CHAPTER-IV

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RESULTS

4.1 Distribution pattern of bats in Baksa District

The survey in Baksa district yielded the occurrence of 13 species of bats in 44 localities. Most of the captures were made in the areas near human habitations. However, two species i.e., *Myotis horsfieldii* and *Pipistrellus javanicus* were found in interior forests (Table 4.1)

Table 4.A: Locality records of bat species in the study area

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Family</th>
<th>Species</th>
<th>Locality records</th>
<th>Observed roosting habitat</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pteropodidae</td>
<td><em>Pteropus giganteus</em> Brunnich, 1782</td>
<td>Balahati, Goreswar, Tamulpur</td>
<td>Large trees near human habitation</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td><em>Rousettus leschenaulti</em> (Desmarest, 1820)</td>
<td>Nagrijuli, Balahati, Goreswar,</td>
<td>Underneath Banana leaf</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td><em>Cynopterus sphinx</em> Vahl, 1797</td>
<td>Balahati Village, Salbari, Barangajuli, Masalpur, Tamulpur, Naokata, Suagpur, Nagrijuli</td>
<td>Underside of Banana leaves, Palm leaves</td>
</tr>
<tr>
<td>Sl. No.</td>
<td>Family</td>
<td>Species</td>
<td>Locality records</td>
<td>Observed roosting habitat</td>
</tr>
<tr>
<td>--------</td>
<td>----------------------</td>
<td>----------------------------------------</td>
<td>-------------------------------------------------------</td>
<td>---------------------------------------------------------------</td>
</tr>
<tr>
<td>4</td>
<td>Megadermatidae</td>
<td><em>Megaderma lyra</em> E. Geoffroy, 1810</td>
<td>Salbari, Bagamati, Balahati, Barangabari, Musalpur.</td>
<td>Abandoned house, caves</td>
</tr>
<tr>
<td>5</td>
<td>Emballonuridae</td>
<td><em>Saccolaimus saccolaimus</em> (Temminck, 1838)</td>
<td>Balahati</td>
<td>Crevices of date Palm, Coconut trees</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td><em>Taphozous longimanus</em> Hardwicke, 1825</td>
<td>Balahati</td>
<td>Crevices of Palm trees</td>
</tr>
<tr>
<td>7</td>
<td>Vespertilionidae</td>
<td><em>Scotophilus heathii</em> Horsefield, 1831</td>
<td>Goreswar, Balahati, Tamulpur, Salbari, Kumariakata, Bangalipara, Borbari bazaar.</td>
<td>In the crevics of bettle nut and coconut tree, houses</td>
</tr>
<tr>
<td>8</td>
<td></td>
<td><em>Scotophilus kuhlii</em> Leach, 1821</td>
<td>Balahati, Maharipara, Naokata, Tamulpur, Salbari, Baganpara, Kumariakata</td>
<td>In the crevics of bettle nut and coconut tree, houses</td>
</tr>
<tr>
<td>9</td>
<td></td>
<td><em>Pipistrellus tenuis</em> (Temminck, 1840)</td>
<td>Goreswar, Balahati, Tamulpur, Baganpara, Darangajuli, Ahitema</td>
<td>Inside bamboo holes in houses</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td><em>Pipistrellus coromandra</em> (Gray, 1838)</td>
<td>Balahati, Goreswar, Tamulpur, Bhalajhar, Darangajuli, Nayabasti, Kahitema, Salbari, Naokata</td>
<td>Commonly found inside bamboo holes in houses</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td><em>Pipistrellus javanicus</em> (Gray, 1838)</td>
<td>Bansbari, Barangabari</td>
<td>Crevices on the ceiling of abandoned housed away from human habitation</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td><em>Tylonycteris fulvida</em> (Gray, 1850)</td>
<td>Balahati</td>
<td>Internode of bamboo</td>
</tr>
<tr>
<td>13</td>
<td></td>
<td><em>Myotis horsfieldii</em> (Temminck, 1840)</td>
<td>Barangabari</td>
<td>Crevices between culverts over forest stream</td>
</tr>
</tbody>
</table>
Fig: 4.A Distribution of bat fauna in Baksa District of Assam

Figure 4.B Pie diagram showing the species diversity in % and the numbers within the brackets under each families of bats in the study area
4.2 Taxonomic account of the species

Order: Chiroptera

Suborder: Megachiroptera

Identification character observed:

Second finger bears a claw (except *Eonycteris*) and more or less dependent on third finger, noseleaf absent, visual orientation with large eyes, tragus absent in ears, tail absent in most cases, short rod like when present; premaxilla well developed but lacks palatal branch; postorbital process well developed.

Suborder Megachiroptera contains a single family Pteropodidae and two subfamilies. One subfamily namely Pteropodinae was represented in Baksa district.

Family: Pteropodidae

Subfamily: Pteropodinae

Tongue covered with well developed papillae, jaws short and powerful for feeding on ripe or hard fruit.

This subfamily was represented by three genera and three species in the study area

Keys to the Pteropodinae species in Baksa District was as follows-

1. Upper incisors 1-1, 5 upper post canine teeth on each side……..2
   Upper incisors 2-2, 4 upper post canine teeth on each side……..3

2. Tail absent, occipital region of skull elongated……………….*Pteropus giganteus*
   A short tail présent, occipital région not elongated ……….*Rousettus leschenaulti*

3. Postorbital foramen, large calcar présent…………………….*Cynopterus sphinx*
Genus: *Pteropus* Brisson, 1762

Medium to large-sized fruit bats and without a tail. Patagium arises from sides of dorsum and the back of the second toe. Uropatagium less developed. Second digit has a small claw. Two pairs of lower and upper incisors present. Among the four species in India, *Pteropus giganteus* occur in Assam and the study area.

1. *Pteropus giganteus* Brunnich, 1782


1825. *Pteropus medius* Temminck, Monogr. Mammal., 1: 176 (Calcutta, West Bengal and Pondicherry, India)


Common names: Indian Flying Fox

Type Locality: West Bengal (no particular locality), India


Diagnosis

Morphological features

1. The largest of all bats in mainland India, forearm length ranges 174.6 from 184.4 mm (Average 179.32.mm, Table – 4.1).

2. Long hairy muzzle with well developed nostrils
3. The first finger in the wing bears a large claw while the second one had a smaller one.

4. The fur was rufous brown around head and neck and orange across the upper back. Fur on the lower back is dark brown. The venter was of various shades of orange and brown.

5. No tail projecting out of the interfemoral membrane

Cranial characters

1. Skull was big with a greatest length of 77.6mm (Table-4.2)

2. The postorbital process well developed

3. Sagittal crest was weak.

4. Palate was long with well developed post-dental extension.

5. Tympanic bullae are represented by a simple bony ring on each side of the basiocciput.

Dental characters

1. The upper toothrow measures 28.68.mm. (Table-4.2)

2. Both the upper incisors were equal in size but the first lower incisor was smaller than the second.

3. The upper canine was huge with a well developed groove on the frontal surface. The second upper molar (m^2) and third lower molar (m_3) were greatly reduced.

Dental formula: i.2-2/2-2, c.1-1/1-1, pm.3-3/3-3, m.2-2/3-3 = 34
Results

Taxonomic measurements

**Table 4.1** External measurements of *P. giganteus* from Assam (Based on specimens in ZSI; observed in the field and specimens collected from the study area) in mm

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>Age &amp; sex</th>
<th>*Fa</th>
<th>*F &amp; CL</th>
<th>*Tb</th>
<th>*E</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS466</td>
<td>AF</td>
<td>179.6</td>
<td>57.8</td>
<td>86.6</td>
<td>35.8</td>
</tr>
<tr>
<td>Released</td>
<td>AM</td>
<td>184.4</td>
<td>58.3</td>
<td>83.2</td>
<td>34.38</td>
</tr>
<tr>
<td>Released</td>
<td>AF</td>
<td>174.6</td>
<td>59.7</td>
<td>86.5</td>
<td>35.9</td>
</tr>
<tr>
<td>Released</td>
<td>AF</td>
<td>179.5</td>
<td>60.02</td>
<td>87.04</td>
<td>34.06</td>
</tr>
<tr>
<td>ZSIS-9339</td>
<td>AF</td>
<td>180.4</td>
<td>58.32</td>
<td>85.3</td>
<td>34.7</td>
</tr>
<tr>
<td>ZSIS-9340</td>
<td>AF</td>
<td>179.8</td>
<td>57.22</td>
<td>84.06</td>
<td>35.62</td>
</tr>
<tr>
<td>ZSIS-9341</td>
<td>AF</td>
<td>180.02</td>
<td>60.02</td>
<td>86.52</td>
<td>35.8</td>
</tr>
<tr>
<td>ZSIS9342</td>
<td>AF</td>
<td>176.3</td>
<td>58.4</td>
<td>83.04</td>
<td>34.03</td>
</tr>
</tbody>
</table>

| Mean            | 179.32 | 58.72 | 85.28 | 35.036 |

* Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F &CL), Tail length (Tl).

