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P A P E R

THE BATS OF NADGEE NATURE RESERVE, NSW

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Abstract

Observations of the bats of Nadgee Nature Reserve have been made between 1981 and 1986. Sixteen species of bats are recorded for the Reserve. These species are compared to those from Mumbulla State Forest (70 km to the north) and various areas in far eastern Victoria. The bat fauna of Nadgee appears to have more affinity with areas in Victoria than further north along the coast in New South Wales.

Introduction

Nadgee Nature Reserve is situated on the far south coast of New South Wales between Wonboyn Inlet (37°15'S) and Cape Howe on the Victorian border (37°30'S). The bats of the area are not well recorded despite extensive studies of other wildlife. This paper outlines records of the bat fauna made separately by the authors over a number of years.

Reference to sighting of bats in the area was made by Wellings (1972) who observed bats during a speleological expedition to sea caves formed in the coastal cliffs.

An intensive study of bats has been carried out in Mumbulla State Forest, some 70 km to the north (Lunney 1982), and at trapping sites in east Gippsland, Victoria (eg. MacFarlane *et al.*, 1987; Lumsden and Bennet, in prep).

Study area

The reserve covers an area of 15,000 ha on the far south coast of New South Wales. It experiences a mild climate with rainfall peaks in both summer and winter. Twelve broad vegetation communities have been identified (Gilmour 1983). Observations made in this paper are mainly within the tall open forest, open forest, headland and beach communities. The area has experienced two major fires in the last ten years (December 1972 and November 1980).

The reserve is primarily managed for nature conservation objectives and visitation to most areas is low.

Survey Methods

This paper combines the results of separate visits to the Reserve made by the authors over the last six years. The main field trips were made in December 1981, December 1982, January 1983, November 1985 and February 1986. Some observations were also made on earlier visits.

All known sea caves were searched for cave-dwelling bats and the coast was systematically explored for additional roost sites (Figure 1). Sea caves and crevices were searched for traces of bats (eg. dung piles) or roosting bats. Access to some sites was difficult and required swimming into the cave entrance with waterproof torches and protective clothing.

Trapping for forest-dwelling bats was conducted in December 1981 and December 1982 using low visibility Bleitz mist nets and harp traps (Tidemann and Woodside 1978). During these visits the majority of trapping was conducted in the Harry's Hut and Nadgee River areas (Figure 1). Casual observations were made of active bats using 50 watt spotlights on most visits.

Rocky clifflines on Mt Nadgee and the eastern side of the Howe Range were also searched for bat roost sites.

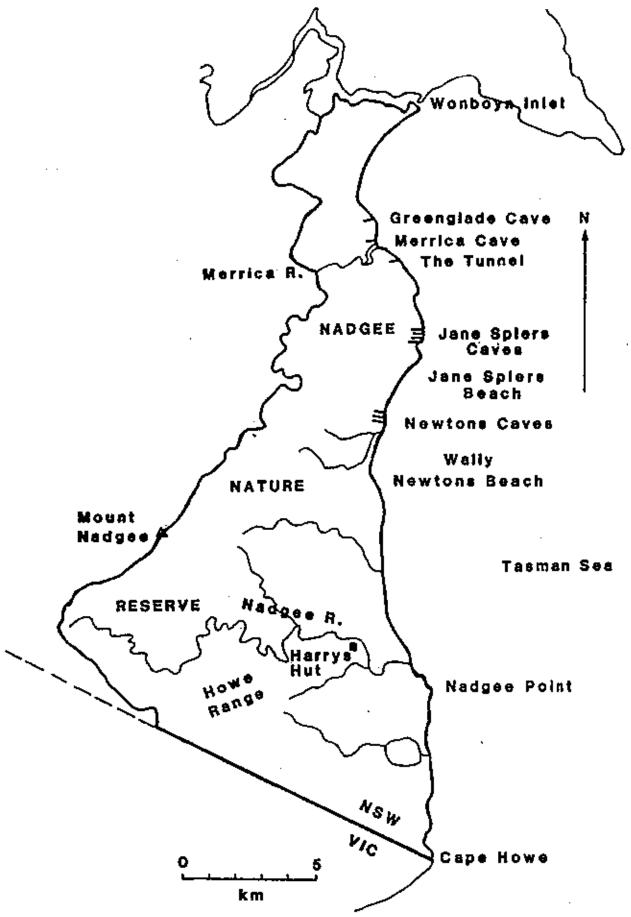

Fig. 1. Map of Nadgee Nature Reserve, N.S.W., showing places mentioned in text.

