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## Results of the research cruises of FRV "Walther Herwig" to South America. LIX. *Lycodonus malvinensis* n. sp. (Pisces, Blennioidei), another new zoarcid fish from the Western South Atlantic Ocean

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with 2 figures and 1 table

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### Kurzfassung

Ergebnisse der Forschungsreisen des FFS „Walther Herwig“ nach Südamerika. LIX. *Lycodonus malvinensis* n. sp. (Pisces, Blennioidei), ein weiterer neuer Zoarcide aus dem Südwestatlantik.

*Lycodonus malvinensis* n. sp. weist ihre Gattung erstmals im SW-Atlantik nach.

Die neue Art ist besonders durch folgende Merkmale definiert: a) einige freie, vordere, dorsale Knochenplatten tragen keine Strahlen der Rückenflosse; b) Knochenplatten der Dorsal- und Analflosse mit einem höckerförmigen Medianfortsatz, der äußerlich leicht fühlbar ist; c) vordere Schwanzwirbel mit sehr kurzen Neuralfortsätzen, die weniger als die halbe Höhe des Wirbelkörpers ausmachen.

Die Typusexemplare (Holotypus, ♀ 249 mm TL; 2 Paratypen, ♀ 237 mm und ♂ 195 mm TL) stammen aus Fängen des FFS „Walther Herwig“ 1971 östlich der Malvina Inseln aus 800 m und 1000 m Tiefe am Kontinentalabhang bei Bodenwassertemperaturen von 3,1 °C und 2,7 °C.

### Resumen

Resultados de los cruceros de investigación del B/IP «Walther Herwig» a Sud America. LIX. *Lycodonus malvinensis* n. sp., otra nueva especie de zoárcido (Pisces, Blennioidei), del Atlántico Sudoccidental.

*Lycodonus malvinensis* n. sp. representa la primera cita del género en el Atlántico Sudoccidental.

La nueva especie presenta como características más salientes: a) cierto número de placas dorsales libres, es decir no provistas de radios dorsales; b) el desarrollo en la parte media de las placas dorsales y anales de protuberancias a modo de espinas, fácilmente detectables al tacto; c) las espinas neurales de las vértebras caudales anteriores muy cortas, representando menos de la mitad de la altura del cuerpo vertebral.

La serie típica de ejemplares (el holotipo, ♀ de 249 mm LT y dos paratipos, una ♀ de 237 mm y un ♂ de 195 mm LT), fue obtenida por el B/IP «W. Herwig» en 1971 sobre el talud continental a profundidades de 800 y 1000 m, en aguas de temperaturas de 3,1 y 2,7 °C, al oriente de las Islas Malvinas.

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## Abstract

*Lycodonus malvinensis* n. sp., represents the first record of the genus in the SW Atlantic.

The new species has the following outstanding characters: a) a few anterior free dorsal scutes, i.e. not bearing dorsal fin rays; b) the mid part of the dorsal and anal scutes produced into spine-like structures, easily detectable through touch and c) very short neural spines on the anterior caudal vertebrae, of less than half the depth of the vertebra.

The type specimens (the holotype, ♀ 249 mm TL, and two paratypes, one ♀ 237 mm TL and one ♂ 195 mm TL) were captured by FRV "W. Herwig" 1971 to the east of the Malvinas Islands on the continental slope at depths of 800 and 1000 m, at bottom temperatures of 3,1 and 2,7 °C respectively.

## A. Introduction

During the 1971 research cruise by the FRV "Walther Herwig" to South America, three specimens of a zoarcid fish belonging to the genus *Lycodonus* Goode & Bean, 1883 were collected and deposited in the Ichthyological Collection of the Institut für Seefischerei in Hamburg (ISH Collection).

The examination of these specimens, the results of which are presented here as an addendum to a previous paper (GOSZTONYI, 1977), and their comparison with material of all recognized species of the genus (including type material of one), precluded their identity with any of the recognized species. Accordingly, apart from being the first record of the genus *Lycodonus* in the South Western Atlantic, they are considered as representing a new species, *Lycodonus malvinensis* herein described.

## B. Methods and list of material for comparison

Measurements and descriptions follow those of an earlier paper (GOSZTONYI, 1977: 193).

