First record of flavism in *Pelophylax perezi* from the Balearic Islands

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Resumen: El flavismo es una aberración cromática caracterizada por la falta de melanina y colores estructurales, resultando en un fenotipo donde solo son visibles los xantóforos. Esta nota reporta el primer registro de flavismo completo en la Rana verde común (*Pelophylax perezi*) en las Islas Baleares, correspondiente a un individuo post-metamórfico encontrado en octubre de 2025 en una charca artificial en Ibiza. Esta observación es relevante ya que documenta la supervivencia de un fenotipo poco común en un hábitat antropizado, destacando el posible papel del aislamiento y la endogamia en la expresión de este tipo de anomalías.

The Iberian Green Frog, *Pelophylax perezi* (López Seoane, 1885), is a widely distributed anuran species native to most of the Iberian Peninsula and southern France, while it has been introduced to several western Mediterranean islands, including the Balearic Archipelago, Spain (Pinya & Carretero, 2011). Its occurrence in the Balearic Islands has been attributed to historical human-mediated introductions (Mateo, 2015). This aquatic species inhabits a wide range of stagnant and slow-flowing freshwater habitats and tolerates eutrophic or slightly saline conditions (Egea-Serrano, 2014). Ecological plasticity and generalist habits allow this species to thrive in disturbed landscapes (Burghelea *et al.*, 2010).

However, despite this ecological success and local abundance, distinct morphological aberrations are infrequent (Henle *et al.*, 2017). Flavism (also known as xanthism) is a chromatic anomaly characterized by the lack of melanin and structural colours, resulting in a phenotype where only yellow pigments (xanthophores) are visible. This condition is caused by a genetic blockage in the synthesis of integumentary pigments or the complete absence of melanophores and iridophores (Henle *et al.*, 2017). While pigmentary anomalies have been sporadically reported in various Iberian amphibian species (Campos-Such, 2017), this condition in *P. perezi* is considered rare, with few documented cases restricted to mainland Spain (Renom, 1995; Aguilar *et al.*, 2011). To date, no pigmentary anomalies have been reported for any amphibian species in the Balearic Islands.

On 12 October 2025, at 10:50 hours, a juvenile post-metamorphic *P. perezi* displaying abnormal coloration was observed in a swimming pool adjacent to an artificial pond near Sant Miquel de Balansat village, Eivissa, Spain (39º03'23"N / 1º27'14"E, 163 masl.). The surrounding landscape is rural and agricultural, characterized by dry-stone terraces and traditional crops. Aquatic vegetation inclu-

ded *Juncus* sp., *Typha* sp., *Nymphaea* sp., *Nelumbo* sp., and *Vallisneria* sp. The pond also contained native aquatic invertebrates (Odonata larvae, *Notonecta* spp., Dytiscidae) and alien fish species, the common carp (*Cyprinus carpio*). *P. perezi* was the only amphibian species observed. The specimen was found basking in the disused swimming pool, where juvenile individuals are frequently seen.

This individual exhibited a uniform yellow-orange dorsal coloration with faint mottling along the dorsum (Figure 1). The flanks and limbs were similarly coloured, and the ventral surface was pale cream. The iris was dark brown, showing a reddish reflection under direct light. No melanotic patterning was visible elsewhere on the body. Consequently, the observed phenotype is consistent with a complete flavistic condition. The specimen displayed normal locomotor behaviour and no morphological abnormalities. It was photographed and released *in situ*.

