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BIOLOGICAL SURVEY OF DOMINICA¹

6. Synopsis of Bats of the Antillean Genus *Ardops*

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The stenodermine bat genus *Ardops*, endemic to the Lesser Antilles, was named and described by Miller (1906, p. 84), based on *Stenoderma nicholli* Thomas (type-species) from Dominica, *S. montserratensis* Thomas from Montserrat, and *S. luciae* Miller from St. Lucia. Subsequently, Miller (1913, p. 33) named a fourth species, *Ardops annectens*, from Guadeloupe. The four named taxa, of which a total of 15 specimens have been reported in the literature, have stood until now as distinct species. Recently acquired material, collected primarily under the aegis of the Bredin-Archbold-Smithsonian Biological Survey of Dominica, has made possible a meaningful reassessment of variation in the genus and has resulted in the systematic arrangement herein proposed.

Ardops is related to three other endemic Antillean genera, *Ariteus* of Jamaica, *Phyllops* of Cuba and Hispaniola, and *Stenoderma* of

¹ See list at end of paper.

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Puerto Rico and the Virgin Islands. Of these, *Ardops* may be related most closely to *Ariteus*, from which it differs principally in having a broader rostrum, narrower mesopterygoid fossa, distinctive sphenoid-basioccipital region, a small, peglike M3 (lacking in *Ariteus*), and the absence of any trace of a metaconule on the first lower molar. *Ardops* presently is known from Dominica, Martinique, St. Lucia, and St. Vincent in the Windward Islands, and from Guadeloupe, Montserrat, and St. Eustatius in the Leeward chain. Bats of this genus probably occur also on Nevis and St. Christopher [St. Kitts], and possibly elsewhere in the Lesser Antilles, but doubtfully in the Greater Antilles, where they are replaced by the genera mentioned above.

Other workers have commented on the slight differences ascribed to the four nominal species of *Ardops*. G. M. Allen (1942, p. 19), for example, noted that the "slightly differing" species were of "similar appearance." Hall and Kelson (1959, p. 142) wrote: "The currently recognized species are separated from each other seemingly on little more than slight differences in size and should possibly be regarded as actually constituting but one species." After study of the available material, taking into account individual and secondary sexual variation (females average larger than males—strikingly so in some populations), we recommend arranging the named kinds as subspecies of a single species, *Ardops nichollsi*, because (1) the differences between them are slight and quantitative in nature, (2) overall variation does not exceed that described as occurring in a number of other polytypic species of stenodermine genera, and (3) such a classification best reflects the similarities and obviously close affinities of the included taxa.

Among the subspecies, *A. n. nichollsi* of Dominica is the smallest (possibly excepting the population on St. Vincent, known to us by a single battered specimen in spirits from which the fragmentary skull has been removed). In order of increasing size, the other recognized races are distributed on St. Lucia (*A. n. luciae*), Guadeloupe (*A. n. annectens*), Martinique (subspecies newly named herein), and on Montserrat and St. Eustatius (*A. n. montserratensis*). A continuum in size can be demonstrated among the five subspecies but the continuum is not clinal, suggesting that the various insular populations have adapted independently to conditions prevailing on individual islands. Some size relationships are illustrated in figures 1 and 2 and in table 1.

Among 29 skulls with complete maxillae and mandibles, we find only two that do not possess the full complement of teeth (2/2, 1/1, 2/2, 3/3=32) typical of *Ardops*. Both of these, a female from St. Eustatius and a female from St. Lucia, lack the peglike M3 on the

left side. Additionally, we note a considerable range of variation in size in the third molars of both upper and lower jaws. In males of *A. n. nichollsi*, for example, the M3 varies from .55 mm wide by .40 mm long up to .70 by .50 mm; in females of that subspecies the tooth varies from .70 by .45 mm up to .90 by .50 mm. Otherwise, only minor variations in tooth structure were observed among the specimens studied.

