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On Insular *Rattus rattus* from the North-west Coast of the Malay Peninsula

By F. N. CHASEN

Along the west coast of Peninsular Siam between Lat. 10° and 7° N. is a number of small islands separated from the mainland by distances varying from about two-hundred yards to eighteen miles.

Racial differentiation of mammals on these islands has already been recognized by Thomas and Robinson in a paper dealing with the very plastic squirrel *Sciurus concolor*¹ and it now appears that good series of *Rattus rattus* from the same area also represent a number of distinct groups, or races, even at first sight separable on size, colour, and general character of

1. Ann. Mag. Nat. Hist. (9), vii, 1921, p. 118.

the pelage from the mainland forms which I dealt with in some detail in Bull. Raffles Mus., 8, 1933, p. 5.

The *Rattus rattus* material examined consists of 265 well-made skins with skulls of animals carefully measured in the flesh and collected by the late H. C. Robinson and Mr. C. Boden Kloss, or their collectors, in 1917-1919¹.

All the specimens are referable to a wild field-rat and none to the derivative form *diardi*. In all, the under parts are mainly whitish more or less sharply defined against the upper parts, but in individuals the under parts may be suffused with grey. In cases where it is possible to count the pectoral mammae there are always only two pairs.

Depths of twenty fathoms are recorded between the island of Mohea and the mainland, but most of the islands are situated between the five and ten fathom lines. On all these islands *R. rattus* has developed subspecies. The coastal islets of the Takuapah Estuary, Junk Seylon, Telibon and Lontar are within the five fathom line, but nevertheless only the rats from the two first named localities seem inseparable from those of the mainland.

SYSTEMATIC.—

- Rattus rattus panjius* subsp. nov.
- Rattus rattus alangensis* subsp. nov.
- Rattus rattus lontaris* subsp. nov.
- Rattus rattus kadanus* subsp. nov.
- Rattus rattus moheius* subsp. nov.
- Rattus rattus pipidonis* subsp. nov.

? *Rattus rattus dentatus* (Mill.).

Epimys rattus dentatus Miller, Smiths. Misc. Coll., lxi., 21, 1913, p. 14 (Hastings Island, Mergui Archipelago).

Delisle Island (Koh Piam), Lat. 9° 44' N. (1 ♂, 1 ♀).

Compared with *R. r. tikos* of the opposite mainland these two rats are of a very similar colour, but they have the cheek teeth larger and the pelage harsher and more spinous. On description they seem to agree with the geographically nearest race, *R. r. dentatus*, but in the absence of comparative material, the identification cannot, of course, be regarded as certain. The male has the teeth half worn; the female is quite young with the teeth slightly worn.

1. Notice of the collecting stations and remarks on the islands are given in Robinson, Journ. F. M. S. Mus., VII., 1917, p. 132-135 (islands south of Junk Seylon); Rob. and Kloss, Journ. Nat. Hist. Soc., Siam, iii., 1918, pp. 87-88 and map (Junk Seylon group); Robinson and Kloss, *op. cit.*, v., 1921, pp. 4-7 (islands north of Junk Seylon and map including all the islands).

ON INSULAR RATTUS RATTUS

MEASUREMENTS¹

	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂ ..	165	182	34.5	23	110	40.5	38.5	19.4	17.1	19	10	14.1	7.1	7.6
♀ ..	170	172	32	22	101	39.3	36.6	19.2	15.9	18.5	11	14.2	7.2	6.9

? *Rattus rattus fortunatus* (Mill.).

Epimys rattus fortunatus Miller, Smiths. Misc. Coll., lxi., 21, 1913, p. 15 (Chance Island, Mergui Archipelago).

Koh Yam Yai (Sugar Loaves), Lat. 9° 30' N. (3 ♂, 3 ♀).

These rats have comparatively large teeth, therein resembling the two animals from Delisle Island, but they differ in being brighter and yellower in colour. No comparative material is available, but on description they cannot be separated from the geographically opposite *R. r. fortunatus*, "color more yellowish (ground color a clearer chamois and blackish hairs less abundant) than in the other races of *Epimys rattus* known to occur in the Mergui Archipelago".

The skull of the type of *fortunatus* is rather larger than that of any specimen from Koh Yam Yai, but it is described as an adult male with the teeth much worn and the present series although composed of adult animals contains no really aged animal with well-worn teeth.

