THE MAMMALS OF THE NETHERLANDS INDIAN MT. LEUSER EXPEDITION 1937 TO NORTH SUMATRA.

By

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The specimens on which this report is based were collected by Mr. A. HOOGERWERF during the period 16th January—16th May, 1937. They are the property of the Zoological Museum, Buitenzorg, to the Director of which institution I am grateful for the opportunity of studying the material.

The forested mountains of Leuser (3466 m) and Lemboe (3044 m) were the main objectives, but the majority of the skins came from the primary forest, and secondary growth of the approaches and neighbouring country. Mr. HOOGERWERF will describe and illustrate the country and his journey in detail in our forthcoming paper on the birds of the expedition. Prior to Mr. HOOGERWERF's visit the area was unknown zoologically and his collections give us the first insight into the mammal fauna of the mountains of North-West Sumatra. In view of the recent publication of "A Handlist of Malaysian Mammals" I have not thought it necessary to repeat synonymies, or regional literature.

The most striking result is the discovery of a new rat, *Rattus hoogerwerfi,* which for the present we must regard as a full species, for it seems to have no close relatives.

New forms described are *Rattus bukit lieftincki* and *Sciurus notatus percommodus;* and additions to the Sumatran fauna are *Rattus rajah pellax* and *Hipposideros sabanus,* the former a Malayan and the latter a Bornean form.

Tupaia glis jacki ROB. & KLOSS.

Tupaia glis jacki ROBINSON and KLOSS, Journ. Fed. Mal. States Mus., VIII, pt. 2, 1918, p. 15: Siolak Daras, Kerintji Valley, West Sumatra.

1 ♂, 1 ♀ Atang Poetar, 1.000 m; 1 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m.

Tupaia tana tana RAFF.

Tupaia tana RAFFLES, Trans. Linn. Soc., XIII, 1821, p. 257: west coast of Sumatra, probably Benkoelen.

1 ♂ imm. Lesten 700 m; 1 ♂ Simpang Agoesan, 1.000 m.

The adult matches specimens from Benkoelen.

Tupaia javanica occidentalis ROB. & KLOSS.

Tupaia javanica occidentalis ROBINSON and KLOSS, Journ. Fed. Malay States Mus., VIII, pt. 2, 1918, p. 16: Soengai Penoh, Kerintji Valley, West Sumatra.

1 ♂ Kotatjane, 200 m; 1 ♂ Palok, 800 - 1.000 m; 1 ♀ Atang Poetar, 1.000 m; 1 ♂, 1 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m.

Measurements of *Tupaia* spp. from Sumatra.

Name	Sex	Head and Body	Tail	Hind-foot	Skull							No.	Remarks
					Greatest length	Basal length	Palatal length	Upper molar row (alveoli)	Tip of pre-maxillaries to lachrymal notch	Interor-bital breadth	Greatest breadth		
Tupaia glis jacki	♀	182	180	42	50	43.6	27.3	15.5	22.3	14.5	26	348	Adult
„	♀	178	164	44	50.9	43.2	26.7	15.5	22	14.5	25 5	463	„
Tupaia tana tana	♂	220	170	46	61.5	53	34.7	17.2	30.5	15.2	26.9	506	„
Tupaia javanica occidentalis	♂	139	171	36	41	36.2	21	—	15.6	12	22.2	493	„
„	♂	143	165	35	41.2	35.6	21.6	12.2	15.9	12.7	21.6	339	„
„	♀	137	167	35	41.3	36	—	12	15.5	12.4	21.5	361	„

Crocidura aequicauda ROB. & KLOSS.

Crocidura aequicauda ROB. & KLOSS, Journ. Fed. Malay States Mus., VIII, pt. 2, 1918, p. 22: Soengai Kring, Kerintji Peak, West Sumatra, 7.200 ft.

1 ♀ Mt. Leuser, ca 3.400 m, 5.12.1937.

The collector's measurements taken in the field are.— head and body, 73; tail, 60; hind-foot, 13 mm, but judging from the skin I think I should have obtained rather higher figures for both tail and hind-foot.

Skull. — Total length including teeth, 20.3; greatest breadth, 9.3; front side of anterior tooth to back of last molar, 9.1; alveolar length of entire tooth-row, 8; greatest ante-orbital breadth, 6; length of entire mandibular tooth-row from point of anterior tooth to back of last molar, 8.3 mm.

This identification cannot be regarded as absolutely certain, for the type of *aequicauda* is now in London.

Galeopterus variegatus temminckii (WATERH.).

Galeopithecus temminckii WATERHOUSE, Proc. Zool. Soc. 1838, p. 119: Sumatra.

1 ad. ♂, 1 ad. ♀ Poelau Moenteh (near Pendeng), 550 - 750 m.

As is normal in the Sumatran race of *Galeopterus* these skins of opposite sexes are much alike in colour: the female is merely slightly paler grey, and rather more washed with buff on the upper parts than the male.

Collector's external measurements. — Head and body, 378, 414; tail, 280, 260; ear, 21, 23; hind-foot, 77, 72 mm.

Skull. — Greatest length, 73.3, 74.8; condylo-basal length, 69, 71.5; basal length, 64.4, 66.5; greatest breadth, 47.7, 49 mm.

Cynopterus horsfieldi lyoni AND.

Cynopterus horsfieldi lyoni ANDERSEN, Cat. Chir. Brit. Mus., 1912, p. 827: *nom. nov.* for *Niadias minor* LYON, 1908 (not *C. minor* TROUESS. 1878): Siak River, East Sumatra.

1 ♂ Poelau Moenteh (near Pendeng), 550 - 750 m.

Forearm, in the skin, about 73 mm. *Skull.* — Total length, 35; zygomatic breadth, 24.5 mm.

Rhinolophus acuminatus sumatranus AND.

Rhinolophus sumatranus ANDERSEN, Proc. Zool. Soc., 1905, p. 133: Lower Langkat, Sumatra.

1 ♂ Lesten, 700 m.

Forearm, 46.5 mm.

Hipposideros sabanus THOS.

Hipposideros sabanus THOMAS, Ann. Mag. Nat. Hist. (7), I, 1898, p. 243: Sarawak.

1 ♀ Atang Poetar, 1.000 m.

Forearm, 39.5 mm. This bat has the terminal part of the nose-leaf entire and not divided into cells. There is no small upper premolar, and the corresponding lower tooth is extremely small. The specimen agrees well with the

description of *sabanus*, but no specimens of the latter are available for comparison. The species has not hitherto been recorded from Sumatra.

Myotis muricola muricola (HODGS.).

Vespertilio muricola HODGSON, in GRAY, Cat. Mamm. Nepal etc. 1846, p. 4: Nepal.

1 ♂ Simpang Agoesan, 1.000 m.

Forearm, 36.5 mm.