Apart from the type material of the new species which will be dealt with below, the following specimens of other species were examined:

*Lycodonus mirabilis* Goode & Bean, 1893: BMNH N° 1896 2. 10. 51, ♂ 114 mm TL, "Albatross" Stat. 323, 39° 35' N, 71° 24' 30" W, 20. 8. 1880, 1043 fms. (+ radiograph). ISH N° 102/73, ♂ 305 mm TL, "Walther Herwig" Stat. 273/73, 45° 24' N, 48° 04' W, Newfoundland slope, 13. 5. 1973, 1760—1940 m, 140' Otter-trawl (+ radiograph). VIMS, uncatalogued: 1 specimen, ♂ 267 mm, "Gillis" Cruise GI-74-04, Stat. 71, 36° 37,6' N, 74° 28' W, 17. 11. 1974; 1701 m; T<sub>b</sub> 3,96 °C; S<sub>b</sub> 34,87 ‰ (Collected by MUSICK *et al.*).

*Lycodonus vermiformis* Barnard, 1927: Paratype, BMNH N° 1927. 12. 6. 71, ♂ 264 mm TL; off Cape Point, South Africa; 460 fms (+ radiograph).

*Lycodonus flagellicauda* (Jensen, 1902) ISH N° 9/74a, ♂ 182 mm TL; "Walther Herwig" Stat. 225/74, 60° 03' N, 05° 38' W to 60° 01' N, 05° 46' W, Farøe Channel, 900—995 m, 140' otter trawl (+ radiograph). ISH N° 9/74 b, 115 mm TL (same data as ISH N° 9/74 a) (+ radiograph).

## Acknowledgements

I am grateful to Dr. G. KREFFT (formerly head of the ISH ichthyology), who brought my attention to these additional ISH specimens; to Dr. M. STEHMANN (ISH), who collected and preserved the three type specimens during 1971 on board with the correct generic identification, who provided radiographs, and brought with him in 1978 the specimens on loan to Argentina, and critically improved the manuscript as well as formulated the 'Kurzfassung'; to Dr. L. BÜRKELE (Zool. Mus. Univ. Hamburg), who kindly improved the English

text of the manuscript; to M. E. ANDERSON (Virginia Institute of Marine Science = VIMS, USA), who provided important literature on different species of *Lycodonus* and particularly first hand information about the holotype of *L. ophidium* (Jensen, 1902) as well as about two *L. mirabilis* from the NW-Atlantic; to A. WHEELER (British Museum Natural History = BMNH, London), who undertook for me the re-examination of the paratypes of *L. vermiformis* Barnard, 1927.

### C. *Lycodonus malvinensis* sp. n.

#### a) Material

*Holotype*: ISH N° 200/71 b, ♀ 249 mm TL; "Walther Herwig" Stat. 219/71; 49° 58' S, 55° 00' W; 23. 1. 1971; 1000 m; 140' otter-trawl;  $T_b$  2,7 °C (+ radiograph).

*Paratypes*: ISH N° 200/71 a, ♀ 237 mm TL; (same data as holotype) (+ radiograph). ISH N° 374/71, ♂ 195 mm TL; "Walther Herwig" Stat. 229/71; 52° 04' S; 56° 45' W; 25. 1. 71, 800 m;  $T_b$  3,1 °C (+ radiograph).

#### b) Diagnosis

The new species is defined by the following combination of characters: 6 to 9 "free", i.e. non-ray-bearing bony scutes in front of dorsal fin; the anteriormost dorsal scute closer to the base of pectoral fins than to their tips. Mid-part of the bony scutes in dorsal fin and hinder part of anal fin produced as a blunt spine (Fig. 2 D). Dorsal fin with 101–103 rays and anal with 96–98 rays.

Neural spines of anterior caudal vertebrae very short, measuring less than half the depth of the vertebra (Fig. 2 D).

#### Etymology

The new species was named after the Malvinas Islands Archipelago in the Western South Atlantic, in the vicinity of which the specimens were captured.

#### c) Description of holotype (Figs 1 and 2)

See table 1 for detailed measurements and meristics.

Body greatly elongated, rounded in cross section, its depth equals the width. Head slightly depressed, its dorsal profile convex, with the mesethmoid bone protruding. Nostrils in the anteriormost quarter of the snout. Eye large, its upper border slightly protruding above dorsal profile of the head. Interorbital width about one fifth of the eye. Gill opening extending downward to below lower end of pectoral fin base, its upper apex above the latter. Upper part of operculum a conspicuous free lobe.

To avoid damaging the holotype, branchiostegals and gill-rakers were not counted in the holotype; see however "Variations observed in paratypes". Posterior fleshy end of upper jaw extending to anterior quarter of the eye.



Fig. 1: *Lycodonus malvinensis* n. sp. Holotype, ISH N° 200/71 b.

