

Andrzej KOMPOWSKI, Carlos ROJAS

Fish systematics

ON SOME DIAGNOSTIC FEATURES OF *MURAENOLEPIS* SP. (EEL-COD) FROM
THE SOUTH GEORGIA SHELF

O PEWNYCH CECHACH DIAGNOSTYCZNYCH *MURAENOLEPIS* SP.
Z SZELFU PD. GEORGII

The morphometric characters of *Muraenolepis* (commonly identified as *M. microps*) were studied. It was found a small relevance of features accepted so far as diagnostic: dorsal filament length, mental barbel length and eye diameter. The length of lateral line exceeds that in individuals of *M. microps* described so far in the available literature, reaching far beyond the anus. Its chord length being on average 49.66% of L. Stand., indicates to *M. marmoratus* presumably.

INTRODUCTION

Family *Muraenolepididae* is still a feebly known group of Antarctic fishes, when comparing to *Channichthyidae* or *Nototheniidae*. Tomo and Hureau (1985), stated that species belonging to *Muraenolepididae*: "... are not well known and a revision of the family is needed". Exactly the same statement is given by Cohen (1990). Also Chiu and Markle (1990), suggest "... additional work on taxonomy and biology of *Muraenolepis* is clearly needed". Howes (1990) indicate that: "... *Muraenolepididae* has been neglected both taxonomically and anatomically". Up to now, *Muraenolepis* being caught around the South Georgia, was recognised as *M. microps* Lönnberg, 1905 (Norman, 1938; Andriashev, 1965; Permitin, 1977; Linkowski and Rembiszewski, 1978; Howes, 1990). Also juveniles of *Muraenolepis* occurring in the water surrounding the island, were considered as belonging to the above mentioned species (Jefremienko, 1983; North, 1988). Tomo and Hureau (1985) stated in the region investigated, the occurrence of *M. microcephalus* Norman, 1937, next to *M. microps*. According to Chiu and Markle (1990) the third species, namely *M. marmoratus*, Günther, 1880, exists there, too.

If so far accepted point of view is considered, assuming *Muraenolepis* being caught in the South Georgia region as *M. microps*, so, according to recent descriptions (Tomo

