

FIRST RECORD OF COMPLETE ALBINISM IN A SPECIES OF THE GENUS *PRISTIMANTIS* JIMÉNEZ DE LA ESPADA, 1870 (ANURA: STRABOMANTIDAE) IN THE ECUADORIAN ANDES

PRIMER REGISTRO DE ALBINISMO COMPLETO EN UNA ESPECIE DEL GÉNERO *PRISTIMANTIS* JIMÉNEZ DE LA ESPADA, 1870 (ANURA: STRABOMANTIDAE) EN LOS ANDES ECUATORIANOS

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Resumen.– Encontramos un individuo albino del género *Pristimantis* en los Andes ecuatorianos. Este es el primer caso de albinismo completo para anuros de desarrollo directo en el Neotrópico y el primer registro en anfibios para el Ecuador.

Palabras clave.– anomalías cromáticas, albinismo, *Pristimantis*, coloración, desarrollo directo, Ecuador.

Abstract.– We found an albino individual of the genus *Pristimantis* in the Ecuadorian Andes. This is the first case of complete albinism for direct-developing anurans in the Neotropics and the first record in amphibians for Ecuador.

Key words.– chromatic anomalies, albinism, *Pristimantis*, coloration, direct development, Ecuador.

Although cases of albinism are rare in nature, it has been reported in several groups of vertebrates, e.g. reptiles (Valencia, 2009; Perrault & Coppenrath, 2019; García-Roa, 2020), mammals (Abreu et al., 2013; Lucati & López-Baucells, 2017), birds (Van Grouw, 2013), and fishes (Manoel et al., 2017). The terms “albinism” and “partial albinism” have been historically used by many authors indistinctively to describe different types of anomalies which encompass leucism (lack of melanin in the entire body, except for eyes which present normal coloration), piebaldism (certain patches or parts of the animal are lacking melanin), and true albinism, that can be recognized by the white phenotype in the body and reddish eyes (Lucati & López-Baucells, 2017). These colour anomalies are the most commonly reported for amphibians, with cases of partial or complete albinism reported in 86 anuran species and 64 urodeles (Henle et al., 2017). This phenomenon might be due to genetic mutations, chemical pollution, disease, UV radiation, temperature, parasites or injury (Henle et al., 2017; Lucati & López-Baucells, 2017; Lunghi et al., 2017).

Albinism in anurans has been reported in larvae (Brassaloti & Bertoluci, 2008; Martinuzzi et al., 2016; Fonseca et al., 2021), and in adults (Spadola & Insacco, 2010; Toledo et al., 2011). However, as mentioned before, there has been much confusion over the use of the term “albinism” to describe different chromatic anomalies (e.g., leucism, piebaldism and true albinism), especially under the term “partial albinism” (Henle et al., 2017; Lucati & López-Baucells, 2017).

On 6 October 2021 at 00:05h at Cloud Forest Organics, Baeza, Napo, Ecuador (−0.43642; −77.89583; 2,219 m a.s.l.) we found an albino adult individual of the genus *Pristimantis*. A photo voucher was deposited at Centro Jambatu, Quito, Ecuador (CJ12484; Fig. 1). We refer the mentioned individual as *Pristimantis* sp. because it is from a population that is between two newly described species (Bejarano-Muñoz et al., 2022), but due to their resemblance, we cannot confirm the correct identification of the species. The albino individual was found 150 cm from ground level on a leaf 10 m away from a stream in secondary forest. The individual was



Figura 1. A) vistas dorsolateral y B) frontal del ejemplar albino de *Pristimantis* sp. encontrado en Baeza, Ecuador (Foto voucher CJ12484).

Figure 1. A) dorsolateral and B) frontal views of the albino individual of *Pristimantis* sp. found in Baeza, Ecuador (Photo voucher CJ12484).

active similar to other individuals of the same species that we found less than 50 m away. The other individuals showed normal coloration ranging from dark to light brown (Fig 2).

This is the first case of true albinism in the genus *Pristimantis* Jiménez de la Espada, 1870, the first for New World direct-developing anurans (species in which there is no free-living larval stage), and also for Ecuadorian amphibians. The genus *Pristimantis*, from the Strabomantidae family, is the most diverse vertebrate groups in the world (Mendoza et al., 2015; Waddell et al., 2018), with more than 590 species distributed from eastern

Honduras to northern Argentina and some Caribbean islands (Frost, 2021).

