



AMBIENT APPRAISAL

First Authentic Report of Salim Ali's Fruit Bat (*Latidens salimalii*) and its Range Extinction Record in Kerala State of Southern Western Ghats

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Study area: Munnar, Kerala

Coordinate: 10°10'96"N; 76°97'79"E

Introduction:

Salim Ali's Fruit Bat (*Latidens salimalii* Thonglongya, 1972) is the only species in the genus *Latidens*, and this bat considered as one of the three rarest bats of the world. Salim Ali's fruit bat is endemic, endangered by the IUCN (Molur & Vanitharani, 2008) to South India and only fruit bat to protected under Schedule-I of the Indian Wildlife Protection Act, 1972. The first specimen collected by Angus Hutton (1948) from the High Wavy Mountains in the Western Ghats of the Theni district. This species was previously reported only from the state Tamil Nadu side of Western Ghats. The extent of occurrence of this species is 101-5,000 km², and the area of occupancy is 501-2,000 km² (Molur *et al.*, 2002).

Methodology:

The study was conducted through direct field survey and roost survey in consecutive three seasons (Summer-February to May; Monsoon-June to November and Winter-December & January) in the Munnar landscape of Southern Western Ghats in Kerala state. The study area administratively divided into two forest division Mankulam forest division and Malayattoor forest division. Handling and Measurement of bats were done with full care especially while handling the captured bats for morphological measurements. Immediately after taking, external measurements based on identification keys (Bates & Harrison 1997; Srinivasulu, 2010) the bats were released. The vegetation of the study area is mid-elevation tropical forest and wet evergreen forest. The fragmented landscape is converted to an agricultural landscape dominated by tea plantations and shade-grown coffee plantations, rubber plantations, mixture plantation, streams, and riverine vegetation. The boundary of the study area are Eravikulam

Abstract

The total population in Kerala was seen to be 250 to 300 individuals for Salim Ali's Fruit Bat which belongs to two permanent roosts, eight seasonally roosts, and they are using 44 resting feeding roosts in a different part of High Range Mountain Munnar landscape. The elevation ranges from approximately 800–1600 m, currently distribution the range of *Latidens salimalii* Thonglongya, 1972 extends only Southern Western Ghats of Kerala and Tamil Nadu.

National Park, Vazhachal Reserve Forest and Munnar Wildlife Division, Munnar Territorial division and Nerimangalam Forest division.

Observations:

New records: Salim Ali's Fruit Bat (*Latidens salimalii* Thonglongya, 1972) in the High Range Mountains of Munnar Landscape. The total population of *L. salimalii* in Munnar landscape is of 250 to 300, the individuals are belonging to two permanent roosts, 7 seasonal roosts, 44 resting or feeding roosts. *Latidens* morphology of skull and wing: individuals are easy to identify using morphology of skull and wing. The teeth and skull are the morphological indicators, the following measurement is the standard morphology of the skull and wing of the species.

Taxonomic description:

Table 1: Measurement of external morphology and bodyweight of *Latidens salimalii* (measurements in mm; Mean±SD)

Body Wt. (g)	Forearm	Tibia	Ear	Foot
Adult Male ♂ Total length; Foot Head to body: 114.4±6.58				
69±1.225 g	70.55±1.778	32.8±0.837	17±0.707	13.6±1.517
Adult Female ♀ Total length; Foot Head to body: 113.2±4.087				
73.8±3.66 g	17.6±2.302	34.8±2.168	17.8±1.304	13.4±1.14

Table 2: Cranial measurement of the (*Latidens salimalii*)

SZE	GTL	CCL	BB	ZB	MSW	PSW	TH	UG
8.9	32.5	31.3	14.2	20.1	7.6	14.2	11.7	33

SZE: sum of the natural longs of condylo-canine length, zygomatic breadth and temporal height. **GTL:** Greatest Skull Length. **CCL:** Condylo-Canine Length. **BB:** Breadth of Brain. **ZB:** Zygomatic Breadth. **MSW:** Minimum Skull Width. **PSW:** Posterior Skull Width. **TH:** Temporal Height. **UC:** Upper Canine.

