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# First report of *Macruronus novaezelandiae* (Gadiformes, Merluccidae, Macruroninae) from Atlantic tropical waters

ALFREDO CARVALHO-FILHO<sup>1</sup>, GUY MARCOVALDI<sup>2</sup>, CLÁUDIO L.S. SAMPAIO<sup>3</sup> AND M. ISABEL G. PAIVA<sup>2</sup>

<sup>1</sup>Fish-Bizz Ltda, Rua Maria Garcez, 39, São Paulo, SP, 05424-070, Brazil, <sup>2</sup>Projeto Tamar-ICMBio, Avenida do Farol Garcia D'Ávila, s/n, Praia do Forte, Mata de São João, BA, 48280-000, Brazil, <sup>3</sup>Universidade Federal de Alagoas, Unidade de Ensino Penedo, Av. Beira Rio s/n, Centro Histórico, Penedo, AL, 57.200-000, Brazil

*The occurrence of the merluccid Macruronus novaezelandiae from tropical waters off Bahia, eastern Brazil, is reported for the first time due to the capture of an adult of 712.3 mm SL in May 2008, from a depth of 400 metres. Until then no specimen had been reported north of 32°29'S on the South American Atlantic coast. This new record extends the species' range to about 2500 km northwards along the Brazilian coastline and is the first ever from tropical waters in the world. A comparison of the morphometric characters is provided.*

**Keywords:** range extension, *Macruronus magellanicus*, deep-sea fish, Brazil

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## INTRODUCTION

Merluccidae is a world-wide commercially important gadi-form family which includes 19 species in two subfamilies: Merluccinae and Macruroninae (Cohen *et al.*, 1990; Lloris *et al.*, 2005; Matallanas & Lloris, 2006). *Steindachneria argentea* Goode & Bean, 1896, is actually placed in the family Steindachneriinae (McEachran & Fechhelm, 1998; Lloris *et al.*, 2005; Fahay, 2006).

Eight species of Merluccidae are known from South American waters: the Pacific *Merluccius angustimanus* Garman, 1899 from California to Colombia; *M. gayi* (Guichenot, 1848) from Peru and Chile; the southern cone *M. australis* (Hutton, 1872), *M. patagonicus* Lloris & Matallanas 2003, *M. tasmanicus* Matallanas & Lloris, 2006 and *Macruronus novaezelandiae* (Hector, 1871) from Chile through Patagonia to Argentina and southern Brazil (*Macruronus*); the Atlantic *Merluccius hubbsi* Marini, 1932 from Rio de Janeiro to southern Argentina and the Falkland Islands; and *Merluccius albidus* (Mitchill, 1818) from Florida to northern South America, including northern Brazil (Cohen *et al.*, 1990; Haimovici *et al.*, 1994; McEachran & Fechhelm, 1998; Menezes, 2003; Lloris & Matallanas, 2003; Mincarone *et al.*, 2004; Bernardes *et al.*, 2005; Lloris *et al.*, 2005; Matallanas & Lloris, 2006; Costa *et al.*, 2007; Melo *et al.*, 2010).

Recent morphological and molecular studies revealed that *Macruronus magellanicus* Lönnberg, 1907, described from Chile, is a junior synonym of *M. novaezelandiae*, which is considered to be comprised of two disjunctive populations (Lloris *et al.*, 2005; Olavarria *et al.*, 2006). The same distribution is

also observed in several other species of the family belonging to the genus *Merluccius*, already cited above.

To date, the northernmost specimen of *Macruronus* ever collected in the American Atlantic is deposited at the MOVI collection (MOVI 22606, one specimen, 354 mm total length (TL), 32°29'S 50°16'W to 32°36'S 50°19'W, depth 350–420 m, May 2002), obtained at the Rio Grande do Sul coast, southern Brazil (Jules M.R. Soto, personal communication; Mincarone *et al.*, 2004). The present record extends the range of the species to about 2500 km northwards along the Brazilian coastline and is the first ever reported from Atlantic tropical waters.

## MATERIALS AND METHODS

Measurements were taken with a digital calliper to tenths of millimetres (mm); measurements over 150 mm to 300 mm were taken with a manual calliper to the nearest tenth of a mm; measurements over 300 mm were taken with a ruler to the nearest tenth of a mm. Length of specimen is given in standard length (SL). For details about capture techniques see Carvalho-Filho *et al.* (2009). Institutional abbreviations follow Sabaj Pérez (2010).



