

A review of the distribution and status of *Latidens salimalii* (Chiroptera: Pteropodidae) with new records from the Western Ghats, India

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Abstract: Salim Ali's fruit bat (*Latidens salimalii*) is endemic to southern India and is classified as Critically Endangered by IUCN. This classification is based on an assessment of the species in 1996 when only seven individuals had been recorded, all of which were from the High Wavy Mountains in the state of Tamil Nadu. This paper documents the expansion in the known range of *Latidens* and includes details of four further localities at which the bat has been found together with information on the species' reproductive status and diet. As the increase in recorded numbers and distribution of the taxon calls into question the validity of *Latidens*' current classification, an argument is put forward for a reassessment of the species' status that concludes in a recommendation that *Latidens salimalii* be reclassified as Endangered.

Keywords: *Latidens salimalii*, Western Ghats, distribution, status, Critically Endangered, India.

Introduction

In 1948, a fruit bat, believed at the time to be *Cynonycteris sphinx*, was collected by Angus Hutton from the High Wavy Mountains in the Madurai District of Tamil Nadu, southern India. The specimen was placed in the collection of the Bombay Natural History Society and it was not until its re-examination in 1970 by Kitty Thonglongya that a number of its characteristics were found to be incompatible with those of *Cynonycteris sphinx*. As a result, the specimen was assigned to a new genus and species, *Latidens salimalii* Thonglongya, 1972, so named on account of its broad cheekteeth and in honour of the Indian ornithologist Dr. Salim Ali. *Latidens salimalii* was known only by the holotype, skin, and skull until 1993, when six further specimens were collected from Yeni Kodai Cave on the

Kardama Coffee Estate (approximately 09° 50' N, 77° 24' E) in the High Wavy Mountains during a survey of the bat fauna of the region by the Harrison Institute (= The Harrison Zoological Museum) and the Bombay Natural History Society (Bates et al. 1994, Muni 1994). The High Wavy Mountains remained the only recorded distributional record of *Latidens* until 1999, when its presence was recorded, but without details, in the Kalakkad-Mundanthurai Tiger Reserve, Tamil Nadu (Ghosh et al. 1999), thereby extending its range between 110 and 160 km southwards. Agoramoorthy (2000) confirmed the species' existence in the vicinity of the Kardama Coffee Estate during an examination of 46 individuals from a colony with an estimated population of 250, while Singaravelan & Marimuthu (2003a) collected 28 individuals from an unidentified cave at the same location during two trap nights and a further ten from a loosely estimated colony of 350 resident in a further cave located

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nearby (Singaravelan & Marimuthu 2003b). Ten *Latidens salimalii* were reportedly collected from the "Agastiyamalai hill complex" by members of the Zoological Survey of India, presumably prior to January 2002 (Singaravelan & Marimuthu 2003a). During the course of a bat species diversity assessment and conservation management study conducted between February 2002 and May 2003 by the Department of Zoology, Sarah Tucker College, Tirunelveli, 28 specimens of *Latidens*, including five subadults and one juvenile, were collected from four further locations in western Tamil Nadu: (1) Therkumalai Estate in the Courtallum Hills, (2) Nagapodigai Cave and (3) Vudumbukal Cave in the Agasthiyar Hills, and (4) Sengaltheri Cave in the Kalakkad Hills. Locations 2, 3, and 4 lie within the perimeter of the Kalakkad-Mundanthurai Tiger Reserve, whilst location 1 is positioned just outside the Reserve's north-eastern boundary.

Latidens salimalii is endemic to India (Bates & Harrison 1997) and is classified as Critically Endangered in the 2003 IUCN Red List of Threatened Species (IUCN 2003).

Geography

The Agasthiyar Hills, together with the adjoining ranges of Courtallum to the north and Kalakkad to the east (referred to collectively hereafter as "the Agasthiyar Hill Range"), form the southernmost extension of the Western Ghats, a series of hill ranges running parallel to India's western seaboard from approximately 08° 20' N to 21° N (figure 1). The Kalakkad-Mundanthurai Tiger Reserve occupies an area of 895 km² and stretches from 08° 23.50' to 08° 53.60' N and 77° 09' to 77° 33.3' E, the western part of its perimeter being delineated by the state border between Tamil Nadu and Kerala. On the western fringes of the Reserve rise the closely connected peaks of Agasthiyar (1847 m), Ainthalaipodigai (1800 m), and Nagapodigai (1745 m). The seasonal drainwaters from these mountains form the headwaters of the perennial Tambraparani River,