MEASUREMENTS

	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂ ..	172	209	38	23	121	42.1	39.6	19.6	17.6	19.9	11	14.5	7.7	7.5
♂ ..	176	211	38	23	120	..	39.5	20.4	17.7	19.8	11	..	6.8	7.2
♂ ..	169	206	39	24	122	41.9	39.5	19.6	17.4	20.1	11.3	14.6	7.4	7.6
♀ ..	169	217	38	22	128	41.5	39.2	20.6	17.7	19.8	11.2	14.3	7	7.5
♀ ..	175	208	38	24	119	42.7	40.8	20.1	18.5	20.8	11.6	15.2	7.8	7.3
♀ ..	176	216	39	..	123	42.7	39.8	20.5	17.6	20.1	11.3	14.7	7.1	7.5

1. The external measurements were taken in the flesh, the hind-foot without claw. The percentage quoted is that of tail referred to head and body. *Skull*.—Occipito-nasal (greatest length); condylo-basal (not basilar) length; greatest zygomatic breadth; post-molar length (to condyle); palatilar length; length of diastema; length of a nasal; length of anterior palatal foramina; upper molar row (alveoli).

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Rattus rattus tikos Hinton.

Rattus rattus tikos Hinton, Journ. Bomb. Nat. Hist. Soc., xxvi, 1919, p. 400 (Tenasserim Town).

Koh Rah, Takuapah Estuary, Lat. 9° 15' N. (3 ♂, 5 ♀);
Koh Pra Tung, Takuapah (2 ♂, 4 ♀).

Four out of eight adult skulls from the above two islands have the molars slightly broader when matched with *tikos* skulls (specimens from South Tenasserim) of approximately the same size and, judging by the teeth, age. Subspecies described from the Mergui Archipelago are all stated to have large cheek teeth, but as the character is not dominant in the present series they are placed under *R. r. tikos*. The average percentage of tail-length to that of the head and body in eight adults is 111 against 108 in a much larger series of *tikos* (*vide* Hinton).

MEASUREMENTS

Five adults from Koh Rah are given first.

	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂	.. 178	215	36	22	121	43.3	40.4	19.5	18.1	20.5	11.3	15.1	7.8	7.9
♂	.. 182	201	36	23	110	41.7	39.6	19.1	17.5	20	11.4	15.4	7.5	7.6
♀	.. 164	196	35	22	119	41	38.4	18.6	17.4	19.4	11.4	14.6	6.7	7
♀	.. 169	183	33	22	108	40.2	37.5	19.5	17	18.5	9.7	14.4	7.2	7.5
♀	.. 183	185	33	23	101	41.3	39.9	20.3	17.7	20.2	10.2	15	7.7	7.1
♂	.. 165	183	34	22	111	40.5	37.9	18.9	16.8	18.7	9.8	14.1	7.6	7.3
♂	.. 181	197	35	22	109	43.8	40.5	19.5	18.1	20.5	12	16	8.5	7.2
♀	.. 171	187	32	23	109	39.7	37.6	18	16.9	18	10.7	14.6	7.7	6.8

Rattus rattus jalorensis (Bonh.).

Mus jalorensis Bonhote, Fasc. Malayenses, Zool., pt. i., 1903, p. 28 (Nong Chik, Peninsular Siam, Lat. 6° 50' N.).

Junk Seylon (also known as Salanga, Puket etc.), Lat. 8° N. (12 ♂, 3 ♀).

These are small, dark rats, exactly like *jalorensis* of the Malay States in colour and skull characters. The average occipito-nasal length is 40 against 40.9 mm. in *jalorensis* and with the following exceptions the other essential measurements are in close agreement.

Head and body, 135-177 (148) against 154-176 (165.6); tail 150-170 (162) against 155-193 (173); percentage of tail length to that of head and body 90-121 (110) against 88-115 (104.5).

ON INSULAR RATTUS RATTUS

The straits separating Junk Seylon from the mainland are only about two-hundred yards wide.

