

NUMBER 277

JULY 7, 1976

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NEWLY RECORDED FROM
COSTA RICA

By ANDREW STARRETT

NATURAL HISTORY MUSEUM OF LOS ANGELES COUNTY

CONTRIBUTIONS IN SCIENCE



Published by the NATURAL HISTORY MUSEUM
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900 Exposition Boulevard, Los Angeles, California 90007

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COMMENTS ON BATS NEWLY RECORDED FROM COSTA RICA¹

By ANDREW STARRETT²

ABSTRACT: *Miconycteris nicefori*, *M. brachyotis*, and *Diphylla ecaudata* are reported for the first time from Costa Rica, and the ranges of these species are summarized. The molt pattern of *M. nicefori* is described and the two color phases of this species are explained on the basis of an apparent annual molt-hair discoloration sequence.

INTRODUCTION

In 1970 and 1971, more than 55 species of bats were collected in Costa Rica by students working in courses under the program of the Organization for Tropical Studies (OTS). Three, which are new to the recorded fauna of Costa Rica, are reported here. They were taken on the Osa Peninsula, Provincia de Puntarenas, in 1970, and at Finca Jiménez (Ministerio de Agricultura y Ganadería, Estación Experimental "Finca Jiménez Nuñez"), Prov. Guanacaste, in 1971. Also included are specimens of two of these species which were collected at Finca La Pacífica, Prov. Guanacaste, by Theodore H. Fleming, and at Finca Jiménez, by Thomas B. Keyse, during the course of separate projects in 1971 and 1972. The specimens are now in collections at the Natural History Museum of Los Angeles County (LACM), the Museum of Southwestern Biology, University of New Mexico (MSB) and the University of Missouri, St. Louis (THF).

All measurements of specimens are in millimeters. Capitalized Forest Formation designations are those of L. R. Holdridge (Tosi 1969).

The sites of capture for the specimens from Finca Jiménez were in riparian forest along the Río Higuero. Both Finca Jiménez and Finca La Pacífica are in the lowland Pacific Tropical Dry Forest region of western Costa Rica; the locality on the Osa Peninsula is in lowland Pacific Tropical Wet Forest, some 260 km to the southeast.

CAPTURES AND COMMENTS

Miconycteris nicefori Sanborn.—Two adult males were caught by O. T. S. students in nets set across the Río Higuero (elev. 10 m) at Finca Jiménez. One was taken on the night of April 21-22, 1971, during the dry season when the river bed was for the most part dry; the second was caught on June 8, 1971, in the early part of the rainy season when the river was flowing. Three additional adult males were

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caught by Thomas B. Keyse, in May and June 1972, in the forest on the south side of the same river, not far from the place of capture of the first two.

In all essential characters and most measurements, the specimens from Costa Rica agree closely with those given in Sanborn's description of the species. In the original description, Sanborn (1949) indicated that his series of five specimens (in alcohol) showed "a gray and a red phase," the holotype being "near Olive Brown above" and the "darkest specimen near Walnut Brown above." He also mentioned "a faint light gray line" on the lower back of all specimens. No light gray line is present on any of the specimens from Costa Rica, and this character appears to be variable over the range of the species (Goodwin and Greenhall 1961; Ojasti 1966). The range of color in the five males from Costa Rica shows variation which apparently represents a molt and discoloration cycle similar to that described by Smith (1972) for *Pteronotus parnellii*. The specimens of *Micronycteris nicefori*, which were all taken from essentially the same locality on five different dates from late April to early June in two successive years, range from a "red phase" (April 22) through a reasonably date-correlated molt progression to a "gray phase" (June 8). One specimen was collected on a later date (June 30) and showed an active intermediate molt condition. The red phase pelage, which is somewhat more orange than Sanborn's "Walnut Brown" specimen (if the two copies of Ridgway 1912, which I consulted, and which differ one from the other in some colors, show the same colors seen in the copy used by Sanborn in 1949), seems to represent chemically altered coloration of the dark olive brown fur attained in what apparently is the single annual molt which takes place, in Costa Rica at least, from April through June or July. Sanborn's specimens (1 ♂, 4??) were collected in January and represent a similar series which would indicate an earlier molt for this species in Columbia. Five specimens caught in August in Amazonian Peru were "olivâtre" (Pirlot 1968), and three taken in Venezuela, a male and female in November and another female in May, were described as "marrón anaranjada" (Ojasti 1966, using Villalobos and Villalobos 1947, color designations). That these specimens represent the olive-brown and red color phases seems indicated, but whether they support the proposed interpretation of color phases in this species, perhaps modified by local factors and/or reproductive condition (Smith 1972), cannot be determined for certain with the limited information available. A relationship between reproductive state and molt pattern is suggested by the fact that in the specimens from Costa Rica which show hair replacement in progress, the chest gland is prominent and presumably active (representing reproductive activity?), whereas in the animal from June 8, which shows no remnant of red phase hair, the gland is not discernible from superficial examination. The timing of male activity is in line with that suggested by data presented by Fleming, Hooper and Wilson (1972) for other species in the same general locality.