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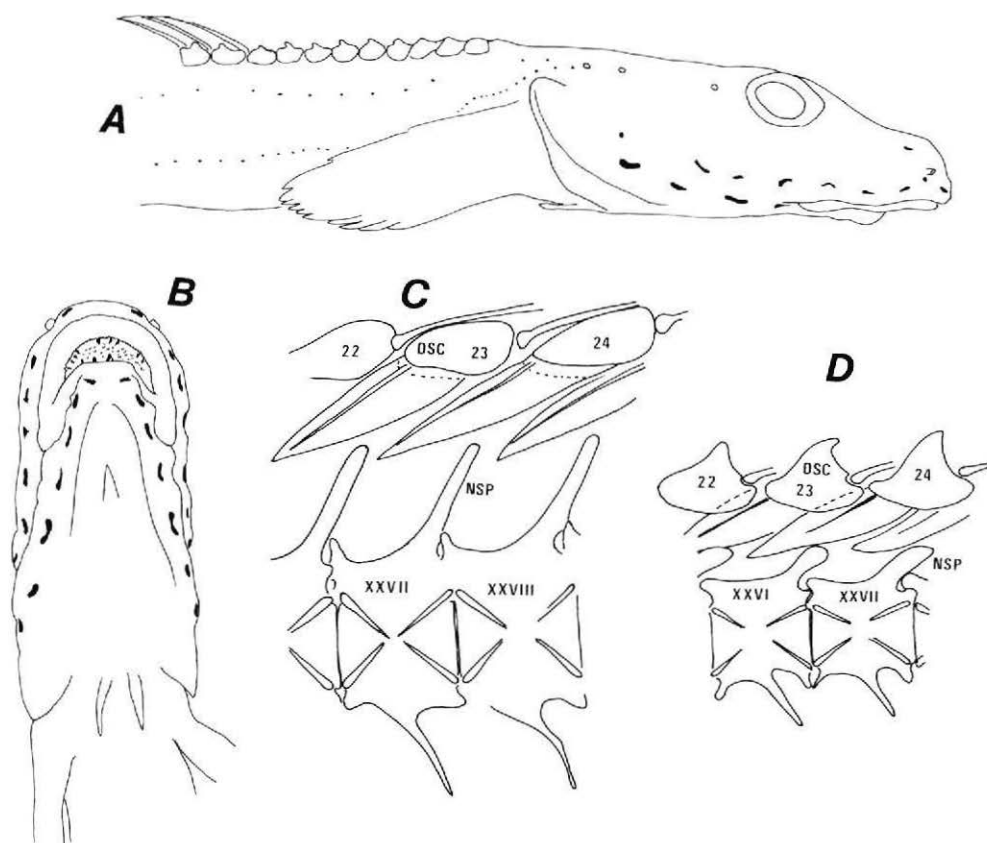


Fig. 2: A) and B) *Lycodon malvinensis* n. sp. Holotype. Lateral and ventral view of the head and anterior part of the trunk. C) *Lycodon mirabilis*. Schematic view, based on a radiograph, of the anterior caudal region of a 115 mm TL specimen. D) *Lycodon malvinensis* n. sp. Holotype. Anterior caudal region showing the very short neural spines (NSP). In both C) and D) the Arabic numerals indicate the ordinal number of the interneural dorsal scutes (DSC), the Roman numerals those of the vertebrae.

Mouth subterminal, with upper jaw greatly overhanging lower one. Both the premaxillary teeth and most of the palatal membrane are visible even when the mouth is closed (Fig. 2 B).

Premaxillary and dentary bones without differentiated caniniforms. Teeth small, conical, with slightly incurved cusps; in a single irregular row of about 12 on the premaxillary and a double row on dentary. Palatal membrane well developed, strongly papillose. Mandibular membrane rudimentary. Vomer and palatines each with 3 teeth in a row on the latter and a patch on the former.

Upper and lower lips delimited by deep grooves, which extend forward to near the symphysis of the latter, but becoming shallower near the tip of snout in the former.

Cephalic lateral-line system with large infraorbital and preoperculo-mandibular pores all of which are about 1 mm in diameter, with the exception of the last preoperculo mandibu-

lar pore which is much smaller. Postocular canal opening in 7 pores. The most anterior and posterior ones somewhat above the others which are arranged in a horizontal line more or less parallel to the upper lip.

Preoperculo-mandibular canal opening in 8 pores, extending in an arch from the upper half of head in the preopercular region to the tip of lower jaw.

