

First record of a gecko species to the fauna of Qatar: *Hemidactylus persicus* Anderson, 1872 (Gekkonidae)

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ABSTRACT

We report the discovery of a gecko species, the Persian leaf-toed gecko *Hemidactylus persicus* Anderson, 1872 (Gekkonidae) in Qatar, found on Halul Island. According to the Qatar National Biodiversity Surveys and the available international literature *H. persicus* was not previously recorded in Qatar. Its known range covers the north east of the Arabian Peninsula, Bahrain, the United Arab Emirates, and south western Asia. Our findings bridge the current geographic gap in the known distribution of the species from Saudi Arabia to Asia. We believe that the species could also be present in the Qatar peninsula. A thorough field survey is needed in order to map the range of this species in the State of Qatar.

Keywords: Halul Island, lizard, mapping, biodiversity, wildlife conservation, Arabian Gulf

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INTRODUCTION

Geckos of the genus *Hemidactylus* comprise taxa which are among the most widely distributed lizards. The genus is also very diverse with a rapidly increasing number of new species descriptions: 80 different species in 2006,¹ 111 in March 2012,² and 122 species in July 8, 2013, according to the Reptile Database.^{3,4} These geckos show large intraspecific variation and it is sometimes difficult to distinguish among species.⁵

The Persian leaf-toed gecko, *Hemidactylus persicus* Anderson, 1872, is a nocturnal lizard of the family Gekkonidae, that occurs in Iran,^{6–9} Iraq,^{10–13} Pakistan,^{14–17} India,^{18,19} northeast Saudi Arabia,^{20–22} Kuwait²³ and Bahrain.^{23,24} Other populations were recorded in North Oman²⁵ and the UAE (Figure 1).⁵ The known Omani populations, in the Hajar Mountains, belong to two recently described species.²⁶ Its type locality is in Persia (Iran),²⁷ but the exact location is unknown. Blandford²⁸ thought that the type specimen was obtained in Bushire, but Smith²⁹ restricted the type locality to Shiraz.

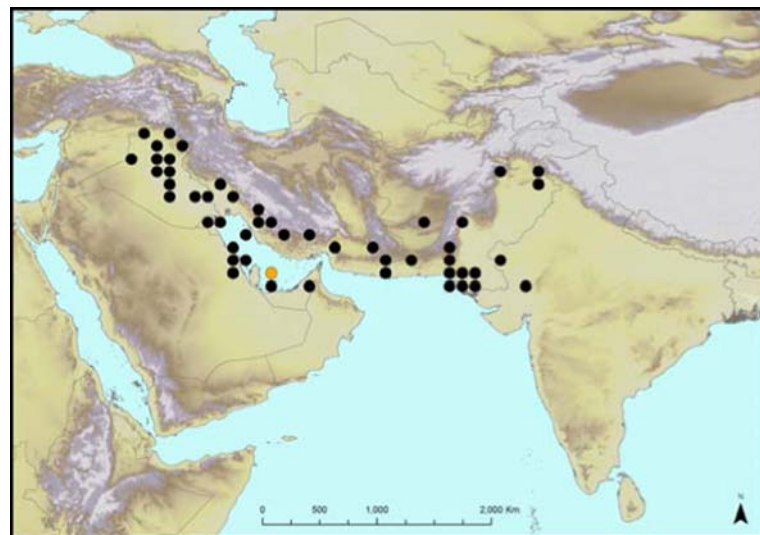


Figure 1. Geographic distribution of *H. persicus*. Black dots represent known locations, and the orange dot is the new record for Halul Island. Map: Aitor Valdeón.

The Persian leaf-toed gecko is a poorly known species and little is known about its biology and ecology. Considering the available recent scientific literature revised in July 2013^{3,30} only a few publications exist about the Persian leaf-toed gecko and they are mainly related to their distribution range and the description of new records for the species (references above). There are few molecular studies concerning systematics and biogeography.³¹ In this study, we report for the first time, the presence of *Hemidactylus persicus* in Qatar, and provide images and information about the morphology of the lizards.

