Hemidactylus frenatus **System:** Terrestrial

Kingdom	Phylum	Class	Order	Family
Animalia	Chordata	Reptilia	Squamata	Gekkonidae

Common name

bridled house gecko (English), common house gecko (English), Asian house gecko (English), Asiatischer Hausgecko (German), Chichak (English, Asia), Gewöhnlicher Halbfingergecko (German), geco-casero bocón (Spanish)

Synonym

Hemidactylus javanicus , Fitzinger 1826 (*nomen nudum*)
Hemidactylus frenatus , Schlegel in Dumeril & Bibron 1836: 366
Hemidactylus , (Pnoepus) Bojeri Fitzinger 1843
Hemidactylus vittatus , Gray 1845
Hemidactylus punctatus , Jerdon 1853
Hemidactylus fraenatus , Bleeker 1857
Hemidactylus inornatus , Hallowell 1861
Hemidactylus pumilus , Hallowell 1861: 502
Gecko caracal , Tytler 1865
Gecko chaus , Tytler 1865
Hemidactylus longiceps , Cope 1869: 320
Hemidactylus hexaspis , Cope 1869: 320
Hemidactylus papuensis , [Macleay] 1877
Hemidactylus tristis , Sauvage 1879
Hemidactylus frenatus , Boulenger 1885: 120
Hemidactylus nigriventris , Lidth De Jeude 1905
Hemidactylus bowringii , Stejneger 1907: 172
Hemidactylus fragilis , Calabresi 1915
Hemidactylus frenatus , De Rooij 1915: 28
Hemidactylus nigriventris , De Rooij 1915: 31
Hemidactylus vandermeer-mohri , Brongersma 1928
Hemidactylus mabouia , Barbour & Loveridge 1929 (*partim*)
Hemidactylus okinawensis , Okada 1936
Hemidactylus vandermeermohri , Wermuth 1965
Hemidactylus auritus , Poeppig (in Obst) 1977
Pnoepus papuensis , Wells & Wellington 1985
Pnoepus frenatus , Wells & Wellington 1985
Pnoepus bojeri , Wells & Wellington 1985
Pnoepus vittatus , Wells & Wellington 1985
Pnoepus punctatus , Wells & Wellington 1985
Pnoepus inornatus , Wells & Wellington 1985
Pnoepus pumilus , Wells & Wellington 1985
Pnoepus caracal , Wells & Wellington 1985
Pnoepus fragilis , Wells & Wellington 1985
Hemidactylus fragilis , Lnaza 1990
Hemidactylus frenatus , Lanza 1990
Hemidactylus frenatus , Liner 1994
Hemidactylus frenatus , Glaw & Vences 1994: 277
Hemidactylus frenatus , Manthey & Grossmann 1997: 235
Hemidactylus frenatus , Cox *et al*. 1998: 84
Hemidactylus frenatus , Cogger 2000: 246
Pnoepus frenatus , Wells 2002
Hemidactylys , cf. *frenatus* Andreone *et al*. 2003

Similar species

Summary

The common house gecko is now established in at least 87 locations around the world outside of its natural range in Asia and the Indo-Pacific. Many of these new locations have been small remote islands in the Pacific and Indian Oceans. Where the common house gecko has been introduced to islands of the Pacific Ocean, researchers have shown that this lizard has been responsible for the competitive displacement of other similar sized or smaller gecko species in urban and suburban environments. It was shown that habitat simplification and clumped food resources around artificial light sources as a result of urbanisation have enabled the common house gecko to gain an indirect competitive advantage over other nocturnal gecko species. The ability of the house gecko to persist outside of its natural range poses a threat to the survival of ecologically similar endemic geckos.\n

