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First case of abnormality in the chilhuil sea catfish (*Bagre panamensis*) from Mexican waters

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The sea catfishes (Family Ariidae) include about 150 species occurring in warm-temperate to tropical continental shelves around the world. These species mainly inhabit marine and brackish waters but some are confined to freshwater (Betancur-R et al. 2007). Ten species have been recognized in the Mexican Pacific, with the chilhuil sea catfish (*Bagre panamensis*) being one of the most frequently caught species in the artisanal fishery that operates in the Gulf of California, Mexico (Saucedo-Barron and Ramirez-Rodriguez 1994). Overall, sea catfish are highly appreciated in the local market for their white meat, high protein content, and palatability. In Mexico, sea catfish rank 35th in terms of production (landed weight), and 27th in terms of economic revenue (total value of national fish production) out of the 58 registered marine fisheries in Mexico according to the National Commission for Fisheries and Aquaculture (Sagarpa-Conapesca 2011, Muro and Amezcua 2011).

The chilhuil sea catfish is common in many parts of its range (Cooke et al. 2010). This species is endemic to the Eastern Pacific; it is found from southern California and the Gulf of California to northern Peru (Allen and Robertson 1994), and can also occur in the Galapagos Islands (Cooke 1992). This demersal fish is found inshore, usually on muddy bottoms, to depths of 177 m. It also enters estuaries and mangrove areas (Cooke 1992).

Ocular abnormalities have not been previously recorded for the chilhuil sea catfish. The purpose of this paper is to describe the first record of an abnormality in one specimen of the family Ariidae (*Bagre panamensis*) from the Pacific Ocean.

On 20 October 2013, one unusual specimen (compared with the typical characteristics of the species) was caught as by-catch of the shrimp fishery at the fishing camp Celestino Gasca (23° 47' 20" N, 106° 52' 40" W), located in Sinaloa, Mexico. The specimen was obtained by artisanal fishermen using a set gillnet (measurements: 6.35 cm mesh size, 3.125 × 130 m). The specimen was donated by the fishermen and carried frozen to the Laboratory of Fisheries at Facultad de Ciencias del Mar-Universidad Autonoma de Sinaloa (FACIMAR-UAS).

The specimen was identified as *Bagre panamensis* (Gill 1863) using the criteria of Kaliola and Bussing (1995). This fish was measured (mm total and standard lengths) and weighed (grams). Stomach contents were analyzed to observe the presence of prey consumed. One normal specimen was obtained from the same fishing camp for comparison. The specimen was photographed at arrival and other photographs were later taken in the laboratory using a bar scale. X-rays were taken at a veterinary clinic. The specimen was preserved frozen in the Laboratory of Fisheries at FACIMAR-UAS.

The abnormal specimen measured 127 mm total length (TL), 97 mm standard length (SL), and weighed 4.6 g, while the normal specimen measured 165 mm TL, 126 cm SL and weighed 30.6 g (Figure 1). The abnormal specimen showed an evident ocular abnormality (Figure 2). The ocular globes were in the buccal cavity, and the ocular cavity was covered with a membrane. It was not possible to determine if the organism was blind. Radiography did not show bone differences between the normal and abnormal specimens (Figure 3). The dissection of the abnormal fish showed a flattened stomach but, contrary to what was expected, the stomach contained food (crustacean remains).

Some abnormalities can cause the death of the organism; however, multiple morphological abnormalities that did not induce death have been observed in living organisms (Escobar-Sanchez et al. 2013). The fishermen who captured and donated the specimens reported that other sea catfish caught along with the abnormal animal did not show any apparent malformations. This information points to factors other than anthropogenic events (i.e. pollution) that affect several living organisms at a time, such as genetic factors that affect only a single individual at a time, as the cause of this abnormal fish.

