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IS THE GREATER ANTILLEAN NIGHTJAR, CAPRIMULGUS CUBANENSIS (AVES: CAPRIMULGIDAE), A COMPOSITE SPECIES?

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Resumen. El Guabairo (Cuba) o Pitangu‡ (Santo Domingo) y Petonoi (Haiti) (Caprimulgus cubanensis) se halla distribu'do en Cuba, Cayo Coco, Isla de la Juventud (antes Isla de Pinos) y la Isla de Santo Domingo. FuŽ descrito de Cuba como Antrostomus cubanensis, y en Santo Domingo (Hait') como A. eckmani y se considera coespec'fico actualmente como coespec'fico con Caprimulgus cubanensis. Sin embargo, hay la sugerencia de que realmente sean dos especies en base a las diferencias en las vocalizaciones. El canto en Santo Domingo es un ÒclickÓ seguido de una frase de 2 s'labas, cuyo ritmo concuerda con el nombre vulgar local ÒPitangu‡.Ó En Cuba, el canto consta de una frase de 4 s'labas, y no de 3 s'labas como expresa el nombre vulgar ÒGuabairo. Ó Puede interpretarse como Ò Gua bai ah ro. Ó En Santo Domingo, el canto es de un tono m‡s alto, c. 200 Hz, con una duraci—n m‡s larga de la frase del canto, (1.2 vs 0.6 s en Cuba); en general el tono sube y baja en Cuba. Las principales diferencias en el plumaje son: 1) los parches beige-blancuzos del extremo inferior de las rectrices son notablemente más largos en las aves de Santo Domingo (70 mm vs 25 en Cuba); 2) las de Santo Domingo exiben las estrías negras de la cabeza y nuca más anchas y marcadas, careciendo de ellas en las cobertoras anales que son conspicuas en las de Cuba. Las medidas convencionales son similares en ambas poblaciones, aunque las de Santo Domingo muestran la cola más larga. Nuestra información respalda su separación original de dos especies: Caprimulgus eckmani, el Pitanguá o Petonoi de Santo Domingo, y C. cubanensis, el Guabairo Cubano, con la reciente descrita subespecie para la Isla de la Juventud. Se sugieren los nombres vulgares en inglés, de Cuban Nightjar y Hispaniolan Nightjar.

Abstract. The Greater Antillean Nightjar (Caprimulgus cubanensis) is found in Cuba, Cayo Coco, Isle of Youth, and Hispaniola. It was described in Cuba as Antrostomus cubanensis, in Hispaniola (Haiti) as A. eckmani, and currently is lumped as Caprimulgus cubanensis). It has been suggested that two species may be present, based on vocalization differences. The song in the Dominican Republic is a "click", plus a 2-syllable phrase, fitting the rhythm of the common name there "Pitanguá." In Cuba, the song is a 4-syllable phrase, not 3 syllables as in its local common name "Guabairo." It could be paraphrased as "gua bai ah ro." In Hispaniola, the song is higher pitched, by c. 200 Hz, longer in duration of the song phrase (1.2 vs 0.6 s

in Cuba), and slower in delivery (one phrase every 2 s vs 1.5 s in Cuba); it rises, overall in pitch, and falls in Cuba. Among plumage differences are: 1) the size of the beige underside distal area of rectrices (70 mm long in Hispaniolan vs 28 mm in Cuba); 2) the former has wider blackish crown and hind neck streaks than Cuban birds; and (3) Hispaniolan birds have a non-streaked vent area coverts, vs streaked in Cuba. Standard measurements are similar in the two main populations, although the tail in Hispaniola is longer. Our information supports returning to two species: *Caprimulgus eckmani*, the Hispaniolan Nightjar, and *C. cubanensis*, the Cuban Nightjar, with the recently described race *insulaepinorum* in the Isle of Youth (formerly Isle of Pines). *Accepted 16 December 1996*.

Key words: Greater Antillean Nightjar, Caprimulgus cubanensis, Caprimulgidae, vocalizations, taxonomy, variation, Cuba, Dominican Republic, Haiti.

