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# Tupaia glis (Diard, 1820) in Bangladesh<sup>1</sup> (Mammalia: Scandentia: Tupaiidae)

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# Abstract

Discussed is the distribution and taxonomic classification of tree-shrews, Tupaia glis, in Bangladesh. A small series of specimens identified as T. g. assamensis has been taken from central Bangladesh, representing the westernmost range extension into the lower Ganges-Brahmaputra plain. Field observations on reproduction and number of teats agree with the findings of previous authors.

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# Introduction

The distribution of many mammal species has been recorded for Bangladesh recently, however their taxonomic status is poorly understood and little is known about their biology. There is little doubt that many species will become extinct or endangered in this part of Asia due to the pressure on natural areas by the increase of human population and their need for further agricultural areas.

The famous "Zoological Survey of India, Burma, and Ceylon" during the first quarter of this century did not collect in any area now included in Bangladesh. Today this is highly regrettable in view of the widespread destruction of original habitat and disappearance of wild life.

The authors collected small mammals within the framework of the Bangladesh German Plant Protection Programme administered through the Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH, Fed. Rep. of Germany. Specimens of tree-shrews have been taken from an area in central Bangladesh, representing possibly the only ones in a museum collection from that part of Asia.

# Tupaia glis assamensis Wroughton, 1921

- 1921 Tupaia belangeri assamensis Wroughton, J. Bombay nat. Hist. Soc. 27, 599; Mokokchung, Naga Hills, Assam.
- 1922 *Tupaia belangeri versurae* Thomas, J. Bombay nat. Hist. Soc. 28, 428; Dening, Mishmi Hills, N-Assam.
- 1969 Anathana ellioti, -- MOUNTFORT, Vanishing jungle, 238, 254; Kalinga (Tarap Hill) Forest Reserve, S-Sylhet, Bangladesh.

#### Material

Jalchatra, 24.38.N.–90.04.E., Thana Madhupur, Tangail Distr., 25.II., 17.–18.III., 14.IV.1981; 2∂∂ 2♀♀ (4 skulls, 4 skins) SMF 59045-8, leg. NELSON, leg. D. KOCK and H. POSAMENTIER, from degraded Sal forest along cultivations. Talkimadh near Jalchatra, 5.V.1981; ♀ (skull, skin) SMF 59049, leg. GABLER and NELSON.

#### Measurements (in mm)

HB ở 164–165, n2: 165; HB  $\heartsuit$  157–174, n3: 168; tail ở 160–162, n2: 161; tail  $\heartsuit$  165–170, n2: 168; hf ở 41–41.8; n2: 41.4; hf  $\heartsuit$  39.5-42, n3: 40.7; ear ở 14–16, n2: 15; ear  $\heartsuit$  15–16.7, n3: 15.7.

Weight (in g): 8 n1: 150; 9 128-141, n2: 135.

*Skull* (in mm): greatest lgth. of skull 46.35–49.0, n5: 47.4; occipit.-nasal lgth. 44.2–46.7, n5: 45.3; condylo-bas. lgth. 43.45–45.6, n5: 44.2; palatinum lgth. to front of I<sup>1</sup> alveola 23.1–24.3, n4: 23.6; mastoid br. 16.7–17.6, n5: 17.3; br. of braincase 18.5–19.1, n5: 18.8; zygomatic br. 23.2–24.95, n5: 23.8; upper toothrow lgth. 23.6–25.0, n5: 24.2; C<sup>1</sup>–C<sup>1</sup> alveol. br. 3.7–4.2, n5: 4.0; M<sup>2</sup>–M<sup>2</sup> crown br. 14.9–15.5, n5: 15.2; interorbit. br. 12.6–13.1, n5: 12.8; postorbit. br. 14.8–15.8, n5: 15.4; mandible lgth. angular 32.0–34.0, n5: 32.5; mandible lgth. condylar 30.9–33.0, n5: 31.8; lower toothrow lgth. 22.5–23.3, n5: 23.0; M<sup>1</sup>–M<sup>3</sup> lgth. 8.15–8.9, n5: 8.4. Ratio condylo-bas. lgth. upper toothrow lgth. 54.1–56.4, n5: 54.9.

## Comparative material

*Tupaia glis ferruginea* Raffles, 1821 (loc. typ.: Bencoolen, Sumatra, Indonesia): Singapore; d (skull, skin) SMF 34706, leg. C.J.L.

*T. g. clarissa* Thomas, 1917 (loc. typ.: Bankacheon, Victoria Prov., Tenasserim, Burma): Tenasserim; S (skull, skin) SMF 4944 (exchanged in 1886 from Brit. Mus. sub *peguana* Lesson, 1842, loc. typ.: Pegu, Burma).

