

Comments on the Proposal (Case 3407) to make *Drosophila melanogaster* the Type Species of *Drosophila* (Diptera: Drosophilidae)

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The conventional Linnaean hierarchy will not be able to survive alone: it will have to coexist with the ideas and terminology of phylogenetic (cladistic) systematics. From a cladistic perspective, our traditional nomenclature is often perceived as too prescriptive and too permissive at the same time. Too prescriptive, in so far as it forces all taxa (and their names) to fit into the arbitrary ranks of the hierarchy; too permissive, in so far as it may be equally applied to paraphyletic as to monophyletic groups. New proposals are therefore to be expected. But even in the perspective of new developments, we believe that it will never be possible or desirable to dispose of 250 years of Linnaean zoological (and botanical) taxonomy and nomenclature. One should always keep in mind that an important function of classifications is information retrieval. The Linnaean tradition will be supplemented, but not replaced, by new semantic and lexical tools. (From the Preface to the Fourth Edition 1999 ICZN)

Case 3407 (van der Linde et al., 2007) is a proposal to preserve the binomen *Drosophila melanogaster*. The combination is threatened by revision of the genus *Drosophila*. We agree that the binomen should be preserved and we agree that the genus is large and paraphyletic but we disagree with some of the qualifying arguments. We would prefer that the taxonomy of Drosophilidae be guided, not driven, by molecular biological data.

We have the view that the Commission should accept this application to preserve the binomen *Drosophila melanogaster* but we strongly believe that the splitting up of the genus, once redefined, should only occur after comprehensive taxonomic investigation “supplemented, but not replaced, by new semantic and lexical tools” (ICZN 1999), in other words not driven by the latest molecular phylogenetic data. We acknowledge that there are a range of views about how to deal with the various groups of species in *Drosophila* but we feel that there is still much work to be done before the numerous species can be correctly reassigned. We feel that this can proceed more freely, with less constraint, if *melanogaster* is the type of *Drosophila*. We see no reason why *Drosophila* should automatically be subdivided into different genera if the nominal species becomes *melanogaster*.

The genus *Drosophila* is the largest in the family Drosophilidae (Insecta: Diptera). It is divided into a number of subgenera and it also holds many species incertae sedis. *Musca funebris* is the type species of the genus *Drosophila*, and *Drosophila melanogaster* is the

type species of the subgenus *Sophophora*. There is widespread agreement that the species currently accommodated in *Sophophora* represent a natural group, a group that could well be removed from *Drosophila* and treated as a genus. Controversy surrounds this action and its consequences because the binomen *Drosophila melanogaster* is by far the most frequently used in all of biological science, and few people want to change it. An alternative is to make *Sophophora* an objective junior synonym of *Drosophila* (by replacing *funnebris* with *melanogaster* as type species), this action will preserve the binomen *Drosophila melanogaster*. The underlying concept of *Drosophila*, and the family Drosophilidae, would shift as a result of changing the nominal species of the nominal genus—put simply, the concept of the typical *Drosophila* (and therefore typical drosophilid) would change from *Drosophila funnebris* to *Drosophila melanogaster*.

An application (Case 3407) is currently before the Commission to use its plenary powers 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; etc.

Six qualifications underpin the application, our comments on each are as follows:

(1) *How Fallén established Drosophila in 1823, and the species included.* We agree with this summary.

(2) *Phylogenetic and molecular studies show that Drosophila is paraphyletic and that an assortment of drosophilids lie within it* (van der Linde et al., 2007). We agree that *Drosophila* is paraphyletic and we are confident that with further taxonomic work the genus will decrease in size and become a more natural group. This will require detailed and, unfortunately, prolonged taxonomic work. See for example the taxonomic work that led to the widely accepted proposals to remove the *Drosophila* subgenera *Scaptodrosophila* Duda, 1923, *Hirtodrosophila* Duda, 1923, *Lordiphosa* Basden, 1961 and *Dichaetophora* Duda, 1940 (Grimaldi, 1990; Hu & Toda, 2002).