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Species Description

Hemidactylus frenatus is a gecko which measures 7.5-15 cm long with males larger than females. Their scalation is uniform, with distinctive enlarged scales along their backs and arranged in bands on their tail. Its coloration may be gray or light brown to beige with greenish iridescence and a white underside (Csurhes & Markula, 2009). *H. frenatus* may be identified by several detailed characteristics. It has vertical pupils. Its digits have widened subdigital lamellae, medial subcaudals which are distinctly enlarged, and are arranged in a series. The subdigital lamellae of digit IV extends to base of digit. It has small dorsal tubercles which are restricted to dorso-lateral rows, and a second pair of anterior chin shields in contact with infralabials. Other characters include divided lamellae; dorsum and venter light in coloration, sometimes semi-transparent; a light line through eye; dark lateral stripe may be present; and maximum size of 60 mm SVL (Krysko & Daniels, 2005). *H. frenatus* has a very distinctive “chuck, chuck, chuck” call (Wilson, 2006) which is most commonly emitted at dusk and dawn. This call is one of the key indicators that house geckos are present in a particular area (N.C. Cole, pers. comm.).

Lifecycle Stages

Females lay two eggs per clutch which have an incubation period of 48-90 days in laboratory conditions (Krysko *et al*., 2003; Church, 1962 in Krysko *et al*., 2003). Studies conducted in outdoor enclosures hatched after an average of 50 days (48 to 53 days) (N.C. Cole, pers. comm..). Eggs are round and hard-shelled, unlike most reptile eggs, making them resistant to moisture loss and better able to survive travelling long distances (Wilson, 2006). Juveniles become sexually mature after six months to a year. The lifespan of *H. frenatus* is approximately 5 years (Csurhes & Markula, 2009).

Uses

Hemidactylus frenatus are kept as pets in some locations.

Habitat Description
Hemidactylus frenatus may occur in tropical, subtropical, and temperate environments. It is most abundant in urban, suburban, and developed locations. It is nocturnal and introduced populations are almost always found on building walls near artificial lighting. *H. frenatus* is also known to inhabit natural environments, including in woodlands, patches of forest, on trees in open fields, rocky and forested areas, coconut palm trunks, under rotting logs, and among dense, low ground-cover such as *Ipomea* and *Canavalia* Canavalia often associated with grasses and a rocky habitat. *H. frenatus* prefers habitats with open hunting surfaces such as walls or vertical rocks near concentrated populations of insects (Csuhres & Markula, 2009; Frenkel, 2006; Newberry & Jones, 2007).

Reproduction
Hemidactylus frenatus is a sexually reproducing, oviparous reptile. Mating includes a short courtship during which males repeatedly touch the female with his snout and may bite and hold her by the neck. Three to four weeks after fertilization females lay two hard-shelled that are partially fixed to a solid surface (Csurhes & Markula, 2009). Incubation of the eggs to a temperature of at least 18 °C is required for development (Ota, 1994; N.C. Cole, pers. comm.). Breeding occurs throughout the year in tropical environments and is seasonal in cooler conditions. Females are able to store functional sperm for up to a year (Yamamoto & Ota, 2006).

Nutrition
Hemidactylus frenatus is predominantly a nocturnal, opportunistic hunter which preys on a wide range of insects and spiders. It may be commonly found hunting in developed environments on walls near artificial lights. Stomach contents analysis revealed prey of insect orders Blattodea, Coleoptera, Dermaptera, Diptera, Hemiptera, Homoptera, Hymenoptera, Isopoda, Isoptera, Lepidoptera, Neuroptera Orthoptera, Zygoptera, as well as Araneae and other arachnids. *H. frenatus* is also known to consume juveniles of other geckos and skinks and also known to consume sugar-based products and nectar (Cole 2005 b; Csurhes & Markula, 2009).