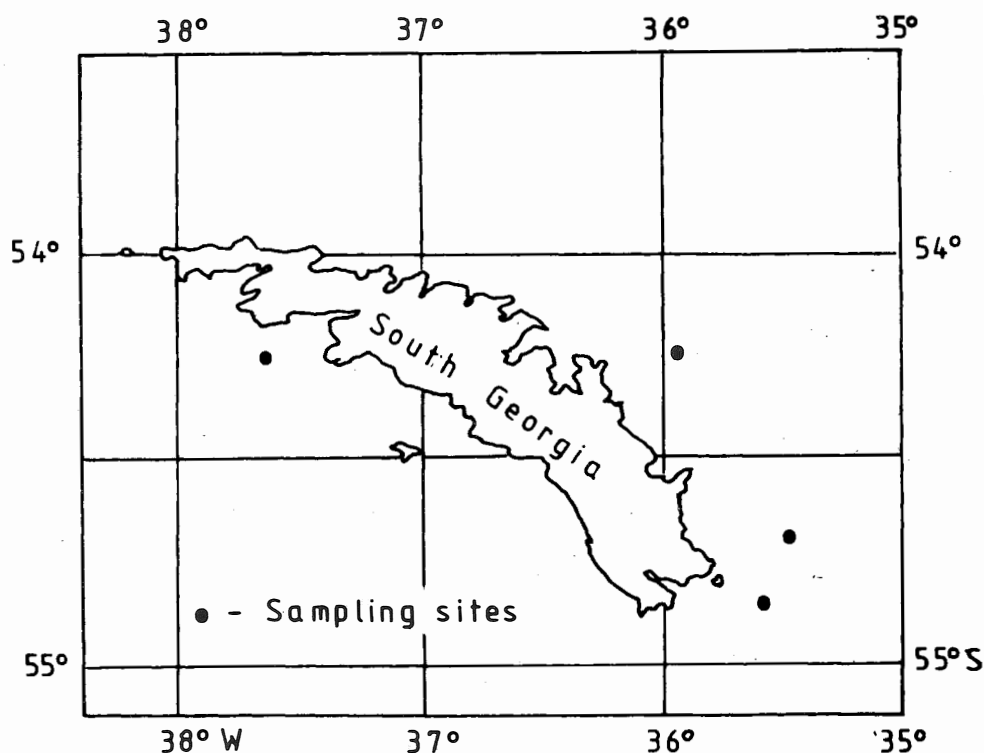


Fig. 1. Sampling sites of *Muraenolepis* sp. on the South Georgia shelf

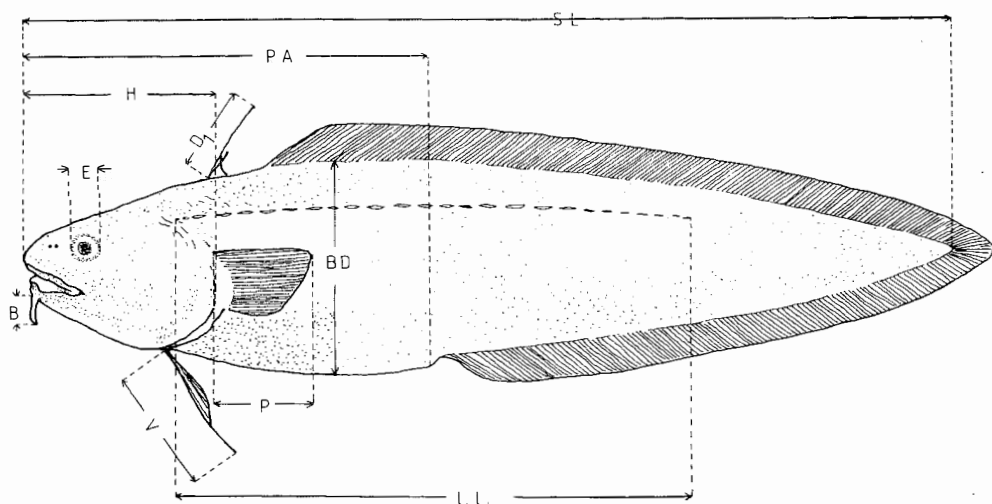


Fig. 2. Diagram of measurements made. Legend: SL — standard length; PA — preanal distance; H — head length; D1 — length of dorsal filament; E — eye diameter; B — length of mental barbel; BD — body depth; P — length of pectoral fin; V — length of pelvic fin; l.l. — chord length of lateral line

and Hureau, 1985; Cohen, 1990; Chiu and Markle, 1990), they should possess a very short lateral line, reaching only behind the tip of the pectoral fin. Norman (1938) in his work displayed the drawing of that species presenting a very similar length of lateral line. However, the authors of present work found much longer length of lateral line (reaching far beyond the anus) in all specimens examined being captured in the South Georgia region. Owing to the above mentioned discrepancies, the authors of present study decided to make further, more detailed investigations on some morphometric characters regarded as diagnostic for *Muraenolepis* genus.

MATERIALS AND METHODS

The fish studied were caught with a bottom trawl at the depth range of 220–290 m, during the research cruises of R.V. "Profesor Siedlecki" in Antarctic summer 1987/1988 and 1988/1989. Frozen *Muraenolepis* individuals were brought to the laboratory on land. The sites of fish capturing on the South Georgia Shelf are presented in Fig. 1, when Fig. 2 demonstrates the diagram of measurements made. Eighty eight fishes were examined, and their total length was ranging from 14.2 to 37.6 cm. In order to make the lateral line more visible for photographic reasons in some individuals the injection of alizarin into sensory canals was applied, using the method given by Jakubowski (1970).

