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DIAGNOSES OF NEW RATS FROM THE NEW GUINEA AREA.

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Since inception of the Department of Mammals in 1919, attention has been given to obtaining collections from New Guinea and the South-West Pacific, for which the Museum was mainly dependent upon the voluntary activities of residents and administrative officers. Appreciative acknowledgement is made for the following collections, which included rat species of importance regarding the scrub typhus problem in war time:

From the Mount Lamington District, inland from Dobodura, Northern Division of Papua, from 1927-1929, representative mammal collections¹ were received from Mr. C. T. McNamara, Resident Magistrate. From the Buin district of Bougainville Island collections were obtained from the Rev. Father J. B. Poncelet, S.M., of especial interest for the discovery of a giant rat, *Unicomys ponceleti*,² which Rummler and Ellerman have since wrongly relegated to the genus *Melomys*. Included also was an insular race of *Rattus praetor*,³ first described from Guadalcanal by Thomas, and mistakenly recorded from New Guinea by Tate. From 1936-1939 interesting series of mammals were received for identification from Dr. C. E. M. Gunther, Medical Officer of the Bulolo Gold Dredging Company, as potential "animal reservoirs" of scrub typhus in the Wau-Bulolo area.

As stated in a paper, "Diagnoses of New Mammals from the South-West Pacific",⁴ several collections relevant to war-time investigations of scrub typhus were submitted for identification by A.I.F. and U.S. research units. The major collection, submitted during 1944 by Colonel Cornelius B. Philip and Major Glen M. Kohls, on behalf of the U.S. of America Typhus Commission, covered not less than six consignments totalling about 600 specimens. Resulting from work on these collections, field-work was carried out by the author in the New Guinea area,⁵ as recommended by Colonel Philip. Following on the period of service with the Tropical Scientific Section, A.I.F., under direction of the Commonwealth Scientific Liaison Bureau, it was hoped to prepare a comprehensive review of the relevant mammal species.

Unfortunately, various difficulties and additional duties have militated against completion of the work. In the present paper, therefore, it seems advisable to provide preliminary diagnoses of various new forms of *Rattus*, with a brief résumé of their complicated group affinities.

Most of the present confusion has resulted from disregard by authors of the basic characters used by Oldfield Thomas for the definition of species and genera, especially in the hastily prepared, inconclusive, and often misleading work of Rummler.⁶ For example, disregard for the importance of the mammary formula concerning group affinities within the *Rattus* genus, must have contributed to his error in transferring the stout-skulled and broad-footed *Rattus mordax* of N.E. Papua, together with the much larger Vogelkop species *coenorom* and *bandiculus* (2-2=8 mammae), to the genus *Stenomys* (1-2=6) which Thomas diagnosed as having slender feet, and a smooth "scarcely ridged" skull with a long narrow muzzle.

¹ Troughton.—*REC. AUSTR. MUS.*, xx, 2, 1937, pp. 117-127.

² Troughton.—*REC. AUSTR. MUS.*, xix, 4, 1935, pp. 259-262, pl. xix.

³ Troughton.—*REC. AUSTR. MUS.*, xix, 5, 1936, pp. 341-353.

⁴ Troughton.—*REC. AUSTR. MUS.*, xxi, 6, 1945, pp. 373-5.

⁵ Troughton.—Review of Field Investigations concerning the Mammal Reservoirs of Scrub Typhus—*Commonwealth (Restricted) Report, Trop. Sci. Sect.*, 2, 1945.

⁶ Rummler.—*Die Systematik und Verbreitung der Muriden Neuguineas. Mitt. Zool. Mus. Berlin.* 1938, Vol. 23, 1, pp. 1-297. pls. i-ix.

Specific Distinction of *Rattus ringens* and *mordax*.

Fortunately, Ellerman⁷ rejected Rummler's incorrect use of *Stenomys*, but did subscribe to the sinking of *R. mordax*, and its more or less allied forms, with *R. ringens*, as mere races of *R. leucopus* of Cape York. Thus, an impossible range, to the Vogelkop of Dutch New Guinea, has been accorded to a preposterous super-species, compounded of several forms diagnosed as specifically distinct by Thomas. Inconsistently, Rummler and Ellerman resuscitated *ratticolor*, which Thomas⁸ had relegated to the synonymy of *ringens*, which he regarded as evidently the common *Rattus* in the Snow Mountains country, south of the Nassau Range in Dutch New Guinea.

