

Unusual finding of *Paranotothenia magellanica* (Nototheniidae) on the temperate north coast of Argentina

by

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RÉSUMÉ. - Présence inhabituelle de *Paranotothenia magellanica* (Nototheniidae) sur la côte tempérée nord de l'Argentine.

Trois exemplaires de *Paranotothenia magellanica* (Forster, 1801) ont été capturés dans la région côtière de la province de Buenos Aires, Argentine, ce qui représente la localisation la plus nordique de l'espèce. Les caractères morphologiques et méristiques, ainsi que la photographie d'un exemplaire, sont inclus dans le travail. *P. magellanica* est normalement présent au sud de la Patagonie. Avec ce signalement, sa distribution s'étend vers le Nord, dépassant ainsi la région d'eaux purement subantarctiques pour atteindre celle des côtes de la Pampa. Deux hypothèses peuvent expliquer cette présence : le transport par le courant de la Patagonie et les valeurs exceptionnellement basses de la température de l'eau du secteur au moment des signalements.

Key words. - Nototheniidae - *Paranotothenia magellanica* - ASW - Argentina - Buenos Aires Province - Morphometric and meristic characteristics - Distribution - New record.

The perciform suborder Notothenioidei is restricted to high latitudes in the southern hemisphere and dominates the Antarctic and sub-Antarctic fish fauna (Johnson and Gill, 1994). It is divided into five families, of which the Nototheniidae is the most speciose. Nototheniid species are predominantly benthic. They dominate the bottom fish fauna of the continental and insular shelves of the Southern Ocean, both in terms of the number of species and of biomass. They form an important benthic component of the southern South American region (DeWitt *et al.*, 1990).

The orange throat notothen *Paranotothenia magellanica*, inhabits the Magellanic region of South America (Patagonia), Malvinas/Falkland, South Georgia, South Orkney, Prince Edward, Crozet, Kerguelen, Heard, McDonald, Macquarie, Campbell and Auckland islands and southern New Zealand (Lloris and Rucabado, 1991).

This is the first report of *P. magellanica* substantially farther north than previously known.

MATERIALS AND METHODS

Three individuals of *Paranotothenia magellanica* were captured at the coast of the Buenos Aires Province: one in Mar del Plata, on 20 November 1995 by an angler; another by a fisherman in Mar Azul on 23 April 1995, and the third one was of unknown

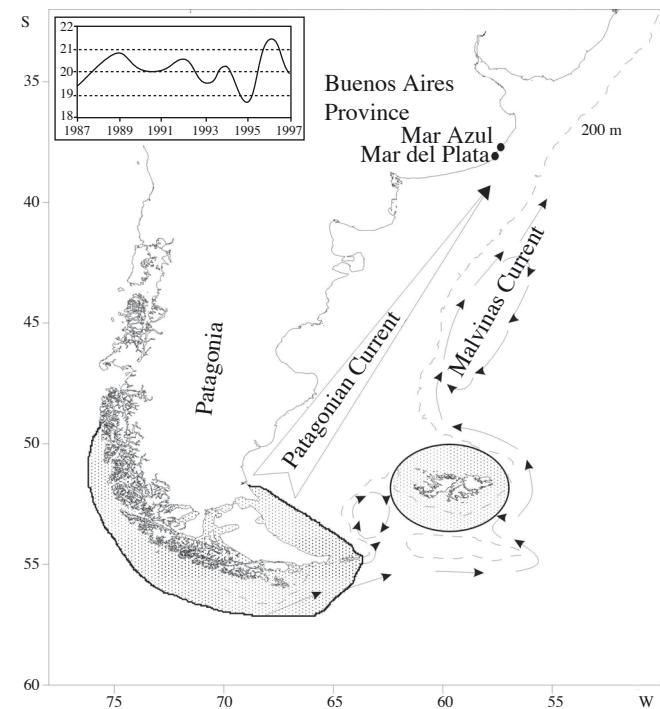


Figure 1. - Map illustrating the Patagonian distribution and the Buenos Aires locations where the orange throat notothen was captured. Inset represents the Mar del Plata mean water temperature for March between 1987 and 1997. [Carte montrant la distribution patagonienne de *Paranotothenia magellanica* et les lieux de captures au large de la province de Buenos Aires. L'encart représente la température moyenne de l'eau à Mar del Plata en mars, de 1987 à 1997.]

origin in 1995 (Fig. 1). The specimens were preserved in 10% formaldehyde and subsequently transferred to 70% industrial ethylated alcohol for long-term preservation. The specimens are lodged with the Instituto Nacional de Investigación y Desarrollo Pesquero, Mar del Plata, as INIDEP 519, 540 and 656 (Fig. 2), respectively. For key determination, morphometric measurements (taken to the mm below using dial calipers) and meristic counts were made according to DeWitt *et al.* (1990). A sea-water temperature series for Mar del Plata city between 1987 and 1997 was used to give an average for March (SHN, unpubl. data) (Fig. 1).

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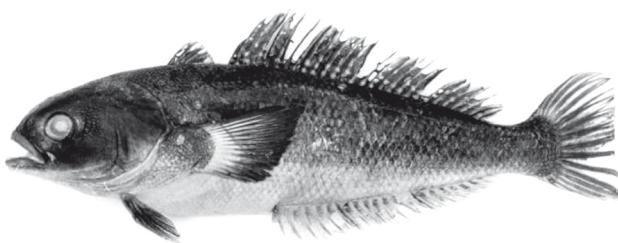


Figure 2. - *Paranotothenia magellanica* INIDEP 656, 284 mm LT, lateral view. [Vue latérale.]

RESULTS

Morphometric and meristic data are given in table I.