Results

A total of sixteen species of bats were recorded from Nadgee Nature Reserve. The bat fauna are divided into the tree-dwelling species and the cave-dwelling species.

a) *Tree-dwelling Species*

The bats in this group are outlined in Table 1. The most commonly captured species were *Nyctophilus geoffroyi, Eptesicus regulus and E. vulturnus.* Several tree-dwelling species were not trapped but were recorded by spotlighting: *Pteropus poliocephalus* - several individuals were observed around Harry's Hut on 19 December 1981; *Tadarida australis* - commonly spotlighted and heard flying above the forest canopy; *Mormopterus* sp. - several individuals were heard and observed by spotlight at Wally Newton's Beach and Nadgee River.

Table 1: Tree-dwelling bats captured at Nadgee Nature Reserve.

Species	19-22/12/81	15-18/12/81	14-16/1/82
Chalinolobus gouldii	1	1	-
Chalinolobus morio	3	2	-
Eptesicus regulus	12	2	-
Eptesicus sagittula	1	1	-
Eptesicus vulturnus	15	20	1
Miniopterus schreibersii	-	1	-
Myotis adversus	7	2	-
Nyctophilus geoffroyi	51	13	3
Nyctophilus gouldi	4	2	-
Falsistrellus tasmaniensis	1	2	5
Scotorepens sp. 'bullet'	-	-	1
Scotorepens orion	4	-	-
Total	96	45	10
No. of Bat Trap Nights	8	8	-
Mistnet Hours	29	30	18

All trapping during these periods was conducted in the vicinity of Harry's Hut, Nadgee River, Merrica River and Wally Newton's Beach in tall open and open forest.

b) *Cave-dwelling Species*

No caves suitable as roost sites were located along the rocky cliff-lines of Mt Nadgee or the eastern side of the Howe Range. Results from the survey of sea caves are given in Table 2. Two species of bats were recorded in the sea caves. These were the Common Bent-wing Bat (*Miniopterus schreibersii*) and Eastern Horseshoe-bat (*Rhinolophus megaphyllus*). The former species was recorded from three sea caves during the survey with the largest number being 180+ at Merrica Cave.

The latter species was uncommon with a maximum of three individuals at Greenglade Cave and four in an unnamed sea cave north of Greenglade Cave.

Table 2: Bats observed in sea caves at Nadgee Nature Reserve.

Cave	Species	Number Observed			
		Dec 1982	Jan 1983	Nov 1985	Feb 1986
Unnamed cave	R m	0	0	0	4
Greenglade Cave	R m	1	0	3	4
Merrica Cave	M s	0	100+	180+	0
	R m	0	0	3	0
Jane Spiers' Cave 1-4	M s	0	50+	70+	0
Newton's Caves 1 and 2	R m	0	0	1	0
Cave south of Newton's Beach	R m	0	0	1	0

R m = *Rhinolophus megaphyllus*
M s = *Miniopterus schreibersii*

The Large-footed Mouse-eared Bat (*Myotis adversus*) was not recorded from any caves. Hall and Richards (1979) and Richards (1983) recorded this species as roosting in dense foliage and under bridges as well as caves and mines. *M. adversus* was trapped along the Nadgee River and observed by spotlight along Wirra Birra Creek (Newton's Beach).

The Sea Caves of Nadgee

1. *Greenglade Cave*
An open cave with large entrance 1 km south of Greenglade. This cave has a low, dark back chamber used as a roost by *Rhinolophus megaphyllus*. With easy access around the shoreline this cave is subject to considerable disturbance.

2. *Merrica Cave*
This cave is at the northern end of Merrica Beach and is described and mapped by Wellings (1972) (named Merrica Bat Cave). The end chamber is used as a permanent roost by a colony of *M. schreibersii*. Described by Wellings as containing 'hundreds of bats' in January 1971, the estimated colony size in January 1983 was about 100 and 180+ in November 1985. Access is difficult, and there is little disturbance.