Nyctalus stenopterus (DOBS.).

Vesperugo stenopterus DOBSON, Proc. Zool. Soc., 1873, p. 470: Sarawak.

1 ♂ Kampoeng Bada.

Forearm, 43 mm.

Kerivoula hardwickii hardwickii (HORSF.).

Vespertilio hardwickii HORSFIELD, Zool. Researches, Java, 1824: Java.

1 ♀ Kampoeng Bada.

Forearm, 36.5 mm.

Simia satyrus abelii (LESS.).

Pongo abelii LESSON, Man. Mamm., 1827, p. 32: Sumatra.

1 imm. (dentition incomplete) ♂, 1 ad. ♀ Poelau Moenteh (near Pendeng), 550 - 750 m.

The great toes are without nails. My comparative material is limited to a good series of skins exported from Borneo, and said mostly to be from the Pontianak area. The Sumatran skins are more uniformly coloured, and are of a slightly paler "chestnut" colour: they lack the conspicuously darker maroon element in the pelage. In both specimens the hair on the crown is of the same cinnamon-rufous colour as that on the back, whereas in the Bornean series the crown is always among the darker areas of colour. There is no coronal crest in the adult.

Collector's external measurements. — Head and body, 770, 950; ear, 36, 30; hind-foot, 228, 293 mm. *Skulls.* — Basal length, 122, 138.5; zygomatic breadth, 113, 118; mastoid breadth, 113, 111; upper tooth row including canine (alveoli), —, 64.5 mm.

Hylobates syndactylus syndactylus (RAFF.).

Simia syndactyla RAFFLES, Trans. Linn. Soc., XIII, 1821, p. 241: Benkoelen, West *Sumatra.*

1 ♂, 1 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m; 1 ♂ Blang Kedjeren, 800 m; 1 ♂ Lesten-Pendeng, 550 - 700 m.

In these skins the pelage is slightly shorter and thinner than in others from higher levels on Mt. Kerintji. As usual the largest skull in each sex slightly exceeds the maximum size of the continental siamang. The skulls are characteristic of the Sumatran race. The largest male (No. 363) has four upper molars. it is, therefore, measured from the back of the third molar. For measurements see page 484.

Hylobates lar albimanus (VIG. & HORSF.).

Simia albimana VIGORS and HORSFIELD, Zool. Journ., IV, 1828, p. 107: Benkoelen, west coast of Sumatra.

Hylobates albimanus LYON, Proc. U.S. Nat. Mus., XXXIV, 1908, p. 673; Aroe Bay, N. E. Sumatra.

1 ♂, 1 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m; 1 ♂, 1 ♀ Atang Poetar, 1.000 m; 1 ♂ Simpang Agoesan, 1.000 m.

Simia albimana was based on two specimens of the white-handed gibbon brought from Sumatra by RAFFLES. According to the description one was black with a complete white facial ring; the other was "light brownish grey" in general colour.

The general colour of all the present specimens is brown. They all have an ill-defined, slightly darker cap; the posterior half of the upper parts much paler than the anterior half; and a complete broad, white facial ring. Nevertheless, the skins vary much in tone and details of colour pattern, and no two are alike. The amount of white on the hands and feet is especially variable. In one case the brown of the forearm extends, broadly, onto to the back of the hand; in another, the forearm is quite white an inch above the wrist.

Judging by the published description, LYON's series of skins from Aroe Bay in North-East Sumatra is very like the present one; and a specimen collected by MADZOED at Aloer Poerba, North Atjeh in 1930 also matches reasonably well. Unless the luck of collecting has been very uneven it seems, therefore, that black, and cream-coloured animals are rare, or non-existant in North Sumatra. The position in the remainder of the island is not clear owing to lack of material and records.

As represented by these northern specimens *albimanus* and typical *lar* of the Malay States are separable on colour. In the south, the latter is usually black, or fairly uniformly dark brown; in the north, cream-coloured animals predominate, but from no part of the Peninsula have I seen specimens showing the combination of peculiar brown colour, dark cap, and particoloured back of *albimanus*, although one or two brown skins from the extreme south of the Malay States provide links between the two forms.

Wherever they occur much above sea-level, gibbons of all the Malaysian forms have the pelage thicker and longer than their neighbours at lower levels. All the present specimens show this character, but it is most marked in the female from Atang Poetar in which the fur on the back has an average length of about 80 mm and can be pulled to 100 mm.!

LYON (*l.c.s.*) gives certain cranial and dental characters by which his material of *albimanus* and *lar* can be separated. In an examination of all available specimens, including many *lar* from the Malay Peninsula, I find that although the distinctions are not absolute, all those quoted for *albimanus* being adumbrated in a minority of *lar*, the extremes are always quite distinct. A *series* of skulls could be referred to a subspecies without difficulty. For measurements see page 484.

Measurements of *Hylobates* spp. from North-West Sumatra.

Locality	Sex	Head and Body	Hind-foot	Skull				No.	Remarks
				Greatest length	Basal length	Zygomatic breadth	Maxillary tooth-row with canine (alveoli)		
H. lar albimanus.									
Pendeng, 550—750 m.	♂	445	116	98	67.3	66.8	30	395	Adult
„	♀	488	147	101.5	71.3	—	28.2	366	„
Atang Poetar, 1,000 m.	♂	415	125	—	—	—	—	480	Immature
„	♀	456	135	98	71.5	66	27.2	481	Adult
Simpang Agoesan, 1,000 m.	♂	470	153	104	72.5	64.5	30.5	503	„
H. s. syndactylus.									
Pendeng, 550—750 m.	♂	590	174	129	97.7	88.5	39.5	363	„
„	♀	575	157	124.5	94.5	85	[42,3	362	„
Blang Kedjeren, 800 m.	♂	465	142	—	—	—	—	309	Immature
Lesten-Pendeng 550—700 m.	♂	591	159	121	93.5	76.8	39.8	419	Adult

A note on Malaysian gibbons. — The oft repeated dictum that the skulls of *agilis* and *lar* are alike needs correction. Excluding certain average distinctions that fail only in a minority of specimens to separate the two forms (e.g., the less elliptical foramen magnum of *lar*), I find that *agilis* always has more projecting supraorbital ridges (in the lateral view, the apex higher; in the dorsal view, the post-orbital depression deeper), with the corollary of more rounded, less flattened and usually narrower dorsal orbital rims.

Comparing skulls of Malayan and Sumatra *agilis* I find that, as in *lar*, there is a tendency to straighter nasals (profile) in the island series, but the distinction is less decided than in *lar*, and two out of eight Sumatran skulls are well-marked exceptions.

Turning to colour, I have not yet seen a Malayan *agilis* so uniformly black on the upper parts as are some from Sumatra: Malayan skins in the dark phase are blackish brown on the lower back, but the difference between specimens from the two localities is not well marked, and the series examined are small. In the Malay States *agilis* is not common, and much less numerous than *lar:* in most parts of Sumatra the situation is reversed.

