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CAVE-FREQUENTING VERTEBRATES IN THE GUNUNG MULU NATIONAL PARK, SARAWAK

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ABSTRACT

The Melinau limestone formation within the Gunung Mulu National Park, Sarawak, is highly cavernous, providing an important subterranean habitat which is exploited by numerous invertebrate species and by at least 31 vertebrates. 13 bats, 3 swiftlets, 2 lizards and perhaps 2 fish use the caves as shelter and perhaps as a breeding site, but leave the cave to feed outside. At least 4 mammals and one snake make sporadic visits to the cave in order to eat cavernicoles or bat guano. At least 6 fish species may perhaps be able to sustain permanent populations in the caves and one of these, Silurus fumessi, may prove to be largely confined to caves.

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Abstract

The Melinau limestone formation within the Gunung Mulu National Park, Sarawak, is highly cavernous, providing an important subterranean habitat which is exploited by numerous invertebrate species and by at least 31 vertebrates. 13 bats, 3 swiftlets, 2 lizards and perhaps 2 fish use the caves as shelter and perhaps as a breeding site, but leave the cave to feed outside. At least 4 mammals and one snake make sporadic visits to the cave in order to eat cavernicoles or bat guano. At least 6 fish species may perhaps be able to sustain permanent populations in the caves and one of these, *Silurus furnessi*, may prove to be largely confined to caves.

Introduction

The following account is a result of three periods of fieldwork. The first was undertaken during a twelve-week exploration of caves of the Melinau limestone with the Royal Geographical Society speleological team in 1978 (Brook and Waltham, 1978). The second was a more detailed study of the terrestrial invertebrate communities of caves of the Park during the Mulu '80 speleological expedition (Eavis, 1981). Results of these studies formed the basis of an MSc thesis (Chapman, 1981) and notes on the invertebrate cave fauna are published elsewhere (Chapman, 1982, 1983b, in press). The third period of fieldwork was undertaken in May 1984 during the Sarawak '84 speleological expedition (Eavis and Lyon, 1985), but was unfortunately interrupted at an early stage by illness. The results which are presented here may therefore be viewed as preliminary. They are intended to alert other workers to the potential for further study in the caves of the Park.

Cave names used in this note are the English versions proposed by Brook and Waltham (1978), Eavis (1981) and Eavis and Lyon (1985); maps and plans can also be found in these publications. The caves which I investigated are all in the southern part of the Park: in Gunung Api, the Deer Cave hills and around Long Pala. Very little is presently known about the biology of the extensive caves of Gunung Benarat and Gunung Buda to the north.

It is easy for those not familiar with the Park to underestimate the extent and significance of the cave habitat. The following figures may prove illuminating. The main trunk of Deer Cave is about 1.8 km long and varies in diameter from 100 m to 150 m. Sarawak Chamber in Good Luck Cave has a floor area of about 24 hectares and a volume of over 12 million cubic metres. The 48 km long Clearwater Cave has a mean passage diameter of about 25 m. To date 150 km of cave passages have been explored and mapped in the Park and the distribution of known caves suggests that this figure will be more than doubled in future explorations.

Animals in caves show varying degrees of ecological dependence on the hypogean realm. Species which are confined to caves often show parallel evolution in reduction or loss of pigment and eyes. This may be compensated by an unusually high degree of development of other remote-sensing organs, such as the lateral line system, as evidenced in some highly cave-evolved fishes (Culver, 1982). A few animals which are not confined to caves, but which are ecologically dependent on them, also show specific cave-adaptations, such as the echolocating rattle-call of cave-nesting swiftlets of the genus *Aerodramus*. The ecological classification system used in my account differs slightly from those employed by other biospeleologists, but works well for the Mulu fauna:

(1) Accidentals (AC): stray non-cavernicolous species which probably have no ecological dependence on caves. They are only mentioned in this account if their only recorded occurrence in the Mulu Park is in caves.

(2) Visitors (VI): non-cavernicolous species which periodically enter caves in order to feed (usually on trogloxenes or their excreta).

(3) Trogloxenes (TX): species which regularly shelter and may breed in cave habitats, but which obligatorily feed outside caves.

(4) Troglophiles (TP): facultative cavernicoles which habitually complete their entire life cycle in hypogean as well as in non-hypogean habitats.

(5) Troglobites (TB): obligate cavernicoles which habitually complete their entire life cycle only in hypogean habitats.

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FISH

To date nine species of fishes have been recorded from the caves. This is by no means an exhaustive total as few cave streams have been adequately sampled and collection has been by hand net. Future visitors to the caves should conduct a thorough survey of the aquatic fauna, both vertebrate and invertebrate and fish traps should be set in the larger, percolation-fed cave streams where any cave-dependent fish are likely to be found. Almost nothing is known concerning the degree of ecological dependence on caves of the fish found in underground streams in Mulu so that their assigned cavernicolous status in the list which follows is largely conjectural.