3. *The Tunnel*
An open tunnel south of Merrica Beach, described by Middleton (1971) (named Merrica Cave). No bats have been observed.

4. *Jane Spiers' Caves*
A series of caves at the northern end of Jane Spiers' Beach described by Wellings (1972) and numbered 1-4 from the south. Cave 3 is large and used as a roost by *M. schreibersii*. A banded *M. schreibersii* was observed here in November 1985. No bats were seen in December 1982, about 50 bats observed in January 1983 and 70+ in November 1985. Access is difficult and there is little disturbance.

5. *Newton's Caves*
Two caves at the northern end of Newton's Beach described by Middleton (1971) and named as Newton's Cave and Jane Spiers' Cave. These caves are locally known as Newton's Caves and should be called 1 (south) and 2 (north). No bats were reported in Newton's Cave No. 2 by Middleton (1971) or Wellings (1972) or seen in December 1982, January 1983 or November 1985. However, a small colony of *M. schreibersii* has been observed at other times by P. Helman, from visits in 1971, March 1977 and February 1982. Approximately 50 bats were observed on these occasions. Various factors including high levels of visitation, fluctuating sand levels and the seasonal movement of *M. schreibersii* could account for the differences in these observations.

6. *Nadgee Point Tunnel*
A short tunnel through the headland of Nadgee Point. It experiences little visitation. No bats have been observed here.

7. *Other Caves*
There is a small cave 700 m south of Newton's Beach with a high dark backchamber used as a roost by *R. megaphyllus*. This cave has easy access around rocks, and is subject to disturbance.

Another sea cave 500 m north of Greenglade Cave has a low dark section used as a roost by *R. megaphyllus*. The entrance of this cave was exposed to waves at high tide. There was no sign of disturbance.

A number of small caves occur between The Tunnel and Jane Spiers' Caves. No evidence of bats has been recorded from these caves.

Discussion

When compared to surrounding areas (Table 3) the fauna recorded from Nadgee Nature Reserve bears a closer affinity to that of eastern Victoria than to that of the southern New South Wales coast.

The assemblage of forest-dwelling bats is typical of that for adjacent areas, such as the Mallacoota region (unpubl. Ministry Conservation, Forests and Lands, Victoria, records), Buckland Forest Block, north-west of Genoa (MacFarlane *et al*, 1987) and the Coopracamba State Park (Lumsden and Bennet, in prep.).

No regular summer colonies of *P. poliocephalus* occur in Nadgee Nature Reserve. The nearest colony is at Dowell Creek near Mallacoota Inlet (37°29'S, 149°48'E) where a large camp of up to 20,000 individuals

Tidemann, C.R. and Woodside, D.P. (1978) A collapsible bat trap and a comparison of results obtained with the trap and with mist-nets. *Aust. Wildl. Res.* 5, 355-362.
Wellings, G. (1972) Some south coast sea caves. *J. Syd. Speleo. Soc.* 16, 151-158.

SHORT COMMUNICATIONS

PHYLOGENETIC STUDIES OF AUSTRALIAN TERTIARY BATS

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Summary
(from PhD thesis, Macquarie University)

The first phylogenetic studies of Australian Tertiary bats have been presented in this thesis. Conclusions arising from these studies are as follows:

1. As early as the middle Miocene, Australia had a diverse bat fauna. The fossil remains of a minimum of sixteen Miocene and nine Pliocene microchiropteran species have been identified from mammal-rich freshwater limestones on Riversleigh Station, northwest Queensland. These represent the microchiropteran families Hipposideridae, Megadermatidae, Molossidae, Emballonuridae, Vespertilionidae and Rhinolophidae. The fossil bat remains are abundant and well-preserved, enabling for the first time determination of the affinities of Australian Tertiary bats.

2. All bat families living in Australia are now represented in the Australian Tertiary record with the exception of the Pteropodidae. Hipposiderids and megadermatids (superfamily Rhinolophoidea) are the best-represented bat groups in the Riversleigh Miocene deposits, comprising 14 of the 16 species identified. However, by the Pliocene (as represented by the Rackham's Roost cave deposit), the number of rhinolophoids is closely approached by the number of vespertilionids, a situation not dissimilar to that found in limestone caves in the Riversleigh area today. Vespertilionids are not yet known from the Australian Miocene but are relatively well-represented in the Miocene record of other continents. In the fossil bat-rich middle Tertiary karstic deposits of Europe, rhinolophoids are also the best-represented bat group even though vespertilionids now dominate the European bat fauna.

