

New finding and description of the Galapagos batfish, *Ogcocephalus darwini* (Actinopterygii: Lophiiformes: Ogcocephalidae), in marine waters of Manabi, Ecuador

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Abstract

The finding of a specimen of the Galapagos batfish, *Ogcocephalus darwini* Hubbs, 1958 in marine waters of continental Ecuador was recorded. The specimen was captured by the artisanal fishing fleet that operates with bottom longlines in Las Piñas fishing cove, Manta Municipality, Manabí province, Ecuador. The specimen was transferred to the Biology Laboratory of the Faculty of Marine Sciences of the Universidad Laica Eloy Alfaro de Manabí, where morphometric data were taken for its identification. Until now, the species was considered endemic to the Galapagos, but it had been reported off northern Peru and now from the Ecuadorian continental shelf.

Keywords

continental shelf, distribution area, eastern Pacific Ocean, morphology

Introduction

Batfishes (Ogcocephaloidei: Ogcocephalidae) are members of the order Lophiiformes, which is composed of some 402 extant valid species and includes deep-sea frogfish (Antennarioidei and Ceratioidei), anglerfish (Lophioidei), and marine toadfish (Chaunacioidei) (Fricke et al. 2022). The classification followed van der Laan et al. (2022). Fricke et al. (2022) counted 90 valid species in ten genera within the family Ogcocephalidae. Except for a limited number of species of commercial interest, there is a distinct paucity of published information on the life history, biology, and ecology of the majority of these species (Bradbury 1980). The bulk of the primary literature on the family Ogcocephalidae is dominated by descriptions of individuals and lists of fish from

specific locations (Grove and Lavenberg 1997; Endo and Shinohara 1999).

Out of 13 valid species of the genus *Ogcocephalus* only two can be found in the Pacific Ocean: *Ogcocephalus porrectus* Garman, 1899 and *Ogcocephalus darwini* Hubbs, 1958. The latter can be easily distinguished from *O. porrectus* by having a pair of dark stripes on the dorsal disc that extends to the lateral sides of the tail (Hubbs 1958; Bradbury 1980). *Ogcocephalus darwini* is found in relatively shallow waters, from 3 to 76 m (Humann and Deloach 1993), although specimens have been observed down to 120 m (Long 1999).

Bradbury (1980) considered both species as island endemics of the eastern Pacific, *O. darwini* in the Galapagos Archipelago and *O. porrectus* off Cocos Island, Costa Rica. However, there are reports of specimens of *O. darwini* being collected off Puerto Pizarro and Manco-

ra Bank, south of Tumbes on the northern coast of Peru (Chirichigno 1978; Bradbury 2003). The report by Zeballos et al. (2000) on this species in Peruvian Pacific waters, between latitudes 3° and 6° South at depths of 90 to 180 m, together with *Zalieutes elater* (Jordan et Gilbert, 1882) seems doubtful since they call both species as batfish with 2 ocelli, but *O. darwini* lacks them.

Materials and methods

One specimen, a female, 21.5 cm SL, was captured in Las Piñas fishing cove, southeast of Manta, Manabí Province, Ecuador, eastern Pacific Ocean (Fig. 1; 01°05'46"S, 080°53'51"W), on 23 April 2022. It was caught by fishermen operating from a fiberglass boat in the artisanal fishery using bottom longlines, 4 NM off the coast and at a depth of 30 m, with a J-type hook number 10.

The specimen was stored in an ice box and taken to the laboratory of the Faculty of Marine Sciences of the Universidad Laica Eloy Alfaro de Manabí. There, the specimen was weighed, and the morphometric parameters were measured using a Fluke 4190 digital ichthyometer with a precision of 1 mm, or a caliper to the nearest 1 mm. The meristic characteristics, sex, and gonadal maturation were determined. The scale of gonadal maturation followed Brown-Peterson et al. (2011). The description of the taxonomic and morphometric characteristics followed Hubbs (1958) and Robertson and Allen (2015).

Results

Family Ogcocephalidae Gill, 1893

Ogcocephalus Fischer, 1813

Ogcocephalus darwini Hubbs, 1958

English common name: Galapagos batfish

Spanish common names: pez murciélago de las Galápagos, pez murciélago de labios rojos.

Figs 2, 3; Tables 1, 2

Description. Head depressed, raised above disc; disk triangular; snout pointed, with horn-like rostrum projecting well in front of eyes; horn with few short hairs; fish-lure with 3 fleshy tips, in small cavity below horn; spine of lower rear corner of operculum blunt, and poorly developed; gill rakers oval plates covered with small teeth; eyes on sides of head; gill opening high, above pectoral base; pectoral and pelvic fins arm-like; pectorals completely separated from body; small dorsal and anal fins on tail; skin with few projecting small bony plates; flank without fringe of hairs; belly completely covered with bony, pointed scales; under tail densely covered with small spines, and sometimes few conical spines on medial line. Light brown to grayish above, white below; snout and horn dark brown to reddish brown; bright red lips; dark brown stripe (sometimes discontinuous) from top of head to base of tail fin on each side of body. Meristic characters shown in Table 1.