Macaca nemestrina nemestrina (LINN.).

Simia nemestrina LINN., Syst. Nat., 12th. ed., I, 1766, p. 35: Sumatra.

1 ♂ imm. Poelau Moenteh (near Pendeng), 550 - 750 m.

Collector's external measurements. — Head and body, 571; tail, 182; ear, 39; hind-foot, 162 mm.

The *skull* measures 94.1 mm in basal length, and 84.5 mm in zygomatic breadth. The back molars are not fully grown.

Macaca irus irus F. CUV.

Macacus irus F. CUVIER, Mémoires du Mus. d'Hist. Nat. Paris, IV, 1818, p. 120: Sumatra.

1 ♂ Mt. Setan-Meloewak, 325 - 520 m; 1 ♂ Lesten, 700 m.

The largest specimen measured, in the flesh, head and body, 451; tail, 622; ear, 36; hind-foot, 138 mm. The *skull* with a strong crest and worn teeth measures. — Total length, 124; basal length, about 89; zygomatic breadth, 80.5; maxillary tooth row including canine (alveoli), 38 mm. The second skull is of a younger animal; the dentition is complete but the teeth are scarcely worn and there is no crest on the cranium. — Basal length, 83.4; zygomatic breadth, 78; maxillary tooth row, 36.5 mm.

Pithecus pyrrhus cristatus (RAFFLES).

Simia cristatus RAFFLES, Trans. Linn. Soc., XIII, 1821, p. 244: Benkoelen, West Sumatra.

1 ♂, 1 ♀ Kotatjane, 200 m.

These specimens are not quite so dark as most skins from South Sumatra, and they must be regarded as diverging towards the paler, more silvered race

Measurements of *Pithecus* spp. from N.W. Sumatra.

Locality	Sex	Head and Body	Tail	Hind-foot	Skull				Collector's No.	Remarks
					Greatest length	Basal length	Zygomatic breadth	Maxillary tooth-row with canices (alvéoli)		
Pithecus pyrrhus cristatus.										
Kotatjane, 200 m. . . .	♂	503	782	169	102	75	78.9	31.6	491	Adult
,, ...	♀	528	738	169	95.5	68.7	73	30	492	,,
Pithecus aygula thomasi.										
Lesten, 700 m.	♂	479	825	172	97	62	70.4	29	407	Adult
,, ...	♂	473	662	177	92	58.8	66.6	27.7	411	Subadult
,, ...	♂	521	723	175	98.5	61	75.5	30	396	Adult

found in the Malay States, *P. p. ultimus*, to which form examples of this species from the lowlands of North-East Sumatra can be definitely referred. For measurements see page 486.

Pithecus aygula thomasi (COLL.).

Semnopithecus thomasi COLLETT, Proc. Zool. Soc., 1892, p. 613, pl. XLII: Langkat, North-East Sumatra.

3 ♂ Lesten, 700 m.

No really satisfactory comparative material is available in Singapore. A specimen from Aroe Bay on the north-east coast of the island is paler than the Leuser skins, but it was collected in 1905, and has since been exposed to light. For measurements see page 486.

Nycticebus coucang coucang (BODD.).

Tardigradus coucang BODDAERT, Elench. Anim., 1785, p. 67: probably Malacca.

1 ad. ♀ Meloewak-Koengke, 520 - 825 m.

This specimen differs from examples of *coucang* from the Malay States and North-East Sumatra only in the rather more richly coloured upper parts which, except for the greyer limbs, match those of *borneanus*. The skull has two pairs of upper incisors. The least distance between the crests of the temporal ridges is about 4 mm. The colour difference may indicate a montane race for which the name *hilleri* (STONE and REHN, Proc. Acad. Sci. Philad., 1902, p. 139: Padang Highlands) is available, but the present specimen does not show the large size and wrinkled bullae postulated for that form by LYON (Proc. U.S. Nat. Mus., XXI, 1906, p. 534).

Collector's external measurements. — Head and body, 294; tail, 21; ear, 18; hind-foot, 61 mm. *Skull.* — Greatest length, 59.1, basal length, 49.6; greatest width, 41.6; front of canine to back of last molar, 20.5 mm.

Lutra sp.

1 juv. ♀ Blang Kedjeren, 800 m.

A kitten, I think of *L. l. barang* CUV.

Paguma larvata leucomystax (GRAY).

Paradoxurus leucomystax J. E. GRAY, Proc. Zool. Soc. IV, 1837, p. 88: Sumatra.

1 ad. ♂ Poelau Moenteh (near Pendeng), 550 - 750 m.

A typical example of the Sumatran subspecies.

Collector's external measurements. — Head and body, 757; tail, 578; ear, 43; hind-foot, 115 mm.

Skull. — Greatest length, 132; condylo-basal length, 129; basal length, 124; palatal length, 63.5; greatest diameter of pm^4, 10.8; mastoid breadth, 48; zygomatic breadth, 69.4 mm.

Felis temminckii temminckii VIG. & HORSF.

Felis temminckii VIGORS and HORSFIELD, Zool. Journ., III, 1827, p. 451: Sumatra.

1 young ad. ♂ Blang Kedjeren, 800 m.

Collector's external measurements. — Head and body, 632; tail, 395; hind-

foot, 154; ear, 46 mm. *Skull.* — Greatest length, 111; basal length, 95; condylo-basilar length, 89; zygomatic width, 73; mastoid width, 46.5; upper carnassial, 15 by 6.8 mm.

A skin in the reddish brown phase, greyest on the feet and brightest on the nape and spine. According to the scanty published record and the few available specimens, continental specimens of this cat run larger than do exact topotypes, but the latter are rare in collection, and our knowledge of the species is still very incomplete.

Manis javanica DESM.

Manis javanica A. G. DESMAREST, Ency. Méth. (Mamm.), II, 1822, p. 377: Java.

1 juv. ♂ Blang Kedjeren, 800 m.

A very young animal with a total length of 644 mm. The distal one-third of the tail is whitish.

Longitudinal rows of scales round the body, 17; total number of scales in the longitudinal line, 62; number of scales in the upper median line of tail only, 29.

Petaurista petaurista batuanus MILL.

Petaurista batuana MILLER, Smiths. Misc. Coll., 45, 1903, p. 27: Batu Islands, West Sumatra.

3 ♂ Atang Poetar, 1.000 m; 1 ♂ Lesten, 700 m.

In colour the Sumatran race is intermediate between the dark Javan forms and the very much paler and redder *melanotus* of the Malay Peninsula, but it is quite distinct. For measurements see page 493.

Aeromys tephromelas bartelsi (SODY).