General Impacts
Hemidactylus frenatus has demonstrated a high propensity for competitive displacement of similar-sized and urban-adapted geckos. The ability of *H. frenatus* to replace locally native gecko species seems most pronounced in urban areas. *H. frenatus* is very well adapted to predation on concentrations of insects that gather along building walls near artificial lighting, seemingly more so than most endemic gecko species. *H. frenatus* also tends to be more aggressive and territorial, as well as, more tolerant of interspecific cohabitation and competition than endemic geckos. Such features allow it to successfully outcompete native species and exclude them from concentrated food sources. Studies have demonstrated aggressive, dominant behavior in *H. frenatus* over native geckos *Nactus* spp. on the Mascarene Islands and *Lepidodactylus lugubris* throughout Pacific islands. *H. frenatus* was frequently observed stalking, lunging towards and biting at other geckos. In some instances *H. frenatus* bit off their tails or ate them entirely. *H. frenatus* was also found to aggressively exclude endemic geckos from daytime refugia, making these native species more vulnerable to predation and adverse climatic conditions (Cole *et al*. 2005; Newberry & Jones, 2008). *H. frenatus* are also known to predate upon other small, usually juvenile lizards, such as *Cryptoblepharus boutonii* (Cole *et al*. 2005b).
There are many records of *H. frenatus* displacing or causing decline in native geckos throughout its introduced range ostensibly by competitive displacement. *H. frenatus* displaces endemic and 'Vulnerable (VU)' lesser night gecko (see *Nactus coindemirensis* in IUCN Red List of Threatened Species) and the endemic night gecko *Nactus durrelli* in the Mascarene Islands. It displaces both *Nactus* spp. from favored environments increasing their risk of predation and has proven to be a major cause in the decline of, the once thought extinct in the wild, *N. coindemirensis* (Cole *et al*, 2005; Jones & Cole, 2004). *H. frenatus* displaces Pacific island native *Lepidodactylus lugubris* in many locations and has demonstrated superior predation abilities. Experiments have demonstrated that *H. frenatus* consumes a disproportionately higher amount of insect prey than *L. lugubris*, thereby leaving it with less potential prey which decreases its body condition, fecundity, and ability to survive (Hanley *et al* 1995; Harvey *et al* 1998; Petren & Case, 1996). A similar predation study with Australian gecko *Gehyra dubia* also found *H. frenatus* to be a more formidable forager (Canyon & Hill, 1997). The displacement of *Hemidactylus garnotii* by *H. frenatus* throughout the Pacific basin has been attributed to behavioral interference from aggressive males. Furthermore, *H. frenatus* was also found to hybridize with *H. garnotti* in laboratory experiments (Dame & Petren, 2006).

Management Info
Preventative measures: The majority of introductions of *Hemidactylus frenatus* are the result of it finding its way onto boats or shipping containers that are transported to new locations. It is recommended that incoming cargo be examined for *H. frenatus* and that any individuals or eggs found be exterminated to prevent its establishment. Its superior ability to cling to surfaces allows it access to high crevice spaces for refuge and egg deposition, which gives it high potential to stowaway undetected in cargo and shipping containers (Csurhes & Markula, 2009; Newberry & Jones, 2008).\n
The use of naturally or artificially occurring substrates with a crumbly/highly concentrated particulate surface may be used to exclude the pad-bearing *H. frenatus* from specific locations, allowing claw-bearing gecko species to forage unchallenged. This method of exclusion was tested in attempts to preserve populations of threatened *Nactus* spp in the Mascarene Islands. Simple habitat modifications through the addition of artificial refugia have been proposed as a means to enhance populations of endangered or displaced native reptiles (Cole *et al* 2005).\n
Chemical control: The use of Tricaine methanesulfonate (MS222) injected into the intracoelomic cavity of *H. frenatus* is a chemical euthanasia method consistent with conditions specified by The Public Health Service Policy on Humane Care and Use of Laboratory Animals which require that euthanasia of ectotherms be consistent with the American Veterinary Medical Association (AVMA) Guidelines on Euthanasia. Test subjects were administered a intracoelomic injection of 250 to 500 mg/kg of 0.7% to 1% sodium-bicarbonate–buffered MS222 solution followed by intracoelomic injection of 0.1 to 1.0 ml unbuffered 50% (v/v) MS222 solution. Test subjects were effectively made unconscious by the first injection and respiratory and cardiac functions were eliminated by the second (Conroy *et al* 2009).\n

Pathway
The majority of introductions of *Hemidactylus frenatus* are the result of it finding its way onto boats or shipping containers that are transported to new locations (Csurhes & Markula, 2009). Its superior ability to cling to surfaces allows it access to high crevice spaces for refuge and egg deposition, both of which increase it potential to stowaway undetected in cargo and shipping containers (Newberry & Jones, 2008).

