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NOTA CIENTÍFICA

DISTRIBUTION OF *Scyllarus depressus* (SMITH, 1881) (DECAPODA: SCYLLARIDAE) OFF SOUTH-SOUTHEASTERN COAST OF BRAZIL

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ABSTRACT

The slipper lobster *Scyllarus depressus* (Smith, 1881) is captured as by-catch of trawling fisheries in Brazilian waters and is suffering this impact although it lacks commercial value. The goal of this study was to review the distribution of this species from deposited specimens in different zoological collections of Brazil. It was possible to rectify the occurrence, range and depth, and estimate its egg count; it's occurrence is now extended: USA (from Massachusetts to Floria), Gulf of Mexico, Antilles, Venezuela, Guianas and Brazil (From Pará to Ro Grande do Sul). The occurrence of *Bathyarctus ramose* was also extended south (to Rio de Janeiro) and to 592m deep.
Keywords: Slipper lobster, Fishery, Achelata.

Resumo

Distribuição de *Scyllarus depressus* (SMITH, 1881) (DECAPODA:SCYLLARIDAE) na costa Sudeste-Sul do Brasil

As lagostas sapateiras *Scyllarus depressus* (Smith, 1881) são capturas como fauna acompanhante nas pescarias de arrasto de fundo em águas brasileiras e, apesar de não apresentarem valor comercial, sofrem com este impacto. O objetivo do presente estudo foi realizar uma revisão na distribuição desta espécie a partir de material depositado em diferentes coleções zoológicas do Brasil. Foi possível corrigir sua ocorrência geográfica e em profundidade, além de estimar a contagem de ovos na massa ovígera. Sua ocorrência agora estende-se do Atlântico Ocidental Norte, dos Estados Unidos – de Massachussets até a Flórida, Golfo do México, Antilhas, Venezuela, Guianas e Brasil (do Pará até o Rio grande do Sul). A ocorrência de *Bathyarctus ramosae* também foi ampliada, estendendo-se ao Sul (até o Rio de Janeiro) e até 592 metros de profundidade.
Palavras-chave: Lagosta Sapateira, Pesca, Achelata.

INTRODUCTION

Slipper lobsters or Spanish lobsters belong to the Scyllaridae, a small decapod family with 85 described species, in 20 recent genera (De Grave *et al*., 2009). Their size vary from small to large, with body more distinctly prominently flattened than in any other group of lobsters. Fischer (1978) wrote that slipper lobsters presents "carapace usually granular, sometimes with blunt spines; eyes movable but recessed into anterior margins of carapace. Antennae short and broad, scale-like, lacking long flagella; antennules short and slender. Tail broad, powerful with a well-developed fan." The first four pairs of legs in both sexes and the fifth pair of leg of the males end in simple dactyli and are not chelate. The females, except those of the genus *Thenus*, have the fifth pair of legs chelate (Holthuis, 1985).

All slipper lobsters are benthic species, many of them living on level bottoms (sand, mud or rock) but some preferring reef areas like the spiny lobsters (Palinuridae family). Specifically to Brazil, there is no established fishery for any of the Western Central

Atlantic species, although some of them - especially the larger *Scyllarides* species - are fished locally or caught incidental in spiny lobster fisheries, and may hence be sporadically seen in local markets (Fischer, 1978; Duarte *et al*., 2010).

The genus *Scyllarus* has been registered only to the Atlantic Ocean and comprises nine species. In Brazilian waters, 3 of this 9 species have been recorded: *Scyllarus americanus* (Smith, 1869), *S. chacei* Holthuis, 1960 and, the main object of this study, *S. depressus* (Smith, 1881) (Melo, 1999; Serejo *et al*., 2007; Coelho *et al*., 2007; Dall'Occo *et al*., 2007, Silva *et al*., 2012).

The species *S. depressus* is up to now registered as a West-Atlantic species, occurring from Massachusetts (USA) to São Paulo (Brazil) (Melo, 1999), at depths between 30 and 536 m (Serejo et al., 2007).