**Table 4.2** Cranial measurements of *P. giganteus* from Assam in mm

<table>
<thead>
<tr>
<th>Registration no.</th>
<th>*GTL</th>
<th>*CB</th>
<th>*ZW</th>
<th>*PC</th>
<th>*BW</th>
<th>*C-M</th>
<th>*C’-C’</th>
<th>*M,M1</th>
<th>*CM</th>
<th>*M</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/AF466</td>
<td>77.6</td>
<td>73.82</td>
<td>41.72</td>
<td>9.23</td>
<td>24.32</td>
<td>28.65</td>
<td>13.8</td>
<td>18.1</td>
<td>33.2</td>
<td>58.4</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condylobasal length (CB), Anterior palatal width (C1-C1), Zygomatic Width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (CM), Mandibular tooth-row length (CM), Length of Mandible (M)

Distribution

**In India:** Widely distributed throughout mainland India and also in Andaman Islands (Bates and Harrison, 1997; Mason, 1908)

**In Assam** and study area: Present throughout the state in areas having suitable roosting trees and two roosting site at Tamulpur and Goreswar was observed(Figure-4.1) Boro et al, 2018 Some reported localities include Guwahati City, Palasbari, Kamrup District; Dalgaon, Darrang District;
Fig. 4.1: Distribution map of *Pteropus giganteus* (Brunnich, 1872) in Baksa district

Lakhimpur, Lakhimpur District; Mahuri Para, Baksa District; Rongjuli, Goalpara District; Bilasipara, Kacharighat, Dhubri District, Cachar, Cachar District; Golaghat, Golaghat District; Doom Dooma, Tinsukia District (Boro et al., 2018). In Baksa district it was observed in Goreswar, Tamulpur.

**Ecological note**

A large colony around 500 individuals was observed roosting on *Ficus bengalensis* at Nagrijuli area. Few of them could be observed selfgrooming but could not observe any social grooming. A common bat seen feeding in fruiting trees especially *Ziziphus mauritiana, Musa balbisiana* etc.

Conservation Status: **Least Concern (LC)**
Genus: *Rousettus* Gray, 1821

The genus consists of medium-sized fruit bats with a short tail. Muzzle was heavy and has deep emargination between the projecting nostrils. First digit bears a large claw and the second has a smaller claw. Males have well-developed glandular hairs on the throat than the females. Two pairs of lower and upper incisors present. A rudimentary form of echolocation developed. *Rousettus leschenaulti* occur in Assam and in the study area.

2 *Rousettus leschenaulti* (Desmarest, 1820)


**Common names:** Fulvous fruit bat

**Type Locality:** Pondicherry, India


**Diagnosis**

*Morphological features:*

1. A well-built bat with an average forearm length of 79.07mm (Table-4.3)

2. Muzzle short and nostrils separated by a deep groove. (Photo plate -- 8D)
3. Eyes large, ears simple without any whitish margin. (Photo plate -- 8C)

4. The pelage was soft and fulvous brown on the dorsum while the belly is paler brown. Sides of the body grey in males while it is uniform fulvous brown in females.(Photo plate- -- 8D)

**Cranial characters**

1. The skull had an average greatest length of length of 37.5 mm (Table- 4.4)

2. The rostrum was slender and the premaxillae project distinctly in front of nasals.

3. Compared to other fruit bats, sagittal crest is less developed and postorbital process was much shorter.

**Dental characters**

1. Average upper tooth row length of 14.1mm. (Table-4.40)

2. The upper incisors were small and conical with a small gap between the two pairs.

3. Upper canine was robust with a weak posterior basal cingulum. The lower incisors were sub equal and in contact with each other and the canine

**Dental formula:** i.2-2/2-2, c.1-1/1-1, pm.3-3/3-3, m.2-2/3-3 = 34

**Taxonomic measurements**

**Table 4.3** External measurements of *R.leschenaulti* from Assam and the study area

(Based on specimens at ZSIK and ZSIS) in mm.

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>Age &amp; sex</th>
<th>*Fa</th>
<th>*F &amp; CL</th>
<th>*Tb</th>
<th>*Er</th>
<th>*2ph3mt</th>
<th>*Tl</th>
<th>*3Mt</th>
<th>*4Mt</th>
<th>*5Mt</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/465</td>
<td>AM</td>
<td>79.8</td>
<td>19.9</td>
<td>39.6</td>
<td>18.9</td>
<td>45.2</td>
<td>13.3</td>
<td>55.6</td>
<td>54.8</td>
<td>52.0</td>
</tr>
<tr>
<td>V/M/ERS/467</td>
<td>AM</td>
<td>79.2</td>
<td>19.7</td>
<td>35.1</td>
<td>20.2</td>
<td>45.1</td>
<td>14.7</td>
<td>55.8</td>
<td>54.4</td>
<td>52.2</td>
</tr>
<tr>
<td>V/M/ERS/468</td>
<td>AM</td>
<td>78.3</td>
<td>19.1</td>
<td>36.6</td>
<td>17.9</td>
<td>44.89</td>
<td>15</td>
<td>54.98</td>
<td>54.1</td>
<td>51.9</td>
</tr>
<tr>
<td>ZSIK-25290</td>
<td>AM</td>
<td>79</td>
<td>19.5</td>
<td>38.4</td>
<td>18.2</td>
<td>45.32</td>
<td>14.6</td>
<td>55.4</td>
<td>54.3</td>
<td>52.3</td>
</tr>
<tr>
<td>Mean</td>
<td></td>
<td>79.07</td>
<td>19.55</td>
<td>37.42</td>
<td>18.8</td>
<td>45.12</td>
<td>14.4</td>
<td>55.44</td>
<td>54.4</td>
<td>52.1</td>
</tr>
</tbody>
</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tl), Tibia length (Tb), Length of the foot including claw (F &CL), Tail length (Tl), Metacarpal length (Ml), Metacarpal phalanx length (phmt)*
Table 4.4 Cranial measurements of *R. leschenaulti* from Assam and the study area; in mm.

<table>
<thead>
<tr>
<th>Registration no.</th>
<th><em>GTL</em></th>
<th><em>CB</em></th>
<th><em>CCL</em></th>
<th><em>ZW</em></th>
<th><em>PC</em></th>
<th><em>BW</em></th>
<th>*CM'</th>
<th><em>C1'-C1</em></th>
<th>*M3'-M3'</th>
<th><em>C-M3</em></th>
<th><em>M</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSIS-468</td>
<td>37.5</td>
<td>35.5</td>
<td>33.4</td>
<td>21.2</td>
<td>8.0</td>
<td>15.1</td>
<td>14.1</td>
<td>7.4</td>
<td>11.4</td>
<td>15.1</td>
<td>29.0</td>
</tr>
<tr>
<td>ZSIS-467</td>
<td>37.6</td>
<td>35.4</td>
<td>33.6</td>
<td>21.1</td>
<td>7.9</td>
<td>15.2</td>
<td>14.0</td>
<td>7.5</td>
<td>11.3</td>
<td>15.2</td>
<td>28.97</td>
</tr>
<tr>
<td>Average</td>
<td>37.55</td>
<td>35.45</td>
<td>33.5</td>
<td>21.15</td>
<td>7.95</td>
<td>15.15</td>
<td>14.05</td>
<td>7.45</td>
<td>11.35</td>
<td>15.15</td>
<td>28.98</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condylobasal length (CB), Condylecanine length (CCL), Anterior palatal width (C1'-C1'), Posterior palatal width (M3'-M3'), Zygomatic Width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (CM'), Mandibular tooth-row length (CM), Length of Mandible (M)

**Distribution**

**In India:** Jammu & Kashmir, Himachal Pradesh, Rajasthan, Gujarat, Maharashtra, Karnataka, Kerala, Tamilnadu, Andhra Pradesh, Orissa, Madhya Pradesh, Uttar Pradesh, Bihar, West Bengal, Sikkim, Arunachal Pradesh, Meghalaya, Tripura (Bates and Harrison, 1997)

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Fig. 4.2. Distributional map of *Rousettus leschenaulti* (Desmarest, 1820) in Baksa district
In Assam and study area: Kaziranga area, Golaghat District; Kherkheria, Darrang District; Kahitema, Manas National Park, Baksa district, (Sinha, 1999); Balahati, Baksa district (Figure-4.2) Boro et al. 2018.

Ecological note: The species were captured in the mist net. Three individuals were sighted under the tent of banana leaves. The occurrence was seem to be rare in the district.

Conservation Status: Least Concern (LC)

Genus: Cynopterus Cuvier, F., 1824

Ear has distinct anterior and posterior pale border. Distinct claw present on both of the first and second digits. The tail was short and half part projects out freely interfemoral membrane. In the skull the occipital region is short.

3 Cynopterus sphinx (Vahl, 1797)

1779, Vespertilio sphinx Vahl, Skrifter Naturh-Sesk Kiobenhavn 4:123 Tranquerbar, Madras, India.

1779, Vespertiliofibulatus Vahl, Skrifter Naturh-Sesk Kiobenhavn4:124 Tranquerbar, Madras, India.

1803, Pteropus pusillus Geoffroy, E. National d'Histoire Naturelle 49 India.

1810, Pteropus marginatus Geoffroy, E. Annales Mus. Hist.nat.paris15: 97 Bengal

1871, Cynopterus brachysoma Dobson Proceeding Asiat. Soc Bengal105: Andaman Islands. Bay of Bengal

1910, Cynopterus sphinx Andersen, Annals Mag. Nat. Hist.7: 623, Lucknow, India

Common name:- Short- nosed fruit bat.
**Type locality:** Tranquebar, Madras, India.

**Material examined:** V/M/ERS/AM316 Balahati, Baksa, A.R.Boro, 08/09/2012; V/M/ERS/AM315, Salbari, Baksa, 20/03/2013, A.R.Boro and realeased specimen.; ZSIS-AF433, Barmura gaon, Near Balipara, Sunitpur district, , 03/08/2017, U.Saikia.

**Diagnosis**

**Morphological features**

1. The wings arise from the flanks and therefore there was no narrowing of dorsal palage (Photo plate -- 8B)

2. The medial part of inter femoral membrane was hairy, above and below (Photo plate -- 8B)

3. The muzzle was short, broad and covered with hairs as far as the nostrils which projects well forwards (Photo plate -- 8B)

4. The ears were simple and essentially naked with well define anterior and posterior borders.(Photo plate -- 8A)

5. The baculum was characterized by its well developed, low shoulders and simple expanded tip.

**Cranial characters**

1. The rostrum was short and broad.

2. The zygomata were robust, evenly rounded off anteriorly.

3. The post orbital processes are well developed.

4. The braincase was ovoid with a weak sagital crest.

5. The supra occipital was vertical. It projects equally posteriorly with the lamboid crests.
6. The tympanic bullae were little developed.

