

Galeus mincaronei sp. nov. (CARCHARHINIFORMES, SCYLIORHINIDAE),
A NEW SPECIES OF SAWTAIL CATSHARK FROM SOUTHERN BRAZIL

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Galeus mincaronei sp. nov. is the fifth species of the *G. arae* complex and the first *Galeus* from southwest Atlantic. Morphologically similar to *G. antillensis*, the new species is distinguished by colour pattern, fewer number of diplospondylous vertebrae, size of pectoral fin, and more geographically isolated, among the other species of the complex.

Galeus mincaronei sp. nov. é a quinta espécie do complexo *G. arae* e o primeiro *Galeus* do sudoeste do Atlântico. Morfologicamente similar à *G. antillensis*, a nova espécie é distinguida pelo padrão do colorido, número reduzido de vértebras diplospôndilas, tamanho da nadadeira peitoral, além do maior isolamento geográfico entre todas as espécies do complexo.

The difficult systematics of *Galeus* from western Atlantic were treated for the first time by Springer (1966), who described *G. cadenati*, separating it from *G. arae* (Nichols, 1927), until then known as the only representative species of the genus in the area. Later, Springer (1979) subdivided *G. arae* into a subspecific complex formed by *G. arae arae*, *G. arae cadenati* and *G. arae antillensis*, that still lasts today (Compagno, 1984, 1988; Konstantinou and Cozzi, 1998; Konstantinou *et al.*, 2000). Also of this complex, *G. springeri* Konstantinou & Cozzi, 1998 was described base on specimens previously treated as *G. arae antillensis* by Springer (1979). The first record of a *Galeus* in the southwest Atlantic indicated more sharks of the *G. arae* complex (Soto, 1998), which raised the suspicion of the existence of a new species.

The species of the *Galeus arae* complex are characterized by having: snout moderately long and pointed; preoral length about 5 to 7% of TL; prenarial snout equal or greater than eye length; eyes virtually lateral on head, without prominent subocular ridges; mouth fairly large but short, very broadly arched, its width 6.2 to 9.1% of TL; labial furrows moderately long, not confined to mouth corners; pelvic fins small, low, and angular; interspace between pelvic and anal bases much shorter than anal base; anal base short to long, 10 to 15% of TL, less than or slightly greater than interdorsal space, its origin varying from under midlength of interdorsal to just behind first dorsal insertion. Colour pattern of variegated dark saddled blotches or dark bands on body. Until the present, the species of *G. arae* complex were restricted to western North Atlantic, South Carolina to Florida; northern

Gulf of Mexico, Texas to Florida; Central America Islands, Cuba, Hispaniola, Puerto Rico, Jamaica, Lesser Antilles; and Caribbean coast from Belize to Colombia (Springer, 1966, 1979; Compagno, 1984b).

In 1988, numerous unusual catsharks were captured off State of Rio Grande do Sul, southern Brazil, by experimental fishing (baited trap). A small part of this material was placed in the Centro de Estudos Bio-Ecológicos Costeiros, Limnológicos e Marinhos (CEBECLIM) and later transferred to Museu Oceanográfico do Vale do Itajaí (MOVI). In 1993, a revision of the fish collection of the same museum, revealed a new *Galeus* species described herein.

MATERIALS AND METHODS

Measurements were taken according to Compagno (1984a) for the specimens and Gomes & Carvalho (1995) for the egg capsules (excepted the diameter of the tendrils) and converted to percent of total length. Vertebral counts were made according to Springer & Garrick (1964) and photographs were taken through stereoscopic microscope (Olympus SZPT with U-PMTVC camera) and software Image-Pro® Plus (version 3.0). Terminology for anatomical structures of the claspers follows Compagno (1988a). Institutional acronyms: AMNH - American Museum of Natural History (New York, United States); AMS - Australian Museum (New South Wales, Australia); CAS - California Academy of Sciences (San Francisco, United States); FSBC - Florida Department of Environmental Protection (Saint Petersburg, United States); MOVI - Museu Oce-

anográfico do Vale do Itajaí (Itajaí, Brazil); ROM - Royal Ontario Museum (Ontario, Canada); TCWC - Texas Cooperative Wildlife Collection (College Station, United States); UF - Florida Museum of Natural History (Gainesville, United States); UPRM - University of Puerto Rico (Mayaguez, Puerto Rico); and USNM - National Museum of Natural History (Washington, DC, United States).

***Galeus mincaronei* sp. nov.**

southern sawtail catshark / tubarão-cauda-de-serra-do-sul
Figures 1-9, Table 1-3

HOLOTYPE – MOVI 00147, mature male (404 mm TL), 30°14'51"S, 048°03'03"W, 430 m depth, off Rio Grande do Sul, Brazil, 04 Apr. 1988, baited trap, F/V "Icanhema".



