Occurrence of the Madras Tree Shrew *Anathana ellioti* (Waterhouse) (Scandentia: Tupaiidae) in the Biligirirangan Hills, Karnataka, India

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The Madras Tree Shrew *Anathana ellioti* (Waterhouse 1850), also referred to as the Indian Tree Shrew, is a small mammal belonging to the order Scandentia, and is endemic to peninsular India. It is distributed "both in the dry and moist deciduous forests of peninsular India, south of the Ganges" (Prater 1971), to Bihar in the east, and the Satpuras in the west, up to an altitude of 1400m ASL (Menon 2003). Tree Shrews are small mammals native to tropical forests of South and South-East Asia and constitute two families (*Tupaiidae* and *Ptilocercidae)* under the Order *Scandentia* (IUCN 1995). Their earlier classification under *Insectivora* is no longer viable and the creation of a separate order is supported by recent molecular evidence (Schmitz et al. 2000). They are closely related to primates and form one of the four superordinal clades along with rodents, primates and flying lemurs (Murphy et al. 2001). *Scandentia* along with *Lagomorpha* form the cohort *Glires*, a sister group of primates (Schmitz et al. 2000). The genus *Anathana* is monotypic with *A. ellioti* being the only species in this genus.

More detailed information on the distribution of this species in India is mostly in the form of short notes on sight records (e.g. George 1989; Shrivastava 1995; Gupta 1996, Pradhan 1997). Karthikeyan (1992) presents the results of a detailed study of the species in Yercaud and summarises the distribution of the species from various locations in the following states: Andhra Pradesh, Kerala, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Uttar Pradesh (near Monghyr) and Tamil Nadu (Fig. 1). The species has so far not been recorded from the state of Karnataka. Molur et al. (2005) show a record from southern Karnataka; however, no details of any published information from the state are included. The sightings of *A. ellioti* from Yercaud (Karthikeyan 1992) are geographically the most proximate sightings of the species from BR Hills.

Information on the ecology and activity patterns of this species is scanty, with only one relatively detailed study from Yercaud, Tamil Nadu (Karthikeyan 1992, 2001). Current threats to this species across its range have been identified as habitat loss due to plantations, denudation for agriculture, small-scale logging and clear-cutting, in addition to mortality due to road kills, hunting and local harvest for medicinal use (Karthikeyan 1992 & Molur et al. 2005). The IUCN Red Data List classifies it as Near Threatened (NT), with "major threats affecting its habitat and/or population."

Over the past four years, several observers have sighted this species from the Biligiri Rangaswamy Temple Wildlife Sanctuary (BRTWLS), or BR Hills (77°-77°16'E & 11°47'-12°9'N, 540km²) in Chamarajanagar district, southern Karnataka. BR Hills consists of roughly four parallel hill ranges (600m to 1816m ASL) running north-south, and supports several vegetation types – moist and dry deciduous forest (61.1%), scrub (28.2%), grassland (3.4%), evergreen forest (6.1%), and shola (0.8%) (Ramesh 1989). These records represent the first reports of the sighting of this species in BR Hills, and possibly Karnataka, and a significant range extension of the Madras Tree Shrew. A previous faunal survey of the area (Srinivasa et al. 1997) did not report the species. RC Morris, a coffee-planter and estate owner in BR Hills in the mid 1900s with a keen interest in natural history, and several articles on the wildlife of the area in the Journal of the Bombay Natural History Society also did not report the presence of the tree shrew. Interviews with some members of the local *Sholaga* tribe indicated that they do not possess any traditional knowledge of this species, although this needs to be more formally investigated. Details of the sightings (in chronological order) are provided in Table 1. Photographs of three individuals by the authors corresponding to sighting number 5, 6 and 9 (Table 1) are presented (Images 1, 2 & 3) The location of these sightings are separated by a distance of at least 3km.