*T. n. nicobarica* (Zelebor, 1869) (loc. typ.: Great Nicobar, Nicobar Islds.): Northern part of Great Nicobar Isld., 23. VIII. 1959; ♀ (skull, skin) SMF 18243, leg. I. EIBL-EIBESFELDT.

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# Taxonomy

We consider the common and widely distributed tree-shrew of the S- and SE-Asian mainland to represent a single taxon, *T. glis*, as it was anticipated partially by BLYTH (1852, 1875) and THOMAS (1914) and considered as such by ELLERMAN and MORRISON-SCOTT (1951).

Although the present series has smaller average external and cranial measurements than *assamensis*, it is clearly larger than *lepcha* Thomas, 1922 (loc. typ.: Narbong nr. Darjeeling, West Bengal). The ratio of upper toothrow length to condylobasal length (compare AGRAWAL 1975: fig. 3) assigns this population sample to *assamensis*.

The specimens are speckled brownish olive dorsally, and have a brownish orange chest and dirty white venter; the shoulder streak is short, of ocraceous colour, but scarcely visible. One specimen (SMF 59049), taken in May, has a rufous suffusion dorsally, a short orange-brown shoulder streak and light rusty coloured underside. This specimen approaches the description by BLYTH (1852) of specimens identified as *belangeri* from Arrakan (see below). However the colouration of Bangladeshi specimens cannot be discussed at any length, because they are not representative for different seasons of the year and all age classes, both of which may effect variations in coat colour. Moreover colour variation in tree-shrews of this taxon from Manipur and Chindwin (ROONWAL 1950) does not agree convincingly with the one described by AGRAWAL (1975).

# Occurrence in Bangladesh

The geographical range of *T. glis* has been mapped several times including, more or less correctly, parts of Bangladesh even before any specimen was collected from this area (FIEDLER 1956: fig 5; CHIARELLI 1971: map 1; LEKAGUL and MCNEELY 1977: 7; ROONWAL and MOHNOT 1977: fig. 9). It is likely that all these range mappings are based on LYON (1913: 75, 125), who extrapolated from the documented records available to him (: 19).

# Known records

DE PONCINS (1935) observed an unidentified species of tree-shrew at Bungsipore, N-Sundarbans, during 1892; the field characters given exclude any confusion with a squirrel. However, the occurrence of tree-shrews has not yet been confirmed for the Bangladesh (HENDRICHS 1975) or Indian part of it (MUKHERJEE 1975; SANYAL 1983). KHAN (1982a) states tree-shrews to be absent from the Sundarbans. Definitely more field work is necessary to confirm the presence or absence of tree-shrews in the Sundarbans.

No tree-shrews were recorded in the first check-lists given by SIDDIQI (1961, 1969) for present day Bangladesh and by CHAUDHURY (1970) for the Chittagong Hill Tracts.

MOUNTFORT (1969: 238) observed "Indian tree-shrews" in the Kalinga (Tarap) Forest Reserve, S-Sylhet, 24.10.N.-91.37.E., and specified his observation (: 254) as "several *Anathana ellioti* seen". His observation is neither substantiated by a reference specimen nor likely in view of the distribution of *A. ellioti* within and restricted to forested hilly and mountainous areas of the Indian Peninsula (LYON 1913; ELLERMAN and MORRISON-SCOTT 1951; ROONWAL and MOHNOT 1977). As shown below, *T. glis* is the species found in the region where MOUNTFORT observed the tree-shrews considered to be *A. ellioti* (compare also comments by KHAN 1982a, b).

The nearest areas to Bangladesh from which *A. ellioti* (Waterhouse, 1850), endemic to India, has been recorded are the Kharakpur Hills, se. of Monghyr, Bihar (ANDERSON 1881) and Manbhum, West Bengal (WROUGHTON 1918). An approximately sketched range of *A. ellioti* is mapped by ROONWAL and MOHNOT (1977: fig. 9).

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# Tupaia glis in Bangladesh



Occurrence of *Tupaia glis* in Bangladesh and neighbouring regions. Dotted areas = forests; black squares = locality record; triangles = no precise locality; ? = occurrence doubtful. (Drawing: J. ALTMANN)

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Bangladesh, 1973), listing all mammals known or likely to occur in the country, does not include tree-shrews. Also HUSAIN (1974: 76), who commented on the uncritical fauna list by the Wild Life Preservation Order, did not mention tree-shrews. RASHID (1977) includes tree-shrews in general for the country, which may relate to MOUNTFORT's field observation discussed above.

KHAN (1980) record the occurrence of *T. glis* in the Cox's Bazar – Teknaf – Reju Reserved Forests and (KHAN 1982a) gave the range as follows: the Forest Divisions (= administrative units) of Jamalpur, Mymensingh, Chittagong, Chittagong Hill Tracts North and South, including but a few precise locality records, i.e. Jalchatra in Tangail Distr., Chunia Cottage in Madhupur National Park and Nhila Rest House in Cox's Bazar Forest Division.

