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ON THE STATUS OF BATS ON ANDROS AND SAN SALVADOR ISLAND, BAHAMAS

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ABSTRACT

Six species of bats have been identified from Andros and San Salvador Islands. Four of these occur on both islands and each has one species not shared by the other. Two new records, *Natalus tumidifrons* for Andros and *Tadarida brasiliensis* for San Salvador are reported for the first time. Information on the reproduction of each species in the islands is provided.

INTRODUCTION

At least once a year since 1984 I have been privileged to visit either Andros or San Salvador Island with the primary purpose of either teaching or pursuing research interests. During each visit observations on bats were made. Visits to Andros Island included 26 May to 9 June 1984, and 24 May to 8 June 1986 where work was conducted through the Forfar Field Station. Studies on San Salvador Island were centered at the Bahamian Field Station during 25 May-8 June 1985; 27 December 1985-4 January 1986; 23 May-6 June 1987; 6 January-8 February 1988; 21 May-4 June 1988; 23 May-6 June 1989; 14-21 June 1989; 22-31 May 1990; 14-23 May 1991; 15-21 April 1992; 12-21 May 1992; 3-12 February 1993; 11-20 May 1993; 7-14 June 1993.

The goal of studying the bats on these islands was to learn as much as possible about their distribution, ecology, and physiology. In this paper I present an update on the distribution of the species known to occur on the islands and discuss their reproduction.

Eleven species of bats are known to occur in the Bahamas. Of these, six species are known to inhabit one or both of the two islands discussed herein. Occurring on both islands

are *Macrotus waterhousii* (big eared bat), *Erophylla sezikorni* (buffy flower bat), *Natalus tumidifrons* (Bahamian funnel eared bat), and *Eptesicus fuscus* (big brown bat). *Lasiurus borealis* (*minor?*) (red bat) has been reported only for Andros Island, and *Tadarida brasiliensis* (Brazilian free-tailed bat) has been reported only for San Salvador Island.

METHODS

My studies on Andros Island were restricted to the northeastern region where I visited two caves near an area known as Morgan's Bluff. The general habitat of this area is known as whiteland coppice (Correll and Correll, 1982) and consists of an array of dense woody vegetation. The caves (referred to herein as Morgan's Cave and Bat Cave) are approximately 3 km west of Nicholes Town and are within 1 km of each other. Morgan's Cave is small and shallow with two entrances approximately 10 m apart. The larger entrance opens into a room approximately 10 m X 4 m with a ceiling height averaging approximately 2.5 m. Limited light enters through this entrance so that during daylight much of the cave is dimly lighted. Because of the small size and shallowness of the cave, air circulates freely through it. Bat Cave is more extensive than Morgan's Cave and has several side rooms. It has a verticle entrance of some 2 m diameter and a nearby smaller horizontal entrance. Little light penetrates Bat Cave and it is warm and humid.

My studies on San Salvador covered much of the island including nearly all the known caves. The two major caves visited on San Salvador Island are Lighthouse Cave located in the northern part and Altar Cave in the southern part of the island. Both caves are described in Gerace (1983). Several smaller

conduit caves, mostly located near the Bahamian Field Station, were also visited. The habitat where these caves are located are best described as scrubland and lacks the taller woody vegetation found on Andros Island. Identification of bats was frequently done by observing them in their day roosts in caves. Descriptions of all but *L. borealis* can be found in Andersen (1990). Specimens were captured at night by use of mist nets strung over or near the entrances of caves and a "harp trap" used primarily at the entrance of a concrete block building approximately 2 1/2 mi west of the Bahamian Field Station. Voucher specimens were kept of all species except *M. waterhousii* and deposited in the Carnegie Museum of Natural History collection of mammals.

SPECIES ACCOUNTS

Macrotus waterhousii---Two subadult specimens of the big eared bat taken on San Salvador in 1903 are in the American Museum of Natural History (Koopman *et al.*, 1957). No other specimens have been reported from this island and none have been observed during my studies.

At Bat Cave on Andros Island two specimens of *M. waterhousii* were captured on 6 June 1984. Both specimens were lactating females, which were released after identification. Only a few other specimens of this species were seen as they emerged from the cave, but avoided the net. Allen (1911) had previously reported this species from Andros Island.

Erophylla sezekorni---Buden (1976) provided the first apparent report of *E. sezekorni* collected in 1968 from Andros Island. No members of this species was identified by me on that island. On San Salvador the buffy flower bat appears to be common (Andersen, 1990) and occurs in Lighthouse and Altar Caves. It appears to prefer larger caves as I have not seen it in any others on the island.

Parturition occurs in this species in early summer as indicated by nine "well developed fetuses" (mean crown-rump length = 15.8 mm) obtained from pregnant females on Andros Island on 27-28 April 1968 and a lactating female from San Salvador on 26 June 1966

(Buden, 1976). Large fetuses (mean crown-rump length of three = 25.4 mm) were found in pregnant females on San Salvador Island in early June (Andersen, 1990) and on 10 June 1993 a female with a nearly hairless newborn was seen in Lighthouse Cave. Numerous other adult individuals of this species were observed on the same day, but none were carrying babies.

