

FIRST RECORD OF THE SPINED PYGMY SHARK, *SQUALIOLUS LATICAUDUS* (SMITH & RADCLIFFE, 1912) IN THE AZORES, EXTENDING ITS DISTRIBUTION IN THE NORTH-EASTERN ATLANTIC

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This paper reports the first observation of the spined pygmy shark, *Squaliolus laticaudus*, from the Azores, extending its westernmost distribution in the North-eastern Atlantic as far as this archipelago. The occurrence of this species in the Macaronesian archipelagos is also discussed.

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A presente nota documenta a primeira observação do tubarão-anão, *Squaliolus laticaudus* (Smith & Radcliffe, 1912), nos Açores, estendendo a sua distribuição ocidental no Atlântico Nordeste até ao arquipélago. A ocorrência da espécie nos arquipélagos macaronésicos é igualmente discutida.

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The spined pygmy shark, *Squaliolus laticaudus* (Smith & Radcliffe, 1912), described by SEIGEL (1978) as "the smallest known species of shark," is a deep-sea squaloid shark that is easily distinguished because it is the only shark with a fin spine on its first dorsal fin but which lacks one on its second dorsal fin (COMPAGNO 1984).

Since the description of the genus *Squaliolus* and *S. laticaudus* (Smith & Radcliffe, 1912) a strong debate arose concerning the validity of the genus. Soon after this description, GARMAN

(1913) synonymized *Squaliolus* with its closely related genus *Euprotomicrus* (Gill, 1864). The latter was retained in subsequent literature until the former's resurrection by HUBBS & MCHUGH (1951). Meanwhile, two additional forms of *Squaliolus* were described (*S. sarmenti* De Noronha, 1926 and *S. alii* Teng, 1959). Through the examination of specimens available in collections world-wide, SEIGEL et al. (1977) supported the monotypic character of the genus *Squaliolus*, represented by *S. laticaudus*, and

recommended that the differences previously used to distinguish other forms, should be considered as "variations shown by widely distributed conspecific populations". The genus was subsequently revised by SEIGEL (1978) and retained as monotypic by later authors (COMPAGNO 1984; MCEACHRAN & BRANSTETTER 1984). Finally, SASAKI & UYENO (1987) confirmed the synonymy of *S. sarmenti* with *S. laticaudus*, but resurrected *S. alii* as a distinct species.

Despite the rare occurrence of *S. laticaudus* world-wide, the limited number of recorded captures reflects the wide geographical distribution of the species in the three major oceans, eastern and western Atlantic, western Pacific and western Indian Ocean (SEIGEL 1978). Here we describe the first occurrence of *S.*

*laticaudus* in the Azores Islands, extending its distribution in the Macaronesian archipelagos (Azores, Madeira, Canary and Cape Verde) (LLORIS et al. 1991; SANTOS et al. 1995) and in the North-eastern Atlantic Ocean. During the Spring (21 March to 18 May) of 1997, a demersal fish cruise survey carried out by the R/V *Arquipélago*, took place in the Azores (the ARQDAÇO-08-P97 cruise). Depth strata ranging from 50-1200 m depth were fished using bottom longlines with hook number 9 baited with horse mackerel, *Trachurus picturatus* (Bowdich, 1825). On March 24, 1997, a female of *S. laticaudus* (Fig. 1) was captured on the Princess Alice Bank (38° 02' N; 29° 21' W), SW of Faial Island, Azores, at a bottom depth of approximately 700-750 m.



Fig. 1. Lateral view of the female *Squaliolus laticaudus* (275 mm TL) captured in the Azores in March 1997. A metric tape is shown at the top (colour shift equals 10 cm). Note that the specimen is not accurately aligned with metric tape.

The female of *S. laticaudus* (Fig. 1) was identified in accordance with COMPAGNO (1984) and, subsequently, the possibility of misidentification with *S. alii* excluded (SASAKI &

UYENO 1987). The total length (TL) was 275 mm, which exceeds the maximum recorded length for the species worldwide (243 mm TL; SEIGEL 1978). This individual was frozen for latter

morphometric analysis in the laboratory and subsequently included in the ichthyological collection of the Department of Oceanography and Fisheries, University of the Azores, Horta, Faial, Portugal (recorded as DOP 370). Following COMPAGNO (1984), the morphometric data for the female *S. laticaudus* from the Azores are given in Table 1.