It has not been possible for us to assess accurately infraspecific variation in color because, save for one skin from Guadeloupe (a female that may have been initially preserved in spirits), the only

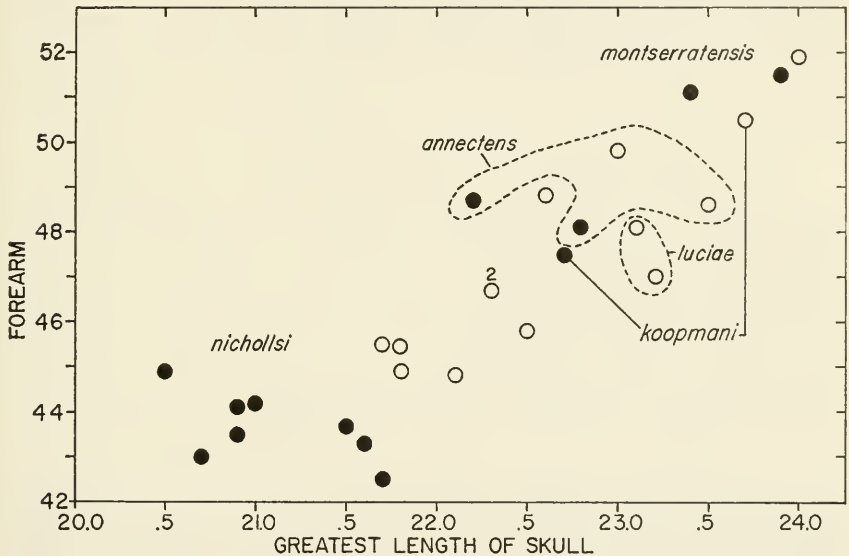


FIGURE 1.—Scatter diagram: length of forearm plotted against greatest length of skull (in mm) for specimens of five subspecies of *Ardops nichollsi* (solid=males, open=females).

museum study skins available are from Dominica. Nevertheless, comparison of specimens stored in alcohol of all named subspecies with the skins from Dominica suggests that geographic variation is slight. The dorsal pelage varies in overall color from near Prout's Brown (capitalized color terms from Ridgway, 1912) or Bister through various paler shades to near Buffy Brown (in one noticeably pale individual), and it is dense and relatively long (measuring 9–11 mm middorsally) in all specimens studied; usually there is a faint grayish-brown patch over the shoulders. The individual dorsal hairs are dark brownish basally, pale buffy in the midregion, and mostly tipped with brown, imparting a distinctly tricolored appearance to the pelage when it is parted. A white spot is present at the junction of

the wing with the body in all specimens that we examined (but see account of *A. n. montserratensis*) and is somewhat better developed in females than in most males. The ears are brownish in museum skins and contrast little with the color of the dorsum. The tragus and basal parts of the ear, tinged with greenish yellow in life, are yellowish or yellowish brown in dried skins. The membranes are dark brownish, contrasting to a greater or lesser degree with the color of the dorsum. Ventrally, the pelage usually is a rich brownish, tinged with grayish white; the hairs of the venter lack the tricolored appearance of those on the dorsum. Some photoelectric reflection readings of pelage colors are given in the account of *A. n. nichollsi*.

Bats of the genus *Ardops* evidently roost exclusively in trees and other types of arborescent vegetation although little precise informa-