7. The basioccipital region was broad.

8. The horizontal ramus of each half mandible was short and robust.

9. The coronoid process was rounded off below.

10. The mandible was heavily built and sharp.

**Dentition characters**

1. The first (i\(^2\)) and second (i\(^3\)) upper incisors were small, peg-like and situated close to one another in a straight line.

2. The upper canine was relatively broad with its tip recurved when unworn and had a secondary cusp on its inner side.

3. The cingulum was well developed postero-laterally.

4. The second premolar (pm\(^3\)) was equal in crown area to third (pm\(^4\)).

5. The lower canine had a well developed secondary cusp on its inner aspect.

6. The first lower premolar was larger than the upper premolar.

**Distribution**

**In India:** Jammu & Kasmir, Rajasthan, Gujarat, Maharastra, Karnataka, Gua, Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Madhya Pradesh, Utter Pradesh, Bihar, West Bengal, Assam, Arunachal Pradesh, Meghalaya, Tripura, Nagaland, Andaman Island, Nicobar Island

**In Assam** and in the study area: In our study area it was almost uniformly distributed throughout the district (Figure-4.3) Boro *et. al.*, 2014
### Table 4.5: External measurement of *Cynopterus sphinx* from the study area in mm

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>Age &amp; sex</th>
<th>*Fa</th>
<th>*F &amp; CL</th>
<th>*Tb</th>
<th>*Er</th>
<th>*Tl</th>
<th>*3Mt</th>
<th>*4Mt</th>
<th>*5Mt</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/316</td>
<td>AM</td>
<td>72.5</td>
<td>16</td>
<td>30</td>
<td>22.3</td>
<td>8.3</td>
<td>49.31</td>
<td>46.03</td>
<td>46.04</td>
</tr>
<tr>
<td>Released</td>
<td>AM</td>
<td>71.8</td>
<td>15.9</td>
<td>31.2</td>
<td>23</td>
<td>8</td>
<td>49.2</td>
<td>46.1</td>
<td>46.12</td>
</tr>
<tr>
<td>Released</td>
<td>AM</td>
<td>72</td>
<td>15.8</td>
<td>30.4</td>
<td>22.6</td>
<td>8.2</td>
<td>48.98</td>
<td>45.8</td>
<td>46.1</td>
</tr>
<tr>
<td>Released</td>
<td>AF</td>
<td>69.9</td>
<td>15.2</td>
<td>30</td>
<td>22.2</td>
<td>8.1</td>
<td>48.74</td>
<td>45.6</td>
<td>45.9</td>
</tr>
<tr>
<td>V/M/ERS/433</td>
<td>AF</td>
<td>74.76</td>
<td>13.42</td>
<td>27.53</td>
<td>18.43</td>
<td>7.70</td>
<td>49.33</td>
<td>46.01</td>
<td>47.05</td>
</tr>
<tr>
<td>V/M/ERS/315</td>
<td>AM</td>
<td>65.8</td>
<td>14.79</td>
<td>25.66</td>
<td>15.78</td>
<td>8.22</td>
<td>44.53</td>
<td>41.66</td>
<td>44.58</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>71.12</td>
<td>15.18</td>
<td>29.13</td>
<td>20.71</td>
<td>8.08</td>
<td>48.34</td>
<td>45.2</td>
<td>45.96</td>
</tr>
</tbody>
</table>

*(E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F & CL), Tail length (Tl), Metacarpal length (Mt).

### Table 4.6 Cranial measurement of *Cynopterus sphinx* from the study area in mm.

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>Age &amp; sex</th>
<th>*GTL</th>
<th>*CB</th>
<th>*ZW</th>
<th>*PC</th>
<th>*BW</th>
<th>*C-M1</th>
<th>*C-M2</th>
<th>*M</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSIS-316</td>
<td>AM</td>
<td>32.6</td>
<td>31.01</td>
<td>20.83</td>
<td>6.6</td>
<td>13.58</td>
<td>11.16</td>
<td>12.42</td>
<td>25.03</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condylobasal length (CB), Condylarcanine length (CCL), Anterior palatal width (C1-C5), Posterior palatal width (M1-M3), Zygomatic Width (ZW), Braincase width (BW), Postorbital constriction (PC), tooth-row length (CM), Length of Mandible (M).
Fig. 4.3 Distributional map of *Cynopterus sphinx* (Vahl, 1797) in Baksa district

**Ecological note:** Very commonly occurring species.

Conservation Status: **Least concern (LC)**
Suborder: Microchiroptera

Second finger did not bear a claw, noseleaf present in many species, eyes small and rely on acoustic mode of orientation, tragus present in the ears in many species, tail always present, enclosed in interfemoral membrane or free, postorbital process of cranium is reduced or absent, basically insectivorous a few are carnivorous and sanguivorous. This suborder consists of three families in the study area

Keys to the families of suborder Microchiroptera in Baksa district

1 Both noseleaf and tragus present………………………………… Megadermatidae

   Noseleaf absent but tragus present .....................................................2

2.a Half of the tail projected out of the interfemoral membrane

   ..................................................................................Emballonuridae

2b. Only the extreme tailtip projected out of the interfemoral membrane …

   ..................................................................................Vespertilionidae

Family: Megadermatidae

Long, leaf like noseleaf, large ears joined over forehead, tail absent, well developed interfemoral membrane present. In the skull, premaxilla absent and postorbital process rudimentary, upper incisors absent, large frontward projecting canines reflective of carnivorous habit.

The family was represented by single species in the study area i.e. Megaderma lyra

Genus 3: Megaderma E. Geoffroy, 1810

Generic characters same as above

4. Megaderma lyra E. Geoffroy, 1810

India)

1839. *Vespertilo carnatica* Elliot, Madras *J. Litt. Sci.*, 10: 96 (Dharwad district, Maharashtra, India)


**Common names:** Greater /Indian False Vampire Bat

Type Locality: Madras (Chennai), Tamil Nadu, India

Material examined: AM V/M/ERS/310, Tamulpur, Baksa Dist, Assam, Coll. A R Boro, 6.VI.13, ZSIK/AF20665, Guijan, Tinsukia, Assam, D.K. Ghosal, 14th Dec.1778,ZSIS-384(Skull only), Range office, Orang National Park, Uttam Saikia, 02nd Dec. 2017

**Diagnosis**

*Morphological features*

1. A large bat with an average for arm length of 66.84, significantly larger than congener *M spasma* (Table-4.7)

2. Ears were large, oval and joins just above the forehead (Photo plate – 10A)

3. The noseleaf was erect and straight sided (Photo plate – 10A)

4. The noseleaf was truncated on the posterior end and is diagnostic of this species. (Photo plate – 10B)
5. Tail was absent.

_Cranial characters_

1. Skull was robust with an average greatest length of 28.48. (Table-4.8) 

2. Supraorbital ridges were noticeable and gives rise to blunt postorbital process.

3. The basisphenoid pits were shallow

4. The tympanic bullae were of relatively smaller compared to the skull (Photo plate – 13A)

_Dental characters_

1. The first upper premolar was very small and covered by the expanded cingulum of the large second premolar.

2. The upper canine was strong with a distinct pointed internal basal cusp but no upper incisors were present

3. The lower incisors were tricuspidate and juxtaposed to lower canine.

_Dental formula: i. 0/4, c.1-1/1-1, pm.2-2/2-2, m.3-3/3-3 = 28_
Taxonomic measurements

Table 4.7 External measurements of *M. lyra* from study area (Based on ZSIS and field measurement; in mm)

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>Age &amp; sex</th>
<th>*Fa</th>
<th>*F&amp;CL</th>
<th>*Tb</th>
<th>*Er</th>
<th>*Tr</th>
<th>*3Mt</th>
<th>*4Mt</th>
<th>*5Mt</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/310</td>
<td>AM</td>
<td>66.74</td>
<td>17.78</td>
<td>34.98</td>
<td>31.54</td>
<td>13.24</td>
<td>48.4</td>
<td>53.92</td>
<td>57.54</td>
</tr>
<tr>
<td>Released</td>
<td>AM</td>
<td>66.36</td>
<td>17.47</td>
<td>34.56</td>
<td>31.56</td>
<td>13.12</td>
<td>48.44</td>
<td>54.02</td>
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<tr>
<td></td>
<td>AF</td>
<td>66.44</td>
<td>17.4</td>
<td>34.72</td>
<td>31.38</td>
<td>13</td>
<td>48.56</td>
<td>54.18</td>
<td>57.32</td>
</tr>
<tr>
<td></td>
<td>AM</td>
<td>66.66</td>
<td>17.72</td>
<td>34.48</td>
<td>31.44</td>
<td>13.22</td>
<td>48.36</td>
<td>53.88</td>
<td>57.48</td>
</tr>
<tr>
<td>ZSIK/20665</td>
<td>AF</td>
<td>68.01</td>
<td>19.5</td>
<td>32.1</td>
<td>15.8</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>66.84</td>
<td>17.974</td>
<td>34.16</td>
<td>28.34</td>
<td>13.14</td>
<td>48.44</td>
<td>54</td>
<td>57.44</td>
</tr>
</tbody>
</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F & CL), Tail length (Tl), Metacarpal length (Mt),

Table 4.8 Cranial measurements of *M. lyra* from the study area and Assam (measurements in mm)