Despite of its extensive occurrence in relatively shallow waters, few studies have been published directly to S. depressus, making this a remarkable work to this species and family.

This paper aims to fulfill some of the gaps on *S. depressus*, providing information about its fecundity and biogeography.

MATERIAL & METHODS

The two main crustacean collections of Rio de Janeiro State (Departamento de Zoologia da Universidade Federal do Rio de Janeiro –DZRJ – and Museu Nacional do Rio de Janeiro – MNRJ – from UFRJ), the largest in Rio Grande do Sul State (Universidade Federal do Rio Grande - FURG) and one of the main collections in Brazil, Zoological Museum of USP (Museu de Zoologia da Universidade de São Paulo - MZUSP) in São Paulo State, were visited in order to analyze all the specimens of *S. depressus* available.

In addition, the whole egg mass of six females from lot DZRJ 4897, collected in 2009 and stored in 70% alcohol were counted using a Bogorov counting chamber under a stereomicroscope, one by one. Although an underestimated information, due to the nature of the preserved material, this counting was considered important ecological parameter, and because the eggs were not fresh they were not weighted nor measured. All six analyzed females were measured (total length - TL, and carapace width - CW and length – CL, values in mm / Figure 1) and weighted (wet weight - WW, values in grams). Using the software PAST (version 3.01 – Hammer et al., 2001), a Spearman correlation between the number of eggs from the masses and the females respective TL and CW was made in attempt to see if the body dimensions of the female are related to how many eggs they are able to carry.

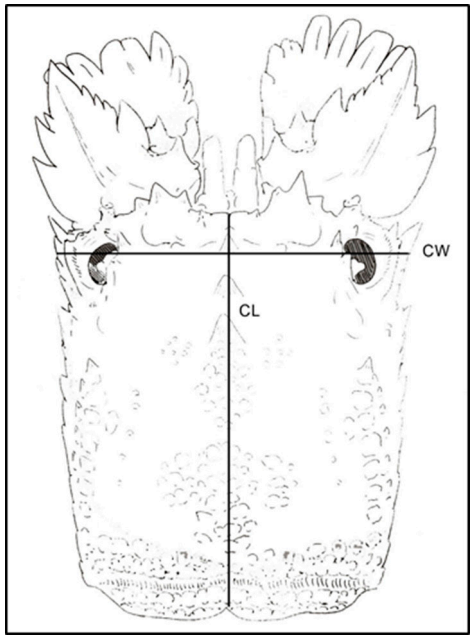

Figure 1. *Scyllarus depressus* carapace scheme with carapace width (CW) and length (CL).

RESULTS & DISCUSSION

A total of 85 specimens analyzed (being 36 ♂ and 49 ♀), from 18 lots in the four collections (Table 1), enabled this work to provide more information about *Scyllarus depressus* of Brazilian coastal zone.

The egg masses count varied from 4471 to 15538 eggs (Table 2), showing a positive Spearman correlation between the number of eggs and TL (0.83), CW (0.83) and CL (0.71).

Although it is an underestimated value, *Scyllarus depressus* females shows an average egg production comparing to size similar Scyllarids lobsters like Scyllarus americanus and Petrarctus demani (Lavalli & Spanier, 2007).

As a record, the female from lot DZRJ 4897 with CL = 27.67mm is the largest and heaviest specimen from all the 85 specimens analyzed in the present study.

From the visit made to MNRJ collection we have noticed that one of the lots deposited as S. depressus (MNRJ 13699) was misidentified and, in fact, it is an female exemplary of *Bathyarctus ramosae*, (Tavares 1997), that can be distinguished by the additional ridge on the fourth antennal segment, as shown in figure 2 (Tavares, 1997).

Table 1. Samples of *Scyllarus depressus* analyzed at the four main marine crustacean collections of Brazil with respective date, location coordinates, depth (m) and number of specimens (N).