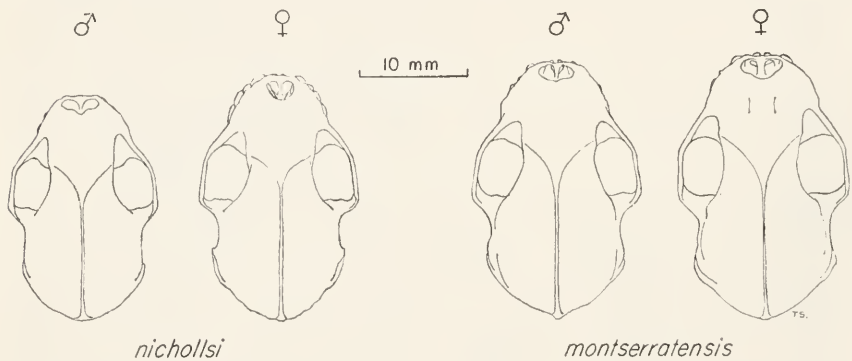


FIGURE 2.—Dorsal view of crania illustrating extent of secondary sexual variation: *Ardops nichollsi nichollsi* (one of smallest males examined, AS 5342; one of largest females, KU 104807); *A. n. montserratensis* (male, C. E. Ray 7926; female, CER 7927). Overall infraspecific variation in cranial size also is illustrated by fact that *A. n. nichollsi* is smallest subspecies of species and *A. n. montserratensis* is largest.

tion currently is available concerning their natural history. Those few observations that have been made are mentioned in the accounts of the several subspecies, particularly under *A. n. nichollsi* of Dominica. Much remains to be learned, too, of distribution and variation in *Ardops*, and we hope this synopsis will provide a useful basis for future work.

All measurements cited in text are in millimeters and all weights are given in grams. For the loan of specimens or for allowing us to study material housed in the institutions mentioned (abbreviations used to identify specimens in text are in parentheses), we are indebted to the following: Charles O. Handley, Jr., and Gary L. Ranck, U.S. National Museum (USNM); Karl F. Koopman, American Museum of Natural History (AMNH); Barbara Lawrence, Museum of

Comparative Zoology, Harvard (MCZ); Joseph C. Moore, Field Museum of Natural History (FM). Specimens in the Museum of Natural History of The University of Kansas (KU) and the collection of Albert Schwartz (AS) also were used. J. E. Hill of the British Museum (Natural History) (BMNH) kindly provided measurements of the holotypes of *Ardops nichollsi* and *A. montserratensis*. We are grateful also to Horton H. Hobbs, Jr., and other officials of the Smithsonian Institution for allowing one of us (Jones) to participate in March and April of 1966 in the Bredin-Archbold-Smithsonian Biological Survey of Dominica.

Ardops nichollsi nichollsi (Thomas)

Stenoderma nichollsi Thomas, 1891, p. 529.

Ardops nichollsi.—Miller, 1906, p. 84.

HOLOTYPE.—Adult female in spirits, skull removed, BMNH 91.5.14.4, from unknown locality on Dominica, Lesser Antilles.

DISTRIBUTION.—Known only from Dominica (see fig. 3).

MEASUREMENTS.—Average and extreme external measurements of six males, followed by those of seven females, are: total length 63.8 (60–67), 67.1 (62–73); length of hind foot 15.5 (15–16), 15.1 (13–16); length of ear 17.4 (16–18), 17.7 (17–18); length of forearm (eight males averaged) 43.6 (42.5–44.9), 46.2 (44.9–48.8). The forearm of the female holotype measures 45.7. Weight of five males averaged 16.9 (15.1–18.5); two nonpregnant females weighed 18.3 and 18.7 (lactating), and four pregnant females averaged 22.8 (17.8–25.2). See table 1 for cranial measurements.

REMARKS.—Representatives of *A. n. nichollsi* are the smallest of the species, save for one bat from St. Vincent that tentatively is referred to the subspecies *A. n. luciae*. The remarkable sexual dimorphism in size seen in specimens from Dominica—no overlap, for example, when length of forearm is plotted against length of skull (see fig. 1)—evidently is shared at least with the population occurring on Martinique, but dimorphism may not be so marked in other races of the species.

