



## Scientific Note

### New record of *Chimaera cubana* Howell-Rivero (Chondrichthyes: Holocephali: Chimaeridae) from the western Caribbean Sea

JUAN PABLO CALDAS A.<sup>1</sup>, DOMINIQUE A. DIDIER<sup>2</sup>, ADRIANA SANTOS-MARTÍNEZ<sup>3</sup>  
& ARTURO ACERO P.<sup>4</sup>

<sup>1</sup>Posgrado en Biología Marina, Universidad Nacional de Colombia, Cerro Punta de Betín, Invemar, Santa Marta, Colombia. E-mail: jpcaldasa@unal.edu.co.

<sup>2</sup>Millersville University Biology Department, Office STB-201, Pennsylvania, USA.

<sup>3</sup>Universidad Nacional de Colombia, Sede Caribe, Instituto de Estudios Caribeños, Sector Free Town, San Andrés Isla, Colombia.

<sup>4</sup>Universidad Nacional de Colombia sede Caribe INVEMAR/CECIMAR, Cerro Punta de Betín, Santa Marta, Colombia.

**Abstract.** A new record of *Chimaera cubana* is described from San Andrés Archipelago (Colombia), western Caribbean Sea. This record provides evidence of a more extensive distribution of *C. cubana* in the western central Atlantic. Morphometric data are given.

**Key words:** Caribbean Sea, *Chimaera cubana*, longline, San Andrés Archipelago, Colombia.

**Resumen.** Nuevo registro de *Chimaera cubana* Howell-Rivero (Chondrichthyes: Holocephali: Chimaeridae) en el Mar del Caribe Occidental. Un nuevo registro de *Chimaera cubana* del Archipiélago de San Andrés (Colombia), Mar Caribe occidental es presentado. Este registro provee evidencia de una distribución más amplia de *C. cubana* en el Atlántico centro occidental.

**Palabras clave:** Mar Caribe, *Chimaera cubana*, palangre, Archipiélago San Andrés, Colombia.

The family Chimaeridae, commonly known as shortnose chimaeras, rattfishes or ghost sharks, is the most speciose of the chimaeroid clade with seven species of *Chimaera* and 15 of *Hydrolagus*. These two genera are distinguished by the presence of a notch anterior to the ventral caudal fin that separates it from the anal fin (*Chimaera*) or absence of such notch (*Hydrolagus*). This family has a worldwide distribution, with the greatest diversity of species known from the Pacific coasts of Japan and New Zealand. All members have a blunt, rounded snout, and lateral line canals that are open grooves that become widened in the snout region. The tail is diphyccercal with dorsal and ventral caudal-fin lobes of nearly equal size. Tooth plates are bladelike and occlude along their anterior edges to form a sharp nipping beak. (Didier, 1993, 1995, 2002a, 2004).

From a total number of seven species of *Chimaera* recognized (Didier, 2002b, 2004), the

only species present in the western Atlantic is *C. cubana* Howell-Rivero, 1936, originally described from Cuba, off Matanzas Bay. *Chimaera cubana* is in fact widely distributed throughout the Caribbean including Jamaica, Puerto Rico, and the Lesser Antilles (Caldwell, 1966; Didier, 2002a). This is the first report from the San Andrés Archipelago, Colombia.

From December 2000 to December 2001, the composition, abundance and distribution of the incidental fish fauna associated with the industrial fishery in San Andrés Archipelago (western Caribbean Sea, Colombia) were evaluated during three cruises. A total of 28 specimens of *C. cubana* were captured in Quitasueño Bank (14° 00.73 N / 81° 11.26 W to 14° 04.45 N / 81° 88.83 W) at 234 to 360 m depth in five sets, using an 11160 m bottom longline hoisted from 100 to 360 m depth and containing 2500 to 3000 hooks.

