Mammals of Crocker Range

Shigeki Yasuma
Ludi Apin
Fred Tuh Yit Yu
Preface

Nine organizations of the Sabah State Government, Universiti Malaysia Sabah (UMS) and several NGOs have been implementing a joint endeavor called the “Bornean Biodiversity and Ecosystems Conservation (BBEC) Programme in Sabah, Malaysia” with the technical cooperation of the Government of Japan through Japan International Cooperation Agency (JICA) since February 2002 until January 2007, for a period of 5 years.

To conserve the endangered and precious biodiversity and ecosystems of Sabah, the BBEC Programme is working towards establishing “Comprehensive and sustainable conservation approaches of biodiversity and ecosystems,” by integrating the efforts of various state government agencies, a university and NGOs.

The Park Management Component of the BBEC Programme is targeting to develop “effective management options for protected areas.” Crocker Range Park, as the model project site of this component, has been studied for its biological and socio-economic situation. Pilot activities and workshops have been carried out, facilities have been setup and its management plan will be developed to be as practical as possible.

The activities of the Park Management Component has been planned, implemented and monitored by Sabah Parks as its leading organization, together with the working group consisting of the Wildlife Department, Forestry Department, the eight district offices around Crocker Range Park, Land & Surveys Department, Environmental Conservation Department and Drainage & Irrigation Department and Universiti Malaysia Sabah, with the assistance of Japanese advisors and experts dispatched by JICA.

Identifying wildlife and making their inventory are the very basic and essential conducts that lead us to understand the biodiversity existing in Crocker Range Park. The status of ecosystems, the needs of protection and where and how to conserve them are our concern. For the purpose of introducing the survey and its identification techniques, and to assist the study of mammal distribution in Sabah, JICA has dispatched an expert on mammal identification, Dr. Shigeki Yasuma from April until November 2002. Dr. Yasuma gave training to the staff of Sabah Parks, Sabah Wildlife Department and UMS and jointly worked and studied the mammals of Crocker Range Park together with Mr. Ludi Apin and Mr. Fred Tuh Yit Yu of Sabah Parks and other research assistants from other organization.

Their study resulted in confirming 101 species of mammals found in Crocker Range Park against the previous record of 69.

We are pleased to present the outcome of their work in this book. This publication is also one of the results of a technical cooperation and joint work of Japanese and several Sabahans. We believe this field guide will serve as a reference for many researchers, rangers and students or even tourists visiting Crocker Range Park to pursue and perform their work more efficiently and effectively and satisfy their interests.
Segments of information cited in this book are extracts and update from the book titled "Mammals of Sabah" written by Dr. Yasuma and Mr. Mahedi Andau. It was published by Sabah Wildlife Department and JICA in 2000. We would like to thank Mr. Mahedi, the director of Sabah Wildlife Department for kindly allowing us to do so.

March 2003

Datuk Lamri bin Ali
Director of Sabah Parks
(Head of Park Management Component, BBEC Programme)

Takahisa Kusano
Chief Advisor for BBEC Programme
Japan International Cooperation Agency (JICA)
Introduction

The objective of this survey done during May-October 2002 is to compile an inventory of mammals inhabiting Crocker Range. This information is intended to be used for the park’s future research and management to make plans of buffer zone, eco-tourism and long-term monitoring. Crocker Range is the longest mountain chain in Sabah, and it runs parallel to the West Coast and separates it from the interior region. Crocker Range is largely covered with hill dipterocarp and montane forests. The area of 1,399.19 square kilometers has been enacted as the Crocker Range Park (= Taman Banjaran Crocker, TBC) since 1984. And it plays very important roles not only to conserve habitats for a diverse community of flora and fauna but also to provide water for about 1,000,000 people of Sabah.

In this report, the term “Crocker Range” includes both inside and outside Crocker Range Park, from hill slopes to ridges and excludes coastal and urban areas such as Tuaran, Kota Kinabalu and Papar. It also excludes Trus Madi Mountains.

Many studies on mammals have been done in Kinabalu Park, and 123 species are scientifically recorded until now. However, very little information is available on the mammals of Crocker Range. Only 69 species have been recorded before our surveys. There are no big mammals such as elephant, rhinoceros or Tembadau in Crocker Range. Many species belong to small or middle sized mammals such as treeshrew, squirrel, rat, civet and wildcat. It is obvious why only a few species are recorded and for this reason there are few surveys and published information one available.

The authors confirmed 67 species of mammals, and 32 of them are scientifically new records in Crocker Range. That is to say, 101 species of mammals have been confirmed in Crocker Range until now. We give a detailed account of these 101 species in this report.

In the future, it is expected that dwelling species will increase to the same number as Kinabalu Park or more. This is because Crocker Range occupies a wide area than Kinabalu Park, and still possesses good forests within the park. These forests have provided good habitat for the animals. The mammals that are familiar to local people like long-tailed macaques, porcupines, otters, malay civet, some other civets and Moonrat are not included in the total number because of lacking scientifically confirmed records. For that reason, more surveys will be needed in the near future, especially on arboreal mammals like lesser flying squirrels, civets, cats, rats and mice, and surveys on montane species and insectivorous bats.

On one hand the forest is protected suitably inside Crocker Range Park, but the exploitation and environmental destruction is rapidly proceeding outside park. We have the impression that the mammalian fauna is comparatively rich inside the park, but an extremely poor diversity and low population outside the park. Also, we feel the management of both sides of the highways that run through Crocker Range should be considered immediately to protect the flora and fauna from un-natural influences.
Explanation of marks, abbreviations and items

The list of “Mammals of Borneo and Crocker Range” is showing all the 229 species of Borneo. The confirmed records in Sabah and Crocker Range are shown in the list. The situations in Borneo and Sabah are shown, too.

Situation in Borneo
E : Endemic to Borneo
M : Montane species
D : Feral domestic species
No mark : Common to other regions

Situation in Sabah
• : It has been recorded in Sabah.
— : It does not distribute to Sabah.
No mark : It is not clear whether the species inhabits or not in Sabah.

Record in Crocker Range
Inside or Outside, or both side of TBC (Crocker Range Park)
Scientific records before May 2002, or during this period (May-October 2002)

All the species recorded in Crocker Range are referred in detail in following pages,

1. Record inside or outside of TBC
2. Scientific name, English name, Malay name
3. Photograph  Suitable photograph or illustration is prepared.
4. Habitat and Activity

Habitat  It is shown by shadow and enclosed with broad-line.

Population size  Tried to estimate the population size in Crocker Range.

Common : Usually it can be found in their habitat.
Few : There are few opportunities to encounter it.
Rare : There is no opportunity to see it, but still new information and materials are found.
Very rare : There is no information recently, surely very rare or already extinguished.

(Four-limb animals)
Live space  Every different story means the utilizing space.

Activity  Cross axle is time scale, and vertical axle is degree of activity.

(For bats)
Food item  Fruit eating or Insect eating
Feeding site and Roost site  Shown by shadow. Open area means the over space of stream, clearings, village and forest canopy. Middle story and under story are layers in the forest.

5. Measurements  Measurement values of each species are shown. All values of length are indicated in millimeters, and weight values are indicated in grams or kilograms.

- HB  : Head and Body length (four-limb animals)
- FA  : Forearm length (bats only)
- T   : Tail length
- T/HB: Ratio of Tail length to Head and Body length (%)
- HF  : Hindfoot length
- E   : Ear length
- W   : Weight
- D   : Dental formula
- M   : Mammillae
- Tragus (bats only)
- Shoulder height (Ungulates)
- Antler length (Even-toed Ungulates)

- Skull  gl : greatest length
  cbl : condylobasal length
  mt : maxillary toothrow
  iob : inter-orbital breadth

6. Introduction  Mentioned mainly external features, color and size.

7. Habitat and Ecology  Vegetation type of habitat, diurnal or nocturnal, terrestrial or arboreal, live in solitary or group, food habits and other ecological features are referred.

8. Distribution  World distribution, distribution in Borneo and Sabah, and confirmed localities in Crocker Range are referred with map.

9. Ethnic name  Names of each species of ethnic groups who live in Crocker Range are listed.
### Mammals of Borneo and Crocker Range - 1/8

**TBC**: Taman Banjaran Crocker = Crocker Range Park

<table>
<thead>
<tr>
<th>Situation in Sabah</th>
<th>Situation in Borneo</th>
<th>Records in Crocker Range</th>
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<tr>
<td>●</td>
<td>E : Endemic to Borneo</td>
<td>Inside TBC</td>
</tr>
<tr>
<td>—</td>
<td>M : Montane species</td>
<td>Outside TBC</td>
</tr>
<tr>
<td>No mark</td>
<td>D : Feral domestic species</td>
<td>Before This period</td>
</tr>
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</table>

**No mark**: It is not clear whether the species inhabits or not in Sabah.

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## Mammals of Borneo and Crocker Range - 2/8

### TBC: Taman Banjaran Crocker = Crocker Range Park

### Situation in Borneo

- E: Endemic to Borneo
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### Situation in Sabah

- : It has been recorded in Sabah.
- : It does not distribute to Sabah.

### Code No Scientific name English name

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Mammals of Borneo and Crocker Range - 3/8

TBC : Taman Banjaran Crocker = Crocker Range Park

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- ● : It has been recorded in Sabah.
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**Situation in Borneo**
- E : Endemic to Borneo
- M : Montane species
- D : Feral domestic species

**Code** | **No** | **Scientific name** | **English name**
--- | --- | --- | ---
011 | Hipposideros diadema | Diadem Roundleaf Bat
0201 | Coelops robinsoni | Lesser Tailles Roundleaf Bat
07 | Family VESPERTILIONIDAE | 43 species
| Subfamily VESPERTILIONINAE | 25
0101 | Myotis muricola | Whiskered Myotis
0102 | Myotis ater | Black Myotis
0103 | Myotis montivagus | Large Brown Myotis
0104 | Myotis siligorensis | Small-toothed Myotis
0105 | Myotis ridleyi | Ridley’s Myotis
0106 | Myotis horsfieldii | Horsfield’s Myotis
0107 | Myotis hesselii | Hasselt’s Large-footed Myotis
0108 | Myotis adversus | Grey Large-footed Myotis
0109 | Myotis macrotarsus | Pallid Large-footed Myotis
0201 | Pipistrellus javanicus | Javan Pipistrelle
0202 | Pipistrellus tenus | Least Pipistrelle
0203 | Pipistrellus ceylonicus | Dark Brown Pipistrelle
0204 | Pipistrellus kitcheneri | Red-brown Pipistrelle
0205 | Pipistrellus petersi | Woolly Pipistrelle
0206 | Pipistrellus cuprous | Coppery Pipistrelle
0207 | Pipistrellus steenopterus | Narrow-winged Pipistrelle
0208 | Pipistrellus vordermanni | White-winged Pipistrelle
0301 | Glischropus tylopus | Thick-thumbed Pipistrelle
0401 | Pipistrellus brachypterus | Narrow-winged Brown Bat
0501 | Hesperoptenus dorae | False Serotine
0502 | Hesperoptenus blanfordi | Least False Serotine
0503 | Hesperoptenus tomesi | Tomes’ False Serotine
0601 | Tylonycteris robustula | Greater Bamboo Bat
0602 | Tylonycteris pachypus | Lesser Bamboo Bat
0701 | Scotophilus kuhlii | Yellow House Bat
| Subfamily MURININAE | 5
0801 | Murina cyclotis | Orange Tube-nosed Bat
0802 | Murina aenea | Bronzed Tube-nosed Bat
0803 | Murina mccandalli | Gilded Tube-nosed Bat
0804 | Murina suilla | Lesser Tube-nosed Bat
0901 | Harpiocheirus harpia | Hairy-winged Bat
| Subfamily KERIVOULINAE | 8
1001 | Kerivoula papillosa | Papillose Woolly Bat
1002 | Kerivoula hardwickii | Hardwicke’s Woolly Bat
1003 | Kerivoula pellucida | Clear-winged Woolly Bat
1004 | Kerivoula intermedia | Small Woolly Bat

Records in Sabah |
- Inside TBC
- Before
- This period

Records in Crocker Range |
- Inside TBC
- Before
- This period
Mammals of Borneo and Crocker Range - 4/8

**TBC** : Taman Banjaran Crocker = Crocker Range Park

<table>
<thead>
<tr>
<th>Situation in Sabah</th>
<th>Situation in Borneo</th>
</tr>
</thead>
<tbody>
<tr>
<td>• : It has been recorded in Sabah.</td>
<td>E : Endemic to Borneo</td>
</tr>
<tr>
<td>--- : It does not distribute to Sabah.</td>
<td>M : Montane species</td>
</tr>
<tr>
<td>No mark : It is not clear whether the species inhabits or not in Sabah.</td>
<td>D : Feral domestic species</td>
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### Code No Scientific name English name

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<thead>
<tr>
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<th>English name</th>
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<tr>
<td>1005</td>
<td>Kerivoula minuta</td>
<td>Least Woolly Bat</td>
</tr>
<tr>
<td>1006</td>
<td>Kerivoula whiteheadi</td>
<td>Whitehead’s Woolly Bat</td>
</tr>
<tr>
<td>1101</td>
<td>Phoniscus jagorii</td>
<td>Frosted Groove-toothed Bat</td>
</tr>
<tr>
<td>1102</td>
<td>Phoniscus atrox</td>
<td>Gilded Groove-toothed Bat</td>
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**Subfamily MINIOPTERINAE**

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<th>English name</th>
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<tbody>
<tr>
<td>1201</td>
<td>Miniopterus magnater</td>
<td>Large Bent-winged Bat</td>
</tr>
<tr>
<td>1202</td>
<td>Miniopterus schreibersi</td>
<td>Common Bent-winged Bat</td>
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<td>1203</td>
<td>Miniopterus pusillus</td>
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<td>1204</td>
<td>Miniopterus medius</td>
<td>Medium Bent-winged Bat</td>
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<tr>
<td>1205</td>
<td>Miniopterus australis</td>
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**Family MOLOSSIDAE**

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<tr>
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<td>Cheiromeles torquatus</td>
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<tr>
<td>0201</td>
<td>Tadarida plicata</td>
<td>Wrinkle-lipped Bat</td>
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<td>0202</td>
<td>Tadarida mops</td>
<td>Free-tailed Bat</td>
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**Order PRIMATES**

<table>
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<tr>
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<tbody>
<tr>
<td>01</td>
<td>Nycticebus coucang</td>
</tr>
<tr>
<td>02</td>
<td>Tarsius bancanus</td>
</tr>
<tr>
<td>03</td>
<td>Presbytis melalophos</td>
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<tr>
<td>04</td>
<td>Nasalis larvatus</td>
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<tr>
<td>05</td>
<td>Macaca fascicularis</td>
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**Family LORISIDAE**

<table>
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<tr>
<th>Species</th>
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<tbody>
<tr>
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**Family TARSIIDAE**

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**Family CERCOPITHECIDAE**

<table>
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<tbody>
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<td>Presbytis melalophos</td>
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<td>Nasalis larvatus</td>
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<tr>
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**Family HYLOBATIDAE**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Hylobates muelleri</td>
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**Family PONGIDAE**

<table>
<thead>
<tr>
<th>Species</th>
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<tbody>
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**Family MANIDAE**

<table>
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<tr>
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**Family HYYLOBATIDAE**

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**Family PONGIDAE**

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**Family MANIDAE**

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**Order RODENTIA**

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**Order PRIMATES**

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<td>Macaca nemestrina</td>
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**Family LORISIDAE**

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**Family TARSIIDAE**

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**Family CERCOPITHECIDAE**

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**Family HYLOBATIDAE**

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**Family PONGIDAE**

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**Family MANIDAE**

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**Family RODENTIA**

<table>
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<tbody>
<tr>
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## Mammals of Borneo and Crocker Range - 5/8

**TBC**: Taman Banjaran Crocker = Crocker Range Park

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<th>English name</th>
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<td>0201</td>
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<td>Callosciurus prevostii</td>
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<td>Callosciurus orestes</td>
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<td>Sundasciurus tenus</td>
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<td>Lariscus insignis</td>
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<td></td>
<td>Lariscus hosei</td>
<td>Four-striped Ground Squirrel</td>
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<td>Dremomys horsfieldi</td>
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<td></td>
<td>Nannosciurus melanotis</td>
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<td>Exilisciurus exilis</td>
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<td>Exilisciurus whiteheadi</td>
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<td>Petaurillus emiliae</td>
<td>Lesser Pigmy Flying Squirrel</td>
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<td>Thomas's Flying Squirrel</td>
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<td>Petinomys hageni</td>
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<td>Petinomys vordermanni</td>
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<td>Hylopetes spadicus</td>
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<td></td>
<td>Petaurista elegans</td>
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<td>Rattus rattus</td>
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<tr>
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<td></td>
<td>Rattus tiomanicus</td>
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</tr>
</tbody>
</table>
## Mammals of Borneo and Crocker Range - 6/8

### TBC : Taman Banjaran Crocker = Crocker Range Park

**Situation in Sabah**
- It has been recorded in Sabah.
- It does not distribute to Sabah.
- It is not clear whether the species inhabits or not in Sabah.

**Situation in Borneo**
- Endemic to Borneo
- Montane species

### Records in Crocker Range

<table>
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<tr>
<th>Code</th>
<th>Scientific name</th>
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<th>Records in Crocker Range</th>
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<tr>
<td>0103</td>
<td>Rattus argentiventer</td>
<td>Ricefield Rat</td>
<td>M</td>
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<tr>
<td>0104</td>
<td>Rattus hulaeensis</td>
<td>Summit Rat</td>
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<tr>
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<td>Rattus exulans</td>
<td>Polynesian Rat</td>
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<td>0202</td>
<td>Sundamys infraluteus</td>
<td>Mountain Giant Rat</td>
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<tr>
<td>0301</td>
<td>Niviventer crenoriventer</td>
<td>Dark-tailed Tree Rat</td>
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<tr>
<td>0302</td>
<td>Niviventer rapit</td>
<td>Long-tailed Mountain Rat</td>
<td>□ □ □</td>
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<tr>
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<td>Maxomys rajah</td>
<td>Brown Spiny Rat</td>
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<tr>
<td>0402</td>
<td>Maxomys surifer</td>
<td>Red Spiny Rat</td>
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<tr>
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<td>Maxomys alticola</td>
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<td>E,M</td>
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<td>Chestnut-bellied Spiny Rat</td>
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<td>Matsumus barodon</td>
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<td>Leopoldamys sabanus</td>
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<tr>
<td>0601</td>
<td>Lenothrix canus</td>
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<td>Mus castaneus</td>
<td>Asian House Mouse</td>
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<td>□</td>
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<td>Mus caroli</td>
<td>Ricefield Mouse</td>
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<td>Chiropodomys gliroides</td>
<td>Common Pencil-tailed Tree-mouse</td>
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<td>□</td>
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<tr>
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<td>Chiropodomys major</td>
<td>Large Pencil-tailed Tree-mouse</td>
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<tr>
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<td>Chiropodomys muroides</td>
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<tr>
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<td>Haeromys margarettae</td>
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<tr>
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<td>Pithcheirops otion</td>
<td>Danum Tree Rat</td>
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### Order CARNIVORA

- 26 species and 2 domestic species

<table>
<thead>
<tr>
<th>Code</th>
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<th>Situation in Borneo</th>
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<tr>
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<td>Canis familiaris</td>
<td>Domestic Dog</td>
<td>D</td>
<td>Domestic</td>
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<td>Helarctos malayanus</td>
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<td>E</td>
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<td>Ferret-badger</td>
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<td>□</td>
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<td>Teledu or Maly Badger</td>
<td>E</td>
<td>□</td>
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<td>0501</td>
<td>Lutra sumatrana</td>
<td>Hairy-nosed Otter</td>
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<tr>
<td>0502</td>
<td>Lutra lutra</td>
<td>Eurasian Otter</td>
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</table>
### Mammals of Borneo and Crocker Range - 7/8

**TBC**: Taman Banjaran Crocker = Crocker Range Park

#### Situation in Sabah
- ●: It has been recorded in Sabah.
- —: It does not distribute to Sabah.
- No mark: It is not clear whether the species inhabits or not in Sabah.

#### Situation in Borneo
- E: Endemic to Borneo
- M: Montane species

#### Records in Crocker Range
- Inside TBC
- Outside TBC
- Before This period

<table>
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<tr>
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Mammals of Borneo and Crocker Range - 8/8

Situation in Sabah  Situation in Borneo

- : It has been recorded in Sabah.     E : Endemic to Borneo
- - : It does not distribute to Sabah.    M : Montane species
No mark : It is not clear whether the  D : Feral domestic species
species inhabits or not in Sabah.

<table>
<thead>
<tr>
<th>Code No</th>
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<th>Situation in Borneo</th>
<th>Records in Crocker Range</th>
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<td>Outside TBC</td>
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<td>Javan Rusa</td>
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<td>Capra aegagrus</td>
<td>Domestic Goat</td>
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</table>

A total of 223 wild terrestrial species, and 6 feral domestic species 202 69 67

The authors confirmed 67 species during May-October 2002, and 32 of them are scientifically new record, then the 101 species are confirmed in total.


* All specimens of Sabah Museum and Sabah Parks (SP) Museum that were collected until the end of September 2000 were examined. ⑦ Sabah Museum ⑤ Sabah Parks Museum

* All specimens of University of Malaysia Sabah (UMS) that were collected until the end of October 2002 were examined.

* All specimens of University of Malaysia Sabah (UMS) that were collected by UMS-SP team during "Crocker Range Park Expedition 2002" were examined.
The 101 species of Crocker Range

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<td>67</td>
<td>Red Giant Flying Squirrel</td>
<td>Petarurista petarurista</td>
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<td>68</td>
<td>Spotted Giant Flying Squirrel</td>
<td>Petarurista elegans</td>
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<td>House Rat</td>
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<td>70</td>
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<td>Rattus argentiniventer</td>
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<td>Polynesian Rat</td>
<td>Rattus exulans</td>
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<td>Muller’s Rat</td>
<td>Sundamys muelleri</td>
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<td>Mountain Giant Rat</td>
<td>Sundamys infraluteus</td>
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<td>Dark-tailed Tree Rat</td>
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<td>Red Spiny Rat</td>
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<td>Maxomys ochraceiventer</td>
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<td>Whitehead’s Rat</td>
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<td>81</td>
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<td>Chiropodomys major</td>
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<td>Long-tailed Porcupine</td>
<td>Trichys fasciculata</td>
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<td>Sun Bear</td>
<td>Helarctos malayanus</td>
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<td>85</td>
<td>Yellow-throated Marten</td>
<td>Martes flavigula</td>
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<td>Teledu</td>
<td>Mydasa javanensis</td>
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<td>Oriental Small-clawed Otter</td>
<td>Aonyx cinerea</td>
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<td>Banded Linsang</td>
<td>Priomodon linsang</td>
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<td>89</td>
<td>Common Palm Civet</td>
<td>Paradoxurus hermaphroditus</td>
<td>104</td>
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<td>90</td>
<td>Masked Palm Civet</td>
<td>Paguma larvata</td>
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<td>91</td>
<td>Small-toothed Palm Civet</td>
<td>Arctogalidia trivirgata</td>
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<td>92</td>
<td>Hose’s Civet</td>
<td>Hemigalus hosei</td>
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<td>93</td>
<td>Short-tailed Mongoose</td>
<td>Herpestes brachyurus</td>
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<td>94</td>
<td>Collared Mongoose</td>
<td>Herpestes semiourquatus</td>
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<td>Clouded Leopard</td>
<td>Neofelis nebulosa</td>
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<td>96</td>
<td>Leopard Cat</td>
<td>Prionailurus bengalensis</td>
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<td>97</td>
<td>Bearded Pig</td>
<td>Sus barbatus</td>
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<td>98</td>
<td>Greater Mouse-deer</td>
<td>Tragulus napu</td>
<td>113</td>
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<td>99</td>
<td>Red Muntjac</td>
<td>Muntiacus muntjak</td>
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<td>Bornean Yellow Muntjac</td>
<td>Muntiacus atherodes</td>
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<tr>
<td>101</td>
<td>Sambar Deer</td>
<td>Cervus unicolor</td>
<td>116</td>
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</tbody>
</table>
**South-east Asian White-toothed Shrew**

**Scientific name**  
*Crocidura fuliginosa*

**Order**  
**INSECTIVORA**

**Family**  
**SORICIDAE**

**English name**  
South-east Asian White-toothed Shrew

**Malay name**  
Cencurut Hutan

**Introduction**

Upperparts dark brownish gray, without pale guard hairs. Underparts slightly paler. Tail brownish, with few or no long hairs. Feet not fringed. Species name "fuliginosa" means "dirty-brown to blackish or sooty".

**Habitat and Ecology**

They occur in both damp and dry forests, open areas, and human habitats of lowland. They can and do dig their own burrows, but often they use those of other animals. Roosts under the ground, or often in a corner of farm-hut. They are active mainly at night. They are aggressive, fearless, and voracious. Diet consists of invertebrates and the bodies of freshly killed animals.

**Distribution**

Assam, northern Indochina, Thailand, Peninsular Malaysia, Sumatra, Java and Sulawesi. [Borneo] Reported from scattered lowland sites. Bt. Soeharto, Langat in East Kalimantan, Bengkayang in West Kalimantan, Lawas, G. Dulit (up to 1470m) and Kuching in Sarawak, Brunei. [Sabah] G. Kinabalu (lower slopes, 1650-3650m), upper Kinabatangan, near Sandakan, near Tawau, Sepilok (cultivated areas around the Reserve), Trus Madi (1650m), Ulu Kalabakan, P. Balambangan. [Crocker Range] Inside TBC Mahua.

**Ethnic name**

Gensuri (Dusun)

**Measurements**


**May - October 2002**

- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature

1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tuen et al. 2000
5. Yasuma 2000

- Crocker Range Area

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. forest</td>
<td>Lowland</td>
</tr>
<tr>
<td>2000-2000m</td>
<td>Inspector</td>
</tr>
<tr>
<td>Mt. forest (200-2000m)</td>
<td>Lowland</td>
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<tr>
<td>Forest on limestone</td>
<td>Inspector</td>
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<tr>
<td>Forest over limestone</td>
<td>Inspector</td>
</tr>
<tr>
<td>Forest over ultramicro-sandstone</td>
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</tr>
<tr>
<td>Swamp Forest</td>
<td>Swamp</td>
</tr>
<tr>
<td>Riverine Forest</td>
<td>Riverine</td>
</tr>
<tr>
<td>Beach, Transitional Forest</td>
<td>Beach</td>
</tr>
<tr>
<td>Swamp Forest</td>
<td>Swamp</td>
</tr>
<tr>
<td>Brackish-water Forest</td>
<td>Swamp</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Mangrove</td>
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</tbody>
</table>

**Time of Activity**

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morning</td>
<td>Arboreal</td>
</tr>
<tr>
<td>Midday</td>
<td>Arboreal &amp; Terrestrial</td>
</tr>
<tr>
<td>Evening</td>
<td>Ground, Terrestrial</td>
</tr>
</tbody>
</table>

[16]
Himalayan Water Shrew

**Measurements**


**Introduction**

Relatively large shrew. Very dark gray-brown with conspicuous silvery guard hairs on the hind quarters. Feet with fringes of white stiff hairs on both lateral edges of the digits. Eyes are small. Ears very small, hidden among the fur of the head. Tail thickly hairy. Second and third teeth of upper jaw about equal. Ellerman and Morrison-Scott (1951) included all Palaearctic and Oriental forms of *Chimarrogale* in one species.

**Habitat and Ecology**

Aquatic. Lives in or near small forest streams, swim well under water. Diet consists of insects, aquatic larvae, small crustaceans, and fish. Apparently nothing has been recorded regarding breeding habits.

**Distribution**

Himalayas through southern China, Southeast Asia, Japan, Taiwan, W. Sumatra. [Borneo] Recorded only from Sabah. [Sabah] Recorded from the middle levels of G. Kinabalu and from G. Trus Madi (450-1700m). [Crocker Range] Inside TBC Mahua.