Regarding the affinities of *R. leucopus*, comparison of a topotypical young female in the "old collection" of the Australian Museum, with two topotypes of *ringens*, kindly provided by Dr. G. H. H. Tate from the Archbold Collections in the American Museum of Natural History, exhibit characters which support the obvious geographical separation of the species. The skull of the female *leucopus*, with unworn molars, has a relatively much wider cranium, as emphasized by the much greater width posteriorly of the zygomatic arches. The interorbital is narrower, and more evenly curved owing to lack of the strong flattened ridging, the angling of which gives the somewhat *norvegicus*-like appearance to the crania of true *ringens*. The incisive foramina are decidedly smaller, and molar row relatively larger, in the young female *leucopus*. The tail is relatively much longer, being 14 mm. longer than the head and body, as opposed to 16-38 mm. shorter in the New Guinea series of *ringens*.

Apparently, the complex and inconclusive treatment of the *ringens-mordax* "group" by Tate⁹ was due to an impression that the type locality of *mordax* was in the Port Moresby district. Actually, the collection of C. A. W. Monckton listed by Thomas¹⁰ came from an area northward of Cape, not "Port", Nelson, as then stated. The type locality, recorded by Thomas as "at about 8° 30' S. lat., 148° E. long.", is across the Owen Stanley divide from Port Moresby, in the Northern Division of Papua. Evidently the locality was in or adjacent to the Buna-Dobodura area, thus making the Mt. Lamington and Dobodura series of *mordax* reasonably topotypical. Comparison of these series with the topotypes of *ringens*, and the U.S.A.T.C. series from Dobodura, provides diagnostic characters which definitely distinguish the species. Some of the differences, confirmed in consultation with Dr. David H. Johnson, Associate Curator of Mammals, U.S. National Museum, during his service with a U.S. Naval Research Unit in the S.W. Pacific, are listed below.

- A. Tail longer, brown, mostly variegated yellowish-white towards end; scales raised, usually longer than broad. Pes narrower, hairs whitish. Skull lighter and narrower; incisive foramina much wider, evenly curved outward. Mammae 1-2=6 *ringens*
- AA. Tail shorter, uncoloured blackish; scales more smoothly adpressed and broader than long. Pes broader, hairs blackish-brown. Skull stouter and broader; incisive foramina decidedly narrower, not evenly curved outward. Mammae 2-2=8 *mordax*

Arising from the above summary, and comparison of material, the Dobodura series referable to *R. ringens* is diagnosed as a geographical race.

***Rattus ringens dobodurae* subsp. nov.**

Diagnosis.—A more robust and duller mid-brown form than the typical race of the Fly River delta. Dorsal coloration about sepia-brown, compared with the brighter tawny-olive tone of typical *ringens*; sides paler, less ochraceous, washed with vinaceous to cinnamon buff (Ridgway). Entire belly pale to whitish olive-buff, the Dobodura series lacking the bright cinnamon to tawny chest-patch of the typical race. The tail is relatively longer, and the pes larger, measuring 39-40 mm. as against 34.5-38 in the topotypical Oriomo series. Mammae 1-2=6. Skull more robust, the interorbital margins more angulate behind due to the more strongly flattened ridging, and the nasals relatively larger.

⁷ Ellerman.—The Families and Genera of Living Rodents, *Brit. Mus. Nat. Hist.*, Vol. ii, 1941, p. 204.

⁸ Thomas.—*Trans. Zool. Soc.*, xx, 9, p. 319.

⁹ Tate.—Muridae of the Indo-Australian Region. *Bull. Amer. Mus. Nat. Hist.*, lxxii, Art. vi, pp. 543-6.

¹⁰ Thomas.—*Ann. Mag. Nat. Hist.* (7), xiv, 1904, p. 397.

Dimensions.—Holotype male, allotype female in brackets: Head and body 182 (196); tail 173 (188); pes 40 (39); ear 19 × 14 (20 × 16.5) mm.

Skull: Greatest length 44.3 (47.9); basal length 38.6 (41.5); zygomatic width 20.5 (22.3); breadth braincase 17 (17.1); interorbital 6.8 (7.3); nasals 16.6 × 5 (18.4 × 5.2); incisive foramina 7.7 × 3.5 (8.7 × 3.4); palatal length 23.5 (25.6); bulla 6.5 (6.9); molar row 7.1 (7.1) mm.

Holotype adult male M.6960, and adult female M.6987, in the Australian Museum, with a considerable series from Dobodura, Northern Division of Papua, submitted for identification on behalf of the U.S. America Typhus Commission.

Rattus gestri bunae subsp. nov.

Diagnosis.—Compared with a topotypical adult female from Rigo, S.E. of Port Moresby, of similar general proportions, but with a smaller ear and longer foot, ranging from 29 to 33.5 mm. Dorsal coloration less buffy and of a more fuscous to blackish-brown tone. Sides also less buffy, about greyish fuscous, and the entire belly more whitish, about pale smoky-grey, instead of the yellowish cream-buff of the topotypical *gestri*. Mammae 2–3=10. Zygomatic plate less prominent above, incisive foramina averaging shorter, and the molar row smaller than in true *gestri*.

