

First records of Purplemouthed conger *Pseudoplichthys splendens* (Anguilliformes: Congridae) from the Galicia Bank (NW Spain). A northward range extension of their distribution in the eastern Atlantic

by

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RÉSUMÉ. - Premier signalement du congre *Pseudoplichthys splendens* sur le banc de Galice (NO Espagne). Une nouvelle limite nord de leur répartition pour l'Atlantique Est.

Deux *Pseudoplichthys splendens* ont été capturés pour la première fois sur le banc de Galice. Ce nouveau signalement étend au nord la limite de l'aire de répartition de cette espèce en Atlantique Est. La présence de *P. splendens* sur le banc de Galice est discutée et les causes probables de sa présence sont étudiées en relation avec des processus océaniques et des stades larvaires.

Key words. - Congridae - *Pseudoplichthys splendens* - North-eastern Atlantic - Galicia Bank - Seamount - New record.

The Congridae constitute a diverse and speciose eel family, including 36 genera and at least 192 named species. In the north Atlantic European waters, only four species have been recorded: *Conger conger* (Linnaeus, 1758), *Ariosoma balearicum* (Delaroché, 1809), *Gnathophis mystax* (Delaroché, 1809) and *Bathyurongconger vicinus* (Vaillant, 1888) (Quéro *et al.*, 2003).

The genus *Pseudoplichthys* Roule, 1915 comprises two species: *P. splendens* (Lea, 1913) and *P. macroporis* Kotthaus, 1968. Nevertheless, only *P. splendens* seems to be a valid species as the taxonomic status of *P. macroporis* is uncertain (Smith 1989; Castle, 1995).

This paper reports the capture of two specimens of *P. splendens* in the Galicia Bank (NW Spain).

MATERIAL AND METHODS

The specimens were obtained by bottom trawl, one onboard the R/V "Cornide de Saavedra" during the survey ECOMARG 09, and the other on the R/V "Thalassa" from the survey BANGAL 0810, carried out both in the Galicia Bank, in the years 2009 and 2010, respectively (Fig. 1).

The Galicia Bank is a large seamount located at 42°7'N-11°8'W, 200 km west of the coast of Spain, with a depth range between 600 and 1500 m.

The specimens described were provisionally identified and frozen on board. Measurements to the nearest mm and meristic characters were recorded later in the laboratory, according to Smith (1989). In the juvenile specimen, the cephalic and lateral line pores were difficult to observe and their numbers were not recorded. The specimens were preserved in 70% ethanol and stored in the fish collection of the Instituto Español de Oceanografía in Santander (IEOST 09011 and IEOST 10030).

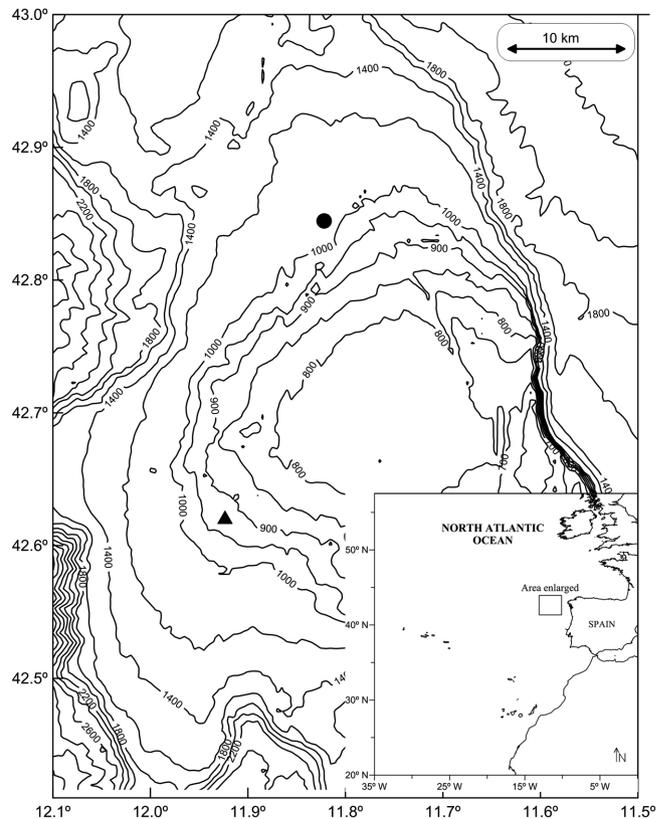


Figure 1. - Map of the Galicia Bank showing the area and station where the specimens of *Pseudoplichthys splendens* were captured: adult (▲) and juvenile (●).

RESULTS

Material examined

Adult specimen (Fig. 2): 316 mm TL, 309 mm SL, weight: 35.6 g, Galicia Bank, 24 Jul. 2009, 42°37'11 N-11°55'21 W, 926 m depth. Juvenile specimen (Fig. 3): 126 mm TL, 122 mm SL, weight: 2.0 g, Galicia Bank, 19 Aug. 2010, 42°50'40 N-11°49'18 W, 1016-1041 m depth.

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Figure 2. - *Pseudophichthys splendens* 316 mm TL.