Petaurista bartelsi SODY, Natuurk. Tijdschr., XCVI, 1936, 146: Pematang Siantar, Deli District, North-East Sumatra.

1 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m.

This race is very close to the typical form from the Malay Peninsula. At the moment I cannot see how *bartelsi* differs unless it is by reason of its less grizzled under parts, but the available material of *tephromelas* is poor, and I have only two specimens from Sumatra for comparison. For measurements see page 493.

Ratufa bicolor palliata MILL.

Ratufa palliata MILLER, Proc. Acad. Nat. Sci. Philad., 1902, p. 147: Indragiri River, East Sumatra.

1 ♂ Poelau Moenteh (near Pendeng), ± 750 m.

The available comparative material is from Kerintji and North-East Sumatra: it confirms that the colour in any one place is very variable. The present skin is unique among the Sumatran series in that the black nape is fairly sharply defined against the cream-brown back, but judging from the original description a similar phase occurs in the type locality of *palliata*. The

details of the skull are as in *palliata* and not as in the neighbouring *laenata* of the Banjak Islands. For measurements see page 493.

Sciurus prevostii piceus PETERS.

Sciurus piceus PETERS, Proc. Zool. Soc., 1866, p. 428: Tenasserim, error for North Sumatra.

3 ♂, 2 ♀ Lesten, 700 m.

These specimens are like others from Aroe Bay, and other places further south, in North-East Sumatra. The action of alcohol on the skins is to change the colour of the under parts to a much deeper, darker red. For measurements see page 493.

Sciurus notatus tapanulius LYON.

Sciurus vittatus tapanulius LYON, Smiths. Misc. Coll., XLVIII, 1907, p. 280: Tapanoeli Bay, West Sumatra.

2 ♀ Kotatjane, 200 m.

These two specimens are clearly referable to *tapanulius* with which they have been compared. The under parts are deeply coloured, rufous to ferruginous rather than near ochraceous or orange-rufous; the feet are concolorous with the back; and the dark lateral stripe is finely grizzled with rufous. For measurements see page 494.

Sciurus notatus percommodus subsp. nov.

Sciurus vittatus albescens LYON, *nec* BONHOTE, Smiths. Misc. Coll., XLVIII, 1907, p. 281.

4 ♂, 6 ♀ Lesten, 700 m.

Compared with *S. n. tapanulius* darker and less ochraceous on the upper parts; the feet usually tinged with orange; the under parts less tawny-ferruginous, and tending to a paler pink or orange. Coloured under parts copiously mixed with white hairs, and the dark lateral stripe heavily overlaid with white tips to the hairs.

Type. — Adult female (skin and skull), collected at Lesten, Atjeh, North Sumatra, on 21st March, 1937 by A. HOOGERWERF. Buit. Mus. No. 416. For measurements see the table on page 494.

Remarks. — This form seems to replace *tapanulius* in the submontane country north of Kotatjane. Judging from LYON's description its range extends to the northern point of Sumatra at Loh Sidoh Bay, and to Aroe Bay on the North-East coast. In the low country of the east coast, south of Aroe Bay the next race is *nicotianae* which is described as having the under parts strongly ochraceous, and the dark lateral stripe grizzled with the same colour.

Sciurus nigrovittatus bocki ROB. & WROUGHT.

Sciurus nigrovittatus bocki ROBINSON and WROUGHTON, Journ. Fed. Malay States Mus., IV, 1911, p. 167: Padang Highlands, Sumatra.

1 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m; 4 ♂, 4 ♀ Atang Poetar, 1.000 m.

The skins exactly match others from Kerintji, excepting that the specimen from the lowest altitude, Pendeng (No 343) has the largest skull of any example of *bocki* yet recorded. Even admitting that the smaller skulls are not aged the range of size (from 44.4 to 47 mm in greatest length) seems very large for one race in this genus, but the intergradation is complete and there are as yet no grounds for separating another form. For measurements see page 494.

Sciurus albescens albescens BONH.

Sciurus notatus albescens BONHOTE, Ann. Mag. Nat. Hist. (7), VII, 1901, p. 446: Atjeh, North Sumatra.

1 ♂ Meloewak-Koengke, 520 - 825 m; 1 ♂ Reket-Atang Poetar, 900 - 1.000 m; 1 ♂, 2 ♀ Atang Poetar, 1.000 m.

I have not examined the type of *albescens*, but the published measurements indicate that it represents this small species and not a local race of the larger *notatus*.

S. a. albescens and *S. notatus percommodus* are much alike in colour and in both forms the dark lateral stripe is overlaid with white hairs, but *albescens* is duller on the under parts than *percommodus* and the dark lateral stripe tends to be wider.

Some comments on *S. albescens* were offered in my "Handlist of Malaysian Mammals", p. 140. It seems to be a submontane species, at least largely replacing the *S. notatus* forms at moderate altitudes, but we know that as *S. albescens adamsi* it infiltrates into the lowlands in North Borneo. When submontane it has always been found in close proximity to a form of *S. nigrovittatus*, although the latter usually seems based on a slightly higher level. Excluding colour the difference between the parallel *albescens* and *nigrovittatus* subspecies is very slight, but existing material does indicate that in Sumatra, *S. a. albescens* runs very slightly shorter in the skull than *S. n. bocki;* and that in North Borneo, *S. a. adamsi* is very slightly broader in the skull than *S. n. venustus*. Topotypical *S. albescens adamsi* from Sarawak is known from very poor material only, and it will be interesting to know whether or not a northern race is separable from it on slightly larger size, as is *S. n. venustus* from *S. n. orestes*. For measurements see page 494.

Sciurus tenuis surdus MILL.

Sciurus tenuis surdus MILLER, Proc. Wash. Acad. Sci., II, 1900, p. 80: Trang, Peninsular Siam.

9 ♂, 3 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m; 6 ♂, 3 ♀ Lesten, 700 m; 1 ♀ Ngo Lemboe, "bivak I" (23rd Febr.), 800 - 2000 m.

Mr. HOOGERWERF obtained this form at low levels. Specimens from other localities in the Sumatran lowlands, whence I have no material, have been referred to typical *tenuis* by several authors, but the present examples are paler in general colour than topotypes of *S. t. tenuis*. In a few of the skins the ochraceous areas on the shoulders are rather more extensive than in topotypical *surdus*, but otherwise the Sumatran series seems exactly like an even number

from the lowlands of the northern part of the Malay Peninsula. For measurements see page 495.

Sciurus tenuis altitudinis ROB. & KL.

Sciurus tenuis altitudinis ROBINSON and KLOSS, Journ. Strs. Br. Roy. Asiat. Soc., No. 73, 1916, p. 269: Kerintji Peak, Sumatra, 7.300 ft.

