a junior objective synonym of *Drosophila* Fallén, 1823. The remaining smaller subgenera *Dorsilopa* Sturtevant, 1942, (p. 28), *Psilodorha* Okada, 1968 (p. 334), *Phloridosa* Sturtevant, 1942 (p. 28), *Dudaica* Strand, 1943 (p. 212) and *Chusqueophila* Brncic, 1957 (p. 100) are also tentatively assigned the rank of genus. All 78 species without subgeneric designation will remain in the genus *Drosophila* as incertae sedis.

4. The paraphyletic nature of the genus *Drosophila* is unacceptable as it violates modern systematic practice (Hu & Toda, 2001; Da Lage et al., 2007). Two options are available to resolve the paraphyletic nature of the genus *Drosophila*. One is to downgrade all included genera to species groups as those genera are positioned between the three major clades of the subgenus *Drosophila* (the fourth clade is the

subgenus *Sophophora*). This would result in a single huge and heterogeneous genus *Drosophila* (s.l.) with more than 2250 species (60% of the family DROSOPHILIDAE). It would also result in more than 100 secondary homonyms (Hu & Toda, 2001). This is not an acceptable solution. The alternative solution is to split the genus *Drosophila* along the major clades resulting in four larger genera as well as several smaller genera (van der Linde et al., submitted).

5. Splitting the genus requires that the subgenus *Sophophora* Sturtevant, 1939 (p. 139) must be ranked as a separate genus. The type species of *Sophophora* is by original designation *Drosophila melanogaster* Meigen, 1830 (p. 85). Establishing *Sophophora* as a genus will require the name of *Drosophila melanogaster* to be changed to *Sophophora melanogaster*. However, *Drosophila melanogaster* is one of the world's most important model organisms, is used in almost all biological disciplines, and is mentioned in a huge number of publications, a situation that can be expected to continue. A vast number of publications refer only to '*Drosophila*' when '*Drosophila melanogaster*' is actually meant; the two names tend to be used interchangeably. Changing the name from *Drosophila melanogaster* to *Sophophora melanogaster* would produce much confusion and is likely not to be accepted by many '*Drosophila*' researchers, most of whom are not taxonomists. The best solution, therefore, is to set aside all previous type fixations for the genus *Drosophila*, and to designate *Drosophila melanogaster* Meigen, 1830 as the type species.

6. The following type designations for *Drosophila* have been published:

(a) *Musca cellaris* Linnaeus, 1758 (p. 597) by Curtis, 1833 (p. 473). As *Musca cellaris* Linnaeus is not originally included in *Drosophila*, this designation is invalid, although Curtis's designation was accepted by Westwood, 1840 (p. 152) and Coquillett, 1910 (p. 535). The systematic status of *Musca cellaris* Linnaeus, 1758 has never been clarified;

(b) *Musca cellaris* Linnaeus, 1758 (p. 597) by Macquart, 1835 (p. 548), without reference to Curtis (1833). Macquart (1835, p. 549) considered *Musca cellaris* Linnaeus, 1758 and *Musca funebris* Fabricius, 1787 to be synonymous. By this action Macquart (1835) validly designated *Musca funebris* Fabricius, 1787 as the type species of *Drosophila* (Article 69.2.2 of the Code – Designated type species at the same time placed in synonymy with the originally included species);

(c) *Musca funebris* Fabricius, 1787 (p. 345) by Zetterstedt, 1847 (p. 2542). This designation, although invalid, was accepted by most subsequent authors.

7. The International Commission on Zoological Nomenclature is accordingly asked to use its plenary power:

- (1) to set aside all previous type fixations for *Drosophila* Fallén, 1823 and designate *Drosophila melanogaster* Meigen, 1830, as the type species of *Drosophila* Fallén, 1823;
- (2) to place on the Official List of Generic Names in Zoology the name *Drosophila* Fallén, 1823 (gender: feminine), type species *Drosophila melanogaster* Meigen, 1830, as ruled in (1) above;
- (3) to place on the Official List of Specific Names in Zoology the name *melanogaster* Meigen, 1830, as published in the binomen *Drosophila melanogaster* (specific name of the type species of *Drosophila* Fallén, 1823, as ruled in (1) above).

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