

How many species of hakes inhabit Argentine and New Zealand waters?

Hakes belonging to the Genus *Merluccius* are one of the most heavily exploited fishes worldwide. In Argentinean waters, merluccids have been one of the most valuable fishery resource, representing about 40% of the total fish catch in recent years, and currently regarded as overexploited. The New Zealand hake fishery has traditionally consisted of bycatch of the much larger hoki *Macruronus novaezealandiae* fishery, but in recent years it has also become an important target fishery.

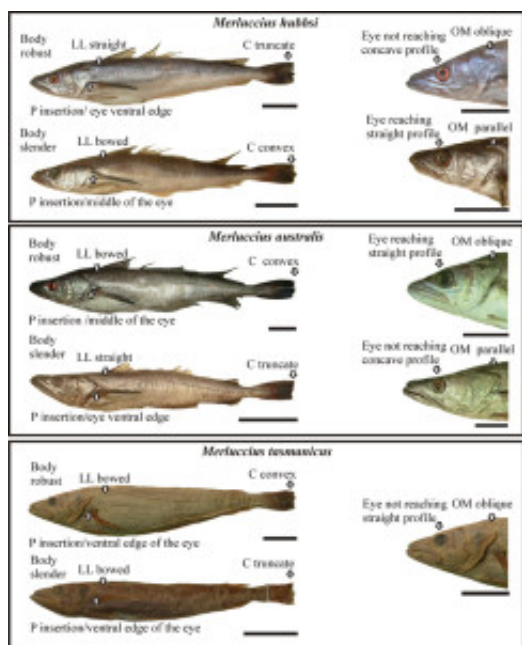


Fig. 1. Morphological variation observed in the studied merluccids. LL, lateral line; C, caudal-fin; P, pectoral-fin; OM, opercular membrane. Scale bar: 50 mm

The correct specific identification is essential for most biological studies, and is necessary to design effective fishery management strategies. Incorrect identifications, the use of outdated names, or the application of misleading names can have considerable economic and environmental consequences. Several detailed taxonomic studies of merluccids have been published. Nevertheless, the high intraspecific variation among and the conservative external morphology of the species have also resulted in identification and differentiation difficulties. These problems are mainly due to many characters traditionally employed to classify merluccids having overlapping values across several species or showing a high variability.

The genus *Merluccius* in Argentine waters has long been recognized as comprising two nominal species: *Merluccius hubbsi* and *Merluccius australis*. However, a new species was cited for Argentinean Patagonian waters *Merluccius tasmanicus* Matallanas & Lloris 2006. The authors redescribed *M. australis* and described *M. tasmanicus* sp.n. from New Zealand waters, differentiating them mainly by non-overlapping morphometric characters (i.e. body depth and eye diameter) and secondarily on morphological features (i.e. shape of the upper profile of the head; eye position; shape of the lateral line, and length of the pectoral fin) (Fig. 1). Based on these diagnostic characters the authors stated that many specimens of *M. tasmanicus* off New Zealand, Argentinean and Chilean waters have been misidentified as *M. australis*.

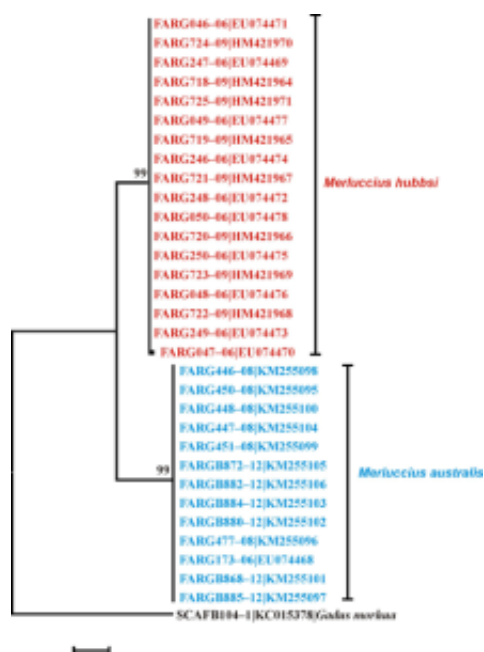


Fig. 2. Neighbour-joining tree based on p-distances of *Merluccius* COI sequences. Numbers at nodes represent bootstrap values. Code numbers represent BOLD process IDs and GenBank accession numbers. Scale bar: 0.02 base substitutions per site.

The purpose of this study was to assess the specific validity of *M. tasmanicus* and its taxonomic relationship with *M. australis* (Argentina and New Zealand) and with *M. hubbsi*. To achieve this, we employed a combined comparison of morphometric, meristic, osteological and genetic characters.

Meristic (accounting structures) and morphometric characters of *M. tasmanicus* completely overlap those of *M. australis*, whereas *M. hubbsi* show fewer scales along the lateral line, total vertebrae, second dorsal and anal-fin rays. A trend of a longer snout and wider head in *M. australis* and *M.*

tasmanicus, and larger eyes and longer pelvic fins, in *M. hubbsi* was observed (Fig. 1). While discriminant characters were found in osteological elements between *M. hubbsi* and *M. australis*, none were observed between *M. australis* and those reported for *M. tasmanicus*. Genetic analyses of cytochrome c oxidase subunit I (col) sequences through DNA barcoding found no evidence of the existence of other species of *Merluccius* besides *M. hubbsi* and *M. australis* (Fig. 2).

In conclusion, this integrative taxonomical study found no evidence to support either the existence of another species of *Merluccius* in New Zealand, or the occurrence of *M. tasmanicus* in Argentinean waters. The reported diagnostic characters of *M. tasmanicus* show overlapping values with those obtain of the examination *M. australis*. Furthermore, DNA barcodes discriminate between two well-support groups, with no evidence of intraspecific variation between the specimens of *M. australis*. Therefore, the evidence irrefutably shows *M. tasmanicus* is a junior synonym of *M. australis*.

Publication

[Merluccius tasmanicus Matallanas & Lloris 2006 is a junior synonym of M. australis \(Hutton 1872\) \(Gadiformes: Merlucciidae\) based on morphological and molecular data.](#)

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