

THE PHILIPPINE BARE-BACKED FRUIT BAT
DOBSONIA CHAPMANI RABOR, 1952:
REDISCOVERY AND CONSERVATION STATUS ON
CEBU ISLAND

Lisa Marie J. Paguntalan, Marisol dG. Pedregosa, and
Mery Jean C. Gadiana

ABSTRACT

The Philippine bare-backed fruit bat *Dobsonia chapmani* is the largest cave-roosting bat in the Philippines. Known only from the islands of Cebu and Negros, it was also the first mammal declared extinct in the Philippines not having been recorded on either of these islands since the early 1970s, despite systemic searches by trained researchers (Heaney *et al.*, 1998; Heaney & Regalado, 1998). However, a preliminary survey conducted in Mabuli, Carmen, Cebu in late February 2001 resulted in the unexpected mist-netting of several individuals of this species, all of which were released after being measured and photographed.

Along with the site of rediscovery of this species on Negros in 2003 (Alcala *et al.*, this volume), the forest in Carmen and Catmon constitutes one of the species' last and critically important strongholds. However, the only available habitat in this area is a series of small secondary growth, limestone forest fragments, all of which are highly disturbed. The largest remaining fragment, *circa* 60 ha, is also threatened by the cutting of trees for charcoal, agricultural development, and poaching. In addition, the site is not a protected area and was not included in the listing of 'Key Conservation Sites' on Cebu (Mallari *et al.*, 2001). Thus, it is important to identify and implement conservation measures in order to protect the surviving populations of this once believed extinct, but still critically endangered, endemic fruit bat.

Introduction

The Philippine bare-backed fruit bat is the only member of the genus *Dobsonia* occurring in the Philippines, where it was known only from low elevation forests in southern Negros and Cebu. It was described and named over 50 years ago (Rabor, 1952). About 35 specimens were collected in the late 1940s, 1950s and 1960s, with most of these originating from several different cave systems in southern Negros, parts of which were still quite well forested and sparsely populated at that time. By contrast, only three individuals collected from Naga are known from Cebu (two housed in Silliman University Natural History Museum and one in the Delaware Museum of Natural History).

Repeated searches for the species in previously known distribution sites over the last 40 years failed to secure any more recent records. At present, less than 4% of Negros Island is forested, with small patches of degraded forest in the Central and Southern portion of the island (Evans, 1993; Heaney and Regalado, 1998; Paguntalan, 2001; Paguntalan *et. al.*, 2003). With the almost total deforestation in Cebu, it was assumed that the population was extinct.

Biological surveys conducted in Barangay Mabuli, Carmen Municipality, Cebu in February 2001 led to the unexpected rediscovery of the bare-backed fruit bat. This report therefore summarizes the present known distribution and conservation status of the bare-backed fruit bat, perhaps the most endangered of the world's megachiropterans.

Distribution status

The Philippine bare-backed fruit bat was formerly common in lowland forest from sea level up to about 800m elevation in southern Negros, roosting exclusively in caves (Heaney and Heideman, 1987; Rabor, 1986; Utzurum, 1992). The species was recorded in four municipalities of southern Negros; namely, Amio, Sta. Catalina; Basay; Bais and Siaton. One was found in Cebu. The exact locality in Cebu was not specified, referring **only** to the municipality of Naga where the species was collected.

Taxonomic status

Our comparison with other species of *Dobsonia* (e.g. *D. viridis*) was based solely on descriptions provided by published literatures (Andersen, 1909; Rabor, 1952; Bergmans 1975a, b; Bergmans & Sarbini, 1985). Measurements and descriptions of the Philippine bare-backed fruit bat were based on published literatures and museum specimens in the University of the Philippines Los Baños (UPLB) and Silliman University. Because these museums do not have *D. viridis*, comparisons with this form were solely based on descriptions provided by publications. The species was considered to be conspecific with *Dobsonia exoleta* by Corbet and Hill (1992) but not by Koopman (1993).

Historical accounts

The Philippine bare-backed fruit bat was believed to be relatively common when it was last recorded in the 1960s. At the time of collection of the type series, there were approximately 300 bats inside the cavern, the largest cavern containing about thirty bats roosting very close to one another. Two females roosting in coconut palms on the banks of Amio River were also captured. Only one specimen taken outside of Negros was publicly announced. This was from Naga, Cebu Island, and is now housed at the Delaware Museum of Natural History. Another two specimens collected from Naga were deposited in Silliman University Natural History Museum. Surveys conducted in the 1970s to 1980s only resulted to recovering skeletal remains consisting of one mandible and a few leg bones, the only indication of the species' occurrence despite surveys in the last ten years of previously documented localities in Negros (Heaney and Utzurum, 1991; Heaney & Heideman, 1987; Utzurum, 1992).