Color, as described earlier, seems not to vary with sex but varies individually in specimens at hand from dark brown to yellowish brown, the palest specimen, a female, being notably paler than any of the others and possibly in worn pelage prior to the onset of molt. At any rate, using a Photovolt 610 Photoelectric Reflection Meter, the reflected values of red, green, and blue on dorsum and venter, respectively, of 13 skins of *A. n. nichollsi* are: red 15.3 (11–22), 18.6 (15–24.5); green 6.3 (4–11), 10.0 (7–15); blue 5.6 (4.5–8), 8.8 (6.5–13). The upper limits for each value are measurements of the unusually pale female. Reflectance readings for the only other museum skin

examined, a female from Guadeloupe that may at one time have been immersed in spirits, fall near the average for the Dominican series except in green and blue values of the ventral pelage, which are at the lower (darker) end of the observed variation.

The female holotype (Thomas, 1891, pp. 529-530) and a male listed by Miller (1902, pp. 407-408) are the only two specimens of the sub-

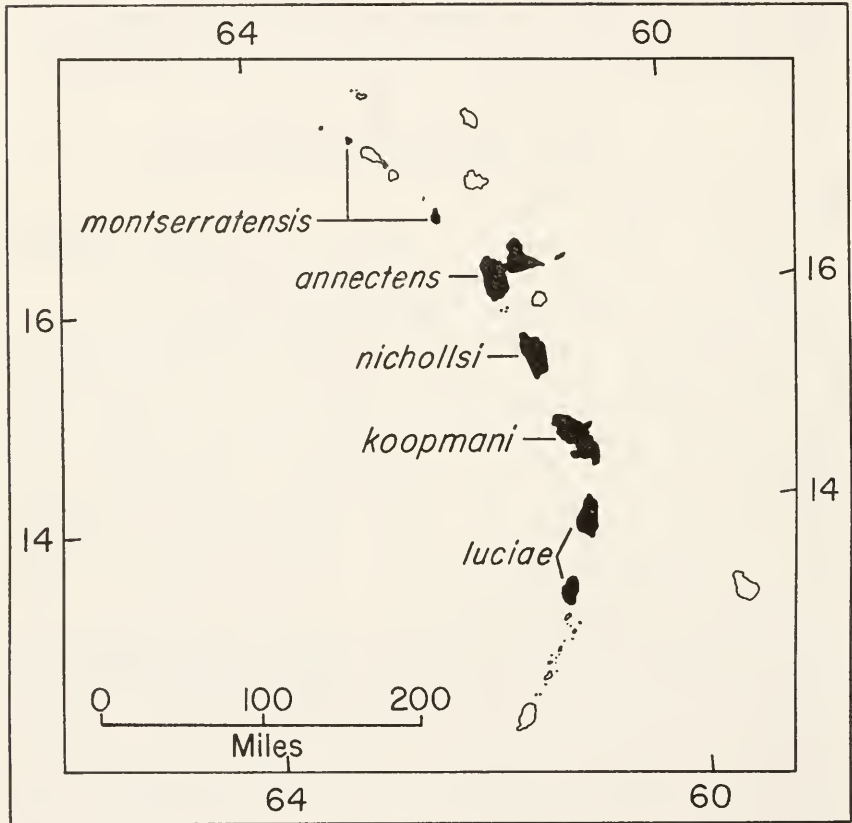


FIGURE 3.—Distribution of subspecies of *Ardoops nicholli* in the Lesser Antilles (north to south): *A.n. montserratensis* (St. Eustatius and Montserrat); *A.n. annectens* (Guadeloupe); *A.n. nicholli* (Dominica); *A.n. koopmani* (Martinique); *A.n. luciae* (St. Lucia and St. Vincent).

