

## Description of a new species of hake: *Merluccius patagonicus* sp. nov. (Gadiformes: Merlucciidae) from the waters of Argentina\*

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**SUMMARY:** A new species of the family Merlucciidae is presented, *Merluccius patagonicus* sp. nov., from the waters of the Argentine Sea. Besides the description of the new species, a brief diagnosis and a key to identification are added, with the purpose of easily separating the species from its similar relatives among the genus *Merluccius* Rafinesque, 1810 reported in the region: *M. hubbsi* and *M. australis*.

**Key words:** Gadiformes, Merlucciidae, *Merluccius patagonicus*, hake, new species, taxonomy, FAO Fishing Area 41, Argentine Sea, South Western Atlantic ocean.

**RESUMEN:** DESCRIPCIÓN DE UNA NUEVA ESPECIE DE MERLUZA: *MERLUCCIUS PATAGONICUS* SP. NOV. (GADIFORMES, MERLUCCIIDAE) EN AGUAS ARGENTINAS. – Se presenta una nueva especie *Merluccius patagonicus* sp. nov. perteneciente a la familia Merlucciidae, capturada en aguas del mar Argentino. En el presente trabajo, se adjunta además de la descripción, una breve diagnosis y una clave de identificación con el propósito de identificar fácilmente las especies similares del género *Merluccius* Rafinesque, 1810 citadas en la región: *M. hubbsi* y *M. australis*.

**Palabras clave:** Gadiformes, Merlucciidae, *Merluccius patagonicus*, merluza, nueva especie, taxonomía, Área de pesca FAO 41, mar Argentino, Atlántico suroccidental.

### INTRODUCTION

The hake, genus *Merluccius*, which inhabits the continental shelf and slope is widely distributed and represents an important resource in marine fisheries. Species of the genus *Merluccius* are very closely related and many taxonomy studies of this genus have been published, but the most recent reviews of all the species of the genus *Merluccius* were made by Inada (1981), and Inada in Cohen *et al.* (1990).

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Inada (1981) reviewed previous studies on the taxonomy of *Merluccius* and examined and compared the external and internal meristic and morphometric characters of all the hake species in the world, concluding that the genus *Merluccius* contains twelve distinct species, with two subspecies each in *M. merluccius* and *M. gayi*, and two populations in *M. australis*. This author presented a diagnostic key using meristic and morphometric characters but admitted that some species could not be separated by these characters because minor overlapping ranges were present.

This observation had been made earlier by Ginsburg (1954), who stated that the greatest divergence in proportional measurements in *Merluccius* seems to be shown by groups of the smallest size; with growth the extent of that divergence appears to decrease and may even disappear in some cases. This stimulated the authors to undertake a revision of this genus to find key characters for differentiating species.

In a recent revision of all the species of Merlucciidae on the world, Lloris *et al.* (in press) approach this problem with other criteria. They use new characters, and recognise thirteen species of *Merluccius*, with two subspecies each in *M. merluccius*, *M. albidus*, *M. polli*, *M. australis* and *M. gayi*. A diagnostic key for these thirteen species is provided, mainly based in species characters that are accurately determined.

*Merluccius* is one of the four genera of the family Merlucciidae and the only one of the subfamily Merlucciinae (Lloris *et al.*, in press). Several specimens of hake studied during this review belong to a species of *Merluccius* that has not yet been described.

The objective of the present paper consists in describing this new species as well as providing a key to differentiate it from other congeneric species occurring in the same biogeographical region.

Measurements and terminology follow Ginsburg (1954), Rojo (1976), Inada (1981), Howes (1991) and Lloris *et al.* (in press).

## DESCRIPTION

### *Merluccius patagonicus* sp. nov.

(Fig. 1)

*Type material*: Five specimens of *Merluccius patagonicus* sp. nov. of the Argentine Sea, 95 m depth near Comodoro Rivadavia (45°30'S, 65°30'W). Holotype: Instituto de Ciencias del Mar (CMIMA-CSIC) of Barcelona, catalogue number IIPB 500/2001, 61 cm TL, 56.2 cm SL. Paratypes: four specimens (IIPB 501-504/2001); the specimen IIPB 504/2001 was used for dissection. Five uncatalogued specimens of *Merluccius hubbsi*, from a lot of 155 specimens, captured between 45 and 49°S, Argentine Sea, some of them used for dissection.

