



# Distribution of *Hemiphyllodactylus aurantiacus* (Beddome, 1870) (Reptilia: Gekkonidae) in Andhra Pradesh, India

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**Abstract:** A recent herpetofaunal survey in Andhra Pradesh resulted in many noteworthy findings. We report new localities of *Hemiphyllodactylus aurantiacus* (Beddome, 1870) on the basis of collected specimens, sightings and literature records. We present the current distribution of this endemic gecko in Andhra Pradesh, southern India and add morphometric, meristic and natural history notes.

**Keywords:** Andhra Pradesh, distribution, *Hemiphyllodactylus aurantiacus*, range extension, Southern Indian Half Leaf-fingered Gecko.

## INTRODUCTION

The genus *Hemiphyllodactylus* Bleeker, 1880 remains one of the most poorly known genera of geckos (Bauer & Das 1999). It is widespread and distributed from Sri Lanka to South China and the Japanese Ryukyu Islands, also inhabiting the Philippines, the Indo-Australian Archipelago, and some Islands of the Pacific Ocean (Bauer & Das 1999; Malkmus et al. 2002). It is globally represented by only four species, namely, *Hemiphyllodactylus aurantiacus* (Beddome, 1870), *Hemiphyllodactylus larutensis* Boulenger, 1900, *Hemiphyllodactylus typus* Bleeker, 1860 and *Hemiphyllodactylus yunnanensis* Boulenger, 1903. In India, the genus *Hemiphyllodactylus* is represented by only two species, namely, *Hemiphyllodactylus aurantiacus* (Beddome, 1870) from mainland India (Smith 1935; Sanyal et al. 1993; Daniels 1994; Daniels & Kumar 1998; Bauer & Das 1999; Sharma 2002; Das 2002) and *Hemiphyllodactylus typus* Bleeker, 1860 from Andaman Islands (Das 2002). So far, *Hemiphyllodactylus aurantiacus* (Beddome, 1870), the Southern Indian Half Leaf-fingered Gecko, has been reported only from few locations in southern Indian states like Andhra Pradesh, Karnataka and Tamil Nadu (Smith 1935; Sanyal et al. 1993; Daniels 1994; Daniels & Kumar 1998; Bauer & Das 1999; Sharma 2002; Das 2002). Recent herpetological surveys have revealed the presence of this species from other localities in Andhra Pradesh. We report range extension of this gecko on the basis of collected specimens, sightings and literature records from northern and central Eastern Ghats. We also assess the current distribution and status of this endemic gecko of southern India in Andhra Pradesh, along with additional information on its habits and habitat.