species *A. n. nicholli* reported previously. Of the remaining 14 individuals examined, we have information concerning the circumstances of capture of 13, all of which were taken in mist nets—one in 1962, one in 1964, and 11 in 1966. At Clarke Hall Estate one bat was trapped in a net (in which *Artibeus*, *Monophyllus*, and *Myotis* also were taken) stretched over a trail bordered by trees and a cacao

grove, and eight were netted in company with *Artibeus*, *Brachyphylla*, *Monophyllus*, and *Sturnira* over a rock-strewn gravel bar between the edge of the Layou River and lush vegetation that lined the bar. A female from 1 mile northwest of Portsmouth was taken in a net stretched across a trail on the side of a hill overlooking the Caribbean in dry, relatively scrubby forest; another female captured near the same place in 1964 was netted near the ruins ("Cabrit") on Prince Rupert Bluff. A male from 6 miles northeast of Roseau was netted in 1962 over a stream in rain forest, whereas a female from Roseau was trapped along with several *Artibeus jamaicensis* in a net placed adjacent to a pond in the Botanic Garden.

Each of six females collected in the spring of 1966 was reproductively active. One taken on April 19 was lactating. The others each carried a single embryo on the following dates (crown-rump length of embryos in parentheses): March 27 (11); March 28 (21); March 29 (31); April 2 (18); April 14 (29). Testes of March- and April-taken males varied in length from 4.5 to 6.0. Wing mites (Spinturnicidae) and hair mites (Listrophoridae) were obtained from several individuals, but no other kinds of ectoparasites were found.

SPECIMENS EXAMINED.—16. DOMINICA: "Cabrit" [northwest of Portsmouth], 1 (USNM); 1 mile northwest of Portsmouth, 100 ft, 1 (KU); Clarke Hall Estate, 100 ft, 9 (KU); 6 miles northeast of Roseau, 1 (AS); Roseau, 1 (USNM); Botanic Garden, Roseau, 50 ft, 1 (KU); no specific locality, 2 (1 MCZ, 1 BMNH—examined for us by J. E. Hill).

Ardops nichollsi montserratensis (Thomas)

Stenoderma montserratense [sic] Thomas, 1894, p. 133.

[*Ardops*]. *montserratensis*.—Miller, 1906, p. 84.

HOLOTYPE.—Adult male in spirits, skull removed, BMNH 94.1.9.1, from unknown locality on Montserrat, Lesser Antilles.

DISTRIBUTION.—Known from Montserrat and St. Eustatius (see fig. 3).

MEASUREMENTS.—External measurements taken from a male and female preserved in alcohol from St. Eustatius are, respectively: total length 69, 72; length of hind foot 18, 17; length of ear 18, 18; length of forearm 51.1, 51.9. The male holotype, also in alcohol, was recorded in the original description as measuring: head and body [total length] 69; length of ear 16.5; length of forearm 51.5. See table 1 for cranial measurements.

REMARKS.—*Ardops nichollsi montserratensis* is so much larger than the holotype of *A. n. nichollsi* that it is easy to understand why Thomas (1894, p. 133) named it as a full species. The subsequently described subspecies on Guadeloupe, Martinique, and St. Lucia

bridge the gap in size between *A. n. montserratensis* and *A. n. nichollsi*. Although we have not personally compared them with the holotype, the two specimens from St. Eustatius resemble it in size to such a marked degree that we unhesitatingly refer them to *A. n. montserratensis*, which also may occur on the intervening islands of Nevis and St. Christopher. Thomas (loc. cit.) described *A. n. montserratensis* as lacking a white spot at the base of the wing. This spot is

