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New and Noteworthy Records from Ten Jamaican Bat Caves

LILIANA M. DÁVALOS¹ AND REBECCA ERIKSSON² ¹Department of Ecology, Evolution and Environmental Biology, Columbia University, and Division of Vertebrate Zoology, American Museum of Natural History, Central Park West at 79th Street New York, New York 10024-5192, USA. davalos@amnh.org. ²12 St. Michaels Terrace, Kingston 6, Jamaica, West Indies

The status and distribution of Jamaican bats is poorly understood despite a handful of publications throughout the last 50 years. Koopman and Williams (1951) and Williams (1952) reviewed the fossil and subfossil bats collected in caves by H.E. Anthony during three months in 1919-1920 and found 17 species in fossil and subfossil layers, including *Brachyphylla nana*, a species currently extinct in Jamaica. Anthony also collected individuals of 13 extant bat species. The difference in species composition found by Anthony led the aforementioned authors to suggest that *Natalus* and *Phyllonycteris* were extinct in Jamaica, and that *Ariteus* had replaced *Brachyphylla* and was itself being replaced by *Artibeus*. Goodwin (1970) reported results from surveys for extant bats in 13 caves, showing that neither *Natalus* nor *Phyllonycteris* were extinct. Howe (1974) reported captures in habitats not immediately associated with caves, suggesting that the paucity of records for *Phyllonycteris* and *Ariteus* stemmed from sampling bias toward caves. McFarlane (1986, 1997) and Fincham (1996) compiled extant bat lists for more than 30 caves, documenting 18 species. Less information is available about species that do not roost in caves (McFarlane, 1986), although Genoways (2001) has presented locality data for *Ariteus*. The recent and fossil bat fauna of Jamaica is composed of 24 species, including 3 species extirpated from the island but

extant elsewhere: *Mormoops megalophylla*, *Tonatia saurophila*, and *B. nana* (Koopman and Williams, 1951; Williams, 1952; Koopman, 1989).

This note presents data from two expeditions to Jamaica (28 Nov-18 Dec 2001 and 20-27 Mar 2002). We surveyed 10 caves (Fig. 1), collected voucher specimens from 7 of them, and document new localities for the endemic Jamaican Fig-eating bat *Ariteus flavescens*. Since the main objective of our surveys was to capture and collect selected species for subsequent systematic studies, we did not standardize the sampling effort. We erected 1 or 2 mist nets (10 × 3 m, 70-d) at dusk at cave entrances and in adjacent forests from 18:00 to 21:00. At Portland Cave all trapping was done in the surrounding dry scrub, and at Geneva Mountain Rat Bat Cave individuals were captured using a hand net. Captured individuals were identified to species using Baker et al. (1984) and reproductive condition and age were noted following Racey (1988) and Anthony (1988). Voucher specimens were collected for each bat species at every locality except Ratbat Cave (Little Bay) and Portland Caves 1 and 2 (Portland Cottage). Excluding 1-3 individuals per species collected at each locality, all captured bats were released on site after measuring. Voucher specimens from our surveys, including tissue preserved in lysis buffer, were deposited at the Department of Mammalogy of the American Museum of Natural History under accession numbers AMNH 274598-274634. Field notes were deposited at the Library of the Department of Mammalogy of the American Museum of Natural History. Taxonomy follows Simmons (in press).

Table 1 presents a summary of chiropteran records from the cave localities we surveyed. The following five caves had not been included in published accounts of Jamaican bat caves (Goodwin, 1970; McFarlane, 1997; Fincham, 1997): **Geneva Mountain Rat Bat Cave** (18° 21' 01.0" N, 78° 09' 10.5" W, reference datum: WGS84, Westmoreland) was discovered by the Dolphin Head biological survey (Koenig, 2001) and

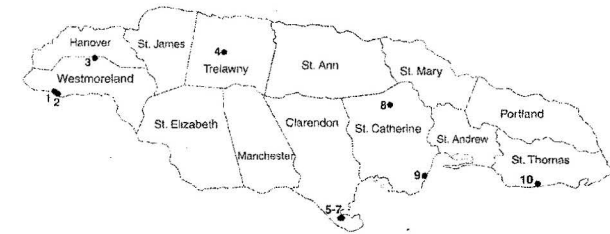


FIG. 1. Map of Jamaican parishes and location of bat caves reviewed in this article. 1= Ratbat Cave (Little Bay, Westmoreland); 2= Monarva Cave (Revival, Westmoreland); 3= Geneva Mountain Rat Bat Cave (Westmoreland); 4= Windsor Great Cave (Sherwood Content, Trelawny); our captures from upper entrance, other records from both upper and lower entrances; 5= Portland Cave 1 (Portland Cottage, Clarendon); 6= Portland Cave 2 (Portland Cottage, Clarendon); 7= Portland Cave 9 (Portland Cottage, Clarendon); 8= St. Clair Cave (Polly Ground, St. Catherine); 9= Two Sisters Cave (Hellshire, St. Catherine); and 10= Ratbat Hole (Botany Bay, St. Thomas).