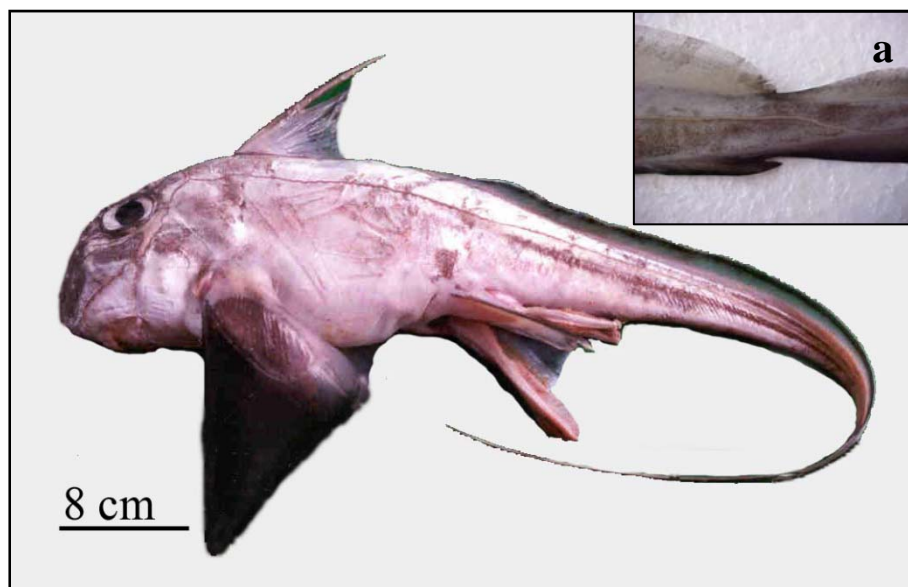
Four individuals were measured using a dial

caliper and ruler or measuring tape, based on Compagno *et al.* (1990) and Didier and Séret (2002). The following measurements were taken: Total length (TL); precaudal length (PCL); body length (BDL); dorsal edge of gill opening to origin of upper lobe of caudal fin; snout-vent length (SVL); distal tip of snout to cloacal opening; trunk length (TRL); ventral edge of gill opening to cloaca; pre-second dorsal length (PD2); pre-first dorsal length (PD1); pre-oral length (POR), snout tip to end of upper labial fold; pre-narial length (PRN); snout tip to anterior edge of nasal apertures; pre-orbital length (POB); snout tip to anterior edge of orbit; second dorsal-fin base (D2B); maximum height of anterior 1/3 of the second dorsal fin (D2PH); first dorsal-fin base (D1B); from anterior edge of fin spine to insertion of first dorsal fin; dorsal spine length along anterior margin (DSA); maximum height to first dorsal fin (D1H); dorsal caudal margin length (CDM); maximum height of dorsal lobe of caudal fin (CDH); ventral caudal margin from origin to insertion of lower caudal fin (CVM); total caudal length (CTL); from origin of upper caudal fin to end of caudal filament; maximum height of ventral lobe of caudal fin (CVH); head length (HDL); pectoral-fin anterior margin (P1A); pelvic-fin anterior margin (P2A); interdorsal space (IDS); dorsal-caudal space (DCS); anterior edge of first dorsal-fin base to anterior edge of pectoral-fin base (D1P1); anterior edge of base of first dorsal-fin to anterior edge of pelvic-fin base (D1P2); anterior edge of second dorsal-fin base to anterior edge of pectoral-fin base (D2P1); anterior edge of second dorsal-fin base to

anterior edge of pelvic-fin base (D2P2); eye length (EYL); eye height (EYH); total length of claspers from pelvic-fin base to tip (CLT); length of medial branch of claspers from fork to tip (CLM); length of lateral branch of claspers from fork to tip (CLL).

Eight measurements from the lateral-line canals of the head were taken: distance from anterior oronasal fold to center of nasal canal (ONC); length of the rostral canal (LRC); length of the nasal canal measured as a straight line distance from right to left side (LNC); distance between infraorbital and angular canal measured as the straight line distance from junction of the oral and infraorbital canal to the junction of the oral and angular canal (IOA); distance between preopercular canal and main trunk canal measured from their junction with the infraorbital canal (OTM); distance between main trunk canal and supratemporal canal measured from their junctions with the infraorbital and postorbital canals, respectively (OCL); length of supratemporal canal measured across the head from its junctions with the postorbital canal (STL); distance from anterior base of spine to the center of the supratemporal canal (SPS).

Comparative data, including measurements, description and geographical distribution of the holotype, paratype and 10 additional non-type specimens were also obtained by D. A. Didier. The following description of *C. cubana* is based on those original observations plus the four additional Colombian specimens captured in the present study. Institutional acronyms are based on Levinton *et al.* (1985).



**Figure 1.** Lateral view of *Chimaera cubana*, adult male. **a** Notch to the ventral caudal fin.

**Material examined.** INVEMAR PEC 6201, female, 719 mm TL, 450 mm BDL; Specimens Discarded, 2 males, 609/803 mm TL, 369/410 mm BDL; female, 745 mm TL, 407 mm BDL.