TABLE 1.—Cranial measurements of five subspecies of *Ardops nichollsi*

Number of specimens averaged, or catalogue number, and sex	Greatest length of skull	Zygomastic breadth	Postorbital constriction	Mastoid breadth	Breadth across upper molars	Length of maxillary tooththrow	Length of mandibular tooththrow (c-m3)
<i>Ardops nichollsi nichollsi</i> : Dominica							
Average 8 ♂	21.1	13.7	5.5	11.5	8.9	6.6	6.6
Minimum	20.5	13.4	5.3	11.2	8.7	6.2	6.3
Maximum	21.7	14.2	5.9	11.9	9.2	7.0	6.9
BM 91.5.14.4 ♀ ¹	21.8	—	5.6	—	9.5 ²	6.8	7.0
Average 7 ♀	22.2	14.5	5.6	12.0	9.6	7.3	7.3
Minimum	21.7	14.2	5.3	11.8	9.3	7.0	7.0
Maximum	22.6	14.8	5.9	12.1	9.7	7.5	7.5
<i>Ardops nichollsi montserratensis</i> : Montserrat							
BM 94.1.9.1 ♂ ¹	23.9	15.8	6.0	12.6	10.2	7.5	7.6
St. Eustatius							
C. Ray 7926 ♂ ³	23.4	15.5	6.1	12.6	10.1	7.7	7.6
C. Ray 7927 ♀ ³	24.0	15.8	6.4	13.0	10.9	8.4	8.1
<i>Ardops nichollsi luciae</i> : St. Lucia							
USNM 110918 ♀	23.1	14.9	5.9	11.8	10.3	7.9	8.0
USNM 110921 ♀ ¹	23.2	14.8	5.7	12.0	10.3	7.8	7.8
<i>Ardops nichollsi annectens</i> : Guadeloupe							
USNM 113498 ♂	22.2	14.4	5.6	11.3	9.6	7.1	7.0
USNM 113501 ♂	22.8	14.7	6.0	12.1	9.7	7.3	—
USNM 113499 ♀	23.0	—	5.9	12.5	—	7.8	7.9
USNM 113502 ♀ ¹	23.5	15.7	5.9	13.2	10.3	7.8	8.0
MCZ 15927 ♀	—	15.7	5.8	—	10.6	7.7	7.9
<i>Ardops nichollsi koopmani</i> : Martinique							
AMNH 213954 ♂	22.7	14.5	5.7	11.6	9.5	7.2	7.1
AMNH 213951 ♀ ¹	23.7	16.0	5.9	12.6	10.5	8.1	8.0

¹ Holotypes (measurements of *A. n. nichollsi* and *A. n. montserratensis* taken by J. E. Hill).

² Measurement after Thomas (1891, p. 530).

³ 7926 in AMNH and 7927 in University of Florida collection.

present in both specimens from St. Eustatius although it is much less distinct in the male than the female. Possibly Thomas overlooked a similarly faint spot on the male from Montserrat.

In the original description, Thomas alluded to the habits of *Ardops* on Montserrat as follows: "This Bat is said to hang all day under the branches of trees, and not to take refuge in holes and crannies as most other species do." He also noted that it was thought to do "much damage to the cacao plantations," which we doubt. The two specimens from St. Eustatius were collected by Clayton E. Ray and Robert R. Allen on Mar. 9, 1963, at a steep-sided volcanic crater called "The Quill." One was taken in a mist net placed across a path at the rim of the crater; this net also captured *Artibeus* and *Brachyphylla*. The other was netted in a small banana patch on the floor of the crater (C. E. Ray, pers. comm.). The female carried a single embryo that measured 15 in crown-rump length.

SPECIMENS EXAMINED.—3. MONTSERRAT: no specific locality, 1 (BMNH—examined for us by J. E. Hill). ST. EUSTATIUS: rim of crater of The Quill, 1 (AMNH); floor of crater of The Quill, 1 (AMNH—to be deposited in University of Florida collection).

Ardops nichollsi luciae (Miller)

Stenoderma luciae Miller, 1902, p. 407.

A[rdops]. luciae.—Miller, 1906, p. 84.

HOLOTYPE.—Adult female in spirits, skull removed, USNM 110,921, from unknown locality on St. Lucia, Lesser Antilles.

DISTRIBUTION.—Known from St. Lucia and tentatively recorded also from St. Vincent (see fig. 3).

MEASUREMENTS.—Some external measurements of the female holotype, preserved in alcohol, were reported in the original description as: head and body [total length] 65; length of hind foot 12.6; length of ear 18. Length of the forearm of a male and four females from St. Lucia are, respectively: 47.0, 45.1, 48.1, approximately 45, 47.0. See table 1 for cranial measurements.