MEASUREMENTS

	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂ ..	144	150	32	18	104	38	36.3	17.8	16.2	18.5	10	13.3	6.5	6.6
♂ ..	145	162	32	20	112	40.5	36.8	18.3	16.7	19	10.6	13.7	6.8	6.9
♂ ..	135	158	32	20	117	39.4	37.1	17.8	17.2	19	10.5	13.9	6.5	6.5
♂ ..	164	165	32	20	111	42.4	40.5	19.8	18.5	20	11.7	13.3	7.1	6.9
♂ ..	160	168	35	20	105	40.8	38.9	19.3	18.2	19.5	10.8	13.9	7.3	6.7
♂ ..	140	155	28	18	111	39.4	37.2	18.6	17	18.7	10.8	13.7	6.4	6.6
♂ ..	135	163	30	20	121	38.5	36.2	17.7	16.6	18.3	10	13.6	6.2	6.7
♂ ..	177	160	33	21	90	42.7	41.2	20	19.2	20.9	11.8	15.1	7	6.8
♂ ..	155	165	30	20	106	40.1	38.5	18.7	17.4	20	11.2	13.6	7.3	7.1
♂ ..	143	158	32	20	110	39.3	36.8	18.5	16.3	19	10.5	13.6	7	7.1
♀ ..	150	160	32	17	107	40.6	38.4	19.2	17.6	19.8	11.3	14.2	7.2	6.6
♀ ..	138	160	32	17	116	38.8	36.8	18	16.5	18.8	11.5	13.6	6.9	6.5
♀ ..	140	170	28	21	121	39.5	37.6	19.2	16.9	19	11.1	13.3	6.5	6.2

Rattus rattus panjius subsp. nov.

Characters.—Very near to *R. r. tikos* of South Tenasserim, but colour averaging paler; the tail longer; and the molars often broader.

Some individuals are not separable from *tikos* in colour, but the average is lighter and a very pale, sand-coloured minority adumbrates the next form to be described.

From the islands of Panjang (11), North Panjang (11), and Koh Boi Yai (14), the average length of the tail is 193.5, 200 and 203 against 169 mm. in *tikos* (59); and the percentage of the tail length to that of the head and body is 114, 120, and 122 against 108 in *tikos*.

Type.—Adult male (skin and skull) with well worn teeth, collected on Pulau Panjang (North), west coast Peninsular Siam, Lat. 8° 10' N. on 29th January, 1918. F.M.S. Mus. 132/18.

External Measurements.—Head and body, 170; tail, 195; hind-foot (c.u.) 35; ear, 22 mm.

Skull.—Occipito-nasal length, 43.5; condylo-basal length, 40.8; greatest zygomatic breadth, 20.5; upper molar row (alveoli), 7.6 mm.

Specimens examined from the following islands.—Pulau Panjang (Koh Yao Yai), Lat. 8° N. (15 ♂, 24 ♀); Pulau Panjang, North (Pulau Panjang Anak; Koh Yao Noi), Lat. 8° 10' N. (18 ♂, 16 ♀); Koh Boi Yai, off west point of Pulau Panjang, North (19 ♂, 11 ♀).

Remarks.—The three islands inhabited by this race are only separated by narrow, shallow straits.

The following table gives the measurements of three animals of each sex from each of the three islands in the order mentioned above. The type is starred.—

	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂ 49/18.2	185	203	33	22	110	44.9	42.4	20.5	19	22.1	12.3	17	7.6	7.5
♂ 100/18.2	115	203	34	23	123	43.8	41.2	19.3	18.9	20.4	11.6	15.3	7.3	7.2
♂ 142/18.2	165	172	32	22	104	42.7	39.5	19.6	17.7	20.6	11.3	15.8	8	7.2
♀ 151/18.2	174	198	34	22	114	43.4	40.2	19.6	19.1	19.9	11.1	16.1	7.3	7.1
♀ ..	165	180	32	23	109	42.5	40	19	17.8	20.6	11.1	16.3	7.3	7.2
♀ 130/18.2	172	200	34	22	116	42.6	40.5	19.5	18.1	20	11	15.2	7.6	7.9
♂ ..	170	195	35	22	115	43.5	40.8	20.5	18.2	21.4	12.7	16.5	8.2	7.6
♂ 131/18.2	163	200	35	22	123	43.3	40.4	20.4	18.2	20.8	12.1	17.4	7.6	6.9
♂ 171/18.2	175	220	35	..	126	44.8	41.8	21.4	19	22	12.7	17.7	7.9	7.3
♀ 131/18.2	163	195	35	23	120	41.6	39.1	18.6	17.7	19.8	10.9	15.7	8	7.1
♀ 99/18.2	160	192	32	23	120	42.9	40.5	19.4	18.4	20.8	11.5	15.7	8.1	7.5
♀ 123/18.2	165	182	30	20	110	41.6	39.9	18.6	18.3	20.7	11.3	15.4	8.5	7
♂ 6142	180	222	36	24	123	44.8	42.2	21.2	19.5	21.5	12.1	17.1	8.5	7.5
♂ ..	167	212	36	23	127	41.3	38.7	20.7	17.9	19.5	10.8	15.1	8	7.3
♂ 6129	170	200	35	22	118	42.5	39.9	20.8	18	20.4	11.7	16.3	7.7	7.1
♀ ..	170	218	35	23	128	43.1	40.9	22	18.5	20.2	11.5	16.4	8.1	7.5
♀ 6141	170	204	35	23	120	42.5	40.3	19.8	18.2	20	11.4	15.1	7.9	7.4
♀ ..	175	203	35	23	116	44.3	42.2	21.9	19.1	21	12.7	16.8	8.5	7.7