3. The number of rhinolophoids represented in the Australian Miocene record (14 species minimum) far exceeds the number of rhinolophoids now living in Australia (9 species). In at least two Riversleigh Miocene local faunas, five hipposiderid species appear to have been contemporaries. Today a maximum of three of Australia's six living hipposiderids occur sympatrically in the Riversleigh area and four in the Cape York area. In the rainforests of New Guinea, a minimum of 6 hipposiderids may occur sympatrically. The number of Tertiary megadermatids (6 species) even more significantly exceeds the single species surviving in Australia today. At least one Pliocene and two Miocene

Riversleigh sites provide evidence for the co-existence of two megadermatid species. Species pairs of non- Australian living megadermatids are sympatric over at least part of their range and from the Moroccan middle Miocene Beni Mellal local fauna two fossil megadermatid species have been recovered. Compared with these faunas, the modern Australian megadermatid fauna must be considered depauperate.

4. Megachiropterans (family Pteropodidae) are conspicuously absent from the Riversleigh fossil deposits. Although the bulk of the Riversleigh fossil bat remains probably initially accumulated in caves and were subsequently washed into adjacent pools, cave-dwelling has evidently not been a prerequisite for fossilization of the thousands of large and small marsupials also preserved in these deposits. The immediate depositional environment of the Riversleigh Miocene sediments is interpreted to have been rainforest and while pteropodids of the genus *Pteropus* may feed more peripherally in rainforest, other living Australian pteropodids (eg. species of *Nyctimene* and *Syconycteris*) typically feed and roost within Queensland rainforests. The absence of pteropodids from the otherwise bat-rich Riversleigh fossil deposits of northern Australia lends some support to the hypothesis that in the middle Miocene pteropodids were radiating in areas such as New Guinea prior to their entry into northern Australia.

5. The living Australian bat species *Rhinonicteris aurantius* and *Macroderma gigas* appear to be descendants of Tertiary species represented in the Riversleigh fossil deposits. They represent monotypic genera now endemic to Australia, endemism in other living Australian bats being otherwise recognised at the species or species group levels. Ancestors of other living Australian bat species have not yet been identified among the Riversleigh bat remains although a Pliocene species of the emballonurid genus *Saccolaimus* may be closely related to *S. hilli*, now living in western and central Australia.

6. The original hipposiderid stock that gave rise to *Rhinonicteris aurantius* appears to have been closely related to Riversleigh species of *Hipposideros (Brachipposideros)*. At least six species of this subgenus have been identified in the Riversleigh Tertiary deposits, the Miocene *Brachipposideros nooraleebus* being the first to be described from anywhere outside of France. The palaeogeographic range of species of the subgenus is interpreted to have extended across Asia. Other rarer Riversleigh Miocene and Pliocene hipposiderids show some affinities to living Australian hipposiderids of the subgenus *Hipposideros (Hipposideros)* and, in particular, to the species *H. semoni*, *H. ater* and *H. diadema*.

7. Species of the genus *Macroderma* are well-represented in the Australian Miocene and Pliocene with six species so far identified. *Macroderma godthelpi*, the oldest known Riversleigh megadermatid, may be close to the base of the Australian *Macroderma* radiation because it appears to be very closely related to the French and Moroccan middle

Miocene species *Lyroderma gaillardi*. Separate megadermatid lineages represented by middle Miocene species of *Macroderma* and the Dwornamor Variant (a plesiomorphic sister-group of a *Macroderma-Lyroderma* sister-group) suggest either that the ancestor of Australia's megadermatids entered the continent well before the middle Miocene and that the original evolution of species of *Lyroderma* occurred within Australia, or that megadermatids dispersed at least twice into Australia: first to produce the ancestor of the Dwornamor Variant and later (after evolution of ancestral *Lyroderma*) to produce the ancestor of the *Macroderma* lineage. Another, perhaps even more plesiomorphic megadermatid represented in the Riversleigh deposits suggests a possible third episode of Australian colonisation by megadermatids by middle Miocene time.

