

A NEW LOCALITY AND MICROHABITAT USAGE BY *CALODACTYLODES AUREUS* (BEDDOME, 1870) FROM TAMIL NADU, EASTERN GHATS, SOUTHERN INDIA

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Abstract: We studied the Indian Golden Gecko, *Calodactylodes aureus*, at a new locality in the hill ranges of Tamil Nadu. The highest numbers of geckos were recorded from Valli Malai, followed by Shyed Basha Malai and the Sathgar Hill. Geckos were encountered at an elevation range of 185–702 m a.s.l. A total of 70 geckos were recorded in 20 rocky caves, and 72 egg deposition sites were noted, bearing signs of hatched and unhatched eggs. The number of egg deposition sites varied from 2 to 8 in the surveyed caves. A total of 477 unhatched live eggs were observed during the study. *Psammophilus dorsalis* is the most commonly encountered lizard species locally; *Cnemaspis otai* and *Hemidactylus graniticulus* were also found in sympatry.

Key words: Reptilia, Sauria, Gekkonidae, Indian Golden Gecko, distribution, egg-deposition sites, ecology.

Resumen: A.K. Mani and A. Nath. “Una nueva localidad y uso de microhábitat por *Calodactylodes aureus* (Beddome, 1870) de Tamil Nadu, Eastern Ghats, Sur India”. Estudiamos al geco dorado de la India, *Calodactylodes aureus*, en una nueva localidad en las cadenas montañosas de Tamil Nadu. El mayor número de geocos se registró en Valli Malai, seguido por Shyed Basha Malai y Sathgar Hill. Los geocos fueron encontrados en un rango de elevación de 185 a 702 msnm. Un total de 70 geocos fueron registrados en 20 cuevas rocosas, y 72 sitios de depositación de huevos fueron observados, con huevos eclosionados y no eclosionados. El número de sitios de depositación de huevos varió de 2 a 8 en las cuevas estudiadas. Un total de 477 huevos vivos sin eclosionar fueron observados durante el estudio. *Psammophilus dorsalis* es la especie de lagartija más común encontrada localmente. *Cnemaspis otai* y *Hemidactylus graniticulus* también fueron encontradas en simpatria.

Palabras Clave: Reptilia, Sauria, Gekkonidae, Geco dorado de la India, distribución, oviposición, ecología.

INTRODUCTION

The Eastern Ghats represent broken and isolated hills of the Deccan plateau. These hills extend over 1750 km from south of the Chota Nagpur plateau, Odhisha, to southwestern peninsula in Tamil Nadu (Mani 1974). They are included under 6C eastern highlands of the Deccan plateau, one of the biologically richest biogeographic zones of India (Rodgers *et al.* 2008). Studies on the distribution of reptiles in the Eastern Ghats are scanty, in contrast to those in the Western Ghats (Daniels and Ishwar 1994, Daniels and Kumar 1998). Geckos are found throughout the world and belong to one of the most species-rich lizard families, second only to skinks (Daniel 2002; Das 1994, 2001; Pough *et al.* 2004). Gekkonidae are a basal lineage (Vidal and Hedges 2005) and the genus *Calodactylodes* consists of large, distinctive geckos endemic to rocky habitat in Peninsular India and Sri Lanka (Bauer and Das 2000). The genus

Calodactylodes consists of two species, the Indian Golden Gecko *Calodactylodes aureus* (Beddome 1870) and the Sri Lankan Golden Gecko *Calodactylodes illingworthorum* (Deraniyagala 1953). The Indian Golden Gecko was discovered in Tripatty (= Tirupati) hills in North Arcot District, Madras Presidency (Beddome 1870, Boulenger 1890) and rediscovered after 115 years in Tirupati Hills, Chittoor District, Andhra Pradesh (Daniel and Bhusan 1985, Daniel *et al.* 1986).

In Andhra Pradesh this species is found at the following sites: Papikonda hills (Perantalapally) in Khammam district, Mareduhilli in East Godavari District, Araku valley and Ananthagiri Hills in Vishakapattinam district (Javed *et al.* 2007, Sreekar *et al.* 2010, Chettri and Bhupathy 2011), Niyamgiri hill ranges of Rayagada, Kalahandi districts in Odhisha (Dutta *et al.* 2005), and one

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unconfirmed record from Castle Rocks, Karnataka, Western Ghats (Bauer and Das 2000).