which flows east to the Gulf of Mannar, some 90 km distant. The waters of the Tambraparani are augmented by a number of tributaries; some of these have been dammed to form reservoirs, which are used for hydroelectric power generation and crop irrigation around Ambasamudram (08° 42' N, 77° 27' E). In addition to numerous peaks, the Agasthiyar Hill Range is characterised by the presence of two plateaux: the Upper Kodayer Plateau (08° 29' N – 08° 34' N), which enjoys an average elevation of 1800 m and supports numerous tea plantations; and, at the lower average elevation of 300 m, the Mundanthurai Plateau (08° 37.50' N – 08° 42' N). Therkumalai Estate is located at an elevation of 900 m in a belt of tropical dry deciduous forest that gives way at about 1000 m to moist deciduous forest. Nagapodigai Cave, Vudumbukal Cave, and Sengaltheri Cave lie between 1300 m and 1600 m amidst tropical wet evergreen rainforest, which occupies elevations in excess of 1200 m.

The south-west monsoon (June to September) and the north-east monsoon (October to January) bring heavy rain and strong winds to the Agasthiyar Hill Range with elevations above 1000 m experiencing frequent mists and cloud cover that may persist for many days. The Hill Range enjoys a warm tropical monsoon climate with an annual rainfall ranging from 2300 mm to 5000 mm. Maximum temperatures range between 23 °C and 34 °C and minimum temperatures between 16 °C and 25 °C (Rajendran 1996).

Land use within the Kalakkad-Mundanthurai Tiger Reserve is strictly controlled by the Tamil Nadu Forest Department. Whilst only a few local tribespeople are known to inhabit areas of the Reserve above 1200 m, the plains to the east are densely populated. Many of the villagers on the plains graze livestock in, or collect wood from, the Reserve. These activities may result in some disturbance of the dry deciduous forest below 1000 m but do not appear to have any adverse affect on land at higher elevations, which remains largely intact.