Figure 1. *Galeus mincaronei* sp. nov., MOVI 00147, holotype, mature male 404 mm. Drawing by author.

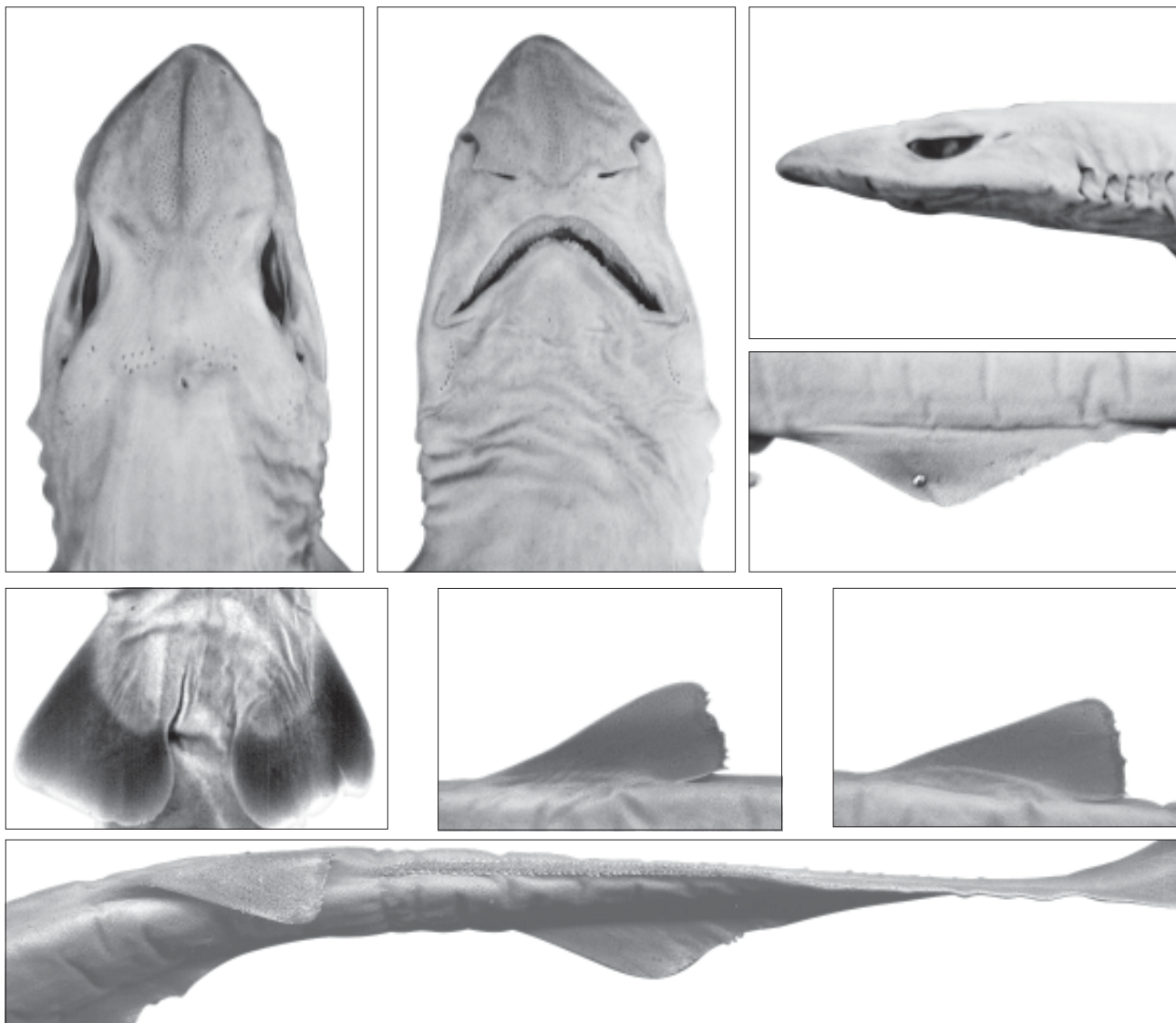


Figure 2. *Galeus mincaronei* sp. nov., MOVI 00147, holotype, mature male 404 mm. Left to right and upper to lower: dorsal, ventral and lateral view of head; anal fin; ventral view of pectoral fins; first dorsal fin; second dorsal fin; and caudal crest.

PARATYPES – Three specimens, all captured in the same haul with the holotype: MOVI 00090, ovigerous mature female (386 mm TL); MOVI 00091, immature male (237 mm TL); and MOVI 00146, ovigerous mature female (388 mm TL).