INTRODUCTION

The Greater Antillean Nightjar (Caprimulgus cubanensis) was described by Lawrence in 1860, and is known as Guabairo in Cuba, Pitanguá in the Dominican Republic, and Petonoi in Haiti. The Hispaniolan taxon was described from Haiti by Lönnberg in 1929 as Antrostomus ekmani. This West Indian element, endemic to Cuba and Hispaniola, is found on only four islands: Cuba, Isle of Youth (formerly Isle of Pines), Cayo Coco, in the Cuban Archipelago, and in Haiti and the Dominican Republic, on the island of Hispaniola. Although the taxon ekmani from Hispaniola was originally described as a separate species from cubanensis, it was soon considered a subspecies of this latter taxon.

Since its discovery, the Greater Antillean Nightjar has been placed under three different genera: Setochalcis by Todd (1916), Antrostomus by Lawrence (1860), Gundlach (1876, 1893), Cory (1892), Ridgway (1907), Bangs & Zappey (1905), Barbour (1923), Hellmayr (1918), Lönnberg (1929), and Wetmore & Swales (1931), and Caprimulgus, by Bond (1936, 1956, 1977, 1982, 1984), Barbour (1943), Lack (1976), Garrido & García Montaña (1975), Clements (1978), Alayón (1985), Garrido (1983), and Reynard & Garrido (1988). Caprimulgus is the name officially recognized in the last edition of the American

Ornithologists' Union Check-list (1983).

SYSTEMATICS, BEHAVIOR, AND COMPARISONS

Little has been written about the Greater Antillean Nightjar, primarily because this bird is secretive, rather rare in most habitats (with the exception of semi-deciduous woods), and has strictly nocturnal habits. Actually, in Cuba, this species is not as rare as it is believed to be. It is difficult to find because the bird stays quiet and motionless during the day, and is active only at dawn and sunset. During these times, its territorial song can be heard, especially during the spring and summer months.

Its foraging abilities are impressive, maneuvering swiftly among the vegetation, wood patches or along the edges of roads in the dark. Nothing is known about its courtship or mating behavior. Alayón (1985) has noted behavior after hatching, and Garrido (1983) has reported on incubating birds.

When Garrido (1983) described the subspecies *C. cubanensis insulaepinorum* from the Isle of Youth, only a small number of specimens were available. Today, the situation has not changed much, since no additional specimens from Hispaniola have been collected, and only three more have joined Cuban collections. However, one of them proved to be the first specimen collected from a Cuban

key. It was secured by Arturo Kirkconnell in Cayo Coco in 1988. This specimen is roughly the same size as the other Cuban examples, and, although slightly darker, falls within the variation of this species (Tables 1 and 2). It is interesting to point out that the populations of Cuba, Cayo Coco, the single specimen from northern Isle of Youth and Hispaniolan birds, share a similar size, with slightly longer tails in the latter, whereas the southern Isle of Youth birds are darker than Cuban birds, averaging shorter wing and tail, and definitely with a lighter body mass. Birds from Zapata are rather intermediate.

When Garrido described the subspecies from the Isle of Youth, he had not heard their vocalizations. A few years later, Reynard & Garrido (1988) published an album including recordings of 122 species in Cuba plus study tapes from 4 other species, for comparative purposes. Among these recordings were vocalizations of Cuban Nightjars from six locations in Cuba, the southern part of the Isle of Youth, and the Dominican Republic. Therefore, the objective of this study is to compare the calls of these three known populations.

Although we only recorded birds from the western and central portion of the island of Cuba, Garrido heard calls in several other areas of eastern Cuba (Camagüey, Guantánamo, Baracoa, and Pico Turquino).