<table>
<thead>
<tr>
<th>Registration no.</th>
<th>*GTL</th>
<th>*CB</th>
<th>*CCL</th>
<th>*ZW</th>
<th>*PC</th>
<th>*BW</th>
<th>*C-M</th>
<th>*C1-C1′</th>
<th>*M1-M′</th>
<th>*C-M</th>
<th>*M</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/310</td>
<td>28.3</td>
<td>24.5</td>
<td>25.2</td>
<td>16.3</td>
<td>4.5</td>
<td>11.6</td>
<td>11.4</td>
<td>5.01</td>
<td>9.6</td>
<td>11.7</td>
<td>18.7</td>
</tr>
<tr>
<td>Regn No</td>
<td>28.2</td>
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<td>25.3</td>
<td>16.2</td>
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<td>5.0</td>
<td>9.5</td>
<td>11.6</td>
<td>18.6</td>
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<td>ZSIS-384</td>
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<td>25.36</td>
<td>16.74</td>
<td>5.1</td>
<td>12.42</td>
<td>10.83</td>
<td>5</td>
<td>9.7</td>
<td>11.62</td>
<td>20.25</td>
</tr>
<tr>
<td>Average</td>
<td>28.48</td>
<td>24.43</td>
<td>25.28</td>
<td>16.41</td>
<td>4.73</td>
<td>11.80</td>
<td>11.24</td>
<td>5.00</td>
<td>9.6</td>
<td>11.64</td>
<td>19.18</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condylobasal length (CB), Condylar length (CCL), Anterior palatal width (C1-C1′), Posterior palatal width (M1-M′), Zygomatic Width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (C-M), Mandibular tooth-row length (M), Length of Mandible (M) 

Distribution

In India: Jammu & Kashmir, Himachal Pradesh, Rajasthan, Gujarat, Maharashtra, Karnataka, Tamil Nadu, Kerala, Andhra Pradesh, Orissa, Madhya Pradesh, Uttar Pradesh, Bihar, West Bengal, Arunachal Pradesh, Assam, Meghalaya (Bates and Harrison, 1997)
In Assam: Goalpara, Tinisukia, Kamrup, Bokakhat, (Sinha, 1999; Boro et al. 2018)

In the study area: This bat was recorded from Tamulpur and Basbari areas and Manas National Park (Figure 4.4) Boro et al., 2018.

Fig. 4.4: Distributinal map of Megaderma lyra E. Geoffroy, 1810 in Baksa district

Natural history notes: A common species in the study area and mostly located in the abandoned houses near forest. Quite tolerant to human presence nearby.

Conservation Status: Least Concern (LC)
Family: **Emballonuridae**

The tail in this genus was characteristically protruding outside the interfemoral membrane at the midpoint. The second digit of the wing was without a phalanx. Well developed postorbital process and the premaxillae were not fused with each other or with maxillae.

**Genus: Saccolaimus** Temminck, 1838

Radio-metacarpal pouch absent except for one species *S. mixtus*. Lower lip had a deep groove which was clearly marked than in closely related genus *Taphozous*. Anterior upper premolar was proportionately much larger, and with a long and pointed cusp than was found in other emballonurid genera.

5 **Saccolaimus saccolaimus** Temminck, 1838


**Common names:** Pouch – bearing bat

**Type Locality:** Java

**Material examined**

ZSIS- AF309, Balahati(Sutia-para), Baksa, Assam, A. R. Boro, 16th Jan.2013 and one released individual, ZSIS-AM314 Balahati , Baksa, Ananda Ram Boro 20thFeb.2013

**Diagnosis**

*Morphological features*
1. In our study specimens, the forearm lengths ranges from 70.03 to 70.66mm (Table-4.9)

2. Wings were without radio-metacarpal pouch.

3. Gular sac was comparatively well developed in males than the female. Very short hairs covered the chin and the sides of the gular sac.

4. A distinct groove was seen in the lower lips.

5. Small irregular shaped white patches were present on the dorsal surface. (Photo plate – 9A)

Cranial characters

1. The average condylo-canine length of the skull ranges from 22.98mm (Table-4.10)

2. The zygomatic arc were widely spread (Photo plate – 13B)

3. Lambda was distinct.

4. The basisphenoid pits were large.

Dental characters

1. The dentition was robust, heavily built.

2. The upper toothrow measured 10.7mm (Table-4.10)

3. The first upper premolar (pm²) was comparatively larger than the second premolar (pm⁴).

Dental formula: i. - 2 -/1 2 -, c. 1/1, pm -2 – 4/- 2 4, m 1 2 3/1 2 3 = 30
Results

Chapter 4

Taxonomic measurements:

**Table 4.9** External measurements of *Saccolaimus saccolaimus* from the study area (ZSIS and one released) in mm

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>Age &amp; sex</th>
<th>*Fa</th>
<th>*F &amp; CL</th>
<th>*Tb</th>
<th>*Er</th>
<th>*Tr</th>
<th>*Tl</th>
<th>*3Mt</th>
<th>*4Mt</th>
<th>*5Mt</th>
</tr>
</thead>
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<tr>
<td>V/M/ERS309</td>
<td>AF</td>
<td>70.03</td>
<td>16.4</td>
<td>27.88</td>
<td>15.27</td>
<td>4.54</td>
<td>26.56</td>
<td>70.2</td>
<td>53.78</td>
<td>39.4</td>
</tr>
<tr>
<td>Released</td>
<td>AM</td>
<td>70.66</td>
<td>16.84</td>
<td>28.01</td>
<td>15.72</td>
<td>4.44</td>
<td>26.96</td>
<td>70.34</td>
<td>54</td>
<td>39.48</td>
</tr>
<tr>
<td>Released</td>
<td>AF</td>
<td>70.54</td>
<td>16.67</td>
<td>27.94</td>
<td>15.44</td>
<td>4.52</td>
<td>26.56</td>
<td>70.33</td>
<td>53.86</td>
<td>39.46</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td>70.34</td>
<td>16.63</td>
<td>27.94</td>
<td>15.47</td>
<td>4.5</td>
<td>26.69</td>
<td>70.29</td>
<td>53.88</td>
<td>39.44</td>
</tr>
</tbody>
</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F & CL), Tail length (Tl), Metacarpal length (Mt),

**Table 4.10** Cranial measurements of *Saccolaimus saccolaimus* from the study area in mm

<table>
<thead>
<tr>
<th>Registration no.</th>
<th>*GTL</th>
<th>*CCL</th>
<th>*ZW</th>
<th>*PC</th>
<th>*BW</th>
<th>*C-M</th>
<th>*C'-C'</th>
<th>*M'-M</th>
<th>*C-M</th>
<th>*M</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSIS-309</td>
<td>26.75</td>
<td>22.98</td>
<td>17</td>
<td>5</td>
<td>10.85</td>
<td>10.7</td>
<td>5.21</td>
<td>11.35</td>
<td>11.88</td>
<td>18.52</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condylocanine length (CCL), Anterior palatal width (C'-C'), Posterior palatal width (M'-M'), Zygomatic Width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (CM'), Mandibular tooth-row length (CM), Length of Mandible (M)

Distribution:

**In India**: Gujarat, Maharashtra, Karnataka, Kerala, Tamil Nadu, Uttar Pradesh, Orissa, West Bengal, Meghalaya, Nicobar Islands (Bates and Harrison, 1997)

**In Assam and study area**: Balahati near Goreswar, Baksa district (Figure-4.5) Boro et al. 2018 and Dhubri dist. (Ali, 2016)
**Fig. 4.5** Distributinal map of *Saccolaimus saccolaimus* Temmink, 1838 in Baksa district

**Ecological note:** The species was roosting on a tall date palm with 100% opened canopy. One more colony was sighted in the crevics of coconut tree. Interestingly the date palm did not bear any fruit.

**Conservation Status:** *Least Concern* (LC)
**Genus: Taphozous E. Geoffroy, 1881**

The members of the genus possess a gular sac and a radio metacarpal pouch. The tragus was club shaped. The tail was included in the interfemoral membrane except for the distal half.

**6 Taphozous longimanus** Hardwicke, 1825

1825, *Taphozous longimanus* Hardwicke; *Transaction Linn Soc Lond*, 14:525, Calcutta, Bengal, India.

1841, *Taphozous fulvidus* Blyth; *Journal Asiat Soc Bengal*, 10: 975, Darjeeling, north eastern India.

1841, *Taphozous brevicaudus* Blyth; *Journal Asiat Soc Bengal*, 10: 976 Travancore, India.

1842, *Taphozous contori* Blyth; *Journal Asiat Soc Bengal*, 11:784 Calcutta, India

**Common name:** Long-winged Tomb bat

**Type locality:** Calcutta, Bengal, India.

**Material examined:** ZSIS-314 Balahati, Baksa, Ananda Ram Boro 20/02/2013; ZSIS-9232, Nalbari, Assam, Y.P.Sinha, 22/12/1988

**Diagnosis**

**Morphological features**

1. The third metacarpal was relatively long and usually equals or exceeds the length of forearm.(Table-4.11)
Results

Chapter 4

2. The side of the face was almost naked and dark brown in colour. (Photo plate – 9C)

3. The tragus was well developed and club-shaped. (Photo plate – 9C)

4. The chin was naked, males had a large gular sac and in female there was a rudimentary fold of skin.

5. The wings were attached to the ankles but not to the tibiae

6. The radio-metacarpal pouch of each wing was moderately developed.

Cranial characters

1. The rostrum was broad with a well developed concavity medially.

2. The post orbital process was long and slender. Their anterior margins were concave and the posterior margins were convex.

