



Corrigendum: Diversity of Mesopelagic Fishes in the Southern Ocean – A Phylogeographic Perspective Using DNA Barcoding

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A Corrigendum on

Diversity of Mesopelagic Fishes in the Southern Ocean – A Phylogeographic Perspective Using DNA Barcoding

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In the original article, there was an error. The sequences of *Symbolophorus boops* included from the Barcode of Life Datasystems (BOLD) in our analyses were likely misidentified, which was kindly brought to our attention by P. A. Hulley.

A correction has been made to the last sentence of the Abstract:

However, we highlight potential (pseudo-)cryptic or unrecognized species in *Gymnoscopelus bolini*, *Lampanyctus achirus*, and the non-myctophid genus *Bathylagus*.

A correction has been made to the Discussion, Sub-section Phylogeny and Phylogeography of Southern Ocean Mesopelagic Fishes, Paragraph 6:

The available sequences identified as *Symbolophorus boops* (BOLD references DSFSE476-08 to DSFSE480-08 and DSFSG260-10) cluster apart from the two other *Symbolophorus* clades resolved in our COI tree (one composed of *S. californiensis*, *S. reversus*, *S. evermanni*, *Symbolophorus* sp., and *S. rufinus* and the other composed of *S. barnardi* and *S. veranyi*; Figure 2). Instead these sequences settle within the Diaphinae (*sensu* Martin et al., 2017). Unfortunately we discovered a posteriori that the COI sequences included here as *S. boops* were likely misidentified on BOLD. These sequences are probably from a *Diaphus* species (P. A. Hulley, pers. comm.) currently also not present on BOLD, but the specimens are in poor condition, preventing definite identification.

The correction has been transmitted to the BOLD database. Other studies that included genetic data proposed that *Symbolophorus* is closer related to *Myctophum*, *Hygophum*, and other genera, as opposed to Diaphinae, but they all lacked specimens of *S. boops* (Poulsen et al., 2013; Denton, 2014; Martin et al., 2017). Therefore, we highly recommend the collection of further samples/sequences in order to resolve the phylogenetic position of *S. boops*, and to re-identify the specimens erroneously labeled as *Symbolophorus boops*. In fact, the entire genus would benefit from a detailed systematic revision as already noted by Wisner (1976).

A correction has been made to the seventh sentence of the Conclusions:

With this study we substantially extend the DNA barcode library of Antarctic mesopelagic fish, particularly lanternfishes. The combination of morphological and molecular identification led to confident species level identification in 281 out of 299 cases. Several misidentifications or otherwise uncertain samples were identified in the database. Overall, DNA barcode libraries provide a robust reference dataset for specimen identification, especially to the rescue of fragile morphological characters. As expected, the mitochondrial *COI* and nuclear *rh1* genetic markers were not sufficient to resolve deep phylogenetic relationships. However, our results are largely congruent with recent phylogenetic studies

of the family. Some of our findings suggest the importance of further study or re-identification, e.g., of *Symbolophorus boops*. In addition, we highlight potential (pseudo-)cryptic or unrecognized species and recommend further investigation of *Gymnoscopelus bolini*, two specific *Gymnoscopelus* specimens (nominally identified as *G. piabilis* and *G. nicholsi*), *Lampanyctus achirus* and the non-myctophid genus *Bathylagus*. The fact that myctophid species from at least three subfamilies are Southern Ocean species suggests that colonization and adaptation to this environment has occurred repeatedly. Overall, spatial divergence of species is rare in this family, potentially due to the enormous abundance of many myctophids and the homogenizing force of ocean currents. Finally, this study provides an overview of currently available Antarctic samples and associated levels of intraspecific diversity, which both may facilitate future ecological, phylogenetic, and evolutionary investigations of Southern Ocean myctophids, a fish family that surely warrants increased scientific attention.

Finally, in Table 2, the third row of the third column should read *Protomyctophum luciferum* instead of *Porotomyctophum luciferum*.

The authors apologize for these errors and state that this does not change the remainder of the scientific conclusions of the article in any way. The original article has been updated.

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Conflict of Interest Statement: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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