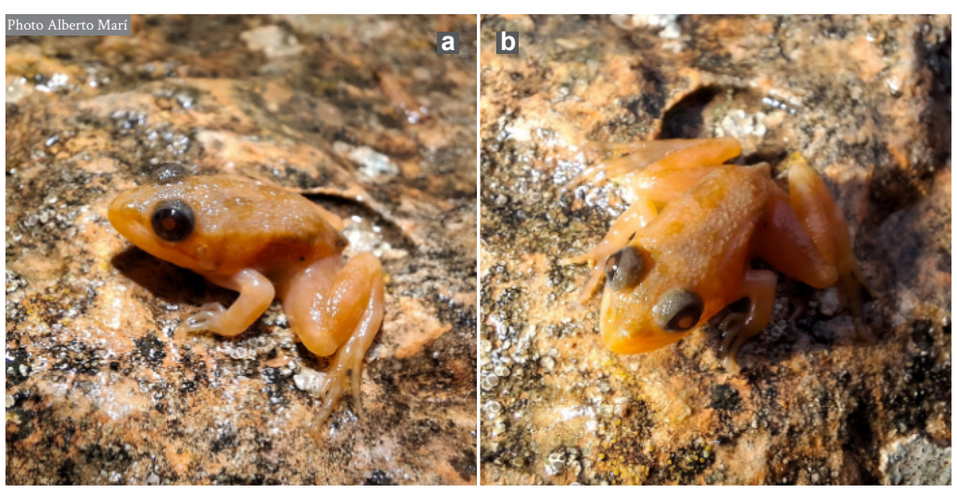

Figure 1: Flavistic *Pelophylax perezi* from Sant Miquel de Balansat (Eivissa, Spain): a) Lateral view showing the uniform yellow-orange coloration. b) Dorsal view highlighting the absence of melanotic patterning.
Figura 1: *Pelophylax perezi* flavístico de Sant Miquel de Balansat (Eivissa, España): a) Vista lateral mostrando la coloración amarilla-anaranjada uniforme. b) Vista dorsal resaltando la ausencia de patrón melanótico.

This record constitutes the first observation of flavism in *P. perezi* from the Balearic Islands, and to our knowledge, the first documented pigmentary anomaly in the amphibian fauna of the archipelago. Unlike the partially flavistic individual described from Girona (Renom, 1995), this specimen exhibited a complete expression of the trait. Similarly, the cases reported by Aguilar *et al.* (2011) in a river in Tarragona were restricted to larval stages. In a broader geographic context, flavism appears to be an exceptional phenomenon within the genus *Pelophylax*. For instance, extensive surveys in Ukraine have identified complete flavism as a rare occurrence compared to other chromatic anomalies (Marushchak *et al.*, 2021). Thus, the occurrence of a fully flavistic post-metamorphic *P. perezi* represents a significant addition to the scarce records of this specific chromatic anomaly in this genus.

Pigmentation plays a key role in camouflage, thermoregulation, and protection against ultraviolet radiation; therefore, pigment anomalies may have significant ecological implications (Rojas *et al.*, 2023). Such anomalies may result from genetic mutations or external factors interfering with pigment-cell development (Henle *et al.*, 2017). Amphibians are particularly sensitive to pollutants and habitat disturbance, which can lead to morphological and pigmentary abnormalities (Henle *et al.*, 2017; Hegde *et al.*, 2019; Marushchak *et al.*, 2021). Colour anomalies similar to the one described here have been reported in other amphibian species and are often associated with polluted or agrochemically influenced environments (Glennemeier & Denver, 2001; Adlassnig *et al.*, 2013; Lifshitz & St. Clair, 2016; Marushchak *et al.*, 2021). However, in our case study, the specific habitat characteristics point towards alternative drivers. The specimen was a post-metamorphic individual found in a swimming pool, acting as a sink for juveniles dispersing from an adjacent ornamental pond characterized by introduced fish (*C. carpio*) and exotic vegetation. Regarding the water quality of this principal habitat, the co-occurrence of diverse aquatic macroinvertebrates (Odonata larvae, Dytiscidae, *Notonecta* spp.) serves as a bioindicator of acceptable water quality, implying a functional trophic web and the absence of acute toxicity (Chovanec & Waringer, 2001), although the presence of *C. carpio* is compatible with eutrophic conditions (Maceda-Veiga *et al.*, 2017). Furthermore, considering that chromatic anomalies compromise crypsis (Henle *et al.*, 2017), the survival of this individual through metamorphosis is remarkable, particularly in a pond populated by *C. carpio*, which are known to exert strong predation pressure on amphibian larvae (Kloskowski, 2011) and alter habitat structure (Maceda-Veiga *et al.*, 2017).

Consequently, the origin of this anomaly could be multifactorial. While the presence of bioindicators suggests the absence of notable toxicity, the agricultural context implies potential exposure to agrochemicals. Simultaneously, the discrete nature of these isolated artificial water bodies could foster local endogamy or founder effects within small populations. Thus, the observed phenotype may reflect the interplay between environmental pressure and the genetic dynamics characteristic of populations inhabiting fragmented agricultural landscapes. These processes may be particularly relevant in insular systems, where geographic isolation, small and fragmented populations, and reduced genetic diversity increase vulnerability to environmental stressors (Fernández-Palacios *et al.*, 2021). Continued monitoring of Balearic amphibian populations could provide valuable indicators of environmental stress and help clarify the role of isolation in the expression of rare phenotypes.

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