

FIRST RECORD OF *NATALUS LANATUS* (CHIROPTERA: NATALIDAE) IN COSTA RICA, AND CURRENT DISTRIBUTION OF *NATALUS* IN THE COUNTRY

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INTRODUCTION

Despite its small area of only 51 100 km², Costa Rica is a country of unusually high biodiversity, which still continues to increase its number of species even within the well-studied group of mammals. The interest in Costa Rican bats started as early as 1869 when Alexander von Frantzius first published a list of 69 mammals from the country, of which nine were bats (Rodríguez-H. *et al.* 2005). Following von Frantzius's list, other mammal lists were published for Costa Rica (see Goodwin 1946, Wilson 1983, Timm & LaVal 1998, Timm *et al.* 2000), but the most recent is LaVal & Rodríguez-H. (2002), which records 108 bat species. Since then, two more species have been recorded; in 2003 Rodríguez-H. *et al.* added *Lasiurus intermedius*, and then the recent separation of *Eptesicus chiriquinus* from *E. brasiliensis* (Simmons & Voss 1998, Simmons 2005) brought the bat list of Costa Rica to 110 species.

In the entire Neotropics the family Natalidae includes 10 species in three genera (Tejedor 2006). Goodwin (1946) was the first to report the genus *Natalus* in his Costa Rican bat list, however he did not collect in the country. Starrett & Casebeer (1968) were the first to collect *Natalus stramineus* in the country, and since their publication the species has been included in all Costa Rican mammal lists. The

present Short Communication adds a new species, *Natalus lanatus*, and we also clarify the genus distribution for the country.

METHODS

We report here a new record of a bat species for the country, which was captured in the vicinity of the Savegre river at a premontane altitudinal zone (Acevedo *et al.* 2002), at a locality called Toma 1 (9°31'36"N, 83°51'39"W; 1405 m a.s.l.). Vegetation cover is described as Premontane Tropical Rainforest (Gómez & Herrera 1986), and contains mature trees between 5 and 25 m in height. A detailed description of the vegetation and ecosystems across the Savegre River Basin can be found in Acevedo *et al.* (2002). The specimen was captured during a mammal survey project, using up to four ground mist nets. Two of these were set in a line perpendicular to a one-meter wide trail inside the forest, and the two others were set 50 meters away in a V-configuration over a three-meter-wide rocky stream. All nets were open from 18:00 to 22:00 h. The specimen was captured in a mist net set inside the forest.

In order to clarify the distribution of the genus *Natalus* in Costa Rica, we reviewed all the records from a database assembled by the first author that includes data from the following mammal collections and museums: American Museum of Natural History (AMNH); British Museum of Natural History,

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FIG. 1. a) *Natalus lanatus* from Savegre showing the diagnostic ventral bicolor fur; b) photograph of a live specimen in Orosi, Cartago.

London (BM); Field Museum of Natural History, Chicago (FMNH); Museum of Natural History, University of Kansas (KU); Natural History Museum of Los Angeles County, Los Angeles (LACM); Louisiana State University, Museum of Zoology (LSUMZ); Museo Nacional de Costa Rica, San José (MNCR); Texas Cooperative Wildlife Collection, Texas A&M University, Texas (TCWC); United States National Museum of Natural History, Smithsonian Institution (USNM), and Museo de Zoología de la Universidad de Costa Rica (UCR).

RESULTS AND DISCUSSION

On 26 March 2002, at about 20:00 h, we collected an adult male *Natalus lanatus* in a mist net set on the ground among trees and shrubs at the edge of the River Savegre. The bat was captured in the upper shelf of the net where it was barely entangled. The specimen was deposited in the collection of the National Museum of Costa Rica (MNCR #1205). It has the following measurements: total length 94 mm; tail 46 mm; right hind foot 8 mm; ear 16 mm; tragus 4 mm, and forearm 39 mm. The specimen shows the characteristic bicolor ventral fur of *N. lanatus* (Fig. 1). The only similar bat species in Costa Rica is *Natalus mexicanus*, which has been recorded mostly in the dry forest of the northwestern lowlands (Rodríguez-H. & Wilson 1999, LaVal & Rodríguez-H. 2002) (Fig. 2). Our specimen extends the documented distributional range of *N. lanatus* to ca. 1600 km from southeastern México (Tejedor 2005) to southwestern Costa Rica. Other bats captured at the site were *Sturnira ludovici* (3), *Sturnira mordax* (1), *Anoura cultrata* (1), *Vampyressa thuyone* (2), and *Hylonycteris underwoodi* (1).

In addition to our capture, *N. lanatus* was also captured by Richard LaVal on 15 May 2001 at 22:50 h, with a bat harp trap over Rio Guacimal, Monteverde, Puntarenas (10°18'16.7" N, 84°48'55.3" W). Its echolocation calls, recorded with an Anabat System, appear to be high frequency, steep-frequency (FM) signals. The recordings revealed two sets of downward-sweeps, stacked one on top of the other, one between 120 - 90 kHz and the other between 60 - 80 kHz (Richard LaVal pers. comm.). The notch between the two sweeps either suggests a recording bias (interference pattern) or a multi-harmonic signal structure. The latter is rather unlikely giving the zero-crossing method of the Anabat System. More recently, in 2010 (21-23 October, 15-17 November, and 6-8 December), Andrea Rasche captured several

individuals of *N. lanatus* in mist nets in Navarro de Socorro, Orosí (09°48'26.1" N, 83°52'41.3" W; 1100 m a.s.l.) near a cave that the bats apparently use as a roost (Andrea Rasche pers. comm.). We have photographs of the individuals that were taken in the field in both localities.