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Rattus rattus alangensis subsp. nov.

The depauperated representative of *R. r. panjius* on the smaller islands of the Puket group.

Characters.—Like *R. r. panjius* but even paler: as pale and bright as *thai* of West Siam. All dimensions averaging slightly less than in *panjius*.

Type.—Adult male (skin and skull). Teeth worn, but not excessively so. Collected on Koh Alang Yai, a small island off the east coast of Junk Seylon, Lat. 7° 56' N., west coast Peninsular Siam, on 9th February, 1918. F.M.S. Mus. 206/18.

External measurements.—Head and body, 155; tail, 165; hindfoot (c.u.), 32; ear, 21 mm.

Skull.—Occipito-nasal length, 41; condylo-basal length, 37.9; greatest zygomatic breadth, 18.9; upper molar row (alveoli), 6.8 mm.

Specimens examined from the following islands.—Koh Naka Yai, off east coast of Junk Seylon, Lat. 8° 4' N. (9 ♂, 3 ♀); Koh Alang Yai, off east coast of Junk Seylon (14 ♂, 8 ♀); Koh Maprau, off east coast of Junk Seylon (3 ♂, 21 ♀).

Remarks.—The difference in size between *alangensis* and *panjius* is small, but it seems consistent in the good series examined of the two races from the various islands. In the following summary of measurements those of *panjius* are given first.

Head and body, 160–185 (170); 150–170 (161) mm.

Tail, 172–222 (200); 165–205 (191) mm.

Percentage of tail to head and body, 104–128 (118); 106–126 (119) mm.

Hind-foot, 30–36 (34); 30–34 (32) mm.

Condylo-basal length, 39.1–42.4 (40.6); 37.3–41 (39.3) mm.

Upper molar row (alveoli), 6.9–7.9 (7.3); 6.2–7.1 (6.7) mm.

The series from Koh Naka Yai is pale in colour like that of the exact topotypes. The condylo-basal length is 38.4–39.8 (39.4) mm. The series from Koh Maprau is darker and not separable from *panjius* in colour: the condylo-basal length, however, is only 38–40.8 (38.9) mm. A single specimen from Pulau Sireh, an island off the east coast of Junk Seylon, near Tongkah Harbour, and separated by a very shallow, narrow

channel from the main island, is so much paler than *jalorensis* that it is best placed with *alangensis* although the condylo-basal length of the skull is only 35.9 mm. To these animals intermediate in characters a precise trinomial is not aptly applied and if the character of colour is given systematic rank before that of size the series from Maprau should be placed with *panjius*.

MEASUREMENTS OF ADULTS FROM KOH ALANG YAI
(TYPE STARRED)

