Mammalia 74 (2010): 93–95 © 2010 by Walter de Gruyter • Berlin • New York. DOI 10.1515/MAMM.2009.070

Short Note

First record of *Ardops nichollsi* from Antigua, Lesser Antilles

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Keywords: Antigua; *Ardops*; Barbuda bank; biodiversity; conservation; forest; Pleistocene; tree bat.

The chiropteran fauna of Antigua, Lesser Antilles was recently described after a mist net survey in a variety of habitats (1998–2003) and after a thorough search and examination of museum voucher specimens from previous survey and collection efforts (Pedersen et al. 2003). The chiropteran fauna of Antigua consists of seven species of bats: two frugivores, *Artibeus jamaicensis* and *Brachyphylla cavernarum*; one nectarivore, *Monophyllus plethodon*; one carnivore, *Noctilio leporinus*; and three insectivores, *Natalus stramineus*, *Molossus molossus*, and *Tadarida brasiliensis*. Antigua's bat fauna falls below the expected species-area regression curve for chiropteran fauna in the Antilles, indicating that other species of bats should be present on this island (Pedersen et al. 2003). It was noted that ''most notable by its absence is *Ardops nichollsi*, a common tree-roosting fruit bat found throughout the Lesser Antilles that is common on the smaller nearby islands.'' The absence of *Ardops nichollsi*, a Lesser Antillean endemic, from Antigua has been suggested to be an ecological rather than a biogeographical problem (Breuil and Masson 1991). Herein, we report the first record of a Lesser Antillean tree bat, *Ardops nichollsi*, from Antigua, West Indies, and the first record of *Ardops* from the Pleistocene Barbuda bank.

On the night of 21 October 2008, mist netting was conducted near the Wallings Reservoir as part of an ongoing survey of population levels at this location. This 13 million gallon reservoir was constructed in 1890 and is surrounded by a mixed evergreen deciduous forest that was planted in 1915 (Loveless 1960). This forest is primarily composed of locust (*Hymenaea courbaril*), ironwood (*Exostema caribaeum*), mahoe (*Daphnopsis americana*), black loblolly (*Guapira fragrans*), mango (*Mangifera indica*), white cedar (*Tabebuia pallida*), mahogany (*Swietenia mahogani*), and Spanish oak (*Inga laurina*). Three ground-level mist nets (6×2.8 m, n=2, 9×2.8 m, n=1) were set to fill the potential flyways across the main water channel drain and sediment trap, situated just below the reservoir, across the access road to the reservoir, and near the dam spillway. The nets were open from 18:00 to 22:00 h and monitored with captured bats removed from nets and held in cloth holding bags until after all nets were closed and measurements recorded (weight, forearm length, reproductive status, tooth wear, presence of scars, and external parasites). Bats were subsequently released or taken as vouchers for further study.

A female Lesser Antillean tree bat, *Ardops nichollsi* (TTU 109090) was netted at Wallings Reservoir, St. John Parish, elevation 166 m (17°02′05.6″ N, 61°49′27.3″ W), on the island of Antigua. This nulliparous female exhibited no obvious reproductive activity. External and cranial measurements (recorded with digital calipers, in millimeters) are as follows: total length, 66; length of hind foot, 16; length of ear, 17; length of forearm, 50.8; greatest length of skull, 23.2; condylobasal length, 20.5; zygomatic breadth, 15.4; postorbital constriction, 6.2; mastoid breadth, 12.5; length of maxillary tooth row, 7.9; breadth across upper molars, 10.0. Based on our external and cranial measurements, we assign this specimen to the taxon *Ardops nichollsi annectens* Miller, which was previously known only from the Lesser Antillean island of Guadeloupe (Jones and Schwartz 1967). Two subspecies have been identified in the region, however. *A. n. montserratensis* is currently known from Montserrat northward in the Lesser Antilles (Jones and Schwartz 1967, Pedersen et al. 1996, 2003), and *A. n. annectens* is known only from Guadeloupe (Baker et al. 1978). Measurements of our specimen match almost exactly those of a female *A. n. annectens* (TTU 20832) from Guadeloupe (Baker et al. 1978).

This is the first record of *Ardops nichollsi* from Antigua (Pedersen et al. 2006). This tree bat was captured along with six *Artibeus jamaicensis* in the net set across the sediment trap below the reservoir. The other two nets captured six *Noctilio leporinus*, two *Brachyphylla cavernarum*, and four *Molossus molossus*. Together, these three nets captured 19 bats belonging to five species.