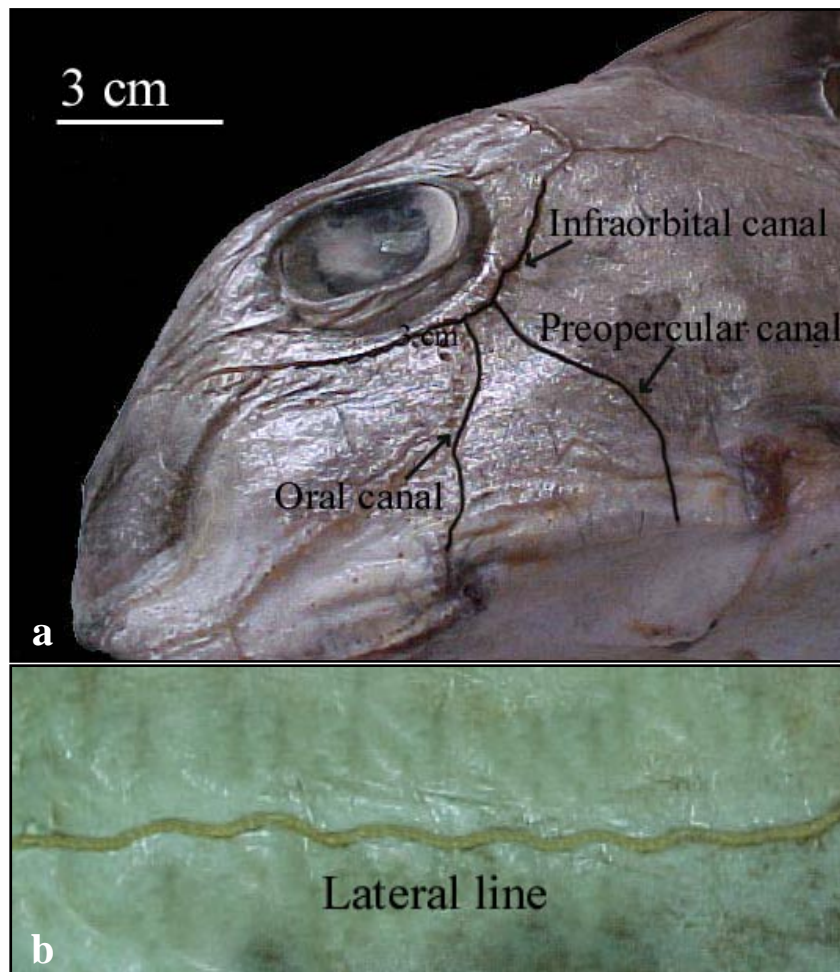
**Comparative material. Holotype.** – MCZ 1464, male, 728 mm TL, 427 mm BDL, Matanzas Bay, Cuba; **Paratype** – MCZ 1385, male, 664 mm TL, 319 mm BDL, Matanzas Bay, Cuba.

**Additional non-type specimens.** – 10 specimens. FMNH 71595, female, 283 mm TL, 118.3 mm BDL, off Puerto Rico; MCZ 40682, 2 males, 258/277 mm TL, 111/116 mm BDL, Caribbean; USNM 222711, female, 429 mm LT, 211 mm BDL, Caribbean; USNM 222796, male, 549 mm LT, 241 mm BDL, Western Atlantic; USNM 222800, 2 females, 300/406 mm LT, 115.4/171 mm BDL, 3 males, 215/267/386 mm LT, 109/129.1/164 mm BDL, Lesser Antilles, Leeward islands.

**Diagnosis.** A small to medium-bodied *Chimaera* with preopercular and oral lateral line canals branching separately from the infraorbital canal with a prominent space between their

respective origins. The anterior portion of lateral line of the body is undulated, gradually becoming straight posteriorly; second dorsal fin evenly tall along its length, not indented. Color uniform silvery gray on a soft pink background in fresh specimens; but in preserved individuals body color pale brown.