Supraorbital canal opening in two pores: one situated between the anterior margin of eye and the tip of snout (somewhat nearer to the latter), the other one in front of the nostril near the tip of the snout.

Body lateral line double. One branch along the upper part of the trunk and mid-lateral line of the tail with very few scattered neuromasts. The other with closely spaced neuromasts (thinning out posteriorly), originating near the third postocular pore, borders the upper end of the opercular membrane, drops to the lower half of the trunk and turns toward the anal fin, along which it runs with widely scattered neuromasts to the end of the tail.

There are 9 bony scutes not supporting fin rays anterior to dorsal fin. The anteriormost scute is situated between the fourth and fifth neural spine, nearer to the base of the pectorals than to their tips. Mid-part of the bony scutes along this fin produced into blunt spine-like structures obvious to touch (Fig. 2).

Mid-part of bony scutes of rear part of anal fin produced into spine-like structures like those of dorsal fin.

Lower part of pectoral fin emarginate, with the integument covering the lower 5 rays thickened.

Ventrals strongly reduced.

Length of the trunk equal to that of the head.

Body and head light brown with some irregular patches of lighter pigment. Preoperculum and part of branchiostegal membrane somewhat more pigmented.

Squamation reduced to the tail region where a few very small circular scales are embedded in the skin.

Peritoneum black. Intestines folded into three parallel portions.

Ovary  $10 \times 3$  mm, with whitish oocytes up to 0,5 mm in diameter.

Vertebrae isoamphicoelous:  $21 + 92 = 113$ . The neural spines of the anterior caudal vertebrae short; their length less than one half of the depth of vertebra (Fig. 2 D). This osteological character is of great importance in distinguishing the new species from its congeners.

#### d) Variations observed in the paratypes

The results of individual measurements, morphometric relationships and meristic counts of the holotype and both paratypes are summarized in table 1.

Five branchiostegals in both paratypes. Gill rakers, examined only in the ISH N° 374/71 a, short, triangular, smooth,  $2 + 8 = 10$ .

Premaxillary and dentary each with a single irregular row of teeth in both paratypes. No caniniforms on either bone in either specimen. Left palatine of each specimen with 5 teeth, right palatine of ISH N° 200/71 a with 4 teeth, and that of ISH N° 374/71 with 3. Vomer with 6 and 4 teeth respectively.

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Cephalic lateral line system in both paratypes as in the holotype as far as the number and pattern of pores in the different canals is concerned.

Squamation completely lacking in both paratypes as opposed to the holotype.

#### D. Discussion

##### a) Comparison with other species of *Lycodonus*

No thorough analysis of the genus *Lycodonus* will be attempted in this paper, since ANDERSON (VIMS) (Pers. comm.) is engaged in the revision of *Lycodonus* Goode & Bean, *Embryx* Jordan & Evermann and *Piedrabuenia* Gosztonyi genus complex.

The new species, *Lycodonus malvinensis* can be distinguished from its congeners by particular external and internal characters. There is, however, a single unique character that clearly sets *L. malvinensis* apart from all the other species. This is the relative length of the neural spines of the anterior caudal vertebrae. In the new species these are very short (Fig. 2 D), actually measuring less than one half of the depth of the vertebra. In all the remaining species these apophyses are much longer, comprising considerably more than the above mentioned length (Fig. 2 C).

*L. malvinensis* can be distinguished from *L. flagellicauda* (Jensen, 1902) and *L. ophidium* (Jensen, 1902), which according to ANDERSON (pers. comm.) should be regarded as a synonym of the latter, and also from *L. vermiformis* Barnard, 1927, by the presence of "free", i.e., non-ray-bearing interneural bony scutes in front of the dorsal fin origin. From the last species it can furthermore be distinguished by the smaller number of vertebrae  $(20-21) + (92-93) = (112-114)$  as against  $23 + 102 = 125$ , and by the number of branchiostegal rays, of which there are 5 in *L. malvinensis* and 4 in *L. vermiformis*, as in the paratype and in 10 specimens examined by ANDERSON (pers. comm.).

From *L. mirabilis* Goode & Bean, 1883 from the NW Atlantic, which species it most closely resembles, e.g. by the presence of "free" dorsal bony scutes, it can be readily distinguished by the structure of the dorsal and some anal scutes. It can furthermore be distinguished by the much shorter neural spines of the anterior caudal vertebrae (Figs. 2 C and D).