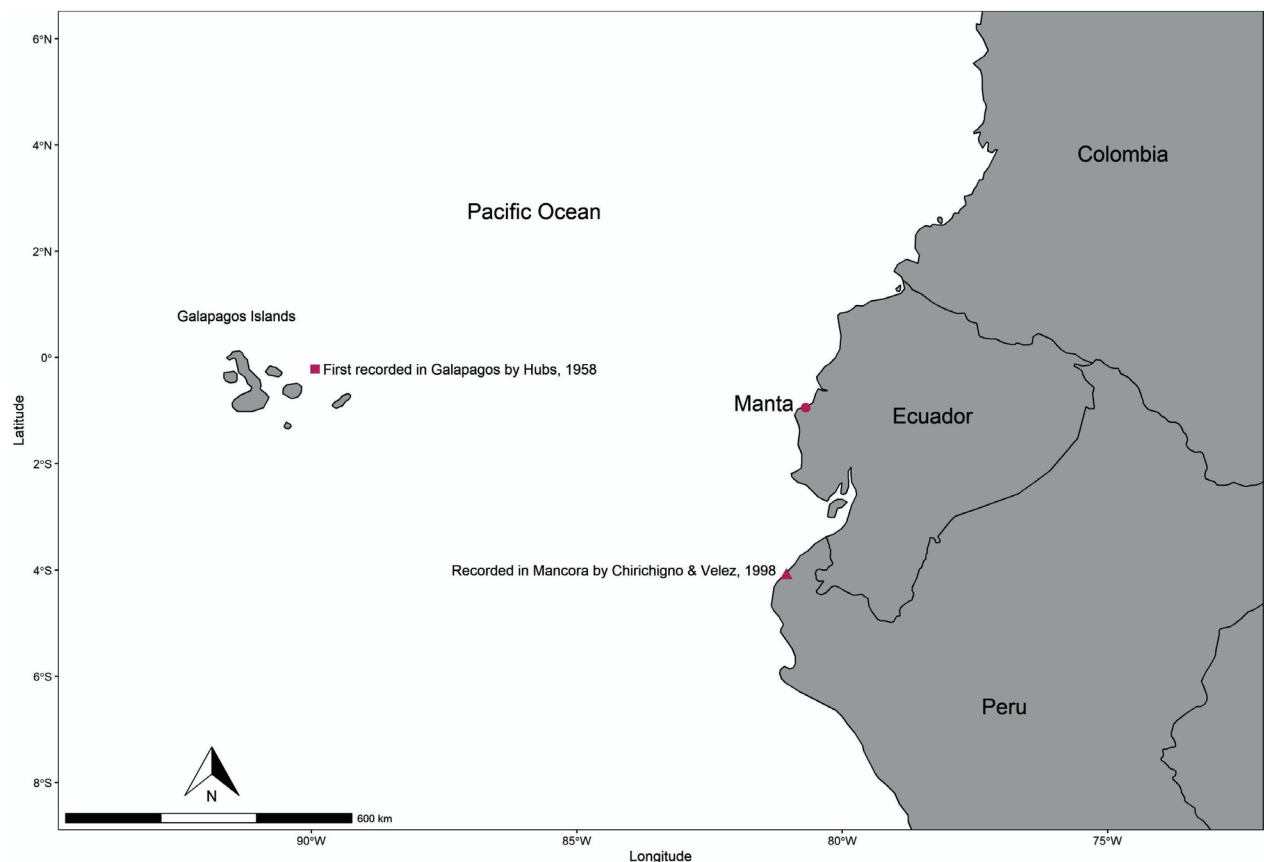


Figure 1. Map of the capture area of the individual of *Ogcocephalus darwini* off the coast of the fishing cove Las Piñas, Ecuador, and the areas reported in Peru.