Table 1

Some morphometric features of *Muraenolepis* sp. from the shelf waters of South Georgia

Feature	Range of variability	\bar{x}	Standard deviation	n
In % of SL:				
Chord length of L.L.	40.96– 59.49	49.66	4.40	67
Head length	15.15– 24.37	16.62	1.98	87
Preal distance	39.40– 54.40	46.62	3.04	84
Body depth	14.21– 19.93	18.28	2.16	43
In % of head length:				
Eye diameter	12.34– 30.00	20.90	3.71	82
Mental barbel length	11.86– 25.86	18.57	3.69	87
Length of pectoral fin	41.17– 91.66	65.43	10.31	88
Length of pelvic fin	51.47–127.77	80.12	14.84	88
Interorbital width	18.42– 44.89	26.53	4.94	40
In % of eye diameter:				
Length of dorsal filament	90.90–425.00	183.96	58.21	80

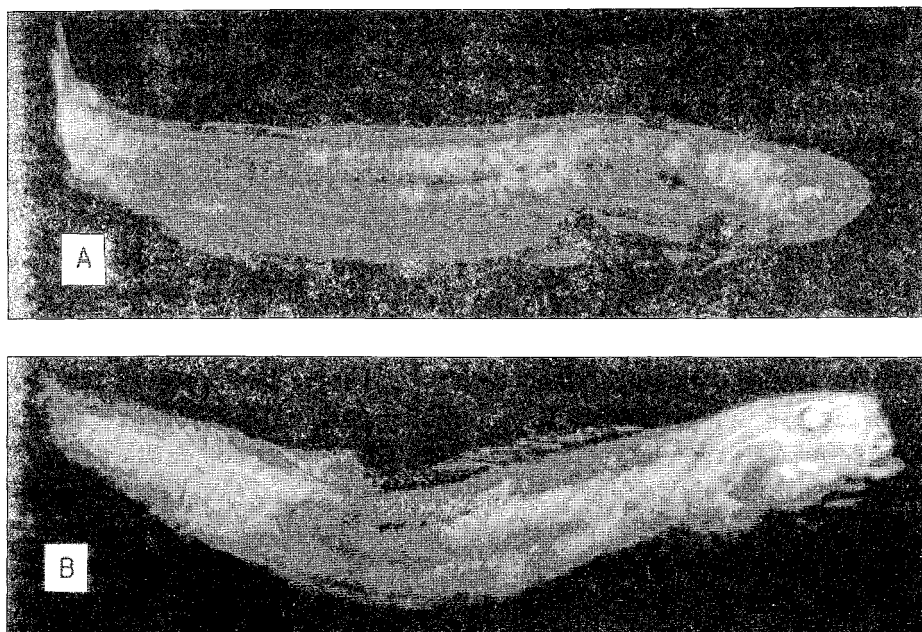


Fig. 3. Photographs of *Muraenolepis* sp. with alizarin-stained lateral line. A. — T.L. = 17 cm; B. — T.L. = 18 cm

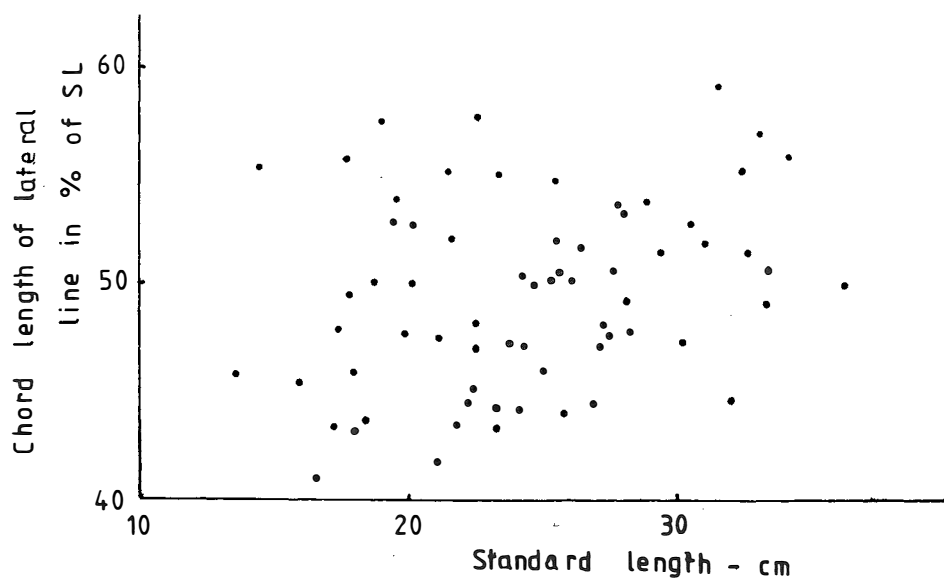


Fig. 4. Chord length of lateral line of *Muraenolepis* sp., expressed as % of S.L.; n = 67