3. The sagittal crest was poorly developed.

4. Outer border of the zygomatic arche were almost straight (Photo plate – 14A)

5. The basispenoid pits were deep with a well defined median septum.

Dental characters

Table 4.11 External measurements of *Taphozous longimanus* from Assam and the study area in mm

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>*Fa</th>
<th>*F &amp; CL</th>
<th>*Tb</th>
<th>*Er</th>
<th>*Tr</th>
<th>*Tl</th>
<th>*3Mt</th>
<th>*4Mt</th>
<th>*5Mt</th>
</tr>
</thead>
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<tr>
<td>V/M/ERRS/AM-314</td>
<td>64.21</td>
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<td>10.15</td>
<td>3.98</td>
<td>20.29</td>
<td>62.49</td>
<td>49.86</td>
<td>38.41</td>
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<td>V/M/ERRS/AM-9232</td>
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<td>16.34</td>
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<td>10.89</td>
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<td>21.75</td>
<td>62.88</td>
<td>49.77</td>
<td>38.52</td>
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<tr>
<td>Released-AF</td>
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<td>14.76</td>
<td>27.66</td>
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<td>62.06</td>
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<td>27.04</td>
<td>12.1</td>
<td>4.38</td>
<td>22.55</td>
<td>61.89</td>
<td>49.2</td>
<td>38.06</td>
</tr>
</tbody>
</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F & CL), Tail length (Tl), Metacarpal length (Mt)
Table 4.12 Cranial measurements of *Taphozous longimanus* from the study area in mm

<table>
<thead>
<tr>
<th>Registration no.</th>
<th><em>GTL</em></th>
<th><em>CB</em></th>
<th><em>CCL</em></th>
<th><em>C1-C1</em></th>
<th><em>C3-M3</em></th>
<th><em>ZW</em></th>
<th><em>PC</em></th>
<th><em>BW</em></th>
<th><em>C-M1</em></th>
<th><em>M</em></th>
</tr>
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<tbody>
<tr>
<td>ZSIS-9232</td>
<td>21.5</td>
<td>19.1</td>
<td>20.1</td>
<td>12.4</td>
<td>5.4</td>
<td>9.98</td>
<td>8.9</td>
<td>4.2</td>
<td>9.8</td>
<td>9.7</td>
</tr>
<tr>
<td>ZSIS-314</td>
<td>21.82</td>
<td>19.54</td>
<td>20.46</td>
<td>12.52</td>
<td>5.5</td>
<td>10</td>
<td>9.01</td>
<td>4.26</td>
<td>9.94</td>
<td>9.8</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condylar length (CB), Condylocanine length (CCL), Anterior palatal width (C1-C1), Posterior palatal width (M3-M3), Zygomatic Width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (CM3), Mandibular tooth-row length (CM), Length of Mandible (M)*

**Distribution**

**In India:** Rajasthan, Maharashtra, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Madhya Pradesh, Uttar Pradesh, Bihar, West Bengal, Tripura

**In Assam** and study area: Nalbari and Balahati, Baksa (Figure-4.6) Sinha, 1999; Boro et al. 2014

![Fig 4.6 Distributional map of *Taphozous longimanus* Hardwicke, 1825 in Baksa district](image_url)

Ecological note: All the colonies were observed and collected under the foliage of Palmyra Palm (*Barassus flbelliformis)*.

Conservation Status: **Least Concern (LC)**
Family: Vespertilionidae

Muzzle simple and lacks the noseleaf. Ears separate from each other, barring a few species in which they were joined over the forehead. Tragus was well-developed; of variable shape and antitragus present. The long tail was completely enclosed in the interfemoral membrane or the extreme tip protrudes out in some species. The family was represented in Baksa district by one subfamily and four genera namely *Myotis, Scotophilus, Pipistrellus and Tylonycteris*

Subfamily: Vespertilioninae

Nostrils simple rounded, tragus shorter, wider, generally rounded at tip, usually curved forwards, its length along the anterior margin usually less than three times its greatest width; less than three pairs of upper and lower premolars

Keys to the genera of Vespertilioninae in Baksa district

1 Checkteeth six on both sides of maxilla and mandible………………………………………*Myotis*
   Checkteeth less than six on both sides of maxilla and mandible…………………………2

2 Upper incisor 1-1, upper premolars1-1. ............................................. *Scotophilus*
   Upper incisor 2-2, upper premolars 2-2 ......................................................... 3

3a. Greatly enlarged pads on the feet and thumb  ......................... *Tylonycteris*
3b. No thumb pads.......................................................................................*Pipistrellus*

Genus: *Pipistrellus* Kaup, 1829

Small to medium-sized bats (FA – 27.5-37.1 mm) with a moderately long tail. The tail was enclosed in the interfemoral membrane except for the extreme tip. Ears were short, broad and tragus well-developed. Antitragus was not well defined. On the muzzle, pararhinal glands and internarial groove were distinct. Usually two pairs of
upper and three pairs of lower incisors; and two pairs each of upper and lower premolars present. Some species have reduction in dentition. Three species were represented in the study area namely species – *P. coromandra* (Gray, 1838), *P. javanicus* (Gray, 1838), *P. tenuis* (Temminck, 1840).

**Keys to the species of Pipistrellus in Baksa**

1. Larger species (average FA 34.23mm and CCL 1258mm), interfemoral membrane naked………………………………………………………………………………*P. javanicus*

   Smaller species, interfemoral membrane haired near the body both above and below ……………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………………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Diagnosis

*Morphological features*: This genus lacks distinctive diagnostic characters. However, some prominent shared characters were as follows

1. A small Pipistrelle with a forearm length of 29.96 mm to 31.93mm (Table-4.13) however, measurements overlap with that of *P. tenius* (Table-4.15).

2. In specimens from the Indian Subcontinent, fur colour varies from uniform brown, chestnut to dark clove brown (Bates and Harrison, 1997); in specimens from Assam, it was little light to dark brown. Ventral surface was comparatively paler with dark hair roots.(Photo plate – 11D)

3. Tragus bends forward and bluntly rounded .(Photo plate – 11D)

*Cranial characters*:

1. The skull was delicate with average greatest length of 12.91mm which was little larger than congeneric *P. tenuis* (Table-4.14).

2. The braincase was small and compacted on the backend. The dorsal profile was almost straight from nasal to the frontal part of braincase

*Dental characters*:

1. Average upper tooth row length measured 4.25.mm.(Table- 4.14)

2. The first upper incisor was bicuspidated; the secondary cusp may be small or sometimes absent (Bates and Harrison, 1997). In our examined individuals, the secondary cusp was present

3. The large second incisor was separated from the canine by a small diestema.
4. The first upper premolar was intruded from the toothrow. The canine and the second premolar were very close but not in contact. The first lower premolar was slightly extruded from the toothrow.

**Dental formula:** i 2-2/3-3, c 1-1/1-1, pm 2-2/2-2, m 3-3/3-3=34

**Taxonomic measurements**

**Table 4.13** External measurements of *P. coromandra* from Assam and study area (based on specimens at ZSIS) in mm

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>*Fa</th>
<th>*F&amp;CL</th>
<th>*Tb</th>
<th>*Er</th>
<th>*Tr</th>
<th>*Tl</th>
<th>*3Mt</th>
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<td>28.39</td>
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<tr>
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<tr>
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<td>22.55</td>
<td>30.00</td>
<td>29.22</td>
<td>28.95</td>
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</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F & CL), Tail length (Tl), Metacarpal length (Mt),

**Table 4.14** Cranial measurements of *P. coromandra* from Assam and study area (based on specimens at ZSIS, in mm)

<table>
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<th>*CB</th>
<th>*CCL</th>
<th>*ZW</th>
<th>*PC</th>
<th>*BW</th>
<th>*C-M³</th>
<th>*C’-C’</th>
<th>*M’-M’</th>
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<tr>
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<td>11.61</td>
<td>8.06</td>
<td>3.63</td>
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<td>5.85</td>
<td>4.96</td>
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</table>

*Greatest length of skull (GTL), Condylar length (CB), Condylar length (CCL), Anterior palatal width (C’-C’), Posterior palatal width (M’-M’), Zygomatic width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (C-M’), Mandibular tooth-row length (CM’), Length of Mandible (M)

**Distribution**

*In India:* Widely distributed in mainland India except for Punjab, Haryana, Rajasthan, Andhra Pradesh and a few north-eastern states (Bates and Harrison, 1997; Molur et al. 2002; Das, 2003) and also Car Nicobar Island (Bhattacharyya, 1977).
Fig. 4.7: Distributional map of *Pipistrellus coromandra* (Gray, 1838) in Baksa district

*In Assam* and the study area: Golaghat, Sadiya (Tinsukia Dist.), Palasbari Kamrup Dist. (Bates and Harrison, 1997), and Naokata Sinha, 1999; Balahati, Nagrijuli, Goreswar of Baksa district (Figure-4.7) Boro et al.2014

Ecological note: This species was caught mostly in around human settlement. Gut content of a preserved specimen collected from Naokata contained mostly undigested parts of moths and flies.

Conservation Status: **Least Concern (LC)**
8 *Pipistrellus tenuis* (Wroughton, 1899)


**Common names:** Least pipistrelle/Indian Pygmy pipistrelle

**Type Locality:** Mheskatri, Surat district, Gujarat


**Diagnosis**

**Morphological features**

1. This was the smallest Pipistrelle in India with average forearm length of 29.35mm(Table-4.15)

2. Fur was deep brown dorsally and ventrer lighter(Photo plate – 11C)

3. Broad and forward curving tragus.(Photo plate – 11C)
4. Feet length relatively larger
5. Extreme tip of the tail projects out of the tail membrane

_Cranial characters_

1. The skull had average greatest length of 11.72 mm (Table 4.160) and smaller than all congener found in India
2. The palate was also comparatively narrower than _P. coromandra_ to which it has close similarity
3. Braincase was small but the postorbital constriction was relatively broad (Photo plate – 16A)

_Dental characters_

1. The first upper incisor was bicuspidate, which was separated from the well-developed second incisor by a narrow diastema.
2. The upper canine had a secondary posterior cusp.
3. The first upper premolar was situated inward from the toothrow, conversely the first lower premolar was projecting outward from the toothrow.