---

**Measurements**


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Pentail Treeshrew

Measurements

Introduction
Upper part is gray-brown, and underparts yellow-gray. Eyes and ears tend to protrude more than do those of a treeshrew. Tail is long and much of its length naked and rat like. However, half or one third of its length near the tip is clothed in long hair which remains in a horizontal position, giving tail the appearance of a large quill feather. The "ptilo-" is "feathery" and "cercus" is "tail", Genus name means "feathery tailed".

Habitat and Ecology
Unlike all other treeshrews, this species is nocturnal, although at least one writer says it is diurnal. This species is an expert climber, using the tail for support and balance. On the ground it proceeds in a series of hops, with the tip of the tail inclined upward. Occurs mainly in from lowland dipterocarp to montane forests. It nests in holes in tree trunks or branches 12-18 meter high. Feed mainly on insects, other arthropods and fruit.

Distribution

Habitat and Activity
Wooded vegetation
Open area

Specimen: Sabah Parks Specimen

---

Pentail Treeshrew

Order SCANDENTIA
Family TUPAIIDAE

Scientific name 
Ptilocercus lowii

English name 
Pental Treeshrew

Malay name 
Tupai Akar Malam

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Forest (2000-20000m)</td>
<td></td>
</tr>
<tr>
<td>Mt. Forest (200-2000m)</td>
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</tr>
<tr>
<td>Lowland dipterocarp</td>
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</tr>
<tr>
<td>Forest on volcanic rocks</td>
<td></td>
</tr>
<tr>
<td>Forest over ultramicro rocks</td>
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</tr>
<tr>
<td>Mixed Forest</td>
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<tr>
<td>Riverine Forest</td>
<td></td>
</tr>
<tr>
<td>Beach, Transitional forests</td>
<td></td>
</tr>
<tr>
<td>Swamp Forest</td>
<td></td>
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<td></td>
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Introduction
Upper part is gray-brown, and underparts yellow-gray. Eyes and ears tend to protrude more than do those of a treeshrew. Tail is long and much of its length naked and rat like. However, half or one third of its length near the tip is clothed in long hair which remains in a horizontal position, giving tail the appearance of a large quill feather. The "ptilo-" is "feathery" and "cercus" is "tail", Genus name means "feathery tailed".

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Unlike all other treeshrews, this species is nocturnal, although at least one writer says it is diurnal. This species is an expert climber, using the tail for support and balance. On the ground it proceeds in a series of hops, with the tip of the tail inclined upward. Occurs mainly in from lowland dipterocarp to montane forests. It nests in holes in tree trunks or branches 12-18 meter high. Feed mainly on insects, other arthropods and fruit.

Distribution

Ethnic name
Measurements
HB 170-237, T 160-203, T/HB 93.2-112.2%, HF 45-56, E 12.1-16.4, W 148-235 g, D 2133/3133=38, M 0+2+0=8 (T.g.longipes 1+2+0=6, 2+1+0=6 or 0+3+0=6). Skull: 48-52, cbl 48.0-51.0, mtC-M 19.1-21.0.

Introduction
The hair on the upper part is banded dark and pale, appearing finely speckled reddish brown and the tail is of uniform coloring. Usually has a pale stripe on each shoulder. The under part is dull buff to reddish buff and the underside of the tail is generally grayish. Genus name "Tupaia" is originated from Malay and Indonesia name of

Habitat and Ecology
Mainly terrestrial. Common throughout the lowlands, in all types of forest or bushy habitats, ranging up to lower montane forests. Most often seen around fallen trees on the ground. Active throughout the daylight hours but mainly in the early morning (8:30-10:00) and late afternoon (15:00-17:00). Nesting among tree roots and in fallen timber. They feed mainly in insects and other arthropods, also soft fruits. Tupaia apparently breeds throughout the year. The gestation

Distribution
Measurements
HB 156-227, T 131-190, THB 62.5-100%, HF 37-45, E 10-18, W 95-219 g, D 2133/3133=38, M 0+2+0=4. Skull: gl 42-47, cb1 43.1-46.1, iob 12.7-15.3, mtC-M 16.2-18.0.

Introduction
Shoulder stripe and underparts not very much paler than dull brown dorsum, so that usually appears entirely dark brown when glimpsed in the field. Species name "montana" means "mountains".

Habitat and Ecology
Terrestrial. Feeds on the ground and among fallen trees. Diurnal, but mainly early morning and late afternoon. Often stay in burrow under big roots, fallen tree or rock. Occurs in montane forests. Diet a mixture of plant and animal material. One of the commonest mammals in primary montane forests in Sabah, and often settle down around hut or shelter, to look for foods, where visitors take a rest. This species is more sociable than other Tupaia species. The gestation period is 49 to 51 days.

Distribution
Confined to Borneo. Recorded from mountains of Sabah and northern Sarawak. G. Mulu (above 1220m), Kelabit highlands (above 1130m), G. Mulud (up to 2100m) in Sarawak, Bt. Retak in Brunei. (Sabah) Maliau Basin, Sabah-Sarawak border mountains (above 1070m), Sayap (Kota Belud), Trus Madi (1500-2340m), Ulu Kalaban. [Crocker Range] Inside TBC Mahua, Mile 8 Keningau-Kimans, Mile 16 Keningau-Kimans, Mile 17 Keningau-Kimans, Ulu Kimans, Ulu Sunsuron. Outside TBC Ulu Tenom (1200m), Ulu Tomani. 

Ethnic name
Tantaburui (Kadazan).

May – October 2002
● Surveys by SP (authors)
○ CRP Expedition by UMS & SP
△ Information by H. Hazebroek
Quoted from Literature
1 Paine & Francis 1985
2 Sabah Museum specimen
3 Sabah Parks specimen
4 Tan et al 2000
5 Yasuma 2000

20
Lesser Treeshrew

**Measurements**


**Introduction**

The hair on the upper part is banded light and dark giving an overall speckled olive-brown appearance. The under part is buffy, often with a reddish tinge towards the rear. The dorsal and tail are of the same brownish color, but the tail is darker than the body. Species name "*minor*" means "smaller".

**Habitat and Ecology**

Diurnal and mainly arboreal, travels along lanais or branches of small trees. Occurs in lowland dipterocarp and lower montane forests. Found in the low woody vegetation of old also young secondary forests.

**Distribution**


**Scientific name** *Tupaia minor*

**English name** Lesser Treeshrew

**Malay name** Tupai Moncong Akar
Measurements

Skull: gl 34-38, cbl 34.6-36.6, iob 11.6-12.7, mtC-M 13.3-

Introduction
Upperparts speckled olive-brown, underparts buff white with no reddish tinge. Tail long, darker above than body. Species name "gracilis" means "slender" or "graceful".

Habitat and Ecology
Diurnal and mainly arboreal, travels along lanais or branches of small trees. Occurs in lowland dipterocarp forests. Found in the low woody vegetation of old and young secondary forests. Very similar to the Lesser Treeshrew, Tupaia minor.

Distribution
Confined to Borneo and small adjacent islands (P. Karimata, P. Bangka, P. Belitung). Recorded from the lowlands and hills in most areas. Northern East and West Kalimantan, Sarawak, Brunei. [Sabah] Danum Valley, G. Kinabalu, Poring, Sukau, Tabin, Tawau Hill, Ulu Kalabakan, P. Banggi. [Crocker Range] Inside TBC Mile

Ethnic name

Confirmed TBC (Inside)

Slender Treeshrew

Scientific name: Tupaia gracilis
English name: Slender Treeshrew
Malay name: Tupai Moncong Kurus

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montane forest</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Submontane forest</td>
<td></td>
</tr>
<tr>
<td>Lowland forest</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Ground vegetation</td>
<td></td>
</tr>
<tr>
<td>Arid ground</td>
<td></td>
</tr>
<tr>
<td>Coastal vegetation</td>
<td></td>
</tr>
<tr>
<td>Wet ground</td>
<td></td>
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Measurements
HB 130-165, T 162-190, T/HB 110-150%, HF 36-43, E 10.7-13.3, W 60-98 g, D 2133/3133-38, M 1+1+0-4. Skull: gl 34-38, cbl 34.6-36.6, iob 11.6-12.7, mtC-M 13.3-

Introduction
Upperparts speckled olive-brown, underparts buff white with no reddish tinge. Tail long, darker above than body. Species name "gracilis" means "slender" or "graceful".

Habitat and Ecology
Diurnal and mainly arboreal, travels along lanais or branches of small trees. Occurs in lowland dipterocarp forests. Found in the low woody vegetation of old and young secondary forests. Very similar to the Lesser Treeshrew, Tupaia minor.

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HB 130-165, T 162-190, T/HB 110-150%, HF 36-43, E 10.7-13.3, W 60-98 g, D 2133/3133-38, M 1+1+0-4. Skull: gl 34-38, cbl 34.6-36.6, iob 11.6-12.7, mtC-M 13.3-

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<tr>
<td>Wet ground</td>
<td></td>
</tr>
</tbody>
</table>

Measurements
HB 130-165, T 162-190, T/HB 110-150%, HF 36-43, E 10.7-13.3, W 60-98 g, D 2133/3133-38, M 1+1+0-4. Skull: gl 34-38, cbl 34.6-36.6, iob 11.6-12.7, mtC-M 13.3-

Introduction
Upperparts speckled olive-brown, underparts buff white with no reddish tinge. Tail long, darker above than body. Species name "gracilis" means "slender" or "graceful".

Habitat and Ecology
Diurnal and mainly arboreal, travels along lanais or branches of small trees. Occurs in lowland dipterocarp forests. Found in the low woody vegetation of old and young secondary forests. Very similar to the Lesser Treeshrew, Tupaia minor.

Distribution
Confined to Borneo and small adjacent islands (P. Karimata, P. Bangka, P. Belitung). Recorded from the lowlands and hills in most areas. Northern East and West Kalimantan, Sarawak, Brunei. [Sabah] Danum Valley, G. Kinabalu, Poring, Sukau, Tabin, Tawau Hill, Ulu Kalabakan, P. Banggi. [Crocker Range] Inside TBC Mile

Ethnic name

Confirmed TBC (Inside)

Slender Treeshrew

Scientific name: Tupaia gracilis
English name: Slender Treeshrew
Malay name: Tupai Moncong Kurus

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montane forest</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Submontane forest</td>
<td></td>
</tr>
<tr>
<td>Lowland forest</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Ground vegetation</td>
<td></td>
</tr>
<tr>
<td>Arid ground</td>
<td></td>
</tr>
<tr>
<td>Coastal vegetation</td>
<td></td>
</tr>
<tr>
<td>Wet ground</td>
<td></td>
</tr>
</tbody>
</table>

Measurements
HB 130-165, T 162-190, T/HB 110-150%, HF 36-43, E 10.7-13.3, W 60-98 g, D 2133/3133-38, M 1+1+0-4. Skull: gl 34-38, cbl 34.6-36.6, iob 11.6-12.7, mtC-M 13.3-

Introduction
Upperparts speckled olive-brown, underparts buff white with no reddish tinge. Tail long, darker above than body. Species name "gracilis" means "slender" or "graceful".

Habitat and Ecology
Diurnal and mainly arboreal, travels along lanais or branches of small trees. Occurs in lowland dipterocarp forests. Found in the low woody vegetation of old and young secondary forests. Very similar to the Lesser Treeshrew, Tupaia minor.

Distribution
Confined to Borneo and small adjacent islands (P. Karimata, P. Bangka, P. Belitung). Recorded from the lowlands and hills in most areas. Northern East and West Kalimantan, Sarawak, Brunei. [Sabah] Danum Valley, G. Kinabalu, Poring, Sukau, Tabin, Tawau Hill, Ulu Kalabakan, P. Banggi. [Crocker Range] Inside TBC Mile

Ethnic name
Large Treeshrew

Scientific name *Tupaia tana*
English name Large Treeshrew
Malay name Tupai Moncong Belang Pendek

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Serat 2000-3000 m</td>
<td>Night</td>
</tr>
<tr>
<td>Mt. Serat 1200-2000 m</td>
<td>Daytime</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td>Common</td>
</tr>
<tr>
<td>Heath forest</td>
<td></td>
</tr>
<tr>
<td>Ritter forest</td>
<td></td>
</tr>
<tr>
<td>Bock, Traditional forest</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Brackenwater forest</td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

Habitat and Ecology

Diurnal and terrestrial. Occurs in lowland dipterocarp and lower montane forests. Found in tall and secondary, and dense, comparatively good forests. Feeds on arthropods and earthworms with some fruit.

Sherman et al. 2000 Sabah Parks specimen Tuen et al. 2000

Yasuma 2000

Qutoed from Literature

May – October 2002
CRP Expedition by UMS & SP
Information by H. Hazebroek

Ethnic name

Confirmed TBC (Inside, Outside)
Smooth-tailed Treeshrew

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. forest 0-100m</td>
<td>Territorial</td>
</tr>
<tr>
<td>Mt. forest 100-200m</td>
<td>Lowland dipterocarp</td>
</tr>
<tr>
<td>Lower montane forest 1-200m</td>
<td>Upper montane forest</td>
</tr>
<tr>
<td>Forest over sandstone</td>
<td>Wetland forest</td>
</tr>
<tr>
<td>Bathyal forest</td>
<td>Grassland savanna</td>
</tr>
<tr>
<td>Riverine forest</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Beach, Transitional forest</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Brackish-water forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

Measurements


Introduction

Small species, appears thin and rat-like. Upperparts are mixed blackish and ochraceous-buff or cinnamon-rufous, the darker color predominating, underparts and the inner side of the legs are ochraceous. No facial markings. Tail long, thickly haired throughout its length, hairs short and close-lying. The "dendro-" means "tree-", "tree-like-" or "on trees-". The "melan-" is "black".

Habitat and Ecology

Mountains. Living among the moss-covered, stunted jungle. During the day, this treeshrew is quite active, running about on the lower branches of trees and shrubs looking for insects. More arboreal than Tupaia species.

Distribution

Confined to Borneo. Montane forest on G. Dulit (above 900m), G. Mulu (1200-2100m) and Kelabit highlands in northern Sarawak, Sabah-Sarawak border. [Sabah] G. Kinabalu (900-3350m), Trus Madi. [Crocker Range] Inside TBC Gn. Emas, Mile 16 Keningau-Kimanis.

Ethnic name

Lohisan (Kadazan).
Measurements
HB 344-377, T 237-245, HF 63.7-73, E 18.5, W 850-1,300 g, D 0134/2124=34, M=2+0+0=4. Skull: gl 70.

Introduction
Called as Flying Lemur, too. The gliding membrane extends between the front and hind legs, and encloses the tail. The fur is a warm reddish brown beneath, while above and on the upper surface of the membrane, it is marked with grayish patches, or the whole fur is grayish green. The ears show up bright red. Genus name "Cynocephalus"

Habitat and Ecology
Arboreal and nocturnal but sometimes active in the morning and late afternoon. Occurs in lowland dipterocarp forests. Found in tall and secondary forests, and sometimes plantations, gardens and mangrove. Rests both in tree holes and in the crowns of trees. The mother often carries the young, and when the mother hangs in an upside-down position, the young appears to be carried inside the membrane, and may occasionally be seen peeping over the edge. Colugo is herbivorous, feeding upon the young

Distribution
South Indochina, Thailand, Peninsular Malaysia, Sumatra and adjacent islands (P. Anamba, P. Riau, P. Lingga, P. Bangka), Java. [Borneo] Known throughout the lowlands and hills, occasionally ranging up to 900m, Brunei, P. Natuna, P. Serasan, P. Laut, P. Sebuku. [Sabah] Danum Valley, G. Kinabalu, Sepilok, Tabin, Tawau Hill, P. Banggi, P. Balambangan. [Crocker Range] Inside TBC No

Ethnic name
Apuyut (Murut), Apuyut Palanuk (Murut), Kagu (Dusun), Kagui (Bisaya), Kubung (Murut, Lundaya, Tidung, Brunei, Kesayan), Langah (Kadazan), Opopuyut (Murut), Tagaut (Kadazan), Tagawat (Kadazan), Tangah (Kadazan).
Measurements
FA 177-200, T none, HF 46.3-50, E 39.7-41.7, W 565-1,100 g, D 2132/2133=34, M 1+0+0=2. Skull: gl 72-78.

Introduction
The largest of all the bats. Forearm over 150 mm. Black back with gray streaking, back of head, neck and shoulders reddish, underparts blackish brown. The penis resembles that of some Primates. The “ptero” is “wing” and “-pus” is “-foot”.

Habitat and Ecology
About dusk they fly to fruiting trees to feed. They eat, rest, and digest their food for several hours while at their feeding trees. They then return to their roosting site. Roosts in large established colonies on open branches of trees. The principal food is fruit juices, which they obtain by squeezing pieces of the fruit pulp in their mouths. They swallow the juice and spit out the pulp and seeds. Occurs lowland dipterocarp, heath, riverine, littoral, swamp and mangrove. Enters plantations and gardens during fruiting seasons.

Distribution

Ethnic name
Bangkawat (Murut), Bangkawot (Murut), Bengkao (Bisaya), Bengkawot (Dasun), Bengkawit (Tidung), Bengkawot (Tidung), Pawai (Lurut), Gahir (Dusun), Gavi (Kadazan), Gawai (Dusun, Kadazan), Kabbui (Sungai), Kaluang (Kedayan), Keluang (Kedayan), Mangkawot (Dasun), Ngkawat (Dasun), Pawai (Murut).

May ~ October 2002
Confirmed by Authors
CPR Expedition by UMS
Quoted from Literature
Paine & Francis 1985 Sabah Museum specimen
Tuen et al. 2000

Large Flying Fox

Scientific name
Pteropus vampyrus

English name
Large Flying Fox

Malay name
Keluang Besar

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Forest 2000-3000m</td>
<td>Tropical Forest</td>
</tr>
<tr>
<td>Mt. Forest 1300-2000m</td>
<td>Cameron Forest</td>
</tr>
<tr>
<td>Lowland deciduous forest &lt;1200m</td>
<td>Cameron Forest</td>
</tr>
<tr>
<td>Forest over 1200m</td>
<td>Cameron Forest</td>
</tr>
<tr>
<td>Forest over ultradomes rocks</td>
<td>Cameron Forest</td>
</tr>
<tr>
<td>Swamp Forest</td>
<td>Cameron Forest</td>
</tr>
<tr>
<td>Riverine Forest</td>
<td>Cameron Forest</td>
</tr>
<tr>
<td>Banana-water forest</td>
<td>Cameron Forest</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Cameron Forest</td>
</tr>
</tbody>
</table>

Roost
- open tree-branch
- under leaf
- bush
- epiphyte-clump
- under fallen-tree
- rock shelter
- live bamboo stem
- dead bamboo stem
- hollow tree
- crevice rock
- shallow cave
- brighter cave
- dark cave
- tunnel or pipe
- house

Confirmed TBC (Outside)

Code 04010201
Order CHIROPTERA
Family PTEROPODIDAE

Large Flying Fox

Scientific name
Pteropus vampyrus

Order CHIROPTERA
Family PTEROPODIDAE

English name
Large Flying Fox

Malay name
Keluang Besar

Measurements
FA 177-200, T none, HF 46.3-50, E 39.7-41.7, W 565-1,100 g, D 2132/2133=34, M 1+0+0=2. Skull: gl 72-78.
Short-nosed Fruit Bat

**Measurements**
FA 51.6-67.2, T 6.2-15.5, HF 10.5-17.7, E 14-17, W 21-42.5 g, Pregnant female 47-50 g, D 2131/2132 =30, M 1+0+0=2. Skull: gl 27-30, cbl 26.4-28.5.

**Introduction**
A medium sized fruit bat with a short muzzle, brown with brighter collar which is dark orange in adult males, yellowish in females. They have prominent, almost tubular nostrils, and upper lip is divided by a deep vertical groove. Ears and wing bones are edged in white. Molar teeth plain (no accessory cusps). The “cyno” means “dog-like”, “brachy” means “short”.

**Habitat and Ecology**
The commonest of fruit bats in all vegetation. The altitudinal range is from sea level to 1,650 meters. Feeds mainly on small fruits, sucking out the juice and soft pulp. Uniparous. Roosts in trees, under leaves, bush, brighter cave and roofs of houses. In flight, short-nosed fruit bats are usually seen among bushes and low trees. They may travel 97 to 113 km, in one night to feed on.

**Distribution**
South Indochina, Thailand, Peninsular Malaysia, Sumatra, Sulawesi, Philippines. [Borneo] Found throughout the state. Batu Putih (Kinabatangan), Batu Putih (Tabin), Binsuluk, Bonggaya, Danum Valley, Gomantong, S. Inarad (Ulu S. Pinangah), G. Kinabalu (up to 1700m), Klias, Maliau Basin, Sapulut forest Reserve, Sepilok, Sukau, Tabin, Tawau Hill, Trus Madi (1650m), P. Bakungan, P. Banggi, P. Balambangan, P. Gaya, P. Malawali. [Crocker Range] Inside TBC Mahua, Mile 8 Keningau-Kimanis, Mile 16 Keningau-Kimanis, Ulu Kinamis, Ulu Membakut, Ulu Magindanau, Ulu Senagang, Ulu Sunsuron. Outside TBC Babagon Lawt, Penampang, Ulu Tomani.

**Ethnic name**
Barubud (Sungai).
Measurements

Introduction
Similar to the Short-nosed Fruit Bat, *Cynopterus brachyotis*, but slightly larger. Cheek teeth broader and squarer than other *Cynopterus*, a small distinct cusp (peg-like projections) present on the occlusal surfaces (in the center) of last premolar and first molar of lower jaw.

Habitat and Ecology
Feeds mainly on fruit. Occurs in lowland dipterocarp forests. Roosts in rock shelters or caves, usually near the entrance. Occasionally found in trees or palms.

Distribution

Ethnic name
Measurements
FA 56.0-63.4, T 7.9-14, HF 11.2-13.9, E 14-17.1, W 30-44 g, D 2131/1132=28, M 1+0+0=2. Skull: gl 27-31.

Introduction
Medium sized bats, very similar to *Cynopterus*, but coloration generally dark gray-brown. Upperparts dark gray-brown, underparts pale buffy gray. Top of head often distinctly darker down the center and paler near the eyes. Ears have dark edges. Only one pair of lower incisors.

Habitat and Ecology
Roosts mainly at large rocks overhanging a small stream, rock shelters or caves. Eats fruit which it carries back to the cave to eat. Uniparous. Occurs in lowland dipterocarp forests. Found in more and less remote forests from village.

Distribution
Peninsular Malaysia, Riau archipelago. [Borneo] Recorded throughout the lowlands, up to 600m on Apau Kayan, Kalimantan, Sarawak, Brunei. [Sabah] Batu Ponggul, Gomantong, upper S. Kuamat, G. Kinabalu, Marak-Parak (Kota Marudu), Sapulut, Tabin, Tawau Hill, Trus Madi. [Crocker Range] Inside TBC Mile 17 Keningau-Kimanis. Outside TBC Bekuku, Gua Laing, Ulu Kimanis, Ulu Tomanai.

Ethnic name

Mammals of Crocker Range

Dusky Fruit Bat

Scientific name: *Penthetor lucasi*
English name: Dusky Fruit Bat
Malay name: Cecada Hitam Pudar

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
<th>Common</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Serat 2000-3000m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mt. Serat 1300-2000m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest 0-200m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest over limestone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heath forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riverine forest</td>
<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
<td></td>
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<tr>
<td>Brackish water forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fruit-bat: | Food: fruit, nectar, pollen
Roost: open tree, branch, under leaf, bush, epiphyte-clump, under fallen tree, crevice, rock, shallow, cave, dark, tunnel, pipe, house

Measurements
FA 56.0-63.4, T 7.9-14, HF 11.2-13.9, E 14-17.1, W 30-44 g, D 2131/1132=28, M 1+0+0=2. Skull: gl 27-31.

Introduction
Medium sized bats, very similar to *Cynopterus*, but coloration generally dark gray-brown. Upperparts dark gray-brown, underparts pale buffy gray. Top of head often distinctly darker down the center and paler near the eyes. Ears have dark edges. Only one pair of lower incisors.

Habitat and Ecology
Roosts mainly at large rocks overhanging a small stream, rock shelters or caves. Eats fruit which it carries back to the cave to eat. Uniparous. Occurs in lowland dipterocarp forests. Found in more and less remote forests from village.

Distribution
Peninsular Malaysia, Riau archipelago. [Borneo] Recorded throughout the lowlands, up to 600m on Apau Kayan, Kalimantan, Sarawak, Brunei. [Sabah] Batu Ponggul, Gomantong, upper S. Kuamat, G. Kinabalu, Marak-Parak (Kota Marudu), Sapulut, Tabin, Tawau Hill, Trus Madi. [Crocker Range] Inside TBC Mile 17 Keningau-Kimanis. Outside TBC Bekuku, Gua Laing, Ulu Kimanis, Ulu Tomanai.

Ethnic name

Mammals of Crocker Range

Dusky Fruit Bat

Scientific name: *Penthetor lucasi*
English name: Dusky Fruit Bat
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Habitat and Activity

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<tr>
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<td></td>
</tr>
<tr>
<td>Mt. Serat 1300-2000m</td>
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<td></td>
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<td>Forest 0-200m</td>
<td></td>
<td></td>
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<td>Forest over limestone</td>
<td></td>
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</tr>
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<td></td>
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</tr>
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</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Fruit-bat: | Food: fruit, nectar, pollen
Roost: open tree, branch, under leaf, bush, epiphyte-clump, under fallen tree, crevice, rock, shallow, cave, dark, tunnel, pipe, house

Measurements
FA 56.0-63.4, T 7.9-14, HF 11.2-13.9, E 14-17.1, W 30-44 g, D 2131/1132=28, M 1+0+0=2. Skull: gl 27-31.

Introduction
Medium sized bats, very similar to *Cynopterus*, but coloration generally dark gray-brown. Upperparts dark gray-brown, underparts pale buffy gray. Top of head often distinctly darker down the center and paler near the eyes. Ears have dark edges. Only one pair of lower incisors.

Habitat and Ecology
Roosts mainly at large rocks overhanging a small stream, rock shelters or caves. Eats fruit which it carries back to the cave to eat. Uniparous. Occurs in lowland dipterocarp forests. Found in more and less remote forests from village.

Distribution
Peninsular Malaysia, Riau archipelago. [Borneo] Recorded throughout the lowlands, up to 600m on Apau Kayan, Kalimantan, Sarawak, Brunei. [Sabah] Batu Ponggul, Gomantong, upper S. Kuamat, G. Kinabalu, Marak-Parak (Kota Marudu), Sapulut, Tabin, Tawau Hill, Trus Madi. [Crocker Range] Inside TBC Mile 17 Keningau-Kimanis. Outside TBC Bekuku, Gua Laing, Ulu Kimanis, Ulu Tomanai.

Ethnic name
**Tailless Fruit Bat**

**Scientific name**: *Megaerops ecaudatus*

**English name**: Tailless Fruit Bat

**Malay name**: Cecadu Tak Berekor

**Measurements**
- FA: 50-58
- HF: 8-16.8
- E: 13-15.4
- W: 18.2-38 g
- D: 2131/1132=28
- M: 1+0+0=2
- Skull: gl 27, cbl 24.0-26.2

**Introduction**
Ears not edged in white. Muzzle short with broad slightly tubular nostrils. Upperparts uniform mid-brown. Posterior margin of interfemoral membrane more or less naked. One pair of lower incisors. The second upper incisor is reduced in length. The base of the thumb is partially enveloped in the wing membrane so that it folds inward when the wing is folded. The "mega-" means "big-".

**Habitat and Ecology**
Occurs in lowland dipterocarp, heath and riverine forests. Usually netted in old secondary forests. Eats fruits. The structural similarity of *Megaerops* to *Cynopterus* suggests similar habits. However, little information regarding the habits and life history has been found.