Collection	Registration Number	Date	Location coordinates		Depth (m)	N
DZRJ	4897	june 2009	23°01.091'S	042°24.319'W	61	36
FURG	378	january 1983	31°10'S	050°34'W	46	4
FURG	377	august 1983	32°16'S	051°25'W	86	8
FURG	2349	may 1996	23°S	45°W	51	1
MNRJ	5703	march 1971	-	-	-	1
MZUSP	749	1909	-	-	-	1
MZUSP	9322	march 1969	30°08'S	49°49'W	46	1
MZUSP	9318	september 1970	21°42'S	40°15'W	90	1
MZUSP	9222	1973	18°54'S	38°40'W	19	1
MZUSP	9074	august 1973	32°16'S	051°25'W	86	1
MZUSP	8812	april 1986	23°50'S	45°10'W	40	1
MZUSP	8811	july 1996	23°47'S	44°58'W	50	1
MZUSP	14086	march 2001	23°S	45°W	-	9
MZUSP	14087	april 2001	23°S	45°W	-	8
MZUSP	17896	january 2007	22°S	44°W	-	1
MZUSP	20812	november 2007	22°5'S	42°3'S	50	4
MZUSP	8365	-	-	-	-	1
MZUSP	12375	-	-	-	-	5

This modification extends *B. ramosae* geographical distribution towards south, to Rio de Janeiro (21º48'S 040º01'W), as noticed by Dall'Occo (2010), and its bathymetric range to 592 meters deep.

Therefore, the only specimen of *S. depressus* found in MNRJ collection is in the lot MNRJ 5703. The exemplary cited by Serejo *et al*. (2007) to expand the species batimetric boundary was not found, consequently, we suggest to maintain the previous registration of 260 meters deep as seen in Melo (1999).

The species *S. depressus* bathymetric occurrence and bottom type preference (Melo 1999) make this species very susceptible to be capture as by-catch of the pink-shrimp (*Farfantepenaeus brasiliensis* and *F. paulensis*) trawling fishery as happened with the 36 specimens of the DZRJ collection from a single five hours trawling sample and also the one specimen from lot 2349 FURG (Keunecke *et al*., 2007). Probably, trawling is the most threatening human activity for *S. depressus* and much more of its biology could be learned if the scientific community joint forces with the fishery industry.

In the FURG taxonomic collection, our analysis showed two individuals collected at 32°16'S/51°25'W (FURG 377) and 31°10'S/50°34'W (FURG 378), which are on the continental shelf of Rio Grande do Sul, both collected in 1983 on different projects. These represent new occurrences for this species towards South (Figura 3), until now its boundary to the South was São Paulo State, around 25°10'S

Figure 2. MNRJ 13699 female left antennae dorsal view. Scale = 5 mm.

Tabela 2. Eggs count from ten females of lots FURG 377 and DZRJ 4897 and their respective total length (TL) and carapace length (CL) and width (CW).

Collection	Registration Number	TL	CL	CW	Weight (g)	Nº of eggs
DZRJ	4897	9.98	20.18	20.78	7.6	4471
		10.79	22.5	22.93	9.5	4963
		9.86	20.6	20.62	7.4	6052
		10.91	22.13	22.32	9.1	6435
		12.68	24.5	25.21	13.4	12543
		14.61	27.67	28.44	19.7	15538
Mean		**11.47**	**22.93**	**23.38**	**11.12**	**8334**
Standard Error		**0.75**	**1.14**	**1.22**	**1.93**	**1868**

Figura 3. Gographic distribution of *Scyllarus depressus*.

(Melo, 1999).

Concluding, *S. depressus* occurs along Western Atlantic continental shelf, ranging from Massachusetts (United States) to Southern Brazil (Rio Grande do Sul) from shallow waters (30 meters) to 260 meters deep.

Regarding the count of eggs per female, our study indicates a wide variation, that seems to increase in number as the females carapace size grows.

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