8. Australia's first Tertiary molossid is referred to a new genus. Its affinities appear to lie not with species groups now living in Australia but with ancient molossid lineages represented in the European Eocene and Oligocene. Because the Riversleigh species does not appear to have given rise to the groups of molossids now living in Australia (ie. species of *Tadarida, Chaerephon* and *Mormopterus*), more than one colonisation of Australia by molossids is envisaged. It seems likely that members of this lineage, like other molossids, were more capable of long-distance flight than their Riversleigh rhinolophoid contemporaries and that representatives of this very old lineage first colonised Australia well before the middle Miocene. By that time, migration routes had evidently been available for some time even for bats not noted for long-distance flight capabilities. The Riversleigh molossid further indicates (together with the Dwornamor Variant) that not all bat lineages represented in the Australian Tertiary record have left living descendants in the modern Australian bat fauna.

9. Studies of intraspecific variation in living Australian megadermatids have helped to define appropriate species limits for fossil megadermatids. Morphological variation in the dentition of the living Australian Ghost Bat, *Macroderma gigas*, indicates that at least some of the dental features used by previous authors to distinguish fossil megadermatids may actually reflect intraspecific variation in a single species. Qualitative and quantitative morphological variation in *M. gigas* appears to be marked and has been found to be as great within populations as between populations. There is, however, some evidence for clinal variation in the size of this species. Subfossil specimens of *M. gigas* from central and southern Australia and Pleistocene fossils from southwestern Western Australia fall at the larger end of this cline together with specimens from existing northeastern Queensland populations of *M. gigas*. Like large Pleistocene specimens, small Pliocene specimens of *M. gigas* from Rackham's Roost fall within the range of variation for modern *M. gigas*.

10. A better understanding of species limits for megadermatids has resulted in recognition of a large new Pliocene species of *Macroderma* from Wellington Caves, New South Wales. This new Tertiary species is interpreted to be the immediate sister-species of the shorter-faced

M. gigas. There is evidence that gigantism has been acquired independently in the two lineages.

11. Close phylogenetic relationships between a number of Tertiary Riversleigh and European bats have provided the first significant opportunity for intercontinental correlation of Australian Tertiary mammal-bearing deposits. Species of *Brachipposideros* in Australian Miocene deposits and better-dated European deposits have provided the first opportunity of this kind. The oldest and as yet only described Riversleigh species of the subgenus, *B. nooraleebus*, does not appear to have evolved for long in isolation from its close relative the French Burdigalian (early Miocene) species *B. aquilari* and is, therefore, interpreted to have arrived in Australia sometime between 20 and 15 million years ago. A comparable opportunity for intercontinental correlation involves the Riversleigh megadermatid *Macroderma godthelpi* and recognition of its close relative *Lyroderma gaillardi* from French Serravalien (middle Miocene) and late Ternanian Moroccan deposits. A number of other internationally-shared groups of bats represented at Riversleigh provide further opportunities for correlation. When this is achieved, indirect correlation of many otherwise undated Tertiary Australian faunas will follow because some of these faunas share marsupial species with the bat-rich Riversleigh local faunas.

SUBCUTANEOUS GASEOUS SWELLINGS OBSERVED IN TWO BATS FROM VICTORIA

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During a recent survey in north-western Victoria, two bats were captured which were found to have large gaseous swellings under the skin. As I have not observed this condition previously, details of these two individuals are presented below.

1. *Chalinolobus gouldii*.
Adult male captured in a mistnet at 1850 hr, 23 April 1986, 19 km NE of Morkalla (34°13'S, 141°4'E). On examination for processing (approximately two hours after capture) the dorsal surface of the body, from the top of the head to the rump, was found to be greatly enlarged, being blown up and swollen with air or gas. This gaseous swelling protruded approximatley 10 mm above the normal level of the dorsum. The gas appeared to be in one continuous bubble and moved from one end of the body to the other when gentle pressure was applied. In other respects, the animal appeared active and normal, although it was reluctant to fly. The only obvious external injuries were a slight cut between the eyes above the nostril, and a small accumulation of blood under the skin where the left leg joined the body. Neither wound was recent. The bat was fed on mealworms and water for two days but it died on the second night. On the morning of its death it was active and it ate, but that night was sluggish and subsequently died. At death the swelling appeared to be the same size as at initial capture.