The Agasthiyar Hill Range is included in two

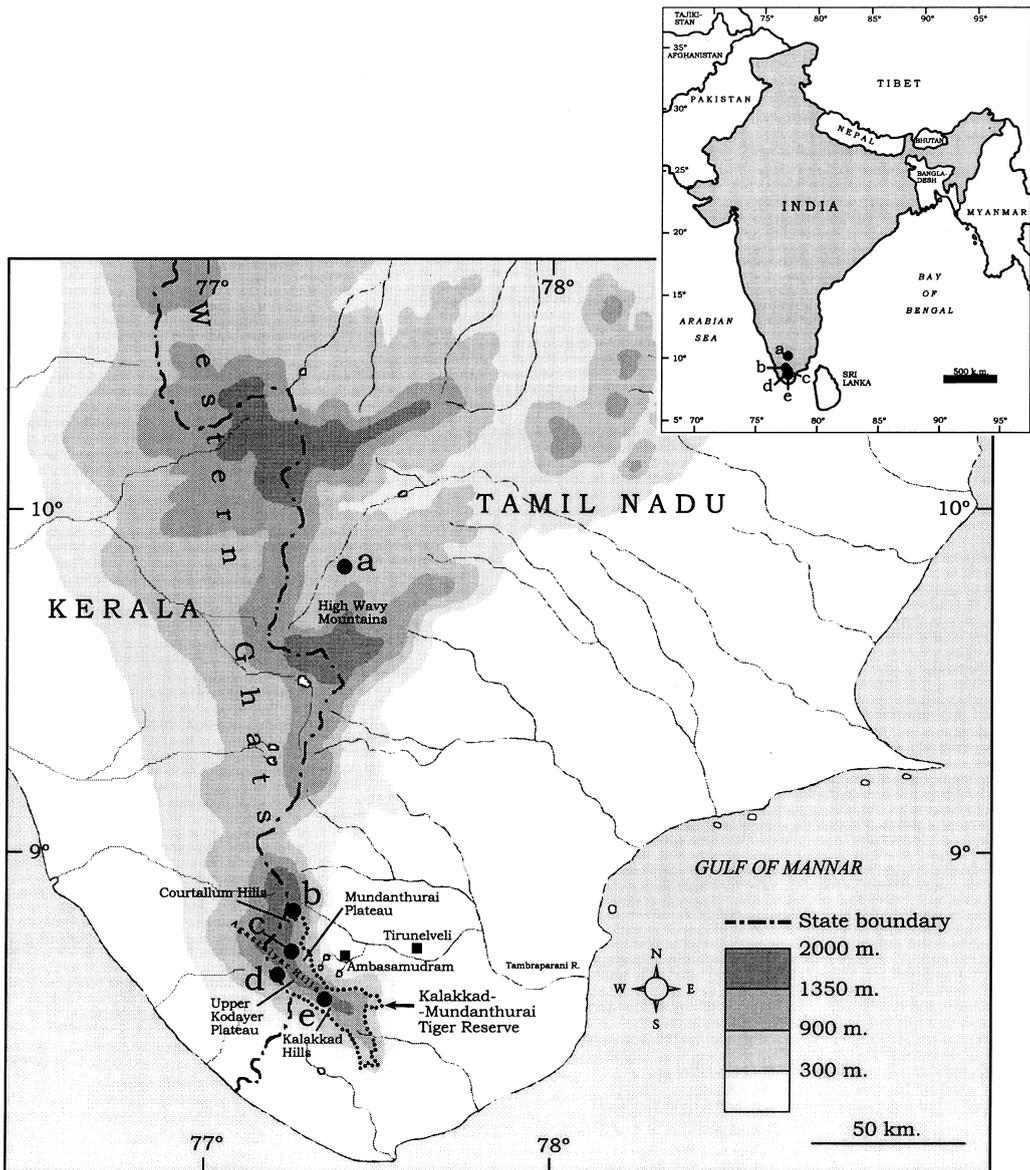


Figure 1. The recorded distribution of *Latidens salimalii*: a. Kardama Coffee Estate, High Wavy Mountains; b. Therkumalai Estate, Courtallum Hills; c. Vudumbukal Cave, Agasthiyar Hills; d. Nagapodigai Cave, Agasthiyar Hills; e. Sengaltheri Cave, Kalakkad Hills.

of the WWF Global 200 Ecoregions, which have been selected for their outstanding biodiversity (no. 20: Southwestern Ghats Moist Forests; and no. 171: Western Ghats Rivers and Streams; see World Wildlife Fund 2004).

Method and materials

Twelve metre two-ply, four shelf, nylon mesh mist nets were used to collect voucher specimens, which were either preserved as wet specimens in 70% ethanol (JVR-1 and JVR-2, see 'Systematic review' section) or tagged and released.

Systematic review

New material

1. Therkumalai Estate, Courtallum Hills, Tirunelveli District, Tamil Nadu
08° 54' N, 77° 15' E
900 m a.s.l.
23 February, 2002
2 males (1 subadult) (adult male = JVR-1), 1 female (pregnant¹) (JVR-2)
1 March, 2003
1 female (released)
2. Vudumbukal Cave, Agasthiyar Hills, Kalakkad-Mundanthurai Tiger Reserve
08° 46' N, 77° 15' E
1400 m a.s.l.
8 September, 2002
1 male (released)
3. Nagapodigai Cave, Agasthiyar Hills, Kalakkad-Mundanthurai Tiger Reserve
08° 35' N, 77° 20' E
1600 m a.s.l.
8 April, 2002
1 male (released), 1 female (with a single juvenile attached) (released)
4. Sengaltheri Cave, Kalakkad Hills, Kalakkad-Mundanthurai Tiger Reserve
08° 32' N, 77° 28' E
1300 m a.s.l.
8 March, 2003
12 males (4 subadult) (released)
6 May, 2003
7 males (released), 1 female (released)

Taxonomic description

Specimens from the Therkumalai Estate in the Courtallum Hills exhibit external characteristics commensurate with recorded data of the genus *Latidens*, notably a short, soft, dark brown to black dorsal pelage with an infusion of chestnut

hairs on the posterior back, on the flanks above the wings, and on the elbows and forearms; dark ears with narrowly rounded tips; uniformly black wings; and no external tail (Bates et al. 1994, Bates & Harrison 1997). Forearm measurements of both specimens (72.0 and 72.0 mm) are greater than those of specimens secured in the High Wavy Mountains (66.0 – 69.0 mm) (Bates et al. 1994). Cranial characteristics include a shortened rostrum; short postorbital processes without postorbital foramina; a long, narrow palate with a notable postdental extension; and well-developed basioccipital pits (Bates et al. 1994, Bates & Harrison 1997). The single pair of upper incisors present in both specimens distinguishes *Latidens* from other species of fruit bat known from the Indian Subcontinent (Bates & Harrison 1997).

External, cranial, and dental measurements of JVR-1 and JVR-2 are listed in table 1. Definitions of measurements given follow Bates & Harrison (1997) and are as follows: HB: head and body length; HF: (hind) foot length; FA: forearm length; E: ear length; GTL: greatest length of skull; CBL: condylo-basal length; CCL: condylo-canine length; ZB: zygomatic breadth; BB: breadth of braincase; M: mandible length; C-M^a: maxillary tooththrow; C-M_a: mandibular tooththrow; M¹-M¹: posterior palatal width; C¹-C¹: anterior palatal width.