Before reaching a conclusion, we must consider the degree of isolation of the different populations of the Greater Antillean Nightjar. The closest relative of *Caprimulgus cubanensis* is unknown. However, Wetmore & Swales (1931) claimed the closest affinity to be with *C. carolinensis*, but this did not seem a plausible theory. On the other hand, Bond (1977: 8) suggested that cubanensis might have been derived from *C. salvini* of Mexico and Central America. This theory seems more plausible, but in the absence of fossil remains, Bond's suggestion can not be taken

for granted. Besides, we have examined material assigned to salvini and badius from Tamaulipas Mexico, and from Cozumel, Chichen Itzá, Quintana Roo, and British Honduras (now Belize). In the latest taxonomic arrangement done for these groups of species (American Ornithologists' Union 1983), the populations from Yucatán and Belize may represent a different species, C. badius. The population from Hispaniola seems closer to badius and not to salvini, but apparently, there are three taxa involved in this central American region instead o two. Birds from Belize and Half Moon Cay (specimens examined) seem to be closer to other Mexican populations rather than to Yucatan's based on size, coloration and tail pattern.

However, there are obvious different degrees of isolation shown by the populations of Cayo Coco, Isle of Youth, and Hispaniola. Cayo Coco has not been differentiated at a subspecies level. This must be due to two reasons: one, the key has not been isolated long enough, and two, the most reasonable one, that Cayo Coco is quite close to the Cuban mainland and the population there may maintain a genetic flow with the Cuban populations.

On the other hand, the populations from the southern part of the Isle of Youth have been differentiated at a subspecific level on the bases of size, coloration, pattern, and voice. Nevertheless, the only specimen found so far in the northern part of the island is more similar in size to Cuban birds than to southern Isle of Youth birds (specimen examined at the Academy of Natural Science of Philadelphia). It is possible that the two different populations of nightjars inhabited the two parts of the island. The northern one more closely resembles the one on the Cuban mainland (except for the Zapata Peninsula), and the southern one constitutes the actual race. The northern one might be a remaining population by fragmentation origin, whereas

TABLE 1. Combined meristic (mm) and weight (g) data from male and female specimens of *Caprimulgus*. N = number of specimens.

Location	Wing				Tail			
	N	Mean	SD	Range	N	Mean	SD	Range
Cuba (main island)	27	179	3.7	172–187	25	129	3.6	121–140
Hispaniola	5	177	3.4	173–181	4	139^{1}	6.7	130–145

 $^{^{1}}P < 0.05$.

the southern one represents a dispersion from central Cuba. The intermediate populations found at the Zapata Swamp (Garrido 1983) substantiate this possibility. Garrido (unpubl. data) has shown that several forms of birds and reptiles on the Isle of Youth have different origins. Some are products of fragmentation from the western part of Cuba, and others are the products of colonization from the central and even eastern sections.

It is interesting to note that the Hispaniolan race *ekmani*, with the exception of a slightly longer tail (Table 1), does not differ in size from the Cuban *cubanensis*, but does in voice, pattern, and coloration.

The period of time during which these Hispaniolan populations have been isolated is impossible to discern, especially in the absence of fossils. It is almost certain, however, that the period of time ought to be much longer than that of the populations on the Isle of Youth.

MATERIALS AND METHODS

Tape recordings were made using a Uher 1000 and a Stellavox SR8 recorder, with microphones mounted in a 91 cm parabolic sound reflector. We obtained recordings of 16 individuals in Cuba, 1 in the southern part of the Isle of Youth, in the environs of "El Guanal," and 11 in Hispaniola (all in the Dominican Republic). In Cuba, they were made in the provinces of Pinar del Río (La Güira, Soroa),

Habana (Jibacoa), and Matanzas (Santo Tomás, Soplillar, and Molina). In the Dominican Republic, they were made in the provinces of Independencia (Aguacate, Duverge), La Vega (Jarabacoa), and Monte Cristi (Pepillo Salcedo). Sonograms were made using Kay Elemetrics equipment. Tape recordings described here may be found in one or more of the following three publications: Hardy et al. (1989), Reynard, (1981), and Reynard & Garrido (1988). In addition, a set of the recordings is filed at the Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, New York.