In the Costa Rican series, dorsal molt progression begins around the eyes (already brown in the April specimen), then proceeds mainly by a gradual intermixture of new hairs and subsequent sloughing of old hairs over the head, and then from the shoulders and interscapular area posteriad, with the fur of the sides and middle back leading the progression. Ventrally, the molt pattern is more clearly

defined with a loss-replacement sequence which starts below the ears and on the mid-abdominal area (light gray-brown hairs characteristic of gray phase ventral pelage present in the under-ear area and a few small patches on the abdomen in the April specimen), then expands laterad and posteriad from the throat and mid-venter, the orange fur under the wings between humerus and femur being the last to go. Especially noticeable dorsally is a frosted appearance caused by hairs with silvery-white tips (not noted by Sanborn 1949) which gradually change to a silvery-yellow in the red phase. During the molt sequence these hairs appear to be lost first, leaving dark-tipped red hairs that give the pelage a dull, worn look. In some areas the new silver-tipped brown hairs become apparent before the dull red pelage is gone, and closer examination shows the less obvious new darker-tipped brown hairs coming in as well. This intermixing of red and brown hairs gives the pelage an intermediate red-brown tone which suggests at first glance a third "color phase."

Selected measurements of the Costa Rica specimens are: (LACM 38542, 38543; MSB 32537, 32538, 32539) forearm, 36.4, 38.2, 38.7, 35.1, 37.5; (LACM specimens) metacarpal III, 33.3, 34.5; metacarpal IV, 30.8, 31.5; metacarpal V, 31.7, 33.0; (LACM 38543) greatest length of skull, 20.9; condylobasal length, 18.6; zygomatic width, 9.5; postorbital constriction, 4.5; maxillary tooth row, 7.4; width across upper canines, 3.4; width across M^3 - M^3 , 6.3.

Since Sanborn described *Miconycteris (Trinycteris) nicefori* from northern Colombia in 1949, it has been reported from Trinidad (Goodwin and Greenhall 1961), Guyana (Hill 1964), Venezuela (Ojasti 1966), Panama (Handley 1966) and the upper Amazon of Peru (Pirilot 1968). The locality nearest to the Costa Rican site reported here is Fort Gulick, Canal Zone (Handley 1966:760) some 600 km to the southeast.

Miconycteris brachyotis (Dobson) (= *M. platyceps* Sanborn).—An adult female (forearm 43) was caught in a net placed across the dry bed of the Río Higuérón, Finca Jiménez, on the night of April 21-22, 1971, and then banded and released. Three members of this species were also banded and released, in 1970-1971, at Finca La Pacífica (approx. elev. 40 m), some 20 km NNE of Finca Jiménez (Fleming et al. 1972), and two more, an adult male (forearm 41.0) and a weanling juvenile male (forearm 28) from the same locality, were saved as a skin and skull and alcoholic specimen, respectively (THF).

The yellow-throated bat was previously known from a scattering of localities in Oaxaca and Chiapas, Mexico (Davis et al 1964; Schaldach 1964), Guatemala (Jones 1966; Rick 1968), Nicaragua (Sanborn 1949), Panama (Handley 1966), Colombia (Marinkelle and Cadena 1972), Venezuela (Sanborn 1949), French Guiana (Sanborn 1949; Cayenne, type locality of *Schizostoma brachyote* Dobson), Trinidad (Sanborn 1949; Goodwin and Greenhall 1961; Guanapo, type locality of *Miconycteris (Lampronnycteris) platyceps* Sanborn) and Brasil (Goodwin and Greenhall 1961: 231).

Diphylla ecaudata Spix.—An adult female was netted, on August 4, 1970, near the Tropical Science Center building and not far from the airstrip for Rincón de Osa. The net in which the animal was captured was set in relatively undisturbed forest, some 25 m from the Río Agua Buena (approx. elev. 15 m).

This species is known from a scattering of localities ranging from southern Texas (Reddell 1968) through Middle and South America to southern Brasil (Cabrera 1957; Hall and Kelson 1959; Villa-R. 1966). In Central America, it has been recorded previously from every country except Belize and Costa Rica (Goodwin 1942b; Burt and Stirton 1961; Handley 1966; Jones 1966; Jones et al 1971). Nowhere does it seem to be abundant, apparently being less influenced by concentrations of domestic animals than is *Desmodus*. It also appears to have more of a preference for humid environments than does the latter, being associated, in Central America, at least, with lowland evergreen forest.

The forearm measurement (57.2) of the Costa Rican specimen (LACM 33180) falls in the middle of the range for females given by Burt and Stirton (1961). I prefer to follow these authors (also Handley 1966, and Jones et al 1971) in considering *Diphylla ecaudata* monotypic, even though Ojasti and Linares (1971) have renewed support for the separate recognition of Middle American populations (based on a comparison of measurements of South American specimens with those given by Burt and Stirton 1961). The wide range of measurements shown by Villa-R. (1966) for this species in Mexico suggests the desirability of a more inclusive review of specimens from Middle America before basing any judgments on size characteristics.

ACKNOWLEDGEMENTS

I thank Roy W. McDiarmid, University of South Florida, for specimens, records and field data from Finca Jiménez, and for reading and commenting on the manuscript. Inclusion of the records and information concerning the *Micronycteris nicefori* in the collection of the Museum of Southwestern Biology was made possible through the courtesy of Thomas B. Keyse, James S. Findley and Kim Mortensen, University of New Mexico; Theodore H. Fleming, University of Missouri, St. Louis, very kindly made available to me the specimens of *Micronycteris brachyotis*, with appropriate field notes, from Finca La Pacífica.

RESUMEN

Por primera vez se reportan tres especies de murciélagos de Costa Rica: *Micronycteris brachyotis*, *Micronycteris nicefori* y *Diphylla ecaudata*. Las primeras dos especies provienen de localidades de la Provincia de Guanacaste, la tercera proviene de la Península de Osa, Provincia de Puntarenas. En el presente informe se esquematiza la distribución de estas especies y se describe el patrón de muda para *M. nicefori*. Se sugiere que las dos fases de coloración en esta especie representan los extremos de una continua secuencia de muda y decoloración química del pelaje.

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Accepted for publication January 7, 1975.