REMARKS.—*Ardops nichollsi luciae* is of medium size and most closely resembles *A. n. annectens* of Guadeloupe among named subspecies. *Ardops n. luciae* averages smaller than *A. n. annectens* in length of forearm. Judging from the limited material available for study, the skulls of the two races are essentially of the same overall size, but skulls of *A. n. annectens* are broader (especially in zygomatic breadth and mastoid breadth) when specimens of the same sex are compared.

Miller (1902, p. 407) described the color of *A. n. luciae* as follows: After a year's immersion in alcohol the color of the fur is a uniform clay color, that of the back, limbs and membranes strongly washed with wood-brown, that

of the under parts somewhat lightened by faintly paler hair-tips. A small but very distinct whitish spot on shoulder at point where membrane joins body. Ears and noseleaf light-brown. Membranes dark-brown throughout, except that the antibrachium has a distinct pale border extending from base of thumb halfway to shoulder. Bones of fingers and distal half of forearm much lighter than membrane.

The skull was described as "distinctly larger than that of . . . *nichollsi*, but of essentially the same form throughout." The several dental characters mentioned by Miller as distinctive in *A. n. luciae* in comparison with *A. n. nichollsi* (bifid upper incisors, for example) have been found individually variable in the sample of the latter now available.

A male from St. Vincent (FM 47718), the first member of the genus to be reported from that island, is preserved in alcohol and the fragmentary skull has been removed. The specimen is in poor condition, but all observable characters indicate that it is referable to the genus *Ardops*. Fragments of the skull, including part of the upper tooththrow, are similar in size to corresponding parts of skulls of *A. n. nichollsi* of Dominica. Both forearms are broken, but the right can be reconstructed for an approximate measurement, which is 39. Judged by this one specimen, bats on St. Vincent may be smaller than those of any described race of *A. nichollsi*, and we have tentatively referred FM 47718 to *A. n. luciae* on geographic grounds pending the acquisition of additional material from the island.

SPECIMENS EXAMINED.—6. ST. LUCIA: no specific locality, 5 (USNM). ST. VINCENT: no specific locality, 1 (FM).

Ardops nichollsi annectens Miller

Ardops annectens Miller, 1913, p. 33.

HOLOTYPE.—Adult female in spirits, skull removed, USNM 113, 502, from unknown locality on Guadeloupe, Lesser Antilles.

DISTRIBUTION.—Known only from Guadeloupe (see fig. 3).

MEASUREMENTS.—Some external measurements of an adult male and the holotype (female), respectively, both in alcohol, were recorded in the original description as follows: head and body [total length] 61, 68; length of hind foot 12.6, 14.6; length of ear 17, 18. The forearms of three males measured 48.1, 48.1, 48.7; those of four females measured 48.4, 48.6, 48.7, and 49.8. See table 1 for cranial measurements.

REMARKS.—All eight specimens of *A. n. annectens* here recorded as examined have been reported previously (Miller, 1913, p.33; G. M. Allen, 1942, p. 20). Differences between *A. n. annectens* and *A. n. luciae* are discussed in the account of the latter subspecies; comparisons between *A. n. annectens* and the subspecies occurring on Martinique are made in the following account.

No information seems to be available concerning the means of

collection of the five specimens listed by Miller (loc. cit.) in the original description save that they were obtained by H. Selwyn Branch between Jan. 25 and Feb. 1, 1902. Of the other three specimens, Allen (loc. cit.) wrote as follows: "Dr. G. K. Noble, who secured an adult female and well-grown young in Guadeloupe in 1914, writes me that he found these hanging [in a tree?] together directly over a path he was following through the woods near Sainte Rose. Later his guide caught another . . ." The young bat mentioned was approximately half grown (forearm 34.4); the exact date of its capture in 1914, however, is not recorded on the specimen label.