In Tamil Nadu, the Indian Golden Gecko was only known from Vellore Hill Fort and Balamathi Hill (Bauer and Das 2000) and it has subsequently been recorded in Otteri, Vannankulam, Kulavimedu, Nayaganeri, Kanyakapuram and Chennai highway rock boulders in the Vellore District (Rajasekhar and Nandakumar 2007). The Indian Golden Gecko is a protected species included under Schedule-I (Part II) of the Indian Wildlife (Protection) Act, 1972. Furthermore, the genus *Calodactylodes* is of interest, being of Gondwanan origin (Bauer and Das 2000). In this paper, we provide new locality and microhabitat information for the Indian Golden Gecko from Tamil Nadu.

MATERIALS AND METHODS

Study Area. The study took place on four hills in Tamil Nadu (Fig. 1). Sathgar Hill (12°57'N and 78°44'E, elevation 620 m a.s.l) and Valli Malai (13°04'N and 79°15'E, elevation 366 m a.s.l) in Vellore District, Shyed Basha Malai (12°32'N and 78°12'E, elevation 700 m a.s.l) in Krishnagiri District and Nedumkunam Hill (12°28'N and 79°23'E, elevation 244 m a.s.l) in Tiruvanamalai District. The vegetation of Sathgar Hill is dominated by *Euphorbia* sp., *Lantana camara* and *Annona squamosa*. A thorny scrub forest with large

rock boulders covers Valli Malai and Nedumkunam Hills. Krishnagiri, Shyed basha hill, is also dominated by *Euphorbia* sp. with historical forts and sacred temples (Fig. 2). All these hills are chiefly connected with Palar, Thenpennai and Ponnai River.

Methods. This paper is mainly based on the data collected by the authors from October 2011 to March 2012, during opportunistic field visits to the Eastern Ghats of Tamil Nadu. We located Golden Geckos by identifying their vocalization and egg deposition sites (Rajasekhar and Nandakumar 2007). Furthermore, we spotted geckos using powerful flash-lights and geckos were visually identified in the field based on their characteristic digits, overall body shape and size, as well as color pattern.

Data set was collected during day time and the following data were noted: number of individuals, number of live (unhatched) eggs, number of egg deposition sites, nearest water source (seasonal water pools, ponds and channels of river). The presence of other lizard species present with Golden Gecko were also noted, and we identified them by using key provided in Smith (1935), Agarwal *et al.* (2011), and Das and Bauer (2000). Geckos were photographed using a Panasonic Lumix DMC-FZ 10 digital camera. Geographic coordinates and altitude (in meters above sea level) were taken from Google Earth, version 6.2 beta.