1 ♂ Palok, 800 - 1.000 m; 1 ♂, Simpang Agoesan, 1.000 m; 2 ♂, 3 ♀ Atang Poetar, 1.000 m; 1 Ngo Lemboe, "bivak I" (22nd Febr.), 800 - 2000 m.

According to the collector's data this form replaces *surdus* at higher levels although both forms were obtained from "bivak I" on Ngo Lemboe. Compared with the specimens listed above as *surdus*, the present subspecies is slightly larger; the rostrum is longer and narrower; the bullae are smaller; the pelage is thicker; the upper parts are darker; the pale spots on the sides of the muzzle are less conspicuous; and seen from above, as a series, the pale tips to the tail hairs are more buffy and less white. Although here put under *altitudinis* these specimens show some deviation in the direction of *S. t. gunong* from the mountains of Peninsular Siam in that the pelage is less thick, and the rostrum less consistently narrowed than in topotypical *altitudinis* which came from a higher altitude than the present series. But *gunong* always has the pale tips to the tail hairs bright rufous-buff.

It is noticeable that the skins from Atjeh are much whiter and less buffy on the under parts than those of the original series from Kerintji, but I am inclined to think that this difference is not a natural one and that possibly it is caused by different methods of preparation. For measurements see page 495.

Sciurus modestus modestus MÜLL.

Sciurus modestus S. MÜLLER, in TEMM., Verh. nat. ges. Ned. overz. bezitt., Zool., 1839, pp. 34, 55: Mt. Singgalang, Padang Highlands, Sumatra.

Tomeutes tenuis modestus, ROB. and KLOSS, Journ. F.M.S. Mus., VIII, pt. 2, 1918, p. 33 (Kerintji Valley, 2.450 ft); *id.*, VII, 1919, p. 272 (West Sumatra); *id.*, p. 310 (West Sumatra).

1 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m; 1 ♀ Meloewak-Koengke, 520 - 825 m; 1 ♂ Palok, 800 - 1.000 m.

The material representing this form is poor and two of the skins have been in alcohol which almost invariably slightly alters the colour of squirrels. Nevertheless, the three skins together with the collector's data show that the submontane *modestus* in altitude partly overlaps the ranges of both *surdus* and *altitudinis*. General appearance suggests that *altitudinis* (represented in the Malay Peninsula by *gunong*), rather than *modestus* is the high level representative of *tenuis*.

In colour *modestus* is very near to both *surdus* and *altitudinus*, but it differs from both in the much deeper orange-buff colour of the anal region and under side of the tail: it is also rather greyer on the under parts. It leans to *surdus* in the pale, cold tone of the upper parts, and pure white tips to the tail hairs. In size it is larger than *surdus* and nearer to *altitudinis*, but it averages slightly

longer in the tail than this latter form. Series of measurements of *modestus* have been published by ROBINSON & KLOSS in the references quoted above.

The skull of *modestus* is large, like that of *altitudinis*, but seen from above the rostrum appears shorter and broader, as in *surdus*. The interorbital region tends to be broader than in *altitudinis* and the zygomata are often heavier. The bullae are relatively small, as in *altitudinis*.

In view of the overlap in range it is now necessary to separate *modestus* from the *tenuis* formenkreise and the following arrangement seems apposite.—

S. m. modestus, Sumatra; *S. m. tahan*, Malay States; *S. m. brookei*, Borneo.

Each of these three forms differs from its neighbouring *tenuis* form by reason of the brighter vent region and under side of the tail; larger size; and more robust skull. Whether or not the name *modestus* really applies to a member of this group only a fresh examination of the original series in Leiden can decide for the published descriptions and figures of *modestus* are too generalised to decide the point. In the meantime the view put forward by ROBINSON & KLOSS in 1913 is here accepted. For measurements see page 495.

Sciurus hippurus hippurosus LYON.

Sciurus hippurosus LYON, Smiths. Misc. Coll., L., 1907, p. 26: Taroesan Bay, West Sumatra.

1 ♀ Lesten, 700 m.

This skin is like specimens of *hippurus* from the Malay States in size and in the colour of the under parts but it differs in being darker, more tawny, on the upper parts. In the skull the dorsal portion of the premaxilla is narrower, and the zygomatic arch is more slender than in *hippurus*. The two small upper premolars are present. The character of the zygomatic arch alone is enough to separate the two subspecies. For measurements see page 493.

Funambulus insignis niobe (THOS.).

Funambulus niobe THOMAS, Ann. Mag. Nat. Hist. (7), II, 1898, p. 249: Padang Highlands.

3 ♂ (1 juv.), Atang Poetar, 1.000 m.

Collector's external measurements. — Head and body, 173, 176; tail, 90 imp., 103; hind-foot, 45, 44; ear, 20, 19 mm.

Skull. — Greatest length, 47.9, 48; condylo-basilar length, 39.3, 39.9; palatilar length, 20.5, 21.3; diastema 12, 12.5; upper molar row, 8.7, 8.5; greatest length of a nasal, 14.9, 14.7; zygomatic breadth, 26.2 mm.

Skins of *niobe* from Mts. Dempo and Kerintji near the west coast of Sumatra resemble the type of the subspecies in that the under parts from chin to tail are yellowish buff, the base of the fur being grey. From Mt. Ophir, ROBINSON & KLOSS have recorded a specimen with a large white patch on the forebreast, and the three skins from Atjeh also have more white on the under parts than a series of *niobe* from Kerintji. All three have the throat whitish, and in one specimen the middle line of the underparts is broadly white. These whiter animals are further distinguished by rather small skulls and it therefore

Measurements of *Sciuridae* from North-West Sumatra.

Species	Sex	Head and Body	Tail	Ear	Hind-foot	Skull								No.	Remarks
						Great-est length	Condylo-basilar length	Palati-lar length	Diaste-ma	Upper molar row	Median nasal length	Inter-orbital breadth	Zygo-matic breadth		
Petaurista p. batuanus	♂	414	484	40	75	68.8	61	31.5	15.1	15.8	20.4	14.4	46.6	462	Adult
,,	♂	414	497	42	76	69.5	—	—	—	15.9	21.5	—	48.1	461	,,
,,	♂	429	439	44	76	69.4	60.5	32.4	15.1	17	21.6	13.5	48.4	428	,,
,,	♂	399	476	42	76	66.7	60	30.8	13.5	16.6	19.4	12 8	46	382	,,
Aeromys teph. bartelsi	♀	383	425	37	70	—	58.2	28.2	14 9	12	18.5	13	—	333	,,
Sciurus prev. piceus	♂	222	242	20	55	55.1	47.5	23.1	12.7	11	16.4	22.5	34.5	381	,,
,,	♂	239	242	20	57	55.1	47.8	23	12.5	10.5	17	21 5	34.1	408	,,
,,	♂	235	236	20	56	57.5	49.2	24.5	13.8	—	17.4	23.5	36	389	,,
,,	♀	217	219	19	54	54.3	47.2	23	12.6	11.5	16.9	21.6	33.7	417	,,
,,	♀	220	224	18	46	55.5	47.7	23.5	12.8	11.6	17.6	21	33.5	371	,,
Ratufa bicolor palliata	♂	371	458	34	83	73.3	62	27.5	16.5	14.4	23.5	30.5	46.9	368	,,
Sciurus hippurus hippurosus	♀	232	255	20	62	58.8	51	26.5	15.3	10	17.5	17.5	34.6	398	,,

Measurements of the *Sciurus notatus* group from North-West Sumatra.

