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THE BATS OF THE GENUS MONOPHYLLUS.

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HITHERTO *Monophyllus* has been regarded as a monotypic genus, with *M. redmani* of Jamaica, and perhaps Cuba also, as its only representative. Material in the United States National Museum, though throwing no light on the question of the identity of the Cuban bat with that from Jamaica, shows that the genus contains at least three additional species, one from Porto Rico, one from Barbados and a third from an unknown locality. The four may be distinguished from each other as follows :

SYNOPSIS OF THE SPECIES OF MONOPHYLLUS.

Size small, forearm about 36, greatest length of skull less than 20 ;
second upper premolar with well developed postero-internal lobe.

M. portoricensis.

Size large, forearm about 40, greatest length of skull more than 20 ;
second upper premolar with postero-internal lobe rudimentary or
absent.

Second lower premolar shorter than first and in contact with third ;
no space between upper premolars.....*M. plethodon.*

Second lower premolar longer than first and not in contact with
third ; a space between upper premolars.

Ventral surface of basioccipital (when viewed from under side)
dipping forward at conspicuous angle (about 32°) with surface
of presphenoid ; bony palate narrow and conspicuously arched.

M. clinedaphus.

Ventral surface of basioccipital (when viewed from under side)
dipping forward at inconspicuous angle (about 16°) with sur-
face of presphenoid ; bony palate broad and slightly arched.

M. redmani.

MONOPHYLLUS REDMANI Leach.

1822. *Monophyllus redmani* Leach, Trans. Linn. Soc. London, XIII, p. 76.

1878. *Monophyllus redmani* Dobson, Catal. Chiropt. Brit. Mus. p. 504.

1898. *Monophyllus redmani* H. Allen, Trans. Am. Philos. Soc. N. S., XIX, p. 248.

Type locality.—Jamaica.

Geographic distribution.—Jamaica. It is doubtful whether the specimens from Cuba recorded by Dobson are actually this species.

General characters.—See synopsis.

Ears.—The ears are short: laid forward they reach about 3 mm beyond eye. Anterior border strongly convex at base, then nearly straight but strongly oblique to narrowly rounded tip. Posterior border slightly concave below tip, then straight to a little below level of anterior base; below this abruptly convex. There is no antitragus. The posterior border terminates directly beneath anterior base, and about 7 mm. behind angle of mouth. A few rudimentary cross striations are faintly indicated on inner side of conch near posterior border. Two well developed ridges run outward along the meatus, one directly over the other. Anterior border of tragus straight, very slightly thickened above. Tip narrowly rounded. Posterior border straight from tip to two tooth-like projections, the lowermost of which is opposite anterior base, then distinctly convex.

Muzzle and chin.—Horizontal portion of noseleaf oval, broader than high, indistinct along upper lip, distinct at side. Height of upright portion about equal to width of horizontal portion, narrowing gradually to rounded tip the width of which is a little less than 1 mm. For a short distance below tip the sides are parallel. Whole leaf finely pubescent. Chin divided by a deep groove.

Membranes.—The membranes are ample, moderately coarse in texture. Width of wing membrane at elbow about 30 mm. Width of propatagium at elbow, 15. Width of uropatagium at middle of femur, 8. Propatagium continued along forearm to include metacarpal of thumb. The membranes are practically naked throughout, though the fur extends in a narrow line on wings close to body, and also over proximal third of forearm and on most of propatagium. On the latter it is very sparse and irregular.

Feet.—The feet are large, slightly more than half as long as tibia. Toes a little shorter than metacarpals, free from membrane. * They are armed with very strong claws. All five toes are essentially equal in length. Calcar distinct, but reduced to a mere rudiment, about 4 mm. long.

Tail.—The tail is about as long as the foot, and a little less than half free from membrane.

Fur and color.—The fur is loose in texture and very short (scarcely 5 mm. on middle of back). It is closely confined to body, scarcely reaching membranes except as stated above.

Color of a specimen after five years' immersion in alcohol, rather pale Prouts brown above, Isabella color below, the hairs tipped with pale gray. These tips are inconspicuous above but very noticeable below.

