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OBSERVATIONS ON BATS IN GUA PAYAU (DEER CAVE), GUNUNG MULU NATIONAL PARK, SARAWAK

Leslie S. Hall

INTRODUCTION

Gua Payau is one of the main tourist attractions in Gunung Mulu National Park. It is regarded as the world's largest cave passage being approximately 1.6 km long, 100-150 m wide and 120 m high (Meredith et al, 1992) (see Fig. 1). The cave contains a large colony of Wrinkle-lipped bats (*Chaerephon plicata*) whose spectacular evening emergence is also a major tourist attraction. The history of discovery of Gua Payau was discussed by Meredith et al (1992). Apart from the observations of Chapman (1985), there is very little published information on the biological aspects of Gua Payau. Hall (1994) commented on the large number of bat species found in Gua Payau, and Anderson et al (1982) listed the bat fauna from Gunung Mulu National Park.

This article will provide a list of species and information on the bats inhabiting Gua Payau found on several visits to the cave. Estimates of the numbers of Wrinkle-lipped bats, *C. plicata*, leaving the cave on a number of occasions will be provided along with comments on other species of bats found at Gunung Mulu National Park. The frequencies of the ultrasonic calls of echolocating bats at Gunung Mulu will also be listed along with information useful for field identification.

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METHODS

Three field trips were made to Gunung Mulu National Park, 7th-11th July 1988, 31st October to 6th November 1992, and 30th December to 3rd January 1993. Observations on bats and their roosts were made inside Gua Payau with a 12 volt, 50 amp spotlight and binoculars. Bat captures were made using a hand net and mistnets, and a bat detector (Ultrasound Advice, Model S25) was used to record calls from captured and free-flying bats in November 1992 and January 1993. The ultrasonic calls of bats were recorded on a modified Aiwa cassette recorder and analysed on a PC computer using Anabat (Corben, 1989). Mist netting and harp traps were used at a number of locations near the Park Headquarters on the first two trips. Searching of limestone outcrops for caves and bats was made near Clearwater Cave, the Garden of Eden, and around Bukit Pala. Counts of emerging *C. plicata* were done on all three trips.

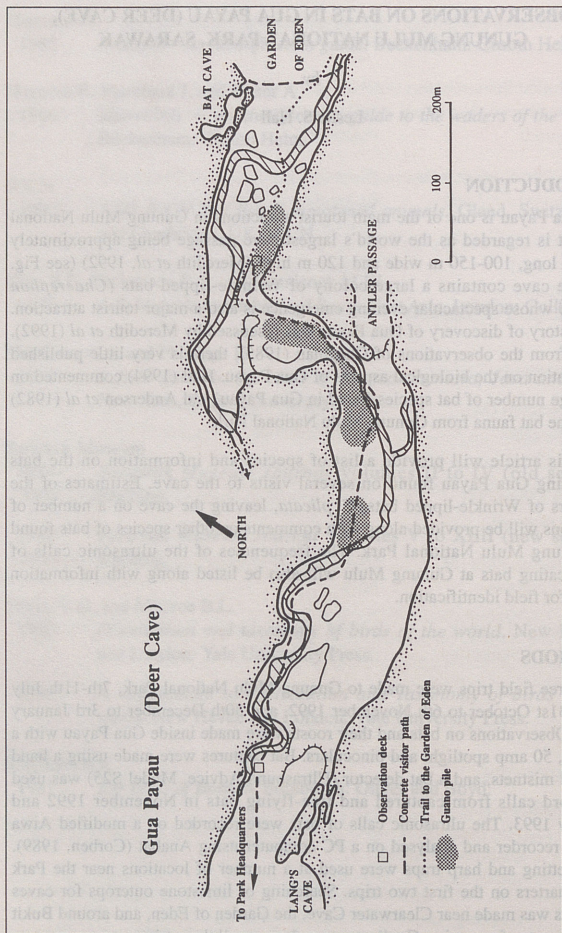


Fig. 1: Details of Gua Payau (Deer Cave), Gunung Mulu National Park, Sarawak. This plan view is slightly modified from Meredith *et al* (1992) and shows the location of guano piles and other major features.

Additional information on bats caught in Gua Payau and elsewhere in Gunung Mulu National Park by S. Hand and M. Archer in January 1990 is also provided. Bat nomenclature follows Payne *et al* (1985).

Population estimates: When *C. plicata* leave Gua Payau they initially form long ribbon-like streams or pulses. These pulses vary in length and width and the height at which they leave the cave. When the maximum number of bats are leaving the cave, they do so in a continuous stream which is at the maximum width. Only one stream emerges at a time.

In July 1988 counts of emerging bats were made at both entrances to Gua Payau. These counts were made using an estimate of the number of bats passing a point in one second at regular intervals during the flyout. The length of the flyout was timed and multiplications performed according to the changing exit rate of bats to give an estimate.

In November 1992 and January 1993 a different technique was used. Photographs were taken of the emerging stream of bats at regular intervals during the flyout and of the different widths of the stream of bats. The time it took for a bat to cross the viewfinder of the camera (Nikon FMZ, 60 mm Micro Nikko lens) was calculated (3 seconds, $n = 20$). The flight speed of the bats did not appear to change throughout the flyout. The nearness to the entrance where the observations took place meant that the height of the exiting bats remained relatively constant. The width of the flyout stream of bats was classified as wide, medium or thin. This was calculated from photographs later to approximate 30, 20 and 10 bats wide, and gave values of 3,500, 1,500 and 650 bats per one second interval. The depth of the stream did not appear to cause any overlap of bats on the photographs. The length of each stream was recorded in seconds and a width classification was assigned to it. This allowed for a calculation based on the number of bats per one second interval.

RESULTS

Twelve species of bats were recorded from Gua Payau. Of these, nine species were recorded during the present survey, an additional two species were added by S. Hand and M. Archer, and there is one species represented by a single museum specimen. Data on forearm lengths, body weights and echolocation calls are given in Table 1.

Species list:

1. *Eonycteris spelaea*. A non-flying young (forearm 44.7 mm, weight 14 g) was found on the floor 150 m inside the main southern entrance on 1st November 1992. This is the first record for the species at Mulu. The location