SPECIMENS EXAMINED.—8. GUADELOUPE: Sainte-Rose, 2 (MCZ); no specific locality, 6 (1 MCZ, 5 USNM).

Ardops nichollsi koopmani, new subspecies

HOLOTYPE.—Adult female in spirits, skull removed, AMNH 213,951, from near Balata, Martinique, Lesser Antilles; obtained by Harry Beatty and Peter Martin on Mar. 18, 1967, original no. 656.

DISTRIBUTION.—Known only from Martinique (see fig. 3).

DIAGNOSIS.—A medium- to large-sized subspecies of *Ardops nichollsi* having a large though relatively narrow skull, well-developed sagittal crest, narrow molariform teeth, and marked sexual dimorphism; color generally as in *A. n. nichollsi*, white spot at junction of wing with body prominent in both sexes.

MEASUREMENTS.—External measurements of the holotype, another adult female, and two adult males (all taken from specimens preserved for several months in alcohol) are, respectively: total length 70, 68, 67, 65; length of hindfoot 17, 17, 16, 16; length of ear 18.5, 18, 18, 17; length of forearm 50.5, 47.3, 47.5, 46.0. See table 1 for some cranial measurements of the holotype and the first-listed male; additional measurements of these two skulls are condylobasal length 21.0 and 19.2, and breadth across upper canines 6.2 and 5.1.

REMARKS.—*Ardops nichollsi koopmani* differs from populations of the species on adjacent islands (*A. n. nichollsi* to the north on Dominica and *A. n. luciae* to the south on St. Lucia) in being considerably larger. Judging from the skulls of the male and female available for study, secondary sexual dimorphism is marked in *A. n. koopmani* in that the cranium of the male is about the size of that of the largest female of the subspecies *A. n. nichollsi* examined, whereas the cranium of the female holotype is the largest we have studied save for those referred to *A. n. montserratensis*. Both the male and female of *A. n. koopmani* have well-developed sagittal crests, reminiscent of some individuals of *A. n. nichollsi*. Members of the new subspecies are notably smaller and somewhat narrower of skull than specimens of the northerly *A. n. montserratensis*.

Among named subspecies, *A. n. koopmani* most closely resembles *A. n. annectens* of Guadeloupe. Cranially, the one male examined is comparable in overall size with two males of *A. n. annectens* studied, but it is narrower relative to length of the skull and has a better developed sagittal crest. The female holotype has a longer forearm and longer, relatively narrower skull (excepting zygomatic breadth) than any of the females of *A. n. annectens* examined and, in direct comparison with a large female *A. n. annectens* (MCZ 15927), has narrower molars and a better developed sagittal crest. The two subspecies are separated geographically by the much smaller race *A. n. nicholli* of Dominica, and we assume, therefore, that the general resemblance in size has evolved independently.

Ardops was unknown from Martinique until five specimens were collected there in March of 1967 for the American Museum of Natural History by Harry Beatty and Peter Martin, supported by a grant from the Explorers Club. All the bats were captured near Balata "in mist nets set over streams in second-growth (about 40 years old) montane rain forest" (Karl F. Koopman, pers. comm., May 25, 1967). We take pleasure in according patronymic recognition to Dr. Koopman for his generosity in making the specimens from Martinique available to us for study and also for his contributions to chiropteran biology in the Caribbean region.

SPECIMENS EXAMINED.—4. MARTINIQUE: Balata, 4 (AMNH).

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Dominica Survey in the *Proceedings*

paper	author	subject	year	volume	number
1	Kier	Echinoids	1966	121	3577
2	Stone	Diptera: Anisopodidae, Bibionidae	1966	121	3578
3	Kirsteuer	Marine archiannelids	1967	123	3610
4	Allen	Hymenoptera: Tiphiidae	1967	123	3617
5	James	Diptera: Stratiomyidae	1967	123	3622