Saucedo-Barron et al. (1988) mentioned that the occurrence of blind specimens in good physical condition led some authors to suppose that these fish feed by the reinforcement of their other senses, especially their sense of smell. Ariids are easily recognized by the whiskers or barbels around their mouth, which they use for food detection (mainly shrimp, crabs, or mollusks). Therefore, in spite of the absence of eyes in the usual place, the presence of these barbels could help in the search for food. The slight obstruction of the buccal cavity could prevent food ingestion, but this hypothesis was rejected because of the presence of crustacean remains in the stomach. In addition, the presence of dorsal spines as defense against predation may also offset any potential disadvantage of this abnormality.

The only abnormality recorded in Ariids is albinism (Evangelista-Leal et al. 2013; Wakida-Kusunoki and Amador-del-Angel 2013). In Mexican waters, albinism and skeletal deformity are the most common abnormalities reported in bony fishes (Table 1); in Ariid species, only albinism in the gafftopsail catfish (*Bagre marinus*) from southeast Mexico (San Pedro, Tabasco) has been reported by Wakida-Kusunoki and Amador-del-Angel (2013).

Figure 1.—Normal (A) and abnormal (B) specimens of the chilhuil sea catfish (*Bagre panamensis*) caught 20 October 2013 in the Gulf of California near Mazatlan, Sinaloa, Mexico. Photographs by Juan A. Maldonado-Coyac.

Figure 2.—Abnormal eye position in a chilhuil sea catfish (*Bagre panamensis*) caught 20 October 2013 in the Gulf of California near Mazatlan, Sinaloa, Mexico. Photograph by Juan A. Maldonado-Coyac.

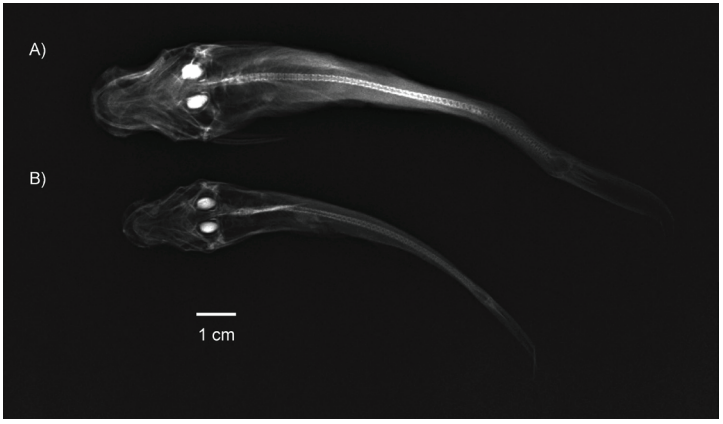

Figure 3.—X-rays of a normal (A) and the abnormal (B) specimen of chilhuil sea catfish (*Bagre panamensis*) caught 20 October 2013 in the Gulf of California near Mazatlan, Sinaloa, Mexico.

Table 1.—Abnormalities in bony fishes recorded in the Baja California Sur region of the Mexican Pacific Ocean. The yellow snapper (Lutjanus argentiventris; marked with an asterisk) was caught off the coast of Sinaloa.

Scientific Name	Common Name	Type of Malformation	Reference
*Lutjanus argentiventris**	Yellow snapper	Malformed pelvic fin	Alvarez-Leon 1980, 1983
Antennarius avalonis	Roughbar frogfish	Ocular malformation	Saucedo-Barron et al. 1988
Sphoeroides annulatus	Bullseye puffer	Ocular malformation	Saucedo-Barron et al. 1988
Diodon holocanthus	Longspined porcupinefish	Ocular malformation	Saucedo-Barron et al. 1988
Atherinops affinis	Topsmelt	Malformed mouth	Rodriguez-Romero et al. 1990
Hoplopagrus guentheri	Green bar snapper	Abnormal vertebral column	Galvan-Magana et al. 1994
Paranthias colonus	Creolefish	Abnormal vertebral column	Rodriguez-Romero et al. 2001
Balistes polylepis	Finescale triggerfish	Skeletal deformity	Escobar-Sanchez et al. 2013

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