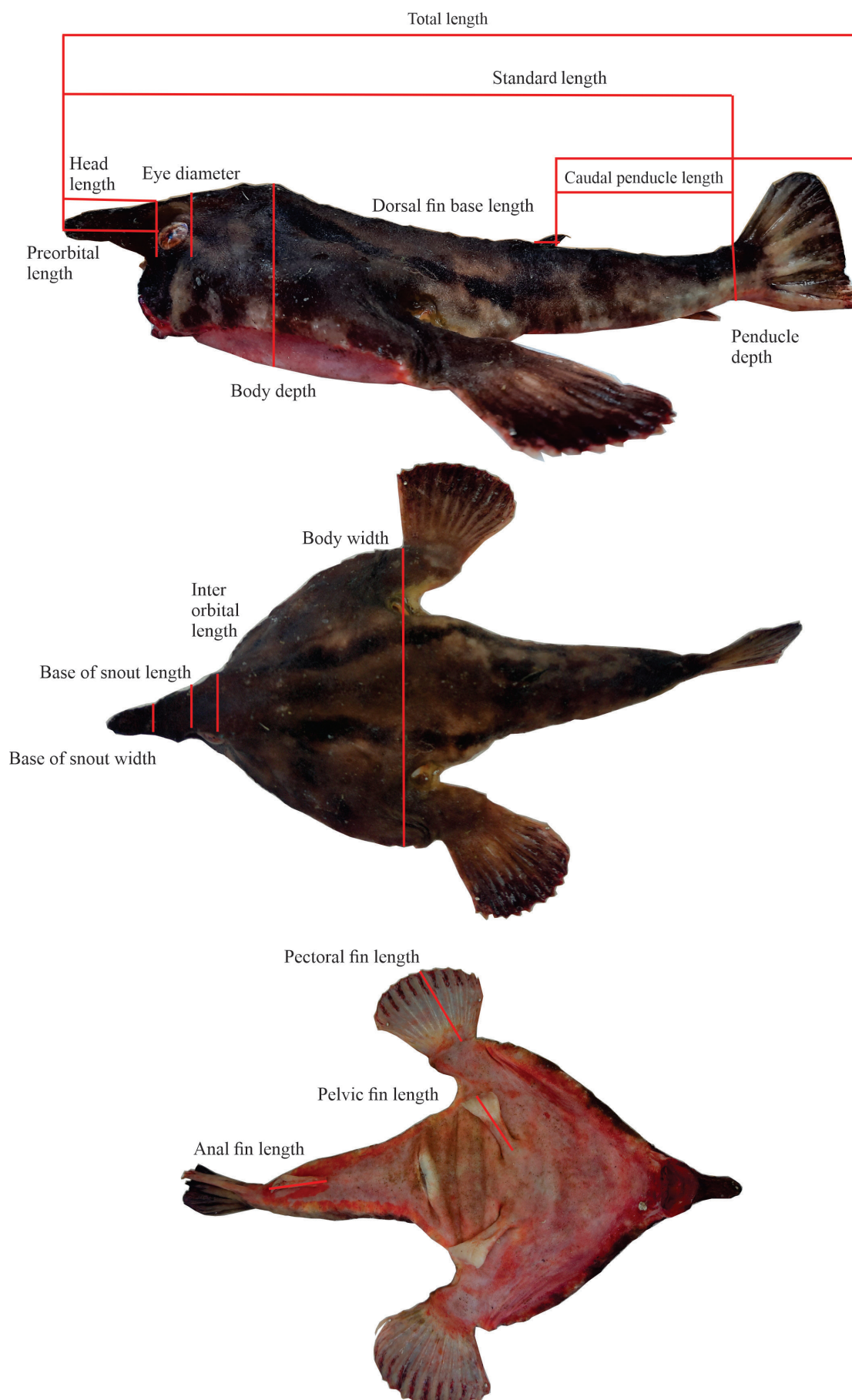


Figure 2. Lateral (a), dorsal (b) and ventral (c) view of the individual of *Ogecocephalus darwini* captured off the coast of the fishing cove Las Piñas, Ecuador, with its respective morphometric measurements.

Table 1. Meristic characters of the fins in the specimen of *Ogcocephalus darwini* found in the fishing cove Las Piñas, Manta, Ecuadorian Pacific.

Character	Value
Rays in pectoral fins	14
Rays in pelvic fins	5
Rays in caudal fin	9
Rays in anal fin	3
Rays in small dorsal fin	3

Remarks. The total weight of the studied specimen was 278.4 g while its total length reached 26 cm. The morphometric characteristics are shown in Table 2 and Fig. 2A, 2B, 2C. After evisceration, it was determined that it was a mature female in stage III. The liver weighed 21.4 g and the gonads 9.7 g. The stomach had fish remains of *Opisthonema* spp., most probably from the bait used in the fishery. The specimen still had the hook attached to the mouth. There were numerous parasitic Nematoda inside the intestine, and in the coelomic cavity near the liver and gonads; no parasites were observed in the gills, mouth, or external surface of the body.