Distinctive characters: body robust, broad head, snout short and steep, posterior extension of maxilla not reaching to vertical line through middle of eye; top of head covered with small dermal papillae. First infraorbital pore in front of vertical through anterior edge of nostril, supratemporal canal complete. Two lateral lines with tubed scales. Caudal fin emarginated or slightly rounded. In alcohol, body bluish-grey to dark brown, paler on lower part; fins dusky to dark, but may also be striped and spotted. In fresh specimens of all sizes the branchiostegal membrane was bright orange-red or orange-yellow.

DISCUSSION

In addition to *P. magellanica*, other genera of nototheniids inhabit the Patagonian shelf and slope: *Eleginops maclovinus* (Valenciennes, 1830) with only one lateral line, *Dissostichus eleginoides* Smitt, 1898, whose middle lateral line begins at the end of pectoral fins (in *P. magellanica* the middle lateral line starts some distance away from them) (Menni *et al.*, 1984) and several species of Patagonotothen, with the first pore of infraorbital canal behind a vertical through anterior edge of nostril (in *P. magellanica* the first infraorbital pore is in front of this vertical) (DeWitt *et al.*, 1990). It is possible to find individuals of *Patagonotothen ramsayi* (Regan, 1913) off Mar del Plata (38°S), seasonal density variations at this latitude of this species may be explained by migrations, but this fish avoid temperatures higher than 11°C (Ekau, 1982); temperatures lower than 11°C have been recorded at the coast of Buenos Aires Province, but this Patagonian nototheniid has never been reported in this region, where the salinity is more variable than the waters where this fish is usually found.

It is difficult to explain how *P. magellanica* arrived in waters of the Buenos Aires Province. The orange throat notothen occurs on the southern Patagonian shelf and around the Malvinas/Falkland Islands, a region that is dominated by sub-Antarctic cold-temperate water, with low salinity. Across the Patagonian shelf the salinity of sea-water increases from the coast towards the slope. The low salinity at the coast of Patagonia is due to freshwater discharge from rivers and the inflow of diluted waters from the Strait of Magellan that, when mixed with shelf water, become the coastal water mass (Bianchi *et al.*, 1982). These waters have a predominantly NNE flow and form the Patagonian Current (Brandhorst and Castello, 1971) (Fig. 1). This current is characterised by a salinity gradient that increases from the Strait of Magellan northwards (Lusquiños, 1971). At 47°S, this current leaves the coast in a NNE direction. Its core area is located between 150 and 180 km from the coast until approximately 38°S. Although the main characteristics of this current have not yet been

Table I. - Counts and measurements (mm) of the three specimens of *Paranotothenia magellanica* captured in Buenos Aires Province. TL: Total length; SL: Standard length; HL: Head length; D: Dorsal spines and rays; A: Anal rays; P: Pectoral rays; GR: Gill rakers; ULL, MLL: Upper, middle lateral line; LSS: Lateral scale series. [*Comptages et mesures (mm) de trois spécimens de Paranotothenia magellanica capturés dans la province de Buenos Aires. TL : Longeur totale ; SL : Taille standard ; HL : Longueur de la tête ; D : Epines dorsales et rayons ; A : Rayons à l'anaïle ; P : Rayons aux pectorales ; GR : Branchiospines ; ULL, MLL : Lignes latérales supérieure et médiane ; LSS : séries d'écailles latérales.*]

Character	INIDEP 519	INIDEP 540	INIDEP 656
TL	142.18	197.00	284.00
SL	125.42	169.38	242.00
Body depth _{max} in SL	3.59	3.73	3.90
HL in SL	3.71	3.81	3.25
Bony orbit in HL	3.74	4.93	5.09
Interorbital width in HL	2.04	2.00	2.04
D ₁ -D ₂	IV-31	IV-31	IV-30
A	25	24	23
P	17	16	16
GR	6+11	4+11	5+11
ULL	43	46	44
MLL	13	10	11
LSS	63	64	61

described, the isohaline of 33.6 ups is considered as the northernmost limit of this current. This value of salinity may occur off Buenos Aires Province, on the bottom (70 to 80 m depth) during winter, but it does not extend to the coast due to the presence of coastal water masses with salinities of 33.8- 34.0 (Martos and Piccolo, 1988). Similarly, Carreto *et al.* (1995) found that a quasi-permanent front separates the coastal water from the shelf water. However, during spring and summer, the 33.6 isohaline intercepts the coast at 39°S (Martos and Piccolo, 1988). Although observations on coastal water parameters off Mar del Plata are scarce, a temporal series of sea-water temperature obtained by a Servicio de Hidrografía Naval tide gauge (unpublished data) may indicate the presence of the Patagonian Current. The mean temperature for March 1995 was below the historic mean and the lowest between 1987 and 1997 (Fig. 1). This could indicate an advection of colder water masses from the intermediate shelf to the coast of Mar del Plata. These conditions could have been as a pathway by *P. magellanica* to get to the shore.

Other main current on the Patagonian region is the Malvinas/Falkland Current. It flows northwards over the shelf break (Fig. 1), carrying colder and saltier water (33.7-34.2‰), and represents the border condition of the Argentinean Sea. Even though this water mass has a great influence over the continental water, never reaches the coastal zone.

Furthermore, *P. magellanica* does not seem to be as strictly demersal as the many other nototheniids (Fischer and Hureau, 1988). The spongy structure of the skull and pectoral girdle, and the adult pelagic coloration may be an indicator of a less benthic lifestyle. Regularly, adult individuals are captured off shore in pelagic waters (Balushkin, 1984), while it has been rarely caught in large bottom trawls (DeWitt *et al.*, 1990). The diet was predominantly pelagic (Lloris and Rucabado, 1991). These characteristics may favour a wide pelagic spreading of *P. magellanica* when the right conditions prevail.

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