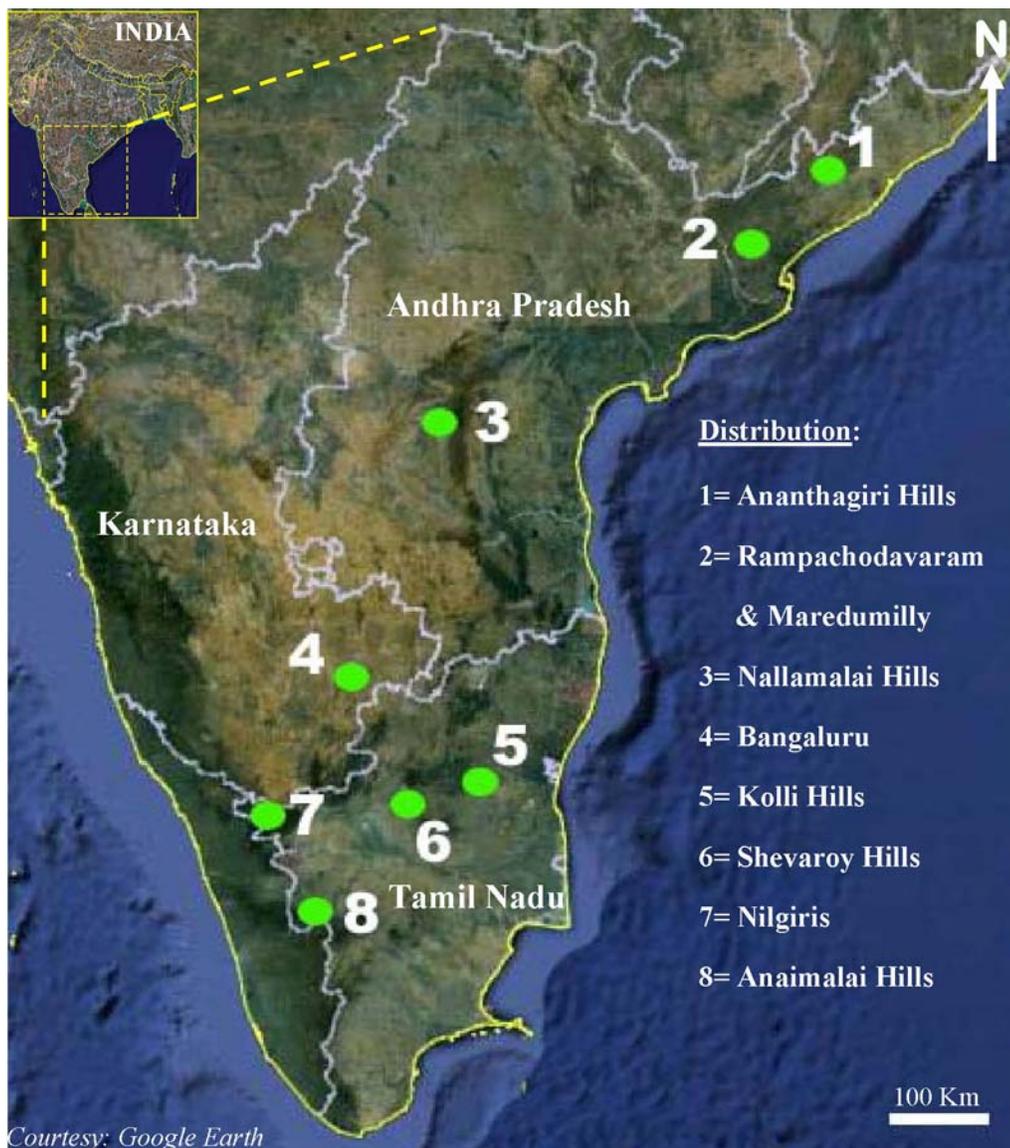
## MATERIALS AND METHODS

Two specimens of *Hemiphyllodactylus aurantiacus* (Beddome, 1870) were collected from the wall of a canteen in a hotel in Araku Town on 28 February 2009, around 2000hr (18°50'N & 79°42'E), Visakhapatnam District. A single specimen was captured, examined and released on 15 July 2009 around 1300hr by SMMJ from the forest guest house, Mareduilly, West Godavari District, Andhra Pradesh. On 20 August 2009, around 2200 hr this species was recorded by KTR near Temple Locality (15°36'N & 78°49'E) in Gundla Brahmeswaram Metta (GBM) Wildlife Sanctuary, Prakasham District, Andhra Pradesh. Altogether 10 specimens were studied, of which only two were collected and the rest of them examined, photographed and released.

One male and one female specimen were euthanized, fixed in 10% formalin, preserved in 70% alcohol and deposited in the collection of the Zoological Survey of India, Fresh-water Biology Station, Vertebrate section (ZSI/FBS/V), Hyderabad. A photo voucher of one specimen sighted near Mareduilly is deposited in the collection of the Natural History Museum of Osmania University (NHM.OU.REP.PV.19-2009), Hyderabad. Morphological and meristic studies (Table 1) were conducted in Department of Zoology, Osmania University, Hyderabad. Meristic counts and external observations of morphology were made using a dissecting microscope. Specimens



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**Image1.** Satellite image showing a map depicting distribution of *Hemiphyllodactylus aurantiacus* (Beddome, 1870) in three Indian states (Andhra Pradesh, Karnataka and Tamil Nadu).