Specimens examined and listed in Tables 1 and 2 were measured in mm (wing chord flattened against the ruler), exposed culmen with calipers. Not all the specimens examined were included in Tables 1 and 2 (e.g., worn plumage, damaged skins, uncertain localities). The examined material was deposited in the following institutions: Museo Nacional de Historia Natural (Havana), Instituto de Ecología v Sistemática (Havana), University of Havana, Academy of Natural Sciences Philadelphia, American Museum of Natural History (New York), Smithsonian Institution (Washington), Museum of Comparative Zoology (Harvard), Field Museum (Chicago), Louisiana State Museum (Baton Rouge), University of Miami (Miami).

When we mention the main island

TABLE 2. Meristic (mm) and weight (g) data from Caprimulgus specimens from Cuba and its islands.

			Cuba	Zapata	Cayo Coco	Isle of Young	Isle of Young
			(main island)			North	South
MALES	Wing	Mean		174	177	181	171
		N		1	1	1	2
		SD					
		Range					168.0, 174.0
	Tail	Mean		124	130		124
		N		1	1		2
		SD					
		Range					121.0, 126.0
	Culmen	Mean	12.9				13.5
		N	9				1
		SD	2.2				
		Range	10.0-16.5				
	Tarsus	Mean	16.6		18.0		19.0
		N	5		1		2
		SD	2.4				
		Range	13.0-19.0				19.0, 19.0
	Weight	Mean	76.0		76.2		58.0
		N	4		1		2
		SD	7.6				
		Range	65.0-82.0				58.0, 58.0
FEMALES	Wing	Mean		173.0			175.5
		N		5			2
		SD		3.4			
		Range		169.0–177.0			175.0, 176
	Tail	Mean		126.0			124.0
		N		5			2
		SD		2.9			
		Range		122.0–129.0			122.0, 125.0
	Culmen	Mean	11.2				
		N	5				
		SD	0.6				
		Range	10.3-13.0				

TABLE 2. (Continuation)

			Cuba	Zapata	Cayo Coco	Isle of Young	Isle of Young
			(main island)			North	South
FEMALES	Weight	Mean	70.0	57.8			55.0
		N	1	3			2
		SD		2.7			
		Range		55.0-60.0			50.0, 60.0

specimens we are referring to the island of Cuba. Birds from Zapata are included.

VOCALIZATIONS

The song in Cuba (Fig. 1A) is a rather harsh buzzy sound with rising and falling pitch. It is unbroken, but gives the impression of four syllables, rather than the three suggested by the local common name, Guabairo. It might be paraphrased as "Gua bái ah ro."

The length of a song phrase shows some variation, from c. 0.5 to 0.7 s. The rate of delivery during a normal song session is fairly uniform, usually having one phrase every 1 or 1.2 s. The pitch of the prominent harmonics was in the 1.15 to 1.35 kHz range, as in the typical example here (Fig. 1A). Only one short song series was recorded during a brief visit to the Isle of Youth (Fig. 1B). It was similar in sound quality to that in Cuba proper, being slightly shorter in phrase length, slower in delivery, and it had the faint "tics" in the phrase, not present in Cuba.

The bird was recorded in the southern part of the Isle of Youth, and vocalizations there deserve additional study; this population is considered a subspecies, *C. cubanensis insulaepinorum*, as noted above, (Garrido 1983).

In contrast with the song phrase in Cuba, which has an overall drop in pitch, that in the Dominican Republic has an overall rise (Fig. 1C). Additional differences in the Dominican

Republic, include the phraseology in its common name, "Pitangúa," recognizing the distinct, separate "click" in the "pit" part of the name, not present in any of the 16 individuals' songs recorded in Cuba proper. Additionally, the prominent harmonics are c. 100 to 250 Hertz higher than those in Cuba. Also, the former phrases are longer, averaging from 1.0-1.5 s, vs 0.5-0.7 s in Cuba. The different song delivery rate is evident in the sonograms (Figs 1A, 1C). In the Dominican Republic, the mean from 71 intervals (8 birds) was 1.9-0.26 s (range 1.5-2.3), and in Cuba, 302 intervals (10 birds), was 1.2-0.24 s (range 0.9-1.5). The common name Pitangúa was listed by Wetmore & Swales (1931) and by Dod (1978).