STUDY AREA

During two visits to Halul Island from 19th–20th and 26th–27th of April 2013, we found several specimens of the Persian leaf-toed gecko. Halul Island (25°40'26"N, 52°24'40"E) is located at approximately 96 km (52 nautical miles) northeast of the city of Doha. The island is pear-shaped and covers an area of approximately 1.5 km², extending a maximum of 1.7 km from north to south direction and 800 metres from east to west.³² The island is hilly, rising to a maximum elevation of 56 metres, where a lighthouse is situated, and has a population of 2000 people employed by the Qatar Petroleum Company. The island is economically important for the State of Qatar. The harbour and field operations were established between 1964 and 1971. Before the start of oil exploitation, the island was used by fishermen and harvested for pearls and seabird eggs.³²

Most native vegetation in the island has been removed to avoid fires. Most current vegetation is exotic and it is concentrated in enclosures or farms. More than 2000 trees were planted in the island in the last 20 years and a large variety of bushes (e.g., *Conocarpus lancifolius*, *Phoenix dactylifera*, *Opuntia ammophila*, *Lycaena thersamon*, *Mesembryanthemum* sp.). The vegetation on the island attracts a large variety of migratory birds to the island, and is also an important breeding area for terns.³²



Figure 2. Habitat in Halul Island where some *H. persicus* were found, near *Acacia* trees (Photo: Aurora M Castilla).

THE SPECIES

During the daily surveys we found 11 Persian leaf-toed geckos hidden under wood, rocks or dry leaves situated under trees and bushes (Figures 2, 3, 4). This is an interesting observation since this species in other areas is associated with vertical surfaces (referees, personal communication). We did not see any Persian leaf-toed geckos active at night; however, night surveys were less intensive than the daytime surveys. Nine Persian geckos captured by hand were measured and photographed (Table 1).

Following the description of Anderson²⁷ and other keys,^{33–35} together with our own observations of the individuals we captured in Halul Island, Persian leaf-toed geckos can be recognised by different features. The dorsal colour is pale yellowish brown- green and the upper surface is covered with small granules and moderately large and strongly keeled tubercles, arranged in an irregular longitudinal series (Figures 5, 6).

Persian leaf-toed geckos show a darkish brown streak from the nostrils through the eye above the ear, with a whitish line above it. The upper eyelid is strongly fringed and the ear-opening



Figure 3. Habitat in Halul Island with palms, where *H. persicus* was observed (Photo: Aurora M Castilla).



Figure 4. Habitat in Halul Island with bushes where *H. persicus* was present (Photo: Aurora M Castilla).

is large (Figure 7). The ventral side of the head is white, with a pair of large first postmentals in contact behind the triangular mental scale, with second postmentals on either side of the first postmentals (Figure 8). Abdominal scales are small, smooth, rounded and imbricate (Figure 9), and 45 to 50 rows occur in the middle of the belly.²⁷ The tail is cylindrical and has transverse rows of tubercles on its upper surface.

Digits are free and show a large number of subdigital lamellae (Figure 10), normally having 8–10 under the first toe and 12–14 under the fourth toe.²⁷ In Halul, two individuals had 8 subdigital lamellae under the first toe, and five had 9. The number of subdigital lamellae under the fourth toe varied from 12 (in two individuals), 13 (in two individuals), and 14 (in one individual). Males of this species are known to have 8 to 13 preanal pores.⁵ In Halul two males showed 8 preanal pores, but only 6 and 7 were clearly visible, respectively. Persian leaf-toed geckos from other populations in Saudi Arabia²⁰ and UAE⁵ also showed 8 preanal pores.

Lizards were weighted using a Sartorius digital balance to a precision of 0.01 grams. The snout-vent length (SVL) and tail length (TL) was measured with a calliper (Mitutoyo) with a precision of 0.01 mm.

Table 1. Morphological measurements of the Persian leaf-toed gecko (male: M, female: F, gravid female: Fg) captured in Halul Island. The sex of the juvenile (Juv) could not be identified. Body mass is indicated in grams and the snout vent length (SVL), the length of intact tails and of those that were broken or regenerated are in millimeters. Tail 1 is the part of the tail near the cloaca, tail 2 the regenerated tail and tail tot the sum of both, or the intact tails. Here we show the mean (X) and standard deviation (sd) for adult lizards only, and the sample size (n).

Date	Latitude	Longitude	Sex	Mass	SVL	Tail1	Tail2	Tail tot
Juveniles								
20 April	25.677810	52.410700	Juv	0.805	32.9	37.7		37.7
Subadults								
19 April	25.680114	52.412620	M	1.371	43	46.9		46.9
19 April	25.680510	52.412500	F	1.337	42.5	17.9	lost	
26 April	25.677920	52.409870	F	1.762	46.8	48.2		48.2
20 April	25.677810	52.410700	F	1.737	44.2	14.7	lost	
Adults								
26 April	25.677940	52.409810	M	2.579	53.6	61.5		61.5
19 April	25.680798	52.412195	M	3.406	58.8	8.9	44.7	53.6
19 April	25.680798	52.412195	Fg	3.331	57.2	12.5	47.9	60.4
19 April	25.681070	52.411990	M	3.371	57.9	56	lost	
			X	3.17	56.88	34.73	46.3	58.50
			sd	0.40	2.28	27.87	2.26	4.28
			n	4	4	4	2	3



Figure 5. Adult *H. persicus*, showing dark dorsal coloration. Halul Island, Qatar (Photo: Aitor Valdeón).