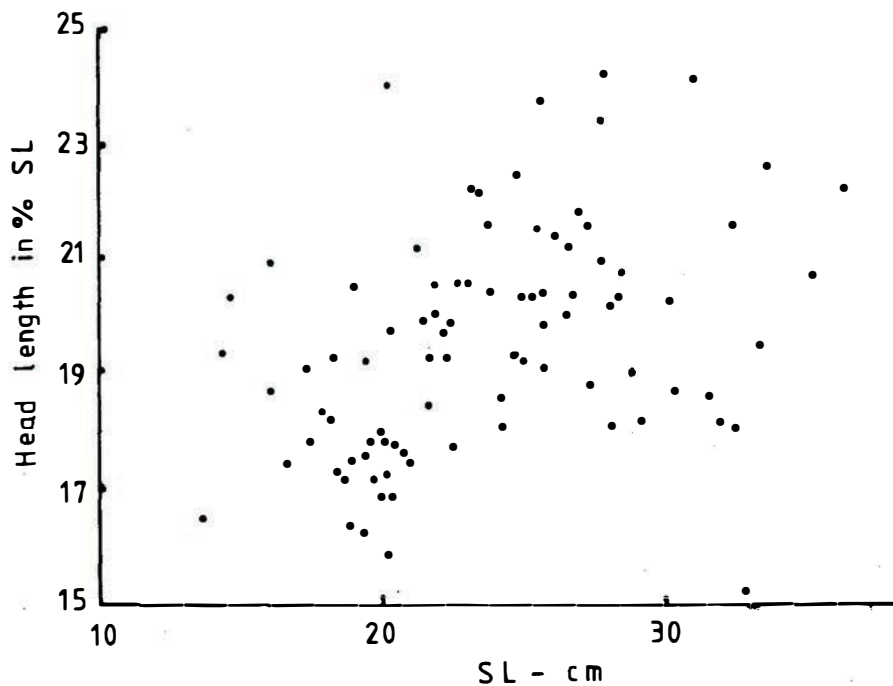


Fig. 5. Head length of *Muraenolepis* sp. expressed as % of S.L.; n = 87

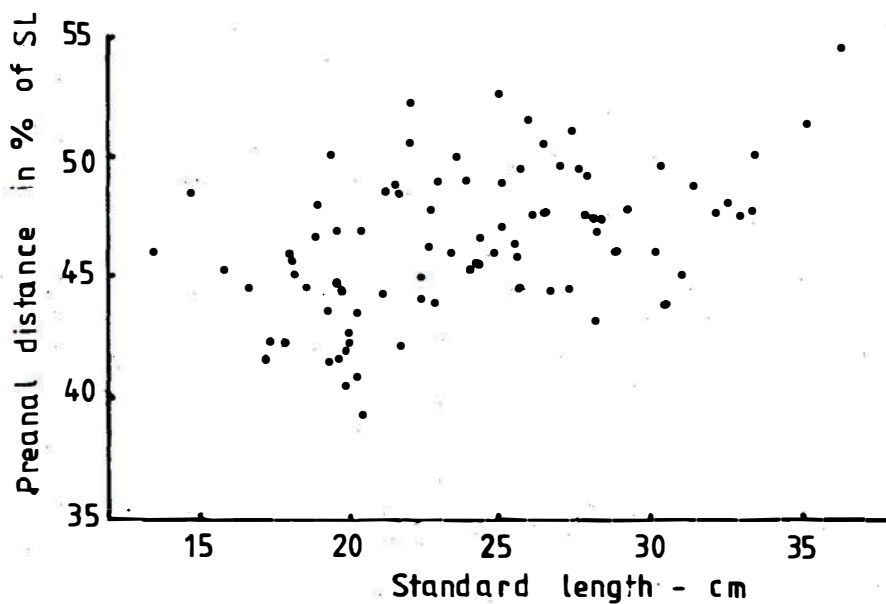


Fig. 6. Preanal distance of *Muraenolepis* sp. expressed as % of S.L.; n = 84

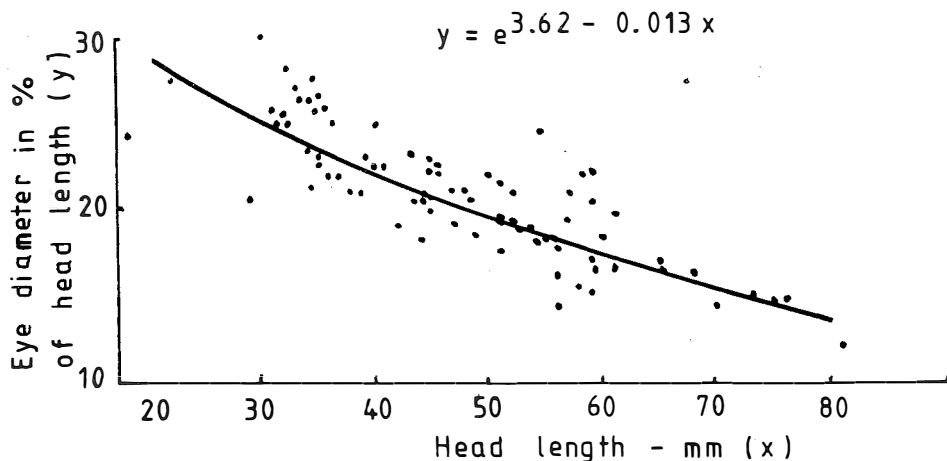


Fig. 7. Eye diameter of *Muraenolepis* sp. expressed as % of head length; $n = 82$

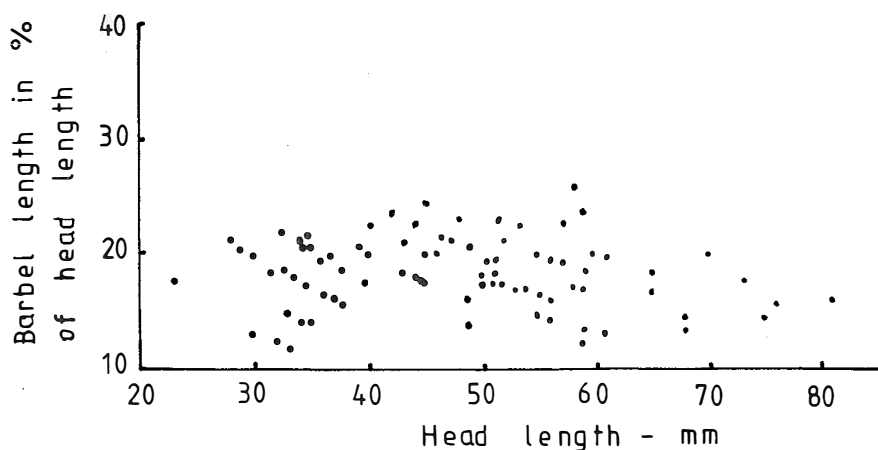


Fig. 8. Length of mental barbel of *Muraenolepis* sp. expressed as % of head length; $n = 87$

RESULTS AND DISCUSSION

Table 1 lists the results obtained.

The lateral line of fish studied is composed of pretty regularly situated pores, and as can be seen in Fig. 3 (demonstrating photographs of fish with alizarin injected in the lateral line) reaches considerably far beyond the anus. The chord length of lateral line, expressed as % of standard length, ranged within 40.96–59.49, on average 49.66 (Fig. 4, Table 1). It is interesting to note, that in the drawing presenting allegedly