The first sighting was from Basavanakadu in 2003. Subsequently frequent trips were undertaken to this area

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Table 1: Sighting details of Madras Tree Shrew *Anathana ellioti* from BR Hills, Karnataka

Sl.	Date	Time	Location	Habitat	Altitude	No.	Observers
01	01/06/2003	c.10.00am	Basavanakadu	*Lantana* in DDF	c.1000m	01	US, PNS
02	16/01/2004	c.11.45am	Basavanakadu	Stream-bed, DDF	c.1000m	01	LS, PNS
03	31/01/2004	c.11.45am	Basavanakadu	Stream-bed, DDF	c.1000m	02	PNS,US
04	18/06/2006	c.05.15pm	Malki Betta	DDF/Grassland	c.1300m	01	US
05	09/10/2006	c.11.00am	Yemmegadde Pala*	*Lantana* in DDF	c.1000m	01	KV
06	10/12/2006	c. 10.00am	K Gudi*	MDF	c.1100m	01	SV
07	21/12/2006	c.08.30am	Durgur road	MDF	c.1100m	02	SK
08	25/02/2007	c. 3.00pm	Hosaholla	*Lantana* in DDF	c.1200m	01	US
09	24/09/2008	c. 8.30 am	Durgur Road	MDF	c.1100m	01	DM, GC, PNS, PR, Th

DDF - Dry Deciduous Forest; MDF - Moist Deciduous Forest; DM - Dilan Mandanna; GC - Giri Cavale; KV - Kalyan Varma; LS - L. Shyamal; PNS - Prashanth N.S.; PR - Philip Ross; SK - S. Karthikeyan; SV - Sainath Vellal; Th - Thapa; US - Umesh Srinivasan)
* Photographs by Kalyan Varma; Sainath Vellal **No.** refers to the number of individuals of the species sighted; details of time of sighting and altitude of location are approximate.