Species	Sex	Head and Body	Tail	Ear	Hind-foot	Skull								No.	Remarks
						Great-est length	Condylo-basilar length	Palati-lar length	Diaste-ma	Upper molar row	Median nasal length	Inter-orbital breadth	Zygo-matic breadth		
Sciurus notatus tapanulius	♀	183	172	18	41	46.9	39.8	19.6	10	9.8	13.3	16	—	489	Vix ad.
„	♀	196	182	18	43	49	42.4	21.5	11.2	9.5	14.2	18	29.4	490	Adult
S. n. percommodus	♂	187	195	19	45	49.5	42.3	22	11.5	9.5	14.7	17.5	29.3	384	„
„	♂	187	—	18	45	48.5	42	22.2	12	9.2	14	17,9	28.5	372	„
„	♂	188	203	18	47	48.4	41.8	21.1	11.5	9.4	13.8	16.6	—	380	„
„	♀	196	175	18	44	49	41.6	20,9	11	9	13.5	18	29.6	402	„
„	♀	185	199	18	46	49	42.3	21.6	11.8	9.4	13.5	16,1	28.5	401	„
„	♀	191	194	18	46	49	42	22.5	12.8	9.6	14.4	18,3	29	416	„ (type)
S. nigrovittatus bocki	♀	191	157	20	42	47	40	19.9	10.7	8,5	14.4	17.5	29.5	343	Adult
„	♀	172	160	19	42	46.2	38.7	18.5	10.4	8.7	13.2	16.6	28.1	458	„
„	♀	176	151	17	42	45.1	38.2	18.5	10.5	8.7	12.8	16.5	27.1	446	„
„	♂	178	166	18	42	45	38	19	10.5	8.6	13.4	17.2	27.1	422	„
„	♀	167	151	17	42	44.4	37.5	18	10	8.5	13	16.5	28	445	„
S. a. albescens	♂	172	155	17	40	44.8	38,3	19.8	10.5	8.2	12.5	16 6	26.3	306	„
„	♂	157	162	18	40	42 3	35.2	18.3	9.5	8	12	15.3	25.6	441	„
„	♂	167	155	18	42	42.7	36.1	17.6	9.4	8.1	11	16.5	26.9	421	„
„	♀	173	153	17	42	43.4	36.8	18.7	10	8 1	12	15	26.5	452	„
„	♀	172	155	18	42	44	37.8	19.2	10.8	8	11.5	16	26	453	„

Measurements of *Sciurus tenuis* group from North-West Sumatra.

Species	Sex	Head and Body	Tail	Ear	Hind-foot	Skull								No.	Remarks
						Great-est length	Condyo-basilar length	Palati-lar length	Dia-stema	Upper molar row	Median nasal length	Inter-orbital breadth	Zygo-matic breadth		
Sciurus tenuis surdus.	♂	138	110	14	33	37.8	31.2	15.7	8.6	6.5	10 5	13	—	342	Adult
,,	♂	129	115	16	33	37.8	31.3	15.9	8.5	6.9	10.3	12.6	—	336	,,
,,	♂	138	110	17	33	37.4	31	15	8	6.7	10.2	12.5	—	355	,,
,,	♂	129	116	16	32	37.5	31	15.9	8.3	7	10.7	12.9	22	404	,,
,,	♀	134	112	15	32	38	31.2	15.8	8.4	6.6	10.5	12.8	22.1	413	,,
,,	♀	—	—	—	—	37	31	15.5	8.5	6.7	11.5	13.2	—	334	,,
Sciurus tenuis altitudinis.	♂	134	116	16	35	—	32	16	9	7.1	—	12.4	22	484	,,
,,	♂	135	119	19	35	—	32.3	16.5	9.3	—	—	12	—	435	,,
,,	♂	145	118	16	—	—	32.7	17	9.4	7 5	—	12.3	22.8	495	,,
,,	♀	143	121	18	34	39	33.2	16.5	9.2	7.1	13	13	22.8	479	,,
,,	♀	148	—	17	34	39.5	32.8	16.9	9	7	11.5	12.7	23.4	434	,,
,,	♂	146	109	17	34	39.3	32.6	16.4	9.5	7.5	12	—	21.5	327	,,
,,	♂	136	112	17	32	40.1	32.3	16.8	9	7.6	11.9	12.9	21.4	505	,,
,,	♀	137	119	17	35	39.8	32.4	16.7	9	7.5	11.8	12	21.8	485	,,
Sciurus modestus modestus.	♂	—	115	14	35	—	32.3	16.5	9	7.2	—	14.5	24.5	499	,,
,,	♀	136	126	15	34	39.5	33.5	—	8.8	—	11.9	13.3	23.6	369	,,
,,	♀	—	—	15	31	38.7	31.5	16.3	—	7.5	11.5	13.2	23.2	305	,,

seems possible that there is an undescribed northern race, but in view of the poor material (one of the present specimens is a juvenile and another is only a young adult), and the fact that a skin from the mountains inland from Medan on the north-east coast is clearly referable to typical *niobe* I do not, at the moment, feel justified in making any further separation.

Rattus rattus jalorensis (BONH.).

Mus jalorensis BONHOTE, Fasc. Malay., Zool., pt. I, 1903, p. 28: Patani, Peninsular Thailand.

1 ♂ Kotatjane, 200 m; 1 ♂, 2 ♀ Simpang Agoesan, 1.000 m; 2 ♂, 2 ♀, Atang Poetar, 1.000 m; 1 ♂ Gadjah, 950 m; 1 ♂, 1 ♀ Lesten, 700 m; 1 ♂ Poelau Moenteh (near Pendeng), 550 - 750 m.

An interesting feature of this series is that the skulls of one or two of the specimens in which the under parts are tinged with grey show certain features adumbrating the characters of the form *argentiventer*. I have not seen such specimens from the Malay Peninsula. For measurements see page 500.

Rattus hoogerwerfi CHAS.

Rattus hoogerwerfi CHASEN, Treubia, XVII, 1939, p. 207: Blang Kedjeren, Atjeh, North Sumatra, 800 m.

1 ad. ♀, 1 juv. ♀ Mt. Leuser; 1 ♀ Blang Kedjeren, 800 m; 1 ♀ Ngo Lemboe, "bivak I", 800 - 2000 m.