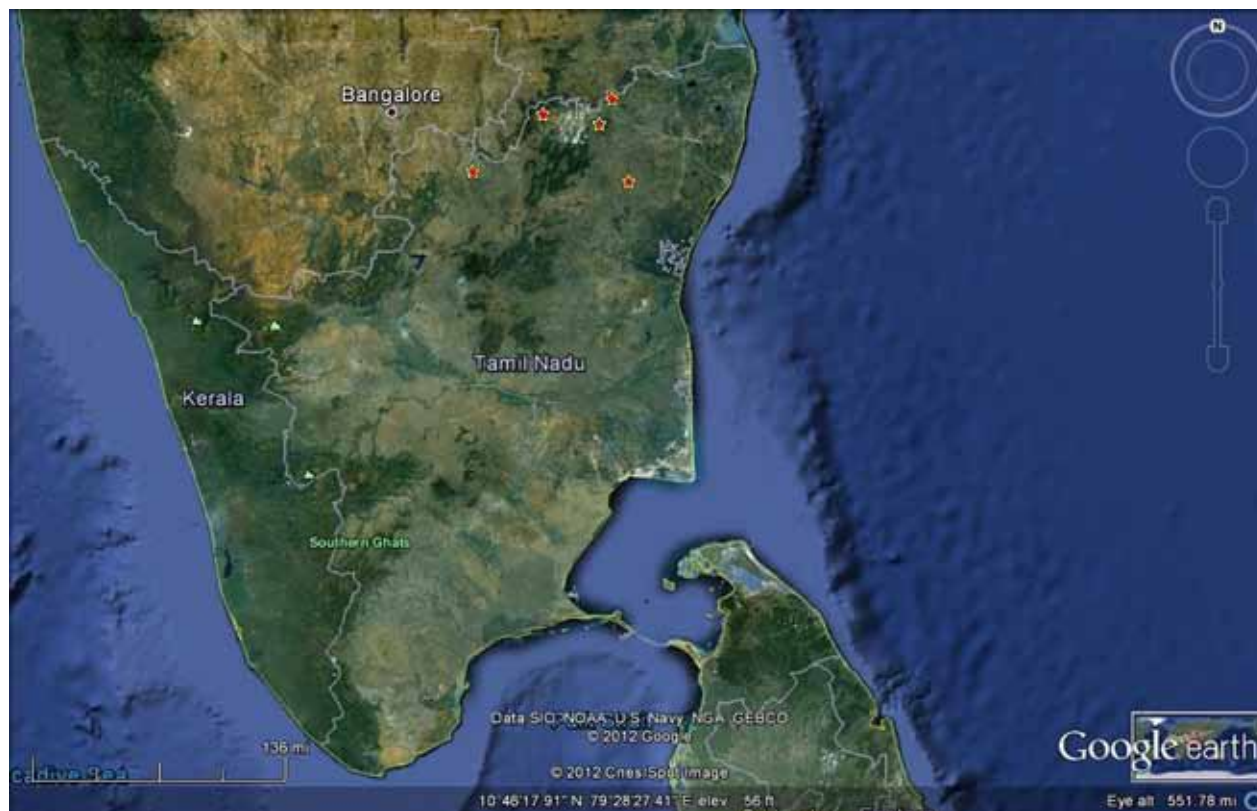


FIG. 1. Map showing the location of *Calodactylodes aureus* encountered in Tamil Nadu, India, between October 2011 to March 2012.
 Mapa que muestra la localización de *Calodactylodes aureus* encontrado en Tamil Nadu, India, entre octubre 2011 y marzo 2012.



FIG. 2. Habitat of *Calodactylodes aureus* in Shyed basha Malai, India.
Habitat de Calodactylodes aureus en Shyed basha Malai, India.

RESULTS AND DISCUSSION

A total of 70 *Calodactylodes aureus* were recorded in 20 rocky caves. Of these, 11 were bright golden yellow in color (Fig. 3). The

highest numbers of geckos were recorded from Valli Malai, followed by Shyed Basha Malai and Sathgar Hill (Table 1). The geckos were found in both vertical and horizontal crevices in the rocks and caves, and temperature was slightly less and more humid than rocky surface areas compared to caves and crevices, as reported by Rajashekhar and Nandakumar (2007). This gecko prefers rocky areas with deep stream valleys (Sreekar *et al.* 2010). We also found them residing in nearby perennial water sources on the hill tops such as naturally generated water from the rocks and small water pools. The distance from nearest water source was found to be 0.1–180 m, with an average of 64.6 m. The geckos were encountered at an elevation range of 185–702 m a.s.l. The Golden Gecko is found to extend the altitudinal distribution up to 1000 m a.s.l in the Araku Valley and the border area between Andhra Pradesh and Odhisha (Chettri and Bhupathy 2010).

The gecko has been reported to lay eggs in communal egg deposition sites (Bauer and Das 2000, Javed *et al.* 2007) on rocky surfaces. In the present survey, 72 egg deposition sites were recognized with hatched and unhatched eggs (Fig. 4). The number of egg deposition sites varied from 2–8 in the surveyed caves. A total of 477 unhatched active eggs were observed during the study. The species was found to lay eggs both horizontally and vertically inside the caves and eggs



FIG. 3. Adult male of *Calodactylodes aureus*.
Macho adulto de Calodactylodes aureus.

TABLE 1. Number of individuals, previous egg marks and altitudinal records of *Calodactylodes aureus* in Krishnagiri, Vellore and Tiruvanamalai Districts, Tamil Nadu, India, during October 2011 to March 2012. Number of individuals (Ind.). Number of previous egg marks approx. (E. Marks). Number of live eggs (E. live) and Elevation in meters a.s.l. (Elev.).

TABLA 1. Número de individuos, huevos previamente marcados y registros altitudinales de *Calodactylodes aureus* en los Distritos Krishnagiri, Vellore y Tiruvanamalai, Tamil Nadu, India, durante Octubre 2011 a Marzo 2012. Número de individuos (Ind). Número de huevos previamente marcados (E. marks). Número de huevos vivos (E. live) y Elevación en msnm (Elev.).