Site Description

There are a few remnant patches of secondary forest on karst limestone, totaling approximately 60 ha, in Barangays Natimao-an and Caurasan, in Carmen, Cebu. The native and natural vegetation is limited to steep slopes and dominated by

typical secondary forest tree species, including batino (*Alstonia macrophylla*), hindunganon (*Macaranga* sp.), tubug (*Ficus septica*) and matamban (*Mallotus* sp.), all with average canopy height of 4 meters.

The presence of well-maintained trails permeating the forest indicates continued use both for extraction of forest resources, access to households situated within the forest (there were at least three such households in February 2001), and passage to surrounding agricultural clearings planted with abacca (*Musa textilis*) and gabi (*Colocasia esculenta*), whilst coconuts were planted between cleared portions of the forest. The majority of the inhabitants in the surrounding local community live on subsistence farming or making charcoal (mostly from forest trees).

Methodology

Mist-nets measuring 6m by 4m with 34-mm mesh size were set along ridge-top flyways and across ravines. Thirty six net-nights were spent in all sites. Opportunistic visits to known roost sites and crevices were also conducted. Search efforts for medium-sized species roosting inside crevices and limestone caves were made intensively.

Standard external measurements described by Ingle and Heaney (1992) were taken using a digital caliper. A 500g Pesola weighing scale was used in measuring the weight of the individuals caught.

Interviews with local people living within the periphery of the limestone forest were also conducted. Informants were asked about species frequently targeted for hunting, the location of reported roosting sites, and the frequency of hunting. The perception of the local people on the importance of forest and wildlife was also noted.

Results

Three females, two adults, and one sub-adult, were caught in Mabuli, Carmen. All three individuals were captured in the same

location but on two separate nights. Identification was confirmed by L. R. Heaney from photographs and measurements.

DESCRIPTION

The individuals are larger than the musky fruit bat (*Ptenochirus jagori*) and a little smaller in size than the little golden-crowned flying fox (*Pteropus pumilus*). The ears, patagium, and naked dorsal skin are blackish brown. The fur on the top and sides of the head are generally olive green. The nape, upperside of shoulders, and furred upper part of the back had olive green hairs; a narrow line of these hairs runs along the spinal tract.

The inter-femoral membrane is somewhat reduced, forming narrow convoluted margins along the insides of their legs. Both the thumb and second digits of the upper limbs bore claws. The most distinguishing feature of this species, the naked membrane of the wings, extends to the midline of the back. There were two upper incisors, and two minute lower incisors.

Table 1. Morphological measurements of the three *D. chapmani* netted in Carmen, Cebu (February 2001). FA means forearm while HF means hind foot.

Individual	FA (cm)	Tail (cm)	HF (cm)	Ear (cm)	Weight (g)	Sex
1 (adult)	128	25	37	26.3	143	Female
2 (adult)	128.4	24.8	36.3	26.8	138	Female
3 (sub-adult)	127	24	35.8	26.4	125	Female
Ingle and Heaney (1992)	123-131	23-26	36-39	25-27	----	

N. B. Figures provided by Ingle and Heaney (1992, n=10) were taken from museum specimens.

The external measurements of the three individuals examined (Table 1), particularly the forearm, fall within the range of measurements provided by Ingle and Heaney (1992). Skull measurements, however, were not taken as no specimens were collected. All individuals caught were released back in the forest.

Discussion

The description of the specimens collected in Negros (Rabor, 1952) differs slightly in external coloration with the individuals caught in Cebu. From the descriptions, the Negros specimens were "colored mummy brown to umber on the top of the head, mantle, and face between the eyes . . . The fur along the forearm on wing membrane is golden tawny-olive." By comparison, the fur of the specimens caught on Cebu was generally olive-green in color.

All three individuals were caught in an agricultural clearing in a mist net set at least 6 meters above the ground, stretched between two coconut palms. The female specimens collected in Amio, Negros were also observed roosting in coconut fronds (Rabor, 1952). This indicates that the species is not restricted to lowland primary forest and to some extent are able to exploit degraded and highly disturbed habitats. It is remarkable that the species has not been previously recorded from the northern part of Cebu, though it may have been quite rare in this part of its range for a century or more, since deforestation occurred early in this area. From occasional contemporary reports received from local people in recent years, it seems likely that the species may also survive in other remnant forest patches on Cebu, though none of these reports have been confirmed.