**Distribution**

**Ethnic name**

---

**Tailless Fruit Bat**

**Code**: 04010501

**Order**: CHIROPTERA

**Family**: PTEROPODIDAE

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. forest 2000-3000m</td>
<td>Village, Bat, Pit, Hut, Croaker Range Area (Few)</td>
</tr>
<tr>
<td>Flatland forest</td>
<td>Hutan, G. Borneo</td>
</tr>
<tr>
<td>Forest over lowland rocks</td>
<td>Forest, G. Kinabalu</td>
</tr>
<tr>
<td>Swamp forest</td>
<td>Garden, Forest, Hutan, G. Kinabalu</td>
</tr>
</tbody>
</table>

**Roost**
- Open tree-branch, trees under leaf, bush epiphyte, gym or under fallen-tree
- Rock shelter, live bamboo stem, dead bamboo stem
- Hollow tree, crevice rock, shallow cave
- Brighter cave, dark cave, tunnel or pipe, house

**May ~ October 2002**
- **Confirmed by Authors**
- **CRP Expedition by UMS**
- **Quoted from Literature**
  1. Paine & Francis 1985
  2. Sabah Museum specimen
  3. Sabah Parks specimen
  4. Tuen et al. 2000

**Confirmed TBC (Inside, Outside)**

**Tailless Fruit Bat**

**Code**: 04010501

**Scientific name**: *Megaerops ecaudatus*

**English name**: Tailless Fruit Bat

**Malay name**: Cecadu Tak Berekor

**Habitat and Activity**

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**Roost**
- Open tree-branch, trees under leaf, bush epiphyte, gym or under fallen-tree
- Rock shelter, live bamboo stem, dead bamboo stem
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- Brighter cave, dark cave, tunnel or pipe, house

**May ~ October 2002**
- **Confirmed by Authors**
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4. Tuen et al. 2000

**Measurement**
- FA: 50-58, T: none, HF: 8-16.8, E: 13-15.4, W: 18.2-38 g, D: 2131/1132=28, M: 1+0+0=2
- Skull: gl 27, cbl 24.0-26.2
Measurements
FA 77-82, T 19-28.6, HF 18-19.6, E 17.5-21.4, W 75-100 g, D 2121/2132=28, M 1+0+0=2. Skull: gl 37-40.

Introduction
Similar to Cynopterus, with a distinct tail, short and stout muzzle, and thick jaw. Only three upper cheek teeth. Upperparts dark gray-brown, underparts paler. Fur short. The "dyac" originated in "Dayak" which is a generic term of ethnic groups. Species name "spadiceus" means "chestnut-brown" or "date-colored".

Habitat and Ecology
Feeds on fruits. Occurs in lowland dipterocarp forests. Once netted in old secondary forests.

Distribution

Ethnic Name
[31]
**Spotted-winged Fruit Bat**

**Measurements**
FA 37.6-45, T none, HF 6.9-9.5, E 9-12, W 10-15 g, D 2132/1132=30, M 1+0+0=2. Skull: gl 21-23.

**Introduction**
A small dark fruit bat easily recognized by pale (chestnut-colored) spots on wings, especially on joints of digits. Upper incisors close together and angled inwards. Species name "maculata" means "spotted". *Balionycteris* closely resembles the Black-capped Fruit Bat, *Chironax melanocepharus*, in structural features.

**Habitat and Ecology**
Occurs in lowland dipterocarp, heath and riverine forests. Roosts in trees, crowns of palms and clumps of epiphytic ferns.

**Distribution**

**Ethnic Name**
Habitat and Activity

**Measurements**
FA 37.6-45, T none, HF 6.9-9.5, E 9-12, W 10-15 g, D 2132/1132=30, M 1+0+0=2. Skull: gl 21-23.

**Introduction**
A small dark fruit bat easily recognized by pale (chestnut-colored) spots on wings, especially on joints of digits. Upper incisors close together and angled inwards. Species name "maculata" means "spotted". *Balionycteris* closely resembles the Black-capped Fruit Bat, *Chironax melanocepharus*, in structural features.

**Habitat and Ecology**
Occurs in lowland dipterocarp, heath and riverine forests. Roosts in trees, crowns of palms and clumps of epiphytic ferns.

**Distribution**

**Ethnic Name**

**Table:**

<table>
<thead>
<tr>
<th>Habitat and Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woody vegetation</td>
</tr>
<tr>
<td>Open area</td>
</tr>
<tr>
<td>Mt. forest 2000-3000m</td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
</tr>
<tr>
<td>SST&gt;2000m</td>
</tr>
<tr>
<td>Forest over limestone</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
</tr>
<tr>
<td>Shale forest</td>
</tr>
<tr>
<td>Riverine forest</td>
</tr>
<tr>
<td>Riverine forest</td>
</tr>
<tr>
<td>Swamp forest</td>
</tr>
<tr>
<td>Brachistophyllum forest</td>
</tr>
<tr>
<td>Mangrove forest</td>
</tr>
</tbody>
</table>

**Food**

<table>
<thead>
<tr>
<th>Fruit-bat</th>
<th>Food</th>
<th>nectar</th>
<th>pollen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roost</td>
<td>open tree-branch</td>
<td>trees under leaf</td>
<td>house</td>
</tr>
<tr>
<td>rock shelter</td>
<td>live bamboo stem</td>
<td>dead bamboo stem</td>
<td></td>
</tr>
<tr>
<td>hollow tree</td>
<td>crevice rock</td>
<td>shallow cave</td>
<td></td>
</tr>
<tr>
<td>brighter cave</td>
<td>dark cave</td>
<td>tunnel or pipe</td>
<td></td>
</tr>
</tbody>
</table>

**Map:**

**May – October 2002**

[1] Confirmed by Authors

[2] CRP Expedition by UMS

Quoted from Literature

1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tuen et al. 2000
5. Yasuma 2000
Measurements
FA 41.3-46, T none, HF 9.1-11.1, E 9.9-13, W 13.5-25.3 g, D 2131/1132=28, M 1+0+0=2. Skull: gl 25.

Introduction
Small tailless bat similar to Balionycteris, but without the second upper molar. Upperparts gray, crown distinctly darkened. Posterior margin of interfemoral membrane narrow and thickly furred to the ankle. Ears small.

Habitat and Ecology
Common in montane forests above 1,000 meters.

Distribution

Ethnic name

Grey Fruit Bat
Scientific name Aethalops alecto
English name Grey Fruit Bat
Malay name Cacada Bukit

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Sarut 2000-3000m</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Mt. Sarut 1000-2000m</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Lowland diphteromyia</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Forest over hilltree</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Heath forest</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Riverine forest</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Beach, Transitional forests</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Swamp forest</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Brackish water forest</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Crocker Range Area Common</td>
</tr>
</tbody>
</table>

| Crocker Range Area Common |

<table>
<thead>
<tr>
<th>Fruit-bat</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roost</td>
<td>fruit, nectar, pollen</td>
</tr>
<tr>
<td>Rock shelter</td>
<td>live bamboo stem, dead bamboo stem</td>
</tr>
<tr>
<td>Hollow tree</td>
<td>crevice rock, shallow cave</td>
</tr>
<tr>
<td>Brighter cave</td>
<td>dark cave</td>
</tr>
<tr>
<td>Tunnel or pipe</td>
<td>house</td>
</tr>
</tbody>
</table>

Measurements
FA 41.3-46, T none, HF 9.1-11.1, E 9.9-13, W 13.5-25.3 g, D 2131/1132=28, M 1+0+0=2. Skull: gl 25.

Introduction
Small tailless bat similar to Balionycteris, but without the second upper molar. Upperparts gray, crown distinctly darkened. Posterior margin of interfemoral membrane narrow and thickly furred to the ankle. Ears small.

Habitat and Ecology
Common in montane forests above 1,000 meters.

Distribution

Ethnic name
Greater Nectar Bat

Scientific name: Eonycteris major
Malay name: Cecadu Fajar Besar

Habitat and Activity

<table>
<thead>
<tr>
<th>Habitat and Activity</th>
<th>Wood</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. forest 2000-3000m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mt. forest 1300-2000m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest &gt; 5000m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest near limestone</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forest near ultramafic rocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shale forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Riverine forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beach, Transitional forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mangroves forest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Food</th>
<th>Fruit-bat</th>
<th>Pollen</th>
<th>Nectar</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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<td></td>
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</tr>
</tbody>
</table>

Measurements

FA 71-84.2, T 18-4.20, HF 15.7-20, E 20.1-21.1, W 91-114 g, D 2132/2133=34.

Introduction

Fur uniform dark blackish brown. Lucks a claw on the second digit. Muzzle elongate and slightly decurved. The "major" is "larger" or "bigger".

Habitat and Ecology

Occurs in lowland dipterocarp forests. Feeds on pollen and nectar. Roosts in caves.

Distribution

Philippines. [Borneo] Scattered records from most areas. Kutai, Kurayan in East Kalimantan, Tabalong in South Kalimantan, G. Dulit and Kuching in Sarawak. [Sabah] Marak-parak (Kota Marudu), Poring, Ranau, Sapulut forest reserve, Sayap (Kota Belud), Tawau Hill, Trus Madi. [Crocker Range] Inside TBC No record. Outside TBC Tuaran.

Ethnic name

CRP Expedition by UMS

Quoted from Literature

Paine & Francis 1985
Sabah Museum specimen
Sabah Parks specimen
Tuen et al. 2000
Yasuma 2000
Measurements
FA 37.6-45, T none or very short 4.1-5.7, HF 8.1-10.1, E 11-16, W 11.2-16.8 g, pregnant female 15-20 g, D

Introduction
Small bats with a long narrow muzzle and a very long tongue. Tail minute or lacking. Lower jaw thin and weak. Upperparts buffy brown with pale bases. Underparts paler and gray. Wing membranes light brown. The "macro-" is "big-" or "long-" and "glossu" is "tongued". Genus name "Macroglossus" means "long-tongued".

Habitat and Ecology
Occurs in lowland dipterocarp, heath, riverine, littoral and swamp forests, and mangrove. They seem to prefer the pollen and nectar of the cultivated jambu, Eugenia, and century plants, Agave. Although long-tailed fruit bats shelter under the branches of trees and under roofs, the preferred daytime retreat seems to be in the rolled leaves of hemp and banana plants.

Distribution
South Indochina, Coastal Thailand, Peninsular Malaysia, southern Philippines, Java, Sulawesi, through to New Guinea, northern Australia. [Borneo] Recorded from most areas. Kalimantan, Sarawak, Brunei. [Sabah] Common to most areas. Batu Ponggul, Bonggaya, Crocker Range (1300m), Danum Valley, Klias, Maliau Basin, Marak-parak (Kota Marudu), Poring, Pun Batu, Sapulut forest reserve, Sepilok, Sipitang, Sukau, Seimens (Kota Marudu), Tabin, Tawau Hill, Tins Madi (1650m), P Banggi, P Malawai. [Crocker Range] Inside TBC Mahua, Mile 8 Keningau-Kimanis, Mile 16 Keningau-Kimanis, Mile 21 Keningau-Kimanis, Ulu Kimanis, Ulu Magindanau, Ulu Senagang. Outside TBC Ulu Tomani.

Ethnic name

<table>
<thead>
<tr>
<th>Habitats and Activity</th>
<th>Habitat and Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Woody vegetation</td>
<td>Open area</td>
</tr>
<tr>
<td>Mt. Serat 2000-3000m</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Mt. Serat 1300-2000m</td>
<td>Common</td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Forest 0-1220m</td>
<td>Common</td>
</tr>
<tr>
<td>Forest over 1220m</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Forest over subalpine</td>
<td>Common</td>
</tr>
<tr>
<td>Heath forest</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Riverine forest</td>
<td>Common</td>
</tr>
<tr>
<td>Beach, Transitional</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Foorest</td>
<td>Common</td>
</tr>
<tr>
<td>Swamp forest</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Brackish water forest</td>
<td>Common</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Crocker Range Area</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fruit-bat</th>
<th>Food</th>
<th>nectar</th>
<th>pollen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roost</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>open tree-branch</td>
<td>tree</td>
<td>under</td>
<td></td>
</tr>
<tr>
<td>bush</td>
<td>epiphyte-clump</td>
<td>under</td>
<td></td>
</tr>
<tr>
<td>rock shelter</td>
<td>live bamboo stem</td>
<td>under</td>
<td></td>
</tr>
<tr>
<td>hollow tree</td>
<td>crevice rock</td>
<td>shallow</td>
<td>cave</td>
</tr>
<tr>
<td>brighter cave</td>
<td>dark cave</td>
<td></td>
<td></td>
</tr>
<tr>
<td>tunnel or pipe</td>
<td></td>
<td>house</td>
<td></td>
</tr>
</tbody>
</table>

Long-tongued Nectar Bat

Scientific name: Macroglossus minimus
Malay name: Cecadu Madu Bakau

Habitat and Activity

Crocker Range Area
Common

Map – October 2002
Confirmed by Authors
CRP Expedition by UMS
Quoted from Literature
1. Paine & Francis 1985
2. Sabah Parks specimen
3. Yasumoto 2000

May 2003
Measurements
FA 45-49.5, T 13.1-19.5, HF 6.3-9.5, E 9.7-15, W 4-9 g, D 2123/3123=34, M 1+0+0=2. Skull: condylocanine length (ccl), from the back of the occipital condyles to the front of the canines, 12.7-13.8.

Introduction
Uniformly dark brown to reddish-brown. Roosting posture, supported by the wrists, is distinctive. There is a short gap (diastema) between first and second premolars and a longer palate in front of the molars. The two species of Emballonura are very difficult to distinguish, but Emballonura alecto is slightly larger. Condylobasal length of skull more than 14.0 mm. Maxillary toothrow more than 5.7 mm.

Habitat and Ecology
Roosts is partially open areas such as under fallen tree, shallow caves, rock crevices or brighter caves, usually small groups of two to five individuals. Uniparous. Occurs in lowland dipterocarp and lower montane forests.

Distribution

Ethnic name

**Greater Sheath-tailed Bat**

**Scientific name**: Emballonura alecto

**English name**: Greater Sheath-tailed Bat

**Malay name**: Kelawar Teng Teng Besar

**Habitat and Activity**

**Woody vegetation**
- Mt. forest 2000-3000m
- Mt. forest 3000-3300m
- Lowland dipterocarp
- Forest over limestone
- Forest over ultramafic rocks
- Swamp forest
- Riverine forest
- Rock crevice forest
- Gully forest

**Open area**
- Rice paddy
- Flooded field
- Coast
- Coastal settlement
- Crocker Range Area

**Insectivorous bat**

**Feeding**
- Open area
- Understory
- Middle story

**Roost**
- Open tree-branch
- Tree
- Bush epiphyte-clump
- Dead bamboo stem
- Hollow tree
- Tale of cave
- Tree
- Tunnel or pipe
- House

**Food**
- Largely insects

Measurements
FA 45-49.5, T 13.1-19.5, HF 6.3-9.5, E 9.7-15, W 4-9 g, D 2123/3123=34, M 1+0+0=2. Skull: condylocanine length (ccl), from the back of the occipital condyles to the front of the canines, 12.7-13.8.

**Introduction**
Uniformly dark brown to reddish-brown. Roosting posture, supported by the wrists, is distinctive. There is a short gap (diastema) between first and second premolars and a longer palate in front of the molars. The two species of Emballonura are very difficult to distinguish, but Emballonura alecto is slightly larger. Condylobasal length of skull more than 14.0 mm. Maxillary toothrow more than 5.7 mm.

**Habitat and Ecology**
Roosts is partially open areas such as under fallen tree, shallow caves, rock crevices or brighter caves, usually small groups of two to five individuals. Uniparous. Occurs in lowland dipterocarp and lower montane forests.

**Distribution**

**Ethnic name**
**Measurements**

FA 70.4-78, T 27.5-34.4, HF 16.7-18, E 19-20.8, Tragus 5.8-5.9, W 39.5-54.5 g, D 1123/3123=32, M 1+0+0=2.

**Introduction**

Upperparts blackish brown. Underparts usually white. No wing pouch (although poorly developed), but chin pouch are there in both sexes. Family Emballonuridae bats have a distinctive tail which is enclosed until about half way along the interfemoral membrane, and the tip of tail lies freely on the surface of the interfemoral membrane. The "sacculus" means "small pocket".

**Habitat and Ecology**

Usually roosts in attics of house. Occurs in lowland dipterocarp, mangrove, heath and riverine forests. In Mangrove, shelters in groups of five or six in hollow trees of full grown Pussur wood, Xylocarpus granatum. Usually begin feeding before dusk at altitudes of 60 to 90 meters, coming to lower levels as the evening progresses. Diet consists of flying insects.

**Distribution**


**Ethnic name**

[37]
Lesser False Vampire

Scientific name: Megaderma spasma
English name: Lesser False Vampire
Malay name: Kelawar Telinga Lebar

Measurements

Introduction
Fur pale gray to gray-brown. Noseleaf has long dorsal lobe with stiffened central ridge. It has large rounded ears joined across the top of the head. Tragus is long and forked. No visible tail, although interfemoral membrane is well developed. Premaxillaries minute with no upper incisors. Canines project well forward with a distinct externally.

Habitat and Ecology
Occurs in lowland dipterocarp forests. Roosts in small groups in caves, tunnels, hollow trees or vacant houses, and are usually the sole occupants of their retreats. The sexes of this species live together the year round. The gestation period is about five months. Feeds on insects, spiders, and small vertebrates, such as other bats, rodents, birds, frogs, and fish. When eating bats, they may first suck the blood and eat the flesh. Remains of fish and frogs are found beneath their roosts, so it is assumed the bats catch such animals themselves.

Distribution

Ethnic name

Confined TBC (Inside)
Measurements
FA 40-44.3, T 21-29, HF 6.8-8.4, E 15.6-19, W 6.5-9.4 g.


Introduction
Gray-brown to reddish, Ears relatively small. Wing arise from ankle. Noseleaf simple without extra lappets or flaps. Connecting process varies from slightly rounded to bluntly pointed. The "lopho-" is "crested", Genus name means "rhino-like crested". 4 mammillae (two teat-like processes, not connected with a mammary gland and known as dummy tears, are found on the abdomens).

Habitat and Ecology
Occurs in lowland dipterocarp and lower montane forests, also found in forests over limestone. Roosts in caves and tunnels, sometimes make big colonies. Forages in under story of forests. Biparous.

Distribution
Con Son island (off Indochina), Java and smaller islands. [Borneo] Commonly found in most cave systems. East, South and West Kalimantan, Niah, Hose Mountains, near Kuching in Sarawak, Brunei. [Sabah] Batu Ponggul, Batu Putih (Tabin), Danum Valley, Gomantong, G. Kinabalu, Madai, Maliau Basin, Sapagaya, Sepilok, Sukau, Tabin. [Crocker Range] Inside TBC Mahua. Outside TBC Ulu Tomani.

Ethnic name
Trefoil Horseshoe Bat

**Measurements**


**Introduction**

Fur long and woolly, pale buffy brown to brownish gray. Noseleaf and ears are pale yellow. Noseleaf has lateral lappets at base of sella. Species name "*trifoliatus*" means "clover" or "trifoliate plants".

**Habitat and Ecology**

Occurs in lowland dipterocarp forests. Roosts in trees or under large leaves. Forages in under story of forests.

**Distribution**


**Ethnic name**

Confirmed TBC (Inside)

**Scientific name**

*Rhinolophus trifoliatus*

**English name**

Trefoil Horseshoe Bat

**Malay name**

Kelawar Ladam Muka Kuning

**Order**

CHIROPTERA

**Family**

RHINOLOPHIDAE

**Malaysian name**

Kelawar Ladam Muka Kuning

**Habitat and Activity**

**Pollination**

*Open area*

- Ovular
- Ground
- Ground, Settlement

**Crocker Range Area**

- Few

**Insectivorous-bat**

**Food**

Largely insects

**Feeding**

- Open area
- Middle story
- Under story

**Roost**

- Open tree-branch
- Bush
- Epiphyte-clump
- Under fallen-tree
- Rock shelter
- Live bamboo stem
- Dead bamboo stem
- Hollow tree
- Crevise rock
- Shallow cave
- Brighter cave
- Rock
- Tunnel or pipe
- House

**Measurements**


**Habitat and Activity**

**Crocker Range Area**

- Few

**Insectivorous-bat**

**Food**

Largely insects

**Feeding**

- Open area
- Middle story
- Under story

**Roost**

- Open tree-branch
- Bush
- Epiphyte-clump
- Under fallen-tree
- Rock shelter
- Live bamboo stem
- Dead bamboo stem
- Hollow tree
- Crevise rock
- Shallow cave
- Brighter cave
- Rock
- Tunnel or pipe
- House

**Introduction**

Fur long and woolly, pale buffy brown to brownish gray. Noseleaf and ears are pale yellow. Noseleaf has lateral lappets at base of sella. Species name "*trifoliatus*" means "clover" or "trifoliate plants".

**Habitat and Ecology**

Occurs in lowland dipterocarp forests. Roosts in trees or under large leaves. Forages in under story of forests.

**Distribution**


**Ethnic name**

**Habitat and Activity**

**Pollination**

*Open area*

- Ovular
- Ground
- Ground, Settlement

**Crocker Range Area**

- Few

**Insectivorous-bat**

**Food**

Largely insects

**Feeding**

- Open area
- Middle story
- Under story

**Roost**

- Open tree-branch
- Bush
- Epiphyte-clump
- Under fallen-tree
- Rock shelter
- Live bamboo stem
- Dead bamboo stem
- Hollow tree
- Crevise rock
- Shallow cave
- Brighter cave
- Rock
- Tunnel or pipe
- House

**Measurements**


**Habitat and Activity**

**Pollination**

*Open area*

- Ovular
- Ground
- Ground, Settlement

**Crocker Range Area**

- Few

**Insectivorous-bat**

**Food**

Largely insects

**Feeding**

- Open area
- Middle story
- Under story

**Roost**

- Open tree-branch
- Bush
- Epiphyte-clump
- Under fallen-tree
- Rock shelter
- Live bamboo stem
- Dead bamboo stem
- Hollow tree
- Crevise rock
- Shallow cave
- Brighter cave
- Rock
- Tunnel or pipe
- House

**Introduction**

Fur long and woolly, pale buffy brown to brownish gray. Noseleaf and ears are pale yellow. Noseleaf has lateral lappets at base of sella. Species name "*trifoliatus*" means "clover" or "trifoliate plants".

**Habitat and Ecology**

Occurs in lowland dipterocarp forests. Roosts in trees or under large leaves. Forages in under story of forests.

**Distribution**


**Ethnic name**
Measurements
FA 40-44, T 20-25, HF 9.9, E 22-23, W 8.4-11 g, D 1123/2133=32.

Introduction
Small and uniformly dark brown, hairs tipped pale gray. Noseleaf and ears gray. Fur long and fluffy. Noseleaf has lateral lappets at base of sella.

Habitat and Ecology
Occurs in lowland dipterocarp and lower montane forests. Roosts in hollow trees or bushes. Forages in under story of forests.

Distribution

Ethnic name

Lesser Woolly Horseshoe Bat

Scientific name: Rhinolophus sedulus
English name: Lesser Woolly Horseshoe Bat
Malay name: Kelawar Ladam Bulu Halus

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Serat 2000-3000m</td>
<td></td>
</tr>
<tr>
<td>Mt. Serat 1000-2000m</td>
<td></td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td></td>
</tr>
<tr>
<td>Forest over limestone</td>
<td></td>
</tr>
<tr>
<td>Forest over alluvial river</td>
<td></td>
</tr>
<tr>
<td>Heath forest</td>
<td></td>
</tr>
<tr>
<td>Riverine forest</td>
<td></td>
</tr>
<tr>
<td>Beach, transitional forest</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

Insectivorous-bat

<table>
<thead>
<tr>
<th>Feeding area</th>
<th>Roosting site</th>
</tr>
</thead>
<tbody>
<tr>
<td>open area</td>
<td>Romant two-branch trees</td>
</tr>
<tr>
<td>middle area</td>
<td>under over</td>
</tr>
<tr>
<td>under over</td>
<td>rock shelter</td>
</tr>
<tr>
<td>under fell-tree</td>
<td>live bamboo stem</td>
</tr>
<tr>
<td>dead bamboo stem</td>
<td>house</td>
</tr>
<tr>
<td>hollow tree</td>
<td>cave</td>
</tr>
<tr>
<td>crevice rock</td>
<td>shallow cave</td>
</tr>
<tr>
<td>brighter cave</td>
<td>dark cave</td>
</tr>
<tr>
<td>tunnel or pipe</td>
<td>house</td>
</tr>
</tbody>
</table>

Confirmed TBC (Inside)

Lesser Woolly Horseshoe Bat

Code 04050109
Order CHIROPTERA
Family RHINOLOPHIDAE

CRP Expedition by UMS & SP
Information by H. Hazebroek
Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
Sabah Parks specimen
Yasuma 2000

May – October 2002

May – October 2002

5

1

41
Fawn Roundleaf Bat

Scientific name: Hipposideros cervinus
English name: Fawn Roundleaf Bat
Malay name: Kelawar Ladam Bulat Gua

Measurements
FA 44-50.2, T 21-30.6, HF 5.4-9.3, E 13.5-17.2, W 5.5-10.2 g, D 1123/2123=30, M 1+0+1=4.

Introduction
Fur color varies from gray-brown or yellowish-brown to bright red-brown or orange. Tail less than 30 mm. Noseleaf grayish pink. Noseleaf simple with two lateral leaflets. Median noseleaf narrower than posterior noseleaf. Species name "cervinus" means "tawny" or "stag-colored".

Habitat and Ecology
Occurs in lowland dipterocarp and lower montane forests, also in forests over limestone. Usually roosts in caves, sometimes in very large colonies. Feeds in forest under story. As same as Rhinolophus bats, two teat-like processes, not connected with a mammary gland and known as dummy teats, are found on the abdomens of females in addition to the two functional mammae of the chest. An infant roundleaf bat may grasp the dummy teats of its mother while she carries it during flight.

Distribution

Habitat and Activity

Crocker Range Area
Common

Feeding
open area

Most
open tree-branch

Food
largely insects

Medicine
understory

under story

under leaf/ bush/ epiphyte-clump

insectivorous-bat

under fallen-tree

rock shelter

live bamboo stem

dead bamboo stem

hollow tree

crevise rock

hollow cave

brighter cave

dark cave

tunnel or pipe

house

Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
Feb et al 2000
Yasuma 2000

Ethnic name

[42]
Measurements
FA 33-37, T 34.2-42, HF 6.1-7.1, E 9.1-14.5, Tragus 7.8-8.5, W 3.5-7.4 g, D 2133/3133=38, M 1+0+0=2. Skull: gl

Introduction
Belong to Subgenus Selysius. Upperparts brown to gray with dark bases. Underparts with broad buffy-white to pale gray tips. Feet small with wing membrane attached at base of toes. Middle (second) upper premolar small and slightly intruded from the toothrow, but not especially reduced. Upper canine much longer than posterior (third) upper premolar. The tragus in Myotis is erect and tapering.

Habitat and Ecology
Occurs in lowland dipterocarp and lower montane forests, also near human settlements. Often roosts in the furled central leaves of banana plants, but occasionally found in caves.

Distribution
India, Assam, Burma, Indochina, Thailand, Peninsular Malaysia, Philippines, Sumatra, Java, through to New Guinea. [Borneo] Found in most areas from lowlands up to 1500m. Kalimantan, Sarawak, Brunei. [Sabah] Gomantong, Danum Valley, G. Kinabalu (up to 1490m), Bt. Kretam, Poring, Sepilok, Tawau Hill, Sandakan, Tabin, Ulu Maligan (1700m). [Crocker Range] Inside TBC Mile 8, Keningau-Kimanis, Ulu Senagang. Outside TBC Keningau.

Ethnic name
[43]
Javan Pipistrelle

Measurements
FA 33-36, T 34-41, HF 7.2, E 9.8-12.5, Tragus 5.6-6.9, W 3.8-5 g, D 2123/3123=34. Skull: cbl 12.4, mt 4.6.

Introduction
Upperparts dark brown with dark bases. Underparts slightly paler. Ear moderately short and rounded. Tragus long but not tapered with rounded tip. First upper premolar small and slightly displaced inwards. Genus *Pipistrellus* bats externally similar to *Myotis* bats, but ears generally more rounded, tragus shorter and not tapered. Dental formula is 2123/3123=34.

Habitat and Ecology
Commonly found in moss forest up to 1,600 meters. Elsewhere in Asia occurs in a wide variety of habitats including towns and lowland forest.

