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Bilateral hindlimb abnormality in an undescribed endemic gecko (genus *Gekko*) from the Koshiki Islands, Japan, locally known as "Nishiyamori"

Kota Okamoto[1]

Limb abnormalities may adversely affect the survival of lizards, but such abnormalities have occasionally been documented in wild lizard species (e.g., Gleed-Owen, 2012; Kolenda et al., 2017; Handal and Christopoulos, 2022). Most of these cases involve abnormalities in only one limb (Cortada et al., 2017; Khandakar et al., 2020; Decemson et al., 2021; Handal and Christopoulos, 2022; Cavalcante and Passos, 2024), although a few reports describe abnormalities in two limbs of a single individual (Gleed-Owen, 2012; Kolenda et al., 2017).

The undescribed gecko species known as "Nishiyamori" (ニシヤモリ in Japanese; Matsuo and Ejima, 1988) is a small, nocturnal gecko found in western Kyushu, Japan, and on multiple islands in the East China Sea (Jono and Toda, 2021; Chiba and Chiba, 2024). During a herpetological survey conducted on the Koshiki Islands, Kagoshima Prefecture, from 4–6 July 2025, I found a Nishiyamori gecko lacking large portions of both hindlimbs. Here, I report the details of the individual and the circumstances of its capture.

On 5 July 2025, at 02:35 h, in fine weather, I found a gecko on a concrete pavement slightly elevated above an asphalt road (Rte. 349) in the northern part of Shimokoshiki Island (31.7810°N, 129.7947°E). Upon hand-capture, I observed that substantial portions of both hindlimbs, just below the knee, were absent (Fig. 1A). I determined the sex of the gecko by checking for the presence of precloacal pores, and I weighed it by placing it into a small plastic bag and using a digital scale. The gecko was a female Nishiyamori (precloacal pores absent) weighing 2.06 g, with a snout–vent length of 49.8 mm. The tip of the left hindlimb had a soft, 1.5-mm-long, scale-covered protrusion, with scales larger than those typically found on gecko limbs (Fig. 1B). The tip of the right hindlimb displayed a 1.0-mm-long presumed cicatrised area, also covered with enlarged scales (Fig. 1C). I placed the gecko in a plastic container at room temperature and transported it to the National Museum of Nature and Science, Tokyo, Japan (NSMT). The gecko defecated in the plastic bag, and the faeces contained insect wings and exoskeletal fragments (Fig. 1D). The individual was euthanised, fixed in 10% formalin, and preserved in 70% ethanol at the NSMT. The specimen has been deposited in the NSMT herpetological collection as NSMT-H 21398. During the survey, I captured a total of 48 geckos of the genus *Gekko*, including Nishiyamori, *G. japonicus* (Duméril & Bibron, 1836), and *G. hokouensis* Pope, 1928. Only the single individual (2.1%) exhibited limb abnormalities.

Limb abnormalities in vertebrates may result from various causes, including malformation during embryonic development, parasitic infections, and traumatic limb loss (Johnson and Lunde, 2005; Manouvrier-Hanu et al., 2012; Cavalcante and Passos, 2024). I speculate that the hindlimbs of the individual reported in the present study were lost due to amputation, as the distal morphology resembles regenerated protrusions and cicatrised portions observed in other lizard species (Cavalcante and Passos, 2024: Fig. 5). In Gekkota, a regenerated tail-like protrusion was reported for *Hemidactylus agrius* Vanzolini, 1978 (Cavalcante and Passos, 2024). To the best of my knowledge, the present study is the second record of such a protrusion in geckos.

Most documented cases of limb amputation in wild lizards are thought to be caused by predation attempts (e.g., Cavalcante and Passos, 2024). Although no specific predators of Nishiyamori have been reported, *Gekko* species in Japan are preyed upon by a variety of animals, including mammals (Nishikawa, 2009), birds (Tobe et al., 2024), snakes (Mori and Moriguchi, 1988), insects (Sato, 2017), arachnids (Tokuyama et al., 2017; Sato, 2018), and centipedes (Okamoto, 2019).

[1] Center for Molecular Biodiversity Research, National Museum of Nature and Science, 4-1-1 Amakubo, Tsukuba, Ibaraki 305-0005, Japan. E-mail: kota_okamoto@kahaku.go.jp

It is likely that this individual lost its hindlimbs during an encounter with one of these predators. However, a question arises: if a predator had attacked from behind, autotomy of the tail would have been expected, but in this individual, only the distal third of the tail was regenerated (Fig. 1A). Features of the predatory behaviour of some species may explain this. For example, Okamoto (2019) reported a predation case by the Chinese red-headed centipede (*Scolopendra mutilans*) on *G. hokouensis*. In this case, the centipede was holding the gecko's left hindlimb with its forcipules until the gecko died, and the gecko did not autotomise its tail throughout the observation. Therefore, in geckos, tail autotomy is not a necessary consequence of predatory attacks.