(3) *The genus consists of four major clades* (van der Linde et al., 2007). Taxonomically we see a single genus with a wide range of species, we see some clustering of species and we predict that those clusters will eventually be assigned to genera. There are 78 species incertae sedis and there are many species represented only by poorly preserved specimens. The task is not as simple as dividing the genus in four and elevating the remaining subgenera to the rank of genus.

(4) *The paraphyletic nature of the genus Drosophila is unacceptable as it violates modern systematic practice* (van der Linde et al., 2007). The statement may be true for systematics but paraphyly is permitted within our traditional nomenclature. That is not to say that it is desirable. Paraphyly is not a violation of taxonomic practice, it is regarded as suboptimal but it is tolerated until evidence allows better classification.

(5) *The binomen Sophophora melanogaster would cause instability and confusion* (van der Linde et al., 2007). We agree, but our discussion on this point led us to appreciate that many of our colleagues do not foresee a problem, this surprised us. If the binomen *S. melanogaster* was introduced, we think that in evolutionary biology and molecular phylogenetics—perhaps yes, there would be instability. In zoological taxonomy—no. In the

normal course of taxonomic work, name-changes (new combinations) are commonplace, it is seen for what it is: a response to new and more compelling data.

If the binomen *Sophophora melanogaster* became available it would continue to convey a precise meaning, and in this sense there would be no confusion. With respect to nomenclatural instability, there may be considerable reluctance to adopt the unfamiliar binomen *Sophophora melanogaster* and many would, no doubt, continue using *Drosophila melanogaster*, *Drosophila* or just *melanogaster*. And this would be confusing. Information retrieval would be hampered.

Van der Linde et al. (2007) argue that many use *Drosophila* as a shorthand or vernacular name for *Drosophila melanogaster* and instability and confusion would result if *melanogaster* was combined with *Sophophora*. The use of a generic name for a species is already an undesirable situation that is not likely to improve or change whatever decision the Commission makes. *Drosophila*, not in italics, is also used as a common name for *Drosophila melanogaster* and other species, but when written in this way—in normal font—it has the same diminished significance as “fruit fly” “vinegar fly” “ferment fly” or “pumice fly”. Application of these names is unrestricted, haphazard and entirely outside the Code. In the French language, researchers are accustomed to using “les Drosophiles” as a vernacular and this is (and could still be) used for flies in any drosophilid genus.

The question asked above could be reframed: *Would changing the type of Drosophila cause instability and confusion?* To which we would answer: no. It is a layer of complexity for taxonomists but not for the rest of the scientific community who work with these flies. To use simplified language: the drosophilid taxonomist currently thinks “*funnebris*” when he or she thinks “*Drosophila s.str.*” because “*funnebris*” is the type species, and has been since the genus was erected. Over the last 115 years new species have been placed in *Drosophila* either because they conform with its underlying generic concept (which is linked to *funnebris*) or because no other genus in the family Drosophilidae was available and the cautious or conservative taxonomist chose not to describe a new one. Lamb (1914), for example, when working on a collection from the Seychelles described 20 new drosophilid species placing 18 of them in the genus *Drosophila*, those 18 are now in seven different genera. Unfortunately and inevitably many large families quite often have such genera, the “trash can genus”, “garbage genus” or “poubelle genre” because of the untidy assemblage of species they accommodate. *Drosophila* currently accommodates the flotsam and jetsam of the family Drosophilidae and it will take a very long time for each species to be examined and correctly re-assigned. It is not simply a matter of examining a type specimen and assigning it to a genus.

The removal from *Drosophila* of the large subgenera *Scaptodrosophila*, *Hirtodrosophila* and *Lordiphosa* and the treatment of them as genera (Grimaldi, 1990) was widely accepted. However, his treatment of the Hawaiian drosophilids (many of which were originally placed in the genus *Drosophila*) has met with disagreement and alternative classifications have subsequently been proposed (O’Grady, 2002). We see the process of offering alternate hypotheses and classification schemes as entirely appropriate and we have a strong sense that gradually we are moving towards a more natural classification scheme overall.

In summary, we agree that it is useful to replace *Drosophila funebris* as the type of *Drosophila* in order to preserve the binomen *Drosophila melanogaster*. But we do not think it is appropriate, at this stage, to automatically and without additional comprehensive taxonomic work, remove all major groups of the newly defined genus.

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