After reviewing the songs of 18 other species of Caprimulgus in the cassette of Hardy et al. (1989), we found none whose territorial song was close to that of the nightjars in Cuba and the Dominican Republic. Those reviewed include the Puerto Rican Nightjar (C. noctitherus), Whip-poor-will (C. vociferus), Chuckwill's-Widow (C. carolinensis), Tawny-collared Nightjar (C. salvini), St. Lucia Nightjar (C. otiosus) and its vocal equivalent, Rufous Nightjar (C. rufus), as well as several other Central and South American species.

Although the two territorial songs under study did not show close relationship with other species' songs, consideration is given here to a few other vocalizations. On 30 May 1971, a change in speed of singing was noted

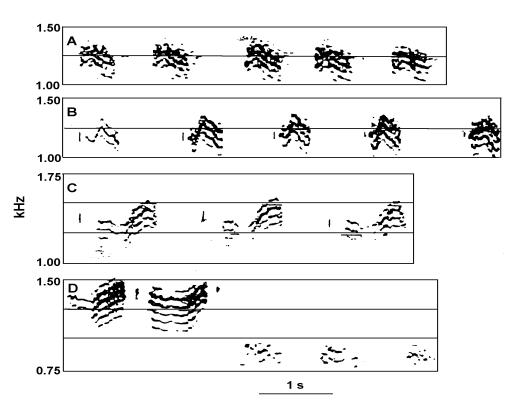


FIG. 1. Song of *Caprimulgus*. A) Characteristic territorial song phrases from Cuba; B) The only song example obtained from the Isle of Youth; C) Territorial song phrases from the Dominican Republic; and D) A modified breeding season vocalization from the Dominican Republic (accelerated phrase delivery, interrupted in a pause, and continued with low-pitched "gaams"; the original 3-s pause is reduced here to c. 0.3 s).

in a recording at Aguacate, Dominican Republic (Fig. 1D). At one point, the speed of delivery doubled, from one phrase every two s to one per s, for 5 phrases, then a 3 s pause, followed by 5 calls, paraphrased "gaaaw gaaaw gaaaw gaaaw" at the low pitch level of 0.9 kHz. The latter were accompanied by wing-clapping sounds, too faint to print out on the sonogram.

We have a recording of a Chuck-will's-Widow at Tallahassee, Florida, performing almost exactly the same sequence. Wing clapping is a recognized activity in several Caprimulgids, as discussed by Mengel *et al.*

(1972), from the Chuck-will's-Widow, European Nightjar (*C. europeus*), and the Common Poorwill (*Phalaenoptilus nutallii*). The clapping was from birds in flight, and was in some cases accompanied by "growling sounds." The speeding up of song was said to be at the time of arrival of a second bird.

A second type of vocalization was recorded on 25 April 1975 at Jarabacoa, in the Dominican Republic (Fig. 2A). During a period of c. 22 s, 10 low-pitched, very brief calls were heard, paraphrased "quat...quat", very faint, and with the fundamental tone at or near 1 kHz. The 2nd

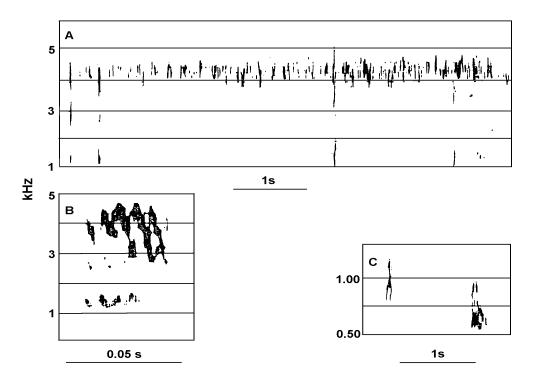


FIG. 2. Calls from Caprimulgus. A) Four disturbance "quit" calls from the Dominican Republic; B) Detail of the 2nd "quit" call above; and C) An infrequently heard "gueck gan" call from Cuba.