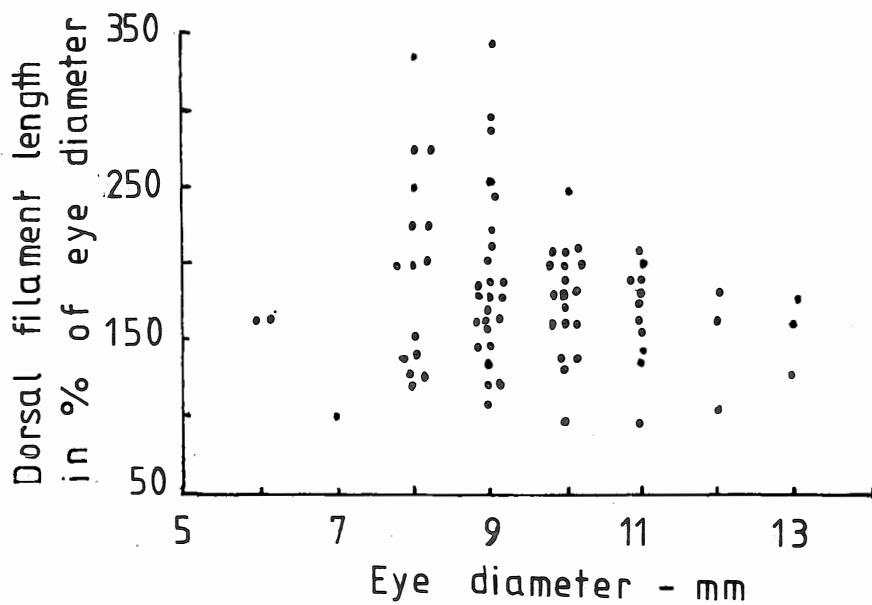


Fig. 9. Length of dorsal filament of *Muraenolepis* sp. expressed as % of eye diameter; $n = 80$

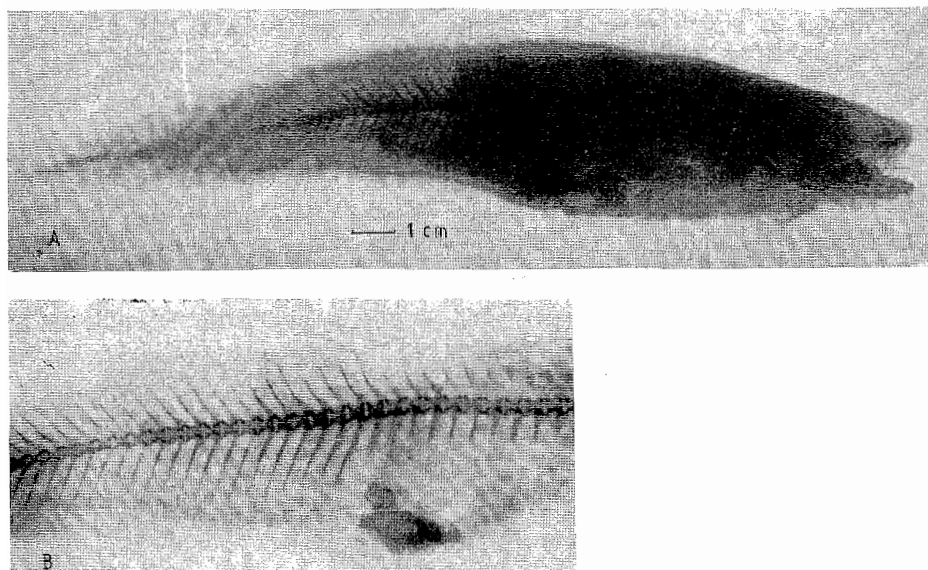


Fig. 10. Roentgenogram of *Muraenolepis* sp. skeleton; A — fish as a whole; B — a section enlarged

Table 2

Comparison of some morphometric features of genus *Muraenolepis* according to the data given by different authors

Species	Features										Source
	in % of SL				in % of head length					in % of eye diameter	
	chord length of L.L.	head length	preanal distance	body depth	eye diameter	length of mental barbel	length of pectoral fin	length of pelvic fin	interorbital distance	length of dorsal filament	
<i>Muraenolepis marmoratus</i>		19.1				25.0				100.0	Norman, 1937
	37.0 *	19.2	45.7 *	16.7–20.0							Tomo, Hureau, 1985; Cohen, 1990
		16.8–23.9		13.9–20.6							Chiu, Markle, 1990
<i>Muraenolepis oraseniensis</i>	36.9 *	15.8	41.1 *	15.0	20.0	20.0					Norman, 1937
	36.4 *	15.9	40.9 *	15.4						100.0	Tomo, Hureau, 1985; Cohen, 1990
	35.9 *										Gon, Klages, 1988
		18.3–19.6		14.9–17.7							Chiu, Markle, 1990
<i>Muraenolepis microcephalus</i>	28.5 *	16.7–17.5	43.1 *	18.2	17.2–18.9				25.0	400.0	Tomo, Hureau, 1985; Cohen, 1990
		13.1–17.7	40.2–43.7	11.8–12.6							Chiu, Markle, 1990
<i>Muraenolepis microps</i>	19.1 *	19.1–22.2	49.2 *	16.7–21.1	16.7–25.0	16.7–20.0	50–60	75–83		66.7–200.0	Norman, 1938
	18.1 *	17.9	50.8 *	20.8	18.9					200.0	Tomo, Hureau, 1985; Cohen, 1990
	75.0 *		50.4 *								Howes, 1990
		18.7–23.9	44.1–52.5	13.8–18.4							Chiu, Markle, 1990
<i>Muraenolepis</i> sp.	41.0–59.5	15.2–24.4	39.4–54.4	14.2–19.9	12.3–30.0	11.9–25.9	41.2–91.7	51.5–127.8	18.4–44.9	90.9–425.0	Kompowski and Rojas, present study