**Dental formula:** i. 2-2/3-3, c. 1-1/1-1, pm. 2-2/2-2, m. 3-3/3-3 = 34

**Taxonomic measurements:**

**Table 4.15.** External measurements of _P. tenuis_ from Assam and study area in mm

<table>
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<tr>
<th>Registration No.</th>
<th>*Fa</th>
<th>*F&amp;CL</th>
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</table>
### Table 4.16 Cranial measurements of *P. tenuis* from Assam and study area in mm

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<th><em>CCL</em></th>
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<th><em>BW</em></th>
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*Greatest length of skull (GTL), Condylar length (CB), Condylar length (CCL), Anterior palatal width (C1-C1), Posterior palatal width (M3-M3), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (C-M), Mandibular tooth-row length (C-M), Length of Mandible (M)

### Distribution

*In India:* Himachal Pradesh, Chandigarh, Rajasthan, Gujarat, Maharashtra, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orissa, Madhya Pradesh, Uttar Pradesh, Bihar, West Bengal, Assam, Meghalaya, Nagaland, Tripura (Bates and Harrison, 1997)
**Fig.4.8 Distributional map of Pipistrellus tenuis** (Wroughton, 1899)  
in Baksa district

*In Assam* and study area: Goreswar, Nagrijuli, Tamulpur and Balahati (Figure-4.8)  
Boro *et al.* 2014, Boro *et al.* 2018

Ecological note: Mostly confined to small huts and confined to human habitation. and also from human dwellings .This species observed to roost in perihuman environment and in a variety of places like house roof, holes and crevices in wall.

Conservation Status: **Least Concern (LC)**
9 *Pipistrellus javanicus*, (Gray, 1838)


**Common names**: Javan pipistrelle

**Type Locality**: Murree, Punjab Province, Pakistan

**Material examined**: ZSIS-AM410, Balahati, Baksa, Assam, Boro *et al.* 2014 and one released individual, ZSIK/AF25689, ZSIK/AF25690 Sibsagar, Assam, S.E. Peal, 1872.

**Diagnosis:**

*Morphological features*

1. Medium sized Pipistrelle with average forearm length of 34.23mm in the study area (Table- 4.17)
2. Pelage colour varies with different shades of brown. Specimens from the present study area had blackish brown dorsum while the venter was greyish white (Photo plate --11 A)

_Cranial characters_

1. Skull was larger for its body size with an average greatest length of 13.72mm (Table- 4.18).
2. The rostrum had a mid depression and two lateral depressions over the orbits (Photo plate – 15B)
3. The lambda was the highest point and supraoccipital was the posteriormost part of the skull

_Dental characters_

1. Upper toothrow length measures 4.72mm (Table-4.18).
2. The first upper incisor was bicuspidate, a narrow diastema separates the second incisor from the canine
3. The upper canine had two cusps. The canine and the second premolar were closely positioned with a intruded first premolar between them.

_Dental formula_: i. 2-2/3-3, c. 1-1/1-1, pm. 2-2/2-2, m. 3-3/3-3 = 34
**Taxonomic measurements**

**Table 4.17** External measurements of *P. javanicus* from the study area in mm.

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>*Fa</th>
<th>*F&amp;CL</th>
<th>*Tb</th>
<th>*Er</th>
<th>*Tr</th>
<th>*Tl</th>
<th>*3Mt</th>
<th>*4Mt</th>
<th>*5Mt</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/AM-410</td>
<td>34.60</td>
<td>6.89</td>
<td>13.19</td>
<td>8.45</td>
<td>4.37</td>
<td>27.7</td>
<td>32.84</td>
<td>32.53</td>
<td>29.70</td>
</tr>
<tr>
<td>Released-AM</td>
<td>34.7</td>
<td>7.1</td>
<td>13.16</td>
<td>9.3</td>
<td>4.63</td>
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<td>33.2</td>
<td>32.0</td>
<td>30.4</td>
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<tr>
<td>ZSIK/AF25689</td>
<td>33.24</td>
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<td>12.76</td>
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<td>29.37</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ZSIK/AF25690</td>
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<td>4.8</td>
<td>30.3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>34.23</td>
<td>6.67</td>
<td>12.94</td>
<td>10.7</td>
<td>4.6</td>
<td>29.19</td>
<td>33.02</td>
<td>32.26</td>
<td>30.05</td>
</tr>
</tbody>
</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F &CL), Tail length (Tl), Metacarpal length (Mt),

**Table 4.18** Cranial measurements of *P. javanicus* specimens from the study area in mm

<table>
<thead>
<tr>
<th>Registration no.</th>
<th>*GTL</th>
<th>*CCL</th>
<th>*ZW</th>
<th>*PC</th>
<th>*BW</th>
<th>*C-M'</th>
<th>*M'-M'</th>
<th>*C-M3</th>
<th>*M</th>
</tr>
</thead>
<tbody>
<tr>
<td>ZSIS-410</td>
<td>13.72</td>
<td>12.58</td>
<td>8.86</td>
<td>4.68</td>
<td>6.2</td>
<td>10.2</td>
<td>6.2</td>
<td>4.7</td>
<td>5.4</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condylocanine length (CCL), Posterior palatal width (M'-M'), Zygomatic Width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (CM'), Mandibular tooth-row length (CM), Length of Mandible (M)

**Distribution**

**In India:** Himachal Pradesh, Madhya Pradesh, Maharashtra, Uttar Pradesh, Uttarakhand, West Bengal, Sikkim, Assam, Nagaland, Manipur and Andaman and Nicobar Islands (Bates and Harrison, 1997).

**In Assam and Study area:** In Assam, this species was known from Bansbari and Barangabari (Figure-4.9) of Baksa district (Boro *et al.* 2018) and Sibsagar. (S.E.Peal, 1872)
Fig 4.9: Distributional map of *Pipistrellus javanicus*, (Gray, 1838) in Baksa district

Ecological note: The species was collected from a wooden house adjacent to Manas National park.

Conservation Status: **Least Concern (LC)**
Genus: *Tylonycteris* Peters, 1872

This genus was characterized by extreme flattening of the skull which probably associated with the roosting habit of the bats. The ball of the thumb and sole of the feet has conspicuous roundish pads. Supraorbital process of each orbit was well developed. This genus was represented by a single species in the study area.

10 *Tylonycteris fulvida* (Blyth, 1859)


Common name: Bamboo bat; Flat-headed bat; Club-footed bat.

Type locality:- Bantam, West Java.

Material examined: ZSIS-407(AM), 408(AF), Balahati, Goreswer, Baksa, Boro *et al.* 2018 and two released individuals.

Diagnosis

Morphological features

1. A small bat with a mean forearm length of 27.77mm(Table- 4.19)

2. The head was very flattened with the nostrils projecting forwards and slightly downwards.(Table5.1)

3. The third, fourth and fifth metacarpals about equal in length (Table -- 4.19).

4. The pelage was fine and dense. The throat was pale golden brown and the belly was slightly darker.( Photo plate – 12A)
**Cranial Characters**

1. The braincase and rostrum were extraordinarily flattened and relatively broad.

2. The breath of the braincase exceeds twice the occipital height. (Table 4.20)

3. The postorbital constriction was broad and the rostrum was also short and broad with distinct supraorbital projection above each orbit.

4. The zygoma were widely flared (Photo plate – 16B)

5. The sagittal crest was absent.

6. The mesotperygoid and basoccipital are broad, the tympanic bullae were small (Photo plate – 16B)

**Dental characters**

1. The horizontal ramus of each half mandible was very delicate.

2. The coranoid process was narrow and bicuspidate.

3. There was a short diastema between $i^3$ and upper canine.

4. The upper premolar ($pm^4$) was relatively small with a crown area about half that of $m^1$.

5. The second $i^3$ was unicuspid.

6. The three lower incisors were tricuspidating.
Table 4.19 External measurements of *Tylonycteris fulvida* from the study area in mm

<table>
<thead>
<tr>
<th>Registration No.</th>
<th><em>Fa</em></th>
<th><em>F&amp;CL</em></th>
<th><em>Tb</em></th>
<th><em>Er</em></th>
<th><em>Tr</em></th>
<th><em>Tl</em></th>
<th><em>3Mt</em></th>
<th><em>4Mt</em></th>
<th><em>5Mt</em></th>
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</thead>
<tbody>
<tr>
<td>ZSIS-AM407</td>
<td>27.2</td>
<td>5</td>
<td>12</td>
<td>9.1</td>
<td>3.2</td>
<td>25.3</td>
<td>27.4</td>
<td>27.3</td>
<td>25.6</td>
</tr>
<tr>
<td>ZSI-AF408</td>
<td>28.6</td>
<td>5.2</td>
<td>13</td>
<td>9.3</td>
<td>4.2</td>
<td>26</td>
<td>27.7</td>
<td>26.3</td>
<td>26.5</td>
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<td>25.7</td>
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<td>27</td>
<td>26.15</td>
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</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F & CL), Tail length (Tl), Metacarpal length (Mt),

Table 4.20 Cranial measurements of *Tylonicteris fulvida* from Baksa district in mm

<table>
<thead>
<tr>
<th>Registration no.</th>
<th><em>GTL</em></th>
<th><em>CB</em></th>
<th><em>CCL</em></th>
<th><em>ZW</em></th>
<th><em>PC</em></th>
<th><em>BW</em></th>
<th><em>C-M'1</em></th>
<th><em>C1-C'1</em></th>
<th><em>M3-M'1</em></th>
<th><em>C-M3</em></th>
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<tr>
<td>ZSIS-AM407</td>
<td>11.92</td>
<td>11.10</td>
<td>11</td>
<td>8.77</td>
<td>3.81</td>
<td>6.58</td>
<td>3.81</td>
<td>4.08</td>
<td>5.37</td>
<td>4.1</td>
</tr>
<tr>
<td>ZSI-AF408</td>
<td>12.40</td>
<td>12.14</td>
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<td>8.81</td>
<td>3.90</td>
<td>6.76</td>
<td>4.0</td>
<td>4.14</td>
<td>5.45</td>
<td>4.53</td>
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<tr>
<td>Mean</td>
<td>12.16</td>
<td>11.62</td>
<td>11.25</td>
<td>8.79</td>
<td>3.85</td>
<td>6.67</td>
<td>3.90</td>
<td>4.11</td>
<td>5.41</td>
<td>4.31</td>
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</tbody>
</table>

*Greatest length of skull (GTL), Condylar basin length (CB), Condylar canine length (CCL), Anterior palatal width (C1-C'), Posterior palatal width (M3-M'), Zygomatic width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (C-M'), Mandibular tooth-row length (CM'), Length of Mandible (M)

Distribution

*In India:* Meghalaya, Manipur, Mizoram, Andaman Island, (Bates and Harrison, 1997)

*In Assam* and Study area: Balahati, Baksa Boro et al. 2018 (Figure-4.10)
Ecological note: It was collected by misnetting and from the crevics of *Bambusa balcooa* and observed only in the summer season.

