

## NOTES ON THE DISTRIBUTION, NATURAL HISTORY AND VARIATION OF *HEMIDACTYLUS GIGANTEUS* STOLICZKA, 1871

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(with two text-figures)

**ABSTRACT.**— A recently collected specimen of *Hemidactylus giganteus* from Basapur, Karnataka provides some new insights into the diet and habitat of this uncommon species of gecko. This specimen and others in the collection of the Bombay Natural History Society (BNHS) were examined to assess morphological variation with respect to published information about the species. Although traditionally regarded as an arboreal species, *H. giganteus* appears to be rupicolous, at least at Basapur.

**KEYWORDS.**— *Hemidactylus giganteus*, BNHS collection, lamellae, femoral pores, variation, distribution.

### INTRODUCTION

*Hemidactylus giganteus* is one of the largest Indian geckos, reaching a snout-vent length of at least 115 mm (Smith, 1935). Stoliczka (1871, 1872) described the species on the basis of a series of specimens collected “on the Godavari river near Badrachalam [Bhadrachalam, Andhra Pradesh], on trees”. Smith (1935), more than 60 years later, noted that the species was still known from only a few specimens and recorded the species range as “Godavary Valley [Andhra Pradesh]; Malabar [Kerala]; Lingsugur, Hyderabad State [Karnataka]; Palkonda Hills (Guvvalacheruvu) [Andhra Pradesh]”. The first records from Maharashtra were reported from Pandava Caves, Kolaba District (Soman, 1966) and Ozar, Nasik District (Chopra, 1968). Murthy (1985, 1990) added localities in the Kurnool District, Andhra Pradesh and the Malappuram and Wayanad Districts, Kerala. Sanyal and Dasgupta (1990) reported several localities for *H. giganteus* in the Bastar District of what is now Chhattisgarh and Tikader and Sharma (1992) and Sanyal et al. (1993) noted additional localities in Andhra Pradesh in the Adilabad, Guntur, Karimnagar, Mahbubnagar, Warangal, and Nellore districts, as well as from the Thane Dis-

trict in Maharashtra, and from Madras [Chennai], Tamil Nadu. Daniels (2001) also cited the species in a list of reptiles of the Eastern and Western Ghats of Tamil Nadu, but the basis for this citation is unclear, as published records for the Eastern Ghats come from Andhra Pradesh (Tikader and Sharma, 1992; Sanyal et al., 1993), whereas those from the Western Ghats are from Kerala (Murthy, 1985).

Finally, Waltair, Andhra Pradesh and Aurangabad, Maharashtra have been reported as localities in the parasitological literature (Madre, 1978, 1979; Saratchandra, 1981), but these references have previously escaped the notice of most herpetologists.

The accumulated distribution records confirm that *Hemidactylus giganteus* is widespread throughout most of peninsular India, yet it remains one of the most poorly known geckos in the region, and despite its wide range, it has been considered rare by many recent reviewers (e.g., Murthy 1990; Tikader and Sharma 1992). Recently a specimen of *Hemidactylus giganteus* (BNHS 1015) was collected from Basapur, Karnataka and deposited in the collection of Bombay Natural History Society (BNHS). The BNHS collection also houses five older speci-

mens of this species. While one of these (BNHS 206) is without specific locality data, the remaining four (BNHS 1259/1-4) were collected from Sirauncha, West Chanda, Maharashtra. As there is almost no published information about the natural history or morphological variation in this species, we take this opportunity to provide some data derived both from the newly acquired specimen and the older museum material in Mumbai.

#### MATERIALS AND METHODS

The recently deposited specimen of *Hemidactylus giganteus* from Karnataka (BNHS 1015) was collected by hand and stomach flushed within eight hours to obtain dietary information. The specimen was euthanised, fixed in 10% formalin, and transferred into 70% ethanol. Measurements were taken with a Mitutoyo dial caliper (to the nearest 0.05 mm). The following measurements were recorded for each specimen. Snout-vent length (SVL); tail length (TL); axila-groin length (AG); head length from posterior edge of mandible to snout tip (HL); maximal head width (HW); maximal head depth (HD); eye diameter (ED); distance from posterior border of orbit to anterior margin of ear (EE); the distance from anterior border of orbit to tip of snout (ES). Characteristics of femoral pores (FP), number of supralabials (SL) and infralabials (IL) and number of lamellae under first toe (L 1st) and fourth toe (L 4th) were also recorded.