* – Data approximate, obtained by employing measurements of features on the basis of drawings only

M. microps in Howes's paper (1990) (concerning osteology of *Muraenolepididae*), the lateral line is even longer with its chord length amounting to circa 75% of SL. However Howes did not make any comments on the detail mentioned.

The remaining metric features examined, considered by Norman (1938), Tomo and Hureau (1985), Cohen (1990) and Chiu and Markle (1990) as diagnostic, show such a remarkable variability that their diagnostic significance seems to be rather improbable (Fig. 5–9, Table 1). For example, according to Tomo and Hureau (1985) and Cohen (1990) *Muraenolepis microps* should possess: "... dorsal filament no longer than twice the eye diameter; mental barbel longer than eye diameter". Still, the data obtained display dorsal filaments may being even four times longer than eye diameter, and mental barbel is not always longer than eye diameter. Furthermore, the eye diameter to head length ratio (Fig. 9) decreases with the growth of head length (negative allometry) being in agreement with the original description given by Lönnberg (1905). For better illustration of above mentioned questions Table 2 contains a comparison of some characters of *Muraenolepis* reported by different authors. To make them comparable, all data expressed as fractions were converted into per cent values. Particularly the body depth seems to be of low utility as diagnostic feature, owing to its considerable variability even in the same individual, resulted from different degree of stomach filling, stage of gonads or fish condition.

But the length of lateral line should be pointed out as pretty suitable diagnostic character. Out of four so far accepted species of *Muraenolepis* genera, two of them possess a long, reaching behind the anus lateral line: *M. marmoratus*, and *M. orangeiensis*. According to Chiu and Markle, (1990), three species, namely *M. marmoratus*, *M. microps* and *M. microcephalus* are distributed in the region of South Georgia. Among them *M. marmoratus* is characterised by a long lateral line, similarly to the all specimens investigated by authors of the present study. Moreover, according to Chiu and Markle, *M. marmoratus* shows a low number of vertebrae (67–71), when comparing to other species of *Muraenolepis*. As can be seen in the roentgenogram (Fig. 10), fishes studied for the purposes of that work also showing a low vertebrae count (67). Therefore the suggestion given by Gon (1988) should be accepted in this respect. This author did not support Efremenko's (1983) thesis concerning juveniles of *Muraenolepis* from the Scotia Sea as belonging to *M. microps*. *Muraenolepis* occurring in great abundance in the South Georgia region should be regarded either as identical with *Muraenolepis marmoratus* or as a quite distinct new species.

Thus the status of *Muraenolepis* species, inhabiting in large quantities the South Georgia region, being commonly identified as *Muraenolepis microps* Lönnberg, 1905, is still questionable, as well as there is no agreement in the species count existing in the region discussed.