Conservation Status: **Least Concern (LC)**
**Genus: Scotophilus Leach, 1821**

The genus had a characteristic tragus in the ear with the tip projecting forward and roughly matching to an inverted plough in side profile. The second incisor was absent in dentition and the main cusps in the first and second molars were projecting outwards. The genus was represented by two species in the study area.

Key to the species of Scotophilus in Baksa district

1. Larger species with an average forearm length of 58.5mm and average condylocanine length of 20.3…………………………………………………………S. heathii

2. Smaller species with an average forearm length of 49.42mm and average condylocanine length of 18.23mm…………………………………………..S. kuhlii

**11. Scotophilus heathii Horsefield, 1831**

1831, Scotophilus heathii Horsefield, Proceeding zool. Soc. London113; Madras, India

1834, Vespertilio belangeri,GeoffroyVoyage aux Indes-orientales... Parris, 87


1851, Scotophilus flaveolus A catalogue of the mammalian in the museum of the east India Company, London Horsfield, 37

**Common name:** Asiatic greater yellow house bat.

**Type Locality:** Madras, India.

**Material examined:** ZSIS-AM312 and AM313, Salbari, Baksa, Assam, A. R. Boro, 8/9/2012 and two released individuals. ZSIS-AM9233, 9234, 9235, Mahari para, Goreswer, Assam, 20th Dec.1988, Dr. Y.P. Sinha.; ZSIS-AF9578, Dudhnoi, Goalpara district, 8th Apr.1971, Dr. R.S. Pillai.
Diagnosis

Morphological features

1. It was a robust bat with an average forearm length of 58.5mm (Table 4.21).
2. Pelage colour was bright yellow to chestnut on the dorsum while it is light yellow ventrally (Photo plate – 10 D, E & F).
3. The muzzle was broad, swollen on the sides and mostly naked.
4. The nostrils slightly project outward. (Photo plate – 10D)
5. The ears were short, naked and had a number of transverse ridges.
6. The tragus was thick curved forward and about half the height of the pinna (Photo plate -)

Cranial characters:

1. The greatest length of the examined specimen was 23.6mm (Table 4.22).
2. The braincase was elongated and deep; the lambdoid crests were well developed.
3. The rostrum was short and broad. The nasal aperture was huge in size.
4. The coronoid process of each half mandible was tall and triangular in shape.

Dental characters

1. The single upper incisor ($i^2$) was strong, unicusp and with a well-developed cingulum. It is in contact with the large upper canine.
2. The upper premolar ($p^m_4$) was large and attains two thirds the height of the canine.
3. The three lower incisors were with three cusps and overlap with each other.
**Taxonomic measurements**

**Table 4.21** External measurements of *Scotophilus heathii* from Assam India (Based on specimens in ZSIS and the collected & the two released individuals) in mm

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>*Fa</th>
<th>*F&amp;CL</th>
<th>*Er</th>
<th>*Tr</th>
<th>*Tl</th>
<th>*3Mt</th>
<th>*4Mt</th>
<th>*5Mt</th>
</tr>
</thead>
<tbody>
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<td>V/M/ERS/AM313</td>
<td>58.3</td>
<td>13.7</td>
<td>11.5</td>
<td>8.9</td>
<td>46.9</td>
<td>56.8</td>
<td>55.3</td>
<td>52.6</td>
</tr>
<tr>
<td>ZSIS-AM9233</td>
<td>58.24</td>
<td>13.66</td>
<td>11.48</td>
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<td>47.3</td>
<td>56.75</td>
<td>56.44</td>
<td>51.34</td>
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<td>ZSIS-AM9234</td>
<td>59</td>
<td>13.76</td>
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<td>8.86</td>
<td>46.84</td>
<td>57.65</td>
<td>55.52</td>
<td>53.54</td>
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<td>11.44</td>
<td>8.91</td>
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<td>56.08</td>
<td>53</td>
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<td>57.02</td>
<td>56.02</td>
<td>52</td>
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<tr>
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<tr>
<td>individuals</td>
<td>58.2</td>
<td>13.7</td>
<td>11.4</td>
<td>8.8</td>
<td>47</td>
<td>56.7</td>
<td>56.4</td>
<td>51.1</td>
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<tr>
<td>Released</td>
<td>58.5</td>
<td>13.6</td>
<td>12</td>
<td>8.4</td>
<td>49.6</td>
<td>57.5</td>
<td>55.3</td>
<td>53.8</td>
</tr>
<tr>
<td>Mean</td>
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<td>13.70</td>
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<td>47.35</td>
<td>57.10</td>
<td>55.92</td>
<td>52.51</td>
</tr>
</tbody>
</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F & CL), Tail length (Tl), Metacarpal length (Mt),

**Table 4.22** Cranial measurements of *Scotophilus heathii* (Horsfield) from the study area in mm

<table>
<thead>
<tr>
<th>Registration no.</th>
<th>*GTL</th>
<th>*CB</th>
<th>*CCL</th>
<th>*ZW</th>
<th>*PC</th>
<th>*BW</th>
<th>*C-M&lt;sup&gt;3&lt;/sup&gt;</th>
<th>*C1-M&lt;sup&gt;3&lt;/sup&gt;</th>
<th>*M&lt;sup&gt;3&lt;/sup&gt;-M&lt;sup&gt;3&lt;/sup&gt;</th>
<th>*C-M&lt;sup&gt;3&lt;/sup&gt;</th>
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<td>10.3</td>
<td>7.6</td>
<td>7.4</td>
<td>10.1</td>
<td>8.6</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condyllobasal length (CB), Condylar length (CCL), Anterior palatal width (C<sup>-1</sup>-C<sup>1</sup>), Posterior palatal width (M<sup>1</sup>-M<sup>3</sup>), Zygomatic Width (ZW), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (CM<sup>3</sup>), Mandibular tooth-row length (CM), Length of Mandible (M)
Distribution

*In India:* States of Punjab, Haryana, Rajasthan, Gujarat, Maharastra, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh, Orrissa, Madhya Pradesh, Uttar Pradesh, Bihar, West Bengal, Assam, Meghalaya (Bates and Harrison, 1997; Sinha, 1999)

*In Assam* and study area (Figure-4.11): Rajapara, Margherita, Palashbari, Gauhati, Marampur, Darangar, Kaliani, Golaghat, (Bates and Harrison, 1997) Goreswar (Boro et al. 2018)

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**Fig4.11 Distributional map of *Scotophilus heathii* Horsefield, 1831 in Baksa district**

**Ecological note:** All the specimens of this species were observed in the crivics of either coconut or bettle nut plants.

**Conservation Status:** Least Concern (LC)
12 Scotophilus kuhlii Leach 1821

1821. Scotophilus kuhlii Leach, Trans. Linn. Soc. Lond. 13 (72) (Type locality unknown)

1843. Scotophilus fulvus Gray, List. Specimens Mammalian Coll. Brit. Mus.: 31 (Java and Madras, India)


Common name: Asiatic Lesser Yellow House bat

Type locality: Unknown but according to Hill and Thonglongya (1972), the type specimen was from India.

Material examined: ZSIS-AM311, Musalpur, Baksa District, Assam, Coll. A. Boro, 08.IX.2012 and three released individuals

Diagnosis

Morphological features

1. Smaller among the congeners with an average forearm of 49.4mm (Table – 4.23)

2. The muzzle was thick with small glandular openings between eyes and nose (Photo plate – 10 C)

3. Ears were short and rounded. Tragus narrow and pointed forward at the tip (Thoto plate – 10C)

4. Fur olive-grey-brown on the back and yellow-buff on the ventral side, patagium dark brown (Photo plate – 10C)

Cranial characters

1. The skull was robust and the greatest length measures 19.15 mm(Table-4.23)

2. Occipital and sagittal crests were well developed.

3. The short rostrum was robust and the distinct outgrowth of lachrymal lies over the orbits(Photo plate – 17B)
4. The nasal opening was wide.
5. The zygomatic arches were moderately flared (Photo plate – 17B).

Dental characters

1. Upper toothrow length averages 7.7mm(Table- 4.24)
2. The upper incisor had a well developed cingulum and almost touches the upper canine
3. The three lower incisors had three cusps each and overlap in position.
4. The lower canine was large. The small first premolar is compacted in the toothrow.