Skull.—The skull of *Monophyllus redmani* is slender but at the same time rather robustly built, in form almost precisely like that of the somewhat larger *Glossonycteris geoffroyi*. Rostrum nearly as long as braincase, its sides essentially parallel. It is narrowest just behind canines. A distinct swelling in lachrymal region over each orbit. Antorbital foramen directly above space between premolars, its upper and posterior margins swollen. Zygomata slender, distinctly expanded vertically near anterior and posterior base, the anterior expansion upward, the posterior downward. Braincase slender, considerably longer than broad, the forehead rising above rostrum at angle of about 20°. Highest point of braincase over middle of mesencephalon. Audital bullæ small, the area of each scarcely exceeding that of glenoid surface. That part of base of braincase formed by basioccipital and basisphenoid forms a plane dipping uninterruptedly forward (when skull is viewed with its dorsum down) from anterior lip of foramen magnum to well developed basisphenoid pits at an inconspicuous angle, about 16°, with surface of presphenoid. The entire ventral surface of the presphenoid lies in one plane, broken only by a narrow but well defined median longitudinal ridge which terminates posteriorly in a pointed projection lying ventral to the ridge separating basisphenoid pits.

Measurements of an adult skull (♂) from Kingston, Jamaica : Greatest length 22.4; basal length 21.4; basilar length 19.4; zygomatic breadth 10; least interorbital breadth 4; mastoid breadth 9.8; greatest breadth of braincase 9; frontopalatal depth (at middle of molar series) 2.4; depth of braincase 8; maxillary toothrow (exclusive of incisors) 8.6; mandible 15.4; mandibular toothrow (exclusive of incisors) 9.

Teeth.—The teeth are small relatively to the size of the skull, though not different in this respect from those of members of related genera. Both upper and lower toothrows are broken by a conspicuous gap in front of posterior premolar. Second upper premolar broader posteriorly than anteriorly, but without postero-internal lobe.

First lower premolar shorter than second or third, but relatively less narrow. Its posterior border is scarcely imbricated over anterior extremity of second premolar.

Measurements.—For measurements of *Monophyllus redmani* see table, page 38.

Specimens examined.—One, from Kingston, Jamaica.

Remarks.—*Monophyllus redmani* is readily distinguishable from the other members of the genus by its large size, heavy rostrum, and nearly flat base of braincase. The peculiarities of the tragus in the only specimen that I have examined may be due to the effect of strong alcohol.

MONOPHYLLUS PORTORICENSIS sp. nov.

Type.—Adult male (in alcohol), no. 86261 United States National Museum, collected in a cave near Bayamon, Porto Rico, January 18, 1899, by Paul Beckwith.

General characters.—See synopsis.

Ears.—The ears are essentially like those of *M. redmani*. The tragus, however, is very conspicuously thickened along its anterior border. Inner surface of conch with scarcely a trace of cross striation.

Muzzle and chin.—Noseleaf smaller than in *M. redmani* and less tapering above, the sides not parallel below tip. Groove in chin apparently deeper and narrower than in *M. redmani*.

Membranes, feet and tail as in *M. redmani*.

Fur and color.—Fur slightly longer than in *M. redmani* (about 6 mm. long on middle of back) but not different in quality or distribution.

Color of a specimen (topotype) skinned after two months' immersion in formalin, seal brown above, broccoli brown below, the extreme tips of the hairs grayish. The light tips are conspicuous on the ventral surface, but scarcely noticeable above.

Skull.—The skull of *Monophyllus portoricensis* is considerably smaller than that of *M. redmani*, and as the reduction in size affects the rostrum relatively more than the braincase the general appearance of the skull is considerably altered. In fact at first glance the skull strongly suggests that of *Glossophaga soricina*, though it is slightly smaller. The rostrum is very noticeably shorter than the braincase. Its sides are nearly parallel and scarcely divergent at base of canines. The braincase rises above rostrum at a slightly greater angle (about 25°) than in *M. redmani*. Base of braincase exactly as in *M. redmani*, except that median ridge of presphenoid is somewhat flattened posteriorly and perfectly continuous with ridge separating basisphenoid pits.