**Description.** Measurements of holotype, paratype and 14 additional specimens are shown in Table 1. A small to medium-bodied species (TL 215-803.4 mm; BDL 143-554 mm) with bluntly rounded snout. Body tapers to a slender tail that ends in a whip-like filament. Body color a silvery gray on a soft pink background in fresh specimens; but pale brown in preserved individuals; in some, faint longitudinal stripes are visible on the trunk and especially on the base of the tail. Dark margins present on the second dorsal and caudal fins. A dark leading edge on the pectoral fin was also observed in one small juvenile (FMNH 71595), and may be representative of colors in life. Lateral line canals of the head appear as open grooves, canals on the snout characterized by wide dilations.



**Figure 2.** (a) Distribution of lateral line canals of the head and (b) form lateral line on the anterior part of the trunk.

Paired fins (pectoral and pelvic) are stout and triangular in shape, darker in color than the body. Anal fin clearly separated from ventral caudal lobe by a notch. First dorsal fin erectile, preceded by a stout spine longer than height of first dorsal fin and reaching to or just beyond origin of second dorsal fin when depressed. Spine with posterior serrations present along distal one-half of spine.

Males characterized by a frontal tenaculum that is small, gently rounded with small bulbous tip bearing 7-8 rows of denticles on the ventral surface. Pelvic claspers slender, divided at its mid-length, pale in color with long fleshy lobes covered in a fine shagreen of denticles. Pelvic claspers do not extend beyond the distal margin of the pectoral fins.

**Remarks.** From a total of 28 specimens captured off the San Andrés Archipelago, Colombia, 16 were collected in one set. This may indicate aggregative behavior in this species. In addition, the species was previously recorded from depths of 238

- 450 m (Bigelow and Schroeder, 1953; Caldwell, 1966), but appears to occur in shallower depths; 234 m in the present study and 180 m reported by Bunkley-Williams and Williams (2004). This is the first record of this genus and species from the western Caribbean Sea and Colombia; only *Hydrolagus alberti* and *Neoharriotta carri* were previously reported from Colombian continental shelf (Rey and Acero, 1983).

This new record of *C. cubana* from the western Caribbean Sea (Fig. 3) provides evidence for a wider distribution in the western central Atlantic, and has specific locations of aggregations, like Quitasueño Bank.

*C. cubana* with the present report is the only species of Chimaera occurring in the western Atlantic Ocean and it is very important to generate guidelines for its conservation. In addition, there is little information of this taxon, and nothing is known of its biology, ecology and behavior (Didier, 2002a, 2004).



**Figure 3.** Distribution of *Chimaera cubana* on Caribbean Sea. C: Cuba, P: Puerto Rico, J: Jamaica, LA: Lesser Antilles, SA: San Andrés Archipelago.

**Table I.** Measurements in mm and in percentage of the body length (%BDL) for specimens of *Chimaera cubana* (n=16). (\*) represent the measurements taken only from specimens examined from Quitasueño Bank.

	Holotype MCZ-1464-H		Paratype MCZ-1385-P		non-type specimens (n = 14)	
	mm	%BDL	range mm	range %BDL	range mm	range %BDL
<b>TL</b>	728	131	664	208	215-803.4	150-196
<b>PCL</b>	427	77	383	120	109-528	76-128
<b>BDL</b>	554	100	319	100	143-450	100
<b>SVL</b>	250	45	191	60	60.9-276	43-61
<b>TRL</b>	154	28	95.5	30	33.8-156	24-36
<b>PD2</b>	256	46	175	55	54.4-251	38-56
<b>PD1</b>	159	29	115	36	35.7-135	25-30
<b>POR*</b>					31-52	8-13
<b>PRN*</b>					23-42	6-9
<b>POB</b>	53.5	10	42.3	13	14-50	10-12
<b>D2B</b>	324	58	236	74	82.5-328	55-76
<b>D2AH*</b>					12.4-17.1	3-4
<b>D2PH*</b>					11.4-16.1	3-4
<b>D1B</b>	67.7	12	51.1	16	19.2-89.7	13-20
<b>DSA</b>	108.9	20	81	25	26.4-118.5	18-28
<b>D1H</b>	103.5	19	80.4	25	33.2-98.7	22-25
<b>CDM</b>	57.1	10	57.1	18	23.6-74.4	14-17
<b>CDH*</b>					4.9-9.6	1-2
<b>CTL*</b>					138.7-281.7	31-69
<b>CVM</b>	160.2	29	110.5	35	48.9-143.3	32-34
<b>CVH*</b>					6-11.4	2-3
<b>HDL</b>	107.8	19	78.5	25	28.4-132	20-29
<b>P1A</b>	144.2	26	111.5	35	42.1-188.3	29-42
<b>P2A</b>	75.8	14	54.7	17	21.3-93	14-20
<b>IDS</b>	39.8	7	29.2	9	1.3-44.1	1-10
<b>DCS</b>	7.2	1	1.6	1	0.9-4.5	0.25-1
<b>D1P1*</b>					71.5-102.2	17-23
<b>D1P2*</b>					140.5-183.1	35-41
<b>D2P1*</b>					108.4-146	29-32
<b>D2P2*</b>					77.1-98.2	19-23
<b>EYL</b>	34.7	6	24.5	8	10.7-38.9	7-10
<b>EYH</b>	21.3	4	16.2	5	7.4-25.9	5-6
<b>CLT</b>	74.4	13	13.8	4	1.9-94.9	1-23
<b>CLM*</b>	45.2	8			49.8-55.2	13
<b>CLL*</b>	40.3	7			56.1-65.3	15-16
<b>ONC*</b>					9.1-13.7	2-3
<b>LRC*</b>					5-6.6	1
<b>LNC*</b>					28.7-37.8	7-8
<b>IOA*</b>					15..7-18.9	4
<b>OTM*</b>					33.8-44.9	9-10
<b>OCL*</b>					14.6-18.9	4
<b>STL*</b>					17-28	5-6
<b>SPS*</b>					20.3-24.4	5-7

