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Scientific note

Diurnal water uptake in nocturnal rainforest frogs observed during the 2023 drought in Amazonian Peru

(Amphibia, Anura)

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Anurans are known to be capable of cutaneous water uptake to regulate their hydric conditions (e. g., Lemenager et al. 2021) and tropical frogs were reported to actively collect dew through their skin during the dry season (e. g., Tracy et al. 2011). In tropical rainforests, water is rarely a limited resource, but conditions during dry seasons or periodic droughts may challenge the hydric balance of rainforest amphibians. In 2023, Amazonia suffered from a record drought that resulted in extremely dry conditions throughout most of the rainforest areas (Espinoza et al. 2024). This also affected the Área de Conservación Privada Panguana (9°37' S, 74°56' W, 260 m a. s. l.), a protected area of lowland rainforest in Amazonian Peru, which received exceptionally low precipitation at the end of the dry season of 2023.

On 8 October 2023, at Panguana, after many days without any rainfall, and rather hot and dry conditions, light rain started in the late morning (10:50 am). After about 25 minutes of rain, following observations were made at the so-called 'Estanque', a temporary pond within the rainforest, known as a breeding place for several anuran species (Schlüter 2005), which at the time of observations was completely dried out: one individual of the nocturnal hylid treefrog species *Dendropsophus rhodopeplus* and two individuals of *Scinax* sp. (aff. *ruber*) left their shelters, climbing up stems of palm leaves, apparently to expose their bodies to the rain for cutaneous water uptake. Having reached exposed perches, individuals showed no further recognizable movement (Fig. 1). In addition, two individuals of *Leptodactylus leptodactyloides* (Leptodactylidae) were seen sitting openly on the forest floor in moist leaf litter at the same time. The rain stopped after approximately 1.5 hours. A visit to the same spot at the same day later at night (no rain, dry conditions) revealed zero calling activity and no encounter of nocturnal frogs.

Such observations are rarely made and may exemplify spontaneous behavioural adjustments of frogs in reaction to exceptional dryness, avoiding desiccation and enabling their survival. Remarkably, Niessner & Köhler (2024) reported a deviant diurnal preying behaviour of an otherwise strictly nocturnal and rain active frog species in the context of the 2023 drought, assumingly to avoid starvation.

Fig. 1. Individual of the nocturnal treefrog *Dendropsophus rhodopeplus* in situ at daytime (8 October 2023, 11:12 am) at Panguana, Peru, apparently exposing its body for cutaneous water uptake during light rain.

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