**Fig. 1.** *Macruronus novaezelandiae*, TAMAR 045, 712.3 mm SL, immediately after collected.

**Corresponding author:**

A. Carvalho-Filho

Email: alfie@telnet.com.br

**Table 1.** Measurements of *Macruronus novaezelandiae* expressed as a percentage of head length.

Proportions	Inada (1986)*	Cohen et al. (1990)†	Present study	Range
Snout length	22.8–35.2	30.3–45.5	26.8	22.8–45.5
Inter-orbital space	20.6–30.2	19.6–25.0	21.3	19.6–30.2
Eye diameter	24.4–35.2	21.7–31.3	21.3	21.3–35.2
Lower jaw length	no data	62.5–66.7	60.6	60.6–66.7
Upper jaw length	50.0–64.8	50.0–58.8	52.1	50.0–64.8
Pectoral fin length	67.9–88.0	66.7–76.9	70.1	66.7–88.0
Pelvic fin length	48.9–71.7	47.6–62.5	56.7	47.6–71.7

\*data adapted from given measurements; 18 specimens of *Macruronus 'magellanicus'*, 338–654 mm SL;

†data of *M. 'magellanicus'* plus *M. novaezelandiae*.

#### SYSTEMATICS

Family MERLUCCIDAE

*Macruronus novaezelandiae* (Hector, 1871)  
(Figure 1; Table 1)

*Coryphaenoides novae-zelandiae* Hector 1871, *Transactions and Proceedings of the New Zealand Institute*, v. 3 (1870), 1871: 103 (Port Nicholson, New Zealand).

#### SYNONYMS

*Coryphaenoides tasmaniae* Johnston, 1883, *Proceedings of the Royal Society of Tasmania*: 143 (Kangaroo Bluff, Tasmania, Australia).

*Macruronus magellanicus* Lönnberg, 1907, *Ergebnisse der Hamburger Magalhaensischen Sammelreise*, 1, Fische: 15, figure 2 (Smyth Channel, Chile).

*Macruronus argentinae* Lahille, 1915, *Anales del Museo Nacional de Historia Natural de Buenos Aires*, 26: 22, p. v, figure 1.

#### COMMON NAMES

Blue grenadier, longtail hake, Patagonian grenadier, hoki (English, New Zealand, Australia), Merluza-azul (Portuguese, Brazil), Merluza de Cola (Spanish, Argentina, Chile), Huaica (Spanish, Chile).

#### MATERIAL EXAMINED

TAMAR 045 (1, 712.3 mm SL), Brazil, Bahia, São João da Mata, Praia do Forte, coll. G. Marcovaldi, depth 400 m, 17 May 2008.

#### SPECIES ACCOUNT

Based on TAMAR specimen, Hector (1871), Ayling (1982), Inada (1986), Cohen et al. (1990), Cousseau & Perrotta (2000), Lloris et al. (2005) and Bernardes et al. (2005); data of our specimen in parentheses; see also Table 1.

Body elongate, compressed, with a long tapering tail; first dorsal fin short, second and anal fin long, continuous with caudal fin; anal fin origin considerably backward of second dorsal fin origin; pectoral fin pointed, its origin slightly to well ahead than pelvic fin origin. Head moderate, mouth oblique and large; end of upper jaw about centre of eye; snout elongate and blunt; inter-orbital space flat. Upper jaw with two series of teeth, the outer larger; lower jaw with a single series of teeth; canine-like teeth present at upper jaw's tip; small teeth on vomer. Scales deciduous and large; lateral line running from upper body behind opercle, down to mid-body and to end of tail; lateral line scales 177–182 (179). Gill rakers slender, 6–8 (8) on upper limb, 21–27



**Fig. 2.** *Macruronus novaezelandiae*, distribution map (grey).

(24), 27–35 (33) in total. First dorsal-fin rays I, 10–13 (12); second-fin rays 96–102 (101); anal-fin rays 83–95 (92); pectoral-fin rays 15–19 (19); pelvic-fin rays 8 (8). Blue overall, darker on dorsum, sometimes with a purplish cast; sides silvery light-blue to greenish-blue, belly whitish; fins dark; inner of mouth blackish; iris pale-bluish brown. Maximum length 120 cm, usually 60–100 cm; maximum weight 5 kg, usually 1.5 kg.

Body proportions are given below, and it is important to be reminded that comparisons against TL or SL might be dubious, since the tip of the tail is often damaged and regenerated; thus, the most trustful comparisons are against the head length. Other than that, the body proportions from Inada (1986) were done against SL, but that from Cohen *et al.* (1990) and Lloris *et al.* (2005) were compared against TL, thus leading us to not consider data other than those compared with the head length.

#### DISTRIBUTION

In Oceania from New Zealand, Tasmania and Australia; in South America from the southern Pacific and southern Atlantic northwards to Bahia, Brazil (present paper) (Figure 2).