Distribution

Ethnic name

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. forest 2000-3000m</td>
<td>Volcano</td>
</tr>
<tr>
<td>Mt. forest 2060-2900m</td>
<td>Coastal</td>
</tr>
<tr>
<td>Lowland dry evergreen</td>
<td>Mountain Settlement</td>
</tr>
<tr>
<td>Lowland dry evergreen</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Rare</td>
</tr>
<tr>
<td>Forest over ultramafic rocks</td>
<td></td>
</tr>
<tr>
<td>Streak forest</td>
<td></td>
</tr>
<tr>
<td>River terrace forest</td>
<td></td>
</tr>
<tr>
<td>Beach, Transitional forest</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

Insectivorous-bat Food

- largely insects

Feeding: open area
- open tree
- branch
- tree
- under story
- under story
- fallen tree
- live tree
- bamboo stem
- dead tree
- hollow tree
- crevice rock
- shallow cave
- brighter cave
- dark cave
- tunnel or pipe
- house

Quoted from Literature
- Paine & Francis 1985
- Sabah Museum specimen
- Sabah Parks specimen
- Tan et al. 2000
- Yasuma 2000
Woolly Pipistrelle

Measurements
FA 40-42, T 39-41, E 13-15.5, W 6-7 g, D 2123/3123=34.

Skull: cbl 15.3, mt 5.6.

Introduction
Fur very long and woolly, dark blackish brown with pale gray-brown tips on upperparts, shorter and browner on the head and underparts. Muzzle long and narrow. Ears broad and rounded. First upper premolar, not especially small.

Habitat and Ecology
Unknown. Colony found roosting under the eaves of an isolated house in lower montane forest.

Distribution
Sulawesi, Moluccas. [Borneo] Known only from Crocker Range. [Crocker Range] Locality unknown (1500m).

Ethnic name

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Serat 2000-3000m</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Limestone Forest</td>
<td>Very Rare</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td></td>
</tr>
<tr>
<td>Forest over alluvial sediments</td>
<td></td>
</tr>
<tr>
<td>Heath forest</td>
<td></td>
</tr>
<tr>
<td>Rock cliff forest</td>
<td></td>
</tr>
<tr>
<td>Baux, Travertine forest</td>
<td></td>
</tr>
<tr>
<td>Swamp Forest</td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

Feeding
- open area
- middle story
- under story
- rotf tree
- rock shelter
- live bamboo stem
- dead bamboo stem
- hollow tree
- service rock
- shallow cave
- brighter cave
- dark cave
- tunnel or pipe
- waters

Habitat and Activity

Crocker Range Area

May – October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tiem et al. 2000
5. Yasuma 2000
Narrow-winged Pipistrelle

Scientific name: Pipistrellus stenopterus
English name: Narrow-winged Pipistrelle
Malay name: Kelawar Malam Kecil

Measurements
FA 38-43, T 40.3-48.6, HF 10.3-11, E 12-13.3, Tragus 5.8-8.1, W 13-16 (Large adult male 25.8g, D 2123/3123=34.

Introduction
Fur short. Upperpart uniform reddish brown to brown. Underparts slightly paler and grayer. Fifth finger very short, not much longer than the metacarpals of the third and fourth finger. Muzzle broad and fairly heavy. The "steno" is "narrow-" and "pterus" is "winged", species name means "narrow-winged".

Habitat and Ecology
Unknown. Sometimes roosts in houses. Has been collected while feeding over open fields.

Distribution
Peninsular Malaysia, Sumatra, Philippines. [Borneo] Scattered records from lowlands and hills of northern and northwestern Borneo. Kelabit highlands (at 1200m), Kuching in Sarawak. [Sabah] G. Kinabalu (up to 500m), Kota Kinabalu, Poring, Sandakan, Tabin, Trus Madi (at 600m), P. Balambangan. [Crocker Range] Inside TBC Ulu Magindanau.

Ethnic name

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Forest 2000-3000m</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Few</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td></td>
</tr>
<tr>
<td>Steel Forest</td>
<td></td>
</tr>
<tr>
<td>Rive cuts forest</td>
<td></td>
</tr>
<tr>
<td>Beach, Transitional forest</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

Insectivorous-bat

<table>
<thead>
<tr>
<th>Feeding</th>
<th>Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Middle story</td>
<td>Largely insects</td>
</tr>
<tr>
<td>Under story</td>
<td></td>
</tr>
<tr>
<td>Tree</td>
<td></td>
</tr>
<tr>
<td>Rock shelter</td>
<td></td>
</tr>
<tr>
<td>Bamboo stem</td>
<td></td>
</tr>
<tr>
<td>Dead bamboo stem</td>
<td></td>
</tr>
<tr>
<td>Hollow tree crevice</td>
<td></td>
</tr>
<tr>
<td>Rock crevice</td>
<td></td>
</tr>
<tr>
<td>Cave</td>
<td></td>
</tr>
<tr>
<td>Shallow pipe</td>
<td></td>
</tr>
</tbody>
</table>

May – October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
5. Yasuma 2000

Confirmed TBC (Inside)

Narrow-winged Pipistrelle

Order CHIROPTERA
Family VESPERTILIONIDAE
Subfamily VESPERTILIONINAE

Scientific name
Pipistrellus stenopterus

English name
Narrow-winged Pipistrelle

Malay name
Kelawar Malam Kecil

Habitat and Activity

Crocker Range Area
- Few

Feeding
- Middle story
- Under story

Food
- Largely insects

May – October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
5. Yasuma 2000

Confirmed TBC (Inside)
Measurements
FA 28-30.2, T 28-37.2, HF 4.8-7.9, E 7.4-11.5, Tragus 6.5, W 3.2-5.5 g, D 2123/3123=34, M 1+0+0=2. Skull: gl 11-12.

Introduction
Upperparts dark brown, underparts paler buffy brown. Short broad face with rounded head. Very similar to Pipistrellus, but base of thumb and sole of foot have thickened unpigmented whitish or pink pads. Second upper incisor displaced outwards from tooth row. Species name "tylopus" means "knob-handed" or "swelling hand".

Habitat and Ecology
Occurs in lowland dipterocarp forests. Usually roosts in dead or damaged bamboo stems usually 3-5 cm in diameter, as well as rock crevices or new banana leaves. This genus resembles Pipistrellus, differing in that the pads on the thumb and foot are more developed, probably as a grasping modification, and in dental features. The longer and pointed tragus distinguishes Glischropus from Tylonycteris, another genus of bats with pads on the hand and foot. Diet consists of insects.

Distribution

Ethnic name

Habitat and Activity
Crocker Range Area
Common
Mammals of Crocker Range

Thick-thumbed Pipistrelle

Scientific name
Glischropus tylopus
English name
Thick-thumbed Pipistrelle
Malay name
Kelawar Tapak Tangan Puteh

Measurements
FA 28-30.2, T 28-37.2, HF 4.8-7.9, E 7.4-11.5, Tragus 6.5, W 3.2-5.5 g, D 2123/3123=34, M 1+0+0=2. Skull: gl 11-12.

Introduction
Upperparts dark brown, underparts paler buffy brown. Short broad face with rounded head. Very similar to Pipistrellus, but base of thumb and sole of foot have thickened unpigmented whitish or pink pads. Second upper incisor displaced outwards from tooth row. Species name "tylopus" means "knob-handed" or "swelling hand".

Habitat and Ecology
Occurs in lowland dipterocarp forests. Usually roosts in dead or damaged bamboo stems usually 3-5 cm in diameter, as well as rock crevices or new banana leaves. This genus resembles Pipistrellus, differing in that the pads on the thumb and foot are more developed, probably as a grasping modification, and in dental features. The longer and pointed tragus distinguishes Glischropus from Tylonycteris, another genus of bats with pads on the hand and foot. Diet consists of insects.

Distribution

Ethnic name

Habitat and Activity
Crocker Range Area
Common

Thick-thumbed Pipistrelle

Scientific name
Glischropus tylopus
English name
Thick-thumbed Pipistrelle
Malay name
Kelawar Tapak Tangan Puteh

Measurements
FA 28-30.2, T 28-37.2, HF 4.8-7.9, E 7.4-11.5, Tragus 6.5, W 3.2-5.5 g, D 2123/3123=34, M 1+0+0=2. Skull: gl 11-12.

Introduction
Upperparts dark brown, underparts paler buffy brown. Short broad face with rounded head. Very similar to Pipistrellus, but base of thumb and sole of foot have thickened unpigmented whitish or pink pads. Second upper incisor displaced outwards from tooth row. Species name "tylopus" means "knob-handed" or "swelling hand".

Habitat and Ecology
Occurs in lowland dipterocarp forests. Usually roosts in dead or damaged bamboo stems usually 3-5 cm in diameter, as well as rock crevices or new banana leaves. This genus resembles Pipistrellus, differing in that the pads on the thumb and foot are more developed, probably as a grasping modification, and in dental features. The longer and pointed tragus distinguishes Glischropus from Tylonycteris, another genus of bats with pads on the hand and foot. Diet consists of insects.

Distribution

Ethnic name

Habitat and Activity
Crocker Range Area
Common

Thick-thumbed Pipistrelle

Scientific name
Glischropus tylopus
English name
Thick-thumbed Pipistrelle
Malay name
Kelawar Tapak Tangan Puteh

Measurements
FA 28-30.2, T 28-37.2, HF 4.8-7.9, E 7.4-11.5, Tragus 6.5, W 3.2-5.5 g, D 2123/3123=34, M 1+0+0=2. Skull: gl 11-12.

Introduction
Upperparts dark brown, underparts paler buffy brown. Short broad face with rounded head. Very similar to Pipistrellus, but base of thumb and sole of foot have thickened unpigmented whitish or pink pads. Second upper incisor displaced outwards from tooth row. Species name "tylopus" means "knob-handed" or "swelling hand".

Habitat and Ecology
Occurs in lowland dipterocarp forests. Usually roosts in dead or damaged bamboo stems usually 3-5 cm in diameter, as well as rock crevices or new banana leaves. This genus resembles Pipistrellus, differing in that the pads on the thumb and foot are more developed, probably as a grasping modification, and in dental features. The longer and pointed tragus distinguishes Glischropus from Tylonycteris, another genus of bats with pads on the hand and foot. Diet consists of insects.

Distribution

Ethnic name

Habitat and Activity
Crocker Range Area
Common

Thick-thumbed Pipistrelle

Scientific name
Glischropus tylopus
English name
Thick-thumbed Pipistrelle
Malay name
Kelawar Tapak Tangan Puteh

Measurements
FA 28-30.2, T 28-37.2, HF 4.8-7.9, E 7.4-11.5, Tragus 6.5, W 3.2-5.5 g, D 2123/3123=34, M 1+0+0=2. Skull: gl 11-12.

Introduction
Upperparts dark brown, underparts paler buffy brown. Short broad face with rounded head. Very similar to Pipistrellus, but base of thumb and sole of foot have thickened unpigmented whitish or pink pads. Second upper incisor displaced outwards from tooth row. Species name "tylopus" means "knob-handed" or "swelling hand".

Habitat and Ecology
Occurs in lowland dipterocarp forests. Usually roosts in dead or damaged bamboo stems usually 3-5 cm in diameter, as well as rock crevices or new banana leaves. This genus resembles Pipistrellus, differing in that the pads on the thumb and foot are more developed, probably as a grasping modification, and in dental features. The longer and pointed tragus distinguishes Glischropus from Tylonycteris, another genus of bats with pads on the hand and foot. Diet consists of insects.

Distribution

Ethnic name
Narrow-winged Brown Bat

**Measurements**
FA 30-36, T 30-38, HF 8.2, E 12-16, Tragus 4.8, W 8-13 g.

**Introduction**
Upperparts dark brown. Underparts paler and grayer. Fur short and dense. Only one, shortened, upper premolar. Inner upper incisors long and narrow with two cusps. Genus *Philetor* bats are externally similar to *Pipistrellus* bats with short fifth finger. External genitalia quite elaborate. The wings are relatively short. The muzzle is broad, and the skull is short and rounded with a large rounded brain case. Species name "*brachypterus*" means "short-winged".

**Habitat and Ecology**
Unknown. Roosts in hollow trees. Feeds in under story of forest.

**Distribution**

**Ethnic name**

---

**Narrow-winged Brown Bat**

**Scientific name**
*Philetor brachypterus*

**English name**
Narrow-winged Brown Bat

**Malay name**
Kelawar Telinga Pendek

---

**Habitat and Activity**
Narrow-winged Brown Bat

**Code**
04070401

**Order**
CHIROPTERA

**Family**
VESPERTILIONIDAE

**Subfamily**
VESPERTILIONINAE

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woody Vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Forest 2000, 2500m</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td>Rare</td>
</tr>
<tr>
<td>Forest (wet)</td>
<td>Extinct</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Extinct</td>
</tr>
<tr>
<td>Peak Forest</td>
<td>Extinct</td>
</tr>
<tr>
<td>Riverine Forest</td>
<td>Extinct</td>
</tr>
<tr>
<td>Beach, Transitional forest</td>
<td>Extinct</td>
</tr>
<tr>
<td>Swamp Forest</td>
<td>Extinct</td>
</tr>
<tr>
<td>Brackish-water Forest</td>
<td>Extinct</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Extinct</td>
</tr>
</tbody>
</table>

**Insectivorous-bat**

<table>
<thead>
<tr>
<th>Feeding</th>
<th>Most</th>
</tr>
</thead>
<tbody>
<tr>
<td>open area</td>
<td>open tree-branch</td>
</tr>
<tr>
<td>middle story</td>
<td>under story</td>
</tr>
</tbody>
</table>

| under fallen-tree | rock shelter |
| dead bamboo stem | live bamboo stem |
| crevice rock | shallow cave |
| brighter cave | dark cave |
| tunnel or pipe | house |

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**May – October 2002**
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

**Quoted from Literature**
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Turn et al. 2000
5. Yasuma 2000

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[ 48 ]
Measurements

Introduction
Upperparts uniform dark blackish brown, underparts similar. Teeth large with well developed cusps. Second upper incisor small and behind first incisor. First upper incisor large and conical, touching the canine.

Habitat and Ecology
One pair was netted flying along a stream in lowland dipterocarp forest.

Distribution

Ethnic name

Measurements

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Serut 2000-3000m</td>
<td></td>
</tr>
<tr>
<td>Mt. Serut 1200-3000m</td>
<td></td>
</tr>
<tr>
<td>Lowland dipterocarp forest 0-228m</td>
<td></td>
</tr>
<tr>
<td>Forest over limestone</td>
<td></td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td></td>
</tr>
<tr>
<td>Heath forest</td>
<td></td>
</tr>
<tr>
<td>Riverine forest</td>
<td></td>
</tr>
<tr>
<td>Beach, Transitional Forests</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Brackish water forest</td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

Insectivorous-bat Food largely insects

Feeding open area: nest, open trees, branch trees, middle story, under story, rock shelter, live/dry bamboo stem, under fallen tree, hollow tree, service rock, shallow cave, brighter cave, dark cave, tunnel or pipe, hour.

Tomes’ False Serotine

Scientific name Hesperoptenus tomesi
English name Tomes’ False Serotine
Malay name Kelawar Petang Palsu

Habitat and Activity
Crocker Range Area
Very Rare

Order CHIROPTERA
Family VESPERTILIONIDAE
Subfamily VESPERTILIONINAE

Tomes’ False Serotine

Code 04070503

<table>
<thead>
<tr>
<th>Habitat and Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Serut 2000-3000m</td>
</tr>
<tr>
<td>Mt. Serut 1200-3000m</td>
</tr>
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<tr>
<td>Beach, Transitional</td>
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<tr>
<td>Brackish water forest</td>
</tr>
<tr>
<td>Mangrove forest</td>
</tr>
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Habitat and Activity

Insectivorous-bat Food largely insects

May – October 2002

CFP Expedition by UMS & SP
Information by H. Hazebrook

Quoted from Literature
1) Paine & Francis 1985
2) Sabah Museum specimen
3) Sabah Parks specimen
4) Tien et al. 2000
5) Yasuno 2000

Tomes’ False Serotine

Scientific name Hesperoptenus tomesi
English name Tomes’ False Serotine
Malay name Kelawar Petang Palsu

Habitat and Activity
Crocker Range Area
Very Rare

Order CHIROPTERA
Family VESPERTILIONIDAE
Subfamily VESPERTILIONINAE

Tomes’ False Serotine

Code 04070503

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4) Tien et al. 2000
5) Yasuno 2000
Greater Bamboo Bat

Scientific name: Tylonycteris robustula
English name: Greater Bamboo Bat
Malay name: Kelawar Buluh Besar

Order CHIROPTERA
Family VESPERTILIONIDAE
Subfamily VESPERTILIONINAE

Measurements
FA 26-30, T 29-36, HF 5.8-6.3, E 8.8-12.1, Tragus 2.3, W 6.5-8.5 g, D 2113/3123=32. Skull: gl 11.8, condylocanine length (ccl) 12.4-12.7, mt 4.3-4.5.

Introduction
Body and skull extremely flattened, can fit through a slot less than 5 mm wide. Upperparts dark brown to dark grayish brown. Fur shiny dark brown, very smooth and sleek. Large dark brown, flattened disk-like pads at base of thumb and on sole of foot. Species name "robustura" means "robust" or "strong-growing".

Habitat and Ecology
Occurs in lowland dipterocarp forests. Roosts in live bamboo stems usually 8-10 cm in diameter, entering through narrow slits created by beetles. Slit usually 5 mm wide. Also sometime uses dead bamboos. Bamboo bats are remarkably adapted for gaining across to, and roosting in, the hollow joints of bamboo stems. The small size and flattened skull facilitate their entrance through cracks in the stem, and the suction pads enable them to hang up in the joint.

Distribution
Subtropical China, Indochina, Thailand, Peninsular Malaysia, Sumatra, Java, Sulawesi and smaller islands. [Borneo] Recorded throughout Sabah and Sarawak. Bt. Bung (Jerudong) and Jalan Berakas in Brunei. [Sabah] G. Kinabalu (up to 1050m), Poring. [Crocker Range] Locality unknown. Inside TBC Mile 16 Keningau-Kimanis.

Ethnic name

Habitat and Activity

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</tr>
</thead>
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<tr>
<td>Mt. forest 2000-3000m</td>
<td>Tree house</td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td>inalg</td>
</tr>
<tr>
<td>Forest over lowland</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Forest over karstic rocks</td>
<td>Common</td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
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<tr>
<td>Mangrove forest</td>
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Insectivorous bat

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<thead>
<tr>
<th>Feeding</th>
<th>Food</th>
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<td>open area</td>
<td>largely insects</td>
</tr>
<tr>
<td>middle story under story</td>
<td></td>
</tr>
<tr>
<td>under fallen-tree rock shelter</td>
<td>live bamboo stem</td>
</tr>
<tr>
<td>dead bamboo stem</td>
<td>hallow tree crevice rock shallow cave</td>
</tr>
<tr>
<td>brighter cave dark cave tunnel or pipe house</td>
<td></td>
</tr>
</tbody>
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May – October 2002
Survey by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek

Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
Sabah Parks specimen
Tuen et al. 2000
Yasuma 2000
Yellow House Bat

Measurements
FA 47.5-52, T 44.6-52, HF 8.9-9, E 11.4-15, Tragus 6.9-7, W 16-23 g, D 1113/3123=30. Skull: gl 17.

Introduction
Upperparts brown. Underparts paler yellowish-brown. Ear moderate, tragus very long and curved forwards. They are rather heavy-bodied, strongly-built bats with powerful jaws and teeth. This genus is distinguished by the structure of the molar and the dental formula, only one pair of upper incisors which are large, conical well developed.

Habitat and Ecology
Occurs in old and young secondary forests. They are common house-roosting bats over most of their range, usually sheltering in attics, often in those that are roofed with corrugated iron and with extremely high temperatures. Hollow trees, often palms, are also used as roosting sites. These bats appear about dusk, in fairly steady and strong flight, and generally feed from 3 to 12 meters above the ground. Diet consists of beetles, termites, moths, and other insects. The gestation period is about 105 to 115 days.

Distribution

Ethnic name

Habitat and Activity
Crocker Range Area

May – October 2002

Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek

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Paine & Francis 1985
Sabah Museum specimen
Sabah Parks specimen
Yasuma 2000

Scientific name
Scotophilus kuhlii
English name
Yellow House Bat
Malay name
Kelawar Rumah

Habitat and Activity

Insectivorous-bat
Food
largely insects

Feeding
open area
middle-story
under foliage
dead bamboo
hollow tree
branched or pipe

Roost
open tree-brach trees
under dead branch
rock shelter
live bamboo stem
service rock
shallow cave

See next page for more information.
Bronzed Tube-nosed Bat

Scientific name: *Murina aenea*
English name: Bronzed Tube-nosed Bat
Malay name: Kelawar Bulu Emas

**Habitat and Activity**

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<tr>
<td>Mt. Forest 3000-3300m</td>
<td>Endangered</td>
</tr>
<tr>
<td>Mt. Forest 2300-2600m</td>
<td>Extinct</td>
</tr>
<tr>
<td>Lowland dipterocarp forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Rare</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td>Rare</td>
</tr>
<tr>
<td>Grass forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Riverine forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Beach, Transitional forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Swamp forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Rare</td>
</tr>
</tbody>
</table>

**Feeding**

Open area: Mostly open forest trees
midstory: under story
under story: epiphyte-clump
under fallen-tree: rock shelter
live bamboo: stem
dead bamboo: stem
hollow tree: crevice
shallow cave: rock
shallow cave: house
hollow tree: house

**Insectivorous-bat Food**
largely insects

**Measurements**
FA 35-38, T 35-41, E 13.5-15.5, W 6-8.5 g, D 2123/3123=34. Skull: cbl 15.3-16.1, mt 5.7-6.0, c-c 4.7-4.8.

**Introduction**
Fur of upperparts dark brown bases with orange-brown tips. Underparts dark brown. Species name "aenea" means "bronzed". Genus *Murina* bats: Nostrils expanded into short tubes that protrude either side of the muzzle. First upper premolar large, similar in size to the second premolar. Upper molars with well developed W-shaped cusps.

**Habitat and Ecology**
Once has been caught in lowland dipterocarp forest and hill moss forest. Members of this genus have been found roosting in the dead dry leaves of cardamom plants and in caves. Several usually roost together.

**Distribution**

**Ethnic name**

**Quoted from Literature**
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tuen et al. 2000
5. Yasuma 2000
**Small Woolly Bat**

**Measurements**

**Introduction**
- Upperparts orange-brown with dark bases. Underparts paler. Premolars small and rounded. Ears relatively small. Flight slow and fluttering. Species name "intermedia" means "middle-sized" of "intermediate".

**Habitat and Ecology**
- Occurs in lowland dipterocarp forests. Forages in under story of forests. Sometimes they come into lighted verandas and rooms in search of insects.

**Distribution**

**Ethnic name**
- Small Woolly Bat
- Kelawar Hutan Kecil

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forest over limestone</td>
<td>Crocker Range Area</td>
<td>Few</td>
</tr>
<tr>
<td>Forest over subalpine rocks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heath forest</td>
<td></td>
<td></td>
</tr>
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<td>Riverine forest</td>
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</tr>
<tr>
<td>Beach, Transitional forests</td>
<td></td>
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<td>Mangrove forest</td>
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</tbody>
</table>

**Insectivorous-bat Food**
- Largely insects

**Confirmed TBC (Inside)**

**Scientific name**
- Kerivoula intermedia

**Order**
- CHIROPTERA

**Family**
- VESPERTILIONIDAE

**Subfamily**
- KERIVOULINAE

**Code**
- 04071004

**Distribution**

**Habitat and Activity**

- Few
- May ~ October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

**Quoted from Literature**
- Paine & Francis 1985
- Sabah Museum specimen
- Sabah Parks specimen
- Tien et al. 2000
- Yasuno 2000

**Small Woolly Bat**

- Scientific name: Kerivoula intermedia
- English name: Small Woolly Bat
- Malay name: Kelawar Hutan Kecil

**Habitat and Activity**

- Woody vegetation
  - Forest over limestone
  - Forest over subalpine rocks
  - Heath forest
  - Riverine forest
  - Beach, Transitional forests
  - Swamp forest
  - Mangrove forest

- Open area
  - Crocker Range Area Few

**Feeding**

- Insectivorous-bat Food
  - Largely insects

**Habitat and Activity**

- Habitat and Activity
  - Crocker Range Area
  - Few
  - May ~ October 2002
  - Surveys by SP (authors)
  - CRP Expedition by UMS & SP
  - Information by H. Hazebroek

**Quoted from Literature**

- Paine & Francis 1985
- Sabah Museum specimen
- Sabah Parks specimen
- Tien et al. 2000
- Yasuno 2000
Large Bent-winged Bat

**Scientific name** | *Miniopterus magnater*
--- | ---
**English name** | Large Bent-winged Bat
**Malay name** | Kelawar Jari Panjang Besar

**Measurements**
- FA 47-52, T 54-64.2, HF 9.2-9.4, E 11.4-13.8, Tragus 4.5-6.5, W 9-16 g, D 2123/3/3123=34. Skull: cbl 15.8-16.8, m-m 7.4-8.0.

**Introduction**
Largest of the *Miniopterus*, with and especially wide palate. Head wider than the Common Bent-winged Bat, *Miniopterus schreibersi*. Almost black color. Genus *Miniopterus* bats are distinctive wing shape, especially the third digit (longest finger), which has a short first phalanx and very long terminal phalanx. Species name "*magnater*" means "large".

**Habitat and Ecology**
Occurs in lowland dipterocarp and lower montane forests. Roosts in dark caves. Forages in open areas.

**Distribution**
Sumatra, Java, Bali, Timor to New Guinea and Australia. [Borneo] Recorded from scattered localities in northern Borneo. Bantol Cave in East Kalimantan. [Sabah] Batu Ponggul, Gomantong, G. Kinabalu (up to 500m), upper S. Kuamut, Madai, Poring. [Crocker Range] Inside TBC No record. **Outside TBC** Gua Laing.

**Ethnic name**

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**Habitat and Activity**

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<tr>
<th>Crocker Range Area</th>
<th>Common</th>
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| Forest over limestone |...
| Forest over ultrabasalt rocks |...
| Swamp forest |...
| Mangrove forest |...

**Insectivorous-bat**

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**Ethnic name**
Measurements
FA 44-49, T 51.6-58.5, HF 7.9-9.5, E 9.9-11.9, Tragus 4.6-5.8, W 8-12.5 g, D 2123/3123=34. Skull: gl 16, cbl 15.1-16.0, m-m 6.6-7.0.

Introduction
Forearm length slightly overlaps the range of the Large Bent-winged Bat, but it is usually shorter, and the body and skull are smaller and narrower. Almost black or dark brown color. When *Miniopterus* bat hangs up by its hind feet, the lengthened terminal part of the third finger folds back upon the wing. The English common names refer to these characters.

Habitat and Ecology
Occurs in lowland dipterocarp and lower montane forests, also forests over limestone. Roosts in dark caves, sometimes mixed with other species of bent-winged bats. Forages in open areas. The call of this species is said to be “a simple metallic clink”, not readily heard by most people.

Distribution
Africa and Europe through Asia (including Temperate China, Japan) to Australia. [Borneo] Recorded from scattered localities. Bantol Cave in East Kalimantan, Kg. Pelaman Lanchang near Kuching in Sarawak. [Sabah] Batu Ponggul, Batu Patih (Kinahatagan), BatuRong, upper S. Kuamut, Madai, Pun Batu, Tapadong, P. Banggi. [Crocker Range] Inside TBC No record. Outside TBC Guu Laang.
Naked Bat

Measurements

Introduction
Body large and almost completely naked. Bare skin of body dark gray with only scattered hairs. Ears separate, not joined over the top of the head. They have great developing throat sacs and the wing pouches. Exposed tail can sometimes be seen well. "cheiro" is "hand". Species name "torquatus" is same as "torques", means "wore a neckchain".