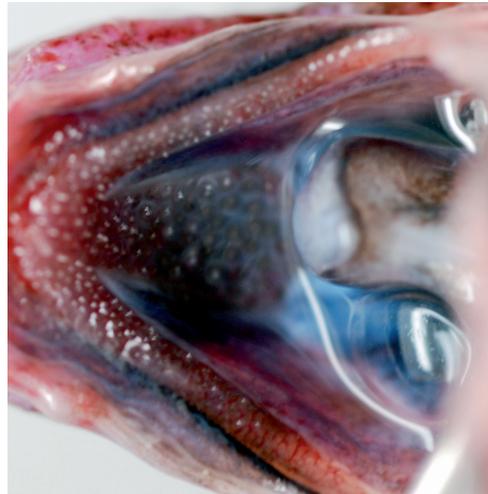


Figure 4. - Detail of the vomerine tooth patch of *Pseudophichthys splendens* 316 mm TL.

Figure 3. - *Pseudophichthys splendens* 126 mm TL showing remnants of the larval pigment pattern.



Diagnostic characters

Body elongated, cylindrical anteriorly and compressed posteriorly along tail; body scaleless; upper jaw projecting beyond lower; eye of medium size, its diameter slightly less than snout length; upper labial flange absent; premaxillary tooth patch confluent with maxillary and vomerine tooth patches (Fig. 4); adnasal and supratemporal pores absent; vomerine teeth in a broad patch of oval shape, wider at its posterior end; dorsal-fin origin immediately behind tip of pectoral fin; granular teeth, not enlarged, in cardiform patches; vomerine tooth patch broad and short, reaching halfway to posterior end of maxillary tooth patch; pectoral fin small and narrow, inserted at the upper edge of the gill opening; pelvic fins absent; anterior nostril tubular, near tip of snout; posterior nostril elliptical, above mid-eye level and well separated from eye; gill opening sublateral; dorsal- and anal-fin rays segmented.

The general coloration of adult specimen when fresh was a

light brown; grey-brown ventrally, in the visceral cavity; head reddish in top and sides; a large black spot in front of pectoral fin. The juvenile specimen showed a similar coloration but additionally, with many small black spots scattered on the surface of the body. Some of these spots are grouped in five rounded clusters, the first four below the lateral line and the posterior fifth above it. These dark spots are remnants of the larval pigment pattern (Smith, 1989).

Distribution range

Amphiatlantic between 37 and 1647 m depth; off the western Atlantic, *P. splendens* was reported from Canada (larval specimens) to Brazil, while off the eastern Atlantic, the species was recorded from Morocco, the Canary and Azores Islands; there is also one record from the Gulf of Guinea (Smith, 1989; McEachran and Fechhelm, 1998).

Table I. - *Pseudophichthys splendens*. Selected proportional measurements in % of total length (TL) and head length (HL).

	Adult		Juvenile		Roule, 1919		Blache and Bauchot, 1976		Smith, 1989	
	%TL	%HL	%TL	%HL	%TL	%HL	%TL	%HL	%TL	%HL
Head length	12.7	–	12.7	–	13.0-13.1	–	10.9-11.4	–	13-15	–
Eye horizontal diameter	1.9	15.0	1.6	12.5	–	16.7-17.8	–	13.9-20.4	–	–
Snout length	2.8	22.5	3.2	25.0	–	26.2-30.8	–	24.6-31.8	25-33	–
Postorbital length	7.9	62.5	7.9	62.5	–	–	–	–	–	–
Interorbital width	1.9	15.0	0.8	6.3	–	–	–	–	–	–
Mouth length	2.8	22.5	2.4	18.8	–	–	–	–	–	–
Predorsal length	18.4	–	17.5	–	18.7-19	–	17.2-17.5	–	17-22	–
Preanal length	39.2	–	34.1	–	38-41.7	–	34.1-36.8	–	35-40	–
Pectoral length	3.2	25.0	2.4	18.8	–	–	–	–	2-3	15-26
Body depth	5.4	42.5	3.2	25.0	5.7-5.9	43.6-45.2	4.2-6.1	38.2-53.8	4-6	–
Body width	3.5	27.5	2.4	18.8	–	–	–	–	–	–
Gill slit length	1.9	15.0	0.8	6.3	–	–	–	12.3-12.7	–	7-12

Table II. - *Pseudophichthys splendens*. Meristic data from selected papers.

	Adult	Juvenile	Blache and Bauchot, 1976	Bauchot and Saldanha, 1986	Smith, 1989
Pectoral fin rays	13	13	12-13	–	10-13
Branchiostegal rays	9	9	–	–	9
Vertebrae	–	–	134-137	134-137	130-136
Pores					
Lateral line (preanal)	33	–	–	39	33-39
Lateral line (prepectoral)	7	–	–	7	–
Supraorbital	3	–	3	–	3
Infraorbital	5	–	5	–	5
Preoperculomandibular	8	–	8	–	8
Supratemporal pores	0	–	0	–	0

DISCUSSION

The main diagnosis of the current specimens agreed with those previously reported by other authors but some differences and inaccuracies have been found.