This is a brightly coloured brown rat of medium size, with long soft pelage. The tail is longer than the head and body, and white for the distal half. The nasals and the interorbital region of the skull are unusually flattened.

The fur is very soft and long, and excluding the numerous long projecting black piles, is about 20 mm thick on the rump. The upper parts are rich bright brown in colour, sprinkled with black, becoming paler on the flanks, and paling to rufous-buff on the under parts: there is no sharp line of demarcation on the flanks. The base of the fur is everywhere, broadly, grey. The under side of the head is grey. The whiskers are long and black. The feet are blackish, but the digits of the forefeet are white. The juvenile is much duller in colour and nearer to liver-brown on the upper parts. The tail has about ten rings to the centimetre. Mammae 1 - 3 = 8.

The skull has the brain case much inflated as in the *surifer* rats; the interorbital region is slightly hollowed between the supraorbital beading, and the region about the posterior end of the nasals is quite flat.

Perhaps the nearest relative of *R. hoogerwerfi* is *Rattus baluensis korinchi* for if consideration of the tail colour is excluded the two forms are not unlike, and the peculiar characters of the skull of *hoogerwerfi* are to some extent adumbrated in adults of *korinchi*. For measurements see page 501.

Rattus concolor ephippium (JENT.).

Mus ephippium JENTINK, Notes Leyd. Mus., II, 1880, p. 15: Sumatra.

5 ♂, 7 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m; 1 ♀ Gadjah, 950 m;

2 ♀ Palok, 800 - 1.000 m; 6 ♂, 9 ♀ Atang Poetar, 1.000 m.

For measurements see page 500.

Rattus mülleri mülleri (JENT.).

Mus mülleri JENTINK, Notes Leyd. Mus., II, 1880, p. 16: Batang Singalan, West Sumatra.

4 ♀ Lesten, 700 m; 2 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m; 1 ♀ Ngo Lemboe, "bivak I", 800 - 2000 m.

On the upper parts these specimens show the cold colour tone of *mülleri*. Of the four adults, two from Lesten have white under parts sharply defined on the flanks; one from Ngo Lemboe is grey below, with no well-defined line of demarcation; and one from Lesten is more or less intermediate between the two conditions. In the adult skulls the rostrum matches that of specimens from the Kerintji highlands regarded as true *mülleri* by ROBINSON & KLOSS in 1918, and not the lowland specimens described by these authors as *campus*. For measurements see page 500.

Rattus infraluteus maxi SODY.

Rattus maxi SODY, Natuurhist. Maandblad (Maastricht), 21, 1932, p. 157: Tjiboeni, Bandoeng, West Java.

1 ♀, Atang Poetar, 1.000 m.

No topotypes of *maxi* are available for comparison. Judging by the original description of that form it seems possible that the present specimen represents a browner and less grey race. In external appearance it is very like adults of the same sex of *infraluteus* from Mt. Kinabalu in North Borneo, but several points of difference are presented. It is not quite so dark on the flanks, and the line of demarcation between upper and lower parts is therefore less distinct; there is a more definite blackening of the mid-dorsal line, especially on the nape; and the under parts are pale smoky grey, without the buffy tinge seen in *infraluteus*.

The skull closely follows that of a female *infraluteus* of about the same age, but the brain case is more inflated, the parietals are more convex, the dorsal ridges are much more curved outwards and therefore less parallel, and the anterior palatal foramina are much longer than in any skull of a series of *infraluteus* although this includes a skull with a total length of 64.3 mm against 62.2 mm in the Atjeh specimen. For measurements see page 500.

Rattus rajah pellax (MILL.).

Mus pellax MILLER, Proc. Biol. Soc. Wash., XIII, 1900, p. 147: Trang, Peninsular Thailand.

1 ♂ Lesten, 700 m.

This specimen is clearly referable to the Malayan *pellax* and not to the South Sumatran *similis*. The rostrum is slightly narrower than in most *pellax*, but similar skulls do occur in Malayan series. For measurements see page 501.

Rattus rapit fraternus (ROB. & KL.).

Epimys fraternus ROBINSON and KLOSS, Journ. Strs. Br. Roy. Asiat. Soc., No. 73, 1916, p. 373: Kerintji Peak, West Sumatra, 4.700 ft.

1 ♀ Blang Kedjeren, 800 m; 3 ♂, 2 ♀ Atang Poetar, 1.000 m.

For measurements see page 501.

Rattus whiteheadi batus (MILL.).

Epimys batus MILLER, Proc. Biol. Soc. Wash., XXIV, 1911, p. 27: Pinie Island, Batoe Islands, West Sumatra.

2 ♀ Ngo Lemboe, "bivak I", 800 - 2000 m; 2 ♂, 1 ♀ Poelau Moenteh (near Pendeng), 550 - 750 m; 5 ♂, 1 ♀ Lesten, 700 m.

All these specimens are strongly rufous on the under parts, and they cannot be referred to the much duller race, *batamanus*, recorded from parts of East Sumatra. The average size of the skull is too large for typical *whiteheadi* which is found in West Sumatra. No topotypes of *batus* are available for comparison, but on description no separation can be made. Some remarks on large series of this rat were offered in the "Handlist of Malaysian Mammals", p. 180. Comparative measurements are given in Bull. Raff. Mus., 10, 1935, p. 19. In the present series the shape of the palatal foramina is more than usually variable. The measurements given in the table (p. 502) are those of the four largest adults.

Rattus alticola hylomyoides (ROB. & KL.).

Epimys hylomyoides ROBINSON and KLOSS, Journ. Strs. Br. Roy. Asiat. Soc., No. 73, 1916, p. 273: Kerintji Peak, Sumatra, 7.300 ft.

2 ♂, 1 ♀ Mt. Leuser; 1 ♀ Gadjah, 950 m; 1 ♂, 1 ♀ Ngo Lemboe, "bivak I", 800 - 2000 m.

In the original topotypical series of this rat the maximum skull-length was 34.4 mm (the aged type), against 37.5 mm in the present series. It is possible, therefore, that a large northern race should be separated, but the original series of *hylomyoides* was small, and Mt. Dempo, south of Kerintji, produces skulls up to 35.4 mm in length. From Mt. Ophir, north of Kerintji, the skulls of adults run up to 37.5 mm in greatest length. For measurements see page 502.

Rattus bukit lieftincki CHAS.

Rattus bukit lieftincki CHASEN, Treubia, 17, 1939, p. 208: Atang Poetar, Atjeh, North Sumatra, 1.000 m.

9 ♂, 4 ♀ Atang Poetar, 1.000 m.