COMPARATIVE MATERIAL – *Galeus arae* - AMNH 8677 (holotype), female (157 mm TL), 366 m depth, off Miami Beach, Florida, United States. *Galeus arae antillensis* - USNM 214178 (holotype), mature female (349 mm TL), 585 m depth, 17°41'N, 065°50'W; USNM 214177 (paratype), mature female (458 mm TL), same haul with the holotype. *Galeus cadenati* - USNM 231724 (holotype), female (305 mm TL), 431-457 m depth, 09°13'N, 080°44'W, off east coast of Panama; USNM 220416 (paratype), female (285 mm TL), 0-512 m depth, 09°16'N, 081°37'W, off east coast of Panama; USNM 221414 (paratype), female (345 mm TL), 0-457 m depth, 09°15'N, 081°32'W, off east coast of Panama. *Galeus springeri* - USNM 221366 (holotype), immature male (318 mm TL), 589 m depth, 17°06'N, 062°17'W, off Leeward Islands of the Lesser Antilles; USNM 221390 (paratype), immature female (231 mm TL), 642 m depth, 17°33'N, 062°47'W; USNM 336868 (paratype), mature female (438 mm TL), same haul with the holotype.

DIAGNOSIS – *Galeus mincaronei* has been confused with *G. antillensis*. However, they are distinguished by color pattern, arrangement and number of blotches; shorter prepectoral length, 16.1-18.6% vs 19.4-21.8%; smaller pectoral anterior margin, 8.9-10.1% vs 10.2-12.7%; smaller pectoral posterior margin, 7.4-8.5% vs 8.8-11.6%; and fewer number of diplospondylous vertebrae, 35-36 (n=3) vs 39-48 (n=41), respectively (Tab. 2). The three other species of the complex, *G. arae*, *G. cadenati* and *G. springeri*, are not closely related to this new species: the first is a dwarf form (maturity between 272 to 327 mm TL); the second has a greater anal fin base (14% for females and 13% for males); and the third is easily distinguished by the longitudinal striped color pattern and presence of crest of enlarged denticles located on the ventral margin of the subcaudal fin.

DESCRIPTION – Body slender; head short, depressed; anterior nasal flaps enlarged; eyes dorsolateral; without prominent subocular ridges; labial furrows pronounced; fourth and fifth gill slits above pectoral fins; dorsal fins small; second dorsal fin slightly larger than first (Fig. 1 and 2). Tail long with precaudal dorsal crest of enlarged denticles (Figs. 2 and 3). First dorsal fin origin slightly anterior vertical from posterior insertion of pelvic fins; second dorsal fin posterior insertion slightly posterior vertical from posterior insertion of anal fin; caudal fin short; supraor-

bital crests absent on cranium. Dermal denticles of the lateral trunk with tricuspid platelike crown attached by a pedicel to a basal plate imbedded in the dermal tissue (Fig. 4); teeth in upper and lower jaws similar and multicuspid, generally tetracuspid or pentacuspid (Fig. 5); clasper moderately short and robust, hooks present, cover rhipidion vestigial and exorhipidion flat and lacking free posterior end (Figs. 6 and 7); color (based on holotype) reddish brown (fresh) or pale (fixed), with aureoled blotches on trunk - one above pectoral base, four in the pectoral-pelvic space (lateral region), one just below first dorsal fin base, three in the interdorsal space, and one just below second dorsal fin base. One dark saddle in the dorsal-caudal space is conspicuous too. Body proportions are given in Table 1.

SEXUAL DIMORPHISM – Secondary sexual dimorphism is present in mouth and slightly in tooth size (smaller in females), but not in tooth morphology (Fig. 8). The same characters mentioned by Gosztonyi (1973) on the mouth shape of *Schroederichthys bivius* are also present to lesser degree in *G. mincaronei*, which is characterized by a “U” shaped mouth, closed in males and open in females.

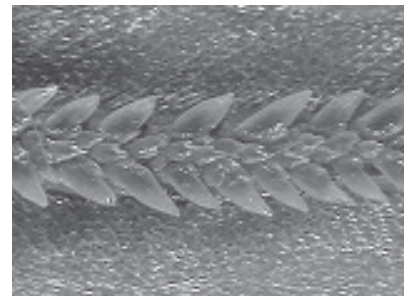


Figure 3. Enlarged denticles of the precaudal dorsal crest of *Galeus mincaronei* sp. nov., MOVI 00147, holotype, mature male 404 mm.