"qual" is shown (Fig. 2B) expanded. The bird was estimated to be about 8 m away, and the vocalization was a disturbance reaction to the recorder's activities in its territory. The Whippoor-will also uses similar vocalizations. A wintering migrant was tape recorded at Homestead, Florida, 19 February 1962, when it gave 6 "quit" calls, before starting a series of the "whip-poor-will" songs. A whistled imitation of the call brought the bird back, hovering and circling low overhead. The Puerto-Rican Nightjars also use a "quit," or "quat" call, interspersed in singing sessions, at least when other singing birds are nearby.

On 27 march 1984, at Jibacoa, Cuba, a resident nightjar was calling and making wing-clapping sounds. At that time, 05:50 h, there was only sporadic singing from other birds,

when a nearby bird gave a weak vocalization (Fig. 2C), paraphrased here as "gueck gaam". This was very low-pitched at c. 0.8 and 0.6 kHz for the two phrases. The purpose of the call is not known, but may be a part of courting activities; we have not located any published examples of similar calls for any Caprimulgus species.

There may be now vocal evidence of common ancestry of the Whip-poor-will and the nightjar in Hispaniola; each has an introductory "click" in the territorial songs and each has a "quit" type of disturbance call. On the other hand, the Chuck-will's-Widow and the nightjar in Hispaniola share the rather complex sequence of the speeded-up song, a pause, "gaaw" calls and "wing-clapping". To date, we have not located territorial songs

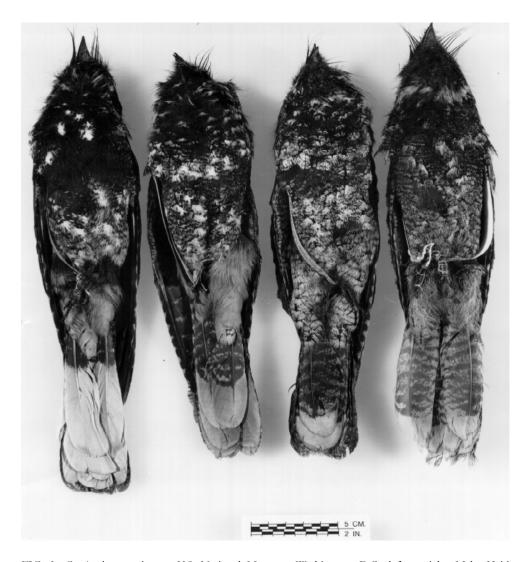


FIG. 3. Caprimulgus specimens, U.S. National Museum, Washington, D.C., left to right: Male, Haiti-#327685; female, Dominican Republic- #279260; female, Cuba- #395362; female, Cuba- #24486. Note the larger white patches on tail of Hispaniolan birds; darker coloration and less streaked anal and undetail feathers.

similar to that of the nightjar in Cuba. The latter does, however, use "wing-clapping", but its "gueck gaan" call (Fig. 2C) may be unique.

MORPHOLOGY

Several species of *Caprimulgus* in general look very similar. There are six taxa of American

Caprimulgus wherein the whitish-beige patches under the end of the tail are longer than Cuban's cubanensis. These are: ekmani from Hispaniola (Fig. 3), *rufus* (three different races) from South America, otiosus from St. Lucia, salvini from Mexico, badius from Yucatán, and ridgwayi also from Mexico. From these taxa, ekmani is closest to salvini, but the former displays more extended, less whitish, almost beige, tail patches. In this respect, it closely resembles rufus. Size of wing chord is about the same. The black flecks of the head of ekmani are much wider and more defined than those of cubanensis; they are quite similar to salvini. Ventrally, they also resemble each other, but the latter has still more white on the feathers, and has a darker and more pronounced rufous nuchal collar. It is interesting to note that despite its occurrence in Mexico, salvini is more similar to ekmani from Hispaniola, than to ridgwayi from Mexico.