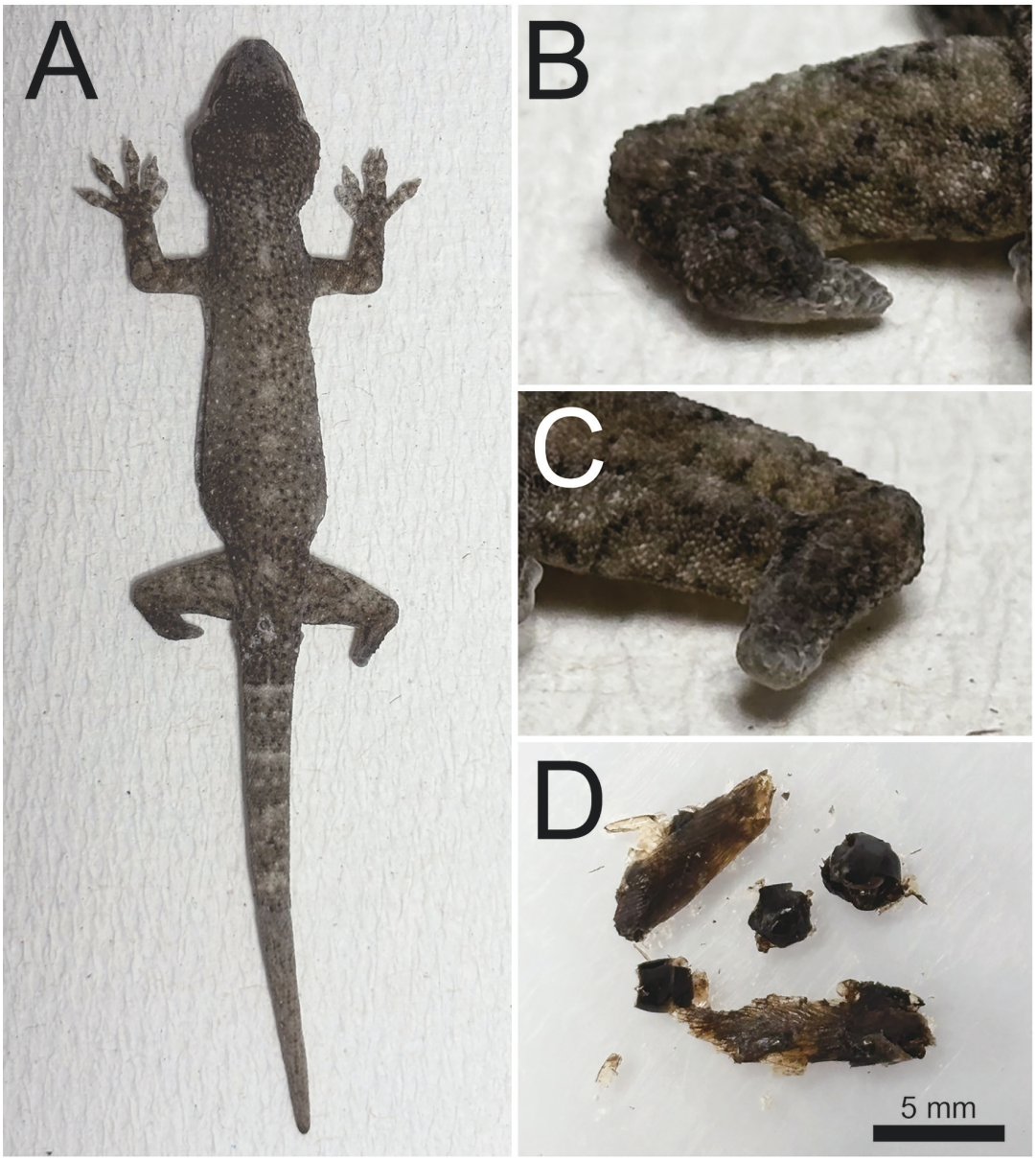

Figure 1. A female "Nishiyamori" (NSMT-H 21398), an undescribed species of *Gekko* from the Koshiki Islands, Japan, lacking both hindlimbs below the knees. (A) Dorsal view. (B) Close-up view of the left hindlimb. (C) Close-up view of the right hindlimb. (D) Insect wings and exoskeletal fragments included in faeces of the individual. Photos by Kota Okamoto.

The loss of large portions of limbs is expected to reduce foraging efficiency, especially in geckos, where adhesive force from the toe pads is critical for locomotion performance. However, the captured gecko appeared to be in good health and had successfully foraged for insects (Fig. 1D). Thus, at least in this individual, the limb abnormality did not prove fatal to its foraging ability.

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