Note: BLYTH (1852) recorded *T. belangeri* Wagner, 1841 (loc. typ.: Siriam nr. Rangoon, Burma) for neighbouring Arrakan, Burma, and from the same area JERDON (1874) and BLYTH (1875) later recorded *T. peguana* Lesson, 1842 (loc. typ. is identical with the senior objective synonym *belangeri*). Although this area was not represented in AGRAWAL'S (1975) samples, those specimens may be relevant for the subspecific classification of treeshrews from southern Bangladesh, which we do not assign to *assamensis* without having examined any specimen.

# Zoogeography

Bangladesh records enumerated above connect eastwards with assamensis in Tripura, India (formerly part of Assam, after being part of East Bengal, designated as Hill Tippera) recorded for the first time by AGRAWAL (1975) and AGRAWAL and BHATTACHARYYA (1977) and with assamensis in Meghalaya (e.g. BLYTH 1852; ANDERSON 1881; LYON 1913; AGRAWAL 1975). There are no records from NW-Bangladesh to connect with *lepcha* in E-Nepal, the northern parts of West Bengal, Darjeeling and the Bhutan Duars. This western subspecies of *T. glis* apparently connects with the main range of the species through the forest belt along the south side of the Himalayas, but not across the Brahmaputra Valley (the classical Valley of Assam) as shown by maps of LYON (1913: 75) and AGRAWAL (1975: fig. 1).

The population examined here probably originates from the east of a former course of the lower Brahmaputra, which changed its course to the present Jamuna River since 1773 (CHATTERJEE 1949; RASHID 1977). It may be assumed that T. glis extended its range subsequently as did *Presbytis pileatus* (Blyth, 1843) which is also represented by a relict population in Madhupur Jungle (GREEN 1978; AKONDA 1979; GITTINS 1980). The same may apply to the distribution of Nycticebus coucang bengalensis (Lacépède, 1800), recorded in Rungpore (= Rangpur, NW-Bangladesh) by BLYTH (1844) and at Dacca (JERDON 1874), although Rangpur is even west of the present Brahmaputra-Jamuna River. Another example is *Callosciurus pygerythrus blythi* (Tytler, 1854), originally discovered at Dacca and recently confirmed to occur in the districts of Jamalpur, Mymensingh and Tangail (POSAMENTIER and VAN ELSEN 1984), to the west of the former Brahmaputra. This is in contrast to the distribution pattern outlined for Vulpes bengalensis (Shaw, 1800) by KOCK and POSAMENTIER (1984) and the former occurrence of Axis axis (Erxleben, 1777) in Mymensingh (BLANFORD 1891; LYDEKKER 1898), now extinct in Madhupur Jungle, and finally the range extension of Millardia meltada (Gray, 1837) into Dacca region reported by Росне́ et al. (1982).

It is most likely that the range of T. glis has contracted during the last 50 years with a rapid reduction of the forests. This applies in particular to the central and northern parts of the country. The animals described here have been caught at the edge of a depauperated remnant forest (about 25 km<sup>2</sup>). It can be expected that this remnant and with it the relict population of T. glis will disappear within the next three decades.

# Field observations

Specimens were caught on or 1.5 m above the ground by life traps baited with tomato or banana (for same baits compare BLANFORD 1888, for similar ones HENDRICKSON 1954). Repeated trapping at the same spot did not yield additional specimens, indicating a low population density or territoriality by the species.

# Reproduction

The smallest  $\Im$  (HB 157, weight 128 g) was the only one gravid (18. III.); it carried two embryos of 45 mm crown-rump length. HENDRICKSON (1954) reported twins in six out of seven pregnancies. ROONWAL and MOHNOT (1977) summarizing available data, give one young at birth for northern populations, but 1–3 for those of the Malay Peninsula.

All  $\Im$  collected in Madhupur Jungle have three pairs of mammae (one each postaxillary, laterally, preinguinally). LYON (1913: sub *belangeri* and *chinensis*) noted 25  $\Im$  out of 28 with three pairs of mammae in northern populations of *T. glis*, whereas 100 % of *ferruginea*- $\Im$  in southern populations had two pairs only (see also MARTIN 1968). Since the Madhupur population is a northern one these findings agree with previous ones.

#### Zusammenfassung

#### Tupaia glis in Bangladesh

Fünf *T. glis* aus dem Madhupur Jungle, Bangladesh, werden der Subspecies *assamensis* Wroughton, 1921, zugeordnet; das Vorkommen im Land wird zusammengestellt und vergleichend zoogeographisch diskutiert. Feststellungen aus dem Freiland zur Fortpflanzung und Zahl der Milchdrüsen weichen nicht von bekannten Daten ab.

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