#### RESULTS

**Locality and habitat.**- The specimen of *Hemidactylus giganteus* was collected from near Basapur village, Koppal District, Karnataka (15° 20' 24.5"N; 76° 25' 20.3"E; altitude 467 m) on 10 November 2002 at about 2130 h. Although the species has recently been listed in a checklist of the Karnataka herpetofauna (Daniels, 2000), this is apparently based on the Lingsugur record of Smith (1935). Thus the Basapur specimen represents only the second confirmed locality for *H. giganteus* in the state. Likewise, the specimens from Sirauncha, Maharashtra constitute only the fifth published record for that state.

The landscape near Basapur is dominated by granite boulders with river sand, gravel and loose soil in patches. At the time of collection it had recently rained and winged termites and other insects were active. About 20 *Hemidactylus giganteus* were observed near Basapur on the night of 10 November 2002. The preferred substrate of the species there appeared to be granite boulders which match the colouration of the geckos to a remarkable degree. Most individuals were observed actively moving and foraging on boulders close to human habitation and many were seen in or close to cracks on the ground. This habitat is also shared by *Hemidactylus* c.f. *brookii*, *Psammophilus* sp. and *Cnemaspis* sp. No *H. giganteus* were seen on trees.

These observations are at odds with Stoliczka's (1872) original statement about the microhabitat of *Hemidactylus giganteus* and with the later assessments of Smith (1935) and Murthy (1990) who regarded it as a strictly arboreal species. Indeed, both Murthy (1990) and Tikader and Sharma (1992) used the English vernacular name "Giant Tree Gecko" to refer to this species. The latter authors reported this to be a strongly arboreal species and noted that all the specimens from Andhra Pradesh were collected from trees in hilly country. Murthy (1985), however, observed geckos of this species in crevices in the ceiling of a fortress at Gooty and in the arches of a temple at Ahobilam, both in Andhra Pradesh, and Sanyal et al. (1993) noted simply "found on trees, crevices". It is likely that the species can occupy either arboreal or rupicolous microhabitats, but its large size and requirement for suitably commodious retreat sites may favor the occupation of natural or manmade stone crevices in most areas. It is also possible that the species is chiefly associated with rocks, but may move onto trees to forage at night, as has been reported for some other large geckos (Bauer 1990).

**Morphological characters.**- In *Hemidactylus giganteus*, the digits are free, moderately dilated and with almost straight transverse lamellae. Previous authors have reported 10-11 lamellae beneath the first toe and 13-15 under the fourth toe (e.g., Smith, 1935; Tikader and Sharma, 1992).

**TABLE 1:** Mensural and meristic data for *Hemidactylus giganteus* from Karnataka and Maharashtra in the collection of the Bombay Natural History Society. Abbreviations as in Materials and Methods. All mensural data in mm. Abbreviations: \* = Tail regenerated; TB = Tail broken.

BNHS No.	Sex	Mensural Characters										Meristic Characters					
		SVL	TL	AG	HL	HW	HD	ED	EE	ES	FP	SL	IL	L 1 <sup>st</sup>	L 4 <sup>th</sup>		
1510	Male	108.80	110.00	44.50	32.10	23.40	13.10	6.80	8.00	14.00	18 (left) 17 (right)	14	10	11	14		
1259/1	Female	102.40	80.00*	42.50	31.20	22.80	12.50	6.80	9.70	13.90	-	14	12	11	14		
1259/2	Female	107.20	62.40*	43.00	33.00	22.60	13.10	6.90	9.80	14.30	-	13	12	10	15		
1259/3	Male	92.50	96.00	40.00	26.80	21.30	11.50	5.50	9.40	11.70	16 (left) 18(right)	14	12	11	14		
1259/4	Female	84.80	90.10	36.30	21.00	19.00	12.10	5.40	7.30	11.68	-	13	13	10	15		
206	Male	101.10	TB	41.40	31.20	22.50	13.00	6.70	9.50	12.10	17 (left) 17 (right)	14	12	11	14		