Habitat and behaviour

Therkumalai Estate (night roost)

Latidens salimalii was found to roost within a dilapidated, abandoned building known as “Kannadimazhligai” in this former British Raj resort. Bats were observed arriving at the roost with uneaten figs, a fruit of which *Latidens salimalii* is reportedly fond (Ghosh et al. 1999), which they proceeded to consume in areas of the building that moonlight did not penetrate. One adult male, one sub-adult male, and a pregnant female *Latidens salimalii* were collected around 5 am on 23 February, 2002 and a single female on 1 March,

¹ The bat was not evidently gravid at the time of capture and was found to be pregnant only when being prepared as a scientific specimen.

Table 1. External, cranial, and dental measurements (in mm) of two specimens of *Latidens salimalii* from Therkumalai Estate, Courtallum Hills, Tirunelveli District, Tamil Nadu, India. HB: head and body length; HF: (hind) foot length; FA: forearm length; E: ear length; GTL: greatest length of skull; CBL: condylo-basal length; CCL: condylo-canine length; ZB: zygomatic breadth; BB: breadth of braincase; M: mandible length; C-M^a: maxillary tooththrow; C-M_n: mandibular tooththrow; M^l-Mⁱ: posterior palatal width; C^l-Cⁱ: anterior palatal width.

Feature	JVR-1	JVR-2
HB	123.0	117.0
HF	15.0	14.0
FA	72.0	72.0
E	17.0	19.0
Mass (g)	69.0	77.0
GTL	33.5	33.5
CBL	32.0	32.5
CCL	31.0	32.0
ZB	21.4	21.0
BB	14.2	14.0
M	25.5	25.0
C-M ^a	11.5	11.1
C-M _n	13.0	12.6
M ^l -M ⁱ	10.6	10.7
C ^l -C ⁱ	6.2	6.1
Sex	Male	Female

2003 in a mist net set up within the building.

Threats: Therkumalai is a private estate and is not subject to government control of its land use. Since February 2002, estate workers have removed several corrugated iron roofing panels from “Kannadimazhligai” with the result that the interior of the building is more exposed with many of its formerly dark recesses now penetrated by moonlight.

Vudumbukal Cave (day roost)

Approximately 50 *Latidens salimalii* were observed at 11 am on 8 September, 2002 within Vudumbukal Cave at an elevation of some 1400 m in the Agasthiyar Hill Range. The cave measured approximately 6 m in both height and width with a lower and narrower entrance and was located near a branch of the Servalar River, itself a tributary of the larger Tambraparani River. The depth of the cave could not be deter-

mined due to the difficulty of access. A single adult male of the species, which was subsequently tagged and released, was collected in a mist net erected at the cave mouth.

Threats: local people have been known to capture *Latidens* for food while collecting honey in the vicinity of Vudumbukal Cave. A recent government order prohibiting the collection of honey in the area may or may not be beneficial to the security of the roost.

Nagapodigai Cave (day roost)

A colony of 350–400 *Latidens salimalii* was observed at 10 am on 8 April, 2002 in Nagapodigai Cave, which lies near the source of the Tambraparani River at an elevation of approximately 1600 m in the Agasthiyar Hill Range. The cave’s principal chamber is approximately 15 m high and 9 m deep before it narrows and disappears within the hill. There are a number of small exits. An adult male *Latidens salimalii* together with a female and a single offspring were collected in a mist net established at the cave’s triangular mouth. A number of birds’ nests, which were attached to the walls of the cave mouth, were evident.

Threats: human disturbance of the Nagapodigai colony may be occasioned by the known collection of birds’ nests by members of the local Kani Tribe, who occupy a small collection of huts at an elevation of 1200 m *en route* to Nagapodigai Cave. Evidence of camp fires has been found in the cave’s entrance.

Sengaltheri Cave (day and night roost)

Approximately 25 *Latidens salimalii* were observed flying around the entrance to Sengaltheri Cave on 8 March, 2003. On a subsequent visit to the cave on 6 May, 2003, bats were heard and seen within the cave, where they were noted to roost in narrow chambers. The mouth of the cave is approximately 15 m wide and 10 m in height. The depth of the cave is not known due to the impossibility of human access beyond the first few metres. Large boulders up to 6 m high occupy the area in front of the cave, which is situated at an elevation of 1300 m next to the Pachaiaru

River, a rocky cascade that flows north to join the Tambraparani River east of Ambasamudram. The area around the cave is well forested and is noted to support *Ficus* sp. Twelve male *Latidens salimalii* (four of which were subadult) were collected in a mist net established at the entrance to the cave on 8 March, 2003 whilst 7 males and 1 female of the same species were caught in a mist net set in a similar position on 6 May, 2003.

Threats: none is known. The habitat around Sengaltheri Cave is tightly controlled by the Tamil Nadu Forest Department. The leases of a small number of cardamom plantations in the area expired in the late 1990s, since when the region has been uninhabited.