Measurements of skull of type: Greatest length 19.6; basal length 18; basilar length 16; zygomatic breadth 8.8; least interorbital breadth 4; mastoid breadth 8.8; greatest breadth of braincase 8.4; fronto-palatal depth at middle of molar series 2; depth of brain case 7.6; maxillary toothrow (exclusive of incisors) 7; mandible 12.8; mandibular toothrow (exclusive of incisors) 7.

Teeth.—Teeth as in *M. redmani* except that the gap in toothrow in front of posterior premolar is greatly reduced, and in the lower jaw nearly obliterated. Second upper premolar with well developed postero-internal lobe. First lower premolar slightly shorter than second or third, and conspicuously less narrow. Its main axis is set obliquely to that of the other premolars and its posterior border is noticeably imbricated over outer edge of second premolar.

Measurements.—For measurements of *Monophyllus portoricensis* see table, page 38.

Specimens examined.—Six, all from the type locality.

Remarks.—*Monophyllus portoricensis* is the smallest of the four species thus far known. It is further distinguished by the form of the posterior premolar.

MONOPHYLLUS PLETHODON sp. nov.

Type.—Adult male (in alcohol) no. 101530, United States National Museum, collected in St. Michaels Parish, Barbados, August 1, 1899, by P. McDonough.

General characters.—See synopsis.

Ears.—The ears are essentially as in *M. redmani* though somewhat broader relatively to their length. Inner surface without cross ridges. Tragus as in *M. portoricensis*.

Muzzle and chin.—Noseleaf like that of *M. portoricensis*, but with upright portion even broader and more bluntly pointed. Groove in chin broader and shallower than in the Porto Rican species.

Membranes, feet and tail as in *M. redmani*.

Fur and color.—Fur similar to that of *M. redmani* in both quality and distribution. Color of type after five months' immersion in alcohol, broccoli brown slightly paler below.

Skull.—The skull of the type specimen has been injured, though not sufficiently to obscure its essential characters. In size it closely agrees with that of *M. clinedaphus*, but in form it suggests that of *M. portoricensis*. Its peculiarities are in some respects carried even further than in the latter, as the rostrum though deeper is relatively narrower, the palate is more arched, and the canines actually closer

together than in the smaller animal. Antorbital foramen over anterior extremity of second premolar and region of contact between it and first. Pterygoids imperfect, but evidently further apart than in *M. redmani*. Base of braincase as in *M. redmani* and *M. portoricensis*. Presphenoid injured, but apparently as in these species and not like that of *M. clinedaphus*. Zygomata very lightly built, even more slender than in *M. portoricensis*. Mandible about as long as that of *M. clinedaphus*, but more lightly built than in any of the known members of the genus; while distinctly longer than that of *M. portoricensis* it is scarcely if any deeper.

Measurements of skull of type: Greatest length 21.6; basal length 19.4; basilar length 17.8; zygomatic breadth 9.8; least interorbital breadth 4.6; mastoid breadth 9.6; greatest breadth of braincase 10; frontopalatal depth (at middle of molar series) 2.4; depth of braincase 6; maxillary toothrow (exclusive of incisors) 7.2; mandible 14; postdental portion of mandible 5.8; mandibular toothrow (exclusive of incisors) 7.8.

Teeth.—The teeth of *Monophyllus plethodon* differ conspicuously from those of the other members of the genus in that they are so crowded that all trace of the characteristic space in front of posterior premolar of both jaws is obliterated. This tendency to crowding is also evident in the upper incisors, the innermost pair of which are almost in contact, while in the three other species they are separated by a noticeable space. Canines slender, relatively closer together than in other members of the genus, *their shafts parallel or a little convergent*. Maxillary teeth otherwise essentially as in *M. redmani*. Mandibular incisors very minute, but normal in form and position. First lower premolar distinctly longer than second, over which its posterior edge is imbricated, much as in *M. portoricensis*. The remaining mandibular teeth do not differ conspicuously from those of the other members of the genus.

Measurements.—For measurements of *Monophyllus plethodon* see table, page 38.

Specimens examined.—One, the type.

Remarks.—*Monophyllus plethodon* is immediately recognizable by its crowded teeth and slender rostrum.

