SUMMARY

The Barbados leaf-toed gecko, a Critically Endangered species is found nowhere else in the world but here in Barbados! These small, nocturnal geckos, about the size of a finger, are masters of camouflage, blending into rocky vegetation. If you spot one, look out for their distinctive "leaf-toed" feet, which help them to grip surfaces, and their brown to cream-colored body marked with unique patterns of darker spots. This Critically Endangered endemic gecko faces significant threats because of habitat loss, degradation, and invasive alien predators.

Barbados Leaf-toed gecko (*Phyllodactylus pulcher* Gray, 1828)
Family: Phyllodactylidae (Leaf-toed geckos)
Order: Squamata (Scaled reptiles)
Class: Reptilia (Reptiles)

Barbados leaf-toed gecko (*Phyllodactylus pulcher* Gray)

SPECIES CHARACTERISTICS

The Barbados leaf-toed gecko (*Phyllodactylus pulcher*) is a small, nocturnal lizard endemic to the island of Barbados (Blades & Bosquet, 2025). The species is distinguished by its flattened body, specialized toe pads that facilitate climbing on vertical surfaces, and a cryptic coloration that provides camouflage against its natural habitat. Adults can reach a snout-to-vent length of up to 67 mm (Williams, Horrocks, & Pernetta, 2015). The dorsal colouration is typically a mottled grey or brownish-grey, which allows it to blend in with the rocky habitats it inhabits (Williams et al., 2015). The pattern of dark markings on their backs are unique to each individual and unchanging, meaning they can be used like fingerprints to distinguish different geckos (Blades, 2019). A key identifying feature is a dark stripe that runs from the nostril, through the eye, and towards the shoulder. The ventral side is usually a lighter, uniform colour (Blades, 2019).

This species is rare and cryptic, with few sightings in the 1990's by Prof. Julia Horrocks before a sub-population was discovered in 2011 on Culpepper Island by herpetoculturalist Damon Corrie. Subsequently, the species was found in isolated pockets of mainland Barbados (Williams et al., 2015). The "leaf-toed" designation refers to the broad, lamellae-bearing pads on their digits, which enable their remarkable climbing abilities on sheer rock faces.

EVOLUTIONARY HISTORY AND GENETICS

The Barbados leaf-toed gecko is the only known leaf-toed gecko found in the Lesser Antilles, making it a significant outlier in the distribution of this group of geckos (Williams et al., 2015). The genus *Phyllodactylus* is widespread in the Americas, but the presence of *P. pulcher* in Barbados suggests a complex biogeographical history that is not yet fully understood.

Genetic studies on the population structure and evolutionary divergence of *P. pulcher* are limited. However, its isolation as the sole representative of its genus in the Lesser Antilles points to a long period of independent evolution. The highly fragmented nature of its current population also raises concerns about genetic diversity and the potential for inbreeding within small, isolated groups (Blades, 2019). Further research into the genetic makeup of the remaining populations is crucial for developing effective conservation strategies.

HABITAT AND DISTRIBUTION

The Critically Endangered Barbados leaf-toed gecko is primarily found around exposed rocks on the island. Its distribution is extremely restricted and fragmented, with about 20 known sub-populations (Blades, 2019). These geckos are scansorial, meaning they are adapted to climbing, and they rely on the complex structure of rock, which provide numerous crevices and ledges for shelter during the day (Williams et al., 2015).

The species' habitat preference or niche means that its range is naturally limited (Blades, 2019). Furthermore, development and habitat degradation have led to a contraction of its already small area of occupancy. Surveys have indicated that the presence of these geckos decreases with proximity to human settlements, highlighting their vulnerability to anthropogenic disturbances (Williams, Horrocks, & Pernetta, 2020).

BEHAVIOUR

As a predominantly nocturnal species, the Barbados leaf-toed gecko typically emerges from its daytime retreats to hunt under the cover of night. Nevertheless, observations from locals have noted the gecko's presence during both sunrise and sunset, suggesting a potential for crepuscular behaviour. Still, more research is needed to confirm this speculation.

Foraging and Diet- The diet of the Barbados leaf-toed gecko consists primarily of insects and other small arthropods. It is an opportunistic insectivore, feeding on crickets, termite alates, moths, caterpillars, spiders and cockroaches (Williams et al., 2015). Like many gecko species, the Barbados leaf-toed gecko is assumed to obtain water from their prey, and licking condensation or dew drops off surfaces like rocks, plants, or crevices.

