# NEW CONTRIBUTIONS ON THE REPRODUCTION OF TWO AMAZONIAN ANOLES: *ANOLIS FUSCOAURATUS* AND *ANOLIS PUNCTATUS* (ANOLIDAE)

## NUEVAS APORTACIONES SOBRE LA REPRODUCCIÓN DE DOS ANOLIS AMAZÓNICOS: *ANOLIS FUSCOAURATUS* Y *ANOLIS PUNCTATUS* (ANOLIDAE)

Joseph L. Oakley[1*] & G. Milagros Reyes-Lizarraga[2,3]
[1]*Crees Foundation for Manu, Manu Learning Centre, Fundo Mascoitania S/N, Manu, Madre de Dios, Perú.*
[2]*Rainforest Expeditions, Av. Aeropuerto, La Joya Km 6 Puerto Maldonado, Madre de Dios, Perú.*
[3]*Universidad Nacional Mayor de San Marcos, Calle Germán Amezaga N° 375, Lima, Perú.*
**Correspondence:* josephoakley94@gmail.com

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**Resumen.**– *Anolis punctatus* y *A. fuscoauratus* son lagartijas amazónicas de amplia distribución, aunque la información sobre su biología reproductiva sigue siendo escasa. Reportamos observaciones respecto a la reproducción de ambas especies y proporcionamos datos novedosos sobre el período de incubación y el tamaño de la cría de *A. punctatus*, y el tamaño de la nidada y el comportamiento de puesta de huevos de *A. fuscoauratus*.

**Palabras clave**.– Cría, huevos, lagartija, tiempo de incubación.

**Abstract.**– *Anolis punctatus* and *A. fuscoauratus* are widely distributed Amazonian lizards, although information on their reproductive biology remains sparse. We report observations of reproduction in both species and provide novel data on incubation period and hatchling size of *A. punctatus* and clutch size and egg-laying behaviour of *A. fuscoauratus*.

**Keywords**.– Eggs, hatchling, incubation time, lizard.

The brown-eared anole, *Anolis fuscoauratus* (D'Orbigny, 1837), and the Amazon green anole, *A. punctatus* (Daudin, 1802), are small-sized diurnal lizards distributed throughout the Amazon basin in primary, secondary and disturbed terra firme forests, flooded forests, and forest edges (Dixon & Soini, 1986; Avila-Pires, 1995; Vitt et al., 2003a,b). In both species, reproduction has been documented to occur throughout the year (Duellman, 1978, Dixon & Soini, 1986; Duellman, 2005). Gravid females of *A. fuscoauratus* and *A. punctatus* are reported to carry one or two oviductal eggs, however records suggest that they only lay a single egg at a time (Duellman, 1978; Dixon & Soini, 1986; Avila-Pires, 1995; Duellman, 2005). Despite both species having a widespread distribution and being commonly sighted in many areas, direct observations of their reproduction are rarely reported. Consequently, information on their reproductive biology is sparse. Here we report novel information on incubation period and hatchling size in *A. punctatus*, and clutch size and egg-laying behaviour in *A. fuscoauratus*.

On 16th September 2023 at 21:15 h, we found an adult female *A. punctatus* perched on a tree branch ca. 210 cm above the ground in the garden of the Manu Learning Centre Biological Field Station (12.78804° S, 71.39127° W; WGS 84; 460 m a.s.l.), Madre de Dios, Peru. The anole was captured to take data for a long-term herpetological monitoring programme and measured 71.2 mm snout-vent length and 181.9 mm tail length. While in captivity, at some point during the following day, it laid a single egg measuring 16.1 mm x 8.1 mm, with a volume of 553.1 $mm^3$. The adult *A. punctatus* was released on 17th September 2023 at the capture site. Due to the lack of information about nest sites in *A. punctatus*, we decided to incubate the egg in captivity to monitor it during development and hatching. We placed the egg in a plastic container (12 x 12 x 12.5 cm) on top of a layer of lightly moistened soil and covered it with leaf litter. We maintained it at ambient temperature, between approximately 17°C and 38°C, and sprayed the leaf litter with water daily to maintain humidity. The egg hatched 83 days later on 9th December 2023, with a male neonate emerging from the distal end of the egg (Fig. 1a). The