In general, colonies of *Latidens* were found to favour the darker recesses of caves, which, at the most, were penetrated only by dappled light coming through cracks or openings in the rock, and typically concentrated their roosts some four to five metres from the cave entrances. If disturbed, the bats would seek refuge further within the caves. Owing to the inaccessibility of the caves, bats were only able to be collected in

mist nets established at cave mouths. All caves were located adjacent to or near streams or rivers.

Latidens salimalii was noted to be the host of a species of parasitic mite, believed, from a preliminary identification, to be *Meristaspis lateralis*, Kolenati 1857.

Reproductive status

Examinations of the reproductive status of male and female *Latidens salimalii* collected in mist nets at “Kannadimazhligai” on the Therkumalai Estate and at Nagapodigai, Vudumbukal, and Sengaltheri Caves were undertaken on an irregular basis in the months of February, March, April, May, and September between 23 February, 2002 and 6 May, 2003 (table 2).

Adult male *Latidens salimalii* with descended testes were found on 23 February at “Kannadimazhligai”, on 8 March and 6 May at Sengaltheri Cave, on 21 April at Nagapodigai Cave, and on 8 September at Vudumbukal Cave. Subadults were observed on 23 February at

Table 2. Observations taken between February and September of the reproductive status of male and female *Latidens salimalii* from four localities in the Agasthiyar Hill Range.

Date	Locality	Male	Female
23 February 2002	“Kannadimazhligai”, Therkumalai Estate (night roost)	1 adult with descended testes 1 subadult	1 pregnant Body mass: 77g
1 March 2003	“Kannadimazhligai”, Therkumalai Estate (night roost)		1 lactating adult with prominent teats
8 March 2003	Sengaltheri Cave (day and night roost)	8 adults with descended testes 4 subadults	
21 April 2002	Nagapodigai Cave (day roost)	1 adult with descended testes	1 adult with juvenile attached Body mass adult: 64 g Body mass juvenile: 25 g
6 May 2003	Sengaltheri Cave (day and night roost)	7 adults with descended testes	1 adult with prominent “weaned” teats
8 September 2002	Vudumbukal Cave (day roost)	1 adult with descended testes	

“Kannadimazhligai” and on 8 March at Sengaltheri Cave.

At “Kannadimazhligai”, a pregnant *Latidens salimalii* with a body mass of 77 g and a lactating adult with prominent teats were recorded on 23 February and 1 March, respectively. An adult female with a body mass of 64 g with an attached juvenile, whose body mass was 25 g, were found at Nagapodigai Cave on 21 April, whilst an adult female with prominent “weaned” teats was recorded at Sengaltheri Cave on 6 May.

Diet

Within the Therkumalai Estate, *Latidens* was observed to gather fruits from *Ficus* and to transport them to its night roost at “Kannadimazhligai” in order to consume them. Fruits were not seen to be consumed at the point of collection. Seeds and partially eaten fruits gathered from the floor of “Kannadimazhligai” have been identified preliminarily as those from the fruit of *Ficus racemosa* Linnaeus, 1753 (V. Chelladurai, personal communication), a species that is known to bear fruit for much of the year (P. Lakshminarasimhan, personal communication). Seeds from the fruit of the same tree were found on the floor of Sengaltheri Cave. Scientific evaluation both of the bark and of leaf extracts from *Ficus racemosa* has shown the tree to be of medicinal value as an anti-diarrhoeal and an anti-inflammatory agent (Mukherjee et al. 1998, Mandal et al. 2000).

Nuts, which appeared to have been ejected orally, were found in abundance alongside the fruits and seeds of *Ficus racemosa* at “Kannadimazhligai” and initial analysis has shown these to be from the following trees: *Elaeocarpus serratus* Linnaeus, 1753, *Elaeocarpus tuberculatus* Roxburgh, 1832, and *Dichapetalum gelonioides* (Roxburgh, 1896). Orally ejected nuts of *Dichapetalum gelonioides* were also evident on the floor of Sengaltheri Cave while partially eaten fruits of the same species were collected from “Kannadimazhligai”. Circumstantial evidence would suggest that fruits from these three tree species may form part of *Latidens*' diet.

No food remnants were visible at Vudumbukal or Nagapodigai Caves.

Current population status, extent of occurrence, and area of occupancy

Calculations of the extent of occurrence and the area of occupancy are based upon an interpretation of IUCN Red List guidelines set out under subsections 9 and 10, section III, Annex 6 of the 2000 IUCN Red List of Threatened Species (Hilton-Taylor 2000).

Population status

Table 3 shows an estimate of the number of individual *Latidens salimalii* recorded in published literature.