Dimensions.—Holotype male, allotype female in brackets: Head and body 176 (155); tail 140 (127); pes 31.5 (29); ear 19.5 × 15 (19.5 × 13.5) mm.

Skull: Greatest length 38.5 (37.7) basal length 37.5 (34.5); zygomatic width 19.9 (19.8); breadth braincase 15.2 (14.8); interorbital 5.3 (5.2); nasals 14 × 4.2 (14.1 × 4.3); incisive foramina 8.2 × 2.3 (7.6 × 2); palatal length 20.8 (21); bulla 7.6 (7.6); molar row 7 (6.9) mm.

Holotype adult male M.7072, collected by E. Le G. Troughton: Allotype adult female M.6989, and U.S.A.T.C. spirit series, from the Dobodura District, Northern Division of Papua.

Note.—Comparison of this series with a topotypical *gestri* (mammae 2–3=10) confirms the specific distinction of *R. brachyrhinus* Tate (mammae 3–3=12), contrary to the listing of it as a race of *gestri* by Rummler. It now appears also that *aramia* Troughton, described as a race of *gestri*, actually represents a swampy race of *brachyrhinus* from the Western Division. This race is comparable with the Archbold Oriomo series, noted as somewhat different in Tate's description. Because of the externally similar appearance, and variable crania, of the two species, it seems likely that Tate's Laloki River specimens, from about 20 miles east of Port Moresby, may represent more or less typical *gestri* in which the mammary count may not have been available. *R. vanheurni* of Manokwari, on the Vogelkop of Dutch New Guinea, is a distinct species.

Rattus purdiensis sp. nov.

Diagnosis.—An insular species somewhat intermediate between *praetor* and *mordax*, but having a thinner and far less spinous pelage. Dorsal coloration much brighter, due to the greater length of the light tipping of the fur, ranging from cinnamon to ochraceous-tawny. Underparts dull greyish, the tipping from pinkish-buff (male) to pale pinkish-buff (female), and lacking the warm cinnamon to russet wash of true *mordax*, or the yellowish "olive buff" of the Bougainville race of *praetor*. Ear relatively small, attaining to 5 mm. from the posterior canthus of eye, or about half the distance to eye, when pressed forward. Tail scales rugose but relatively fine, averaging 11–12 to the cm. Mammae 2–2=8. Skull relatively smaller and less coarsely ridged than in *mordax* or *praetor*, and the nasals decidedly smaller; incisive foramina definitely smaller, and shaped more as in *praetor*.

Dimensions.—Holotype male, allotype female in brackets: Head and body 190 (175); tail 160 (125); pes 35 (32); ear 17 × 14 (18 × 14) mm.

Skull: Greatest length 42.4 (40); basal length 38.3 (36); zygomatic width 22 (21.5); breadth braincase 16.4 (16.7); interorbital 7.3 (6.3); nasals 15.8 × 4.9 (14.9 × 4.2); incisive foramina 7.6 × 2.8 (7.4 × 2.7); palatal length 23.5 (22.6); bulla 6.1 (5.5); molar row 6.3 (7.3) mm.

Holotype adult male M.7183, and allotype adult female M.7184, in the Australian Museum, from Bat Island, Purdy Group, adjacent to the Admiralty group. Collected and presented by F./Lt. D. C. Swan, R.A.A.F.

Note.—Specimens of *Rattus browni*, but none of this larger rat, were obtained by Colonel Philip and Major Kohls during brief investigations for the U.S.A.T.C. While engaged with a R.A.A.F. party upon intensive studies of the heavy mite and rat populations of the Island concerning scrub typhus, F./Lt. Swan had ample opportunity for a field study of both species of rats. He noted that the large *mordax* type burrowed strongly, and that burrows containing young had been found under boxes resting on sand. The smaller *browni* was never observed to be a natural burrower.

***Rattus sansapor* sp. nov.**

Diagnosis.—A large sparse-haired and comparatively non-spinous rat, with the bodily dimensions of *coenorom* but the cranial dimensions of the altogether much larger *bandiculus*. Dorsal coloration between wood and clove brown, the very sparse fine basal fur showing through as an avellaneous wash; long pile hairs, up to 56 mm., projecting conspicuously over the rump-curve to beyond the tail-root. Sides drab to hair brown, washed with vinaceous buff. Belly sparsely and non-spinously haired, pale pinkish-cinnamon. Ear relatively short, reaching about half-way to eye, pressed forward. Feet sparsely pale-haired. Tail decidedly shorter than the head and body, longer in *coenorom*, scales about 8 to cm., evenly ringed, not rugosely overlapping. Skull with the bolder zygomatic plate, and stouter more expanded arches typical of the much smaller *mordax*, but having the relatively very short and broadly curved incisive foramina of the small *ringens*; the foramina, and molar row, smaller than in *bandiculus*. Mammae 2-2-8.