Figure 6. Juvenile *H. persicus* showing pale dorsal coloration. Halul Island, Qatar (Photo: Aitor Valdeón).



Figure 7. Head of *H. persicus*. Halul Island, Qatar (Photo: Aitor Valdeón).



Figure 8. Ventral view of the head of *H. persicus*. Halul Island, Qatar (Photo: Aitor Valdeón).

Our data (Table 1) shows that the Persian leaf-toed gecko in Halul seems to be smaller (mean adult body size: 56.88 mm, range: 53.6–58.8 mm, $n = 4$) than those reported in other regions (maximum adult body size: 65–73 mm),^{11,22} but similar to the specimens measured in UAE (mean adult body size: 57.33 mm, range: 57–58 mm, $n = 3$).⁵

Sexual dimorphism in body size has been reported for this species in other geographic areas, with males being bigger than females.³⁶ With the available data for the Halul population we are unable to document the sexual differences in body size, as we would need to examine a larger sample of lizards from this island.

During our study we observed one juvenile, one gravid female with two oviductal eggs that could be seen easily through the ventral skin (Figure 11), and one individual shedding its skin. Our observations show that lizards of different size, sex and reproductive and physiological condition were active on the island at the end of April. That suggests that the population in Halul is healthy.

Five geckos had shown broken or regenerated tails (Table 1). We accidentally broke three tails during handling, but two of them had already been regenerated. This suggests that predation pressure on the island must be high. In fact, in the same habitat we found the lizards there were several farm birds (e.g. chicken, ostriches) and cats, as well as wild migratory birds.³² The Persian leaf-toed gecko in Halul also shares the island with other lizards, including the yellow-bellied house gecko



Figure 9. Ventral body scales of *H. persicus*. Halul Island, Qatar (Photo: Aitor Valdeón).



Figure 10. Details of the lamellae under the digits of the left hind leg in one adult *H. persicus*. Halul Island, Qatar (Photo: Aitor Valdeón).



Figure 11. Gravid female of *H. persicus* showing two oviductal eggs. Halul Island, Qatar (Photo: Aitor Valdeón).

(*Hemidactylus flaviviridis*), the rough-tailed bowfoot gecko (*Cyrtopodion scabrum*), the golden grass mabuya (*Trachylepis septemtaeniata*) and the rock semaphore gecko (*Pristurus rupestris*).

DISCUSSION

According to the National Biodiversity Surveys and studies conducted in Qatar,³⁷ the Global Biodiversity Information Facility,³⁸ the Reptile Database³⁹ both verified on July 7, 2013, and Sindaco and Jeremčenko,²³ there are no records for the Persian leaf-toed gecko, *Hemidactylus persicus* in Qatar. Our finding therefore bridges the current geographic gap in the known distribution of the species from Saudi Arabia to Asia (Figure 1). We believe that the species could be present in other locations in the Qatar peninsula and possibly on other Qatar islands. In fact, previous studies have shown that a rapid

radiation and long distance dispersal in geckos of the genus *Hemidactylus* are more extensive than in any other reptilian genus.¹

The Qatari population of Persian leaf-toed gecko, as well as populations from Bahrain, Saudi Arabia and UAE, showing a lower number of preanal pores, could be other cryptic species, different from *Hemidactylus persicus sensu stricto*. Future genetic and taxonomic analyses are necessary to clarify the identity of the *Hemidactylus* species in the region, as well as its biogeographic history.⁴

During our recent (2012–2013) biodiversity surveys in Qatar, we have inventoried 21 lizard species, in 605 geographic locations,⁴⁰ but the Persian leaf-toed gecko was only found on Halul Island. More surveys are needed to map the distribution range of this species in Qatar mainland and islands, and explore if this species is more vulnerable than other lizards. If this were the case it would require specific conservation measures for its survival in Qatar. If the only area for its local distribution is Halul Island, the species should be considered a threatened species in Qatar and the population in Halul should be highly protected and conserved.

Our study suggests that the lizard fauna of Qatar is insufficiently known. Basic knowledge of species ecology and distribution is required for a proper management and conservation plan of biodiversity in Qatar, and to comply with the requirements of the Convention on Biological Diversity (CBD) and the Aichi Biodiversity Targets for 2020.

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