The sagitta otoliths measured 5.69×3.44 mm (Fig. 3). The shape of the otoliths was oval, with an irregular dorsal margin and crinated ventral margin. The acoustic groove was heterosulcoidal, in supramedial position. Ostium, funnel-shaped, larger than cauda. Cauda, tubular, slightly curved. The ridges run the entire cauda. Anterior side blunt, with rostrum prominent and round shape; anti-rostrum, small and pointed. There were at least 17 sets of hyaline and opaque rings counted in the sagitta otoliths, which may suggest that the specimen was 17 years.

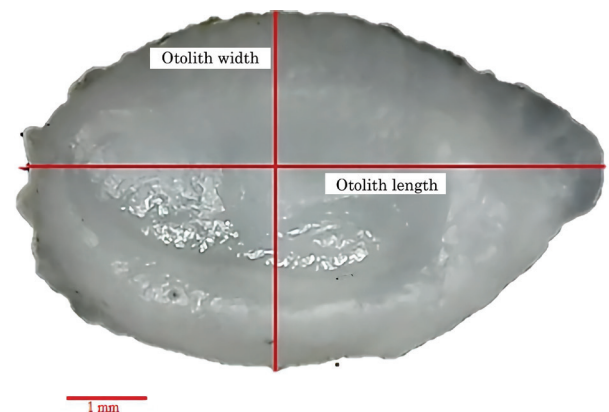
Discussion

In continental Ecuador, there was a previous record of the presence of *Ogcocephalus darwini* published by Massay (1983), without a description of the individuals or indication of the place of finding. This author also reported two other species of Ogcocephalidae, *Zalieutes elater* and *Dibranchius spinosus* (Garman, 1899). This record of *O. darwini* was later reported by Béarez (1996) and Jiménez and Béarez (2004), without further verification of the presence of the species. However, Coello and Herrera (2010), in four cruises made between 2003 and 2007 along the continental shelf of Ecuador, at depths of 10 to 120 m, did not report the presence of *O. darwini*, but did find *Z. elater*. Similar results were reported by García et al. (2014), who did not find the presence of *O. darwini* in the cruises made for 8 months (April to December 2013) in the fishing grounds of the fleet targeting *Merluccius gayi* (Guichenot, 1848) located in the central and southern Ecuadorian coast with trawls at depths of 20–500 m.

The paucity in the detection of fish species typical from the Galapagos Archipelago (GA), like *O. darwini*, in the continental shelf of Ecuador and northern Peru, could be associated with the occasional arrival of fish

Table 2. Morphometry of the specimen of *Ogcocephalus darwini* found in the fishing cove Las Piñas, Manta Municipality, Manabi, Ecuador.

Character	Value [cm]
Total length	26.00
Standard length	21.50
Body width	10.88
Body depth	5.41
Length at mean width of horn	1.03
Depth at mean base of horn	1.82
Dorsal fin base length	0.58
Pectoral fin length	2.66
Pelvic fin length	3.26
Base of pelvic fins length	2.21
Base of pectoral fin length	3.26
Caudal peduncle length	6.05
Caudal peduncle depth	1.83
Snout length	2.64
Caudal lobe length	3.20
Anal fin length	2.43
Pre-orbital length	2.97
Maximum body height	5.47
Interorbital length	1.89
Ocular diameter	1.10

**Figure 3.** Description of the internal face of the right sagittal otolith of the specimen *Ogcocephalus darwini* landed in the artisanal fishing cove Las Piñas, Ecuador.

larvae from this archipelago. Larval movement could be either in ballast water from vessels traveling between GA and the continent or in water masses loaded with plankton from the surroundings of this archipelago. The area between GA and the South American continental shelf is affected by several oceanic currents, the Southern Equatorial (surface) Current which moves west after receiving the flow of the Humboldt Current, and the Cromwell or Equatorial Undercurrent, moving eastward at depths from 100 to 400 m (Knauss and Garfield 2016). Changes in the flow of these currents may cause eddies that pinch off the main current and could move toward the continental shelf transporting fish larvae from the GA.

It seems that the occasional arrival of larvae of *Ogcocephalus darwini* has permitted its recruitment to

the continental shelf, but not its dispersal within this new territory for the species. The fact that old fishermen from Las Piñas Cove described that they had not observed this species before, which is characterized not only by its brilliant colors but also its large size, in comparison with other local batfish, reveals that the presence of *O. darwini* in continental waters is a rare phenomenon and could be related to recent environmental changes occurring worldwide.

It should be noted that the records reported a maximum total length of 25 cm (Merlen 1988; Robertson and

Allen 2015), so this report extends the maximum total length of *O. darwini* to 26 cm.

Acknowledgments

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Supplementary material 1

Ogcocephalus darwini images

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Data type: images

Explanation note: Photos of the morphology, organs and parasites of the individual *Ogcocephalus darwini*.

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