BIOLOGICAL AND ECOLOGICAL NOTES – Two males range in size from immature specimen 237 mm to a mature specimen 404 mm TL. The two available females are ovigerous mature specimens 386 and 388 mm TL. Organisms taken near *G. mincaronei* collecting sites indicate the species inhabits a deep-reef habitat in the shelf break, generally found in depths greater than 400 m, with deepwater gorgonians, hard corals, tube sponges, crinoids, ophiuroids, and a great number of the sympatric scyliorhinid shark *Scyliorhinus haeckelii*.

REPRODUCTION – Two egg capsules removed from the uteri of two females, confirm that *G. mincaronei* is an oviparous species with a single encapsulated egg.

Table 1. Measurements (% of TL) for Western Atlantic *Galeus* species.

Species Status	present paper			Konstantinou et al. (2000)			Konstantinou & Cozzi (1998)		
	<i>G. mincaronei</i> sp. nov.			<i>G. antillensis</i>			<i>G. springeri</i>		
Sex	paratypes			<i>G. arae</i>			<i>G. cadenati</i>		
	holotype	female	male	38 males 43 females mature	10 males 16 females	1 male 12 females	holotype	paratypes	paratypes
Development stage	male	female	male				male	2 males	8 females
	mature	mature (oviger.)	immatur.	mature	mature	immatur.	immature	mature and immature	immature
n	1	1	1	81	26	13	1	10	10
Total length (TL) (mm)	404	388	237				316		
Collection number	MOVI 00147	MOVI 00146	MOVI 00091	AMNH, TCWC	FSBC, UF, UPRM, USNM	USNM	USNM 221366	AMS, CAS, ROM, USNM	
Morphometrics	mean (S)	mean	range	mean	range	mean	range	mean (S)	range
Precaudal length (PRC)	71.5	69.2	70.2	65.8	69.2 (2.4)	-	-	-	-
Prenarial length (PRN)	5.0	5.3	4.8	5.1	5.0 (0.2)	-	-	-	-
Preoral length (POR)	6.3	7.0	6.0	6.5	6.4 (0.4)	6.4	5.0-7.5	-	-
Preorbital length (POB)	6.6	6.8	6.5	6.8	6.7 (0.2)	-	-	6.6	5.4-7.4
Prespiracular length (PSP)	10.9	12.5	10.5	11.4	11.3 (0.9)	-	-	-	-
Prebranchial length (PGI)	14.9	16.5	14.5	19.8	16.4 (2.4)	-	-	-	-
Head length (HDL)	19.1	20.4	17.9	20.3	19.4 (1.2)	-	-	-	-
Prepectoral length (PPI)	18.1	18.0	16.1	18.6	17.7 (1.1)	18.7	15.4-20.6	20.4	19.4-21.8
Prepelvic length (PP2)	40.1	37.1	39.4	36.7	38.3 (1.7)	-	-	-	19.2
