


First record of partial albinism in the critically endangered Angelshark (*Squatina squatina*) (Linnaeus, 1758)

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Abstract

We report the first case of partial albinism in the Critically Endangered angelshark, *Squatina squatina*. The encounter with this specimen took place while SCUBA diving on the beach of Tufia, located on the east coast of the island of Gran Canaria on 2 April 2021. This is also the first confirmed finding of an albino elasmobranch specimen in the Canary Island archipelago.

KEYWORDS

achromia, Canary Islands, chondrichthyans, genetic alteration, shark

1 | INTRODUCTION

Albinism is a genetic condition also known as achromia or achromasia. It is well described in the literature, characterized by a total absence of pigments in the skin, hair and eyes. However, leucism is when a total or partial loss of skin pigmentation occurs but the individual has a normal iris pigmentation. These abnormalities are caused by a hereditary alteration that can be found present in all species from mammals to amphibians (Arronte *et al.*, 2022; Oetting & King, 1999). In the case of chondrichthyans (sharks, rays and chimaeras), this alteration is not documented for all species, but there are several cases where leucism or albinism has been confirmed, including zebra shark (*Stegostoma faciatum*), smooth dogfish (*Mustelus schimitti*), finetooth shark (*Carcharhinus isodon*), kitefin shark (*Dalatias licha*), blacktip shark

(*Carcharhinus limbatus*), Aleutian skate (*Bathyraja aleutica*), swell shark (*Cephaloscyllium ventriosum*), Lucifer's dogfish (*Etmopterus lucifer*), spotted ratfish (*Hydrolagus collieri*), and the smooth butterfly ray (*Gymnura micrura*) (Arronte *et al.*, 2022; Becerril-García *et al.*, 2017). Genetic alterations can also cause more severe conditions, such as the case in which the blackmouth catshark (*Galeus melastomus*) presented an absence of various skin-related structures (Mulas *et al.*, 2020).

The angelshark (*Squatina squatina*) belongs to the highly threatened family Squatinidae (Dulvy *et al.*, 2014) and is listed as Critically Endangered by the IUCN Red List of Threatened Species (Morey *et al.*, 2019). Angelsharks have a dorsoventrally flattened body which is characterized by colours that vary from grey to reddish, or greenish brown to greyish brown on the back, with small black spots scattered along its body (Compagno *et al.*, 2005; Roux, 1989). These demersal

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sharks are mostly active at night (Escanez *et al.*, 2016) and can be found at depths down to at least 150 m (Morey *et al.*, 2019). Angelsharks are distributed along the coastal continental shelf of the north-east Atlantic Ocean and the Mediterranean Sea (Lawson *et al.*, 2020). The Canary Islands are considered to be an important stronghold for the species (Barker *et al.*, 2016; Jimenez-Alvarado *et al.*, 2020). In this archipelago, the angelshark is a species frequently sighted by divers and beach users at all life stages (Meyers *et al.*, 2017). In 2019, the species was listed as “in danger of extinction” in the Spanish Catalogue of Threatened Species (BOE. Núm. 134, de 5 de junio de 2019). This protection means that angelsharks cannot be captured or disturbed throughout the Canary Island archipelago and its surrounding waters.

On 2 April 2021, a juvenile angelshark was sighted in Tufia, a beach located at the east coast of the island of Gran Canaria (Figure 1). The sighting took place during an early-morning SCUBA dive by recreational divers. The specimen was reported as swimming freely near the seabed at 10 m depth. The individual presented a white coloration throughout its entire body except for a small black spot on the dorsal skin, between the pectoral and pelvic fins, and some small pale black dots surrounding the body, making it easy to differentiate from an angelshark with normal coloration (Figure 2). It also presented some malformation in the front part of the head, altering the morphology of the mouth (Figure 3). This malformation on both sides of the head shows a rostral pyramidal fold that appears to

originate between the spiracles and the mouth, like that shown in the *Squatina californica* specimen discovered by Escobar-Sánchez *et al.* (2014) in the Gulf of California, Mexico. Part of the sac yolk was still attached to the body (Figure 3), so it is assumed that the individual was prematurely born due to the sac dimensions, with a total body length of approximately 23 cm, in the range described by Meyers *et al.* (in prep) for newborn juvenile specimens of this species. The specimen could not be captured due to the protected status of angelsharks in the Canary Islands, but the divers that observed the shark recorded and photographed it as it swam away. No morphometric measurements were taken.