were identified based on the descriptions available in the literature (Smith 1935; Bauer & Das 1999; Sharma 2002). Measurements were taken following Giri & Bauer (2008) with Mitutoyo™ digital calipers (to the nearest 0.1mm): snout-vent length (SVL; from tip of snout to vent), trunk length (TRL; distance from axilla to groin measured from posterior edge of forelimb insertion to anterior edge of hindlimb insertion), body width (BW; maximum width of body), crus length (CL; from base of heel to knee); tail length (TL; from vent to tip of tail), tail width (TW; measured at widest point of tail); head length (HL; distance between retroarticular process of jaw and snout-tip), head width (HW; maximum width of head), head height (HH; maximum height of head, from occiput to underside of jaws), forearm length (FL; from base of palm to elbow); orbital diameter (OD; greatest diameter of orbit), nares to eye distance (NE; distance between anteriormost point of eye and nostril), snout to eye distance (SE; distance between anteriormost point of eye and tip of snout), eye to ear distance (EE; distance from anterior edge of ear opening to posterior corner of eye), internarial distance (IN; distance between nares), interorbital

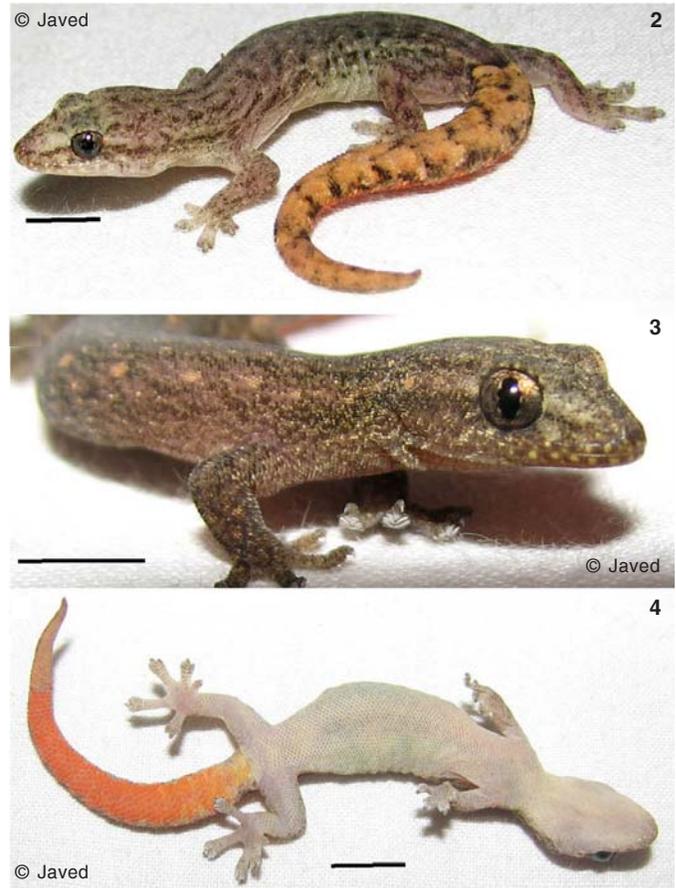
distance (IO; shortest distance between left and right supraciliary scale rows).

#### DESCRIPTION

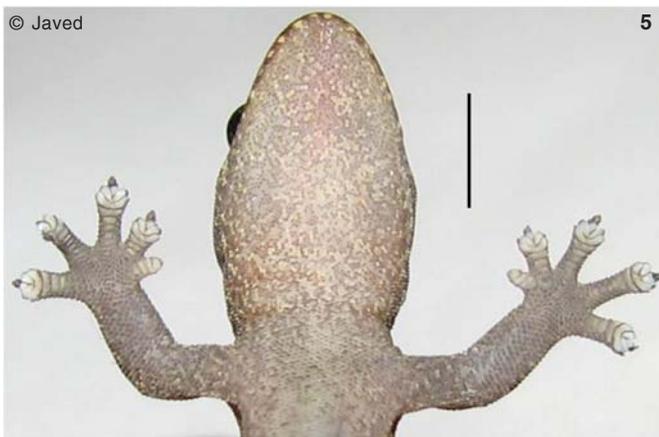
*Hemiphyllodactylus aurantiacus* (Beddome, 1870) is a small, slender, dorsoventrally compressed gecko with homogenous, granular scutellation (Malkmus et al. 2002). Head is oviform and longer than broad (Images 3 & 5). Snout rounded, very convex and slightly shorter than the distance between eyes and ear-opening. Ear-opening very small and round. Body elongated, limbs short, fore limb measuring half the distance between axilla and groin, or rather less. Head covered with very minute granules. Rostral very small and almost pentagonal while mental is also very small and triangular. Nostril placed between rostral, first labial, and several granules. Labials very small, 10 upper and 10 lower, no chin-shields. Digits (Image 6) are relatively short and free, inner very small, rudimentary and only two large chevron-shaped divided scansors beneath the distal part of the digits,