The gill slit length observed in our specimens (15 and 6.3% HL) is similar to the 7-12% HL range reported by Smith (1989). Comparison of length relationships between the two specimens showed some differences in the morphometric measures, mainly in the interorbital width, body depth and gill-slit length. These differences are probably associated to the different growth rate during the juvenile and adult phases.

The main counts of the meristic data are also in agreement with previous studies on this species (Tab. II).

The presence of new records of rare and southern fish species in Galician waters has been linked to climatic change and global warming (Bañón *et al.*, 2010). A review of published data on Northeast Atlantic fish species representing different biogeographic affinities, habitats, and body size lends to support the hypothesis that global warming results in a shift in abundance and distribution of fish species (Rijnsdorp *et al.*, 2009).

However, in the case of deep-water and seamount species this question is more complex. Deep water and seamount areas are poorly monitored and their fish fauna is less known than that of coastal and shelf areas. Thus, the occasional records of new fish species are not sufficient to discern if recent faunal changes are a response to ocean warming or to an increase of fishing and sampling effort. In this respect, the fish fauna of the Galicia Bank is not well known. Piñeiro *et al.* (2001) establish as 86 the number of recorded fish species in this area: 70 teleosts, 11 sharks, 3 rays and 2 chimaeras. Nevertheless, these authors only provided the scientific name of 19 species.

On the other hand, recent studies confirm that ocean warming also affects deep sea areas, which could be relevant to the analyses of the distribution of deep-water and seamount species. Thus, substantial changes in heat content have been observed in the 300 to 1000 m layers of each ocean and in depths greater than 1000 m of the North Atlantic (Levitus *et al.*, 2000).

Strehlow *et al.* (1998) recorded three leptocephali of *Pseudophichthys* sp. between 89-107 mm TL in a northern vicinity of the Galicia Bank, at 45.5°N, 10.6°W. We assume that the genus *Pseudophichthys* is monospecific, these larvae most probably belong to *P. splendens*. This could be indicative that the Galicia Bank is a reproductive area of this species in the NE Atlantic. However, future reproductive analysis and leptocephali samples are required to clarify this aspect.

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REFERENCES

- BAÑÓN R., VILLEGAS-RÍOS D., SERRANO A., MUCIENTES G. & ARRONTE J.C., 2010. - Marine fishes from Galicia (NW Spain): an updated checklist. *Zootaxa*, 2667: 1-27.
- BAUCHOT M.L. & SALDANHA L., 1986. - Congridae. *In*: Fishes of the Northeastern Atlantic and the Mediterranean, Vol. 2 (Whitehead P.J.P., Bauchot M.L., Hureau J.C., Nielsen J. & Tortonese E., eds), pp. 567-574. Paris: Unesco.
- BLACHE J. & BAUCHOT M.-L., 1976. - Contribution à la connaissance des poissons anguilliformes de la côte occidentale d'Afrique. 16^e note : les familles des Congridae et des Colocongridae. *Bull. IFAN*, 38A(2): 368-444.
- CASTLE P.H.J., 1995. - Alcock's congrid eels from the "Investigator" collections in Indian Seas 1888-1894. *Copeia*, 3: 706-718.
- MCEACHRAN J. & FECHHELM J.D., 1998. - Congridae. *In*: Fishes of the Gulf of Mexico, Myxiniformes to Gasterosteiformes, vol. 1, pp. 291-313. Austin: Univ. of Texas Press.
- LEVITUS S., ANTONOV J.I., BOYER T.P. & STEPHENS C., 2000. - Warming of the world ocean. *Science*, 287: 2225-2229.
- PIÑEIRO C.G., CASAS M. & ARAÚJO H., 2001. - Results of Exploratory Deep-sea Fishing Survey in the Galician Bank: Biological Aspects on Some of Seamount-associated Fish (ICES Division IXb). NAFO SCR Doc. 01/146 Serial No. N4540, 7 p.
- QUÉRO J.C., PORCHE P. & VAYNE J.J., 2003. - Guide des Poissons de l'Atlantique européen, 465 p. Delachaux & Niestlé.
- RIJNSDORP A.D., PECK M.A., ENGELHARD G.H., MÖLLMANN C. & PINNEGAR J.K., 2009. - Resolving the effect of climate change on fish populations. *ICES J. Mar. Sci.*, 66: 1570-1583.
- ROULE L., 1919. - Poissons provenant des campagnes du yacht 'Princesse Alice' (1891-1913) et du yacht 'Hirondelle II' (1914). *Résult. Camp. Sci. Prince Albert I*, 52: 1-191.
- SMITH D.G., 1989. - Family Congridae. *In*: Fishes of the Western North Atlantic (Böhlke E.B., ed.). *Mem. Sears Found. Mar. Res.*, 1(9): 460-567.
- STREHLOW B., ANTUNES C., NIERMANN U. & TESCH F.W., 1998. - Distribution and ecological aspects of leptocephali collected 1979-1994 in North- and Central Atlantic. I. Congridae. *Hëlhol. Meeresunters*, 52: 85-102.

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