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## References

- Bigelow, H. B., & Schroeder, W. C. 1953. Fishes of the western North Atlantic. Memoir 1, part 2. Sawfishes, guitarfishes, skates and rays, chimaeroids. **Sears Foundation for Marine Resources**, Pp. 515-533.
- Bunkley-Williams, L. & Williams, E. H. 2004. New locality, depth, and size records and species character modifications of some Caribbean deep-reef/shallow slope fishes and a new host and locality record for the *Chimaera* Cestodarian. **Caribbean Journal of Science**, 40(1): 88-119.
- Caldwell, K. D. 1966. Marine and freshwater fishes of Jamaica. **Bulletin of the Institute of Jamaica**, 17: 7-109.
- Compagno, J. L. V., Stehmann, M. & Ebert, D. A. 1990. *Rhinochimaera africana*, a new longnose chimaera from southern Africa, with comments on the systematics and distribution of the genus *Rhinochimaera* Garman, 1901 (Chondrichthyes, Chimaeriformes, Rhinochimaeridae). **South African Journal of Marine Science**, 9: 201-222.
- Didier, D. A. 1993. The chimaeroid fishes: a taxonomic review with notes on their general biology (Holocephali: Chimaeroidei). **Chondros**, 4(5): 1-6.
- Didier, D. A. 1995. Phylogenetic systematics of extant chimaeroid fishes (Holocephali, Chimaeroidei). **American Museum Novitates**, 3119: 1-86.
- Didier, D. A. 2002a. Chimaeras. Pp. 591-599. In: Carpenter, K.E. (eds.) **FAO species identification guide for fishery purposes and American society of ichthyologist and herpetologists. The living marine resources of the Western Central Atlantic. Vol. 1. Introduction, mollusks, crustaceans, hagfishes, sharks, batoid fishes and chimaeras**. FAO, Rome.
- Didier, D. A. 2002b. Two new species of chimaeroid fishes from the southwestern Pacific Ocean (Holocephali, Chimaeridae). **Ichthyological Research**, 49: 299-306.
- Didier, D. A. 2004. Phylogeny and Classification of Extant Holocephali. Pp. 115-164. In: Carrier, J.C., Musick, J.A. & Heithaus, M.R. (eds.) **Biology of Sharks and Their Relatives**. CRC Press, Boca Raton, FL, USA, 596 p.
- Didier, D. A. & Séret, B. 2002. Chimaeroid fishes of New Caledonia with description of a new species of *Hydrolagus* (Chondrichthyes, Holocephali). **Cybium**, 26: 225-233.
- Howell-Rivero, L. 1936. Some new, rare and little-known fishes from Cuba. **Proceedings of the Boston Society of Natural History**, 41: 51-55.
- Levinton, A. E., Gibbs, R. H., Heal, E. & Dawson, H. E. 1985. Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. **Copeia**: 802-832.
- Rey, I. & Acero, A. 1983. Registros nuevos de peces cartilagosos para el Caribe colombiano. **Actualidades Biológicas**, 17(63): 36-39.

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