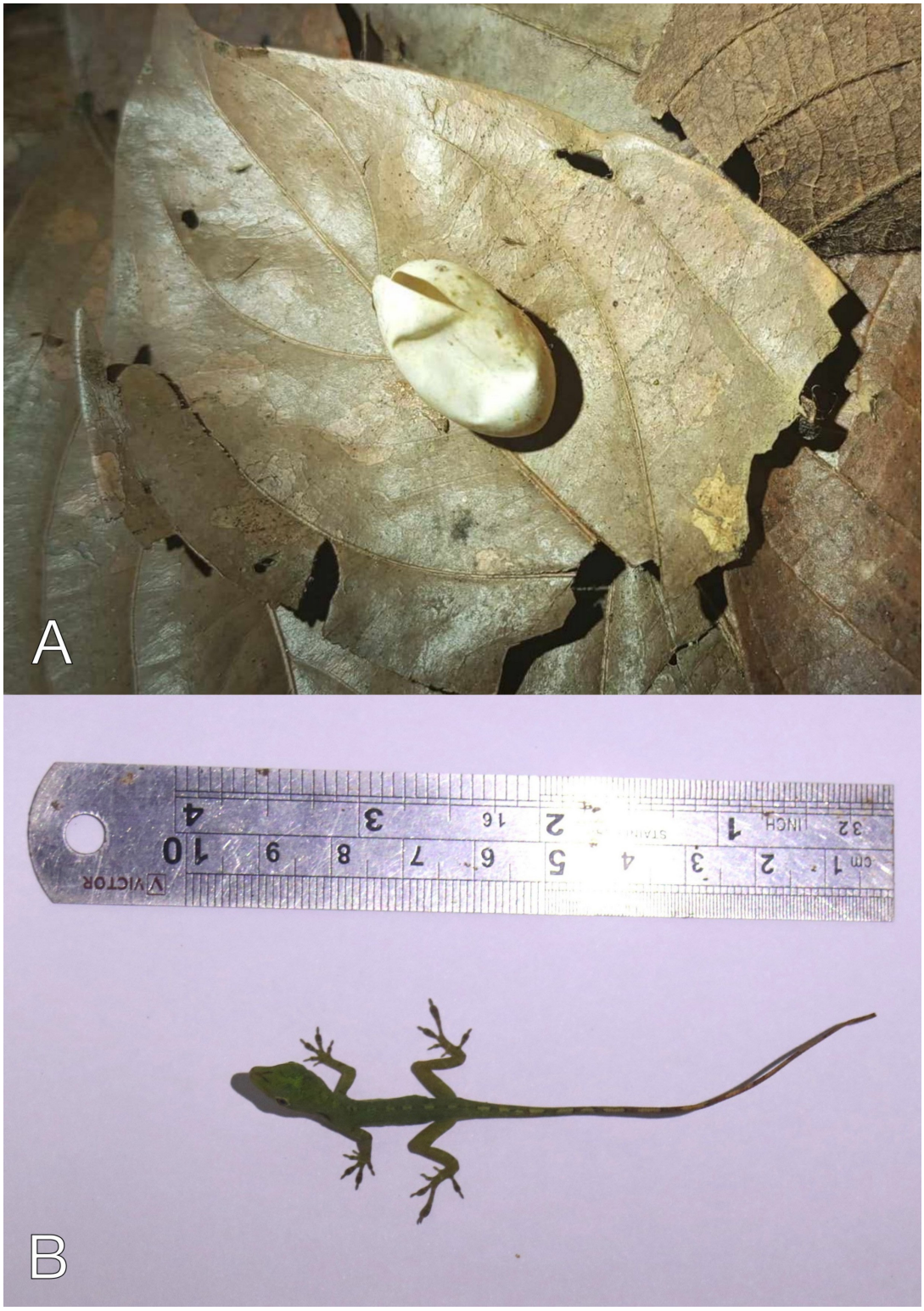


**Figura 1.** A) Cáscara vacía de huevo de *Anolis punctatus* que muestra el extremo distal como punto de salida del neonato. B) Macho neonato de *A. punctatus* al día siguiente de la eclosión. Fotos: A) Joseph L. Oakley y B) Daniel Ash.

**Figure 1.** A) Empty eggshell of *Anolis punctatus* showing the distal end as the exit point of the neonate. B) Male neonate of *A. punctatus*, taken one day after hatching. Photos: A) Joseph L. Oakley and B) Daniel Ash.

hatchling measured 30.9 mm snout-vent length, 62.2 mm tail length and weighed 0.6 g (Fig. 1b). Two days later, the hatchling was released on a leaf at the site where the gravid female was found.

On 17th April 2024 at 08:17 h, we observed an adult female *A. fuscoauratus* laying two eggs on the side of a small wooden bridge located at the Posada Amazonas Lodge (12.80251° S, 69.29964° W; WGS 84; 246 m a.s.l.), in Madre de Dios, Peru. One of the eggs was adhered between the rear left leg and tail of the female, while the other was enveloped in a membrane and situated beneath the cloaca (Fig. 2). Throughout the observation, we noted that the individual's reflexes remained seemingly normal, as it still moved in response to the proximity of people as expected, although the eggs stayed attached to its body. This event occurred on a bridge with regular human traffic, resulting in the lizard eventually leaving the location without depositing its eggs. Attempts to relocate the female *A. fuscoauratus* or its eggs were unsuccessful.

Little is known about nest sites used by *A. punctatus* and *A. fuscoauratus* since reproductive behaviour is rarely observed and eggs are presumably laid in inconspicuous microhabitats. Other species of *Anolis* are known to lay eggs in leaf litter, in crevices in rocks and trees, and buried in substrate (Avila-Pires, 1995; Pruett et al., 2022). As far as we are aware, there are no existing records of anoles transporting eggs after laying them. It is possible that the *A. fuscoauratus* from our observation was in the process of laying the eggs within a crevice in the bridge but was disturbed by human activity and consequently left with the eggs attached to search for an alternative nest site