Habitat and Ecology
Occurs in lowland dipterocarp forests. They roost in hollow trees which entrance more 10 m high, rock crevices, and holes in the earth. They have been seen at dusk flying high in the air with a rapid flight. A captive individual was maintained for several weeks on a diet of grasshoppers and moths. The mammillae are located near the opening of the pouch, and it was formerly thought that the young were carried and nursed in this pocket. The young are probably left in the roost by the parents when they leave on their evening flights.

Distribution

Ethnic name
Ekuan (Murut), Pandikih (Kedayan), Pendikih (Bisaya, Dusun, Kedayan).

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Faur et al. 2000
5. Yasuma 2000
**Free-tailed Bat**

**Scientific name**  
Tadarida mops

**Malay name**  
Kelasar Lubang Kayu

**Measurements**

- FA 41.6-46, T 37-37.6, HF 11.6-12.3, E 11.7, W 16.1-21.5 g, D 1113/2123=28

**Introduction**

- Belong to Subgenus *Mops*. Fur short and close. Upperparts and underparts uniform dark brown to reddish brown, crown of head nearly naked. Only one pair of premolars. Upper incisors long and well-developed. Ears joined across top of head by narrow flap of skin.

**Habitat and Ecology**

- Occurs in lowland dipterocarp forests. Roosts in hollow trees. The flight is swift, high and fairly direct, between 10 and 12 m.p.h. Forages in open areas over streams or clearings. Moths and beetles are apparently the preferred foods. One has been caught when it was crawling speedily on stony river-beach.

**Distribution**

- Peninsular Malaysia, Sumatra. Borneo: Two specimens were reported from Baram district and upper S. Sarawak in Sarawak, and one from Kuala Belalong in Brunei. [Sabah]

**Ethnic name**  

**Measurements**

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
<th>Fiele</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Serat 2000-3000m</td>
<td></td>
<td>May-Oct.</td>
</tr>
<tr>
<td>Mt. Serat 1200-2000m</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td></td>
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<tr>
<td>6-12 km</td>
<td></td>
<td></td>
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<tr>
<td>Forest over limestone</td>
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<tr>
<td>Forest over alluvial</td>
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</tr>
<tr>
<td>Riverine forest</td>
<td></td>
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<tr>
<td>Beach, transitional</td>
<td></td>
<td></td>
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<tr>
<td>Swamp forest</td>
<td></td>
<td></td>
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<tr>
<td>Brackish water forest</td>
<td></td>
<td></td>
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<tr>
<td>Mangrove forest</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Insectivorous-bat Food**

- Open area
- Roost open tree-brunch trees
- Tree hollow
- Live bamboo stems
- Small cave
- Shallow cave
- Tree hollow
- Stalactite
- Various rock
- Shallow cave
- Stalactite
- Stalagmite

**Mammals**


**Crocker Range Area**

- Very Rare

**Ethnic name**

May – October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

**Quoted from Literature**

1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tien et al. 2000
5. Yasuma 2000

**Ordered**

- CHIROPTERA

**Family**

- MOLOSSIDAE
**Slow Loris**

**Code** 05010101  
**Scientific name** Nycticebus coucang  
**English name** Slow Loris  
**Malay name** Kongkang

**Measurements**  
HB 199-275, T 13-25, T/HB less than 10%, HF 48-63, E 18.9, W 230-610 g, D 2123/3123=34.

**Introduction**  
Lorises are small primates with a very short tail and rather inconspicuous ears. Body covered with uniformly brownish or grayish woolly hair, with a dark brown stripe from top of head to middle of back or base of tail. Usually has a dark brown spectacled mark around each eye. All digits have nails, with the exception of the second digit of foot, which has a short claw.

**Habitat and Ecology**  
Nocturnal and arboreal. Usually solitary. Feeds on insects and pulpy fruits. Occurs in lowland dipterocarp and lower montane forests. Found in secondary forests, mostly in small to medium-sized trees. Often enters in plantations and gardens. Diet consists mainly of insects but also includes small mammals, fruits, leaves, and tender shoots. Sometimes hangs head downward to eat. A single young is born after a gestation period of about 90 days. The young clings to its mother until it is almost as large as she. The life span is at least ten years.

**Distribution**  
Assam, Burma, Indochina, Thailand, Peninsular Malaysia, Southern Philippines, Sumatra and adjacent islands (P. Riau, P. Bangka), Java. [Borneo] Known from many lowland and hills. Sometimes observed near the villages. East Kalimantan, Sarawak, Brunei. P. Natunabesar, P. Karimata. [Sabah] Danum Valley, G. Kinabalu (at least up to 1280m), Medai, Poring, Sepilok (may be captive individual released), Sukau, Tabin, P. Bangga. [Crocker Range] Inside TBC No record. Outside TBC Bekuku, Tamparuli, Ulu Kimanis.

**Ethnic name**  
Fugah (Lundaya), Impayutong (Kadazan, Sungai), Induyutong (Kadazan), Kokang (Tidung), Kuge (Lundaya), Kukam (Sungai), Kukem (Tidung), Kukom (Sungai), Lotung (Murut), Lunang (Bisaya, Dusun, Murut, Kadayan), Pugah (Lundaya), Tanduyutong (Kadazan), Tondesyutong (Kadazan), Tondutung (Dusun), Tonduyutong (Dusun).

**Habitat and Activity**  
Crocker Range Area

**Measurements**  
HB 199-275, T 13-25, T/HB less than 10%, HF 48-63, E 18.9, W 230-610 g, D 2123/3123=34.
Western Tarsier

**Habitat and Activity**

- **Woody vegetation**: Moist, non logged, 200-300m; Lembeh Dendron; Forest over limestone; Forest over shallow rocks; Heath forest; Rickettsia forest; Bocca, Traditional Forest; Swamp Forest; Brackish-water forest; Mangrove forest.

**Open area**: Rainforest, Mangrove, Swamp, Forest, Mangrove Forest.

**Habitat and Activity**

- **Tree**: Arboreal
- **Ground**: Terrestrial
- **Space**: Night, Daytime, Night

**Distribution**


**Ethnic name**

- Ikau (Lundaya), Mplee (Dusun), Rinukut (Kadazan), Sundukut (Kadazan), Sundukut (Sungai), Sirukut-rukut (Kadazan), Tampalele (Kadayan), Tampallyi (Sungai), Tamplee (Dusun), Tempelili (Sungai), Tindukut-rukut (Kadazan), Tindukut-rukut (Dusun).
Pig-tailed Macaque

**Measurements**
HB 500-600, T 150-250, HF 140-170, W 7,000-9,000 g. Skull: gl 150.

**Introduction**
A large thick-set monkey with a very short tail which is usually carried arched or projecting straight up. Olive-brown with whitish under parts and dark brown on top of head and neck.

**Habitat and Ecology**
Diurnal. It is quite at home on the ground, and is the only primate which descends to the ground to flee from man. A general feeder on both vegetable and animal food. Occurs in lowland dipterocarp and lower montane forests. Found mainly in tall forests, but sometimes enters in plantations. Group size usually ten to twenty monkeys, but solitary males are often observed.

**Distribution**
Assam, South Indochina, Thailand, Peninsular Malaysia, Sumatra and adjacent islands (P. Bangka, P. Riau), [Borneo]
Known throughout the lowlands and hills up to 1300m. Kalimantan, Sarawak, Brunei [Sabah]
Widespread in forest and plantations. Batu Sap, Bonggay, Danum Valley, Gomantong, G. Kinabalu (up to 750m), S. Kinabatangan, Klias, Kulamba, Maliau Basin, Poring, Septilok, Sukau, Tabin, Tawau Hill, Tomanggong, Ulu Kalabakan. [Crocker Range] Inside TBC Mile 14 Keningau-Kimanis. Outside TBC Mile 21 Keningau-Kimanis, Ulu Senagang.

**Ethnic name**
Bacuk (Lundaya), Bada (Kadazan), Baruk (Brunei), Basuk (Murtu), Bauk (Kedayan), Bechuk (Murtu), Beduk (Lundaya), Gabok (Bisaya, Dusun, Tidung), Gobuk (Dusun, Tidung), Gebok (Kadazan, Murtu, Sungai), Gobuk (Dusun, Kadazan), Tabangan (Sungai), Tagbangan (Sungai), Tanduoi (Murtu).

**Habitat and Activity**
Crocker Range Area

**Confirmed TBC (Inside, Outside)**

---

**Measurements**
HB 500-600, T 150-250, HF 140-170, W 7,000-9,000 g. Skull: gl 150.

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**Ethnic name**
Bacuk (Lundaya), Bada (Kadazan), Baruk (Brunei), Basuk (Murtu), Bauk (Kedayan), Bechuk (Murtu), Beduk (Lundaya), Gabok (Bisaya, Dusun, Tidung), Gobuk (Dusun, Tidung), Gebok (Kadazan, Murtu, Sungai), Gobuk (Dusun, Kadazan), Tabangan (Sungai), Tagbangan (Sungai), Tanduoi (Murtu).
Measurements HB 420-470, T none, HF 128-150, W 5,000-6,400 g. Skull: gl 100.

Introduction Color, uniform brown or grayish brown, with gray hair round the face. Long arms. The feet and hands tend to be paler than the rest of the body. No tail. Adult female has a “bubbling” loud call. Distributes throughout Borneo, except the region between S. Kapuas in West Kalimantan and S. Barito in eastern Central Kalimantan.

Habitat and Ecology Diurnal and completely arboreal. Sometimes seen walking across logging road to reach the opposite side of the forest. Active from one hour before dawn, but cease activity about two hours before dusk. Occurs in lowland dipterocarp and lower montane forests. Normally found only in tall and selectively logged dipterocarp forests. Adult females often utter loud calls usually in the morning. Usually seen in small groups of three or four individuals but sometimes solitary males are seen. Feed on ripe fruits, young leaves and small insects.

Distribution Confined to Borneo in lowlands and hills. Kalimantan, Sarawak, Brunei. [Sabah] Recorded from many localities. Bonggaya, Danum Valley, Gomantong, Sg. Inarud (Ulu Sg. Pinangah), G. Kinabalu (up to 1500m), S. Kinabatangan, Kulamba, Malai Rasin, Batu Punggul, Sepilok, Sukau, Tabin, Tawau Hill, Trus Madi (1650m), Ulu Kalabakan, Ulu Maligan (1700m). [Crocker Range] Inside TBC Mile 16 Keningau-Kimanis, Mile 21 Keningau-Kimanis, Ulun Sunsuron.

Ethnic name Kaloat (Bisaya), Kalawot (Dusun, Kadazan, Murut, Sungai), Kaliwot (Murut), Kelabat (Kedayan), Kelabet (Lundaya), Kelabot (Murut), Kelawat (Kadazan, Lundaya, Murut, Sungai), Kelawot (Tidung), Kelawot (Dusun), Klawot (Dusun), Tabilig (Murut), Wak-wak (Brunei).

**Bornean Gibbon**

- **Scientific name**: Hylobates muelleri
- **English name**: Bornean Gibbon
- **Malay name**: Kelawat

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Survey 2000-2500m</td>
<td></td>
</tr>
<tr>
<td>Mt. Survey 1200-1500m</td>
<td></td>
</tr>
<tr>
<td>Lowland dipterocarp forest</td>
<td></td>
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<tr>
<td>Forest over limestone</td>
<td></td>
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<tr>
<td>Forest over ultrabasic rocks</td>
<td></td>
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<tr>
<td>Heath forest</td>
<td></td>
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<tr>
<td>Ritterroth forest</td>
<td></td>
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<tr>
<td>Boeci, Transitional ferns</td>
<td></td>
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<tr>
<td>Swamp forest</td>
<td></td>
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<tr>
<td>Brackenwater forest</td>
<td></td>
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<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Tree: Arboreal</th>
<th>Arboreal &amp; Terrestrial</th>
<th>Ground: Terrestrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night</td>
<td>Daytime</td>
<td>Night</td>
</tr>
</tbody>
</table>

**May ~ October 2002**

- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebrook

**Confirmed TBC (Inside)**

- Paine & Francis 1985
- Sabah Museum specimen
- Tien et al. 2000
- Yasumo 2000

**Quoted from Literature**

- Paine & Francis 1985 Sabah Museum specimen
- Tien et al. 2000

**Bornean Gibbon**

- **Code**: 05040101
- **Order**: PRIMATES
- **Family**: HYLOBATIDAE

**Habitat and Activity**

- **Measurements**: HB 420-470, T none, HF 128-150, W 5,000-6,400 g. Skull: gl 100.

**Introduction**

Color, uniform brown or grayish brown, with gray hair round the face. Long arms. The feet and hands tend to be paler than the rest of the body. No tail. Adult female has a “bubbling” loud call. Distributes throughout Borneo, except the region between S. Kapuas in West Kalimantan and S. Barito in eastern Central Kalimantan.

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**Distribution**

Confined to Borneo in lowlands and hills. Kalimantan, Sarawak, Brunei. [Sabah] Recorded from many localities. Bonggaya, Danum Valley, Gomantong, Sg. Inarud (Ulu Sg. Pinangah), G. Kinabalu (up to 1500m), S. Kinabatangan, Kulamba, Malai Rasin, Batu Punggul, Sepilok, Sukau, Tabin, Tawau Hill, Trus Madi (1650m), Ulu Kalabakan, Ulu Maligan (1700m). [Crocker Range] Inside TBC Mile 16 Keningau-Kimanis, Mile 21 Keningau-Kimanis, Ulun Sunsuron.

**Ethnic name**

- Kaloat (Bisaya), Kalawot (Dusun, Kadazan, Murut, Sungai), Kaliwot (Murut), Kelabat (Kedayan), Kelabet (Lundaya), Kelabot (Murut), Kelawat (Kadazan, Lundaya, Murut, Sungai), Kelawot (Tidung), Kelawot (Dusun), Klawot (Dusun), Tabilig (Murut), Wak-wak (Brunei).
Measurements
HB 376-645, T 334-565, HF 61-97, E 13.2-17.2, W up to 12,500 g, D 0000/0000=0.

Introduction
Called as Scaly Anteater, too. A distinctive brownish, scaly mammal, with long claws in the forefeet. Head and tail long and tapering. The muzzle is very long and narrow, and the mouth is small, so that jaws can open only a short way. A Pangolin has no teeth, but the stomach is thick and muscular.

Habitat and Ecology
Nocturnal and terrestrial, sleeping during the daytime in underground burrows or tree holes touching with the ground. Usually solitary, the young is carried about by the mother clinging to the upper side of the base of the mother's tail. Tail rapped around body when animal is disturbed, to protect the non-scaly under parts. Occurs in lowland dipterocarp and lower montane forests. Food consists exclusively of termites taken from nests. Nests of termites are opened with the hugely clawed feet and contents licked up with the long sticky tongue. Uniparous. Most often seen on roads at night, where it is slow-moving and conspicuous.

Distribution

Ethnic name
Aram (Murut, Lundaya), Arem (Lundaya), Belukun (Tidung), Bohukun (Kadazan), Bukkuh (Murut), Buku (Murut), Bulukun (Dusun, Kadazan, Murut), Langkabau (Murut), Langkutungy (Bisaya), Mangkotong (Kadazan, Sungai), Ngkutung (Dusun, Tauan, Sungai), Tenggiling (Sungai), Tenggiling (Dusun, Kadazan, Sungai, Tidung), Tenggiling (Kedayan), Tinggiling (Kedayan).

May ~ October 2002
• Surveys by SP (authors)
• CRP Expedition by UMS & SP
• Information by H. Hazebroek
Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tur in et al. 2000
5. Yosuma 2000

A FIELD GUIDE

Pangolin

Code 06010101
Order PHOLIDOTA
Family MANIDAE

Scientific name Manis javanica
English name Pangolin
Malay name Tenggiling

Habitat and Activity

<table>
<thead>
<tr>
<th>Woods vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. forest 2000-2500m</td>
<td>Ground Terrestrial</td>
</tr>
<tr>
<td>Mt. forest 2000-3000m</td>
<td>Ground Terrestrial</td>
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<tr>
<td>Lowland dipterocarp</td>
<td>Ground Terrestrial</td>
</tr>
<tr>
<td>Forest over granite</td>
<td>Ground Terrestrial</td>
</tr>
<tr>
<td>Forest over alluvial soils</td>
<td>Ground Terrestrial</td>
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<tr>
<td>Mixed forest</td>
<td>Ground Terrestrial</td>
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<tr>
<td>Riverine forest</td>
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<tr>
<td>Beach, Transitional forest</td>
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</tr>
<tr>
<td>Mangrove forest</td>
<td>Ground Terrestrial</td>
</tr>
</tbody>
</table>

Time, Arterial
Arterial & Terrestrial
<table>
<thead>
<tr>
<th>Space</th>
<th>Male</th>
<th>Daytime</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

Measurements
HB 376-645, T 334-565, HF 61-97, E 13.2-17.2, W up to 12,500 g, D 0000/0000=0.

[62]
Measurements
HB 225-380, T 317-444, THB 110-150%, HF 50-87, E 23.5, W 875-1,500 g, D 1013/1013=20, M 2+3+0=10. Skull: gl 63-68.

Introduction
The largest tree squirrel. Coloration is variable, but upperparts usually dark in the middle, underparts pale. In the common color type of Sabah; upperparts very dark in midline and underparts very pale, almost white, and the tail as same as upperparts. The “affinis” means “related” or “similar to”.

Habitat and Ecology
Diurnal. Mostly active in tall trees, usually going to the ground only to chase another squirrel or to follow a female during the breeding season, or running across the forest road to reach the opposite forest. Diet consists of fruit, nuts, the bark of some trees, insects, and birds’ eggs. Occurs in lowland dipterocarp and lower montane forests. They are solitary or associate in pairs, and they are often wary and keep well hidden in the dense forest vegetation. Moves very quickly through the tree canopy. Holes in trees are used for shelter. During the breeding season a large nest is constructed. The young are born and raised in this nest.

Distribution
South Thailand, Peninsular Malaysia, Sumatra and smaller Indonesian islands (P. Riau, P. Bangka, P. Banyak). [Borneo] Widespread throughout lowlands and hills. Kalimantan, Sarawak, Brunei, P. Natunabesar, P. Karimatata. [Sabah] Batu Ponggul, Danum Valley, G. Kinabalu (up to 1700m), Kulamba, Maliau Basin, Patui (Kota Marudu), Sepilok, Sukau, Tabin, Tawau Hill, Ulu Kalabakan, Tomanggong, Ulu Maligan (1200m), P. Banggi. [Crocker Range] Inside TBC Mahau, Ulu Sunsuron.

Ethnic name
Basing Tupar (Tidung), Labo Puan (Murut), Labo Siga (Lundaya), Mangas (Bisaya, Dusun, Murut), Manggas (Dusun, Kadazan, Murut, Sungai), Siga (Lundaya), Tengekarawak (Kedayan).
Prevost’s Squirrel

**Measurements**

HB 200-270, T 202-273, T/HB 90-110%, HF 45-65, E 17.1-20,
W 250-500 g. Skull: gl 53-57.

**Introduction**

Subspecies found in Sabah (black phase, occurs in Sabah and northern-most of Sarawak), upperparts black, underparts chestnut red and tail black. Other subspecies are upperparts black, grizzled or grizzled olive. White or, gray stripe, or white and black stripes on each side, but all have reddish underparts. The "calli-" or "calo" is "beautiful" and "sciurus" is "squirrel". Genus name "Callosciurus" means "beautiful squirrel".

**Habitat and Ecology**

Diurnal, most active in the early morning and late afternoon. Usually arboreal. Diet includes fruits, especially those with a sweet or oily flesh, and insects, notably beetles and their larvae which are gnawed out of dying wood or under part of the bark. Often seen staying on stem for a long time to feed insects. Occurs in lowland dipterocarp forests. Encountered along the road in tall and secondary forests mainly in the late afternoon. Enters gardens and plantations to feed on fruits.

**Distribution**


**Ethnic name**

Basing Hitam (Kedayan), Bessing Sidum (Sungai), Korok (Dusun), Labo Fuan (Landaya), Lekik (Sungai), Monggeluton (Dusun), Mongoluton (Dusun, Kadazan), Solom (Murut), Sampuan (Kadazan), Sapuan (Kadazan), Solom (Murut).

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Time</th>
<th>Arboreal</th>
<th>Arboreal &amp; Terrestrial</th>
<th>Ground</th>
<th>Terrestrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Night</td>
<td></td>
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<tr>
<td>Day</td>
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</tbody>
</table>

**Crocker Range Area**

Common

**Prevost’s Squirrel**

<table>
<thead>
<tr>
<th>Code</th>
<th>Scientific name</th>
<th>English name</th>
<th>Malay name</th>
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<tr>
<td>07010201</td>
<td><em>Callosciurus prevosti</em></td>
<td>Prevost’s Squirrel</td>
<td>Tupai Gading</td>
</tr>
</tbody>
</table>

**Order**

RODENTIA

**Family**

SCIURIDAE

**Subfamily**

SCIURINAE
Measurements

Introduction
Upperparts black, shoulders and thighs grizzled brown or olive-brown. Muzzle red. Short white and black side-strips. Underparts dark reddish. Some individuals have a dark line along the centre of belly. Species name "baluensis" means "from Kinabalu".

Habitat and Activity
Diurnal, mainly arboreal but occasionally descends to the ground, and feed on seed, nuts, fruits, buds and flower, and probably bird and insect eggs. They live in hollow trees and also build leaf and stick nests. Occurs in montane oak and lower moss forests.

Distribution

Ethnic name
May ~ October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek
Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
Tuen et al. 2000
Yasuma 2000

Kinabalu Squirrel
Scientific name Callosciurus baluensis
Order RODENTIA
Family SCIURIDAE
Malay name Tupai Kinabalu

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody Vegetation</th>
<th>Open Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Sabat 2000-3000m</td>
<td>Few</td>
</tr>
<tr>
<td>Mt. Sabat 1200-2000m</td>
<td>Night</td>
</tr>
<tr>
<td>Lowland Diplocarp Forest 0-1200m</td>
<td>Night</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Night</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td>Night</td>
</tr>
<tr>
<td>Heath Forest</td>
<td>Night</td>
</tr>
<tr>
<td>Ritterihehe Forest</td>
<td>Night</td>
</tr>
<tr>
<td>Rodal, Transitional forest</td>
<td>Night</td>
</tr>
<tr>
<td>Swamp forest</td>
<td>Night</td>
</tr>
<tr>
<td>Blackwater forest</td>
<td>Night</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Night</td>
</tr>
</tbody>
</table>

Locality unknown
Specimen: Sabah Parks Museum

Code 07010202
Order RODENTIA
Family SCIURIDAE
Subfamily SCIURINAE

Callosciurus baluensis
Kinabalu Squirrel
Tupai Kinabalu

Kinabalu Squirrel

[Image of Kinabalu Squirrel]

[Map of Crocker Range Area]

[Map of Crocker Range Area]
Measurements
HB 160-238, T 160-210, THB 70-110%, HF 42-52, E 16.3-18,
W 150-280 g, D 1023/1013=22. Skull: gl 50.0-51.0, cbl 45.7, iob 18.6, 
mt 18.6.

Introduction
Upperparts and tail brown. Underparts pale red or orange,
ever gray. Side-stripes buff and black. No pale spot behind
ear. Hindfoot over 40 mm. Species name "notatus" means
"spotted". The Ear-spot Squirrel, Callosciurus adamsi,
is very similar, and often difficult to see in the field, but it is
slightly smaller, usually has a gray tinge on underparts, and
has a pale spot behind each ear.

Habitat and Ecology
Diurnal, most active early morning and late afternoon.
Arboreal but usually in small trees. The most abundant, and
often the only squirrel in gardens and plantations. Common
in coastal, riverine and swamp forests. Rare in tall
dipterocarp forests. Diet includes a wide variety of fruits
and insects.

Distribution
South Thailand, Peninsular Malaysia, Sumatra, Java and most
intervening islands. [Borneo] Widespread in the lowlands and
hills. Kalimantan, Sarawak, Brunei. [Sabah] Common to villages
and riverside forests. Binsuluk, Danum Valley, G. Kinabalu
(60 to 1700m), S. Kinabatangan, Klias, Kota Kinabalu, Kulumba,
Sepilok, Sorsinsan (Kota Marudu), Sukau, Tabin, Tawau Hill,
Tomanggong, Ulu Kalabakan, P. Malawali. [Crocker Range]
Inside TBC Inobong, Mile 8 Keningan-Kimanis. Outside TBC
Mile 7 Keningau-Kimanis, Ulu Kinamis.

Ethnic name
Kaitan (Murut), Labo Kater (Lundaya).

<table>
<thead>
<tr>
<th>Code</th>
<th>Order</th>
<th>Scientific Name</th>
<th>Common Name</th>
<th>Malay Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>07010203</td>
<td>RODENTIA</td>
<td>Callosciurus notatus</td>
<td>Plantain Squirrel</td>
<td>Tupai Pinang</td>
</tr>
</tbody>
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is very similar, and often difficult to see in the field, but it is
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Diurnal, most active early morning and late afternoon.
Arboreal but usually in small trees. The most abundant, and
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South Thailand, Peninsular Malaysia, Sumatra, Java and most
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Inside TBC Inobong, Mile 8 Keningan-Kimanis. Outside TBC
Mile 7 Keningau-Kimanis, Ulu Kinamis.

Ethnic name
Kaitan (Murut), Labo Kater (Lundaya).

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HB 160-238, T 160-210, THB 70-110%, HF 42-52, E 16.3-18,
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Introduction
Upperparts and tail brown. Underparts pale red or orange,
ever gray. Side-stripes buff and black. No pale spot behind
ear. Hindfoot over 40 mm. Species name "notatus" means
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is very similar, and often difficult to see in the field, but it is
slightly smaller, usually has a gray tinge on underparts, and
has a pale spot behind each ear.

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Diurnal, most active early morning and late afternoon.
Arboreal but usually in small trees. The most abundant, and
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dipterocarp forests. Diet includes a wide variety of fruits
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South Thailand, Peninsular Malaysia, Sumatra, Java and most
intervening islands. [Borneo] Widespread in the lowlands and
hills. Kalimantan, Sarawak, Brunei. [Sabah] Common to villages
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Sepilok, Sorsinsan (Kota Marudu), Sukau, Tabin, Tawau Hill,
Tomanggong, Ulu Kalabakan, P. Malawali. [Crocker Range]
Inside TBC Inobong, Mile 8 Keningan-Kimanis. Outside TBC
Mile 7 Keningau-Kimanis, Ulu Kinamis.

Ethnic name
Kaitan (Murut), Labo Kater (Lundaya).
Measurements
HB 166-183, T 152-167, T/HB=111.6%, HF 36-40, E 13, W 115-154 g.

Introduction
Closely resembles the Plantain Squirrel, *Callosciurus notatus*, but smaller and with a distinct pale buffy spot behind ear. Underparts reddish. Hindfoot under 38 mm.

Habitat and Ecology
Diurnal, mainly active in small trees. Occurs in lowland dipterocarp forests, doesn’t go out from there. Diet includes a wide variety of fruits and insects.

Distribution
Confined to Borneo. Known from scattered localities throughout Sabah and Sarawak. Niah, S. Rejang, the upper S. Baram (210-270m) and Kelabit highlands (840-900m) in Sarawak, Br. Tudal in Brunei. [Sabah] S. Danum, G. Kinabalu, Sepilok (cultivated areas around the Reserve), Sukau, Tabin, Trus Madi, [Crocker Range] Inside TBC Mahua. Outside TBC Ulu Tuaran.

Ethnic name

May – October 2002
\[\text{Surveys by SP (authors)}\]
\[\text{CRP Expedition by UMS & SP}\]
\[\text{Information by H. Hazebrook}\]

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tien et al. 2000
5. Yasuma 2000
Measurements

Introduction
Upperparts finely speckled brownish. Underparts gray. A pale buffy spot behind each ear. The Plantain Squirrel, Callosciurus notatus, and the Ear-spot Squirrel, Callosciurus adamsi, are similar, but they are larger and have reddish underparts. Species name "orestes" means "mountain-dweller".

Habitat and Ecology
Uncommon squirrel restricted to lower montane forest. Diurnal. Active in small and medium-sized trees. Feeds mainly fruits.

