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A Dorsal Fold in *Gymnura micrura* (Bloch and Scheneider, 1801) (Chondrichthyes: Gymnuridae)

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ABSTRACT

This paper reports a dorsal fold which is a membranous structure located on the tail of two juvenile butterfly rays, Gymnura micrura (Bloch & Scheneider, 1801), caught through artisanal fishery in the shallow waters of Maranhão State (Brazil).

Key Words: Elasmobranchii, rays, teratogeny, South America, Brazil

INTRODUCTION

The family Gymnuridae belongs to the order Rajiformes and possess two genera and fourteen species, most of them distributed in the coastal zone (Figueiredo, 1977; Compagno, 1984). In Brazil, the family is represented by two species of the genus *Gymnura*: *G. altavela* (Linnaeus, 1758) and *G. micrura* (Bloch and Scheneider, 1801). Both species are widely distributed throughout the coastal areas of the Atlantic Ocean with some records from the Indian Ocean. However, in this part of the world, the records of *G. micrura* probably refer to other species (Eschmeyer, 2004). In South America, the species seems to have a disjunct distribution, with *G. micrura* occurring in the north and *G. altavela* in the south (Figueiredo, 1977; Compagno, 1984, Humann and Deloach, 2002; Léopold, 2004; Froese and Pauly, 2007), although Menni and Stehmann (2000) and Eschmeyer (2004) have cited *G. micrura* from southern Brazil.

These two *Gymnura* species are coastal and benthic animals of shallow waters inhabiting the sandy and muddy bottoms in estuaries and mouths of rivers. *G. micrura* presents a variable color pattern, with a gray, light to olive green, pink or dark brown dorsal region, with or without dispersed spots, and a white tending to yellow ventral surface. Morphologically, the species is characterized for presenting a disc width larger than the total length, reduced disc length and pelvic fins with straight margins, which in profile resembles a quadrilateral. The back, as well as the tail, is deprived of fins (Bigelow and Schroeder, 1953; Compagno, 1984).

This paper reports the occurrence of a dorsal fold (congenital disorder) located on the tail of two specimens of *G. micrura* caught in the Maranhão State (Brazil).

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MATERIAL AND METHODS

Between October 1997 and February 1999, a total of 18 *G. micrura* rays were caught along the coast of Maranhão. During this period, the specimens were obtained in cruises of the LABOHIDRO I boat and bought from the local fisheries. The catches were performed in cruises between the depths of 8 to 25 meters using nets of 500 to 1000 fathoms, 4 fathoms long and a mesh of 8 centimeters (Stride, 1992; Nunes *et al*, 2005). Morphometric data were obtained using a steel pachymeter, according to Last (2004). The tails were X-rayed using the Funk 1070 odontological X-ray equipment (10mA, 60kV). The specimens were deposited in the Fish Collection of the Oceanography and Limnology Department of the Universidade Federal do Maranhão (Maranhão Federal University), under the numbers CPDOL 97610 and CPDOL 99611.

RESULTS AND DISCUSSION

From the eighteen *G. micrura* studied specimens, only two of them presented a dorsal fold. The anatomic formation observed corresponded to a small membranous expansion located in the middle point of the tail (Fig.1-2). This structure has nothing to do with the keel reported by Bigelow and Schroeder (1953), which is located on the upper surface of tail. The analysis of the X-ray images suggested an adipose structure deprived of sustentation rays. This condition was similar to the additional structure observed by Ben Brahim and Capapé (1997), which reported a case of a supplementary dorsal fin in the ray *Torpedo torpedo* (Linnaeus, 1758), caught in the Tunisian Mediterranean Sea.

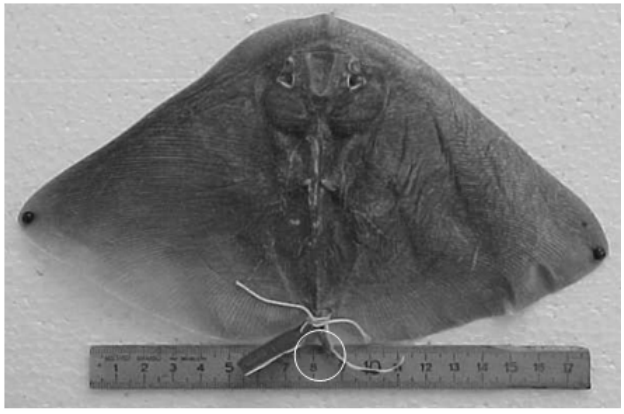

Figure1 - Specimen of *G. micrura* caught in the coastal region of the Maranhão State (Brazil) with dorsal fin.