Bates et al. (1994) and Muni (1994) record the collection of six bats as they flew into a cave on the Kardama Coffee Estate in the High Wavy Mountains. The collectors were of the opinion that “the large number of bats seen flying near the cave during the evening were also *Latidens*” but were unable to establish the fact. Ghosh et al. (1999) describe the netting of an adult male and a young male “and females of different ages” in the Kalakkad-Mundanthurai Tiger Reserve, where “flocks” of *Latidens* reportedly visited a *Ficus* tree. In a report on a study of the population status of *Latidens* in Tamil Nadu State prepared for Fauna and Flora International by Agoramorthy (2000), 46 individuals (19 males and 27 females) from a cave near the Megamalai Forest Reserve were captured and released. The author observed “250 individuals of *Latidens salimalii* when they emerged from the cave at dusk”. Twenty-eight bats were collected from the Kardama Estate as detailed by Singaravelan and Marimuthu (2003a), the authors referring also to the capture of ten specimens by scientists from the Zoological Survey of India in the Agasthiyar Hill Range. A further 24 bats were collected from a cave on the same estate (Singaravelan & Marimuthu 2003b), although the figures given of the total number of *Latidens salimalii* present are confusing: firstly, the bats are

Table 3. Estimated population of *Latidens salimalii* in May 2003.

Reference	N of bats collected*	N of bats observed	Comments
Bates et al. 1994, Muni 1994	6	6**	A large number of bats seen flying (near the cave) were thought to be <i>Latidens</i> but this remains unproven.
Ghosh et al. 1999	3	>3**	Ghosh mentions “flocks” of <i>Latidens</i> visiting a <i>Ficus</i> tree.
Agoramoorthy 2000	46	250	
Singaravelan & Marimuthu 2003a	38***	38**	
Singaravelan & Marimuthu 2003b	24	>110 - <350	
<i>This paper</i>			
Therkumalai Estate	4	4*	
Vudumbukal Cave	1	50	
Nagapodigai Cave	3	350-400	
Sengaltheri Cave	20	25	
Total	>145	>826 - <1126	

* Assumes all bats collected were released.

** No mention is made of bats being observed other than those that were collected.

*** Includes ten individuals collected by the Zoological Survey of India.

identified as roosting inside the cave in “two clusters, each comprising 50 to 70 individuals” with “several individuals” hanging separately; secondly, “a total of nearly 350 bats” was counted “during their outflights”, “24 of which were captured in a mist net”. It is stated that “apart from a pair of male *Rhinolophus rouxi*..... no other species of bats were observed inside the cave”. An assumption is made, therefore, that the minimum number of *Latidens salimalii* (if the visual identifications are correct) was more than 100 (50 plus 50 plus “several individuals”) and that the maximum number was less than 350 (“nearly 350” minus “a pair of male *Rhinolophus rouxi*”). The figures for this paper are given in the sections entitled “New material” and “Habitat and behaviour”, *supra*. If the number of bats collected is taken to be included in the number of bats observed, a minimum estimate of the total number of

Latidens salimalii is (more than) 826 individuals with a maximum estimate of (less than) 1126.