2. *Mormopterus planiceps.*
Adult female, captured in a mistnet at 2050 hr on 20 October 1986 27 km SSW of Morkalla (34°31'S,141°7'E). When caught this individual had a gaseous swelling on the throat and chest, extending the full width of the body and protruding approximately 8 mm. The bat appeared normal in other respects. It was kept overnight, alone in a cloth bag, and then held in a refrigerator for four days before being taken to Melbourne (a full day's drive). When removed from the bag the bat was found to have chewed off the extremity (approximately 2 cm) of one wing, leaving a gnawed, ragged edge. No remains of the chewed portion were found, and they were presumed to have been eaten. The bat was kept for a further seven days. It fed voraciously on mealworms, and in the process often caught the end of its lower jaw in the swelling on the chest. It was very aggressive when handled. During this period, the swelling decreased to approximately half the size it had been at the time of capture. A greater amount of skrinkage occurred on the left side of the chest than on the right, and the protrusion of the swelling was reduced.

On 1 November 1986, a post-mortem was conducted on both individuals by Dr C. Chapman of the Veterinary Research Institute, Parkville. The finding noted: 'Air or gas in subcutaneous tissues, but no evidence of any inflammation at these sites. No abscess or tumour. Small calcified lesion in pectoral muscles of the *M. planiceps*.' Thus, the swelling appears to have been a simple accumulation of air rather than production of gas from a pathological condition such as inflammation or bacterial infection. No definite cause for the accumulation of air was found, but it was suggested that a small puncture wound may have allowed air to enter, possibly being pumped in by the action of flight, and then becoming trapped in the tissues. The injury may have occurred at the affected site (eg. a bite from a conspecific perforating the skin) or, alternatively, air may have entered at a site remote from the gaseous accumulation (eg. the oesophagus punctured by a sharp protrusion of a food item) and then moved through the body tissues to accumulate under the skin. After the wound healed it would take some time for the trapped gas to dissipate. This explanation is consistent with the reduction in swelling shown by the *M. planiceps* during its two weeks in captivity. Chapman (pers. comm.) has observed similar symptoms of subcutaneous swelling in mice and in a horse. In the mice, the lesion was due to perforation of the trachea, while in the horse, air was drawn in from under the front leg following a deep puncture wound. In the horse it took approximately ten days for the trapped air to dissipate.

Several questions remain to be answered. The post-mortem revealed no evidence of disease or traumatic injury (eg. bacterial infection, inflammation, abscess, tumour or broken bones). If the air did enter via an injury either at, or remote from, the swollen area, what was the cause of such an injury? Why did the *M. planiceps* mutilate its wing? Did the *C. gouldii* die because of the swelling or for other reasons?

I would be very interested to hear from anyone who has observed similar subcutaneous swellings in bats, or who may have further suggestions or evidence of the cause of this condition.

I would like to thank Dr Colin Chapman for conducting the post-mortems and for suggestions as to the cause of the phenomenon, and Andrew Bennett and Bob Warneke for improving earlier drafts of this note.

THE OCCURRENCE OF *MYOTIS ADVERSUS* CONFIRMED ON THE RIVER MURRAY IN SOUTH AUSTRALIA

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Wood Jones (1925) included *Myotis adversus* in the South Australian fauna on the basis of a specimen in the South Australian Museum 'from the River Murray in South Australia' and another in the British Museum, 'a specimen of Gould's taken in South Australia'. McKean and Hall (1965) re-examined the collecting details accompanying these and two other bats, also reputed to be from South Australia and held in the British Museum, but concluded that they did not constitute a basis for the species to be listed for the state. They were, however, able to demonstrate that *M. adversus* occurred in the far south-east of the state by observing individuals in Dry Creek Cave on the Glenelg River, just over the Victorian border. Subsequently, Aitken (n.d.) and Strahan (1983) have restricted the distribution of *M. adversus* in South Australia to the far south-eastern region.

This note details the capture of five *M. adversus* 3 km WSW of Nildottie on the River Murray in South Australia (34° 40'S, 139° 37'E on) 21 February 1987. This observation raises a distinct possibility that the species occurs all along the River Murray system from the eastern states to South Australia.