Other material examined (NMNZ P. 3963) (MOVI 27490): *Merluccius australis* (41.5 cm. TL; 38 cm SL, Cook Strait, 41°30'S, 174°30'E. depth: 91 m.). IIPB 92/1987: *Merluccius hubbsi* (Canal Beagle). MNHN 1975-0245: *M. hubbsi* (Uruguay). MNHN 1989-0376: *M. hubbsi* (Brazil). MNHN 1989-0377: *M. hubbsi* (Brazil). Six uncatalogued juvenile specimens of *M. hubbsi* from Argentina (37°41'S, 55°48'W, 75 m depth, given by M. Ehrlich (INIDEP). Two uncatalogued specimens of *Merluccius hubbsi* from Argentina (43°50'S, 65°02'W) given by A.E. Ruiz and R.R. Fontdacaro. USNM 218549: two specimens of *Merluccius australis* (New Zealand). USNM 157765: one specimen of *Merluccius polypleps*

(paratype) (Chile). Two uncatalogued specimens of *Merluccius australis* (Puerto Montt, Chile) given by G. Pequeño and used for dissection. Two uncatalogued specimens of *Merluccius australis* from Chile (46°22'S, 75°27'W) given by R. Bravo.

*Diagnosis*: Body elongated, slender. Superior profile of the head with a depression above the eyes. Upper border of the opercular membrane inclined, descending from its origin, moving away from lateral line. Ocular diameter relatively large. Second dorsal fin with 37 to 38 rays. Anal fin with 37 to 39 rays. Lateral line with 123 to 126 oblique rows of scales. First gill arch with 12 to 17 gill-rakers: 3-4 + 9-13.

*Description*: (In parenthesis data from the holotype). Body elongate, slender with the upper profile of the head with a depression above the anterior border of the orbit. Lateral line with 123 to 126 (123) oblique rows of scales. Head length 26.8-28.8% (28.8), pectoral fin length 15.2-16.8% (15.6) and ventral fin length 10.7-13.0% (11.7) of standard length. Eye diameter 14.1-20.2% (17.9), interorbital width 21.1-26.7% (24.7), snout length 30.6-33.3% (33.3) of head length. Nasal membrane, lacrimal and lower part of the interopercle scaleless; lower part of cheek and preopercle with scales. Lower jaw projecting forward; well developed teeth in both jaws; outer fixed teeth in lower jaw more numerous than inner depressible ones. First gill arch with 12-17 (14) gill-rakers: 3-4 + 9-13. First dorsal fin rays 11-13 (11); second dorsal fin rays, 37-38 (38). Anal fin rays, 37-39 (39). Pectoral fin rays, 14. The pectoral fin reaches the anal fin origin. Posterior margin of the caudal fin truncated or somewhat convex. Colour greyish, somewhat dark on the back and light on sides; belly whitish.

*Etymology*: named after the marine geographic region from which the species comes (Patagonia, Argentina).

## Relationships

*M. patagonicus* belongs to the subgroup of hakes of the southern tip of South America and New Zealand (*M. hubbsi* and *M. australis*) characterised by the presence of scales on the lower part of the cheek and preopercle, and their absence on the lower part of the interopercle. Nevertheless, the three species differ by characters given in the key of classification (see below), and also in the shape of some internal structures: the hyomandibular, the *sagitta* and the urohyal (Fig. 1