is located a 45 min drive SW from Askenish (Hanover) and 30 min hike from King Pen into Geneva Mountain. This cave harbored several thousand *Pteronotus quadridens* and *P. parnellii*, easily caught at dawn (4 December 2001) when they returned to the 5-m wide entrance we surveyed. A previous

species assessment conducted on 27 April 2001 recorded 19 *Mormoops blainvillii* and 16 *P. quadridens* (Koenig, 2001). **Ratbat Cave** (18° 12' N, 78° 14' 24" W, reference datum: WGS84 [from ArcView 3.2], Little Bay, Westmoreland). This locally well-known cave, located 3 min walk from the

TABLE 1. Bat species collected in 10 cave localities, including number of captures. Bat presence according to other sources, when the species was not observed in our survey: G = Gannon (1999), K = (S. Koenig pers. comm.), M = McFarlane (1986, 1997), F = Fincham (1996, see text for comments on this source). Our observations are listed as capture numbers (December 2001) or, when species were observed but not captured, as TP. Locality numbers match those in Figure 1.

Species/cave	1	2	3	4	5	6	7	8	9	10
<i>Noctilio leporinus</i>		F		F	F			F	2	
<i>Mormoops blainvillii</i>		5	K	5	F			42		
<i>Pteronotus parnellii</i>		10	2	25				20		16
<i>Pteronotus quadridens</i>		25	10					5		
<i>Pteronotus macleani</i>		2		M				2		
<i>Glossophaga soricina</i>				G	M		2		1	
<i>Monophyllus redmani</i>				14				7		14
<i>Erophylla sezekorni</i>				3			1	M		33
<i>Phyllonycteris aphylla</i>				F				M		
<i>Macrotus waterhousii</i>				6	23	TP	14	F		
<i>Artibeus jamaicensis</i>	TP			F	F	F				6
<i>Natalus major</i>					F			M		
<i>Chilonatalus micropus</i>		M		K				2		
<i>Eptesicus fuscus</i>				M						
<i>Molossus molossus</i>		M								
<i>Tadarida brasiliensis</i>				G						
<i>Eumops glaucinus</i>								F		

Little Bay elementary school, housed hundreds of *Artibeus jamaicensis* as a day roost (12:00, 5 December 2001). This cave is large and well ventilated and its 25 m wide \times 3 m tall entrance leads to a well-lit chamber approximately 75 m in diameter. The light and exposure conditions of this cave suggest that its bat community is restricted to *Artibeus* and other roosting generalists (Silva-Taboada, 1979). **Portland Cave 9** (17° 45' 12.1" N 77° 09' 28.4" W, reference datum: WGS84, Portland Cottage, Clarendon). This minor entrance was found while searching for entrances to Portland Caves 1 and 2 (Fincham, 1997: 294-295). Portland Cave 9 is located a 15 min hike south of entrances 1 and 2. A 3 m wide, low (1.5 m), entrance in overgrown secondary scrub marks the locality. On 9 December 2001 we captured *Glossophaga soricina*, *Erophylla sezekorni*, and *Macrotus waterhousii*. Fourteen female *M. waterhousii* were captured, all in late gestation, as were 13 the females captured from Portland Cave 1 on 14 December 2001. On this last date we also observed at least 10 *M. waterhousii* females with young pups inside Portland Cave 2. Silva-Taboada (1979) noted that *M. waterhousii* females did not carry pups during regular night flight. We did not capture females with pups outside Portland Cave 2, so our observations inside the cave are consistent with the behavior observed in Cuba. **Two Sisters Cave** (17° 54' N, 76° 54' W, reference datum: WGS84 [from ArcView 3.2], Hellshire, St. Catherine). This local attraction, located about 30 min SE of Spanish Town, is depicted on Jamaican tourist maps and is equipped with observation platforms that offered exceptional views of about 20 *Noctilio leporinus* fishing immediately after dusk (18:00, 11 December 2001). One *Glossophaga soricina* was also captured. A Barn Owl (*Tyto alba*) circled the cave for about 2 h, occasionally returning to its nest near the top of the east entrance. **Ratbat Hole** (17° 52' 12" N, 76° 29' 24" W, reference datum: WGS84 [from ArcView 3.2], Botany Bay, St. Thomas) does not correspond to Bat Hole Cave of Donaldson (1997: 61) but it may correspond to Rat Bat Hole 2 of Donaldson (1997: 68) and/or to Botany Bay Cave of Fincham (1997: 101). A