Distribution

Ethnic name
May - October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebrook

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Taun et al 2000
5. Yasuma 2000
Measurements

Introduction
Upperparts speckled brown, underparts cream with the color sharply defined on the flanks. Muzzle short and rounded. Tail very short and bushy. Other small squirrels have a significantly longer tail or grayish underparts.

Habitat and Ecology
Diurnal. Most active in early morning and late afternoon. Diet includes fruits, insects and fungi. Walks and feeds in small standing trees, in fallen trees and on ground. Occurs in lowland dipterocarp forests. Found in tall and secondary forests.

Distribution

Ethnic name
May ~ October 2002

\[ 69 \]
Jentink’s Squirrel

Measurements
HB 120-144, T 110-133, T/HB 96-100%, HF 30-34.

Introduction
Upperparts pale speckled brownish, underparts creamy-white on gray under-fur. Tail long and very thin, appearing banded dark and pale due to reddish. Has a conspicuous facial markings, including creamy-white mustache-like line, eye-ring and ear margin.

Habitat and Ecology
Diurnal. Active in the crowns of small trees. Occurs in montane forests.

Distribution
Confined to Borneo in mountains above 900 m. S. Telen (1170m), Badang in East Kalimantan, G. Mulu, G. Murud, Kelabit highlands, Usun Apau and G. Dulit in Sarawak. [Sabah] G. Kinabalu (900-3140m), Sayap (Kota Belud), Trus Madi, The Sabah-Sarawak border hills. [Crocker Range] Inside TBC Gn. Alab.

Ethnic name
Tolikid (Kadazan).

May ~ October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tan et al. 2000
5. Yasuma 2000
Measurements

Introduction
Upperparts speckled brown, underparts gray, with a patch of bright chestnut between thighs (not visible from side). Muzzle short and rounded. Hindfoot over 32 mm.

Habitat and Ecology
Diurnal and arboreal. Occurs in montane forests. Found in tall forests in hill ranges.

Distribution

Ethnic name
May ~ October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek

Quoted from Literature
Paine & Francis 1985
Sahab Museum specimen
Sahab Parks specimen
Tuen et al. 2000
Yasuomo 2000
Red-bellied Sculptor Squirrel

**Measurements**

**Introduction**
Very small, Head & Body length less than 150 mm. Hindfoot length less than 33 mm. Upperparts finely speckled brownish, underparts reddish so that the animal looks similar to a miniature of Ear-spot Squirrel, *Callosciurus adamsi*. Distinctive teeth, especially the lower incisors, which diverge in a shape and are slightly concave on the outer surface. Species name "*simus*" means "flat nosed".

**Habitat and Ecology**
Diurnal. Habits and function of unusually shaped teeth unknown.

**Distribution**
Known only from Borneo with all records from northwest mountains, mostly from 1300-1700m. Kelabit highlands (above 1650m) in Sarawak. [Sabah] Bundu Tuhan (1350m), G. Kinabalu (1350m) Maliau Basin. [Crocker Range] Inside TBC No record. Outside TBC Moyong, Ulu Tuaran.

**Ethnic name**
May ~ October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Turn et al. 2000
5. Yasuma 2000

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. forest 2000-2500m</td>
<td>Forest - Night</td>
</tr>
<tr>
<td>Mt. forest 2000-2500m</td>
<td>Forest - Day</td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td>Forest - Night</td>
</tr>
<tr>
<td>Forest (d+1) 1200m</td>
<td>Forest - Day</td>
</tr>
<tr>
<td>Forest over ultrarbric</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Forest</td>
<td>Brackaloe-water forest</td>
</tr>
<tr>
<td>Riverine forest</td>
<td>Mangrove forest</td>
</tr>
</tbody>
</table>

May - October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Turn et al. 2000
5. Yasuma 2000

**Order** RODENTIA
**Family** SCIURIDAE
**Malay name** Tupai Kericek Merah
**Scientific name** Glyphotes simus
**English name** Red-bellied Sculptor Squirrel

**Habitat and Activity**

- Day: Arboreal & Terrestrial
- Night: Arboreal & Terrestrial
- Ground: Terrestrial

**Taxon Code**
- 07010401
- Scientific name: Glyphotes simus
- English name: Red-bellied Sculptor Squirrel
- Malay name: Tupai Kericek Merah
- Order: RODENTIA
- Family: SCIURIDAE
- Subfamily: SCIURINAE
Four-striped Ground Squirrel

**Code:** 07010502  
**Order:** RODENTIA  
**Family:** SCIURIDAE  
**Subfamily:** SCIURINAE

**Scientific name:** Lariscus hosei  
**English name:** Four-striped Ground Squirrel  
**Malay name:** Tupai Belang Empat

### Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Sua &amp; Sua 1000-2000m</td>
<td>Night</td>
</tr>
<tr>
<td>Mt. Sua 1200-2000m</td>
<td>Daytime</td>
</tr>
<tr>
<td>Lowland dipterocarp forest</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Heath forest</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Ritterosa forest</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Boreal transitional heath forest</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Blackwater forest</td>
<td>Swamp forest</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Swamp forest</td>
</tr>
</tbody>
</table>

### Measurements

HB 172-192, T 110-142, T/HB 60-72.9%, HF 42-46, E 13.6, W 145-215 g. Skull: gl 45.0-47.7, cbl 42.9, iob 12.5.

### Introduction

Four black stripes, the two in the center separated by a central buff line, and the inner and outer stripes on each side separated by a very pale line. Underparts orange.

### Habitat and Ecology

Diurnal and terrestrial. Occurs in tall and secondary forests but with a very patchy distribution.

### Distribution

**Confined to Borneo.** Recorded from northwest lowlands and montane sites. G. Dulit (1200m), G. Kalulong and Bt. Batu Song (1500m), Kelabit highlands in Sarawak. [Sabah] Danum Valley, G. Kinabalu (up to 1530m), Poring, Sapagaya near Lahad Datu, [Crocker Range] Inside TBC Mile 8 Keningau-Kimanis, Ulu Kimanis. **Outside TBC** Moyong, Ulu Tuaran.

### Ethnic name

Montogok (1-Kadazan).

---

Quoted from Literature

1. Paine & Francis 1985  
2. Sabah Museum specimen  
3. Sabah Parks specimen  
4. Tuen et al. 2000  
5. Yasuma 2000
**Bornean Mountain Ground Squirrel**

**Measurements**
HB 160-190, T 72-130, T/HB usually 55-60%, up to 70%, HF 30-42, E 15-18, W 145-185 g, D 1023/1013=22, M 0+1+2=6. Skull: gl 45.

**Introduction**
Smaller animals. Upperparts gray or grayish buff. Underparts gray with buffy-white tips. Tail hairs black with buffy-red bases and tips, but not with pale and dark bars. Tail is short and bushy than other montane squirrels. Muzzle slightly pointed than other small squirrels except the Shrew-faced Ground Squirrel, *Rhinosciurus laticaudatus*.

**Habitat and Ecology**
Diurnal, but active mainly during whole morning and late afternoon. Mainly terrestrial, but often climb small trees. Often stay in burrow under big roots, fallen tree or rock. Occurs in montane forests. Diet a mixture of plant and animal material. One of the commonest mammals in primary montane forests in Sabah, and often settle down around hut or shelter, to look for foods, where visitors take a rest.

**Distribution**
Confirmed to Borneo. Recorded from northwest mountains, G. Pueh, G. Penrisen, G. Dulit, Usun Apau, Kelabit highlands, G. Murud and G. Mulu in Sarawak. [Sabah] G. Kinabalu (1050-3400m, one of the commonest mammals), Trus Madi (1320-1650m), Tawau Hill, Ulu Kalabakan, Ulu Maligan (1700m). [Crocker Range] Inside TBC Mahua, Mile 17 Keningau-Kimanis, Ulu Sunsuron (1300m).

**Ethnic name**
May ~ October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tan et al. 2000
5. Yasuma 2000
Measurements

Introduction
Upperparts dark brown. Underparts white of buff. Tail short and bushy. Head & Body length usually over 195 mm. Muzzle elongated and tapered like a treeshrew. Hindfoot over 37 mm. The Bornean Mountain Ground Squirrel, Dremomys everetti, is similar, but it has a shorter muzzle and grayish underparts. The "Rhinosciurus" means "rhino-like squirrel". Species name "laticaudatus" is "broad-tailed".

Habitat and Ecology
Diurnal and terrestrial. The unusual proportions of the rostrum of these squirrels is related with their diet. Their food consists mainly of large ants, termites, and beetles, but they also eat fruit. In old individuals the teeth are worn down considerably. This is thought to be caused by the dirt and grit taken in with the insect food. Occurs in tall and secondary forests.

Distribution

Ethnic name
May ~ October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek

Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
Sabah Parks specimen
Yasuma 2000

Habitat and Activity

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<thead>
<tr>
<th>Woody vegetation</th>
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<td>Yang 2nd Forest</td>
</tr>
<tr>
<td>Mt. Serat 1200-2000m</td>
<td>Malaysia</td>
</tr>
<tr>
<td>Lowland Dipterocarp</td>
<td>Sarawak</td>
</tr>
<tr>
<td>Forest</td>
<td>Singapore</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Sumatra</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td>P. Banyak</td>
</tr>
<tr>
<td>Heath Forest</td>
<td>T.B.C.</td>
</tr>
<tr>
<td>Riet Forest</td>
<td>P. Natuna</td>
</tr>
<tr>
<td>Boreal, Tembok Semen</td>
<td>[Crocker Range]</td>
</tr>
<tr>
<td>Swamp Forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Brachileaf forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Rare</td>
</tr>
</tbody>
</table>

| Tree: Arboreal        | Night |
| Arboreal & Terrestrial| Daytime |
| Ground: Terrestrial   | Night |

Map - October 2002

Shrew-faced Ground Squirrel
Confirmed TBC (Outside)

Scientific name
Rhinosciurus laticaudatus

English name
Shrew-faced Ground Squirrel

Malay name
Tupai Naning

Order
RODENTIA

Family
SCIURIDAE

Subfamily
SCIURINAE

Scientific name
Rhinosciurus laticaudatus

Order
RODENTIA

English name
Shrew-faced Ground Squirrel

Family
SCIURIDAE

Malay name
Tupai Naning

Subfamily
SCIURINAE

Scientific name
Rhinosciurus laticaudatus

Order
RODENTIA

English name
Shrew-faced Ground Squirrel

Family
SCIURIDAE

Malay name
Tupai Naning

Subfamily
SCIURINAE
Plain Pigmy Squirrel

Measurements

Introduction
Very small. Plain coloration. Upperparts speckled olive-brown. Underparts pinkish-buff. Ear has no tufts of hair. Call is a single high-pitched squeak. Genus name "Exilisciurus" means "small squirrel". The "exilis" is "small".

Habitat and Ecology
Widespread in heavy forests. Diurnal. Active in the morning and late afternoon, mainly in small to medium sized trees, often on tree trunks. Diet includes various material from the surfaces of trees and lianas such as bark and small insects.

Distribution
Confined to Borneo. Known from many localities throughout the lowlands and hills, usually below 750m. East, South and Central Kalimantan, Sarawak, Brunei. [Sabah] Batu Ponggul, Danum Valley, Gomantong, G. Kinabalu (up to 900m), Klias, Kulamba, Maliau Basin, Poring, Sepilok, Sukau, Tabin, Tawau Hill, Tomanggong, Ulu Kalabakan, P. Banggi. [Crocker Range] Inside TBC, Ulu Senagang.

Ethnic name
Mantuk (Bisaya, Dusun), Tantabuk (Kedayan).

Quoted from Literature
Measurements

Introduction
Very small. Ear bear conspicuous tufts of hair at least 20 mm long. Upperparts dark grayish brown, finely grizzled with black, with long hair. Underparts slightly paler and more buffy. The tail is dark orange-brown and black, giving an obscurely banded impression. This squirrel is a heavier-bodied, more robust squirrel than *Exilisciurus exilis*.

Habitat and Ecology
Known from hill dipterocarp and lower montane forests. Diurnal. Active mainly in small to medium sized trees, but ranges from tree buttresses up to the canopy of tall trees. Diet includes mosses and lichens.

Distribution

Ethnic name
May ~ October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebrook
Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
Sabah Parks specimen
Tuen et al. 2000
Yasuma 2000
**Black Flying Squirrel**

**Scientific name**: *Aeromys tephromelas*

**English name**: Black Flying Squirrel

**Malay name**: Tupai Terbang Hitam

**Measurements**

- HB 355-426, T 410-470, HF 67-78, E 35
- W about 900 g.

**Skull**: gl 67.

**Introduction**

Large species. Flanks, gliding membrane, tail and cheeks dark gray-brown, almost black. Back similar, with gray tips to longer hairs. Underparts slightly paler. Fluffy hair. The Smoky Flying Squirrel, *Pteromyscus pulverulentus*, is similar, but it is smaller and has creamy underparts. The "aero-" means "air-" or "mist-". Species name "tephromelas" means "ash-gray".

**Habitat and Ecology**

This species are chiefly nocturnal, spending the day curled up asleep in a hole high in a tree and emerging at dusk. They scamper about the treetops during the night foraging for fruits, nuts, leaves, and probably some insects. It is believed that the number of young is two to four per litter. The young are born in the mother's nest, where they remain until they have sufficient strength to seek their own food. Occurs in lowland dipterocarp forests.

**Distribution**

South Thailand, Peninsular Malaysia, Sumatra. [Borneo]

Recorded from scattered localities in the northern half of Borneo. Near Samarinda in East Kalimantan, Neighborhood of Kuching, G. Dulit, Marudi, S. Baram in Sarawak. [Sabah] Bundu Tuhan, Danum Valley, G. Kinabalu (up to 1050m), Tawau Hill in Tawau. [Crocker Range] Inside TBC No record. Outside TBC Ulu Tomani.

**Ethnic name**

May – October 2002

- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebrook

Quoted from Literature

1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tan et al. 2000
5. Yasuma 2000
Measurements

Introduction
Large species. Uniformly rich red brown all over, without black tips. The cheeks lack whiskers, the ears are of moderate size, and the membrane, in addition to being connected between the feet, is continued between the forearms, the neck, the hind legs, and the tail. The Red Giant Flying Squirrel is similar, but it is more larger, and has black on the face, tip of the tail and feet.

Habitat and Ecology
Nocturnal. Diet includes fruits. Occurs in lowland dipterocarp and lower montane forests. They inhabit mature forests or clearings having a stand of a few large trees.

Distribution
Confined to Borneo. Recorded from scattered localities in the island. East and West Kalimantan, Sarawak. [Sabah] Danum Valley, G. Kinabalu (up to 1600m), Ranau, Sandakan, Sepilok, Tabin, Tawau Hill. [Crocker Range] Inside TBC No record. Outside TBC Ulu Tomani.

Ethnic name
Tagaut (Kadazan).

Measurements

Introduction
Large species. Uniformly rich red brown all over, without black tips. The cheeks lack whiskers, the ears are of moderate size, and the membrane, in addition to being connected between the feet, is continued between the forearms, the neck, the hind legs, and the tail. The Red Giant Flying Squirrel is similar, but it is more larger, and has black on the face, tip of the tail and feet.

Habitat and Ecology
Nocturnal. Diet includes fruits. Occurs in lowland dipterocarp and lower montane forests. They inhabit mature forests or clearings having a stand of a few large trees.

Distribution
Confined to Borneo. Recorded from scattered localities in the island. East and West Kalimantan, Sarawak. [Sabah] Danum Valley, G. Kinabalu (up to 1600m), Ranau, Sandakan, Sepilok, Tabin, Tawau Hill. [Crocker Range] Inside TBC No record. Outside TBC Ulu Tomani.

Ethnic name
Tagaut (Kadazan).
Measurements
HB 160-180, T 155-188, HF 31-32.

Introduction
Medium-sized. Whitish hairs at the base of each ear. Distinct tuft of long whisks on the cheek behind the eye. Gliding membrane with a white margin. Upperparts reddish-brown with gray underfur, speckled with gray anteriorly, and with reddish posteriorly, giving an strong pinkish tinge. Underparts cream or dull orange-buff.

Habitat and Ecology
Nocturnal. Occurs in lowland dipterocarp forests. These flying squirrels eat nuts, fruits, young twigs, tender shoots and leaves, possibly the bark of certain trees, and perhaps some insects.

Distribution
Peninsular Malaysia, Sumatra, Java. [Borneo] All known specimens are from the northern half of Borneo. Upper S. Telen in East Kalimantan, G. Pensi, S. Patah, S. Baram in Sarawak, Tasek Merimbun in Brunei. [Sabah] [Crocker Range] Inside TBC No record. Outside TBC Tuaran, Ulu Tuaran.

Ethnic name

Specimen: Sabah Museum

May – October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature:
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tuen et al 2000
5. Yasuma 2000
Vordemann’s Flying Squirrel

Scientific name: Petinomys vordemannii
English name: Vordemann’s Flying Squirrel
Malay name: Tupai Terbang Kecil

Measurements
HB 92-105, T 98-103, HF 21. Skull: cbl 28.2-30.0, iob 5.9, mt 5.5-6.2.

Introduction
Small. Upperparts blackish with rusty colored tips. Underparts buffy-white. Cheeks orange. Gliding membrane with a pale buff (not white) margin. Tail brown with buffy hairs at the base; convex above, about 2 cm wide. Black ring around each eye. Tufts of whiskers at the base of each ear.

Habitat and Activity
Nocturnal. Occurs in lowland dipterocarp forests. Nest holes recorded at 0.3-6.0 meters above the ground.

Distribution

Ethnic name
May ~ October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek

Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
Sabah Parks specimen
Yasuma 2000

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Siret 2000-3000m</td>
<td>Old and Forest</td>
</tr>
<tr>
<td>Mt. Siret 1200-2000m</td>
<td>Lowland Dipterocarp</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Young 2nd Forest</td>
</tr>
<tr>
<td>Forest over ultrasonic rocks</td>
<td>Mangrove Forest</td>
</tr>
<tr>
<td>Heath Forest</td>
<td>Swamp Forest</td>
</tr>
<tr>
<td>Riberbo Forest</td>
<td>Brackishwater Forest</td>
</tr>
<tr>
<td>Decid, Transitional Savanna</td>
<td>Mangrove Forest</td>
</tr>
</tbody>
</table>

Crocker Range Area Race

Specimen: Sabah Parks Museum
Measurements
HB 370-450, T 365-490, HF 65-80, E 40, W 1,000-2,900 g.
Skull: gl 65-70.

Introduction
Largest flying squirrel. Entire body reddish brown with black markings on the nose and chin, around the eyes, behind the ears, at the tips of the feet and tail. The black tip to the tail is main characteristic of this species in the field, other large reddish flying squirrels lack this black tip. The "Petaurista" means "an acrobat".

Habitat and Ecology
Mostly nocturnal, becoming active shortly before dusk, but sometimes observed during the day resting on a branch near its nest hole. On the fruiting tree, found alone or in small groups (2-6 individuals). Changes feeding sites with the flowering and fruiting. Occurs in lowland dipterocarp forests, the commonest flying squirrel in Borneo. Found in open areas with only few tall trees, plantations and gardens. Careful observation using head-lamp or spotlight may not disturb their feedings.

Distribution

Ethnic name
Red Giant Flying Squirrel

Petaurista petaurista
Tupai Terbang Merah

Red Giant Flying Squirrel

Habitat and Activity
Wooded vegetation
Open area
Montane Forest
Lowland Dipterocarp Forest
Forest 1200m
Forest 2000m
Forest over limestone rocks
Montane Forest
Riverine Forest
Beach Transitional Forest
Swamp Forest
Brackishwater Forest
Mangrove Forest

Crocker Range Area

Common

May - October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
- Paine & Francis 1985
- Sabah Museum specimen
- Sabah Parks specimen
- Yasuma 2000

Red Giant Flying Squirrel

Habitat and Activity

Red Giant Flying Squirrel

Habitat and Activity
Measurements

Introduction
Flanks and gliding membrane reddish laterally. Black in the middle, heavily flecked or spotted with white. Underparts reddish. Tail black. The Red Giant Flying Squirrel is somewhat similar, but it has an entirely red back and a red tail with a black tip. The "elegans" is "elegant" or of "graceful".

Habitat and Ecology
Arboreal and nocturnal. They inhabit dense hillside forests, and are usually found at 15 to 30 or more meters above the ground. They spend the daylight hours in hollow trees or branches and become active after dusk. They live singly, in pairs, or in family groups. They travel the treetops in a squirrel-like manner, but when a branch or a tree is too distant to reach by a leap, they go to a high branch and leap toward their objective, extending the membrane as they spread the arms forward and out, and the legs backward and out. Diet consists of fruits, nuts, young twigs, tender shoots, leaves, and possibly insects and larvae.

Distribution

Ethnic name
May ~ October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek
Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
Tuen et al. 2000
Vosma 2000

Specimen: Sabah Parks Museum

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Sann 2000-5000m</td>
<td>Night</td>
</tr>
<tr>
<td>Mt. Sann 1200-2000m</td>
<td>Daytime</td>
</tr>
<tr>
<td>LBST (Lowland highland)</td>
<td>Night</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td>Daytime</td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td>Night</td>
</tr>
<tr>
<td>Heath forest</td>
<td>Daytime</td>
</tr>
<tr>
<td>Rhododendron forest</td>
<td>Night</td>
</tr>
<tr>
<td>Borneo, Transitional heath</td>
<td>Daytime</td>
</tr>
<tr>
<td>Swamp forest</td>
<td>Night</td>
</tr>
<tr>
<td>Borneo, Transitional heath</td>
<td>Daytime</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Night</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Daytime</td>
</tr>
</tbody>
</table>

Specimen: Sabah Parks Museum
Measurements
HB 110-219, T 121-220, T/HB 85-120%, HF 27.5-39, E 16.5-21.6, W 80-210 g, D 1003/1003=16, M 2+0+3=10 rarely 3+0+3=12. Skull: gl 41.0-45.9, cbl 33.8-42.9, iob 5.8-7.4, mt 6.2-8.6.

Introduction
Medium sized rat. Upperparts dull-brown, underparts usually slightly paler, buffy-brown with gray bases. Tail entirely brownish. The Malaysian Field Rat, *Rattus tiomanicus*, is very similar, but differs in coloration of the underparts, usually lacks long, black guard hairs on the rump, has somewhat softer fur.

Habitat and Ecology
Nocturnal. Diet includes a wide range of plant and animal matter. Confined to human settlements, plantations and gardens near settlements. This species and the Norway Rat, *Rattus norvegicus*, harbor and carry such diseases as bubonic (black) plague, typhus, *Salmonella* food poisoning, rabies, tularemia, and trichinosis.

Distribution

Ethnic name

<table>
<thead>
<tr>
<th>Habitat and Activity</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wetland vegetation</td>
<td>Ground</td>
</tr>
<tr>
<td>Forest</td>
<td>Arboreal</td>
</tr>
<tr>
<td>Rainforest</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

Confirmed TBC (Inside)

House Rat

Scientific name: *Rattus rattus*

English name: House Rat

Malay name: Tikus Rumah

- **Habitat and Activity**

- **Measurements**

- **Introduction**

- **Habitat and Ecology**

- **Distribution**

- **Ethnic name**
**Ricefield Rat**

**Scientific name** *Rattus argentiventer*
**English name** Ricefield Rat
**Malay name** Tikus Sawah

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Serat 2000-3000m</td>
<td>Crocker Range Area</td>
</tr>
<tr>
<td>Limestone</td>
<td>Common</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td></td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
<td></td>
</tr>
<tr>
<td>Heath forest</td>
<td></td>
</tr>
<tr>
<td>Ritteria forest</td>
<td></td>
</tr>
<tr>
<td>Beola, Transitional beorea</td>
<td></td>
</tr>
<tr>
<td>Swamp forest</td>
<td></td>
</tr>
<tr>
<td>Beach/river forest</td>
<td></td>
</tr>
<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**


**Introduction**

Upperparts pale brown with fine black speckling, very similar to House Rat, *Rattus rattus*, but more speckled appearance, and underparts wholly silvery-gray, often with a dark streak along the middle. Species name "argentiventer" means 'silvery belly'. The House Rat, *Rattus rattus*, and Malaysian Filed Rat, *Rattus tiomanicus*, are somewhat similar, but they differ in coloration of underparts, and females of both have only 10 mammillae.

**Habitat and Ecology**

Active mostly on the ground. Occurs in ricefields, grassland and plantations. This species constitutes the major pest of rice crops in south Asian countries. It can swim well. The breeding season is influenced by the nutritional conditions of the rice plant. The average litter size reaches 10.7-10.8 in the field. During the early breeding season individuals live solitarily (1 male or female), but in the mating season pairs occasionally appear in the same nest, mother-litter combinations are found in the middle of the breeding season.

**Distribution**

Thailand, Peninsular Malaysia, Sumatra, Java, Sulawesi, Flores, Timor to New Guinea. [Borneo] Recorded from scattered localities throughout the island. East, South and West Kalimantan, Sarawak, Brunei. [Sabah] G. Kinabals (up to 600m), Ranau, P. Tiga. [Crocker Range] Inside TBC No record. Outside TBC Tenom.
**Measurements**


**Introduction**

Small sized rat. Upperparts grayish-brown, underparts grayish-white. Spines white with dark brown tips. Tail uniformly black. Females have 8 mammillae. House Rat, *Rattus rattus*, is somewhat similar, but it is larger respectively (HF usually at least 28 mm).

**Habitat and Ecology**

Nocturnal. Diet includes plant and animal material. This rat confined to human settlements, plantations and gardens, and is a pest of wasteland, crops, and houses. Encounters suggest this species stands to the House Rat, *Rattus rattus*, in relation to inter-specific competition. There is no year in which these species both found in abundance.

**Distribution**


**Ethnic name**

May ~ October 2002

Surveys by SP (authors)

CRP Expedition by UMS & SP

Information by H. Hazebroek

Quoted from Literature

Paine & Francis 1985

Sabah Museum specimen

Sabah Parks specimen

Tuen et al. 2000

Yasuma 2000

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**Polynesian Rat**

**Scientific name** *Rattus exulans*

**English name** Polynesian Rat

**Malay name** Tikus Kecil

**Code** 07020105

**Order** RODENTIA

**Family** MURIDAE

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woods vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Montane forest</td>
<td>High Density</td>
</tr>
<tr>
<td>Lowland dipterocarp forest</td>
<td>Rare</td>
</tr>
<tr>
<td>Forest over mature rocks</td>
<td>Low</td>
</tr>
<tr>
<td>Lake forest</td>
<td>Ultralocenic rocks</td>
</tr>
<tr>
<td>Shore forest</td>
<td>Low</td>
</tr>
<tr>
<td>Swamp forest</td>
<td>Ultralocenic rocks</td>
</tr>
<tr>
<td>Borneo forest</td>
<td>Low</td>
</tr>
</tbody>
</table>

**Crocker Range Area**

Common

**Polynesian Rat Code**

07020105

**Scientific name** *Rattus exulans*

**Order** RODENTIA

**English name** Polynesian Rat

**Family** MURIDAE

**Malay name** Tikus Kecil

**Measurements**

Muller’s Rat

Measurements

Skull: gl 44.1-54.2, iob 6.8-8.0, mt 8.2-10.0.

Introduction
Large sized rat. Upper part dark brown with a coarse fur and prominent long black guard hair. Under part distinctly paler (buffy color). Tail entirely dark brown.

Habitat and Ecology
Nocturnal and terrestrial. Diet includes plant and animal matter. Occurs in lowland dipterocarp forests not in dense but lightly wooded area. Also in villages near forests. Common in the wetter parts of the forest floor.

Distribution
South Thailand, Peninsular Malaysia, Sumatra and adjacent islands, and Palawan. [Borneo] Known from lowlands and hills throughout the area. Kalimantan, Sarawak, Brunei, P. Natuna, P. Selbuk, P. Labuan. [Sabah] Binosulu, Danum Valley, Gomantong, G. Kimahala (at least up to 1280m), Maliau Basin, Sepilok, Sorinsim (Kota Marudu), Tabin, Tawau Hill, Trus Madi, P. Banggi, P. Balambangan, P. Gaya, P. Tiga. [Crocker Range] Inside TBC Ulu Membakut, Ulu Kimanis, Ulu Magindanau, Ulu Senagang. Outside TBC Purulon (Tenom), Ulu Kimanis.