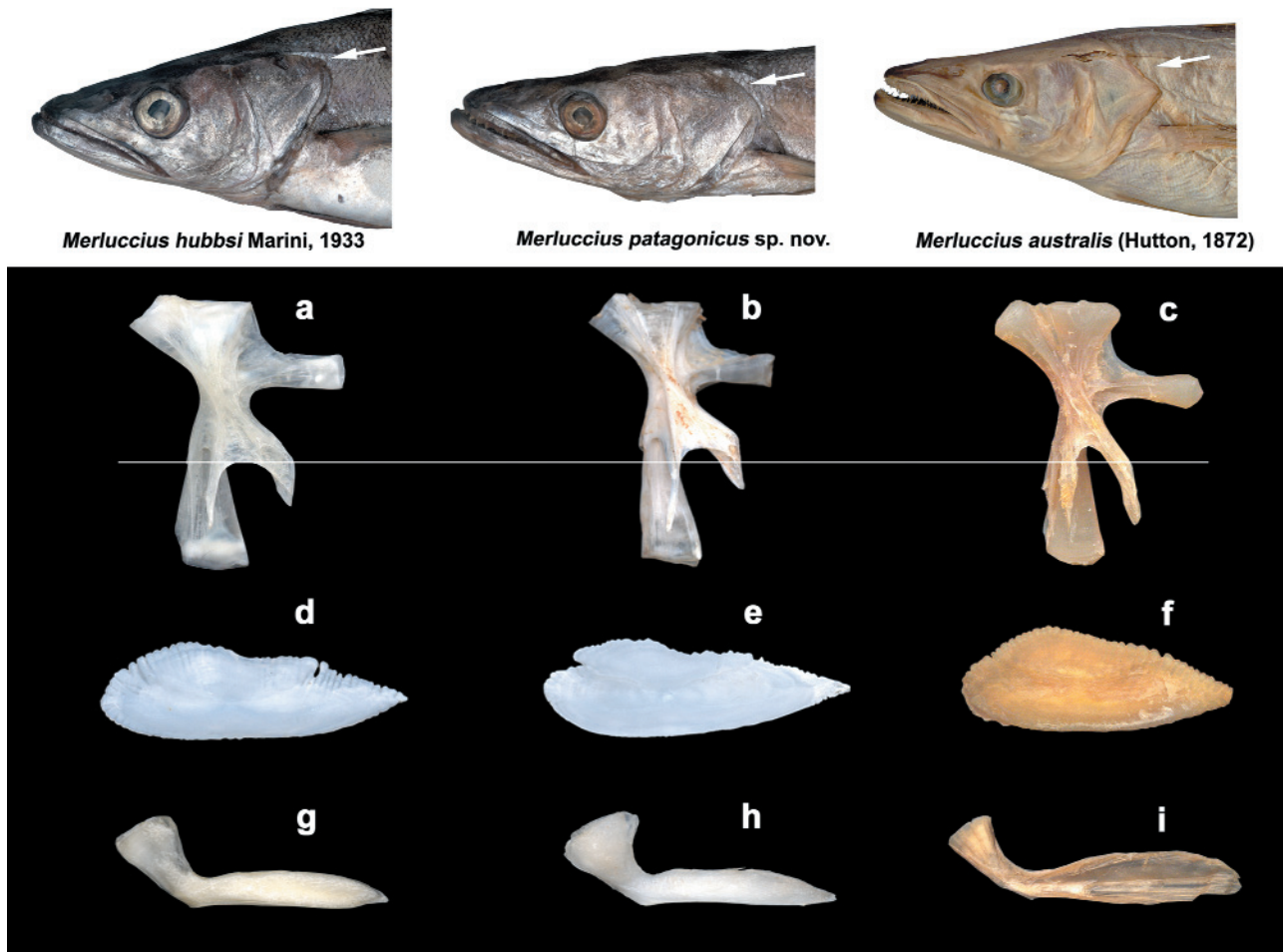


FIG. 1. – On top, with white background, comparison of anterior half of *M. hubbsi*, *M. patagonicus* and *M. australis*, where the existing differences can be observed in the cephalic profile, the ocular diameter, and the distance between the lateral line and the posterior margin of opercle, in all the studied species. At bottom, with dark background, comparative details of hyomandibular (a, b, c), sagitta (d, e, f with acute tip broken) and urohyal (g, h, i) from *M. hubbsi* (540 mm TL), *M. patagonicus* (610 mm TL) and *M. australis* (415 mm TL) respectively.

top to bottom) are clearly different in the three species of this subgroup.