2 | DISCUSSION

This record represents the second description related with albinism in a species belonging to the Squatinidae family, but it is the first case for *Squatina squatina* and the first description of an albino elasmobranch in the Canary Island archipelago. Angelsharks rely on their capacity to camouflage to feed, whereby they bury themselves in the sand to ambush prey that swim overhead (Compagno *et al.*, 2005).

It is expected therefore that colouration plays an important role in both foraging success and predator avoidance. It remains uncertain whether the white coloration may affect the shark's ability to

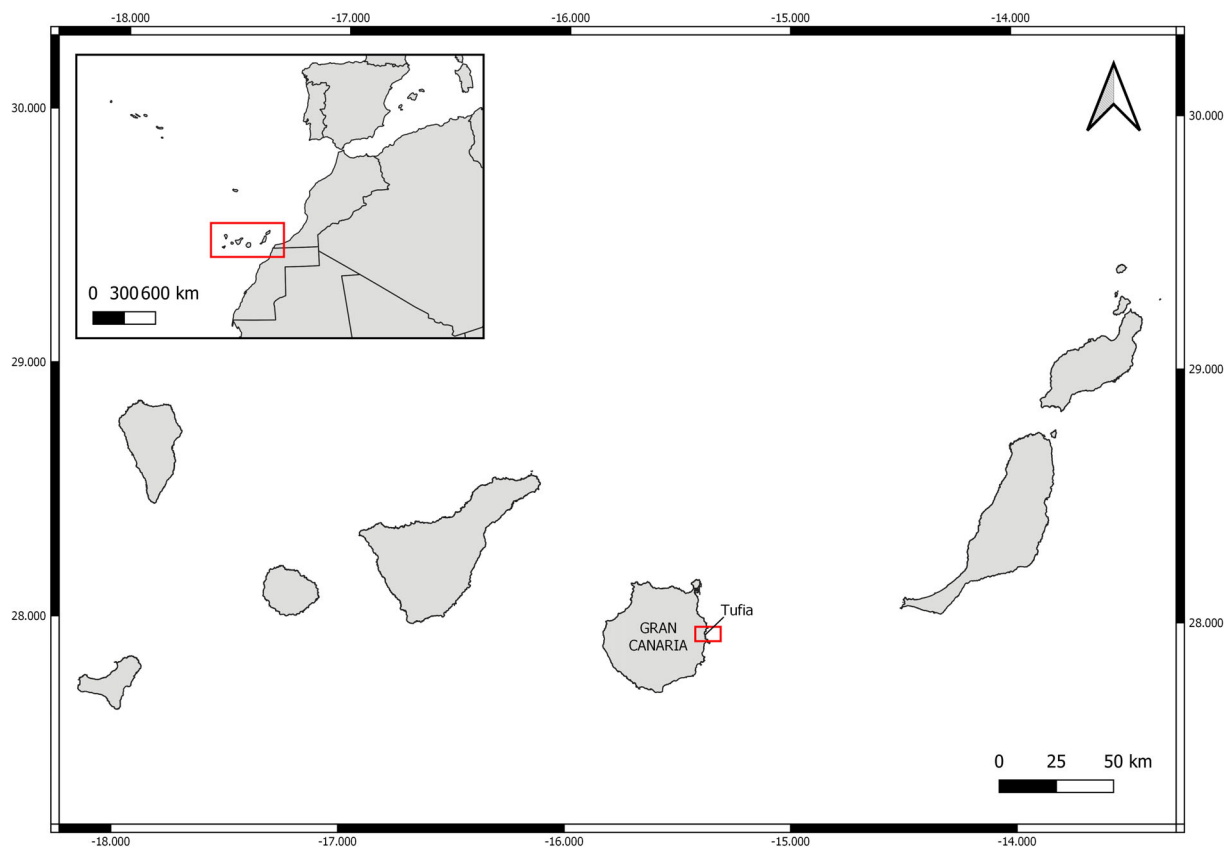


FIGURE 1 Tufia bay. East coast of the island of Gran Canaria in the Canary Islands