Dimensions.—Holotype adult male: Head and body 232; tail 198; pes 45; ear 19 × 17 mm.

Skull: Greatest length 54; zygomatic width 27.3; breadth between ridges on braincase 15.7; interorbital 7.5; nasals 22 × 7; palatilar length 26.2, palatal 30.1; incisive foramina 9.3 × 3.8; bulla length 7.4; molar row 8.3 mm.

Holotype adult male M.7195, and young paratype male M.7194, in the Australian Museum, from Sansapor on the north-west coast of the Vogelkop region of Dutch New Guinea. Collected and submitted for identification by Captain James T. Griffiths of the 26th U.S. Malaria Survey Unit, who subsequently confirmed the mammary count of eight mammae.

***Rattus biakensis* sp. nov.**

Diagnosis.—A very large insular species, equalling the external and cranial dimensions of the mainland *bandiculus*, but with shorter pes, much narrower zygomatic width, and smaller molars. General proportions larger but the molar row relatively smaller than in the insular *jobiensis*. Dorsal coloration a dusky umber or sepia-brown tone, flecked with tawny-olive; sides buffy-brown tipped with avellaneous, merging into the soiled greyish-white of the belly, which lacks any of the warm tipping of typical *mordax* or *ringens*. Pes sparsely pale-haired, larger than in *jobiensis*, smaller than in *bandiculus*. Tail coarsely plated with overlapping scales, averaging eight to the cm. Mammae 2-2-8. Skull of similar length to *bandiculus* and *sansapor* but with a much narrower zygomatic width, and molar row decidedly smaller than in the former species; incisive foramina much larger than in *coenorom* or *sansapor*. Nasals relatively long and narrow.

Dimensions.—Holotype female: Head and body 252; tail 224; pes 45; ear 23 × 18 mm.

Skull: Greatest length 53.3; zygomatic width 23.5; breadth between ridges on braincase 15.5; interorbital 7.4; nasals 21.1 × 5.7; palatilar length 25.5, palatal 29.3; incisive foramina 10.2 × 4.5; bullae missing; molar row 7.9 mm.

Holotype old female M.7082 in the Australian Museum, collected on Biak Island, Schouten Group, by E. Le G. Troughton, on 9th March, 1935.

Note.—Evidently differing from all three large mainland forms of northern Dutch New Guinea in the combination of the short and crisp Uromyid-like pelage, and the

delicately built skull, with much narrower zygomatic width, and nasals. Differing from *jobiensis* of Japen Island in the larger pes, shorter pelage, and more umber or medium-brown coloration, and in lacking the bright reddish wash on the chin and breast, described for *jobiensis*, the mammary formula of which is not known.

SUMMARY.

Rattus ringens and *mordax* are distinct species, as shown by Oldfield Thomas. Combination of the two by Tate, and the recording of *mordax* and *praetor* (Solomons) from south-west of the Papuan dividing range, was evidently due to a misconception regarding the type locality of *mordax*.

Inclusion by Rummler of races of *mordax* with *ringens* under the genus *Stenomys* is quite untenable, as is Ellerman's combining of the races of both species under *R. leucopus* of Cape York.

A survey of records and material indicates that *R. ringens* is naturally a lowland species with a mainly western distribution, extending from the Fly River delta, north-westward to the Snow Mountain slopes of Dutch New Guinea. No authentic specimens of *ringens* have been identified northward of the Wau-Bulolo region of the Territory of New Guinea; the more robust *mordax* becomes the dominant medium-sized species of *Rattus* in North-Eastern New Guinea.

The confusion of specific affinities by Rummler and Ellerman results partly from disregard for the diagnostic value of the mammary formulae, which affirm the distinction of *mordax* (2-2-8) from *ringens* (1-2-6), and *gestri* (2-3-10) from *brachyrhinus* (3-3-12). The mammary formula, however, may be overstressed, as doubtless in the establishing of genera from within *Rattus* by Sody.¹¹

The racial alliance of relatively giant species such as *coenorom* and *bandiculus*, and the new *sansapor* and *biakensis*, with the much smaller *mordax* and *ringens*, from which they differ in various combinations of major characteristics, is quite untenable.

Apart from having the mammary formula of *mordax*, the unusually long tail and other features of *R. morotaiensis* Kellogg,¹² collected also by the author on Morotai Island, Halmahera Group, distinguish it from both *ringens* and *mordax*, and suggest affinity with a Moluccan rather than a New Guinea group of *Rattus*.

¹¹ Sody.—*Treubia*, Vol. 18, 2, 1941, p. 260.

¹² Kellogg.—*Proc. Biol. Soc. Washington*, Vol. 58, 1945, pp. 66-68.