20 min steep hike north from Botany Bay leads to this karst cave well known among guano collectors. The cave entrance is 5 m wide and leads to a vertical drop 15-20 m deep. We captured numerous *Pteronotus parnellii*, *Monophyllus redmani*, *Erophylla sezekorni*, and *Artibeus jamaicensis* (Table 1) on 16 December 2001. We surveyed the cave again on 23 March 2002 and found no *M. redmani* and only five *E. sezekorni*. Twenty-seven of 30 *P. parnellii* captured on our second visit were heavily pregnant females. Ten *A. jamaicensis* captured on our second visit were males in reproductive condition. A Jamaican boa *Epicrates subflavus* was found at the entrance of the cave during both visits.

McFarlane (1986) highlighted six species in his paper about the conservation status of Jamaican cave bats: *Monophyllus*, *Erophylla*, *Phyllonycteris*, *Natalus*, *Chilonatalus*, and *Eptesicus*. We did not sample known localities of *Eptesicus* and did not detect *Phyllonycteris* or *Natalus* despite mist netting at St. Clair and Windsor Great caves (Table 1). It should be noted that the record of *Phyllonycteris* (Fincham, 1996) from Windsor Great Cave (Table 1) may represent a field misidentification of *Erophylla* (Gannon, 1999). *Natalus major* is only known in Jamaica from St. Clair Cave (AMNH 182000), where it was first collected in 1951 (Goodwin, 1959). Fincham's (1996) record from Portland Cave 2 (Table 1) also seems suspect considering the open, well-ventilated cave conditions. Since Fincham's list is not supported by vouchers, and given the possibility of misidentification, his records should be interpreted with caution (if not disregarded). The distribution of *Phyllonycteris* and *Natalus* within our localities is probably restricted to St. Clair Cave. Of the remaining species, we collected *Chilonatalus* (*Natalus*) *micropus* at St. Clair Cave, but not at Monarva or Windsor Great Cave (Table 1). We found decreases in capture of 100% for *Monophyllus* and 84% for *Erophylla* at Ratbat Hole (St. Thomas) between our two visits. Both species depend on local plant resources presumably associated with rainfall and these observations may point to seasonal variations in abundance and distribution.

In 2001 we also documented three new localities for the poorly known and threatened, Jamaican endemic *Arctites flavescens* (Hilton-Taylor, 2000). We found the species in early secondary stands outside the Monarva Cave entrance (Westmoreland, 5 December 2001), in primary forests near the upper entrance of Windsor Great Cave (Trelawny, 2 and 3 December 2001), and in late successional stands around Portland Cave 9 (Clarendon, 9 December 2001). Despite extensive work by H.E. Anthony (Koopman and Williams, 1951; Williams, 1952) and ongoing surveys (Susan Koenig pers. comm.) at Windsor Great Cave and environs, ours is the first live record of this species at this locality; it is also the first record for the less-studied Monarva area. Several owl pellet specimens (AMNH 269832-269834, see McFarlane and Garrett, 1989) had been collected from Portland Ridge (Clarendon) but no live *Arctites* had been reported until now. After our survey, S. Koenig mist-netted another individual flying close to the ground in front of the upper entrance of Windsor Great Cave (pers. comm.).

Williams (1952) proposed decrease in primary habitat as the main explanation for the absence of *Arctites* from H.E. Anthony's 1919-1920 extensive collection. *Arctites* was later found in banana-coconut groves in eastern Portland (Howe, 1974) and our observations confirm that this species, regardless its (unknown) habitat preference, is not exclusive to primary habitat. In March 2002 we revisited the Monarva locality and did not detect this species; during this last trip we also placed nets in *Piper* stands approximately 1 km west of Windsor Great Cave but failed to capture *Arctites*.

The need for more information about the natural history, status, and distribution of Jamaican bats, and the Jamaican fauna in general, is today as great as ever. But observations cannot be established conclusively without vouchers: detailed notes, photographs, and ultrasound recordings, as well as skins, skulls, skeletons, and preserved specimens. We urge all those conducting chiropteran surveys in Jamaica to collect as much information as possible on bats, their natural history and habitat, and

to publish the results of such efforts in detail.

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