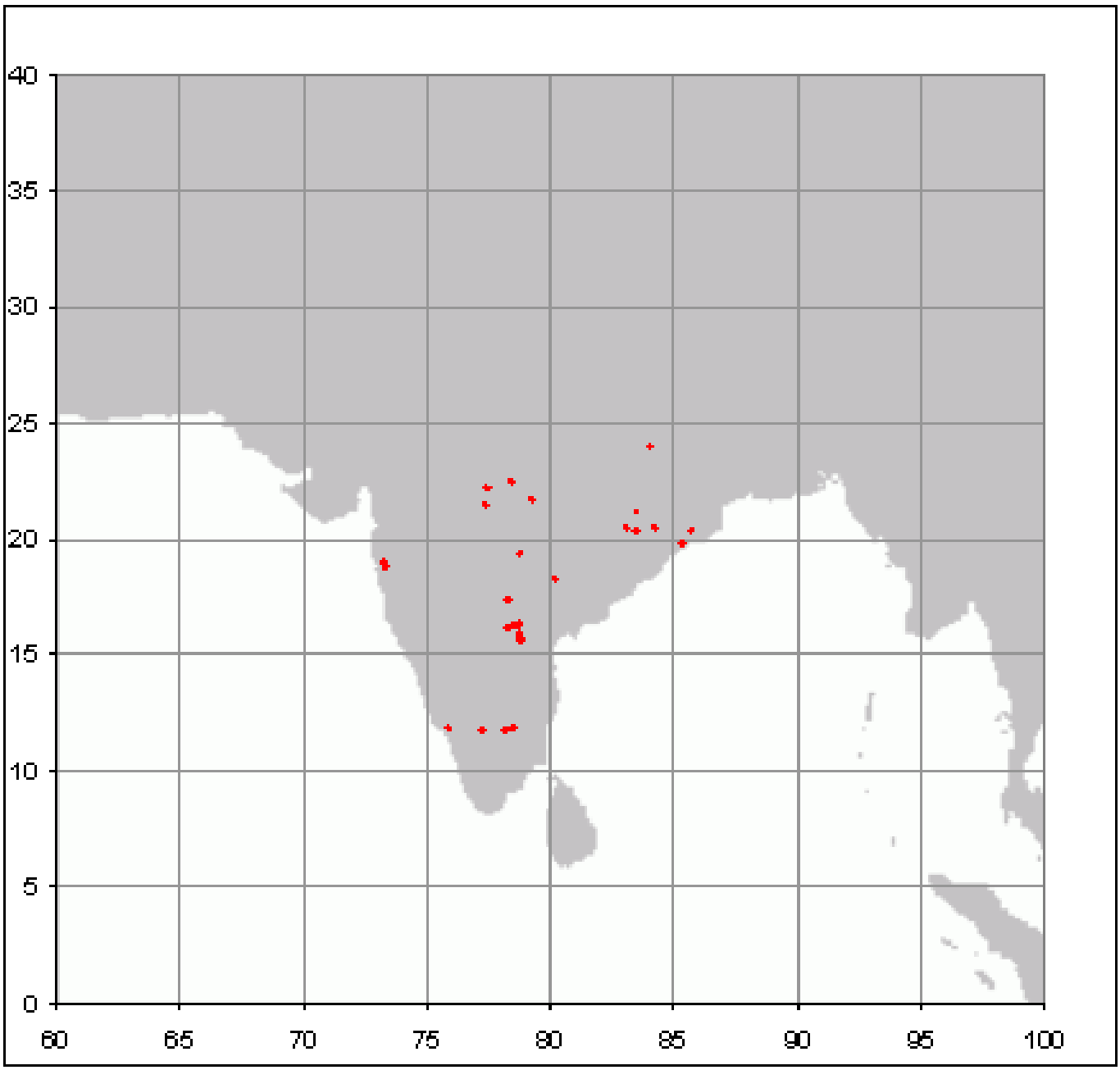

Figure 1. Current distribution of the Madras Tree Shrew *Anathana ellioti*.
Based on published records in George (1989), Shrivastava (1995), Pradhan (1997), Tiwari et al. (2002), Srinivasulu et al. (2004) and Chakraborty (2005).

Image 1. Madras Tree Shrew *Anathana ellioti* at Yemmegaddepala, BR Hills on 09.x.2006.

Image 2. Madras Tree Shrew *Anathana ellioti* coming down a *Terminalia* tree at K Gudi, BR Hills on 10.xii.2006.

Image 3. Madras Tree Shrew *Anathana ellioti* seen foraging under the bark of a dead tree bark at Durgur Road, BR Hills on 24.ix.2008.

resulting in two further sightings in 2004. In 2006, a photo of the species was obtained further south, leading to subsequent sightings (No. 6, 7, 8 & 9) around that area. Apart from sightings 3 & 9, where there was a special effort undertaken to look for the species, all others were opportunistic in nature. The present sightings are clustered in two areas in the sanctuary – one cluster around the BR Hills settlement (Nos. 1-4) and another around K Gudi (Nos. 5-9) (Fig. 2). This is perhaps because of the opportunistic nature of the sightings and lack of a systematic survey for the species.

On most occasions, individual(s) were sighted on the ground for brief periods of time, and apart from identifying the species, additional observations could not be made. Sighting numbers 01 and 05 were of single individuals crossing the BR Hills-Chamarajanagar main road. Identification was based on the squirrel-like body shape with a long pointed snout, russet-brown colour with grayish fore-parts, and absence of stripes. Photographic evidence (Image 1) was first obtained from Yemmegadde Pala and subsequently from K Gudi (Image 2) and Durgur Road (Image 3). Sighting number 07 was of two individuals. One of them was seen up a *Terminalia* tree, approximately 5-6 feet from the ground, exploring a cavity in the tree trunk. While one individual quickly got down to the ground and disappeared into the undergrowth, the other lingered on the tree for about a minute or so basking in the early morning winter sun before following suit. The latest sighting (number 09, Image 3) was for about 5 min. Although the animal was seen actively moving about between *Terminalia* trees, it was never seen climbing any of them. It moved quickly, never staying still at any location, actively foraging under the leaf litter and peeling the bark off a dead tree trunk with its forelimbs.

The above nine observations of the species and the photographs indicate the presence of the species in BR Hills, raising the possibility of its presence in the contiguous hill ranges which share similar habitat features. The MM Hills Reserve Forest situated between Yercaud and BR Hills is likely to be a potential habitat. Although, direct contiguity is only through a few surviving forest fragments in and around Perumbalai, Thoppur and Bommiampetti, the presence of the species in BR Hills raises the possibility of the species in MM Hills Reserve Forest and the other contiguous forest areas - Bandipur, Cauvery Wildlife Sanctuary and MM Hills Reserve Forests of Karnataka and the Satyamangalam range in Tamil Nadu. The species is yet to be reported from these areas.