Snout-vent length (SVL)	43.8	41.8	41.7	40.9	42.1 (1.2)	-	-	-	-
Prenarial length (PAL)	57.4	54.6	54.7	54.0	55.2 (1.5)	-	-	-	-
Pre-first dorsal length (PD1)	45.8	45.4	44.8	43.9	45.0 (0.8)	-	-	-	-
Pre-second dorsal length (PD2)	65.6	62.9	64.5	62.4	63.9 (1.5)	-	-	-	-
Interdorsal space (IDS)	13.9	12.1	13.5	13.5	13.2 (0.8)	12.0	10.2-14.2	13.4	12.1-15.7
Dorsal-caudal space (DCS)	2.7	2.2	2.8	3.8	2.9 (0.7)	3.0	1.8-4.5	3.8	2.9-4.9
Pectoral-pelvic space (PPS)	14.4	12.1	15.9	12.2	13.7 (1.8)	14.9	11.3-18.4	12.9	9.2-15.9
Pelvic-anal space (PAS)	11.4	7.0	7.8	7.8	8.5 (2.0)	7.8	4.2-10.4	8.9	6.7-11.8
Anal-caudal space (ACS)	4.7	4.6	4.9	6.1	5.1 (0.7)	-	-	-	-
Eye length (EYL)	3.8	4.1	3.9	3.4	3.8 (0.3)	3.6	2.7-4.2	3.9	3.4-4.3
Interorbital space (INO)	6.2	6.3	6.5	7.6	6.6 (0.6)	6.9	5.9-8.2	7.6	6.9-9.0
Nostril width (NOW)	2.8	3.0	3.1	3.0	3.0 (0.1)	-	-	-	-
Internarial space (INW)	2.4	2.7	2.5	3.0	2.6 (0.3)	2.8	2.3-3.2	3.0	2.8-3.4
Anterior nasal flap length (ANF)	1.0	0.9	1.0	1.1	1.0 (0.1)	-	-	-	-
Spiracle length (SPL)	0.7	0.8	1.0	0.8	0.8 (0.1)	-	-	-	-
Eye-spiracle space (ESL)	0.6	0.8	0.5	0.4	0.6 (0.2)	1.1	0.6-1.6	1.1	0.7-1.3
Mouth length (MOL)*	3.1	3.6	3.2	3.4	3.3 (0.2)	4.1	3.2-6.6	3.9	3.3-5.3
Mouth width (MOW)	8.9	8.5	9.2	8.9	8.9 (0.3)	8.0	6.6-9.7	8.7	8.0-9.6
Upper labial furrow length (ULA)	1.2	1.5	1.3	1.3	1.3 (0.1)	1.3	1.0-1.9	1.5	1.3-1.9
Lower labial furrow length (LLA)	1.6	1.5	1.6	1.7	1.6 (0.1)	1.6	0.9-2.3	2.1	1.5-3.0
Intergill space	-	-	-	-	-	4.0	2.0-5.7	4.0	3.0-6.6
First gill slit height (GS1)	1.2	1.0	1.4	1.3	1.2 (0.2)	1.6	1.1-2.3	1.6	1.0-2.4
Second gill slit height (GS2)	1.1	1.3	1.6	1.3	1.3 (0.2)	-	-	-	-
Third gill slit height (GS3)	1.1	1.3	1.7	1.3	1.3 (0.2)	-	-	-	-
Fourth gill slit height (GS4)	1.1	1.4	1.3	1.3	1.3 (0.1)	-	-	-	-
Fifth gill slit height (GS5)	0.7	1.0	1.0	1.1	1.0 (0.1)	0.9	0.4-1.7	0.8	0.3-1.2
Caudal peduncle height (CPH)	3.2	3.6	3.4	3.8	3.5 (0.3)	-	-	-	-
Caudal peduncle width (CPW)	2.4	2.1	2.3	2.5	2.3 (0.2)	-	-	-	-
Pectoral length (PIL)	10.0	10.6	10.2	10.5	10.3 (0.3)	-	-	-	-
Pectoral anterior margin (PIA)	9.4	10.1	8.9	9.7	9.5 (0.5)	10.8	7.5-12.6	11.3	10.2-12.7
Pectoral base (PIB)	6.3	6.8	6.5	5.7	6.3 (0.5)	-	-	-	-