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#### REFERENCES

- Ayling T. (1982) *Collins guide to the sea fishes of New Zealand*. Auckland, NZ: William Collins Publishers Ltd, 343 pp.
- Bernardes R.A., Figueiredo J.L., Rodrigues A.R., Fischer L.G., Vooren C.M., Haimovici M. and Rossi-Womgtschowski C.L.D.B. (2005) *Peixes da Zona Econômica Exclusiva da Região Sudeste-Sul do Brasil; levantamento com armadilhas, pargueiras e rede de arrasto de fundo*. São Paulo, Brazil: Editora Universidade de São Paulo, 295 pp.
- Carvalho-Filho A., Marcovaldi G., Sampaio C.L.S., Paiva M.I.G. and Duarte L.A.G. (2009) First report of rare pomfrets (Teleostei: Bramidae) from Brazilian waters, with a key to western Atlantic species. *Zootaxa* 2290, 1–26.
- Cohen D.M., Inada T., Iwamoto T. and Scialabba N. (1990) *FAO species catalogue*. Volume 10. *Gadiform fishes of the world (Order Gadiformes). An annotated and illustrated catalogue of cods, hakes, grenadiers and other gadiform fishes known to date*. Rome: FAO, 442 pp. [FAO Fisheries Synopsis no. 125.]
- Costa P.A.S., Braga A.C., Melo M.R.S., Nunan G.W.A., Martins A.S. and Olavo G. (2007) Assembléias de teleósteos demersais no talude da costa central brasileira. In Costa P.A.S., Olavo G. and Martins A.S. (eds.) *Biodiversidade da fauna marinha profunda na costa central brasileira*. Documentos REVIZEE, Score Central. Série Livros, no. 24, 87–107. Rio de Janeiro, Brazil: Museu Nacional.

Cousseau M.B. and Perrotta R.G. (2000) *Peces marinos de Argentina. Biología, distribución, pesca*. Mar Del Plata, Argentina: INIDEP, 167 pp.

Fahay M.P. (2006) Steindachneriidae. In Richards W.J. (ed.) *Early stages of Atlantic fishes, an identification guide for the western central North Atlantic*, vol. I, pp. 657–659. CRC Marine Biology Series, Taylor & Francis Group, 2640 pp.

Haimovici M., Martins A.S., Figueiredo J.L. and Vieira P.C. (1994) Demersal bony fish of the outer shelf and upper slope of the southern Brazil Subtropical Convergence Ecosystem. *Marine Ecology Progress Series* 108, 59–77.

Hector J. (1871) On a new species of fish, *Corypahenoides novaezelandiae*, the okarari of natives. *Transactions and Proceedings of the New Zealand Institute* 3, 136.

Inada T. (1986) Merlucciidae. In Nakamura I. (ed.) *Important fishes trawled off Patagonia*. Tokyo, Japan: JAMARC, Japan Marine Fishery Resource Research Center, 369 pp.

Lloris D. and Matallanus J. (2003) Description of a new species of hake: *Merluccius patagonicus* sp. Nov. (Gadiformes: Merlucciidae) from the waters of Argentina. *Scientia Marina* 67, 323–326.

Lloris D., Matallanus J. and Oliver P. (2005) *Hakes of the world (Family Merlucciidae). An annotated and illustrated catalogue of hake species known to date*. Rome: FAO, 57 pp. [FAO Species Catalogue for Fishery Purposes, no. 2.]

Matallanus J. and Lloris D. (2006) Description of *Merluccius tasmanicus* sp. nov. and redescription of *Merluccius australis* (Pisces: Merlucciidae). *Journal of the Marine Biological Association of the United Kingdom* 86, 193–199.

McEachran J.D. and Fechhelm J.D. (1998) *Fishes of the Gulf of Mexico, vol. 1. Myxiniiformes to Gasterosteiformes*. Austin, Texas: University of Texas Press, 1004 pp.

Melo M.R.S., Braga A.C., Nunan G.W.A. and Costa P.A.S. (2010) On new collections of deep-sea Gadiformes (Actinopterygii: Teleostei) from the Brazilian continental slope, between 11° and 23°S. *Zootaxa* 2433, 25–46.

Menezes N.A. (2003) Merlucciidae. In Menezes N.A., Buckup P.A., Figueiredo J.L. and Moura R.L. (eds.) *Catálogo das Espécies de Peixes Marinhos do Brasil*. São Paulo, Brazil: Museu de Zoologia da Universidade de São Paulo, 160 pp.

Mincarone M.M., Consolim C.E.N., Kitahara M.V., Lima A.T., Lima e Silva C.M., Neves R.D., Soto J.M.R. and Souza Filho M.B. (2004) Report on the demersal fishes sampled by onboard observers off Southern Brazil. *Mare Magnum* 2, 127–144.

Olavarría C., Balbontín F., Bernal R. and Baker C.S. (2006) Lack of divergence in the mitochondrial cytochrome *b* gene between *Macruronus* species (Pisces: Merlucciidae) in the Southern Hemisphere. *New Zealand Journal of Marine and Freshwater Research* 40, 299–304.

and

Sabaj Pérez M.H. (ed.) (2010) *Standard symbolic codes for institutional resource collections in herpetology and ichthyology: an online Reference*. Version 2.0. Accessed on 8 November 2010. <http://www.asih.org>

#### Correspondence should be addressed to:

A. Carvalho-Filho  
Fish-Bizz Ltda  
Rua Maria Garcez, 39  
São Paulo SP, 05424-070  
Brazil  
email: alfie@telnet.com.br