This new record gives Antigua a chiropteran fauna of eight species typical of the nine islands north of Guadeloupe, which constitute the Northern Antillean Faunal Area (Genoways et al. 2007a). Excluding Montserrat, these island faunas share the same eight species of bats—*Noctilio leporinus*, *Monophyllus plethodon*, *Brachyphylla cavernarum*, *Ardops nichollsi*, *Artibeus jamaicensis*, *Natalus stramineus*, *Tadari-*

da brasiliensis, and *Molossus molossus* – none of which are endemic to this series of islands. This faunal area is a transition zone between the Lesser Antillean Faunal Core to the south and the Greater Antillean Faunal Core to the north and west. Beyond its significance as a new island record, this is the first record of *Ardops* from the Pleistocene Barbuda bank. During maximal sea level depression in the Pleistocene (Clark et al. 2009), it is believed that only five islands existed to the north of Guadeloupe in the northern Lesser Antilles (Pregill and Olsen 1981, Pregill et al. 1988, Weiss 1994, Genoways et al. 2007a). These islands include Montserrat, Saba (which might have been somewhat larger because of the emergence of part of the Saba bank), the St. Martin bank (incorporating St. Martin, St. Barthélemy, and Anguilla), the St. Kitts bank (including St. Kitts, Nevis, and St. Eustatius), and the Barbuda bank (consisting of Antigua and Barbuda). Based on previous information, the Barbuda bank was the only one of these Pleistocene emergent landmasses from which *Ardops nichollsi* had not been recorded.

Previous bat survey work on Antigua included 78 net-nights of effort with 21 of these expended at the Wallings reservoir with five of Antigua's eight species being captured at this one location (*A. jamaicensis*, *B. cavernarum*, *N. leporinus*, *T. brasiliensis*, *M. molossus*; Pedersen et al. 2006). That previous mist-netting efforts did not yield *Ardops* at this location is unsurprising given that the bias associated with this capture method severely limits capture rates (<5%; Larsen et al. 2007), which in turn can affect estimates of bat diversity. In addition, the total effort of Pederson et al. (2006) was not a great amount (78 net nights) to characterize an island the size of Antigua, hence ongoing monitoring. As such, additional survey efforts are strongly encouraged to continue to determine if other present but undocumented taxa are on Antigua, such as *Chiroderma improvisum*, *Sturnira thomasi*, *Eptesicus guadeloupensis*, and *Myotis dominicensis* (Pedersen et al. 2006, Larsen et al. 2007).

Ardops nichollsi is the sixth species netted at the Wallings reservoir area making the mountainous, volcanic southwestern corner of the island a bat diversity hotspot on Antigua. Historically, this relationship is consistent with the absence of *A. nichollsi* from the Holocene cave deposits of Burma Quarry in north-central Antigua, St. George Parish (Steadman et al. 1984, Pregill et al. 1988). This site includes fossils of at least eight species of bats, including three species that are extinct on the island, but there is no evidence of *Ardops*. Ecologically, there are very few remnants of closed-canopy, evergreen seasonal forest on Antigua (Loveless 1960) and these are located in protected mesic valleys on Boggy Peak, Rock Peak, Sugar Loaf Mountain, and Wallings Hill. Given the association of *Ardops* with similar habitats on other islands throughout the region (Genoways et al. 2007a), the habitat available for this species on Antigua is limited to approximately 22 km^2, which is less than 8% of the surface area of the island. This is a fairly restricted geographic area, but we have found *Ardops* occupying even smaller areas, such as on Saba with as little as 4 km^2 of effective habitat (Genoways et al. 2007a) and St. Martin where the suitable inhabitable area might cover as little as 1.5 km^2 along the western slope of Pic du Paradis (Genoways et al. 2007b). Nevertheless, the government and conservation organizations on Antigua should be aware of the restricted ecological and geographic range of the tree bat and work to conserve the forests on which they depend.

Acknowledgements

The work under which the *Ardops* was captured was supported by the Environmental Division, Government of Antigua and Barbuda, and the Organization of Eastern Caribbean States (OECS). The financial support for the fieldwork was provided by the United States Agency for International Development. We thank Adriel Thibou, Forestry Division, and Zackiah Goodwin, Veterinary Division, Ministry of Agriculture of Antigua for assistance in arranging collecting and export permits and access to public lands. We also wish to acknowledge the excellent field assistance of Chris Pratt of the Environmental Awareness Group's Plant Project, and Jemesia Lindsay and Jahwan Lindsay.

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