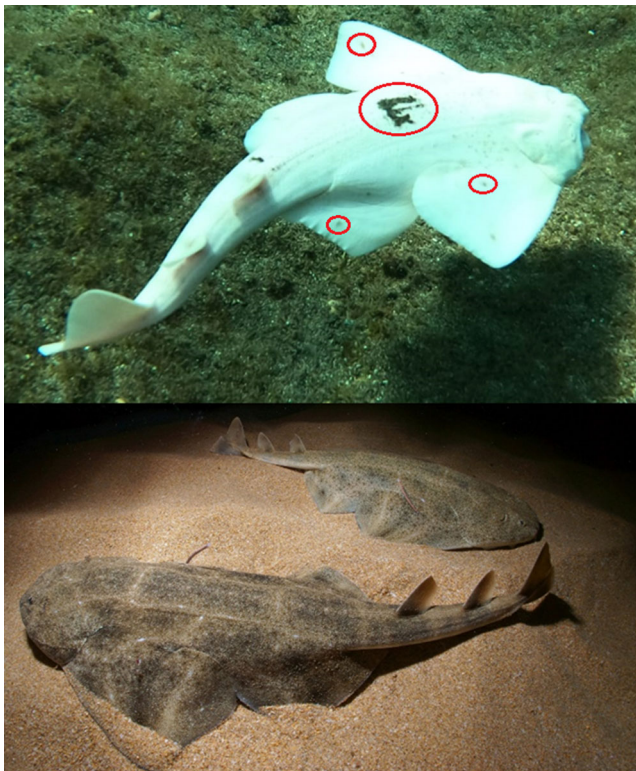


FIGURE 2 Colour difference between individuals of *Squatina squatina* species. Albino individual showing white pattern with a small black spot on the dorsal skin, between the pectoral and pelvic fins, and some small pale black dots surrounding the body highlighted with red circles (upper image) and individuals with normal pigmented coloration (lower image)

successfully camouflage and how this might impact its survival. It is suggested that individuals suffering this type of albinism are solitary (Sandoval-Castillo *et al.*, 2006), with a lower survival chance than other specimens (Talent, 1973; Taniuchi & Yanagisawa, 1987). However, it is difficult to know what can happen with this premature albino angelshark, since it is not possible to predict if it will be able to adapt to the environment and survive as has been reported with other species, as suggested by Arronte *et al.* (2022).

Noting that this species is highly threatened with extinction, the survival of each individual may be crucial for the recovery of the Canary Island population.

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ETHICS STATEMENT

An ethics statement is not required in this manuscript as there was no interaction with the animal.

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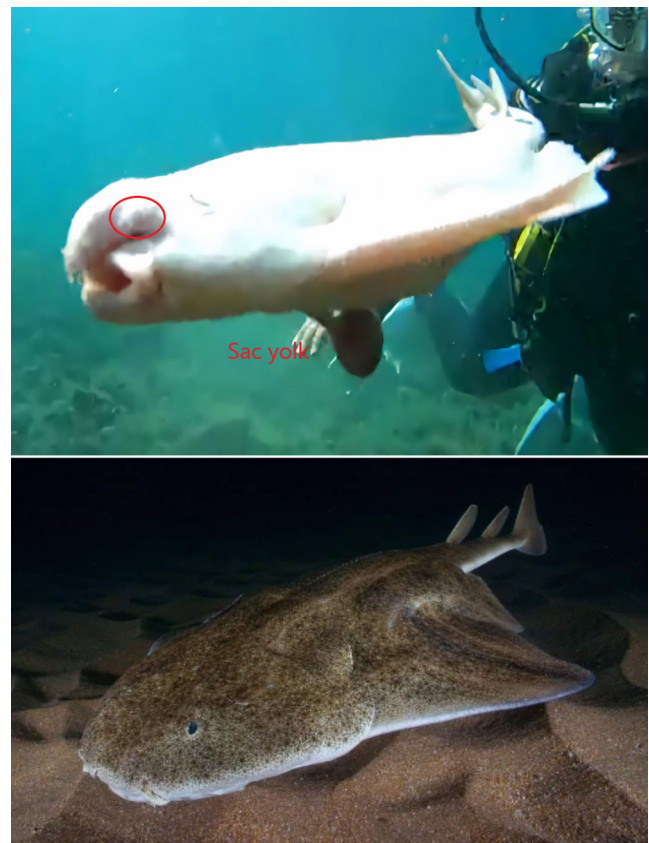


FIGURE 3 Frontal part of the head of the albino individual showing an alteration of the morphology in the mouth, full white eye (highlighted with a red circle) and the presence of a big yolk sac probably related to a premature delivery (upper image) and a normal individual with normal structure in the mouth and head (lower image)

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