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A new record of a white humpback whale (*Megaptera novaeangliae*) in Papeete, Tahiti

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Abstract

A new record of a white humpback whale (*Megaptera novaeangliae*) was made off Papeete, Tahiti in July 2019. The individual was completely white, except for grey patterns on its body and on the ventral part of the fluke. The presence of different colourations indicates that this individual is not an albino but a leucistic individual. According to field observations, the individual was likely a juvenile or a subadult. It was seen breaching several times and travelled further north of Papeete, where the animal was recaptured off Arue. White individuals are rare and offer unique opportunities to understand whale movement patterns and potential population connectivity among humpback whale populations.

Melanin production in mammals is regulated by the enzyme tyrosinase (Behrmann, 1998). Melanocytes and chromatophore cells are responsible for the production of melanin, which results in the dark skin colour of cetaceans (Behrmann, 1998). Albinism is characterized by the complete absence of melanin, and consequently, a lack of pigmentation in the skin, hair, and eyes (Grønsvold *et al.*, 2007). Leucism occurs when a lack of melanin partially affects skin pigmentation in some areas of the body, excluding the eyes (Fertl and Rosel, 2009). Piebaldism occurs when the lack of pigmentation in the skin is random, leading to the display of patchy patterns (Fertl and Rosel, 2009). Anomalous white colouration in marine mammals can negatively affect survival due to the increased visibility of predators (Hain and Leatherwood, 1982), and decreased protection from ultraviolet radiation and sun damage (Martinez-Levasseur *et al.*, 2011). Anomalous white colouration in mammals can cause health problems, such as anaemia, reduced fertility, sensory system defects, and increased susceptibility to infections (Searle, 1968); however, it is currently unclear whether these health problems affect marine mammals. Albinism and anomalous white colouration were recorded in approximately 25 cetacean species (Fertl and Rosel, 2009) including 17 odontocetes (*e.g.* killer whales [Speckman and Sheffield, 2001], pilot whales [Hain & Leatherwood, 1982], harbour porpoises [Tonay *et al.*, 2012; Kopalani *et al.*, 2017], short-beaked dolphins [Kopalani *et al.*, 2017]), and eight mysticetes (*e.g.* grey whales [Willoughby *et al.*, 2018], and humpback whales [Polanowski *et al.*, 2012; Burns *et al.*, 2014; Pirota *et al.*, 2023]).

The humpback whale, *Megaptera novaeangliae*, is a migratory species morphologically characterized by dark grey to black dorsal surface colour with dark or white ventral sides according to the population from which they originate. Northern Hemisphere humpback whales tend to be totally black, while the Southern Hemisphere humpback whales are mostly white in the ventral area (Chittleborough, 1965; Allen *et al.*, 1994; Acevedo *et al.*, 2017). The variation in skin pigmentation is used for individual identification, which allows to assess migratory routes, movement patterns, and site fidelity (Forestell *et al.*, 2001; Lydersen *et al.*, 2013; Pirota *et al.*, 2023). Southern Hemisphere humpback whale populations are divided into seven breeding stocks (A–G) according to the International Whaling Commission. Anomalous skin colour patterns (leucism) were previously reported in humpback whales in Ecuador (stock G, 2002, Castro *et al.*, 2007), in eastern Australia (stock E, 1991, Forestell *et al.*, 2001), in Norway (Cape Verde, 2012, Lydersen *et al.*, 2013), and in South Africa (stock B, 2014, Koper *et al.*, 2017). Albinism was only confirmed genetically in the eastern Australia sighting (Forestell *et al.*, 2001; Polanowski *et al.*, 2012). Two presumed cases of albinos were reported both in eastern Australia in 2011 (Koper *et al.*, 2017) and in Costa Rica in 2022 (Mora *et al.*, 2022).

In this note, I report the first record of a humpback whale with anomalous skin pigmentation sighted opportunistically off the coast of Papeete, Tahiti, French Polynesia. Two opportunistic sightings were made on the same day (Figure 1A, B). On 25 July 2019, at 0930 am a white humpback whale was observed off Papeete (17°31′30.0″S, 149°34′34.9″W) during a private boat trip (Figure 1). Data were collected by a citizen (Montlahuc) during this trip and included photographs of the whale, geographic location, behaviour, and time of the sighting. Photographs were taken with a Sony DSC-Rx10M4 camera. The whale was re-sighted by divers about 5 km away in the early afternoon of the same day farther north near the commune of Arue (Montlahuc, pers. comm.) (Figure 1C). No coordinates were obtained from this resighting. The whale has not been resighted since 2019 by local nonprofits dedicated to whale research (Bennet, pers. comm.). It was impossible to determine the individual's size based on *in situ* observations. The individual was displaying surface-active behaviours such