Table 1. Cont.

Pectoral height (PIH)	6.7	8.1	6.9	7.8	7.4 (0.7)	-	-	-	-	-	-	-	-	-	-	-	-
Pectoral inner margin (PII)	3.7	4.1	3.6	3.8	3.8 (0.2)	-	-	-	-	-	-	-	-	-	-	-	-
Pectoral posterior margin (PIP)	7.4	8.5	8.0	7.4	7.8 (0.5)	9.5	7.5-11.6	-	-	10.2	8.8	-	9.8	8.7-10.8	9.7	8.6(1.5)	6.1-10.9
Pelvic length (PZL)	11.4	12.2	12.3	9.7	11.4 (1.2)	-	-	-	-	-	-	-	-	-	-	-	-
Pelvic anterior margin (P2A)	5.3	4.4	4.4	4.6	4.7 (0.4)	-	-	-	-	-	-	-	-	-	-	-	-
Pelvic base (P2B)	8.9	9.0	8.9	8.2	8.8 (0.4)	-	-	-	-	-	-	-	-	-	8.3	9.1(0.9)	7.4-10.7
Pelvic height (P2H)	2.0	2.1	1.8	2.1	2.0 (0.1)	-	-	-	-	-	-	-	-	-	-	-	-
Pelvic inner margin (P2I)	3.0	4.0	3.1	3.4	3.4 (0.5)	-	-	-	-	-	-	-	-	-	-	-	-
Pelvic posterior margin (P2P)	6.7	8.9	9.1	7.4	8.0 (1.2)	-	-	-	-	-	-	-	-	-	-	-	-
Clasper outer length (CLO)	10.4	-	-	2.7	6.6 (5.4)	-	-	-	-	-	-	-	-	-	-	-	-
Clasper inner length (CL)	13.4	-	-	4.0	8.7 (6.6)	-	-	-	-	-	-	-	-	-	-	-	-
Clasper base width (CLB)	2.2	-	-	1.3	1.7 (0.7)	-	-	-	-	-	-	-	-	-	-	-	-
First dorsal length (D1L)	8.0	8.8	8.2	8.2	8.3 (0.3)	-	-	-	-	-	-	-	-	-	-	-	-
First dorsal anterior margin (D1A)	7.7	8.6	8.0	8.4	8.2 (0.4)	7.6	6.2-8.8	7.8	6.9-8.6	9.3	7.3-10.5	6.6	7.6(0.5)	7.3-10.5	6.6	7.6(0.5)	6.6-8.2
First dorsal base (D1B)	6.2	6.6	6.2	6.1	6.3 (0.2)	5.0	4.1-6.0	5.0	4.2-5.4	5.7	4.8-6.6	4.3	4.4(0.5)	4.8-6.6	4.3	4.4(0.5)	3.5-5.1
First dorsal height (D1H)	4.0	4.1	3.5	3.8	3.8 (0.3)	-	-	-	-	-	-	-	-	-	-	-	-
First dorsal inner (D1I)	2.2	2.4	2.1	2.3	2.3 (0.2)	-	-	-	-	-	-	-	-	-	-	-	-
First dorsal posterior margin (D1P)	2.7	3.6	3.0	3.0	3.1 (0.4)	-	-	-	-	-	-	-	-	-	-	-	-
Second dorsal length (D2L)	8.2	9.3	8.5	8.9	8.7 (0.5)	-	-	-	-	-	-	-	-	-	-	-	-
Second dorsal anterior margin (D2A)	7.3	8.9	8.4	8.4	8.3 (0.7)	7.4	5.2-8.4	7.5	6.7-8.3	8.7	8.1-9.6	7.3	8.0(0.4)	8.1-9.6	7.3	8.0(0.4)	7.4-8.9
Second dorsal base (D2B)	5.9	7.1	6.5	7.0	6.6 (0.5)	5.1	3.9-6.0	4.9	4.2-5.7	5.5	4.7-6.2	4.4	4.9(0.3)	4.7-6.2	4.4	4.9(0.3)	4.5-5.5
Second dorsal height (D2H)	3.6	4.0	3.8	4.2	3.9 (0.3)	-	-	-	-	-	-	-	-	-	-	-	-
Second dorsal inner margin (D2I)	2.1	2.2	2.1	2.5	2.2 (0.2)	-	-	-	-	-	-	-	-	-	-	-	-
Second dorsal posterior margin (D2P)	2.7	3.6	3.1	3.2	3.2 (0.4)	-	-	-	-	-	-	-	-	-	-	-	-
Anal length (ANL)	14.1	15.2	14.8	13.5	14.4 (0.7)	-	-	-	-	-	-	-	-	-	-	-	-
Anal base (ANB)	6.6	7.5	7.8	6.8	7.1 (0.6)	6.7	5.1-8.7	6.9	5.3-8.1	7.3	6.7-9.2	6.6	6.9(0.9)	6.7-9.2	6.6	6.9(0.9)	5.3-8.5
Anal height (ANH)	12.6	12.9	13.2	12.2	12.7 (0.4)	12.0	10.1-14.2	11.0	7.9-14.1	15.0	12.6-15.9	11.0	13.0(0.9)	12.6-15.9	11.0	13.0(0.9)	12.1-14.6
Anal inner margin (ANI)	2.8	3.6	3.4	3.4	3.3 (0.3)	-	-	-	-	-	-	-	-	-	-	-	-
Anal posterior margin (ANP)	1.6	1.8	1.7	1.7	1.7 (0.1)	-	-	-	-	-	-	-	-	-	-	-	-
Dorsal caudal margin (CDM)	8.7	9.3	8.9	8.0	8.7 (0.5)	-	-	-	-	-	-	-	-	-	-	-	-
Preventral caudal margin (CPV)	28.7	30.7	29.4	34.2	30.7 (2.4)	-	-	-	-	-	-	-	-	-	-	-	-
Postventral caudal margin (CPL+CPU)	9.2	10.1	9.5	9.7	9.6 (0.4)	-	-	-	-	-	-	-	-	-	-	-	-
Subterminal caudal margin (CST)	15.1	15.7	15.5	17.3	15.9 (1.0)	-	-	-	-	-	-	-	-	-	-	-	-
Terminal caudal margin (CTR)	4.2	4.4	4.1	4.6	4.3 (0.2)	-	-	-	-	-	-	-	-	-	-	-	-
Terminal caudal lobe (CTL)	3.5	3.9	3.6	3.4	3.6 (0.2)	-	-	-	-	-	-	-	-	-	-	-	-
	5.2	5.4	4.9	6.1	5.4 (0.5)	-	-	-	-	-	-	-	-	-	-	-	-

* According to Compagno (1988b), this measurement was incorrectly shown in the diagram (Compagno, 1984a: 12) as extending from the lower symphysis to the mouth corners, but should be from the upper symphysis to the mouth corners.

Table 2. Counts of diplospondylos and precaudal vertebrae of the Western Atlantic *Galeus* species. Values for holotype are underlined.