OTHER BATS RECORDED

Several other species of fruit bats were also netted in the area. The most frequently captured bat was the common short-nosed fruit bat (*Cynopterus brachyotis*), followed by the musky fruit bat (*Ptenochirus jagori*), and the dagger-toothed flower bat (*Macroglossus minimus*) (Table 2). Except for the musky fruit bat, these bats are associated with disturbances in agricultural areas and are regarded as indicators of such degraded habitats (Utzurum, 1992). However, the presence of these species also contributes to the natural regeneration of native trees in the area since they assist in natural seed dispersal as well as pollinating many agricultural plants (e.g. bananas).

Table 2. Species of bats caught in Mabuli, Carmen (February 2001).

Scientific name	Common Name	Status
<i>Pteropus pumilus</i>	Little Golden-crown Flying Fox	Vulnerable
<i>Pteropus hypomelanus</i>	Island Flying Fox	Common
<i>Ptenochirus jagori</i>	Musky Fruit Bat	Common
<i>Cynopterus brachyotis</i>	Common Short-nosed Fruit Bat	Common
<i>Eonycteris spelea</i>	Common Nectar bat	Common
<i>Rousettus amplexicaudatus</i>	Common Rousette	Common
<i>Haplonycteris fischeri</i>	Pygmy Fruit Bat	Vulnerable
<i>Macroglossus minimus</i>	Dagger-toothed Flower Bat	Common
<i>Dobsonia chapmani</i>	Negros Bare-backed Fruit Bat	Critically endangered

Threats and Conservation Status

Several individuals of Island Flying Fox (*Pteropus hypomelanus*) were found kept in cages in several households of Mabuli, Carmen. During the study, three groups of hunters, all using rifles, were observed hunting larger species of wildlife. From interviews conducted, hunters often visit caves and search crevices and known roosting trees to hunt for bats. This activity is obviously prejudicial to the continued survival of the bare-backed fruit bat.

A number of the local households surrounding the forest are dependent on the charcoal business. This creates a pressure on the remaining forest, as trees were cut and burned to make into charcoal, which is sold in neighboring towns or as far as metro Cebu. As there is very little forest left on Cebu, removing a single tree will have a large impact on the remaining forest.

Recommendations

Surveys in all likely habitats within Cebu, especially those linked with recent, convincing reports (descriptions) from local informants, should be intensified. The species were found in areas with limestone and at least secondary forest with caves. Focus should also be directed on the habitat

preferences, feeding habits, and ecological requirements of the species. With this information, conservation action will be more directed towards assuring the survival of the species.

The presence of *D. chapmani* and its effect in regenerating second growth habitats demonstrates the species' tolerance to disturbed areas. The three individuals netted in Sitio Mabuli included a sub-adult, thereby indicating a breeding, if remnant, population. However, the very limited amount of forest (c. 60 ha) in this region is likely to be too small to sustain a viable population, especially given the continued, high degree of disturbance, attrition of habitat, and hunting pressure. This calls for immediate conservation action for the ensured survival of the species, especially the protection of roosting sites from intrusion by local people. A follow-up study, intended to help identify key sites and formulate protection measures (possibly including grid fencing of cave entrances, intensification of conservation awareness, and anti-hunting measures), is in the planning stages. The role and the possible practical contributions of local government units and the Department of Environment and Natural Resources (DENR), which are non-existent at present, will also be explored.

Acknowledgments

We are grateful to the Bristol, Clifton, and West of England Zoological Society (Bristol Zoo Gardens), in particular to Duncan Bolton, Geoffrey Greed, and Dr. Bryan Carroll, for sponsoring this project; and to William Oliver of Fauna and Flora International's Philippine Biodiversity Conservation Programme for facilitating fund support and reviewing the paper. We gratefully thank Dr. Lawrence R. Heaney, Dr. Nina Ingle, and Dr. Lawrence Liao for their substantial inputs and comments on this paper. We also thank Dr. Bergmans for providing us with reprints on important literature on *Dobsonia*. We equally acknowledge the assistance provided by the British Embassy Conservation

Program and the British American Tobacco (BAT) to the project.