Previous reports suggest that *A. fuscoauratus* produces two oviductal eggs but only lays a single egg at a time (Avila-Pires, 1995; Duellman, 2005). In our observation, one of the eggs appeared to be enveloped in a membrane, and we are uncertain whether it was a developed egg or an undeveloped egg that was prematurely laid.

**Figura 2**. Hembra adulta de *Anolis fuscoauratus* transportando dos huevos recién puestos. Foto: G. Milagros Reyes-Lizarraga.

**Figure 2**. Adult female *Anolis fuscoauratus* transporting two recently laid eggs. Photo: G. Milagros Reyes-Lizarraga.

Incubation period varies greatly within the genus *Anolis*, from less than two months in some species to more than five months in others (Duellman, 1978; Quirola et al., 2017). The species *A. aequatorialis* and *A. trachyderma* have been reported to have incubation periods of similar length to that in our observation. In captivity, an *A. aequatorialis* egg was reported to be fully developed after 83 days but subsequently failed to hatch (Ayala-Varela et al., 2022), while the incubation time for an *A. trachyderma* egg was 77 days (Duellman, 1978). To the best of our knowledge, ours is the first report of incubation period and hatchling size in *A. punctatus*, providing novel data on the reproductive biology of this species. Since we only provide data for a single observation, additional records would prove valuable to document the possible range of incubation period and hatchling size. Similarly, our observation of *A. fuscoauratus* provides novel data on the actual clutch size and egg-laying behaviour of this species.

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