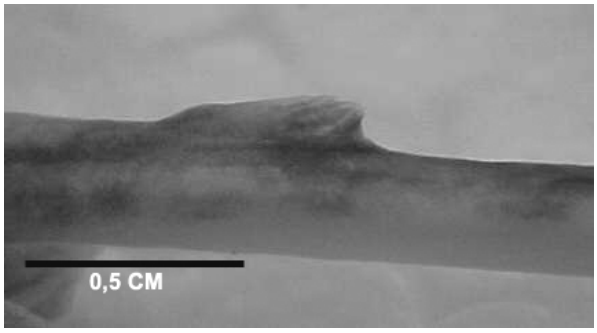

Figure 2 - Dorsal fin on the tail of a *G. micrura* specimen caught in the Maranhão State (Brazil).

Old illustrations and descriptions of elasmobranchii show great morphological variations and treat as "monstrosities" the specimens that present teratogenic anomalies. (Bureau, 1890 *apud* Ben Brahim and Capapé, 1997). In many ray species, congenital disorders were responsible for the creation of new taxa, which were subsequently rejected after refined studies concerning their embriology (Müller and Henle, 1841 *apud* Rosa *et al.*, 1996). Reporting a teratogenic structure in the fins of *Potamotrygon motoro* Müller and Henle, 1841, Rosa et al. (1996) observed that this anomaly did not compromise the biological activities, given that the nutritional conditions were considered normal. For the taxonomical identification of the studied specimens, morphometrics (Table 1) and morphological features presented by Bigelow and Schroeder (1953), Figuereido (1977) and Compagno (1984) indicated that all the specimens belonged to the species *G. micrura*, including the two individuals with the dorsal membranous structure.

The fold observed in *G. micrura* from Maranhão was probably related to some teratogenic effect or pedomorphosis process, deserving further studies in order to explain these questions.

Table 1 - Morphometric data of two specimens of *G. micrura* with a dorsal fold (CPDOL 97610 and CPDOL 99611) and a normal specimen (X = average; SD = standard deviation, N = number of individuals). Measures expressed in centimeters.

Morphometric Variables	Individuals with dorsal fold		Individuals without dorsal fold		
	97610	97611	X + SD	N	Range
Disc Width	21.7	17.8	22.28 + 5.49	16	16.0 – 35.9
Disc Length	12.7	10.5	12.91 + 3.73	16	8.8 – 22.8
Total Length	15.9	14.0	16.75 + 4.89	16	11.7 – 28.35
Caudal fin - Length	4.0	3.8	4.59 + 1.43	16	3.1 – 8.2
Interorbital Width	2.2	1.9	2.55 + 0.7	16	1.4 – 4.2
Distance between narial apertures - maximum	1.5	1.3	1.51 + 0.43	16	1.15 – 2.5
Interspiracular Width	1.9	1.6	2.17 + 0.61	12	1.6 – 3.5
Orbit diameter	0.5	0.5	0.41 + 0.1	16	0.3 – 0.7
Mouth Width	1.7	1.4	1.78 + 0.62	16	0.9 – 2.9
Snout to Cloaca	10.7	9.4	10.88 + 3.1	16	7.3 – 18.3
Snout to Mouth	2.2	2.2	2.48 + 1.0	16	1.3 – 5.05
Distance between 1^{st} and 5^{th} gill openings	1.5	1.5	1.74 + 0.52	16	1.1 – 2.9
Distance between 1^{st}-1^{st} gill openings	3.4	3.1	3.59 + 0.93	12	2.5 – 5.35
Distance between 3^{rd}-3^{rdt} gill openings	3.2	2.8	3.08 + 0.92	12	1.7 – 4.9
Distance between 5^{th}-5^{th} gill openings	2.5	2.3	2.35 + 0.61	11	1.75 – 3.7

RESUMO

Neste manuscrito registra-se uma nadadeira dorsal em dois espécimes juvenis de *Gymnura micrura* (Bloch and Scheneider, 1801) capturadas pela pesca artesanal em águas rasas do estado do Maranhão (Brasil).

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