This rat is very like *R. bukit* of the Malay Peninsula, but the upper parts are brighter in colour; the fur on the under parts is noticeably softer and less spinous; and the average length of the skull is considerably less. *R. b. lieftincki* differs from *treubii* of the Javan mountains in that the upper parts are less brightly coloured; but it is brighter than *temmincki* of the Javan lowlands: *bukit* and *lieftincki* differ from *treubii* and *temmincki* in that the inside of

the thigh is white, not largely coloured; and the brown on the upper side of the foot is much less extensive.

R. b. jacobsoni BARTELS, Natuurk. Tijdschr. Ned. Ind., XCVII, 1937, p. 121 Lampoengs, South Sumatra), was a reference not known to me when *lieftincki* was described, and I have no examples of it for comparison, but in view of the fact that *jacobsoni* and *temmincki* are specifically stated to be alike in cannot be confused with the much duller *temmincki*. For measurements see page 502.

Measurements of *Rattus* spp. from North-West Sumatra.

Species	Sex	Head and Body	Tail	Hind-foot	Ear	Skull								No.	Remarks
						Greatest length	Condylo-basilar length	Diastema	Upper molar row	Length palatal foramina	Median nasal length	Breadth combined nasal	Zygomatic breadth		
Rattus concolor ephippium	♂	128	134	25	20	32.5	27.8	8.4	5	6	11.8	3.6	15.7	467	Adult
,,	♂	131	144	26	20	32.7	27.8	8.9	5	6	11.7	4.1	16	423	,,
,,	♂	135	144	26	18	33.2	28.5	9.4	5.1	6.5	12.1	—	15.6	351	,,
,,	♀	120	127	24	17	32.1	27.2	8.4	5.2	6	11.2	4.1	15 5	474	,,
,,	♀	135	135	25	19	32.4	28.1	8.6	5.2	6.5	11.7	4	16.5	470	,,
,,	♀	122	140	26	19	32.7	27.9	8.3	5.2	6.1	12 3	4.2	15.9	443	,,
,,	♀	133	130	24	18	32	27.3	8.1	5.2	5.7	11.8	3.9	15.5	507	,,
,,	♀	—	—	25	18	32.5	27.8	8.4	5.2	5 8	11.9	4 2	15.2	497	,,
Rattus rattus jalorensis	♂	145	157	31	18	—	30.9	9.4	6.4	5.5	—	—	17.5	344	,,
,,	♂	143	165	28	19	—	31.9	9.5	6.6	6.2	—	—	—	319	,,
,,	♂	176	175	34	22	40.9	36 4	11.4	6.9	6.8	14.9	4.5	20.5	494	,,
,,	♂	177	171	32	19	39 9	34	10.6	6.5	6.7	14.5	4.7	19.1	375	,,
,,	♀	160	152	32	18	38	33.5	10.5	6.9	7	13	4.4	19.4	501	,,
Rattus infraluteus maxi	♀	259	298	57	29	62.2	54	17.7	11.1	11.1	25	7	33	486	,,
Rattus m. mülleri	♂	238	236	48	21	53.9	46.9	14.5	10	8.8	21.3	6.1	27.3	—	,,
,,	♀	230	254	47	23	53	46.2	14	10.1	8.2	19.7	5,7	27	328	,,
,,	♀	218	235	48	22	51.2	43.5	13.1	9.6	8.5	19	5 2	24.3	418	Vix ad.
,,	♀	245	283	52	23	55	47	14.5	9.9	8.5	19.5	6.9	27.5	415	Adult

Measurements of *Rattus* spp. from North-West Sumatra.

Species	Sex	Head and Body	Tail	Hind-foot	Ear	Skull								No.	Remarks
						Great-est length	Condylo-basilar length	Dias-tema	Upper molar row	Length palatal for-amina	Median nasal length	Breadth combi-ned nasals	Zygo-matic breadth		
Rattus rajah pellax.	♂	197	201	41	—	47	39.3	12.5	7	7.3	17.9	5.2	21.2	391	Adult
Rattus rapit frater -nus.	♂	162	239	33	25	40.5	34	10.2	6.8	7.2	15.2	5.3	17.7	460	,,
,,	♂	160	237	34	26	40.3	33	9.5	7.2	6.8	15.5	4.8	18.3	459	,,
,,	♂	163	—	32	23	41 8	35.3	10.8	6.8	7.5	15	5.3	17.9	455	,,
,,	♀	165	224	33	25	40 7	33.5	10.5	7	7	14.6	5	—	448	,,
Rattus hoogerwerfi.	♀	183	225	37	26	43.3	37.2	10.8	8.1	8.2	14.5	4.8	—	324	,,
,,	♀	173	230	35	23	41.8	35.5	10.5	7.8	7.5	15	4.8	19.8	315	,,
,,	♀	189	257	37	26	41.6	36	10.7	7.5	7.8	14.5	5	20.4	311	,,(type)

Measurements of spiny-backed *Rattus* from North-West Sumatra.

Species	Sex	Head and Body	Tail	Hind-foot	Ear	Skull								No.	Remarks
						Great-est length	Condylo-basilar length	Diast-ema	Upper molar row	Length palatal forami-na	Median nasal length	Breadth combi-ned nasals	Zygo-matic breadth		
Rattus alticola hylomyoides	♂	150	155	32	22	—	30.2	8.8	6.7	5.2	12.2	3.5	—	325	Adult
„	♂	156	133	31	21	37.5	32	9.7	6.2	5.8	12	3.4	16,9	314	„
„	♀	149	145	31	21	36.5	30.3	8,8	6.5	5	11.7	4.1	17.1	326	„
„	♀	147	135	—	—	35.9	29.3	8.6	6.2	5.5	12.9	3.7	16.3	323	„
Rattus whitehead batus	♂	147	113	30	18	36.7	30.5	9.3	5.3	5.1	12.2	4	—	406	„
„	♂	143	118	29	18	35.7	30.1	9.1	5.7	5.1	12.4	4.1	15.7	387	„
„	♂	132	—	28	21	36	30.2	8.8	5.5	5.1	12.2	4.1	15.9	508	„
„	♂	133	127	28	19	34.8	28 2	8.2	5.5	4.3	11.4	3.8	15.5	374	„
Rattus bukit lieftincki	♂	136	169	28	20	35.7	29	8.5	5.9	5.5	11.5	3.5	—	464	„
„	♂	140	185	28	20	36.5	30.3	9.2	5.7	5.9	12.6	3.7	—	449	„
„	♂	135	168	28	20	36.4	30	9	6	6	13.1	4.4	—	468	„
„	♂	139	185	28	20	36.3	29.5	8.5	6	5.4	12.5	4	—	456	„
„	♀	150	194	29	19	37	30.8	9	6.3	6.1	13.7	4.4	17	478	„ (type)
„	♀	143	177	28	19	36.5	29.9	8.8	6	5.3	13.4	4.2	16.6	477	„