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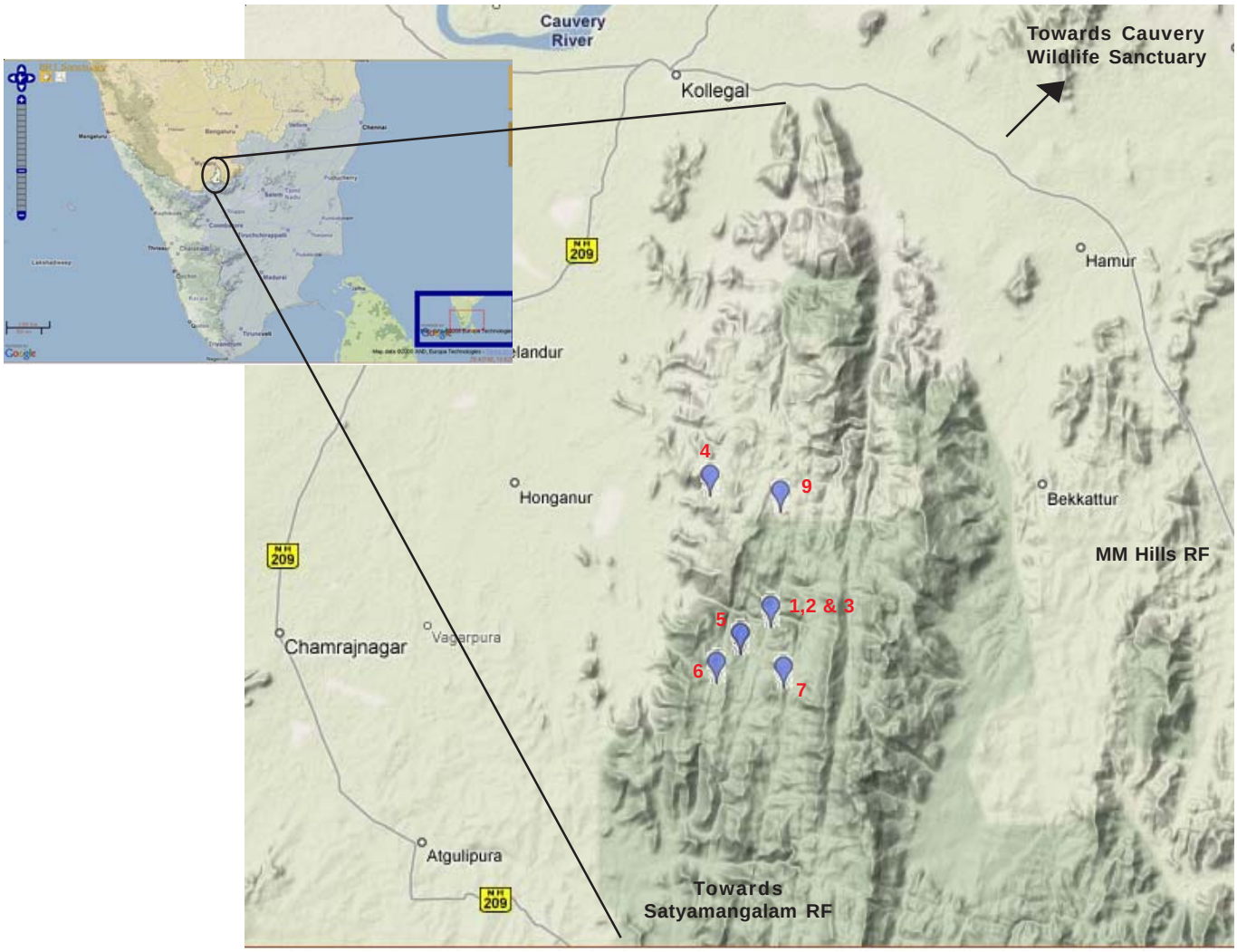

Figure 2. Locations of sightings of Madras Tree Shrew *Anathana ellioti* in BR Hills. The numbers refer to the sighting locations in Table 1. Inset shows the location of BR Hills in southern India.
Map credits: Google Maps through India Biodiversity Portal (http://indiabiodiversityportal.org)

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