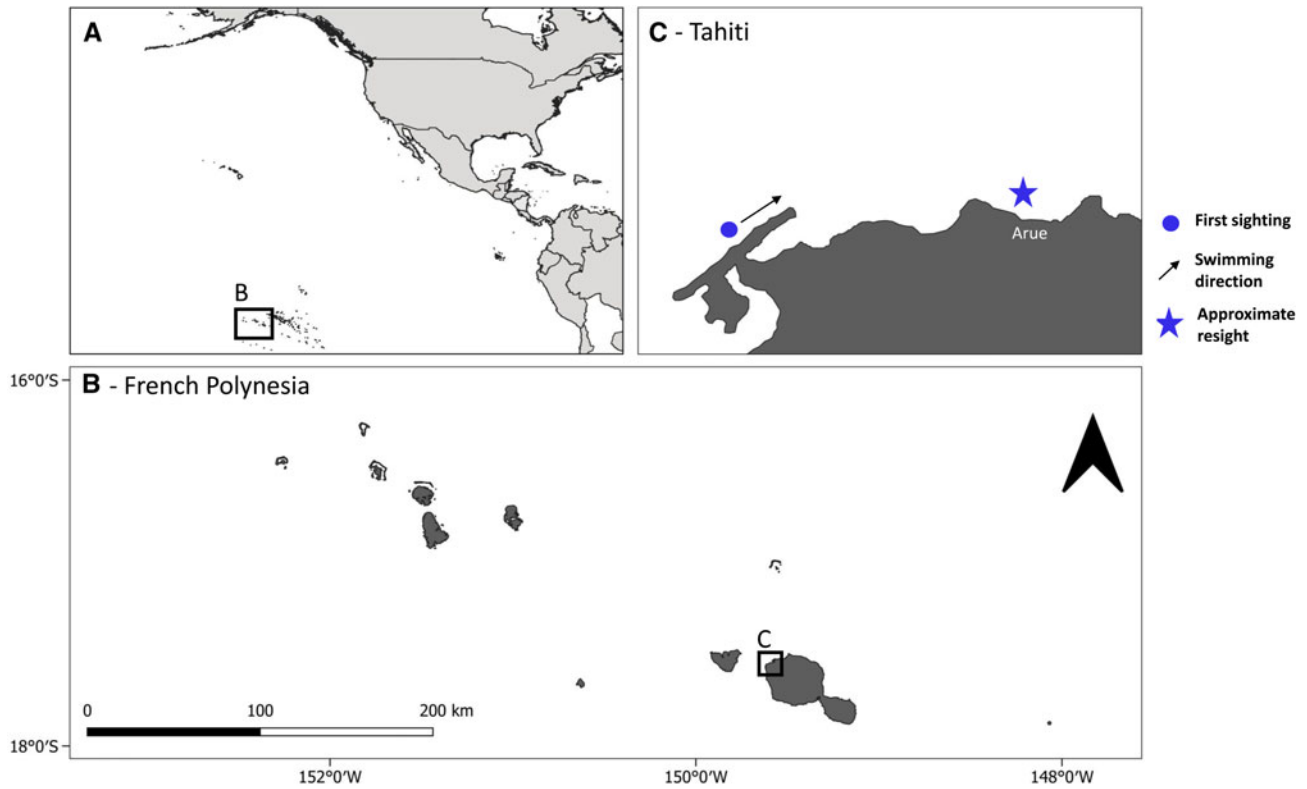


Figure 1. Location of French Polynesia (A, B) and the observation location in Papeete, Tahiti (C) with a black arrow indicating the track of the boat that followed the whale.

as breaching and tail slapped several times. The individual presented a mixed grey-white body colour with some skin lesions likely made by cookie shark (*Isistius brasiliensis*) bites (Figure 2A–D). The ventral surface of the flukes displayed

some white-grey-coloured patterns (Figure 2D). Pink skin was also observed on the dorsal fin of the animal (Figure 2A). No photograph could be taken of the eyes to assess the presence of red eyes to characterize albinism. This report represents the