—	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F	M.
♂ 217/18 ✓	160	198	34	20	124	41.7	40	18.5	18.6	19.6	11.1	15.1	7.5	6.5
♂ 212/18 ✓	154	190	30	20	123	38.8	37.3	19.5	16.9	19.1	11	14.1	6.7	6.5
♂ .. ✓	155	165	32	21	106	41	37.9	18.9	17	18.6	10.6	14	7.6	6.8
♂ 215/18 ✓	155	197	32	21	126	..	38.3	18.6	17.5	19.1	10.7	14.6	6.6	6.6
♂ 213/18 ✓	162	..	33	41.7	39.3	19.5	17.7	20.2	11.9	15.3	7.6	6.5
♂ .. ✓	164	..	32	21	..	41.9	39.6	18.8	17.9	20	11.3	14.2	7.5	7
♂ 214/18 ✓	162	188	34	21	116	42.2	40	19.8	18.2	20.3	11.9	15.2	7.5	6.6
♂ .. ✓	165	197	32	20	119	42.6	39.9	18.7	18.7	20	11.7	15.4	7.8	6.2
♂ 217/18 ✓	170	205	34	24	121	44.3	41	19.7	18.9	19.9	11.5	16.3	7.5	7.1
♂ 213/18 ✓	163	195	32	22	120	43.9	40.5	20.2	18.5	20.7	12.2	16.7	8.5	6.7
♀ .. ✓	162	190	32	21	117	42.3	39.6	18.7	18.1	20	11	14.8	8	7.1
♀ 220/17 ✓	160	..	32	20	..	41.9	40	20	18.3	20	11.5	14.9	7.5	6.8
♀ 210/18 ✓	150	183	32	22	122	39.7	38.1	18.8	17	19	11.1	14.3	6.9	6.8

Rattus rattus lontaris subsp. nov.

Characters.—Differs from all other local races in its curiously soft and less spinous pelage. In colour as bright as the most richly coloured *tikos* and much less blackened than any *jalorensis*. In size averaging even smaller than *jalorensis*, but with the tail relatively longer (percentage of tail to head and body, 111-126 (120) against 88-115 (104.5)). Molars conspicuously and consistently broader than in *jalorensis*.

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ON INSULAR RATTUS RATTUS

Type.—Adult female (skin and skull), collected at Pasir Raja on Pulau (Island) Lontar, west coast Peninsular Siam, Lat. 7° 35' N. on 13th January, 1917 F.M.S. Mus. No. 384/17.

External Measurements.—Head and body, 140; tail, 171; hind-foot (*c.u.*), 30; ear, 20 mm.

Skull.—Occipito-nasal length, 38; condylo-basal, 35.3; greatest zygomatic breadth, 18.1; upper molar row (alveoli), 6.4 mm.

Specimens examined.—Three males and four females, all from the type locality.

Remarks.—Of the seven skulls examined the first three given in the table of measurements below are only young adults with the teeth not much worn. Furthermore, no skull in the series is that of a really aged animal. No exact comparison can therefore be made, but it can be said that the adult skulls of *lontaris* are like those of the smallest adults of *jalorensis* in a large series.

MEASUREMENTS (TYPE STARRED)

	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂	156	186	31	20	119	39.5	37.4	19	16.9	19	10.7	13.7	6.5	6.7
♂	155	178	32	20	115	39.1	37.3	18.2	17	19.1	10.5	13.7	6.9	6.5
♂	156	189	33	21	121	39.7	37	19.3	16.6	19	10.3	13.8	6.2	6.9
♀	140	171	30	20	122	38	35.3	18.1	15.4	18.5	10.3	13.5	6.5	6.4
♀	130	164	31.5	20	126	37.6	35.8	18.5	16.4	18.2	10.2	13	6.3	6.5
♀	135	168	30	18.5	124	..	35	17.7	16.2	17.7	9.6	..	6.2	6.7
♀	144	160	29	19.5	111	37.5	35.2	18	15.9	17.8	9.6	13.3	6.1	6.4

Rattus rattus kadanus subsp. nov.

Characters.—Nearest to *jalorensis* in colour, but slightly darker, more blackened on the upper parts, with a tendency, in the majority of specimens, to an additional darkening on the mid-dorsal line. The pale element in the pelage, rich ochraceous and the general tone therefore warmer than in *R. r. rumpia* and *payanus* which are other dark races known from islands in the Straits of Malacca. Larger than *jalorensis*, the occipito-nasal length of the skull running up to 45.7 against 44.3 with the high average of 44 against 40.9 mm.

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F. N. CHASEN

Type.—Adult male (skin and skull), with worn teeth, collected on Koh (Island) Kadan, west coast of Peninsular Siam, Lat. 7° 18' N. on 8th January, 1917. F.M.S. Mus. 337/17.

External Measurements.—Head and body, 205; tail, 230; hind-foot (c.u.) 40; ear, 22.5 mm.

Skull.—Occipito-nasal length, 45.3; condylo-basal length, 43.4; greatest zygomatic breadth, 21.5; upper molar row (alveoli), 7.4 mm.

Specimens examined.—Pulau Muntia (Koh Muk), Lat. 7° 24' N. (8 ♂, 6 ♀); Pulau Kadan (Pulau Papan), Lat. 7° 18' N. (7 ♂, 5 ♀).

