

## Flesh flies, rogues and molecules – the diversification of *Sarcophaga* (sensu lato) (Diptera: Sarcophagidae)

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The mega-diverse genus *Sarcophaga* Meigen, which includes more than 900 named species arranged into 133 subgenera, makes up for almost half of the diversity of the subfamily Sarcophaginae. Current knowledge of evolutionary relationships is based on morphological and molecular analyses with poorly supported hypotheses or small taxon sets, or both. The results presented in this study provide the most comprehensively sampled phylogenetic analysis of *Sarcophaga* subgenera, and it is the first to include representatives from all regional faunas. The monophyly and phylogenetic relationships of selected subgenera were examined, and the placement of a recently discovered new species from Turkey was given special attention. Sequence data from two gene regions were used: the mitochondrial protein-coding gene cytochrome c oxidase subunit I (COI) and the nuclear 28S ribosomal RNA gene. The secondary structure of three expansion segments (D1, D2, D3) of 28S is presented for the family Sarcophagidae and used for the first time in a multiple sequence alignment. Molecular data were analyzed using maximum likelihood and Bayesian inference. A study of rogue species resulted in a long list of potentially removable taxa, from which less than 50% caused a remarkable increase in posterior probabilities and bootstrap supports. The backbone of the phylogeny was not consistently supported, but more distal nodes were better supported. All New World subgenera emerged as monophyletic. The monophyly of few of the subgenera from the Afrotropical, Oriental/Australasian and Palaeartic regions was consistently supported. Although with low support, Afrotropical taxa were found to be the earliest diverging lineages, which is in conflict with currently available evidence favouring a New World origin and early diversification of *Sarcophaga*. A better sampling of Nearctic taxa and more (nuclear) gene sequences should be considered for future studies.