Natalus tumidifrons---This is the only species of bat endemic to the Bahamas, and until recently was known to occur only on San Salvador and Great Abaco Islands (Koopman *et al.*, 1957; Ottenwalder and Genoways, 1982). Four specimens (3 females and 1 male) were captured at Bat Cave on Andros Island on 6 June 1984. Many others of this species were noted avoiding the net as they swarmed from the cave.

On San Salvador, *N. tumidifrons* appears to be common and can be found using many of the caves including small ones such as Garden Cave and others near Reckly Hill (Andersen, 1990). However, its presence and abundance at any given day is generally unpredictable. Even in Alter Cave where individuals are always present the population estimates range from 20 to 200 individuals.

The reproductive cycle in this species is unknown and no female specimens observed by me in winter and early summer were gravid or lactating. Testes in all males examined were regressed.

Eptesicus fuscus---Koopman *et al.* (1957) reported *Eptesicus fuscus* from both Andros and San Salvador Islands. On Andros Island I located one maternity colony (approximately 150-200 bats) in Morgan's Cave in both 1984 and 1986. A second maternity colony (approximately 200 bats) was located in a vacated industrial building near the San Andros airport in 1986.

On San Salvador Island *E. fuscus* has been taken from "an old church in Cockburntown" (Allen and Sanborn, 1937) and a concrete block building near the Bahamian Field Station (Andersen, 1990). Although it has been reported to occur in caves on other islands (Koopman *et al.*, 1957; Buden, 1985) there are no records of it being in any of the caves on San Salvador.

The reproductive cycle of this species on the islands merits further study. On Andros Island the maternity colonies contained young that were capable of flying in early June, thus suggesting parturition in early May. On the other hand, females on San Salvador Island were still gravid in early June (Andersen, 1990).

Lasiurus borealis---The status of the red bat in the Bahamas is uncertain although specimens are reported for Andros and other islands (Koopman et al., 1957). On 30 May 1986 an additional specimen was found lying crushed flat on the road near San Andros, Andros Island. No specimens have been reported for San Salvador Island.

The reproductive status of red bats in the Bahamas is unknown.

Tadaridabraciliensis---Although the Brazilian free-tailed bat has not been reported from Andros Islands, Koopman et al. (1957) predicted that it was likely to occur there. The first specimens known from San Salvador are a male and a female captured at the same location but on separate dates (15 May 1992 and 7 February 1993 respectively). Both were captured, along with several *Eptesicus*, with a bat trap placed at an entrance to an abandoned concrete block building near the Bahamian Field Station. Whether these specimens represent a permanent population or are transients is uncertain. None has been seen in caves or other areas of the island.

The reproductive status of this species in the Bahamas is uncertain although in Florida it gives birth in June (Sherman, 1937).

DISCUSSION

My studies of bats on the islands have provided some insight into their biology and raise many questions as well. In terms of distribution I have confirmed the presence of *T. brasiliensis* on San Salvador and *N. tumidifrons* on Andros. However, the fact that only two specimens of the former were taken at different times makes its status on the island uncertain. If it is a permanent resident, a colony using a day roost in a building or cave should be expected to be found. No specimens of *M. waterhousii* are known to have been

identified from San Salvador since those taken in 1903. If this species is a permanent resident it also should be found in buildings or caves. The two specimens reported by Koopman et al. (1957) are immature, thus perhaps implying they were born on the island and that a resident population existed at that time. However, both *T. brasiliensis* and *M. waterhousii* occur on Cat Island (Hall, 1981; McHale, 1986) which is approximately 65 km west of San Salvador. Because of the close proximity of the two islands occasional visits of bats between them should be expected, and thus these specimens were not necessarily residents of San Salvador.

Red bats in the Bahamas have been considered as both a distinct species (Hall, 1981) and as a subspecies, *L. b. minor* (Pine, 1980; Buden, 1985). However, relatively few good museum specimens are available from the islands (Koopman et al., 1995; Buden, 1985) and their status is still questionable. The specimen I took on Andros has no measurable skeletal parts and thus, based on previous records (Koopman et al., 1957), is tentatively identified as *L. b. minor*.

Some of the more intriguing questions that have sprung from these studies relate to reproduction. For example, the long eared bat in southwestern United States goes through a period of delayed development after fertilization in the fall (Bradshaw, 1962). Do the Antillian populations have a similar reproductive phase?

Female big brown bats in continental United States, like other temperate bats, mate in fall but store sperm over winter in the reproductive tract with subsequent fertilization occurring upon arousal from hibernation. Has this species foregone sperm storage in the Bahamas since it does not hibernate there? Also, what is the explanation for the apparent difference in parturition time on Andros (mid-May) versus San Salvador (mid-June)? These and many other unanswered questions about the bats of the northern Bahamian islands demonstrate the need for further and more intensive investigations that will lead to a better understanding of their biology.

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