We also wish to acknowledge the assistance of the following persons: Barangay Council members in Mabuli, Caurasan; the Municipal Planning and Development Officer of Catmon, Mr. Juan Concha; Ariel Rica from Community Environment and Natural Resources Office (CENRO); and especially to Reynaldo Lepangue and Fortunato Catalbas, for their innovative ways in setting mist-nets. The continued support of Ms. Charito Chiu and Vitaliano Lingo is greatly appreciated.

References

- Andersen, K. (1909) On the Fruit-bats of the Genus *Dobsonia*. *Ann. Mag. Nat. Hist.* (8) 4: 528-533.
- Bergmans, W. (1975), A new species of *Dobsonia* [Palmer 1898 (Mammalia, Megachiroptera) from Waigeo, with notes on other members of the genus]. *Beaufortia*. Institute of Taxonomic Zoology (Zoological Museum). University of Amsterdam. 1-13.
- _____. (1975). Taxonomy and Zoogeography of *Dobsonia* [Palmer, 1898 from the Louisade Archipelago, the D'Entrecasteaux Groups, Trobiand Island, and Woodlark Island (Mammalia, Megachiroptera)]. *Beaufortia*. Institute of Taxonomic Zoology (Zoological Museum). University of Amsterdam. 199-214.
- Bergmans, W. and Sarbini S. (1985). Fruit bats of the Genus *Dobsonia* [Palmer, 1898 from the islands of Biak, Owii, Numfoor, and Yapen, Irian Jaya (Mammalia, Megachiroptera)]. *Beaufortia*. Institute of taxonomic Zoology (Zoology Museum), University of Amsterdam. 181—189 pp.
- Corbet G. and J.E. Hill (1992). *The Mammals of Indomalayan Region*. Oxford University Press, Oxford, 488 pp.
- Heaney, L.R., D.S. Balete, M.L. Dolar, A.C. Alcala, A.T.L. Dans, P.C. Gonzales, N.R. Ingle, M.V. Lepiten, W.L.R. Oliver, P. S. Ong, E.A. Rickart, B. R. Tabaranza, R., and C. B. Uzzurum (1998). A synopsis of the mammalian fauna of the Philippine islands. *Fieldiana: Zoology series*. Field Museum of Natural History: Chicago. 88. 55pp.
- Heaney, L.R. and P. Heideman (1987). Philippine fruit bats, endangered and extinct. *Bats*. 5: 3-5.

- Heaney, L.R. and J. C. Regalado, Jr. (1998). Vanishing treasures of the Philippine Rain Forest. Field Museum, Chicago. 87pp.
- Heaney, L. R. and R. B. U. Uzzurum. 1991. A review of the conservation status of Philippine land mammals. Association of Systematic Biologists of the Philippines. Communications 3:1-13.
- Ingle, N. R. and L. R. Heaney (1992). A Key to the Bats of the Philippine Islands. Fieldiana: Zoology new series, 69: 1-44.
- Koopman, K.F. (1993) Order Chiroptera, pp. 137-241. In Wilson, D., and D.M. Reeder, eds., Mammal Species of the World, a Taxonomic and Geographic Reference, 2nd ed. Smithsonian Institution Press, Washington, D.C., 1206 pp.
- Mallari, N. A. D., B. R. Tabaranza, Jr., and M. J. Crosby. (2001). Key conservation sites in the Philippines. Bookmark, Inc., Makati. 486 pp.
- Paguntalan, L.M. J. (2001) Abundance and Distribution of Threatened Birds of Southern Negros, Philippines. M. Sc. Thesis. Silliman Press: Dumaguete, Philippines.
- Paguntalan, L. M. J., J. C. T. Gonzales, M. J. C. Gadiana, A. D. L. Dans, M. dG. Pedregosa, A. B. Cariño, and C. N. Dolino (2003). Birds of Bantayan, Central Negros, Philippines: Threats and Conservation Status. Silliman Journal: Dumaguete, Philippines. 110-136pp.
- Rabor, D.S. (1952). Two new mammals from Negros Island, Philippines. Natural History. Miscellanea. (Chicago Academic Science). 96: 1-7.
- Rabor, D. S. (1986). Guide to Philippine Flora and Fauna. Vol. 11, Birds and Mammals. Ministry of Natural Resources and the University of the Philippines, Quezon City. 213 pp.
- Uzzurum, R.B. (1992). Conservation status of Philippine fruit bats (Pteropodidae). Silliman Journal. 36: 27-45.