District	Place	GPS location	Ind.	E. marks	E. live	Elev.
Krishnagiri	Shyed Basha Malai					
	Cave 1	12°32'07.66"N 78°12'48.53"E	1	150	0	540
	Cave 2	12°32'10.05"N 78°12'46.45"E	0	1500	0	574
	Cave 3	12°32'13.00"N 78°12'46.60"E	14	2000	3	683
	Cave 4	12°32'14.42"N 78°12'48.50"E	2	2500	0	702
Vellore	Sathgar Hill					
	Cave 1	12°57'42.49"N 78°44'06.63"E	0	1200	0	520
	Cave 2	12°57'43.26"N 78°44'11.44"E	4	150	0	588
	Cave 3	12°57'42.27"N 78°44'14.41"E	9	2500	0	620
Vellore	Valli Malai					
	Subramanya Temple cave	13°04'24.40"N 79°15'38.14"E	0	300	0	305
	Cave 1	13°04'26.11"N 79°15'34.52"E	2	860	15	322
	Cave 2	13°04'29.10"N 79°15'35.69"E	8	800	0	328
	Cave 3	13°04'29.59"N 79°15'37.17"E	2	600	0	331
	Cave 4	13°04'30.40"N 79°15'38.42"E	4	300	0	336
	Cave 5	13°04'30.85"N 79°15'39.54"E	6	150	0	350
	Cave 6	13°04'33.64"N 79°15'36.37"E	2	800	0	358
	Cave 7	13°04'34.26"N 79°15'35.32"E	0	60	7	362
	Suriyan Kana Sunai	13°04'38.45"N 79°15'31.44"E	3	600	450 +	366
Tiruvanamalai	Nedumkunam Hill					
	Cave 1	12°28'01.40"N 79°23'03.68"E	2	450	0	185
	Cave 2	12°28'01.20"N 79°23'06.48"E	0	1500	0	212
	Cave 3	12°27'59.95"N 79°23'05.06"E	8	85	0	235
	Cave 4	12°27'59.59"N 79°23'07.77"E	3	200	0	244

are well protected from sunlight and heavy rain. In Valli Malai, the crevices of cave temple were blocked with cement, and Golden Geckos were found to lay eggs in gaps between the fluorescent tube lamp frames. The habitat characteristics of *Calodactylodes aureus* appear similar to that of the Sri Lankan Golden Gecko, *Calodactylodes illingworthorum*, which also inhabits granite rock caves and is restricted to eastern and south-eastern parts of the dry zones of Sri Lanka, between circa 125 to 800 m a.s.l (Karunaratna and Amarasinghe 2011).

Psammophilus dorsalis is the most commonly encountered lizard species, and *Cnemaspis otai* and *Hemidactylus graniticolus* are also found to reside along with Golden Geckos. Apart from that, a bat *Rhinopoma hardwickii* was found to roost in the caves of Shyed Basha Malai and Valli Malai, where the Golden Geckos were encountered.

The Indian Golden Gecko is facing various anthropogenic threats, such as mining activities in Niyamgiri Hills of Odhisha (Dutta *et al.*

2005) and construction of dams in the Papikonda Hills (Javed *et al.* 2007). In Tamil Nadu, Rajashekhar and Nandakumar (2007) found that rock boulders are being blasted for construction of roads and for buildings near Vellore town. They also mentioned two large metal manufacturing industries, namely Kalai Blue Metals and VCE metals, destroying the Golden Gecko habitat in Vellore. Shyed Basha Hill is under Archaeological Survey of India (ASI), but its foothills are surrounded by human habitations. In this hill, caves are polluted with polythene bags and in one instance it was found that visitors had written their names on a previous egg-deposition site (Fig. 5) while surrounding rock boulders are being blasted for developmental activities. Valli Malai also comes under the Archaeological Survey of India. Most of the crevices in cave temples in this hill were sealed with cements where geckos were found. At Sathgar Hill and Nedumkunam Hill the major threat of the habitat is cattle grazing and disturbances due to human activity such as man-made fires. Trade was considered to be a major threat to the Indian Golden Gecko



FIG. 4. Communal egg deposition sites of *Calodactylodes aureus*.
Sitio de depositación comunal de huevos de Calodactylodes aureus.

(Molur and Walker 1998), but we did not come across any of these circumstances during the surveyed period. The distribution of the Indian Golden Gecko is restricted to the Eastern Ghats of Andhra Pradesh, Odhisha and Tamil Nadu, and the present paper gives the distribution hill ranges nearby Karnataka state. Further surveys are needed to reveal many interesting facts about this species.

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FIG. 4. Previous egg deposition site of *Calodactylodes aureus*.
Sitio previo de depositación de huevos de Calodactylodes aureus.

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