Despite reports showing the occurrence of *S. laticaudus* near continental and island land masses, the incidence of this pelagic species has been strongly associated with high productivity areas around the former habitat (SEIGEL 1978; COMPAGNO 1984; SADOWSKY et al. 1985). Most notably, the distribution of *S. laticaudus* clearly shows a strong association with insular landmasses in the North-eastern Atlantic. In fact, the species has been reported off the Cape Verde and Madeira archipelagos (SEIGEL 1978), as far north as the French shelf of the Bay of Biscay (SEIGEL 1978), and in open North-eastern Atlantic waters (GLUKHOV & KUZ'MICHEV 1984) (Fig. 2). The present specimen provides the first record of *S. laticaudus* in Azorean waters, extending its distribution westwards within Macaronesia and the North-eastern Atlantic (cf. Fig. 2). Future citation of *Squaliolus* off the Canary Islands will extend the geographical distribution of the species for all Macaronesian archipelagos.

*Squaliolus laticaudus* seems to undertake vertical migrations on a diel cycle within its depth range (SEIGEL 1978). During the night, this species appears to migrate vertically up to 200 m depth, while during the day it retreats to the bottom of its depth range, referred by SEIGEL (1978) down to a maximum of 1600-2000 m. The present female *Squaliolus* was captured at dawn, at supposedly the bottom depth of 700-750 m depth. During soaktime, the longline stayed near bottom and the hook that captured the spined pygmy shark fished within the 700-750 m depth strata. However, this depth range should be regarded with caution. Since this species is pelagic there is a possibility that this shark was

captured in shallower waters during longline hauling operation.

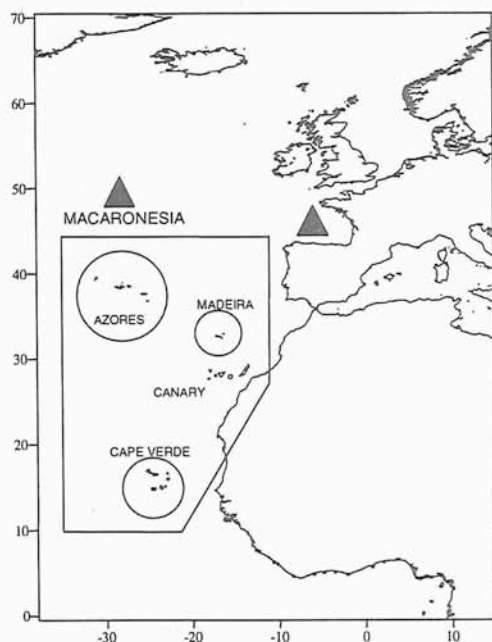


Fig. 2. Generalised distribution of *Squaliolus laticaudus* in the North-eastern Atlantic. The Macaronesia geographic area is identified following LLORIS et al. (1991). Open circles and black triangles identify respectively archipelagos and other areas where *Squaliolus* has been reported.

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Table 1

Morphometric data from the female specimen of *Squaliolus laticaudus* collected in the Azores. Terminology follows COMPAGNO (1984). All measurements presented as percentage of total length (275 mm).

BODY		EYE		CAUDAL FIN		PELVIC FIN	
Precaudal length (PRC)	85.5	Length (EYL)	5.0	Dorsal caudal margin (CDM)	14.8	Anterior margin (P2A)	5.7
Pre-first dorsal length (PD1)	35.3	Height (EYH)	3.0	Preventral caudal margin (CPV)	11.7	Posterior margin (P2P)	5.4
Pre-second dorsal length (PD2)	68.4	MOUTH		FIRST DORSAL FIN		Base (P2B)	6.5
Head length (HDL)	25.9					Inner margin (P2I)	4.2
Prebranchial length (PGI)	21.4	Length (MOL)	1.1	Anterior margin (D1A)	6.9	Length (P2L)	10.8
Prespiracular length (PSP)	15.2	Width (MOW)	6.2	Posterior margin (D1P)	3.8	WIDTH	
Preorbital length (POB)	7.5	NOSTRIL		Height (D1H)	2.9		
Prepectoral length (PP1)	25.5			Base (D1B)	6.1	Head width (HDW)	7.9
Prepelvic length (PP2)	64.0	Width (NOW)	2.8	Inner margin (D1I)	5.5	Trunk width (TRW)	9.4
Snout-vent length (SVL)	67.3	Internarial space (INW)	1.9	Length (D1L)	11.5	Abdomen width (ABW)	9.4
Interdorsal space (IDS)	27.3	SPIRACLE		SECOND DORSAL FIN		Tail width (TAW)	6.1
Dorsal-caudal space (DCS)	6.6					Caudal peduncle width (CPW)	1.9
Pectoral-pelvic space (PPS)	35.5	Length (SPL)	1.4	Anterior margin (D2A)	6.3	HEIGHT	
Pelvic-caudal space (PCA)	15.2	PECTORAL FIN		Posterior margin (D2P)	10.7		
Vent-caudal length (VCL)	32.5			Height (D2H)	2.2	Head height (HDH)	10.4
Prenarial length (PRN)	3.0	Anterior margin (P1A)	10.9	Base (D2B)	11.3	Trunk height (TRH)	11.1
Preoral length (POR)	12.7	Posterior margin (P1P)	8.7	Inner margin (D2I)	5.0	Abdomen height (ABH)	10.9
Intergill length (ING)	4.5	Height (P1H)	8.5	Length (D2L)	16.4	Tail height (TAH)	6.4
Interorbital space (INO)	6.3	Base (PIB)	4.6			Caudal peduncle height (CPH)	17.1
Eye-spiracle space (ESL)	2.6	Inner margin (P1I)	6.3			GIRTH	31.3
		Length (P1L)	10.1				