Principal source:

Compiler: IUCN SSC Invasive Species Specialist Group
Updates with support from the Overseas Territories Environmental Programme (OTEP) project XOT603, a joint project with the Cayman Islands Government - Department of Environment

Review: Dr. Nik Cole, Durrell Wildlife Conservation Trust.

Pubblication date: 2010-10-04

ALIEN RANGE

[1] AMERICAN SAMOA
[1] BELIZE
[1] BRITISH INDIAN OCEAN TERRITORY
[1] CAROLINE ISLANDS
[1] CHRISTMAS ISLAND
[1] COMOROS
[1] ECUADOR
[1] FIJI
[1] GUAM
[1] HONDURAS
[1] JAPAN
[1] MADAGASCAR
[1] MARSHALL ISLANDS
[1] MELANESIA
[1] MICRONESIA, FEDERATED STATES OF
[1] NAURU
[1] NEW CALEDONIA
[1] NEW ZEALAND
[1] NORFOLK ISLAND
[1] PAKISTAN
[1] PANAMA
[1] POLYNESIA
[2] SAINT HELENA
[1] SINGAPORE
[1] SOMALIA
[1] TAIWAN
[1] VANUATU
[1] VIET NAM
[2] AUSTRALIA
[1] BHUTAN
[1] CAMBODIA
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[1] COLOMBIA
[1] COSTA RICA
[1] EL SALVADOR
[5] FRENCH POLYNESIA
[1] GUATEMALA
[1] INDIA
[1] KENYA
[1] MALDIVES
[1] MAURITIUS
[1] MEXICO
[1] MYANMAR
[1] NEPAL
[1] NEW GUINEA
[1] NICARAGUA
[1] NORTHERN MARIANA ISLANDS
[1] PALAU
[1] PHILIPPINES
[1] REUNION
[1] SAMOA
[1] SOLOMON ISLANDS
[1] SOUTH AFRICA
[3] UNITED STATES
[1] VENEZUELA

Red List assessed species 2: CR = 1; EN = 1;

Oedodera marmorata **CR**
Urosaurus auriculatus **EN**

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Summary: This compilation of information sources can be sorted on keywords for example: Baits & Lures, Non Target Species, Eradication, Monitoring, Risk Assessment, Weeds, Herbicides etc. This compilation is at present in Excel format, this will be web-enabled as a searchable database shortly. This version of the database has been developed by the IUCN SSC ISSG as part of an Overseas Territories Environmental Programme funded project XOT603 in partnership with the Cayman Islands Government - Department of Environment. The compilation is a work under progress, the ISSG will manage, maintain and enhance the database with current and newly published information, reports, journal articles etc.
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Summary: English:
The species list sheet for the Mexican information system on invasive species currently provides information related to Scientific names, family, group and common names, as well as habitat, status of invasion in Mexico, pathways of introduction and links to other specialised websites. Some of the higher risk species already have a direct link to the alert page. It is important to notice that these lists are constantly being updated, please refer to the main page (http://www.conabio.gob.mx/invasoras/index.php/Portada), under the section Novedades for information on updates.
Invasive species - reptiles is available from: http://www.conabio.gob.mx/invasoras/index.php/Especies_invasoras_-_Reptiles [Accessed 30 July 2008]
Spanish:
La lista de especies del Sistema de informaci□n sobre especies invasoras de m□xico cuenta actualmente con informaci□n aceca de nombre cient□fico, familia, grupo y nombre com□n, as□ como h□bitat, estado de la invasi□n en M□xico, rutas de introducci□n y ligas a otros sitios especializados. Algunas de las especies de mayor riesgo ya tienen una liga directa a la p□gina de alertas. Es importante resaltar que estas listas se encuentran en constante proceso de actualizaci□n, por favor consulte la portada (http://www.conabio.gob.mx/invasoras/index.php/Portada), en la secci□n novedades, para conocer los cambios.
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