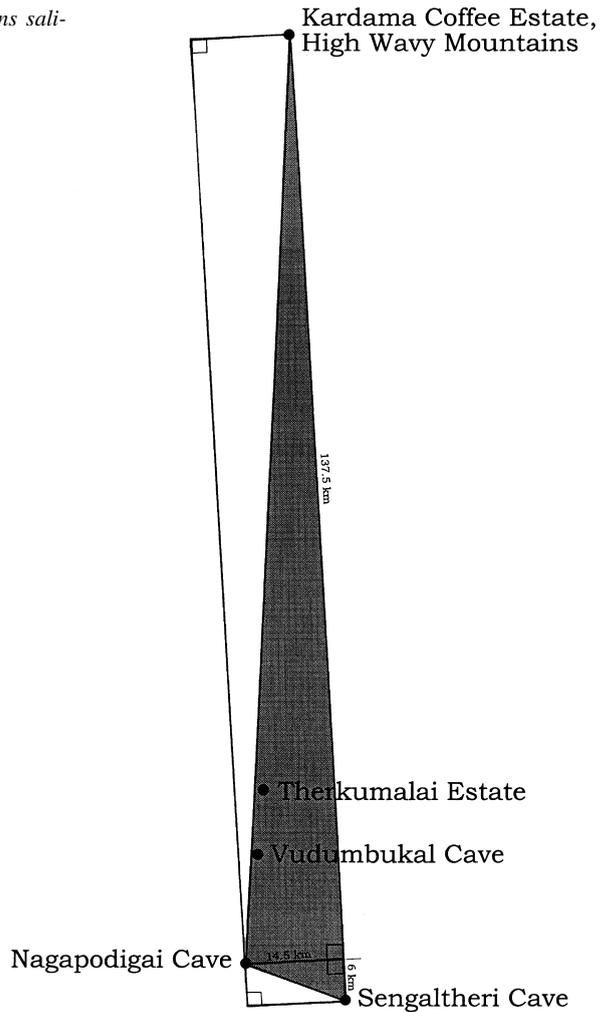
Extent of occurrence

The shaded area delineated by the lines drawn between the Kardama Coffee Estate in the High Wavy Mountains, Sengaltheri Cave, and Nagapodigai Cave in figure 2 represents the known distributional range of *Latidens salimalii*. By dividing the area into simple triangles, the following calculation may be made in order to arrive at a measurement of the extent of the taxon’s occurrence:

$$\text{Extent of occurrence} = (137.5 \times 14.5 \div 2) + (6 \times 14.5 \div 2) = 1040.38 \text{ km}^2$$

As there is more than a reasonable likelihood, on account of a similarity of topography, habitat, and

Figure 2. The extent of occurrence of *Latidens salimalii*.



elevation, that fieldwork carried out between the High Wavy Mountains and the Agasthiyar Hill Range will disclose further populations of *Latidens salimalii*, this area has not been excluded from the extent of occurrence as calculated above (see Annex 6, III: 9 of the 2000 IUCN Red List of Threatened Species (Hilton-Taylor 2000)).

Area of occupancy

Singaralvelan and Marimuthu (2003b) suggest that *Latidens salimalii* may cover a distance of at least 0.8 km from its diurnal roost to nocturnal feeding grounds, although the morphologically similar species *Cynopterus sphinx* has

been observed carrying fruits up to 2 km from feeding grounds to the roost site (Agoramoothy 2000).

If each of the five known roost sites of *Latidens salimalii* is circumscribed by a circle with a radius of 0.8 km., the following formula may be used to calculate the sum of the areas of the circles and, accordingly, the species' total area of occupancy:

$$5\pi r^2, \text{ where } \pi = 3.142 \text{ and } r = 0.8$$

$$\text{Total area of occupancy} = 5 \times 3.142 \times 0.8 \times 0.8 = 10.05 \text{ km}^2$$

Discussion

From studies of *Latidens salimalii* carried out on the Kardama Coffee Estate, Singaravelan and Marimuthu (2003a) suggest that parturition in the species may occur at the end of May or the beginning of June. However, the observations recorded here of a pregnant female *Latidens salimalii* on 23 February, a lactating female on 1 March, a female with young attached on 21 April (the mass of the offspring being 39% of that of the mother at this date), and a female with prominent “weaned” teats on 6 May would indicate, at least in respect of the more southerly colonies of *Latidens salimalii*, that parturition occurs as early as late February. If the production and nurturing of the young of *Latidens* is compared to that of *Cynopterus sphinx* and *Rousettus leschenaultii*, juveniles can be expected to reach 40% of the body mass of adults when 55 to 65 days old and to be fully weaned by 75 days (Singaravelan & Marimuthu 2003a). By applying these periods to the observation of the female with young on 21 April and the female with weaned teats on 6 May, the inference is that these two females gave birth between 14 and 24 February.

The absence of food remnants at Vudumbukal and Nagapodigai Caves would suggest that although these two localities are used as day roosts, seeds gathered by the Vudumbukal and Nagapodigai colonies are consumed elsewhere. In contrast, “Kannadimazhligai” is utilised only as a nocturnal feeding roost, whereas Sengaltheri Cave is employed both as a nocturnal feeding roost and as a day roost. Favoured fruits may be abundant in the vicinity of Sengaltheri Cave but may be too far from Vudumbukal and Nagapodigai Caves to warrant the level of energy expenditure required in returning to these localities for the sole purpose of food consumption. Further studies, perhaps using radio-tracking equipment, may be helpful in determining the positions of day and night roosts relative to the most proximate feeding grounds. It is suggested that further fieldwork around Therkumalai should be undertaken to locate the day roost of the population that utilizes “Kannadimazhligai” as a nocturnal feeding site.

Latidens' preference for establishing roosts in dark recesses in caves raises the question of the navigational methods used by the species in this environment. It may be the case that some form of echolocation is employed similar to that known to be used by the genus *Rousettus* Gray, 1821 (Roberts 1975). A study to determine the use (if any) of echolocation by *Latidens salimalii* was propounded by Singaravelan & Marimuthu (2003b) and that view is reiterated here.