For direct-developing frogs (Brachycephaloidea) there are two previous records of chromatic anomalies, both in species from the family Eleutherodactylidae: *Eleutherodactylus planirostris* (Petrovic, 1973) and *E. zeus* (García-Padrón & Bosch, 2019), however, the two cases correspond to piebaldism. In the report for *E. planirostris* (Petrovic, 1973), although the author refers to it as albino, describes the specific dark coloration in the head of the individual.

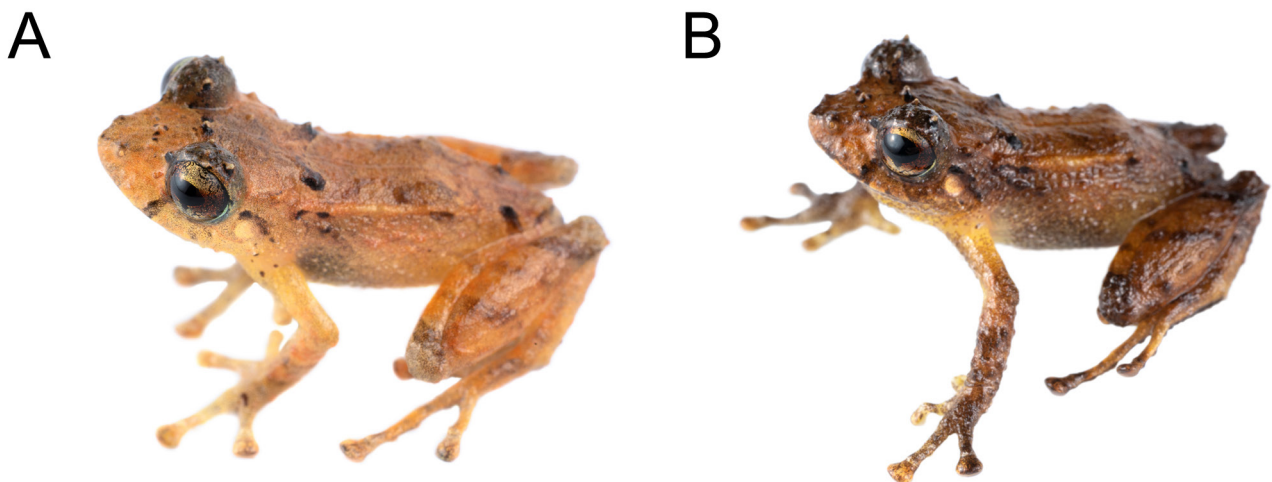


Figura 2. A) y B) vista dorsolateral de individuos de *Pristimantis* sp. con coloración normal encontrados en la misma localidad que el individuo albino.

Figure 2. A) and B) dorsolateral view of normally coloured individuals of *Pristimantis* sp. found in the same locality as albino individual.

Some authors hypothesize that, due to predation, albinism might increase selective pressure against these individuals (Childs, 1953; Petrovic, 1973; Toledo et al., 2011; Silva-Caballero et al., 2014). Nevertheless, Stephenson et al. (2022) did not find differences on the attack rate of birds among albino and normal phenotypes of the eastern garter snakes. On the other hand, Sazima & Di-Bernardo (1991) suggest that survival of albino individuals is greater in species with nocturnal habits, since selective pressure is higher on diurnal animals as their predators are more visually oriented. Fonseca et al. (2021) found only tadpoles and newly metamorphosed albino individuals in a population of *Leptodactylus macrosternum*, suggesting that this could be evidence of higher risk of predation on these individuals. However, also suggest that due to the nocturnal and fossorial habits of adults of *L. macrosternum*, albino individuals could increase their chances of survival. Other authors proposed that animals with an uncommon phenotype (e.g., albinism) could be less predated because some predators may reject them as a prey (Tinbergen, 1960) due to some sort of neophobia. It is clear that further studies are required to understand better the implication of predation in frogs –and other animal groups– with abnormal colorations (Childs, 1953) thus, we suggest caution when drawing conclusions based on casual observations.

Finally, when albino recessive gene is present in a population, the frequency of albinism may increase in consequence of high levels of deforestation and fragmentation that drive the populations into isolation enhancing inbreeding (Chetnicki et al., 2007; Russell et al., 2011; Gilhen et al., 2012; Prado-Martinez et al., 2013; Espinal et al., 2016).

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