##### b) Key to the species of *Lycodonus* Goode & Bean, 1883

- 1 a Dorsal bony scute series originating nearer the base of the pectoral fin than to its tip. The anterior 6—13 bony scutes not bearing dorsal fin rays . . . . . 2
- 1 b Dorsal bony scute series commencing closer to the tip of the pectoral fins than to their bases and all of them bearing fin rays . . . . . 3
- 2 a Mid-part of dorsal scutes flattened, not conspicuously protruding from the dorsal profile. Neural spines long . . . . . *L. mirabilis* Goode & Bean, 1883
- 2 b Mid-part of bony scutes of anterior part of dorsal fin and second half of anal, conspicuously protruding from dorsal profile in easily detectable spine-like structures. Neural spines of anterior caudal vertebrae very short . . . . . *L. malvinensis* n. sp.
- 3 a Five branchiostegal rays. About 110 vertebrae (= 25 + 85) Eye diameter more than 20 % of head length . . . . .  
. . . . . *L. flagellicauda* (Jensen, 1902) (including *L. ophidium* [Jensen, 1902])
- 3 b Four branchiostegal rays. About 125 vertebrae (= 23 + 102). Eye diameter about 15 % of head length . . . . . *L. vermiformis* Barnard, 1927

Table 1: *Lycodonus malvinensis* n. sp.  
Measurements and meristics holotype and 2 paratypes

Measurements and Meristics	Holotype		Paratype 200/71 a		Paratype 274/71		
	mm	%	mm	%	mm	%	
Total length	249,0		237,0		195,0		
Body depth	9,0	3,61 TL	8,8	3,71 TL	7,5	3,84 TL	
Body width	9,0	3,61 TL	8,7	3,67 TL	8,0	4,10 TL	
Head length	27,5	11,04 TL	25,2	10,63 TL	20,8	10,66 TL	
Head width	10,3	4,13 TL 37,45 HL	11,0	4,64 TL 43,65 HL	9,9	5,07 TL 47,59 HL	
Snout length	9,0	3,61 TL 32,72 HL	8,6	3,63 TL 34,12 HL	7,1	3,64 TL 34,13 HL	
Eye length	5,4	2,16 TL 19,63 HL	6,5	2,74 TL 25,79 HL	4,0	2,05 TL 19,23 HL	
Interorbital width	1,2	0,48 TL 4,36 HL	1,4	0,59 TL 5,55 HL	1,7	0,87 TL 8,17 HL	
Predorsal length	46,0	18,47 TL	38,8	16,37 TL	34,6	17,74 TL	
Preventral length	22,3	8,95 TL	22,0	9,28 TL	17,0	8,17 TL	
Preanal length	55,0	22,08 TL	53,4	22,53 TL	41,8	21,43 TL	
Trunk length	27,5	11,04 TL 100,00 HL	28,2	11,9 TL 112,00 HL	21,0	10,76 TL 100,00 HL	
Tail length	194,0	77,91 TL	183,6	77,46 TL	153,2	78,56 TL	
Ventral fin	length	3,7	1,48 TL 13,45 HL	4,5	1,89 TL 17,85 HL	3,6	1,84 TL 17,30 HL
	base	0,4	1,45 HL	0,7	2,77 HL	0,5	2,40 HL
	length/base		9,25		6,42		7,2
Pectoral fin	length	15,5	6,22 TL 56,36 HL	16,0	6,75 TL 63,49 HL	13,7	7,02 TL 65,86 HL
	base	5,0	18,18 HL	4,7	18,65 HL	4,0	19,23 HL
	length/base		3,1		3,4		3,4

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Table 1 (continued)

Measurements and Meristics	Holotype		Paratype 200/71 a		Paratype 274/71	
	mm	%	mm	%	mm	%
Dorsal fin rays	102,0		103,0		101,0	
Anal fin rays	98,0		96,0		97,0	
Pectoral fin rays	16; 16		15; ?		16; 16	
Caudal fin rays	4 + 4		4 + 4		3 + 4	
Free dorsal scutes	9,0		6,0		8,0	
First dorsal scute between neural spines N°	3 & 4		4 & 5		3 & 4	
Vertebrae	21 + 92 = 113		20 + 92 = 112		20 + 93 = 113	

### c) Geographical distribution

The new species is only known from the type locality on the continental slope east of the Malvinas Islands in the South Western Atlantic Ocean.

The occurrence of a *Lycodonus* species in the Western South Atlantic widens the known distribution of the genus, which was hitherto confined to deep and cold waters in the Eastern North Atlantic (*L. mirabilis*), the Norwegian Sea and to the south of Iceland (*L. flagellicauda*) and off southern South Africa (*L. vermiformis*).

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