Social Dynamics and Communication- Direct research into the social dynamics of *P. pulcher* is limited. However, some inferences can be drawn from observational studies and anecdotal observations. Multiple shell fragments have been found within single rock crevices which may be evidence that this species nests communally (Williams et al., 2015), however, this is not enough to confirm that the species illustrate a degree of social tolerance; therefore, more research is warrant. On the other hand, the high incidence of tail loss among individuals may

be indicative of agonistic intraspecific interactions, possibly related to competition for resources or mates (Blades, 2019), in addition to predation pressure (Williams et al., 2015). Information on their communication methods, including the use of vocalizations, is currently lacking. Unprovoked vocalisations in this species have not been heard in natural habitats; only during handling.

Reproduction and Nesting- The Barbados leaf-toed gecko is oviparous, laying one to two, hard-shelled eggs per clutch (Blades & Bosquet, 2025). Nesting sites are carefully selected within deep, narrow crevices in rocks, which offer protection from predators and environmental extremes. Gravid females and neonates have been observed year-round (Blades, pers. com.), though may peak between March and June (Williams et al., 2015).

Anti-Predator Responses- The primary anti-predator response of the Barbados leaf-toed gecko is caudal autotomy, the ability to shed its tail when threatened (Williams et al., 2015). The detached tail continues to wriggle, distracting the predator and allowing the gecko to escape. A new tail will regenerate over time.

Historically, predators of the Barbados leaf-toed gecko likely included the extirpated native barn owl (*Tyto* sp.) and the extincted endemic Barbados rice rat (*Megalomys georginae*) (Blades, 2019; Williams et al., 2020). Today, predators of the Barbados leaf-toed gecko are primarily introduced invasive species. These include rats (*Rattus rattus*), mice (*Mus musculus*), domesticated cats (*Felis catus*), cane toads (*Rhinella marina*) and the giant centipede (*Scolopendra* spp.) (Blades, 2019). Competition for resources and refuge with the invasive tropical house gecko (*Hemidactylus mabouia* and *H. frenatus*) also poses a significant threat to the survival of the native gecko (Williams, Pernetta, & Horrocks, 2016). House geckos are also known to prey on juveniles of other lizard species, known as saurophagy, which means that these introduced geckos may pose an additional threat to the endemic Barbados leaf-toed gecko.

INTERACTIONS WITH HUMANS

The secretive, nocturnal nature of the Barbados leaf-toed gecko means that direct interactions with the public are rare. However, human activities have a profound impact on the species' survival. Development, including the construction of hotels, residences, and associated infrastructure, has led to significant habitat degradation, loss and fragmentation, which is the primary threat to the gecko (Blades, 2019).

In recent years, following its rediscovery, there have been concerted efforts to raise public awareness about this critically endangered endemic species. The Government of Barbados, through the GEF-funded “Preventing Costs of Invasive Alien Species (IAS) in Barbados and the Countries of the OECS” and “Conserving Barbados’ Endemic Reptiles” projects; in collaboration with conservation organizations, has initiated community outreach programs to inform residents in areas close to the gecko's habitat about its importance and the threats it faces. There are also plans for the creation of biosecure enclosures, also known as “Mainland Islands”, which could potentially serve an educational or ecotourism purpose, allowing for the protection of sub-populations of this unique reptile from the threats of habitat loss and invasive species while providing conservation and regeneration co-benefits to other species that share their habitat.

CONSERVATION STATUS AND THREATS

The Barbados leaf-toed gecko is listed as "Critically Endangered" on the IUCN Red List of Threatened Species (IUCN, 2017). This status reflects its very small range, and a continuing decline in the extent and quality of its habitat. The estimated population is small; between 4,000 - 6,000, and highly vulnerable to stochastic events (Blades, 2019; Blades & Bosquet, 2025).

The Barbados leaf-toed gecko faces significant threats to its survival. Its habitat is shrinking and becoming fragmented due to erosion and ongoing development. Additionally, the gecko is preyed upon by invasive species like centipedes, cane toads, rats, mice and cats, and it faces competition and saurophagy from the invasive tropical house gecko. Finally, its small, isolated populations are highly vulnerable to extreme weather/stochastic events, such as hurricanes and volcanic ash exposure (Blades, 2019; Blades & Bosquet, 2025).

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Did You Know? That the giant centipede (*Scolopendra* spp.) prey on the Barbados leaf-toed gecko! This highlights just how fragile and important it is to protect these unique, critically endangered creatures!

Rare glimpse into the hidden struggles of the Barbados Leaf-toed gecko— a giant centipede observed attacking an adult gecko beneath a large rock at Ragged Point.

Authors: Connor Blades[1], Chad Barrow[1] and Linton Arneaud[2]

[1] Ministry of Environment and National Beautification
Biodiversity Conservation and Management Section
Warrens, St Michael, Barbados

[2] The University of the West Indies, Cave Hill Campus
Faculty of Science and Technology
Department of Biological and Chemical Sciences

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