*M. patagonicus* shares with *M. australis* the form of the opercular membrane, their dorsal border being inclined in both species. It differs from *M. australis* in body shape, which is slender in *M. patagonicus* and robust in *M. australis*; upper profile of the head, with a depression in *M. patagonicus* and straight in *M. australis*; the lateral line descends gradually from its origin to nearly the middle of the body in *M. patagonicus* while in *M. australis* it is gently bowed over the pectoral; and *M. australis* has a lesser number of rows of scales over the lateral line, about 123-126 versus 144-186 in *M. australis*.

*M. patagonicus* shares with *M. hubbsi* a similar body shape and a similar number of oblique rows of lateral line scales. It differs from *M. hubbsi* in the upper profile of the head, which has a depression, whereas it is straight in *M. hubbsi*; in the dorsal border of the opercular membrane, inclined in *M.*

*patagonicus* and horizontal in *M. hubbsi*; and the lower jaw of *M. patagonicus* projects farther than that of *M. hubbsi*.

The hyomandibular (Fig. 1a, b, c) is different in the three species. In *M. patagonicus* the intermuscular process of the hyomandibular is longer than the preopercular process, while in *M. australis* and in *M. hubbsi* the two processes are of similar length; in *M. hubbsi* the intermuscular process is bowed and its tip converges into the preopercular process, whereas in *M. australis* both processes diverge; the inferior process of hyomandibular is straight in *M. patagonicus* and in *M. australis*, whereas it is curved forward in *M. hubbsi* forming an angle with the anterior condyle.

The sagittae of the three species (Fig. 1d, e, f) can be regarded as having apomorphic characters, with a protruding, acute tip, which is characteristic also of other American species of *Merluccius* studied by Lombarte and Castellón (1991). The sagitta of *M. patagonicus* presents a well developed *excisura ostii*,

also found in *M. gayi gayi* from North Chilean waters (Lombarte and Castellón, 1991). The presence of this feature in both species could suggest a close relationship between *M. patagonicus* and *M. gayi gayi*.

The shape of the urohyal (Fig. 1g, h, i) and its degree of ossification is different in the three species. The urohyal of *M. hubbsi* has a short base and its anterodorsal process forms an obtuse angle to the vertical medial plate; it is thickly ossified and triangular-shaped in transverse section in examined specimens larger than 50 cm TL; in juveniles and examined specimens of around 25 cm TL it is thin and inverted T-shaped (transverse section). The anterodorsal plate of the urohyal of *M. patagonicus* forms an acute angle to the vertical medial plate; its ossification increases with the size, and it is thickly ossified in observed specimens longer than 40 cm TL. The urohyal of *M. australis* is thin regardless the size of the fish and inverted T-shaped (transverse section).

*Synonyms:* It is very likely that specimens of this species have been mistakenly assigned to *M. hubbsi* Marini, 1933 and perhaps also to *M. australis* (Hutton, 1872).

### Key of identification

- 1a. Upper border of the opercular membrane horizontal, parallel to the lateral line. Body slender. Superior profile of the head without a depression, rectilinear. Second dorsal fin with 36 to 38 fin rays. Anal fin with 38 or 39 fin rays. Lateral line with 133 to 144 oblique rows of scales. First gill arch with 12 to 15 gill-rakers ..... *M. hubbsi*  
(South Western Atlantic:  
Brazil, Uruguay, Argentina)
- 1b. Upper border of the opercular membrane inclined, descending from its origin to the top of opercle, moving away from lateral line ..... 2
- 2a. Body robust. Superior profile of the head without a depression, rectilinear. Second dorsal fin with 39 to 45 fin rays. Anal fin with 40 to 46 fin rays. Lateral line with 144 to 186 oblique rows of scales. First gill arch with 11 to 15 gill-rakers ....  
..... *M. australis*  
(Japan, New Zealand, south coast of Chile  
and Argentina)
- 2b. Body slender. Superior profile of the head with a depression above the anterior border of the orbit. Second dorsal fin with 37 or 38 rays. Anal fin

with 37 to 39 rays. Lateral line with 123 to 126 oblique rows of scales. First gill arch with 12 to 17 gill-rakers ..... *M. patagonicus*  
(South Western Atlantic: Argentina)

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