Species	Diplospondylos vertebrae																	Precaudal vertebrae																											
	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	n	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	n				
<i>G. mincaronei</i> sp.nov.	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<u>3</u>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	3		
<i>G. arae</i>	-	-	-	4	26	45	39	20	5	1	1	141	-	-	-	-	-	-	-	9	25	32	40	21	10	2	1	1	-	-	-	-	-	-	-	-	-	-	-	-	141	-			
<i>G. antillensis</i>	-	-	-	1	5	5	8	4	8	2	6	2	41	-	-	-	-	-	-	2	5	4	4	9	1	6	2	5	2	1	-	-	-	-	-	-	-	-	-	-	-	41	-		
<i>G. cadenati</i>	-	-	-	5	4	2	1	-	-	-	-	12	-	-	-	-	-	-	-	1	2	6	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11	-	
<i>G. springeri</i>	-	-	-	-	-	-	-	-	3	5	5	1	1	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	17	-

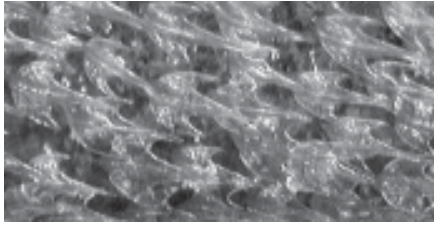


Figure 4. Dermal denticles of *Galeus mincaronei* sp. nov., MOVI 00147, holotype, 404 mm, mature male. Taken just below first dorsal fin.

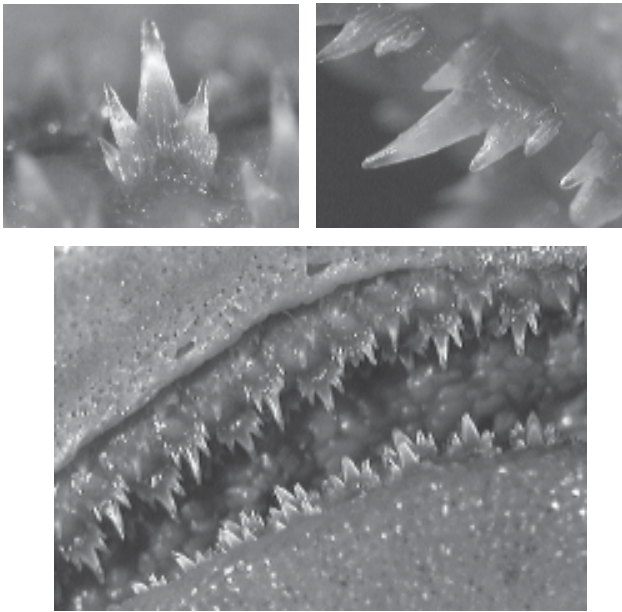


Figure 5. Teeth of *Galeus mincaronei* sp. nov., MOVI 00147, holotype, 404 mm, mature male. Taken just behind symphyseal region.

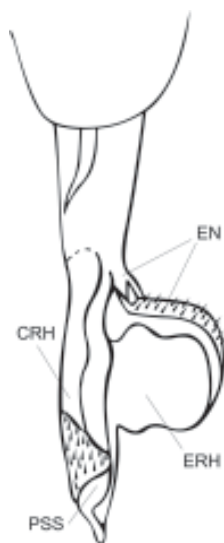


Figure 6. Morphology of the clasper of mature *Galeus mincaronei* sp. nov., (MOVI 00147, holotype, 404 mm). Abbreviations: EN, envelope; ERH, exorhipidion; CRH, cover rhipidion; PSS, pseudosiphon. Drawing by author.



Figure 7. Sexual dimorphism in the pelvic fins of mature *Galeus mincaronei* sp. nov.: MOVI 00146, paratype, 388 mm, mature female (left); and MOVI 00147, holotype, 404 mm, mature male (right).

EGG CAPSULE – The egg capsule of *G. mincaronei* is reddish (fresh) or brownish (fixed), with flat superficial texture (Fig. 9). Measurements of egg capsules are in Table 3.

Table 3. Measurements (% of TL) of egg capsules removed of the oviduct of *Galeus mincaronei* sp. nov.

Collection number	MOVI 00090	MOVI 00146
Total length (mm)	50.5	57.1
Width	39.6	37.5
Anterior border	22.0	22.1
Posterior border	10.3	8.1
Anterior lateral respiratory fissure	12.1	-
Posterior lateral respiratory fissure	8.7	8.8
Diameter of the tendrils (beginning)	0.8	0.7

DISTRIBUTION – Four specimens were collected in one station off State of Rio Grande do Sul (30°14'51"S, 048°03'03"W). According to Rincón *et al.* (1998), eight other specimens were collected in three stations off Santa Catarina State (29°13'S, 47°51'W, n=1; 29°10'S, 47°54'W, n=1; and 29°06'S, 46°55'W, n=6), establishing the northernmost record (Fig. 10). The species is probably endemic to southern Brazilian waters and allopatric with other *Galeus* species (Fig. 11).