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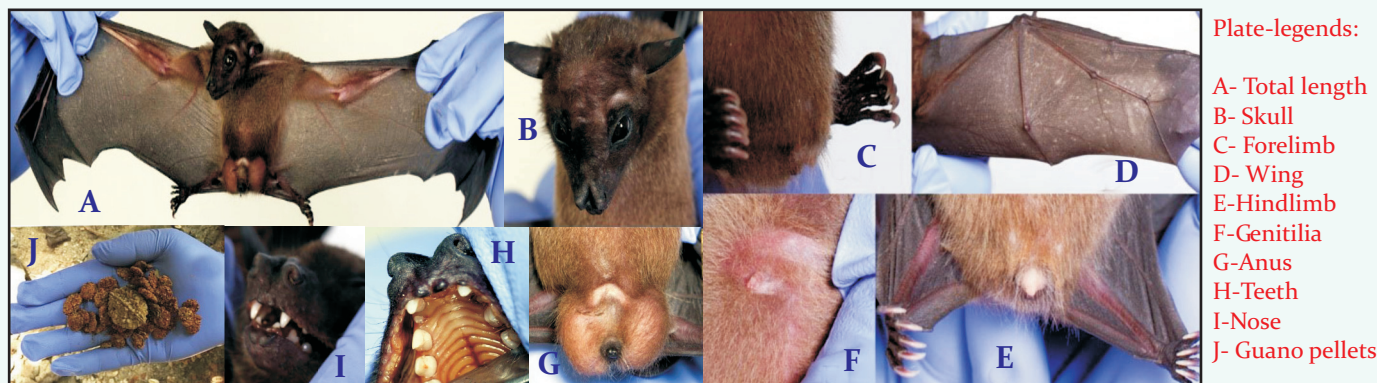


Plate-legends:

- A- Total length
- B- Skull
- C- Forelimb
- D- Wing
- E- Hindlimb
- F- Genitalia
- G- Anus
- H- Teeth
- I- Nose
- J- Guano pellets

Table 3: Body mass and wing dimension of *Latidens salimalii*

Body Mass: 0.068 ± 0.001 kg; Wing Span: 0.449 ± 0.02 m; Wing area: 0.0312 ± 0.04 m²; Aspect ratio: 6.46 ± 0.4 ; Tip length ratio: 1.02 ± 0.02 ; Tip area ratio: 0.67 ± 0.01 ; Tip shape index: 2 ± 0.03 ; Wing loading: 21.5 ± 1.5 Mg/S (Nm²); Wing loading index $M^{2/3}/S$: 5035 ± 0.036 (Values: Mean $\pm$ SD)

The new records of Salim Ali's Fruit Bat from Mankulam forest division and Malayattoor forest division. Two permanent day roost (Pakshipara cave and Ranikallu cave) The roost caves are situated in high elevated evergreen forest in the Mankulam forest division. The six different seasonal day roost reported in three different habitats (riparian evergreen forest, evergreen forest, and agriculture land). One seasonal day roost is situated in the evergreen forest of Malayattoor forest division.

Details of Salim Ali's Fruit Bat (*Latidens salimalii*) Permanent roost, Seasonal day roost and Feeding night roost in the study area.

Table-3: Information about Roost Locations of *Latidens salimalii*

Sl. No	Type of roost	Location (GPS)		Elevation
1	Permanent day roosts	10.15078	76.97575	1356m
2	Permanent day roosts	10.10962	76.97786	1422m
3	Seasonal day roosts	10.11062	76.93597	863m
4	Seasonal day roosts	10.1296	76.9739	1023m
5	Seasonal day roosts	10.13408	76.977	803m
6	Seasonal day roosts	10.16666	76.94218	1112m
7	Seasonal day roosts	10.13734	76.9821	1087m
8	Seasonal day roosts	10.14335	76.97614	912m
9	Seasonal day roosts	10.14265	76.97723	1099m
10	Feeding night roost	10.14265	76.97798	730m
11	Feeding night roost	10.14025	76.97514	732m
12	Feeding night roost	10.12952	76.97421	909m
13	Feeding night roost	10.12969	76.97425	915m
14	Feeding night roost	10.1302	76.9748	870m
15	Feeding night roost	11.51497	76.93596	960m
16	Feeding night roost	10.16856	76.93922	813m
17	Feeding night roost	10.15846	76.94008	844m
18	Feeding night roost	10.16363	76.93422	927m
19	Feeding night roost	10.14435	76.97628	1052m
20	Feeding night roost	10.14317	76.97586	1061m
21	Feeding night roost	10.13728	76.97746	1055m
22	Feeding night roost	10.13606	76.97625	718m
23	Feeding night roost	10.16363	76.98999	718m