MONOPHYLLUS CLINEDAPHUS sp. nov.

Type.—Adult male (in alcohol) no. $\frac{5219}{37405}$ United States National Museum. No history.

General characters.—See synopsis.

Ear.—The ears exactly resemble those of *M. redmani* except that they are slightly broader and the inner surface of the conch is marked by seven distinct parallel cross ridges.

Muzzle and chin.—Noseleaf smaller than in *M. redmani*, the upright portion less tapering at tip, its sides nowhere parallel. Groove in chin apparently narrower and deeper than in *M. redmani*.

Membrane, feet and tail as in *M. redmani*.

Fur and color.—Fur similar to that of *M. redmani* in distribution and quality. Color after nearly forty years' immersion in alcohol, mars brown above, wood brown below.

Skull.—The skull of *Monophyllus clinedaphus* is slightly smaller than that of *M. redmani*, though in general appearance it is not noticeably different. In *M. clinedaphus* the rostrum is slightly narrower anteriorly, and the antorbital foramen is placed further forward, its anterior half lying over the first premolar. The striking differences between the two species are seen in the base of the braincase when the skull is held back down. In *M. clinedaphus* the plane of the basioccipital and basisphenoid, instead of sloping forward at a faint angle as in the other species of the genus, pitches abruptly forward and downward at an angle of 32° . The resulting secondary changes in form of the adjacent parts are noticeable on comparison, though not easy to describe. Presphenoid with ventral surface in two planes, the change from the anterior more ventral level to the posterior more dorsal level taking place abruptly at a point about half way between tip of hamulars and line joining posterior molars. The median ridge extends as far back as the anterior (ventral) level only, leaving the posterior level essentially flat.

Measurements of skull of type: Greatest length 21.8; basal length 19.4; basilar length 17.4; zygomatic breadth 9; least interorbital breadth 4; mastoid breadth 9; greatest breadth of braincase 9; frontopalatal depth (at middle of molar series) 2.4; depth of braincase 8; maxillary tooththrow (exclusive of incisors) 8; mandible 14; mandibular tooththrow (exclusive of incisors) 8.4.

Teeth.—The teeth are slightly smaller than in *M. redmani*, but of the same form.

Measurements.—For measurements of *Monophyllus clinedaphus* see table, page 38.

Specimens examined.—One, the type.

Remarks.—This species is strongly characterized by the form of the presphenoid as well as by the more conspicuous peculiarities of the base of the braincase. It requires no special comparison with the other members of the genus.

MEASUREMENTS OF SPECIES OF MONOPHYLLUS.

Name.	Locality.	Number.	Sex.	Total length.	Tail.	Tibia.	Foot.	Calc. ar.	Forearm.	First digit.	Second digit.	Third digit.	Fourth digit.	Fifth digit.	Ear.			Noseleaf.		Tarsus.
															from meatus.	from crown.	width.	height.	width.	
<i>M. redmani</i>	Jamaica.	64480	♂	68	10	18	11	3.4	40	11.4	38	88	65	57	13	11	8	5.5	4	4.4
<i>M. clineadaphus</i> .	?	5210	♂	65	8	16.4	9	4	39	9	33	77	56	51	12	9	10	4.6	3.6	5
<i>M. portoricensis</i> .	Porto Rico.	86256	♂	60	9.4	16	9	4	36	9	32	73	55	48	12	10	8.6	5.4	3.8	4
"	"	86259	♀	65	8	16.4	9.4	4	36	9	29	72	53	49	12.8	9.6	8	5	3.8	4
"	"	86260	♀	67	7	16	9	3	37	10	28	72	53	48	12	9	8.8	4.8	3.8	5
"	"	86258	♂	65	9	16	8.4	4	37	8.4	31	76	55	48	12.6	10	9	5	3.6	4
"	"	86261	♂	62	9	15	9	3	36	8.8	29	74	53	49	12.4	10	9	5	3.6	4
<i>M. plethodon</i> .	Barbados.	101530	♂	68	9	17	11	2.4	38	12	32	77	57	50	13.6	8.8	10	5	4	4.8