MEASUREMENTS OF ADULTS (8 FROM MUNTIA, 3 FROM KADAN).
THE TYPE IS STARRED

	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂	✓ 181	230	36.5	21	127	42.5	40.5	19.6	18.4	21	11.6	15.7	7.4	7.3
♂	✓ 184	215	37	20.5	117	43.4	42.1	20.5	19.2	21.5	12.3	16.5	7.7	7.1
♂	✓ 180	215	38	21	119	44.9	43.5	20.6	19.1	22	12.7	17.1	8.1	7.3
♂	.. 183	201	37.5	20	110	42.4	40.5	20	18.2	20	11.5	15.6	7.6	7.1
♂	.. 185	215	37	20	116	44.5	42.4	20.5	19	21.7	12.6	16.2	7.2	7.2
♀	✓ 181	203	35	22	112	43.7	41.5	20.3	18.7	21.2	12.2	16	7.3	6.6
♀	✓ 188	211	36	21	112	44.5	43	21	19.1	22	12.6	16.5	7.7	7.2
♀	✓ 175	210	37	20	120	43.7	41.2	20.1	18.3	20.8	12.1	16	7	7.3
♂	.. 205	210	39.5	22	102	45.7	44.2	22.2	20.3	21.9	12.8	16.9	7.6	7.4
♂*	.. 205	230	40	22.5	112	45.3	43.4	21.5	19.9	21.5	12.5	16.4	8.1	7.4
♂	.. 196	240	40	21.5	122	43.7	43	20.7	19.8	21.4	12.2	16.3	7.8	7.2

Rattus rattus viclana (Mill.).

Epimys rattus viclana Miller, Smiths. Misc. Coll., lxi., 21, 1913, p. 13 (Langkawi Island, Straits of Malacca).

Pulau Telibon (Koh Libong), Lat. 7° 18' N. (6 ♂, 6 ♀).

These rats are like *jalorensis* in colour, but the cheek teeth are usually larger. The series seems inseparable from one of exact topotypes of *viclana*.

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ON INSULAR RATTUS RATTUS

MEASUREMENTS

—	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂ ..	154	178	34	21	116	39.4	36.8	18	16.3	19	10.3	13.7	6.6	6.9
♂ ..	160	192	34	20	120	40.1	37.4	18.8	16.5	19.3	10.5	14.6	6.6	6.8
♂ ..	166	196	35	21	118	40.4	37.8	17.8	17.2	19.5	11	13.9	7.1	6.8
♂ ..	157	201	36	21	128	41.4	38.6	18.7	17.1	20.1	11.6	14.5	7.1	6.5
♀ ..	171	190	34	21	111	40.5	38.6	18.7	17.4	19.8	11	15	6.7	6.8
♀ ..	163	187	33	20.5	115	40.2	37.9	19.2	16.7	19.5	11	14.2	7.7	6.6
♀ ..	173	173	32	21	100	42.3	39.3	19.5	17.7	20.3	12.2	15.1	7.4	6.2
♀ ..	163	196	35	20.5	120	40.4	38.1	18	17.4	20.1	11.2	14.3	7.2	6.5
♀ ..	151	182	34	21	121	39.5	37.1	18.7	16.7	19	11.5	13.7	6.6	6.6
♀ ..	150	180	32	20	120	38.7	36.2	18	16	19	10.5	14.3	6.8	6.8

The next rats to be dealt with are those inhabiting the outlying islands of Pipidon and Mohea. They seem closely allied to the forms inhabiting the Butang Islands (*Rattus r. pannosus*¹ and *R. r. panellus*² which are also the outermost islands of their archipelago. All these islands are inhabited by largish rats with harsh, spiny pelage and robust skulls.

***Rattus rattus moheius* subsp. nov.**

Characters.—A large-toothed form nearest to *R. r. pannosus* of Pulau Adang, Butang Islands, but the skull smaller (occipito-nasal length of aged adults 42.1–44.9 against 46.5–46.7 mm.). Tail perhaps longer (198–217 against 184–208 mm., and percentage of tail to head and body 106–114 against 99–100). In colour rather distinctive. The general tone as in *kadanus* and *jalorensis*, but the spinal blackening, incipient in *kadanus* is intensified producing, on the series, a saddle-backed appearance, the rather bright sides of the head and flanks showing up against the darker crown and back. In all the specimens the under parts are much stained, but they were, once, certainly pale with a sharply defined line on the flanks. Pelage harsh and even the under parts semi-spinous, but the pelage less shaggy than in *pannosus*.