Our observations of material from Karnataka and Maharashtra confirm these ranges (Table 1). Previous authors, however, have not commented on the fact that the lamellae are divided distally, but single basally (Fig. 1). Variation in the degree of lamellar division is high across *Hemidactylus* as a whole, and there is a tendency towards undivided lamellae in Indian members of the genus, culminating in *H. anamallensis* (fide Bauer and Russell, 1995).

Smith (1935) and Tikader and Sharma (1992) described males of *Hemidactylus giganteus* as having 18-22 femoral pores per thigh, with the left and right series separated by a small median gap. While this was generally borne out by the BNHS material, as few as 16 pores were found in BNHS 1259/3 (Table 1), and in BNHS 1510 the pores of the left femur were not continuous, but were interrupted by poreless scales (Fig. 2), while in two other specimens (BNHS 1259/3 and BNHS 206) the left and right femoral pore series are continuous across the preloacal region, with no median gap.

Diet.- Dietary composition was determined by stomach flushing a single specimen (BNHS 1510) within eight hours of collection. It contained 12 specimens of winged termites. It is probable that the diet of *Hemidactylus giganteus* is actually fairly catholic, but that the stomach contents retrieved from this individual represent the capitalization on an eruption of a temporally and spatially patchy resource, alate termites. Such prey utilization has been noted in many lizards, including geckos in Punjab (Arora, 1962) and elsewhere in Asia (Frith, 1981). The only specific mention of diet in this species has been with respect to captive specimens, which were fed cockroaches (*Blaberus* spp.; Klátíl, 1988).

**CONCLUSIONS**

*Hemidactylus giganteus* has generally been considered a rare species (e.g., Murthy, 1990; Tikader and Sharma, 1992), or at least a species of indeterminate status (Sanyal et al., 1993). However, a review of distribution records reveals its occurrence in at least five Indian states. Records from north-eastern Maharashtra and Chhattisgarh further suggest that the species may



**FIGURE 1:** Ventral view of left forefoot of *Hemidactylus giganteus* showing varying degrees of lamellar subdivision. Although distal lamellae are divided, some basal lamellae are single or only partially divided.



**FIGURE 2:** Ventral view of thighs and preloacal region of *H. giganteus* (BNHS 1510) showing the disruption of the femoral pore series on the animal's left thigh.

yet be found in Orissa and/or Madhya Pradesh. In addition to its wide distribution, *H. giganteus* also appears to be abundant at individual sites. This is attested to by our own observations at Basapur as well as those of previous authors (e.g., Stoliczka, 1872; Murthy, 1985). It thus appears that the apparent rarity of *H. giganteus* is an artifact. Despite its large size and high local density, the species has escaped the notice of zoologists and has remained poorly known. This situation parallels that of the golden gecko, *Calodactylodes aureus*, a large, brightly coloured and highly vocal gecko of the Eastern Ghats. Despite its conspicuousness and its occurrence near human settlements, this species was until recently considered one of the rarest of Indian geckos (Bauer and Das, 2001).

Our observations suggest that *Hemidactylus giganteus* is probably chiefly an inhabitant of

rock crevices, rather than trees as has been previously reported, or at least that, boulders are one of several habitat types used by the species. Dietary information and details of morphological variation are also provided for the first time. These data, however, are preliminary and it is hoped that additional information on natural history, distribution, and variation will be collected from throughout the range of this large, regionally endemic gecko. Indeed, significant field work is required on most of the geckos of India, as most biological data on this family have been collected from a few widespread and anthropophilic species and are probably not reflective of the group as a whole.

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