The IUCN Red List of Threatened Species, 2003, classifies *Latidens salimalii* as Critically Endangered with the extent of its occurrence estimated to be less than 100 km² or its area of occupancy less than 10 km² (IUCN 2003). IUCN suggests that the species is severely fragmented or known to exist at only a single location and that its numbers are expected to decline in respect of the area, extent and/or quality of habitat and that the current population is estimated to number fewer than 50 mature individuals. Whilst the accuracy of these data and projections may have been acceptable at the time of IUCN's assessment of *Latidens salimalii* in 1996 (the date of the assessment on which the 2003 Red List is based), it is now the case that the numbers and distributional range of the species are greater than was known at the time of the assessment, when only seven specimens of the species had been recorded, all of which were from a single location (the High Wavy Mountains). From current and recent field studies of populations of *Latidens*, it would seem reasonable to assume that the species' present extent of occurrence is in the region of 1040 km² and that its area of occupancy is at least 10.05 km². It may also be estimated that the current number of individuals of the species is not less than 826. If the above data are accepted, the species would no longer meet Criterion B (extent of occurrence estimated to be less than 100 km² or area of occupancy estimated to be less than 10 km²) or Criterion D (population estimated to number less than 50 mature individuals) of the Critically Endangered classification.

On current information, however, the taxon would satisfy the criteria for an Endangered classification under Criterion B (extent of occur-

rence estimated to be less than 5000 km² or area of occupancy estimated to be less than 500 km² and [sub-criterion 1] the taxon is severely fragmented or known to exist at no more than five locations and [sub-criterion 2c] a continuing decline is estimated in the area, extent, and/or quality of habitat). There are, obviously, extant threats to *Latidens*' habitat. Human activity on the Therkumalai Estate and at Nagapodigai and Vudumbukal Caves poses a threat to the security of the roosts at these locations, particularly the latter two as these are permanent day roosts. The worsening state of disrepair of "Kannadimazhligai" may not be of such concern, as this is a transitory night roost, but any interference with the arboreal ecostructure of the Therkumalai Estate may be detrimental to *Latidens* in terms of the diminution of available feeding grounds. Singaravelan and Marimuthu (2003b) report that tree cutting on the Kardama Coffee Estate in the High Wavy Mountains may pose a threat to the habitat occupied by *Latidens* at that location.

It is likely that further colonies will be discovered during the course of subsequent field studies, especially as the area between the northernmost point of *Latidens*' current known range and the southernmost point offers similar habitat. In this event, the species would be known at more than five locations and would only continue to meet Criterion B1 of the Endangered classification if the taxon is regarded as severely fragmented. It is a moot point whether populations of *Latidens* are "severely fragmented" within the meaning of Annex 6, III: 8 of the Red List (Hilton-Taylor 2000). Whilst it may be said that "most individuals within (the) taxon are found in small and relatively isolated subpopulations", an inference may be drawn from reading Criterion C2a (of the Endangered category) that a subpopulation is not "small" if it exceeds 250 individuals. The same Criterion states that a taxon may not be "severely fragmented" if any subpopulation is estimated to exceed that number (250); the population at Nagapodigai Cave is estimated at no fewer than 350 individuals and a similar number of individuals may exist in another cave roost in the High Wavy Mountains (Singaravelan & Marimuthu 2003b). If further populations are found that bring the total number of known locations to more than five and the taxon is not considered to be severely fragmented at that time, *Latidens* would not meet the criteria for an Endangered classification but would meet the current criteria for a classification of Vulnerable under Criteria B1 and B2c, C2a, and D1 and/or D2 (*q.v.*).

It is suggested here that, at the appropriate time², *Latidens salimalii* be reclassified as Endangered on the ground that the taxon no longer meets any of the criteria of the Critically Endangered classification but that it does satisfy Criteria B1 and B2c of the Endangered classification.

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² Annex 6, II: 13 of the 2000 IUCN Red List of Threatened Species (Hilton-Taylor 2000) states that: "A taxon may be moved from a category of higher threat to a category of lower threat if none of the criteria of the higher category has been met for five years or more".

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Samenvatting

Een herwaardering van de IUCN-status van *Latidens salimalii* (Chiroptera: Pteropodidae), gebaseerd op nieuwe gegevens uit de Westelijke Ghats, India

India, staat op de Rode Lijst van de IUCN vermeld als 'Critically Endangered'. Deze classificatie is gebaseerd op de vondst van zeven individuen in de High Wavy Mountains (Tamil Nadu, India) in 1996. Recente vondsten van de soort in de westelijke Ghats laten echter zien dat de huidige aantallen en het verspreidingsgebied groter zijn dan voorheen werd aangenomen. De auteurs stellen daarom voor de IUCN-status van *Latidens salimalii* te wijzigen in 'Endangered'. Naast aantals- en verspreidingsgegevens presenteert het artikel gegevens over de voedselkeuze en de reproductieve status van de gevonden dieren.

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