24	Feeding night roost	10.1216	76.98733	733m
25	Feeding night roost	10.12169	76.12115	834m
26	Feeding night roost	10.12096	76.98355	922m
27	Feeding night roost	10.12085	76.98231	1139,
28	Feeding night roost	10.12126	76.98092	1109m
29	Feeding night roost	10.12146	76.98003	883m
30	Feeding night roost	10.12138	76.98003	850m
31	Feeding night roost	10.12138	76.97924	937m
32	Feeding night roost	10.12126	76.97831	857m
33	Feeding night roost	10.12066	76.97754	840m
34	Feeding night roost	10.12011	76.97695	827m
35	Feeding night roost	10.11916	76.97487	805km
36	Feeding night roost	10.12041	76.97483	794m
37	Feeding night roost	10.16609	76.97453	794m
38	Feeding night roost	10.11017	76.97812	793m
39	Feeding night roost	10.11416	76.97553	789m
40	Feeding night roost	10.11503	76.97494	803m
41	Feeding night roost	10.11538	76.97494	808m
42	Feeding night roost	10.11597	76.97483	849m
43	Feeding night roost	10.11639	76.97473	844m
44	Feeding night roost	10.11995	76.93366	918m
45	Feeding night roost	10.11101	76.93599	1377m
46	Feeding night roost	10.16609	76.92578	1040m
47	Feeding night roost	10.1669	76.92335	974m
48	Feeding night roost	10.11958	76.97421	964m
49	Feeding night roost	10.12788	76.97705	944m
50	Feeding night roost	10.12951	76.97498	932m
51	Feeding night roost	10.12309	76.97478	944m
52	Feeding night roost	10.12132	76.95949	713m
53	Feeding night roost	10.10247	76.97095	809m

Discussion:

The previously reported locations were in few areas - Kalakkad Mundunthurai Tiger Reserve (KMTR) Tamil Nadu (Ghosh *et al.*, 1999) Kardana Coffee Estate, Meghamalai Tamil Nadu, the High Wavy Mountains in Tamil Nadu (Molur *et al.*, 2002; Vanitharani *et al.*, 2004, 2005) and reported via mist net captured two individuals in Anamalai Hills, Tamil Nadu (Worledy *et al.*, 2016). However, two unconfirmed reports from the Southern Western Ghats, the first report from Periyar Tiger Reserve in Kerala (Molur *et al.*, 2002) and second unconfirmed report from Uppinangadi in Karnataka, which was described as unverified by Molur & Vanitharani (2008), the Munnar landscape permanent roosting location identification was strenuous. The permanent roost

identified by the help of the Muthuvan tribal community. The tribal communities are familiar with nearby forest areas, their searching and tracking talents were used to identify the Salim Ali's Fruit Bat's permanent roosting sites (caves). During the field survey, we found 44 resting or feeding roosts in nearby the permanent and temporary roost. The two permanent roosts were found in high elevation (1422m, 1356m) compared to temporary roosts, it has been found in montane tropical evergreen forest and coffee and cardamom plantations (Molur *et al.*, 2002; Vanitharani *et al.*, 2004). Ranikallu cave is 1232m elevation, and the Eravikulam Pakshipara cave is 1356m elevation. This roosting cave species was found at altitudes of 800–1,100 m and estimated to occupy an area of about 1,100 km based on the location of known roosts (Vanitharani *et al.*, 2004, Molur & Vanitharani, 2008). The Two seasonal roosts found in the agricultural area but not inside the agriculture land. It's the fringes of the forest and nearby streams hide from the agriculture land. Two of the locations are on private lands, where the forest fragments are not legally protected, although the imminent destruction of these forests was unlikely. Despite being reported as roosting in colonies of hundreds (Vanitharani *et al.*, 2004; Molur & Vanitharani 2008), the temporary roost was an open cave and some of the caves are hidden from the humans. The highest number population counted in the Eravikulam Pakshipara cave was 165 individuals rely on direct citing. The second-largest population in the Eravikulam Pakshipara cave was 120 individuals count indirect citing. The two caves are a permanent cave, and these are the highest elevation cave in the study area. The forearm measurements (68.3–69.8 mm) were similar to those recorded for this species in the High Wavy Mountains (Bates & Harrison 1997; Srinivasulu *et al.*, 2010)

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