Only brief references have been found concerning the size of *Caprimulgus* in Hispaniola. Dod (1978: 193) cited only the length, 27–28 mm. Wetmore & Swales (1931: 251) described one female specimen, collected by W. L. Abbot, in the Dominican Republic, reporting "It has the following measurements (in millimeters): wing 170.5, tail 128.3, culmen from bas 16.3, tarsus 17.9. The dimensions are closely similar to those of *A. c. cubanensis*. Gundlach (1893) only gave brief descriptions of size, coloration and localities. He did not even find their eggs. There are no skeletons of these two forms in collections (Storrs L. Olson, pers. comm.).

Unfortunately, we have only wing and tail data from Hispaniolan specimens (Table 1), showing wing length essentially the same in the two populations. Tail length is marginally longer in Hispaniola, and there is considerable overlap in the ranges. In a second comparison, using a t-test for small, unequal sample sizes, the 6 specimens from the Zapata area had a mean of 125 mm, compared

with 139 form the 4 Hispaniolan specimens: the difference resulted in a t-value of 2.54, exceeding the 2.306 needed for significance at the 5% level. Other data (Table 2) from Cuba, although limited in coverage and sample size, are presented for the record, and for possible use in any later studies.

Since the main object of this contribution is to determine if the Cuban and Hispaniolan birds are conspecific, we will discuss some differences in detail that have not been precisely described.

Both sexes of Hispaniolan ekmani have more extended beige-whitish patches of the under rectrices than does cubanensis (70 mm Hispaniolan against 28 mm Cubans) in males (Fig. 3). In addition, the color of these markings on ekmani is also very beige, even lighttan. But Bond (1939: 3) wrote: "I have recently received from Navarrete, Dominican Republic, a male of this rare Nightjar. This differs strikingly from the male of the Cuban race in having most of the distal half of the outer rectrices white, these feathers being merely broadly tipped with white in Cuban birds." The anal coverts in ekmani are also very beige, almost tan, and without any streaks, vermiculations, or even barring, as has cubanensis (Fig. 3). Ventrally, both forms are quite similar, although ekmani males are decidedly blacker around the breast. Females are more similar. The buffy collar is more conspicuous in cubanensis than in ekmani, on which it is practically indistinguishable from the rest of the throat feathers. The barring of the undertail rectrices is also more marked in cubanensis. Dorsally, they look more alike, including other taxa such as salvini, for instance; but ekmani is more blackish, and displays more whitish feathers on the back. Ekmani also has wider and sometimes confluent black streaks on the head. The females also display this wider streaking. Both taxa (specimens examined in Tables 1 and 2) exhibit similarly shaped rictal bristles bent inward at the end, but these bristles are slightly longer in cubanensis (48 mm against 41).

CONCLUSION

Our study of territorial songs in Hispaniola and Cuba supports the suggestion in the American Ornithologists' Union Check-list (1983) that the population in Hispaniola may be a separate species, based on vocalization differences. The songs differ in pitch, phraseology, and length and speed of delivery of the individual phrases. There were also found a number of plumage differences including color, pattern in dorsal head flecks and streaks, size and color or ventral tail patches, and streaking of vent area coverts. Therefore, C. cubanensis becomes a species endemic to the Cuban archipelago, whereas C. ekmani is endemic to the island of Hispaniola. The proposed new taxonomic arrangement would be: Caprimulgus cubanensis cubanensis Lawrence, 1860, inhabiting the island of Cuba and Cayo Coco (Archipelago Sabana-Camagüey), C. c. insulaepinorum Garrido, 1983, inhabiting the Isle of Youth (Archipelago de los Canarreos). The populations from the Zapata Swamp are considered intermediate between cubanensis and insulaepinorum, (Garrido 1983). Typical populations of this latter taxon inhabit the southern part of the Isle of Youth, south of "Ciénaga de Lanier." And finally, Caprimulgus ekmani Lönnberg 1929 is distributed in Haiti and the Dominican Republic (Island of Hispaniola). Suggested common names are Cuban Nightjar and Hispaniolan Nightjar.

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