ETYMOLOGY – The species is named *mincaronei* in honor of Michael Maia Mincarone, in recognition of his extensive work and tireless dedication to Museu Oceanográfico do Vale do Itajaí.



Figure 8. Secondary sexual dimorphism in the mouth of mature *Galeus mincaronei* sp. nov.: MOVI 00147, holotype, 404 mm, male (left); and MOVI 00146, paratype, 388 mm, female (right).



Figure 9. Egg capsule (50.5 mm TL) removed of the oviduct of *Galeus mincaronei* sp. nov. MOVI 00090, paratype, 386 mm.

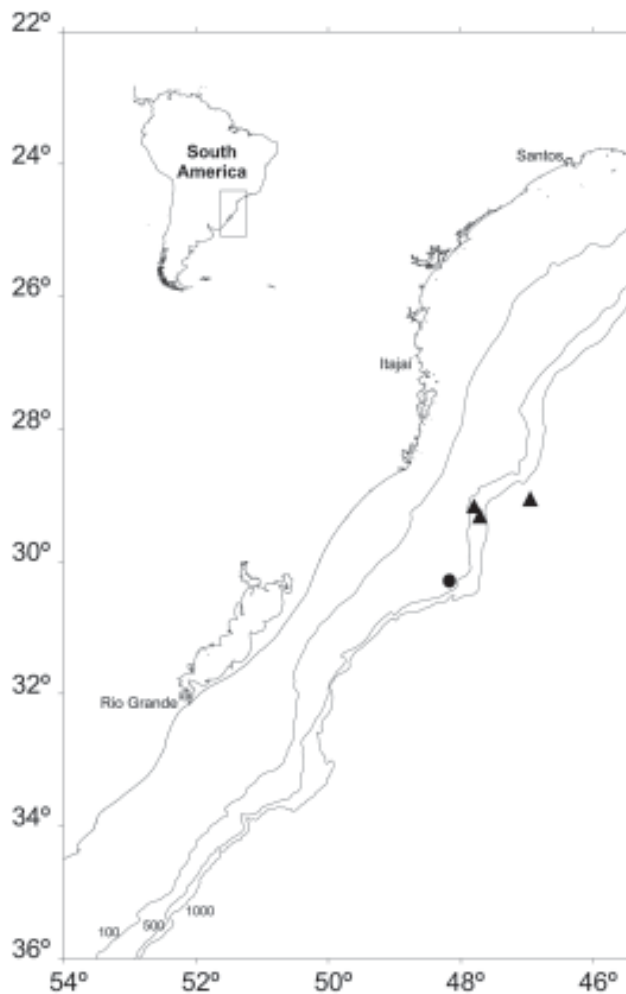


Figure 10. Records of *Galeus mincaronei* sp. nov. Type series indicated by a full circle.



Figure 11. Geographic distribution of western Atlantic *Galeus* species: *G. mincaronei* sp. nov. (M), *G. arae* (A), *G. antillensis* (N), *G. cadenati* (C) and *G. springeri* (S).

KEY TO THE WESTERN ATLANTIC *GALEUS* SPECIES

[Modified from Konstantinou *et al.* (2000)]

- 1a. Dorsolateral body surface with marbled pattern, crest of enlarged denticles located only on dorsal margin of caudal fin 2
- 1b. Dorsolateral body surface with longitudinal striped pattern, crest of enlarged denticles located on dorsal margin and ventral margin of subcaudal fin *G. springeri*

- 2a. Length of anal-fin base for adults generally equal to or greater than 14% TL for females or 13% TL for males *G. cadenati*
- 2b. Length of anal-fin base for adults usually less than 14% TL 3

- 3a. Diplospondylous vertebrae usually 38-43 (40.49 in mean); length at maturity from 272 to 327mm *G. arae*
- 3b. Length at maturity from 327 to 458 mm 4

- 4a. Prepectoral length 16.1-18.6% TL; pectoral anterior margin 8.9-10.1% TL; pectoral posterior margin 7.4-8.5% TL; diplospondylous vertebrae usually 41-48 (44.08 mean) *G. antillensis*
- 4b. Prepectoral length 19.4-21.8% TL; pectoral anterior margin 10.2-12.7% TL; pectoral posterior margin 8.8-11.6% TL; diplospondylous vertebrae usually 35-36 (n=3) *G. mincaronei* sp. nov.

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