**Table 1. Morphometric and meristic data of *Hemiphyllodactylus aurantiacus* (Beddome, 1870) from Araku Valley, Ananthagiri Hills, Visakhapatnam District, Andhra Pradesh. (All morphometric measurements in mm and abbreviations explained under materials and methods. Asterisks refer to broken tail).**

Character	ZSI/FBS/V/1519* (Female)	ZSI/FBS/V/1520* (Male)
SVL	30.8	32.2
TRL	15.0	17.1
BW	5.4	6.4
CL	4.2	4.4
TL	31.0	30.4
TW	3.8	3.9
HL	5.5	5.9
HW	5.7	5.9
HH	3.4	3.2
FL	2.8	3.0
OD	2.0	2.0
NE	2.1	2.7
SE	3.0	3.0
EE	2.8	2.8
IN	1.1	1.2
IO	3.6	3.7
Scansors (divided, right/left):		
Digit I manus	2/2	2/2
Digit IV manus	2/2	2/2
Digit I pes	2/2	2/2
Digit IV pes	3/3	3/3
Labials (right/left):		
Supralabials	10/10	10/10
Infralabials	10/10	10/10



**Images 2-4 (Scale 5mm)**  
 2 - Dorsolateral aspect of *Hemiphyllodactylus aurantiacus* (in life) female (ZSI/FBS/V/1519); 3 - Lateral aspect of *Hemiphyllodactylus aurantiacus* (in life) female (ZSI/FBS/V/1519) head region showing eye, ear opening and labials; 4 - Ventral aspect of *Hemiphyllodactylus aurantiacus* (in life) female (ZSI/FBS/V/1519).



**Images 5 & 6 (Scale 5mm)**  
 5 - Ventral aspect of *Hemiphyllodactylus aurantiacus* (in life) male (ZSI/FBS/V/1520) head, axilla and digits of manus with scansors; 6 - Ventral aspect of *Hemiphyllodactylus aurantiacus* (in life) male (ZSI/FBS/V/1520) digits of pes with scansors.

followed by transverse undivided scansors, decreasing in width. In case of digits of pes (Images 5 & 6) two divided scansors beneath first and second while three scansors beneath third, fourth and fifth. Back covered with very small granular scales, abdominal scales a little larger, flat and imbricate. Male possess five (left) / six (right) minute femoral pores and eight enlarged (in comparison with femoral pores) preanal pores. Postcloacal hemipeneal bulge distinct in males (Image 9). Both the sexes possess two equal sized postcloacal spurs (Image 9), but in females they are much smaller in size. Tail cylindrical, tapering, covered with small imbricate smooth scales, larger below (Images 8 & 9).

**Colouration:** The colour pattern of *Hemiphyllodactylus aurantiacus* (Beddome, 1870) appears to be similar to that of *Hemiphyllodactylus typus* Bleeker, 1860 in most regards, but differs by showing a bolder pattern on body, comprising two series of thin, black stripes, a dark stripe under eye and distinct banded tail (Das 2002). The dorsal pattern of the specimens is however, bolder, tail pattern well defined, and the subcaudal colouration richer. The dorsum bears two series of thin black stripes. The first pair extends from the nasals, above the eyes and along the dorso-lateral margin of the animal's body to behind the forelimb insertion. A second dark, canthal stripe



Images 7 & 8 (Scale 5mm)

7 - Dorsal aspect of *Hemiphyllodactylus aurantiacus* (in life) male photo voucher (NHM.OU.REP.PV.19-2009) showing peculiar colouration while sloughing-off skin; 8 - Positioning of body under threat and dorsal aspect of tail of *Hemiphyllodactylus aurantiacus* (in life) male (ZSI/FBS/V/1520).