REFERENCES

- Andriashev A.P., 1965: A general review of the Antarctic fish fauna (in): P. van Oye and J. van Mieghen (eds), Biogeography and ecology in Antarctica. Monogr. Biol. 15, The Hague: 491–550.
- Chiu T.S., D.F. Markle, 1990: Muraenolepididae. Eel cods. (in): O. Gon, P.C. Heemstra (eds): Fishes of the Southern Ocean. J.L.B. Smith Institute of Ichthyology: 179–182.
- Cohen D.M., 1990: Family Muraenolepididae (in): Cohen D.M., Inada T., Iwamoto T., N. Scialabba: Gadiform fishes of the World (order Gadiformes). FAO species catalogue vol. 10, Rome: 380–384.
- Gon O., 1988: The fishes collected during the South African SIBEX I + II expeditions to the Indian Ocean sector of the Southern Ocean (60–66° S, 48–64° E). S. Afr. J. Antarct. Res., 18, 2: 55–70.
- Gon O., N.T.W. Klages, 1988: The marine fish fauna of the sub-Antarctic Prince Edward Islands. S. Afr. J., Antarct. Res., 18, 2: 32–54.
- Howes G.J., 1990: The syncranial osteology of the southern eel-cod (family Muraenolepididae with comments on its phylogenetic relationship and on the biogeography of subantarctic gadoid fishes. Zool. Journ. Linnean Society, 100, 1: 73–100.
- Jakubowski M., 1970: Metody wyjawienija i okraski sistiemy kanalov bokowej linii i kostnych obrazowanij u ryb in toto. Zoologiceskij Žurnal, 49, vyp. 9: 1398–1402. [in Russian]
- Jefremienko V.N., 1983: Opisanije licinok Muraenolepis microps Lönnberg (Muraenolepididae) iz morja Skotja. Voprosy Ichtiologii, 23, vyp. 1: 149–152. [in Russian]
- Linkowski T.B., J.M. Rembiszewski, 1978: Ichthyological observations of the South Georgia coast. Pol. Arch. Hydrobiol., 25, 3: 697–704.
- Lönnberg A.J.E., 1905: The fishes of the Swedish South Polar Expedition 1901–1903. Wiss. Ergebn. Swed. Südpolarexp. Bd. 5, H(6): 1–69.
- Norman J.R., 1937: Coast fishes. Part. II. The Patagonia region. Discovery Repts. 16: 1–150.
- Norman J.R., 1938: Coast fishes. Part. III. The Antarctic zone. Discovery Repts., 18: 1–105.
- North A.W., 1988: Distribution of fish larvae at South Georgia: horizontal, vertical, and temporal distribution and early life history relevant to monitoring year-class strength and recruitment. SCCAMLR, Sel. Sci. Pap. 4, 1987: Hobart, Australia: 105–141.
- Permitin J.E., 1977: Vidovoj sostav i zoogeograficeskij analiz fauny donnyh ryb morja Skotia. Vopr. Ich., 17, vyp. 5 (106): 843–861. [in Russian]
- Tomo A., J.C. Hureau, 1985: Muraenolepididae. (in): W. Fisher, J.C. Hureau (eds): FAO species identification sheets for fishery purposes. Southern Ocean, vol. II, Rome: 306–315.

Translated: mgr inż. B. Więcaszek

Andrzej KOMPOWSKI, Carlos ROJAS

O PEWNYCH CECHACH DIAGNOSTYCZNYCH *MURAENOLEPIS* SP. Z SZELFU PD. GEORGII

STRESZCZENIE

Badane ryby, o długości całkowitej 14,2–37,6 cm złowiono włokiem dennym na głębokości 90–250 m na szelfie Pd. Georgii podczas rejsów badawczych r.v. „Profesor Siedlecki” w sezonach 1987/88 i 1988/89. Wyniki pomiarów, wykonanych zgodnie z diagramem przedstawionym na rys. 2, świadczą o tym, że badane ryby miały długą linię naboczną, sięgającą daleko za odbyt (tab. 1, rys. 3), co sugeruje, że nie może to być *Muraenolepis microps*, jak się do niedawna powszechnie sądziło o *Muraenolepis* występującym w rejonie Pd. Georgii, ale iż jest to najprawdopodobniej *Muraenolepis marmoratus*. Inne badane cechy – uznawane dotąd za diagnostyczne, wykazują taką zmienność (tab. 1 i 2, rys. 4–9), że ich wartość diagnostyczna jest raczej wątpliwa.

Author's address:

Received: 1991.10.29

Prof. dr hab. Andrzej Kompowski
Zakład Biologicznych Zasobów Morza
Akademia Rolnicza
ul. K. Królewicza 4
71-550 Szczecin, Polska (Poland)