Dental formula: i.1-1/3-3, c.1-1/1-1, pm.1-1/2-2, m.3-3/3-3 = 30

Taxonomic measurements

Table 4.23 External measurements of S. kuhlii from study area in mm

<table>
<thead>
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<th>Registration No.</th>
<th>Sex</th>
<th>Fa</th>
<th>F&amp;CL</th>
<th>Tb</th>
<th>Er</th>
<th>Tr</th>
<th>Tl</th>
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<td>AM</td>
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<td>11.6</td>
<td>20.7</td>
<td>14.2</td>
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<td>49.7</td>
<td>50</td>
<td>49.7</td>
<td>45.7</td>
</tr>
<tr>
<td>V/M/ERS/469</td>
<td>AM</td>
<td>48.9</td>
<td>12</td>
<td>20.5</td>
<td>14.2</td>
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<td>49.8</td>
<td>49.8</td>
<td>45.7</td>
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<tr>
<td>Released</td>
<td>AF</td>
<td>49.2</td>
<td>12.1</td>
<td>20.4</td>
<td>14.2</td>
<td>5.8</td>
<td>49.1</td>
<td>50</td>
<td>49.6</td>
<td>45.4</td>
</tr>
<tr>
<td>Released</td>
<td>AF</td>
<td>50</td>
<td>11.3</td>
<td>20.8</td>
<td>15</td>
<td>6</td>
<td>47</td>
<td>48.2</td>
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<td>45.8</td>
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<tr>
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<td>11.75</td>
<td>20.6</td>
<td>14.4</td>
<td>5.9</td>
<td>48.75</td>
<td>49.5</td>
<td>49.45</td>
<td>45.65</td>
</tr>
</tbody>
</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F &CL), Tail length (Tl), Metacarpal length (Mt),

Table 4.24 Cranial measurements of S. kuhlii from study area in mm

<table>
<thead>
<tr>
<th>Registration No.</th>
<th>*GTL</th>
<th>*CB</th>
<th>*CCL</th>
<th>*ZW</th>
<th>*PC</th>
<th>*BW</th>
<th>*C-M1</th>
<th>*C1-C3</th>
<th>*M1-M3</th>
<th>*C-M3</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/311</td>
<td>19.15</td>
<td>17.34</td>
<td>18.23</td>
<td>13.97</td>
<td>5.05</td>
<td>9.06</td>
<td>7.07</td>
<td>6.37</td>
<td>8.79</td>
<td>7.7</td>
</tr>
</tbody>
</table>
Distribution

In India: Practically distributed throughout the Indian Union including Nicobar Islands (Hill, 1967; Bates and Harrisnon, 1997).

In Assam: Balahati Village (Figure-4.12), Goreswar, Baksa District, Assam (Boro et al. 2014).

Fig 4.12: Distributional map of Scotophilus kuhlii Leach 1821 in Baksa district

Ecological note: It’s rosting sites mostly overlapped with S. heathii.

Conservation Status: Least Concern (LC)
Genus: *Myotis* Kaup, 1829

The ears were long and the tragus was tall and slender. The tail was entirely enclosed in the interfemoral membrane. Well developed tympanic bullae. Dentition had three upper and three lower premolars. A single species represented this genus in the study area.

13. *Myotis horsfieldi* (Temminck, 1840)

1840, *Vespertilio horsfieldii* Temminck, *Monographies de mammalogie* 226; Mount Gede, Java


**Common names:** Horsfield’s bat

**Type locality:** Mount Gede, Java.

**Material examined:**
ZSIS-318 & ZSIS-319, near Manas National Park, Assam, A.R. Boro, 30th Aug. 2014 and two released individuals

**Diagnosis**

**Morphological features**

1. A medium sized *Myotis* with a forearm length of 34.7-35.8 mm (Table- 4.25)

2. The feets were enlarged and exceed half the length of tibiae.

3. The palage was blackish on the dorsal surface while venter was deep brown with greyish tints near the base on the tail (Photo plate – 12C)
4. The interfemoral and wing membranes were deep chocolate brown and were essentially naked. (Photo plate – 12C)

5. The wing membranes were attached to the outer metatarsal of each foot.

**Cranial characters**

1. The rostrum was robust with a shallow depression in its midline.
2. The sagital and lambdoid crests were poorly developed.
3. The braincase was rounded posteriorly with the supraoccipital forming the most posterior part of the skull.
4. The zygoma were well developed and outwardly flared (Photo plate – 14B)
5. The palate was concave (Photo plate – 14B)

**Dental characters**

1. The teeth were robust.
2. The upper canine was nearly twice the height of the third upper premolar but the first and second premolars were small.
3. The lower canine exceeds the third lower premolar in height and crown area.
4. The second lower premolar was two-thirds the crown area of the first lower premolar.

**Table 4.25** External measurements of *Myotis horsfieldii* (Temmink, 1840) from the study area (ZSIS-318, 319 and 2 released individuals) in mm

<table>
<thead>
<tr>
<th>RegistrationNo.</th>
<th>*Fa</th>
<th>*F&amp;CL</th>
<th>*Tb</th>
<th>*Er</th>
<th>*Tr</th>
<th>*3Mt</th>
<th>*4Mt</th>
<th>*5Mt</th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/AM318</td>
<td>35.83</td>
<td>8.9</td>
<td>16.9</td>
<td>13.8</td>
<td>5.7</td>
<td>36.23</td>
<td>34.91</td>
<td>33.33</td>
</tr>
<tr>
<td>V/M/ERS/AM319</td>
<td>34.73</td>
<td>8</td>
<td>17.1</td>
<td>13.9</td>
<td>5.2</td>
<td>35</td>
<td>34.91</td>
<td>33.17</td>
</tr>
<tr>
<td>Released-AF</td>
<td>35.26</td>
<td>8.4</td>
<td>17</td>
<td>14</td>
<td>5.6</td>
<td>35.88</td>
<td>34.9</td>
<td>33.26</td>
</tr>
<tr>
<td>Released-AF</td>
<td>35</td>
<td>8.6</td>
<td>17.3</td>
<td>13.94</td>
<td>5.6</td>
<td>36.04</td>
<td>34.92</td>
<td>33.28</td>
</tr>
<tr>
<td>Average</td>
<td>35.20</td>
<td>8.47</td>
<td>17.07</td>
<td>13.91</td>
<td>5.52</td>
<td>36.23</td>
<td>34.91</td>
<td>33.33</td>
</tr>
</tbody>
</table>

*Forearm length (Fa), Ear length (E), Tragus length (Tr), Tibia length (Tb), Length of the foot including claw (F &CL), Tail length (Tl), Metacarpal length (Mt),
**Table 4.26** Cranial measurements of *Myotis horsfieldii* (Temminck, 1840) from the study area (ZSIS-318, 319) in mm

<table>
<thead>
<tr>
<th>Registration no.</th>
<th><em>GTL</em></th>
<th><em>CB</em></th>
<th><em>CCL</em></th>
<th><em>PC</em></th>
<th><em>BW</em></th>
<th><em>C-M</em></th>
<th><em>C'-C'</em></th>
<th><em>M'-M'</em></th>
<th><em>C-M</em></th>
<th><em>M</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>V/M/ERS/318</td>
<td>14.87</td>
<td>13.49</td>
<td>12.83</td>
<td>3.7</td>
<td>7.15</td>
<td>5.4</td>
<td>4.07</td>
<td>6.08</td>
<td>5.58</td>
<td>10.95</td>
</tr>
<tr>
<td>V/M/ERS/319</td>
<td>14.73</td>
<td>14.14</td>
<td>13.18</td>
<td>4</td>
<td>7.21</td>
<td>5.37</td>
<td>4.08</td>
<td>6.1</td>
<td>5.45</td>
<td>10.7</td>
</tr>
<tr>
<td>Average</td>
<td>14.8</td>
<td>13.74</td>
<td>13</td>
<td>3.85</td>
<td>7.18</td>
<td>5.38</td>
<td>4.07</td>
<td>6.09</td>
<td>5.51</td>
<td>10.82</td>
</tr>
</tbody>
</table>

*Greatest length of skull (GTL), Condylobasal length (CB), Condylocanine length (CCL), Anterior palatal width (C'-C*'), Posterior palatal width (M'-M*'), Braincase width (BW), Postorbital constriction (PC), Maxillary tooth-row length (CM'), Mandibular tooth-row length (CM), Length of Mandible (M)*

**Distribution:**

*In India:* Maharastra, Goa, Karnataka, Kerala, Tamil Nadu, Madhya Pradesh, Andaman Islands, Maghalaya (Bates and Harrison, 1997), Assam (Boro and Saikia, 2016)

*In Assam and study area:* Only known from Barangabari (Figure-4.13) near Manas National Park (Boro and Saikia, 2016)

![Fig.4.13 Distributional map of *Myotis horsfieldii* (Temminck, 1840) in Baksa district]
Ecological notes: Four adult specimens were caught in a net while coming out of a concrete culvert over a small watercourse. Close examination inside the culvert reveal small roosting packs of 4-5 individuals inside the crevices of culvert joints. The collection locality was surrounded by deciduous forest.

Conservation Status: Least Concern (LC)
Results

Chapter 4

Results

Chapter 4

**Photo plate 16:** [A] Skull profile of *P. tenuis* ZSIS-325, [B] Skull profile of *Tylonycteris fulvida* ZSIS-407.
**Photo plate 19:** [A] *Cynopterus spinx* making a tent of banana leaf, [B] *Cynopterus spinx* on the underside of Palmyra Palm leaf, [C] *Cynopterus spinx* on the underside of Coconut leaf.
Photo plate 20: [A] *Saccolaimus* roosts in the crevics of Coconut tree, [B] *Pipistrellus javanicus* roosting under the roof of a forest camp, [C] Roosting site of *Myotis horsfieldii* inside a culvert on forest stream.