¹ *Mus pannosus* Miller, Proc. Biol. Soc. Wash., 13, 1900, p. 190: Pulau Adang, Butang Islands.

² *Epimys panellus* Miller, Smiths. Misc. Coll., 61, No. 21, 1913, p. 8: Pulau Rawi, Butang Islands.

Type.—Adult female (skin and skull) with very worn teeth, collected on Pulau Mohea (south island) west coast Peninsular Siam, Lat. 7° 14' N., on 3rd February, 1919. F.M.S. Mus. 136/19.

External measurements.—Head and body, 192; tail, 206; hind-foot (c.u.) 38.5; ear, 24 mm.

Skull.—Occipito-nasal length, 44.9; condylo-basal length, 41.7; greatest zygomatic breadth, 20.1; upper molar row (alveoli), 7.7 mm.

Specimens examined.—Pulau Mohea, North, 2 ♂, 4 ♀; Pulau Mohea, South, 4 ♂, 6 ♀.

Remarks.—Mohea is a twin-island. A narrow, shallow strip of water divides it into two parts. It is situated on a small coral shelf in about 20–25 fathoms. The distance from the coast is about eighteen miles. Each islet has developed a race of *Sciurus caniceps*.

MEASUREMENTS (TYPE STARRED)

	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂ 123/19	196	217	39	26	111	43.3	42	20.4	19.9	20.4	11.1	15.6	8	7.3
♂ 147/19	190	216	38	23	114	44.8	41.3	20.1	19.2	19.9	11	16	7.8	7.9
♂ 139/19	188	209	37	23	111	43.7	41.1	19.4	19.3	20	11	16	8	7.5
♀ 113/19	190	201	36.5	25	106	42.5	40.3	19.7	19	19.7	11	14.8	7.6	7.1
♀ 154/19	192	206	38.5	24	107	44.9	41.7	20.1	19	20.9	11.6	16.6	7.8	7.7
♀ 135/19	173	198	34	23	114	42.1	39.4	19.6	18.2	18.8	10.3	15.4	7.5	7.5
♀ 143/19	177	202	37	23	114	42.2	39.6	19.9	18.5	19.7	10.5	15.4	7.4	7.5
♀ 152/19	196	217	38	23	111	45.2	42.6	20.4	19.9	21	12	16.9	8	7.6

Rattus rattus pipidonis subsp. nov.

Characters.—Very near to *R. r. moheius*, but the pelage even more spinous and the colour of the upper parts more uniform and without conspicuous mid-dorsal blackening. The skull is as large as that of *pannosus*, but the molars are distinctly smaller although the tooth row is only very slightly shorter (7.4–7.5 against 7.9–8.2 mm.).

Type.—Adult male (skin and skull), collected on Koh Pipidon, west coast Peninsular Siam. Lat. 7° 45' N. in February, 1919, F.M.S. Mus. 201/19.

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ON A SECOND COLLECTION OF INDO-MALAYAN CIRRIPEDES

External measurements.—Head and body, 180; tail, 200; hind-foot (c.u.) 36; ear, 23.5 mm.

Skull.—Occipito-nasal length, 45.6; condylo-basal length, 43; greatest zygomatic breadth, 20.4; upper molar row (alveoli), 7.4 mm.

Specimens examined.—Four males and one female, all from the type locality.

Remarks.—Koh Pipidon is in Ghirbi Bay, about ten miles from the coast.

MEASUREMENTS (TYPE STARRED)

—	H.B.	T.	H.F.	E.	%	O.N.	C.B.	Z.	P.M.	P.	D.	N.	F.	M.
♂ 193/19	189	..	35	23	..	45.6	43	20.4	19.9	21.7	12.6	..	9	7.3
♂ 180	180	200	36	23.5	111	45.6	43	20.4	20.3	20.8	12.9	16.1	8.3	7.4
♂ 165/17	188	195	35	22	104	44.7	42	19.7	19.5	20.5	11.9	15.7	8	7.5
♂ 202/19	218	218	39	23	100	46.8	43.6	22.2	20.7	21.6	12.1	16	8	7.4
♀ 204/17	193	198	37	26	103	21.1	..	21.2	11.8	16.6	7.6	7.1

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