Ethnic name
Labo Bada (Lundaya), Tikus Bankalan (Kadazan).

Confined TBC (Inside, Outside)

Scientific name Sundamys muelleri
English name Muller’s Rat
Malay name Tikus Lembah

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Surat 2000-3000m</td>
<td>Night</td>
</tr>
<tr>
<td>Mt. Surat 1200-1500m</td>
<td>Day</td>
</tr>
<tr>
<td>Forest near limestone</td>
<td>Night</td>
</tr>
<tr>
<td>Forest near ultrabasic rock</td>
<td>Day</td>
</tr>
<tr>
<td>Heath forest</td>
<td>Night</td>
</tr>
<tr>
<td>Rhythmic forest</td>
<td>Day</td>
</tr>
<tr>
<td>Beach, Mangrove forests</td>
<td>Night</td>
</tr>
<tr>
<td>Beach-Mangrove forest</td>
<td>Day</td>
</tr>
<tr>
<td>Mangrove forest</td>
<td>Night</td>
</tr>
</tbody>
</table>

Date
May ~ October 2002

Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tuen et al. 2000
5. Yasuma 2000

Order RODENTIA
Family MURIDAE

Muller’s Rat

Scientific name Sundamys muelleri
English name Muller’s Rat
Malay name Tikus Lembah

Crocker Range Area
Common

Muller’s Rat

Mammals of Crocker Range

Confirmed TBC (Inside, Outside)

Measurements

Skull: gl 44.1-54.2, iob 6.8-8.0, mt 8.2-10.0.

Introduction
Large sized rat. Upper part dark brown with a coarse fur and prominent long black guard hair. Under part distinctly paler (buffy color). Tail entirely dark brown.

Habitat and Ecology
Nocturnal and terrestrial. Diet includes plant and animal matter. Occurs in lowland dipterocarp forests not in dense but lightly wooded area. Also in villages near forests. Common in the wetter parts of the forest floor.

Distribution
South Thailand, Peninsular Malaysia, Sumatra and adjacent islands, and Palawan. [Borneo] Known from lowlands and hills throughout the area. Kalimantan, Sarawak, Brunei, P. Natuna, P. Selbuk, P. Labuan. [Sabah] Binosulu, Danum Valley, Gomantong, G. Kimahala (at least up to 1280m), Maliau Basin, Sepilok, Sorinsim (Kota Marudu), Tabin, Tawau Hill, Trus Madi, P. Banggi, P. Balambangan, P. Gaya, P. Tiga. [Crocker Range] Inside TBC Ulu Membakut, Ulu Kimanis, Ulu Magindanau, Ulu Senagang. Outside TBC Purulon (Tenom), Ulu Kimanis.

Ethnic name
Labo Bada (Lundaya), Tikus Bankalan (Kadazan).
Mountain Giant Rat

Scientific name: Sundamys infraluteus
English name: Mountain Giant Rat
Malay name: Tikus Bukit Besar

Measurements:

Skull:
- gl: 55.9-63.3
- iob: 7.8-9.1
- mt: 10.6-11.6

Introduction:
Very large, Hindfoot length more than 50 mm. Upperparts dark brown with buffy speckling with long hair and longer black guard hairs, underparts gray with strong orange tinge. Tail entirely dark brown. The "infra" is "below", "luteus" is "yellow".

Habitat and Ecology:
Nocturnal and terrestrial. Diet includes plant and animal matter. Occurs in montane forests.

Distribution:

Ethnic name:
Dongkulum (Kadazan), Mongkolom (Kadazan).

Habitat and Activity:
Crocker Range Area
Rare

Mountain Giant Rat
Code: 070202
Order: RODENTIA
Family: MURIDAE

Measurements:

Habitat and Activity:

Crocker Range Area
Rare

Time: Arboval & Terrestrial
Ground: Terrestrial
Space: Night:

Quoted from Literature:
- Paine & Francis 1985
- Sabah Museum specimen
- Sabah Parks specimen
- Yasuma 2000

Confirmed TBC (Inside)
Dark-tailed Tree Rat

Scientific name: *Niviventer cremoriventer*

Order: Rodentia

Family: Muridae

Malay name: Tikus Akar

**Measurements**


**Introduction**

Small to medium sized rat. Upperparts pale brown, usually with a yellowish tinge. Underparts whitish, usually with a yellow or buff tinge, especially on the chest. Distinct long, black guard hair and numerous rather stiff spines in both upper and under part. Tail uniformly dark brown. Tail covered in short hairs with longer, more prominent hairs on the terminal 2 cm.

**Habitat and Activity**

Nocturnal. Active in small trees and thickets, and on the ground. Occurs in lowland dipterocarp and lower montane forests. Found in forest edge and lightly wooded areas. This species is largely fruit eater.

**Distribution**

East Burma, Indochina, Thailand, Peninsular Malaysia, Sumatra, Java and adjacent islands. [Borneo] Recorded in lowlands and hills throughout the area up to 1110m at Bario in Kelabit highlands. Kalimantan, Sarawak, Brunei. [Sabah] Danum Valley, G. Kinabalu (up to 1965m), Maliau Basin, Marak-parak (Kota Marudu), Poring, Sepolok, Tabun, Tawau Hill, Trus Madi, P. Banggi, P. Balambangan, P. Malawali. [Crocker Range] Inside TBC Mile 8 Keningau-Kimanis, Mile 16 Keningau-Kimanis, Ulu Kimanis, Ulu Senagang. Outside TBC Ulu Kimanis.

**Ethnic name**

Tikus gayat (Kadazan).
Measurements
Skull: gl 40.9-48.6, iob 6.6-7.4, mt 6.9-8.1.

Introduction
Medium sized rat. Upperparts brown, darker in the midline and with numerous stiff gray-brown spines. Underparts white, with many short, white spines, usually with a dark brown streak along the middle in adults, but never with an orange throat patch. White of the under part extends down in a narrow line to the feet. Tail brown above, pale below, thinly haired. Young grayer and duller. The "rajah" means "king" in Malay language.

Habitat and Ecology
Nocturnal and predominantly terrestrial. Occurs in lowland dipterocarp forests. Found in tall and secondary forests.

Distribution

Ethnic name
Pupulak (Murut), Tikus Sintatatvui (Kadazan).
Red Spiny Rat

Scientific name: Maxomys surifer
English name: Red Spiny Rat
Malay name: Tikus Duri Merah

Measurements

Introduction
Medium sized rat. Upperparts distinctly orange or reddish-brown, slightly darker along the middle, with numerous short, stiff, dark spines. Underparts white with soft, white spines. Coloration of upperparts usually extends around part or all of the neck and around the inner side of the leg above the ankle. Tail brown above, pale below. Young grayer and duller very similar to those of Brown Spiny Rat, Maxomys rajah, they cannot be distinguished.

Habitat and Ecology
Nocturnal and predominantly terrestrial. Found in forests. Occurs in more higher altitudes than the Brown Spiny Rat, Maxomys rajah.

Distribution

Ethnic name
Pupulak (Murut).

Quoted from Literature
Paine & Francis 1985 Sabah Museum specimen
Sabah Parks specimen
Tuen et al. 2000

Map – October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tuen et al. 2000
5. Yasuno 2000
Chestnut-bellied Spiny Rat

Scientific name: *Maxomys ochraceiventer*

Malay name: Tikus Duri Perut Kastanye

**Measurements**

HB 140-171, T 128-175, T/HB 111.1-116.3%, HF 29-36, E 21-22, W 92.5-101.5 g, D 1003/1003=16. Skull: gl 35.3-39.6, iob 6.2-7.4, mt 5.4-6.0.

**Introduction**

Medium sized rat. Very similar to Mountain Spiny Rat, *Maxomys alticola*, in size, but differ in coloration. Upperparts reddish brown. Underparts grayish with a strong yellow or buffy-red tinge, sometimes appear entirely yellowish. Tail dark-brown above, pale below. Numerous stiff spines on entire body. The "ochracei-" is "yellowish" or "ochre-colored", species name "ochraceiventer" means "yellow-bellied".

**Habitat and Ecology**

Nocturnal. Occurs in lowland dipterocarp, mainly hills, and lower montane forests.

**Distribution**

Confirmed to Borneo. Recorded only from northern parts of the island. G. Sidong (360m), G. Dulit (1020m), S. Lein, S. Tinjar (150m), Bario in Sarawak. [Sabah] Danum Valley, G. Kinabalu (below 2000m), Tawau Hill. [Crocker Range] Inside TBC Mile 8 Keningau-Kimanis. Outside TBC Lower Sg. Padas (Beaufort).

**Ethnic name**

**Measurements**

HB 140-171, T 128-175, T/HB 111.1-116.3%, HF 29-36, E 21-22, W 92.5-101.5 g, D 1003/1003=16. Skull: gl 35.3-39.6, iob 6.2-7.4, mt 5.4-6.0.

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**Ethnic name**

**Measurements**

HB 140-171, T 128-175, T/HB 111.1-116.3%, HF 29-36, E 21-22, W 92.5-101.5 g, D 1003/1003=16. Skull: gl 35.3-39.6, iob 6.2-7.4, mt 5.4-6.0.
Measurements

Introduction
Small sized rat. Upperparts brown, dark along the midline; progressively paler towards the underparts, which are pale buff colored. Whole body covered in soft fur intermixed with numerous stiff spines. Tail dark above, pale below.

Habitat and Ecology
Unknown.

Distribution
Known from a few, scattered localities in northern Borneo. Kelabit highlands (above 1200m). [Sabah] G. Kinabalu 900-1400m, Sandakan Bay. [Crocker Range] Inside TBC Ulu Kinianis, Ulu Senagang.

Ethnic name
May ~ October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Tuen et al. 2000
5. Yasumo 2000

Habitat and Activity

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Sukau 3000-5000m</td>
<td>02 Night</td>
</tr>
<tr>
<td>Mt. Sukau 1200-2000m</td>
<td>02 Daytime</td>
</tr>
<tr>
<td>Lowland dipterocarp</td>
<td>06 Night</td>
</tr>
<tr>
<td>Dipterocarp forest</td>
<td>06 Daytime</td>
</tr>
<tr>
<td>Forest over limestone</td>
<td></td>
</tr>
<tr>
<td>Forest over ultrabasic rocks</td>
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<tr>
<td>Heath forest</td>
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<tr>
<td>Rhetoric forest</td>
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<tr>
<td>Boral, transitional heath</td>
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</tr>
<tr>
<td>Swamp forest</td>
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<tr>
<td>Brackishwater forest</td>
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<tr>
<td>Mangrove forest</td>
<td></td>
</tr>
</tbody>
</table>

N

Code 07020405
Order RODENTIA
Family MURIDAE
Scientific name Maxomys baeodon
English name Small Spiny Rat
Malay name Tikus Duri Kinabalu

Crocker Range Area
Few

Habitat
Tree: Arboresal
Arboresal & Terrestrial
Ground: Terrestrial
Space: Night

May – October 2002

[93]
Measurements
HB 103-150, T 87-125, T/HB 95.8-98.2%, always less than 100%, HF 23-30, E 18.3-19.9, W 30-83g, D 1003/1003=16. Skull: gl 29.2-33.7, iob 5.2-5.8, mt 5.1-6.2.

Introduction
Small sized rat. Upperparts reddish-brown with gray under-fur and numerous stiff, pale gray spines with black tips. Underparts orange-buff with gray under-fur and numerous soft, pale spines. Tail dark-brown above, pale below. Tail always less than 100% of head and body length.

Habitat and Ecology
Occurs in lowland dipterocarp forests, also in lower montane forests. Nocturnal. Active in small trees and thickets, but usually on the ground. Diet includes ants and other insects.

Distribution

Ethnic name
Pupukol (Murut), Tikus Tondomtondom (Kadazan).

Measurements
HB 103-150, T 87-125, T/HB 95.8-98.2%, always less than 100%, HF 23-30, E 18.3-19.9, W 30-83g, D 1003/1003=16. Skull: gl 29.2-33.7, iob 5.2-5.8, mt 5.1-6.2.

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Distribution

Ethnic name
Pupukol (Murut), Tikus Tondomtondom (Kadazan).
Measurements
HB 204-273, T 327-402, T/HB 134.2-174 %, HF 40-52, E 24.3-30.4, W 216-532 g, D 1003/1003=16, M 2+0+2=8. 
Skull: gl 50-58, cbl 46.0-52.3, iob 8.0-8.5, mt 9.1-10.0.

Introduction
Large sized rat. Upperparts bright brown with gray underfur and numerous soft hair-like spines. Underparts creamy-white, never has yellow or buff-tinge. Tail is very long, usually more than 135 % of head and body length. Tail dark brown, sometimes with pale, irregular blotches. Specimens from G. Kinabalu above 1700 meters including Mesilau are larger than others including from Crocker Range and G. Trus Madi, and duller with a blackish midline and upper-side of the head.

Habitat and Ecology
Nocturnal. Lives in the trees of up to at least 3 meters but often active on the ground. Occurs in lowland dipterocarp and lower montane forests.

Distribution
Subtropical China, Northern Indochina, Thailand, Peninsular Malaysia, Sumatra, Java and adjacent islands. [Borneo] Recorded throughout the lowlands and hills, up to 3100m on G. Kinabalu. [Sabah] Danum Valley, Gomantong, G. Kinabalu (up tp 3100m), Sepilok, Sipitang, Sugud, Tabin, Tawau Hill, Tenom, Trus Madi (1650m), Ulu Maligan (1700m). [Crocker Range] Inside TBC Mahua, Mile 8 Keningau-Kimanis, Mile 16 Keningau-Kimanis, Mile 17 Keningau-Kimanis, Mile 21 Keningau-Kimanis, Ulu Magindanau, Ulu Kimanis, Ulu Senagang, Ulu Sunsuron. Outside TBC Purulon (Tenom), Sugud (Penampang).

Ethnic name
Berud (Kadazan), Tatandalon (Murut), Tikus Boud (Kadazan).

May – October 2002
• Surveys by SP (authors)
• CRP Expedition by UMS & SP
• Information by H. Hazebroek

Quoted from Literature
1 Paine & Francis 1985 2 Sabah Museum specimen 3 Sabah Parks specimen 4 Tuen et al. 2000
Asian House Mouse

Scientific name: Mus castaneus
English name: Asian House Mouse
Malay name: Mencit Rumah

Measurements:
HB: 50-79, T: 72-84, T/HB: 90-120
D/o: 14-17, E: 5.5, W: 7-12 g, D: 1003/1003 = 16, M: 3+2 = 10
Skull: gl: 10-20, cbl: 18.5, iob: 4.1, mt: 3.2

Introduction:
Very small. Upperparts brown with gray underfur. Underparts slightly paler. Fur soft. Tail entirely dark brownish. The "castaneus" means "chestnut-brown".

Habitat and Ecology:
Restricted to buildings in towns. Active at any hour. They are good climbers, and also swim well. The daily range of movement may be an area of only 15 square meters. Nests are made of soft, shredded material wherever suitable cover and food are present. They feed on any human food that is available, and also on paste, glue, soap, and other household articles. They may also store food at times. They breed throughout the year, and may have five or more litters in a year. The gestation period is 10 to 21 days, and the litter size is 3 to 12 but usually 4 to 7.

Distribution:
Thailand, Peninsular Malaysia, may be widely Asia.
Borneo: Restricted to urban areas. Kuching in Sarawak.
[Sabah]: Danum Valley, Kota Kinabalu, Sandakan. [Crocker Range] Inside TBC. No record. Outside TBC: Kasigui (Penampang), Keningau.

Ethnic name:
Tikus Kotombulu (Kadazan).

Quoted from Literature:
Paine & Francis 1985
Sabah Museum specimen
Pains Park specimen
Yasuma 2000

Habitat and Activity:

<table>
<thead>
<tr>
<th>Area</th>
<th>Arborescent</th>
<th>Terrestrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Habitat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Crocker Range</td>
<td>Inside TBC</td>
<td></td>
</tr>
<tr>
<td>Common</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Time:
Daytime: 05 - 12
Days: 18 - 24
Night: 00 - 05

May - October 2002
Surveys by SP (authors)
CRP Expedition by UMS & SP
Information by H. Hazebrook

Native name
Tikus Kotombulu (Kadazan).
Measurements
HB 94-114, T 109-144, HF 21-28. E 16, W 42.0g, Skull: gl 27.5-30.2, iob 4.9-5.4, mt 4.2-5.1.

Introduction
Very small. Upperparts pale gray with a yellow tinge. Underparts white. Fur is soft dense, and uniform in length, without conspicuous guard hairs or spines. Tail brown, sometimes with whitish patches on the underside; hairy and with a brush of hairs at the tip. The whiskers are numerous and long. The "major" means "larger".

Habitat and Ecology
They are confined to forested areas, and are arboreal. They are most active during the night, although if disturbed during the day they become quite active and agile. They are said to be aggressive little rodents that try hard to bite an adversary. Members of Chiropodomys are quite clean and dainty in their habits.

Distribution
Confined to Borneo. Recorded from Sabah and southwestern Sarawak. Sabod, Samarahan, Balingian, Kuching in Sarawak. [Sabah] Most records are from the neighborhood of G. Kinabalu, from Ranau, up to Tenompok (1490m), Poring, Sepilok, Tawau Hill. [Crocker Range] Inside TBC Mile 21 Keningau-Kimanis.

Ethnic name

Measurements
HB 94-114, T 109-144, HF 21-28. E 16, W 42.0g, Skull: gl 27.5-30.2, iob 4.9-5.4, mt 4.2-5.1.

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Ethnic name

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HB 94-114, T 109-144, HF 21-28. E 16, W 42.0g, Skull: gl 27.5-30.2, iob 4.9-5.4, mt 4.2-5.1.

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Ethnic name
Measurements
HB 375-437, T 152-240, HF 61-67, W 1,500-2,000 g. Skull: gl 81-91.

Introduction
Gives the overall impression of a large rat. Upperparts brown, underparts whitish. The tail is long and scaly, ending in a tuft of large hair, and the quills are quite short, at most 5 cm, and flat. The individual quills are brown at the tip, but pale the base. Species name ‘fasciculata’ means ‘clustered in bundles’.

Habitat and Ecology
Nocturnal. Occurs in lowland dipterocarp forests and cultivated areas. Diet includes various of plant materials such as seeds of ironwood and bamboo shoots. Usually solitary, but often encountered in groups of two to three individuals.

Distribution
Peninsular Malaysia and Sumatra. [Borneo] Known from many localities throughout the lowlands and hills. East Kalimantan, Sarawak, Brunei. [Sabah] Danum Valley, Gomantong, G. Kinabalu (up to 900m), Sepilok, Tabin, Tawau Hill. [Crocker Range] Inside TBC Mile 8 Keningau-Kimanis, Ulu Senagang.

Ethnic name
Afan (Lundaya), Angkis (Kadazan, Sungai, Brunei, Kedayan), Apan (Lundaya, Murut), Bebas (Kadazan, Sungai), Lisis (Bisaya, Dusun, Kadazan, Murut, Sungai, Tidung), Maawas (Murut), Mawas (Murut).

Quoted from Literature
Paine & Francis 1985 Sabah Museum specimen
Sabah Parks specimen
Yasuma 2000
Measurements

Introduction
The hair is short and entirely black, except for a white spot or v-shape mark on the upper chest. Bears are large, powerfully built, omnivorous mammals with a short tail and a good sense of smell, but poor sight and hearing. Only one species is found in Borneo, and it is the smallest bear in the world. The “heli” is “sun” and “arctos” is “bear”, Genus name “Helarctos” means “sun bear”.

Habitat and Ecology
Active periodically during the day and at night time, on the ground in tall trees. But often climbs the tree. Diet includes entire bees nests, termites, small animals, fruits, and the front paws are used for most of the feeding activity. Trees are torn open in search of nests of wild bees and for insects and their larvae. The soft growing point of the coconut-palm, known as palmite, is ripped apart and consumed. Occurs in lowland dipterocarp and lower montane forests. Found in extensive areas of forests. The number of young per litter is usually two. The cubs are born on the ground in a secluded spot and remain with the parents for some time.

Distribution
Assam, East Burma, Subtropical China, Indochina, Thailand, Peninsular Malaysia, Sumatra. [Borneo] Recorded from many localities in lowlands and hills, but at low densities. Kalimantan, Sarawak, Brunei. [Sabah] Danum Valley, G. Kinabalu (2,300m), Kulambu, Maliau Basin. Sepilok (may be captive individual released into the Reserve), Sook, Tabin, Tawau Hill, Ulu Kalabakan. [Crocker Range] Inside TBC Near Kianap.

Ethnic name
Baruang (Kedayan), Bauang (Kedayan), Bawaang (Murut), Bawang (Kadazan, Murut, Sungai), Befang (Kadazan, Sungai), Beruang (Bisaya, Dusun, Lundaya, Murut, Tidung, Brunei), Boruwang (Kadazan), Buang (Kadazan), Bufang (Kadazan, Sungai), Patut (Sungai).

May – October 2002
– Surveys by SP (authors)
– CRP Expedition by UMS & SP
– Information by H. Hazebroek

Quoted from Literature
1. Paine & Francis 1985
2. Sabah Museum specimen
3. Sabah Parks specimen
4. Toon et al. 2000
5. Yasuma 2000
Measurements
HB 403–463, T 310–375, T/HB about 75%, HF 81–91, E 28–35, W 1,000–1,370 g, males slightly larger than females, D 3141/3142 = 38. Skull: gl 80–90.

Introduction
Upper part brown tending to be darker at the extremities of feet and tail, but there is a large yellow or orange patch extending from the chin, over the whole front of the neck to the front of the chest. It has short legs, a rather pointed muzzle and thick, rather bushy tail. In the field, the long, slender body, long tail and lithe, bounding motion are distinctive. The "flavis" is same as "flavus" means "yellow" and "gula" is "throat", species name means "yellow-throated".

Habitat and Ecology
Active mainly during the day, especially in the morning and late afternoon, but sometimes at night. Agile, moving fairly quickly on the ground or in the tree canopy. Usually alone, but sometimes in groups of two or three individuals. Diet includes a wide range of small vertebrates and invertebrates. Occurs in lowland dipterocarp and lower montane forests. Found in tail and secondary forests.

Distribution
Mainland Asia from eastern Siberia south to Peninsular Malaysia, Taiwan, Sumatra, Java. [Borneo] Recorded from many localities throughout lowlands and hills. East, South, Central and West Kalimantan, Sarawak, Brunei. [Sabah] Danum Valley, G. Kinabalu (up to 1700m), Maliau Basin, Sepilok, Sukau, Tabin, Tawau Hill, Ulu Kalabakan. [Crocker Range] Locality unknown. Inside TBC Mile 13 Keningau-Kimanis.

Ethnic name
Beragok (Murut), Bungale (Lundlaya), Kakaa (Kadazan, Murut, Sungai), Kakaah (Murut), Kakah (Murut), Kelak (Sungai), Kesimbong (Dusun), Menaleh (Murut), Munin (Tidung), Toni (Dusun, Kadazan).

Quoted from Literature
Paine & Francis 1985 Sabah Museum specimen
Sabah Parks specimen
Tin et al. 2000

May ~ October 2002
CRP Expedition by UMS & SP
Information by H. Hazebroek

Measurements
HB 403–463, T 310–375, T/HB about 75%, HF 81–91, E 28–35, W 1,000–1,370 g, males slightly larger than females, D 3141/3142 = 38. Skull: gl 80–90.

Yellow-throated Marten
Martes flavigula
Order CARNIVORA
Family MUSTELIDAE
Subfamily MUSTELINAE

Habitat and Activity
Crocker Range Area
Few

Photo: Wong Shew Te
Measurements
HB 350-550, T 34-65, T/HB 6-12.9 %, HF 64-70, E 30.1, W 1,500 g, D 3142/3143= 42. Skull: gl 85-90.

Introduction
Called as Malay Badger, too. Upperparts very dark brown to black, with a conspicuous broad white or creamy white mid-dorsal line running backwards from the head. Muzzle long, no facial "mask". Tail very short, not prominent from a distance. Often detected by its strong, pervading odor.

Habitat and Ecology
Nocturnal but sometimes seen in the early morning. Terrestrial. Mostly in groups of two or three. Sleeps in underground burrows. The burrows are usually not more than 60 cm. Deep. Diet includes earthworms, soil arthropods and small vertebrates. Occurs in lowland dipterocarp forests. Found in tall and secondary forests. When they are molested or threatened, they raise the tail and eject a pale greenish fluid to a distance of 15 cm. or more.

Distribution

Ethnic name
Bilud (Kadazan, Sungai, Tidung), Pasis (Kedayan), Sadui (Sulu), Sudu (Lundaya), Suduh (Lundaya), Teledu (Kadazan), Tudoth (Sungai), Tudu (Sungai), Tulu (Dusun, Kadasan), Tulu (Kadazan), Turu (Murut).

Quoted from Literature
Paine & Francis 1985 Sabah Museum specimen
Sabah Parks specimen Tuen et al. 2000
Yasuma 2000

May – October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek
Oriental Small-clawed Otter

Scientific name: *Aonyx cinerea*

Order: Carnivora

Family: Mustelidae

Subfamily: Lutrinae

**Introduction**

Belong to Subgenus *Amblonyx*. Upperparts usually dark brown, only occasionally having the gray or ashy tint. Underparts usually paler brown. Chin, throat, cheeks and sides of neck grayish or whitish. Claws in the adults are only minute spikes which do not project beyond the ends of the digital pads. Webbing on the feet does not extend along the digital pads, as in the Lutra species.

**Habitat and Activity**

Aquatic and occurs in many habitats where there is permanent water and some tree cover, such as coast, rivers, small inland streams, ponds and lakes. But also travel freely on land. Solitary individuals sometimes encountered, but usually in groups. They communicate by shrill, yelping calls and whistles. Mainly diurnal. Diets include fish, crustaceans, mollusks, aquatic insects, amphibians and other prey taken on land. This species feeds more extensively on mussels, snails, and crabs than does Lutra. The “*cinerea*” means “ash-gray”.

**Distribution**


**Measurements**

HB: 360-460, T: 225-310, T/HB 71.1%, HF 85-95, E 19, W: 2,700-5,400 g. Skull: gl 80-90, cbl 80.5-84.6, mt 24.2-26.0.

**Habitat and Ecotone**

Crocker Range Area

<table>
<thead>
<tr>
<th>Common</th>
<th>Fauna</th>
<th>Flora</th>
</tr>
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<tbody>
<tr>
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<td></td>
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</tbody>
</table>

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**Distribution**


**Ethnic Name**

May ~ October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebrook

Quoted from Literature:
- Paine & Francis 1985
- Sabah Museum specimen
- Sabah Parks specimen
- Turn et al. 2000
- Yasuma 2000
Measurements

Introduction
Whitish to golden or buff, with a pattern of bold dark brown spots and bars on the upperparts and a distinctive barred tail. Claws are retractile; claw sheaths are present on the forepaws, and protective lobes of skin are present in the hind paws. The "priono" means "saw-toothed" or "serrated". Species name "linsang" is from Malay name of this species.

Habitat and Ecology
Seem to be active mainly at night and are good climbers. Diets include small mammals, birds, reptiles and arthropods. Live in hollows of trees but are at home on the ground. Occurs in lowland dipterocarp forests. Found in tail and secondary forests. The Banded Linsang has two litters of two or three young each year.

Distribution
East Burma, Thailand, Peninsular Malaysia, Sumatra and adjacent islands (P. Bangka), Java. [Borneo] Recorded from scattered localities. South and West Kalimantan, Sarawak, Muara in Brunei. [Sabah] Danum Valley, G. Kinabalu (1800m), Sandakan area, upper S. Segama, Sepilok, Tabin, Ulu Kalabakan. [Crocker Range] Inside TBC Ulu Sumsurun.

Ethnic name
Antutukar (Murut), Ketukad (Dusun), Palang Alud (Murut), Tagawot (Kadazan), Tetokad (Dusun).