## REFERENCES

- COMPAGNO, L. J. V. 1984. FAO species catalogue. Vol. 4. Sharks of the world. An annotated and illustrated catalogue of shark species known to date. Part 1. Hexanchiformes to Lamniformes. *FAO Fisheries Synopsis*: 125. 249 pp.
- DE NORONHA, A. C. 1926. A new species of deep water shark (*Squaliolus sarmentii*) from Madeira. *Annals of the Carnegie Museum* 16: 385-389.
- GARMAN, S. 1913. The Plagiostomia (sharks, skates, and rays). *Memoirs of the Museum of Comparative Zoology, at Harvard College* 36. 515 pp.
- GLUKHOV, A. A. & A. P. KUZ'MICHEV. 1984. New record of *Squaliolus laticaudus* (Squalidae) and *Neocyttus helgae* (Zeidae) in the Northeast Atlantic. *Journal of Ichthyology* 24: 122-124.
- HUBBS, C. L. & J. L. MCHUGH. 1951. Relationships of the pelagic shark *Euprotomicrus bispinatus*, with description of a specimen from off California. *Proceedings of the California Academy of Sciences* 27: 159-176.
- LLORIS, D., J. RUCABADO & H. FIGUEROA. 1991. Biogeography of the Macaronesian ichthyofauna (The Azores, Madeira, the Canary islands, Cape Verde and the African enclave). *Boletim do Museu Municipal do Funchal* 43: 191-241.
- MCEACHRAN, J. D. & S. BRANSTETTER. 1984. Squalidae. Pp. 128-147 in: WHITEHEAD, P. J. P., M. -L. BAUCHOT, J. -C. HUREAU, J. NIELSEN & TORTONESE (Eds). *Fishes of the North-eastern Atlantic and the Mediterranean* (FNAM). Vol. I. UNESCO, Paris. 510 pp.
- SADOWSKY, V., A. F. AMORIM & C. A. ARFELLI. 1985. Record of unusual number of Dwarf shark, *Squaliolus laticaudus*, off the south coast of Brazil. *Boletim do Instituto de Pesca* 12: 45-50.
- SANTOS, R. S., S. J. HAWKINS, L. R. MONTEIRO, M. ALVES & E. J. ISIDRO. 1995. Case studies and reviews: Marine research, resources and conservation in the Azores. *Aquatic Conservation: Marine and Freshwater Ecosystems* 5: 311-354.
- SASAKI, K. & T. UYENO. 1987. *Squaliolus aliae*, a dalatiid shark distinct from *S. laticaudus*. *Japanese Journal of Ichthyology* 34: 373-375.
- SEIGEL, J. A. 1978. Revision of the Dalatiid Shark Genus *Squaliolus*: Anatomy, Systematics, Ecology. *Copeia* 1978: 602-614.
- SEIGEL, J. A., T. W. PIETSCH, B. H. ROBISON & T. ABE. 1977. *Squaliolus sarmentii* and *S. alii*, synonyms of the dwarf deepsea shark, *Squaliolus laticaudus*. *Copeia* 1977: 788-791.
- TENG, H. T. 1959. Studies on the elasmobranch fishes from Formosa. Part IV. *Squaliolus alli*, a new species of deep sea squaloid shark from Tung-Kang, Formosa. *Report of the Laboratory of Fisheries Biology, Taiwan Fisheries Research Institute* 8: 1-6.

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