Natalus lanatus Tejedor, 2005 (Chiroptera: Natalidae) was described based on 71 specimens sampled in México. They had been previously identified as *N. stramineus* (currently *N. mexicanus*). However, the two species of *Natalus* can be clearly distinguished by the bicolored ventral fur of *N. lanatus* versus the uniformly colored ventral fur of *N. mexicanus* (Tejedor 2005). So far the species was only known from 16 lowland to middle elevation (43-1200 m a.s.l.) localities in México in the states of Chihuahua, Durango, Guerrero, Jalisco, Nayarit, Sinaloa, and Veracruz. These localities show a wide range of habitat types, from dry subtropical forest with marked seasonal variations in temperature and precipitation to continuously moist montane tropical forest (Tejedor 2005).

Based on morphometric characteristics, Tejedor (2006) recognized three different species (*N. mexicanus*, *N. spiritusantensis*, and *N. stramineus*) that were so far included in *N. stramineus*. Until now *Natalus stramineus* was the species reported for Costa Rica, but in accordance with Tejedor (2006) the current distribution for this species is in the Antilles Islands; *N. mexicanus* is in México and Central America, and *N. spiritusantensis* is in South America.

Hall (1981) and Reid (2009) proposed that the distribution of *Natalus mexicanus* in Costa Rica was on both Pacific and Atlantic slopes, but in our review all the Costa Rican records of this species correspond to the dry forest of the North Pacific area, specifically in the following localities: Barra Honda National Park: USNM - 543420-23, UCR - 2767; Santa Rosa National Park: USNM - 566451, UCR - 1851; Palo Verde National Park: KU - 158310, UCR - 1961, 1995; Hacienda Solimar: UCR - 1989; Curial de Santa Rosa: LACM - 24742, 24759-60. This distribution was previously reported by Rodríguez-H. & Wilson (1999) and LaVal & Rodríguez-H. (2002). With this information the distribution of genus *Natalus* in Costa Rica is shown in Fig. 2.

CONCLUSIONS

The report of this species increases the known bat fauna of Costa Rica to 111 species. Over the years, the main focal areas for bat research were the Costa

Rican lowlands, yet the middle elevations and highland regions of Costa Rica, and especially the Talamanca mountain range, include some of the best-preserved and still least-known areas of the country (Rodríguez-H. *et al.* 2003). Bats of the Natalidae family are probably difficult to capture with mist nets given their unbelievably agile flight as they fly around understory vegetation searching for prey (LaVal & Rodríguez-H. 2002). Also, in-depth knowledge of the distribution and ecology for many of the Costa Rican insectivorous bats is lacking, especially species that fly at high altitudes and that utilize roosts that are difficult to find, such as many molossid species (Kalko *et al.* 2008). This new record shows that in spite of a long tradition of bat studies in Costa Rica we can still expect the discovery of more species when sampling understudied areas with mist nets as well as using alternative methods such as roost searches and bioacoustics. Finally, we propose that the distribution

of *N. mexicanus* in Costa Rica is restricted to the lowlands of the northern and central Pacific slope, while *N. lanatus* is found in the mountains of the Tilaran and Talamanca ranges.

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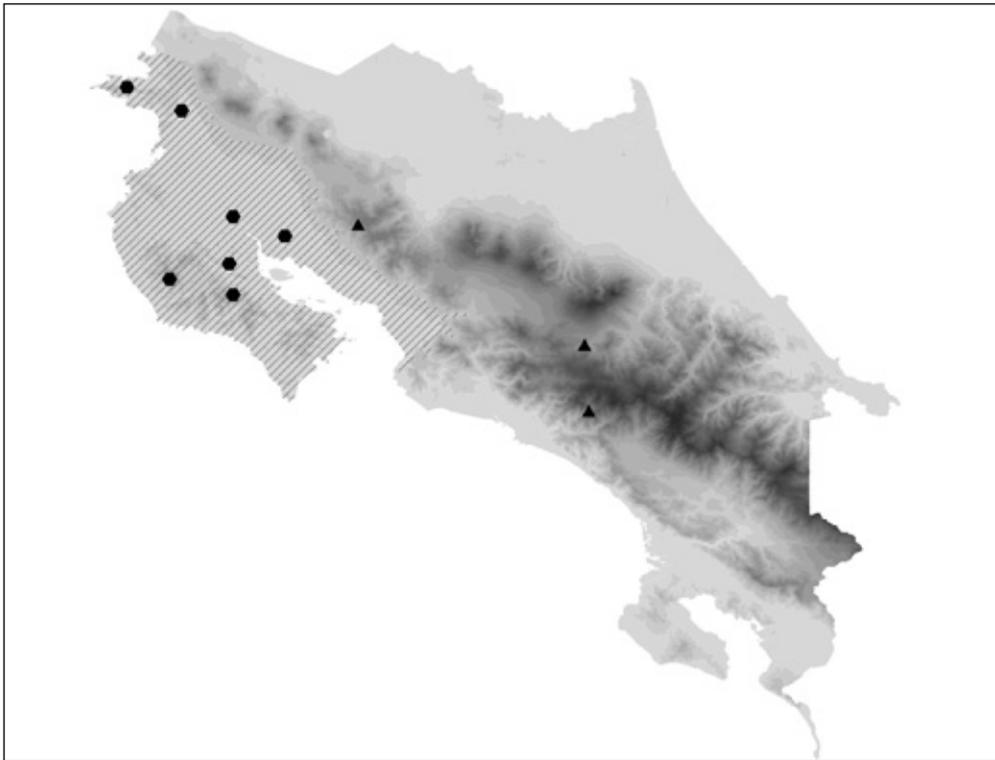


FIG.2. Geographical distribution of the genus *Natalus* in Costa Rica. *Natalus mexicanus* finds are represented by circles, *Natalus lanatus* by triangles).

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