Two 60' monofilament mistnets were set across a small creek (approximately 40 m wide) connecting Tartanga Lagoon and the River Murray. The adjacent vegetation is a *Muehlenbeckia cunninghamii* association including occasional *Eucalyptus camaldulensis* with scattered *Phragmites australis*, *Juncus kraussii* and *Typha* spp. along the creek bank. Small caves are a common feature of the limestone cliffs on the nearby river.

Between 2100 and 2130 h five *M. adversus* were caught in one of the nets. Three were caught within 0.5 m of the bank, one approximately 2 m from the bank and the other midstream. All were caught 0.5-1.0 m above the water surface. After the nets were furled at 2200 h other individuals were detected using a Q.M.C. bat detector, suggesting that *Myotis adversus* is quite common along the creek.

A small number of scats were collected when the animals were held overnight. Most contained fish skin, scales of *Gambusia affinis* were present in two scats and several fish vertebrae in another, thereby corroborating the observations of Robson (1984) of *M. adversus* eating fish in Queensland. Coleoptera and Diptera, particularly Chironominae and Culicidae were common and an orthopteran coxa was also found. One scat contained moth scales only.

Further surveys need to be carried out to determine how widespread the species is in South Australia.

I wish to thank Marie Senn and Winston Head and Ben Head for help with trapping, Lynette Queale for identification of insect remains, Lance Lloyd for identification of fish scales and David Paton for comments on the manuscript.

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From August 1987 to August 1988. Seasonal changes in a bat community in the Pilbara in response to seasonal patterns of insect abundance and flowering of major plants.

NOTICES

Eighth International Bat Research Conference

The 8th IBRC is to be held in Sydney, 9-15 July 1989, at the University of New South Wales. It will be hosted by the Royal Zoological Society of NSW and the convenor is Michael Augee. An information leaflet and notice of intention to attend is included with this issue of *Macroderma*. Information is contained on associated events, including a pre-conference workshop and a post-conference study tour, both in Queensland.

Proceedings of the First National Flying Fox Symposium

The proceedings of the symposium will be published in *Australian Mammalogy*, Volume 10, Numbers 1 and 2, which should be distributed in May 1987.

Monofilament mist-net supplies

We are informed that monofilament (or other) mist-nets are no longer available from Bleitz Wildlife Foundation due to the death of the founder.

We are in the process of establishing an alternative supplier(s), but have not been successful so far. We hope to be able to provide details in the next issue of *Macroderma*.

Cassette of European bat sounds

A cassette tape of the calls of 25 European bat species transformed by ultrasound detectors is available. It is compiled from recordings made in the field when bats were studied hunting in their natural habitats.

Buyers' names and addresses will be registered so that information on updated versions and a manual for species identifications can be distributed when they become available.

Payment in advance includes packing and postage: SEK 100 (preferred); USD - 15; DEM 30; GBP 10 accepted.

Supplier: Ingemar Ahlen, Department of Wildlife Ecology, SLU, Box 7002, 5-750 07 UPPSALA, SWEDEN.

Bat Cleft emergence flight

The evening foraging flight of over 100,000 lactating Little bent-winged bats, *Miniopterus australis*, from a maternity cave at Bat Cleft, Mt Etna, central Queensland occurs each summer for a little over two months. Bat Cleft is one of only five known maternity sites in Australia and it is used by an estimated 80% of the population.

Tours to view the emergence flight leave Rockhampton at 5.30 pm on at least two evenings each week in December and January. Return time is about 10.00 pm. The tour itself is free, but a reservation fee of $1.00 per group (maximum 15) is levied.

For further details contact: Central Queensland Speleological Society, PO Box 538, Rockhampton, Qld 4700, or 'phone (079) 285-798; (079) 342-788; (079) 279-016.

Ectoparasites of Australian bats

Philip Hodgson is a graduate diploma student in the Zoology Department at ANU. His project is a survey of ectoparasites on Australian bats. He would be grateful for specimens preserved in 70% ethanol or any records of these animals. A sample data sheet is included loose with this issue. For further information or records: Philip Hodgson, Zoology Department, Australian National University, GPO Box 4, Canberra, ACT 2601. Telephone (062) 951-390.

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Common names, where used, should conform with therecommendations of the Australian Mammal Society (*Bull. Aust. Mammal. Soc.* 6: 13-23).

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