Image 9 (Scale 5mm)

9 - Ventral aspect of *Hemiphyllodactylus aurantiacus* (in life) male (ZSI/FBS/V/1520) showing tail morphology, postcloacal spurs and hemipeneal bulge.

extends under each eye and continues to just behind the axilla. The base dorsal colouration is a light to mid-brown with darker dashes or broken transverse bars on the back. Small white clusters of scales are present on the flanks and along the dorso-lateral body margin. The dorsum of the tail is boldly patterned with irregular dark bars, while the ventral side is orange-red (Images 2, 4, 8 & 9), as noted by Bauer & Das (1999). During the surveys, we found an individual undergoing ecdysis and displaying very peculiar colouration (Photo voucher-19, Image 7).

#### HABITS AND HABITAT

*Hemiphyllodactylus aurantiacus* (Beddome, 1870) is a slow moving gecko species. On several occasions we have sighted this species feeding in a group of 4-6 individuals (of all age groups) on walls and floor of the buildings. This species found under stones in forested habitats and on walls of houses. It is nocturnal and active on relatively dark portion of walls, presumably to avoid competition with larger geckos (Das 2002). It has been seen with *Hemidactylus* sp. *Hemidactylus cf. frenatus*, *Hemidactylus subtriedrus* Jerdon, 1853 and *Hemidactylus leschenaultii* A.M.C. Duméril & Bibron, 1836, and has been observed not to mingle with any of these species. It is timid in nature and very docile when handled. Some individuals escaped capturing by scuttling for some distance and then breaking into a rapid run. Gravid females, each with two eggs, were recorded in February. Das (2002) recorded egg production in January.

*Hemiphyllodactylus aurantiacus* (Beddome, 1870) is recorded from different locations and found occupying variety of habitats with hilly to rocky terrain, plenty of shade, humidity

and also inside human habitations adjacent to forest patches. In Andhra Pradesh, this species occupies different forest types, from dry deciduous mixed scrub forest to semi moist deciduous forest cover.

#### DISTRIBUTION

According to Smith (1935) *Hemiphyllodactylus aurantiacus* has been recorded from southern India (Nilgiri, Shevaroy and Anaimalai Hills in Tamil Nadu). Sanyal et al. (1993) reported it from Madhugulu and Araku Valley, Visakhapatnam District, Andhra Pradesh. After this it was recorded from Bangalore (now Bengaluru), Karnataka and Kolli Hills, Tamil Nadu (Daniels 1994; Daniels & Kumar 1998). Later, Bauer & Das (1999) recorded its presence from the type locality, Yercaud. Recently, we recorded its occurrence from Visakhapatnam District (Araku Valley, Ananthagiri and Tyda localities), East Godavari District (Rampachodavaram & Maredumilly) and Prakasham District (Gundlabhrameshwarm Wildlife Sanctuary-near Temple locality) in Andhra Pradesh. Image 1 depicts the locations of the sites from where the species has been recorded from Andhra Pradesh along with earlier distribution in other states of India.

#### STATUS AND THREATS

*Hemiphyllodactylus aurantiacus* (Beddome, 1870) is

treated as endemic to southern India and listed as Vulnerable (Molur & Walker 1998). Very little is known about its ecology and major threats are restricted population, loss of habitat and human interference.

## DISCUSSION

Sanyal et al. (1993) reported *Hemiphyllodactylus aurantiacus* (Beddome, 1870) from Andhra Pradesh and since then there has been no record of this species from the state (Srinivasulu & Das 2008). In the recent past it has not been reported from the Nallamalai Hills (Rao et al. 2005; Srinivasulu & Das 2008). Bauer & Das (1999) and Srinivasulu & Das (2008) predicted its presence in other parts of Andhra Pradesh.

The Eastern Ghats of Andhra Pradesh are home to a varied fauna and some areas such as the Anathagiri and Nallamalai Hills, are home to a rich and diverse herpetofauna. Recent herpetofaunal studies carried out by WWF-India; Eco-Research and Monitoring Labs, Forest Department; Osmania University (Rao et al. 2005; Srinivasulu & Das 2008; Javed et al. 2009; this work) reveals this fact. The present study indicates that this species seems to be widely distributed and could be present in many other localities in Andhra Pradesh. Further exploration will probably reveal presence of *Hemiphyllodactylus aurantiacus* (Beddome, 1870) from other parts of Eastern Ghats in Andhra Pradesh, and its range may not be as limited as it appears now.

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