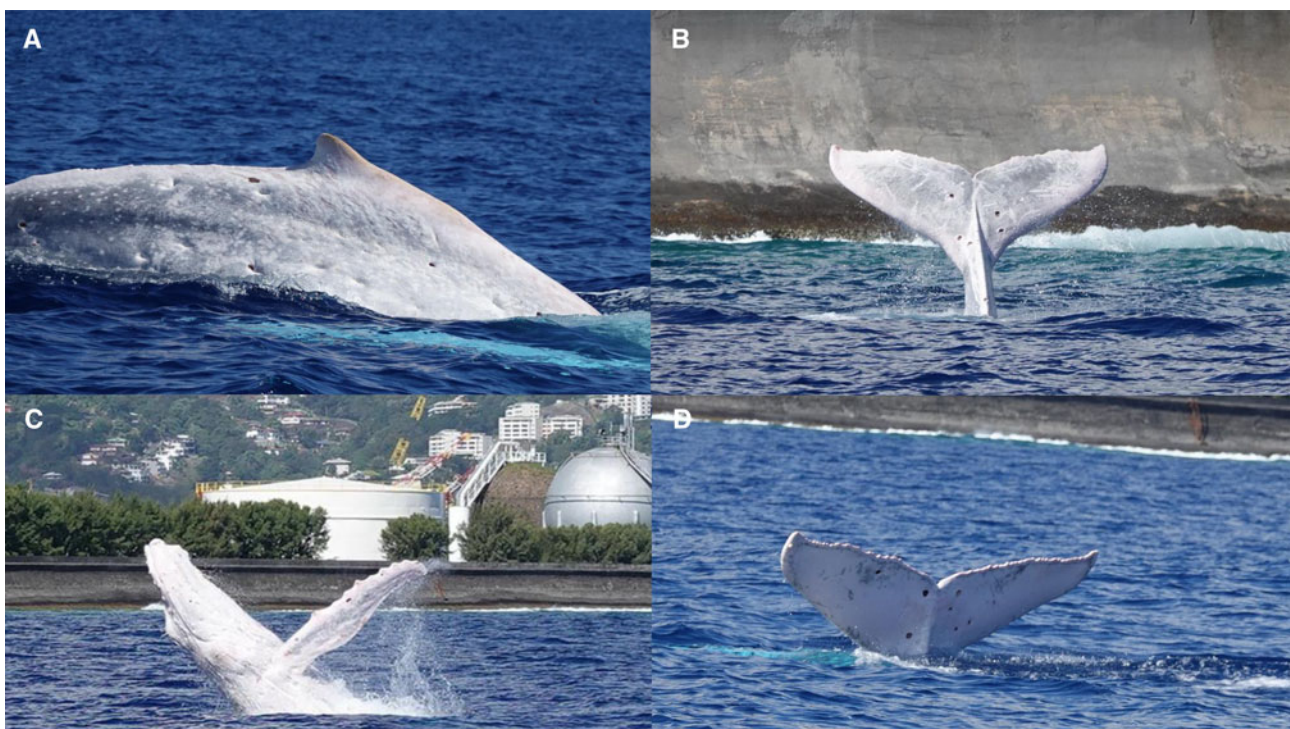


Figure 2. Photographs of an anomalous skin-coloured humpback whale observed in Papeete, Tahiti, on 25 July 2019 showing the dorsal surface of (A) the dorsal fin and (B) the dorsal side of the fluke; (C) the right side of the head and right pectoral flipper head and (D) the ventral side of the fluke with skin lesions likely made by cookie shark (*I. brasiliensis*) bites. Photo credit: Olivier Montlahuc.

first documented case of a leucistic white whale in the breeding stock F.

Humpback whales observed in Oceania are part of breeding stock F, which ranges from the Cook Islands (substock F1) to French Polynesia (substock F2) (Pastene *et al.*, 2011). No other sighting of anomalous skin-coloured whales was previously reported in breeding stock F. Despite the disadvantages that white skin colours may present, two adult white whales are known to be at least 20 years old as reported off the Norwegian mainland coast (Lydersen *et al.*, 2013) and eastern Australia (Pirota *et al.*, 2023). Except for those two whales, few photographic or visual recaptures of white whales were reported in the past. The atypical body colouration of the individual sighted off Tahiti can result in a higher likelihood to be resighted compared to normal skin colouration, especially if it occurs in coastal areas with high anthropogenic activity. No recaptures of this animal were made on the Happywhale citizen science platform containing a database of approximately 289,000 encounters and uses fully automated fluke-matching software (Cheeseman *et al.*, 2022).

Anomalous white colouration can be of genetic origin due to mutations in the tyrosinase enzyme, and albinism is the result of homozygous deletion of the nucleobase cytosine in DNA (Polanowski *et al.*, 2012). In the Southern Hemisphere, the recessive allele responsible for depigmentation in humpback whales has been reported in stock E (eastern Australia; Forestell *et al.*, 2001) and potentially in stock G (Central to South America; Mora *et al.*, 2022). It is unclear if this phenomenon is the result of a recessive allele transmission between stocks or if this results from an independent genetic anomaly (e.g. insertions or deletions). Interchange has been found in the past between stocks E and F (Western Australia) through photo-identification methods (Garrigue *et al.*, 2011). If the recessive allele responsible for albinism is present in stock F it might indicate potential inter-stock movements with stock E, where one albino was previously observed (Pirota *et al.*, 2023). Future resighting of anomalous white-coloured humpback whales should include biopsy sampling and genetic analysis of skin samples to understand the origin of the genetic deviation (e.g. gene mutation or allele transfer) to assess potential stock exchanges and reproduction.

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Competing interest. None.

Data availability. All the data are available upon request.

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