Photo: Wong Shew Te
Common Palm Civet

Code 08040301
Order CARNIVORA
Family VIVERRIDAE

Scientific name: *Paradoxurus hermaphroditus*
English name: Common Palm Civet
Malay name: Musang Pulut

**Measurements**

- HB: 420-575
- T: 330-420
- T/HB: 70-90%
- HF: 70-89
- E: 38-44
- W: 1,990-2,500 g
- D: 3142/3142=40
- M: 0+1+2=6 or 0+3+0=6

**Skull**
- gl: 80-105
- cbl: 92.4-99.6
- mt: 32.4-36.8

**Introduction**

Upper part dark gray-brown, under part paler. Face, limbs and tail black. Pattern of five dorsal longitudinal stripes, the outer stripes sometimes much broken up and tending to merge with the irregular spotting of the flanks. The "paradoxus" is "strange" and "-urus" is "-tailed", genus name means "strange-tailed".

**Habitat and Ecology**

Nocturnal. Sleeps during the day in trees. Arboreal and terrestrial, but more often active on the ground. The food includes small vertebrates, fruits, arthropods, worms and mollusks. Occurs in lowland dipterocarp forests. Found in secondary forests and near human settlements. Often seen crossing roads at midnight. This species emits an extremely potent discharge from its anal glands, which is used only as a last resort when threatened by a predator. Litters of two to four young are born throughout the year, and the female probably gives birth to more than one litter a year.

**Distribution**


**Ethnic name**

Busan (Murut), Fugo (Lundaya), Mihaun (Kadazan), Munin (Kadazan, Sungai), Omunin (Kadazan, Sungai), Temuning (Kadazan, Sungai), Tomin (Kadazan), Tomuning (Dusun).

**Habitat and Activity**

- Common Palm Civet
- Code: 08040301
- Scientific name: *Paradoxurus hermaphroditus*
- Order: CARNIVORA
- Family: VIVERRIDAE
- Malay name: Musang Pulut

**Measurements**

- HB: 420-575
- T: 330-420
- T/HB: 70-90%
- HF: 70-89
- E: 38-44
- W: 1,990-2,500 g
- D: 3142/3142=40
- M: 0+1+2=6 or 0+3+0=6

**Skull**
- gl: 80-105
- cbl: 92.4-99.6
- mt: 32.4-36.8

**Introduction**

Upper part dark gray-brown, under part paler. Face, limbs and tail black. Pattern of five dorsal longitudinal stripes, the outer stripes sometimes much broken up and tending to merge with the irregular spotting of the flanks. The "paradoxus" is "strange" and "-urus" is "-tailed", genus name means "strange-tailed".

**Habitat and Ecology**

Nocturnal. Sleeps during the day in trees. Arboreal and terrestrial, but more often active on the ground. The food includes small vertebrates, fruits, arthropods, worms and mollusks. Occurs in lowland dipterocarp forests. Found in secondary forests and near human settlements. Often seen crossing roads at midnight. This species emits an extremely potent discharge from its anal glands, which is used only as a last resort when threatened by a predator. Litters of two to four young are born throughout the year, and the female probably gives birth to more than one litter a year.

**Distribution**


**Ethnic name**

Busan (Murut), Fugo (Lundaya), Mihaun (Kadazan), Munin (Kadazan, Sungai), Omunin (Kadazan, Sungai), Temuning (Kadazan, Sungai), Tomin (Kadazan), Tomuning (Dusun).

**Habitat and Activity**

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**Distribution**


**Ethnic name**

Busan (Murut), Fugo (Lundaya), Mihaun (Kadazan), Munin (Kadazan, Sungai), Omunin (Kadazan, Sungai), Temuning (Kadazan, Sungai), Tomin (Kadazan), Tomuning (Dusun).
Measurements
HB 580-605, T565-599, THB 70-90%, HF 95-101, E 30-60, W 3,600-7,000 g, D 3142/3142=40. Skull: gl 110-140.

Introduction
Face yellowish-white with a dark “mask” extending from behind the eyes to the tip of the muzzle. The general color is dark reddish-brown with yellow-gray underfur. There are no stripes or spots on the body, and no spots or bands on the tail. The distal part of the tail may be darker than the basal part, some individuals have a white or yellow tail tip. Feet are blackish. This species differs externally from *Paradoxurus* and *Arerogalidia* in the absence of the striping and spotting.

Habitat and Ecology
Nocturnal, arboreal and terrestrial. Sleeps in tree holes or forks in large trees. Diet includes small vertebrates, probably insects, and fruits and roots. Like the Common Palm Civet, *Paradoxurus hermaphroditus*, this species has an extremely potent anal-gland secretion which it uses to ward off predators. Occurs in lowland dipterocarp and lower montane forests. Found in tall and secondary forests, sometimes enters plantations to feed.

Distribution

Ethnic name
Mangulok (Kadazan), Manguluk (Kadazan), Paragasu (Kadazan, Sungai).

Measurement
HB 580-605, T565-599, THB 70-90%, HF 95-101, E 30-60, W 3,600-7,000 g, D 3142/3142=40. Skull: gl 110-140.

Introduction
Face yellowish-white with a dark “mask” extending from behind the eyes to the tip of the muzzle. The general color is dark reddish-brown with yellow-gray underfur. There are no stripes or spots on the body, and no spots or bands on the tail. The distal part of the tail may be darker than the basal part, some individuals have a white or yellow tail tip. Feet are blackish. This species differs externally from *Paradoxurus* and *Arerogalidia* in the absence of the striping and spotting.

Habitat and Ecology
Nocturnal, arboreal and terrestrial. Sleeps in tree holes or forks in large trees. Diet includes small vertebrates, probably insects, and fruits and roots. Like the Common Palm Civet, *Paradoxurus hermaphroditus*, this species has an extremely potent anal-gland secretion which it uses to ward off predators. Occurs in lowland dipterocarp and lower montane forests. Found in tall and secondary forests, sometimes enters plantations to feed.

Distribution

Ethnic name
Mangulok (Kadazan), Manguluk (Kadazan), Paragasu (Kadazan, Sungai).
Measurements

HB 440-520, T 480-630, T/HB about 110-120 %, HF 78-91, E 40, W 1,550-2,180 g, D 3142/3142=40, M 0+2=4. Skull: gl 100-120, cbl 100.0-108.7, mt 38.0-41.0.

Introduction

Coloration varies from olive-brown to grayish. Face, ears, feet and much of tail blackish. There is a median white stripe on the muzzle, and usually three black or brown longitudinal stripes on the back; the median stripe is usually complete and distinct, whereas the laterals may be broken up into spots or almost absent. The back teeth are smaller, hence the common name. Only the females possess the civet gland, which is located near the opening of the urinogenital tract.

Habitat and Ecology

Usually nocturnal and arboreal, rarely descending to the ground. They are active climbers and leap from branch to branch with considerable agility. Diet includes fruits and small animals such as squirrels. Occurs in lowland dipterocarp and lower montane forests. Often enters plantations and gardens to feed fruits. The young are reared in hollow trees; litter size seems to be two or three, and there are probably two litters a year.

Distribution

Assam, Burma, Subtropical China, Thailand, Peninsular Malaysia, Sumatra, Java. [Borneo] Recorded from many localities in lowlands and hills. Kalimantan, Sarawak, Brunei. [Sabah] Danum Valley, G. Kinabalu (up to 1500m), Kulamba, Sukau. [Crocker Range] Inside TBC No record. Outside TBC Ulu Tomani.

Ethnic name

Binangkai (Murut), Kilabas (Dusun, Kadazan), Munin (Kadazan, Sungai), Musang Tengua (Kedayan), Omunin (Kadazan, Sungai), Ribuan (Lundaya), Tantag (Kadazan, Sungai), Tomunin (Kadazan), Temuning (Kadazan, Sungai).
Measurements
HB 472-540, T 298-346, T/HB 71.5%, HF 74-81, E 36, W 1,370 g, D 3142/3142=40. Skull: gl 90-95.

Introduction
Uniformly black above and on the limbs and the tail. Underparts white. The sides of the muzzle, back of the ears, chin, and forepart of the throat white, but the hinder part of the throat. Ears are thinly haired and white inside. Tail is dark throughout. Feet partly webbed with patches of hair between the foot-pads. Has the long facial whiskers.

Habitat and Ecology
Nocturnal and mainly terrestrial. Diet includes small animals in mossy boulders and streams. Occurs in lower montane forests. Under the rearing, it prefers fish rather than flesh or luncheon meats as foods, and usually doesn’t eat fuits such as banana or watermelon. Moreover it often has been observed to excrete into a water tub, although it’s mean is not clear.

Distribution
Confined to Borneo. Recorded only from hills and montane localities in northwestern Borneo. Bt. Bat Song, G. Kalulong, G. Dalit and Kelabit highlands in Sarawak, Bt. Retak (1300m) in Brunei. [Sabah] G. Kinabalu. [Crocker Range] Locality unknown (600-1200m).

Ethnic name
Boligai (Dusun), Toni (Kadazan).

Measurements
HB 472-540, T 298-346, T/HB 71.5%, HF 74-81, E 36, W 1,370 g, D 3142/3142=40. Skull: gl 90-95.

Introduction
Uniformly black above and on the limbs and the tail. Underparts white. The sides of the muzzle, back of the ears, chin, and forepart of the throat white, but the hinder part of the throat. Ears are thinly haired and white inside. Tail is dark throughout. Feet partly webbed with patches of hair between the foot-pads. Has the long facial whiskers.

Habitat and Ecology
Nocturnal and mainly terrestrial. Diet includes small animals in mossy boulders and streams. Occurs in lower montane forests. Under the rearing, it prefers fish rather than flesh or luncheon meats as foods, and usually doesn’t eat fuits such as banana or watermelon. Moreover it often has been observed to excrete into a water tub, although it’s mean is not clear.

Distribution
Confined to Borneo. Recorded only from hills and montane localities in northwestern Borneo. Bt. Bat Song, G. Kalulong, G. Dalit and Kelabit highlands in Sarawak, Bt. Retak (1300m) in Brunei. [Sabah] G. Kinabalu. [Crocker Range] Locality unknown (600-1200m).

Ethnic name
Boligai (Dusun), Toni (Kadazan).
Measurements
HB 380-445, T/HB less than 55 %, HF 75-86, W 2,000 g, D 3142/3142=40. Skull: gl 95.

Introduction
Dark brown, finely marked with yellow, except chin and throat which are pale brown. Head and tail somewhat paler than body. Greatest length of skull more than 87 mm, coronoid process of lower jaw rounded. The Collared Mongoose, *Herpestes semitorquatus*, is similar, but it has a longer tail and clear area of yellowish on the underside of the head and neck. Species name "*brachyurus*" means "short-tailed".

Habitat and Ecology
Mainly diurnal and terrestrial, mostly active in the morning and late afternoon, but also active during night. Seek refuge in hollow logs, holes in the ground, and crevices. Diet includes arthropods and small mammals, snakes, frogs, fish, crabs, insects and birds. Occurs in lowland dipterocarp and lower montane forests. Found in tall and secondary forests.

Distribution

Ethnic name
Mongoose Asau Balay (Brunei), Asuh Tanih (Dusun), Budutlapad (Sungai), Dumbang (Sungai), Encimbung (Kadazan), Fuer (Murut), Simbong (Murut), Tulok (Kadazan), Tuhok (Kadazan).
Collared Mongoose

**Scientific name**: Herpestes semitorquatus

**English name**: Collared Mongoose

**Malay name**: Bambun Ekor Panjang

**Habitat and Activity**

- **Woody vegetation**
  - Mt. Sorung 1000-2000m
  - Mt. Sorung 1200-2000m
  - Leufo Upington forest 0-120m
  - Forest over limestone
  - Forest over ultrabasic rocks
  - Heath forest
  - Rines nightlife forest
  - Bocca, Transitional forest
  - Swamp forest
  - Black-litter forest
  - Mangrove forest

- **Open area**
  - Vernant 2nd estate
  - Nabat
  - Settlement
  - Humus

**Crocker Range Area**

- **Tree**: Arboresal
- **Arboresal & Terrestrial**
- **Ground**: Terrestrial
- **Space**: Night, Daytime

**Measurements**

HB 400-455, T 258-303, T/HB over 60 %, HF 82-93, W 2,000 g, D 3142/3142=40. Skull: gl 95.

**Introduction**

Reddish-brown, with fine yellow markings on the back. Lower parts of legs blackish-brown. Underside of head and neck distinctly yellowish. A pale buff or chestnut stripe running backwards from below the ear on each side of the neck. This genus is characterized by the typical mongoose body form: long tail, five toes on the fore and hind feet, hind foot naked to the heel, sharp, curved fore claws, and 40 teeth in all. Some zoologist place the mongooses in their own family, Herpestidae. The "semi-" is "half-" and "torquatus" is same as "torques", means "wore a neckchain".

**Habitat and Ecology**

Mainly terrestrial. Diurnal and probably nocturnal. Occurs in lowland dipterocarp forests. Found in tall and secondary forests, also plantations.

**Distribution**


[Crocker Range] Inside TBC Mile 8 Keningau-Kimanis.
Measurements
HB 800-1,000, T 750, the height at the shoulder is about 803 mm, HF 180, W usually 16,000 to 23,000 g, D

Introduction
The largest cat species found in Borneo. Adults are grayish or yellowish with cloud-like black markings on the sides of the body. The young animals lack these markings. This is a long animal with short, stout legs and broad paws. The pads are quite hard. The canine teeth are exceptionally long; the upper canines are about three times as long as the basal width at the socket. Genus name "Neofelis" means "new cat". Species name "nebulosa" means "cloud-like".

Habitat and Ecology
Nocturnal and arboreal, although it is found to be mostly terrestrial in Borneo. This animal hunts in trees and springs on ground prey from overhanging branches, but it also hunts on the ground. Diet includes monkeys and smaller mammals, even porcupines. It is not known to attack people. Occurs in lowland dipterocarp and lower montane forests, also mangrove, parts of riverine, swamp forests. Found in tall and secondary forests. The young are said to be born in a tree hollow. The litter size is usually two.

Distribution
Himalayas, Assam, Subtropical China, Taiwan, Indochina, Thailand, Peninsular Malaysia, Sumatra. [Borneo] Recorded in many scattered localities. East, Central and West Kalimantan, many parts of Sarawak, Brunei. [Sabah] Danum Valley, Kalabakan, G. Kinabalu (000m), Kulamba, G. Madalon, Malian Basin, Mumiang, upper S. Segama, Sepilok, Sagut, Sukau, Tabin, Ulu Kalabakan. [Crocker Range] Locality unknown.

Ethnic name
Ampungon (Murut), Harimau (Tidung), Harimau Dahan (Brunei, Kedayan), Inanasad (Kadazan), Ipos (Sungai), Kana Bakud (Dusun), Kuir (Lundaya Murut), Kuli (,Tidung), Lakuing (Dusun), Lekuing (Bisaya), Mandog (Sungai), Mondou (Kadazan, Sungai), Nanansad (Kadazan, Sungai), Tana-nansad (Dusun), Tanga-ngansad (Kadazan), Tantakinon (Murut), Tantanion (Murut).

May ~ October 2002
- Surveys by SP (authors)
- CRP Expedition by UMS & SP
- Information by H. Hazebroek

Quoted from Literature
Paine & Francis 1985
Sabah Museum specimen
P Расks specimen
Furn et al. 2000
Yasuma 2000

Habitat and Activity

Clouded Leopard

Scientific name Neofelis nebulosa
English name Clouded Leopard
Malay name Harimau Dahan

Order CARNIVORA
Family FELIDAE

Habitat
- Forest 1,000-2,000m
- Lowland dipterocarp forest 0-120m
- Forest near Sutera
- Forest over ultrarocks
- Coastal forest
- Riverine forest
- Beach, Transitional forest
- Brackish-water forest
- Mangrove forest

Crocker Range Area

Few

Locality unknown

<table>
<thead>
<tr>
<th>Month</th>
<th>Night</th>
<th>Daytime</th>
</tr>
</thead>
<tbody>
<tr>
<td>May</td>
<td></td>
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<tr>
<td>June</td>
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<tr>
<td>July</td>
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<tr>
<td>August</td>
<td></td>
<td></td>
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<tr>
<td>September</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Map

Locality unknown

110
**Measurements**

HB 400-650, T 150-300, T/HB 34.1-45.7%, HF 90.5-120, E 40-45, W 1,800-2,500 g, D 3131/3121=30, M 0+1+2=6. Skull: gl 90.

**Introduction**

Similar in size and shape to the Domestic Cat, but is said to have longer legs. Tawny yellow coat with many black spots over entire upper part including tail. Undersides is white and there are white streaks on its cheeks and running from its eyes to the top of its head.

**Habitat and Activity**

The commonest and most widespread cat in Borneo. Usually nocturnal and terrestrial. Leopard Cats are found in a variety of habitats including woodlands, forests and scrub. Occurs in lowland dipterocarp and lower montane forests. Diet includes small mammals such as rats and squirrels, birds, snakes, frogs, and large insects. This cat may occupy dens in hollow trees, small caves or under tree roots.

**Distribution**

Himalayas, Assam, Burma, China, Taiwan, Japan, Indochina, Thailand, Peninsular Malaysia, Sumatra, Java, Bali, Palawan. **[Borneo]** Widespread, and common in a variety of habitats throughout Borneo. Kalimantan, Sarawak, Brunei. **[Sabah]** Danum Valley, G. Kinabalu (up to 1450m), Kinabatangan, Maliau Basin, Sukau, Tabin. **[Crocker Range]**

**Ethnic name**

Ampungon Mumbir (Murut), Lekuang (Bisaya), Mandog Kaut (Sungai), Mendeu (Tidung), Tambah (Murut), Tompumpu (Dusun)

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**Leopard Cat**

**Scientific name** *Prionailurus bengalensis*

**English name** Leopard Cat

**Malay name** *Kucing Batu*
Measurements
HB 1,000-1,500, T 170-260, HF 250-320, Shoulder height 800-900, W usually 60-100 kg or more when fat, D 3134/3134=44, M 0+5=10. Skull: gl 400-500.

Introduction
Blackish colored pig. Head long with a flat tip to the very long snout, with long hair along the lower jaw, and a fleshy protuberance midway between the eye and tip of the nose with upward pointing bristles. Longer legs. Unlike other even-toed ungulates, pigs have upper incisors. The “barbatus” means “bearded”.

Habitat and Ecology
Mostly active at night but also late afternoon. An adult male is usually solitary, but groups of four or more are often seen consisting of an adult female and young. Occurs widely from lower montane to beach forests. Found in forests and cultivated land adjacent to forest. Enters gardens and plantations to feed. An omnivorous diet includes fallen fruits, seeds, other plant materials, earthworms, snakes and other small animals. Adult females make nests where they give birth to the young. As the nests are made of saplings and shrubs which are bitten and piled up on the ground, it looks like a poor shanty. Often swims across the river.

Distribution

Ethnic name
Asi (Murut), Asih (Murut), Baka (Landaya), Bakaa (Landaya), Bakah (Murut), Bakas (Dusun, Kadazan, Sungai). Bakas Hotan (Tidung), Basing (Murut), Bavui (Suhu), Bayi (Kedayan), Kolus (Kadazan, Sungai), Ramoh (Bisaya, Dusun), Ujak(Murut).
**Measurements**

- HB 500-600, T 60-100, Shoulder height 300-350, W 3,000-4,500 g, D 0133/3133=34. Skull: gl 110-120.

**Introduction**

Hair on upper part gray-buff to orange-buff with blackish tips, giving a coarsely flecked overall appearance. Under part white with a pale brownish tinge in the middle and distinctive dark brown markings on the chest. In profile white on neck usually appears as two more or less separate bars. "napu" is Malay name of this species.

**Habitat and Ecology**

Very similar to the Lesser Mouse-deer. One, rarely two, young are born in some secluded nook or crevice amongst a jungle of rock, 150 to 155 days after the parents have mated. Mouse-deer are preyed upon by a large number of carnivores and snakes and are also widely sought by the natives for food.

**Distribution**


**Ethnic name**

Paanduk Batang (Tidung), Palandok Napu (Kedayan), Palanuk Batang (Sungai), Palanuk (Dusun), Palanuk Batang (Murut), Pelanduk Napu (Bisaya, Kedayan), Pelanuk Mituo (Dusun), Palanuk Balubug (Kadazan, Sungai), Pelanuk Napu (Dusun), Timbalahog (Dusun), Timbalahog (Kadazan).

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Tree</th>
<th>Arboresal</th>
<th>Arboreal &amp; Terrestrial</th>
<th>Ground</th>
<th>Terrestrial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time</td>
<td>Night</td>
<td>Daytime</td>
<td>Night</td>
<td></td>
</tr>
</tbody>
</table>

**Crocker Range Area**

**Common**

Greater Mouse-deer

**Code** 11020102

**Scientific name** *Tragulus napu*

**English name** Greater Mouse-deer

**Malay name** Napuh

**Family** TRAGULIDAE

**Order** ARTIODACTYLA

**Scientific name** *Tragulus napu*

**English name** Greater Mouse-deer

**Malay name** Napuh

**Habitat and Activity**

<table>
<thead>
<tr>
<th>Woody vegetation</th>
<th>Open area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt. Sobat 2000-3000m</td>
<td>Crocker Range Area Common</td>
</tr>
<tr>
<td>Mt. Sobat 1000-2500m</td>
<td></td>
</tr>
<tr>
<td>Lowland Dipterocarp forest</td>
<td></td>
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<tr>
<td>Forest over limestone</td>
<td></td>
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<tr>
<td>Forest over ultrabasic rocks</td>
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<tr>
<td>Heath Forest</td>
<td></td>
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<tr>
<td>Riverine forest</td>
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<tr>
<td>Beach, Transitional forests</td>
<td></td>
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<tr>
<td>Swamp Forest</td>
<td></td>
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<tr>
<td>Brackish-water forest</td>
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<tr>
<td>Mangrove Forest</td>
<td></td>
</tr>
</tbody>
</table>

**Measurements**

HB 500-600, T 60-100, HF 140-160, Shoulder height 300-350, W 3,000-4,500 g. D 0133/3133=34. Skull: gl 110-120.

**Introduction**

Hair on upper part gray-buff to orange-buff with blackish tips, giving a coarsely flecked overall appearance. Under part white with a pale brownish tinge in the middle and distinctive dark brown markings on the chest. In profile white on neck usually appears as two more or less separate bars. "napu" is Malay name of this species.

**Habitat and Ecology**

Very similar to the Lesser Mouse-deer. One, rarely two, young are born in some secluded nook or crevice amongst a jungle of rock, 150 to 155 days after the parents have mated. Mouse-deer are preyed upon by a large number of carnivores and snakes and are also widely sought by the natives for food.

**Distribution**


**Ethnic name**

Paanduk Batang (Tidung), Palandok Napu (Kedayan), Palanuk Batang (Sungai), Palanuk (Dusun), Palanuk Batang (Murut), Pelanduk Napu (Bisaya, Kedayan), Pelanok Mituo (Dusun), Palanuk Balubug (Kadazan, Sungai), Pelanuk Napu (Dusun), Timbalahog (Dusun), Timbalahog (Kadazan).
Red Muntjac

Measurements
HB 800-1,100, T 130-200, HF 220-260, Shoulder height 500-550, Antler length 73-130, W 17,000 g, D 0133/3133=34. Skull: gl 170-200.

Introduction
Called as Common Barking Deer, too. Body is covered with short, soft hairs, except for the ears, which are sparsely haired. Upper part reddish brown, somewhat darker along the middle. Under part whitish. Males have rough antlers, curving sharply near the tip and bearing small spike near the base. Young have white spots or blotches on upperparts.

Habitat and Ecology
Chiefly nocturnal except in sparsely settled areas, where they are active during the morning. They are not gregarious and are generally found alone or in pairs not far from water. They are dainty little creatures; when walking, they lift their feet high, always on the alert. Diet consists mainly of grasses, low-growing leaves, and tender shoots. Occurs in lowland dipterocarp forests.

Distribution
Locality unknown. Sri Lanka, India, Himalayas, Assam, Burma, Subtropical China, Taiwan, Indochina, Thailand, Peninsular Malaysia, Sumatra, Java. [Borneo] Recorded in most part of Borneo. Kalimantan, Sarawak, Brunei. [Sabah] Distribute throughout lowlands and hills. Danum Valley, G. Kinabalu (up to 3350m), Maliau Basin, upper S. Segama, Septik, Sukau, Tabin, Tawau, G. Trus Madi, Ulu Kalabakan. [Crocker Range] Locality unknown.

Ethnic name
Kijang Bauang (Kedayan).
Measurements
HB 860-920, T 140-200, HF 260-290, Shoulder height up to 500, Antler length 160-420, W 13.5-17.700 g, D 01133/3133=34.

Introduction
Upper part yellowish-red with diffused brownish along the midline especially on the neck. Under part pale yellowish-orange to whitish. Males have quite short, un-branched antlers on slender, curved pedicels, normally without any bur where the antler and pedicel join. The "atherodes" means "bristle".

Habitat and Ecology
Probably similar to that of the Red Muntjac, Muntiacus muntjak. Active mainly during the day. One or occasionally two young are born about 180 days after the parents have mated. The young are usually born in dense jungle growth where they remain hidden until they can move about with mother. At birth the young weigh about 550-650 grams. Life expectancy is probably about 10 years. Muntjacs are hunted for their meat by the natives.

Distribution
Restricted to Borneo, in all regions. [Sabah] Danum Valley, Tabin, Ulu Kalabakan. [Crocker Range] Inside TBC Ulu Magindanau.

Ethnic name
Kijang Kuning (Kedayan). Muntiacus sp. Bengalau (Bisaya, Dusun), Gantadun (Kadazan), Kalau (Murut), Ncalau (Dusun), Paus (Dusun, Kadazan, Murut), Perukah (Kadazan, Sungai), Purog (Sungai), Talao (Brunei), Talau (Lundaya), Telau (Lundaya), Tehou (Murut).
Measurements
HB 1,500-2,000, T 210-300, Shoulder height 1,000-1,400, Antler length 290-560, E 170-200, W 85-100 kg, D 0133/3133=34. Skull: gl 300-380.

Introduction
Called as Rusa or Payau, too. Uniformly brown, from pale reddish brown to almost black, usually darker along the midline. Underparts pale brown to creamy-white. Tail bushy and entirely blackish. Males have antlers; inner branch of terminal fork normally somewhat smaller than the outer, which appears to be a continuation of the main beam of the antler. Genus name "Cervus" means "deer" in Latin language. Species name "unicolor" means "single colored".

Habitat and Ecology
Active mainly at night, also early morning and late afternoon. Occurs in lowland dipterocarp and lower montane forests, also in swamp forests. Enters gardens and plantations to feed. Diet includes grasses, herbs, shrubs, young leaves of woody plants and fallen fruits. Usually solitary, but groups of two or more are sometimes seen.

Distribution
Sri Lanka, India, Himalayas, Subtropical China, Indochina, Thailand, Peninsular Malaysia, Sumatra and main larger adjacent islands. [Borneo] Recorded in A regions. Kalimantan, Sarawak, Brunei, P. Laut. [Sabah] Recorded throughout the area. Bonggaya, Danum Valley, G. Kinabalu (up to 3350m), Klias, Kulamba, Maliau Basin, Sepilok, Sukau, Tabin, Tawau Hill, Tomanggong, Trus Madi (1650m), Ulu Kalabakan, Ulu Maligan (1700m), P. Banggi, P. Balambangan. [Crocker Range] Inside TBC. No record. Outside TBC Upper S. Padas (Tenom).

Ethnic name
Bangkahakun (kadazan), Fayao (Lundaya), Fuyur (Lundaya), Payao (Murut), Payau (Kadazan, Sungai, Tidung, Brunei, Kadayan), Payeu (Tidung), Payou (Kadazan, Murut, Sungai), Tambang (Bisaya Dusun, Kadazan, Murut), Usa (Sulu).
References


* All specimens of Sabah Museum and Sabah Parks Museum, which were collected until the end of September 2000 were examined.

* All specimens of University of Malaysia Sabah, which were collected by UMS-SP team during "Crocker Range Park Expedition 2002" were examined.

* All specimens of University of Malaysia Sabah which were collected until the end of October 2002 were examined.

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MAMMALS OF CROCKER RANGE: A FIELD GUIDE

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