

Bats

on New England wool properties

Why are bats important?

Small, insect-eating bats ('microbats') fulfil an important role on wool properties, that of natural pest control. Microbats eat a wide range of invertebrates, predominantly moths, beetles and bugs, with some species also consuming mosquitoes, grasshoppers and crickets. Individual microbats can consume up to half their body weight in insects in a night. Without their services, insect populations could explode!

Microbats differ in size and shape and where and how they prefer to hunt, so

their diet varies accordingly. The freetail bats have long, narrow wings and fly fast and high above trees. Others with broader wings are able to fly below the canopy and pick insects off leaves and branches. The more species and numbers of bats, the better the pest control service they perform.

How many different kinds of bats are there?

Australia-wide, there are more than 70 species of bat, with quite a few yet to be formally described by scientists. The Land, Water & Wool (LWW) Northern

Table 1. The bats recorded by the LWW Northern Tablelands Project on 18 Monitor and Case Study wool properties in the summers of 2002-03 and 2004-05.

Common Name	Latin Name	Diet*	Abundance**
Microbats			
Broad-nosed bat or eastern falsistrelle	<i>Scoteanax</i> or <i>Scotorepens</i> or <i>Falsistrellus</i> sp.	Beetles, slow-flying insects	0.42
Chocolate wattled bat	<i>Chalinolobus morio</i>	Predominantly moths with some beetles	0.58
Common bentwing bat	<i>Miniopterus schreibersii</i>	Predominantly moths	0.27
Eastern cave or little forest bat	<i>Vespadelus pumilus</i> or <i>V. vulturnus</i>	Small flying insects (e.g. moths, beetles, bugs, mosquitoes)	3.94
Eastern freetail bat	<i>Mormopterus</i> sp. 2	Bugs and flying ants	0.01
Freetail bat	<i>Mormopterus</i> sp. 4	Probably bugs	***
Gould's wattled bat	<i>Chalinolobus gouldii</i>	Moths, beetles, bugs, flies and locusts	6.79
Large forest bat	<i>Vespadelus darlingtoni</i>	Small flying insects (e.g. moths, beetles, bugs, mosquitoes, flying ants)	1.55
Little broad-nosed bat	<i>Scotorepens greyii</i>	Ants, termites, crickets, bugs, beetles, flies and moths	0.17
Long-eared bat	<i>Nyctophilus</i> sp.	Wide variety of flying and flightless insects	0.83
Southern forest bat	<i>Vespadelus regulus</i>	Moths, beetles, flies, mosquitoes, ants, bugs	1.63
White-striped freetail bat	<i>Tadarida australis</i>	Moths, beetles, bugs, grasshoppers	0.75
Yellow-bellied sheath-tail bat	<i>Saccolaimus flaviventris</i>	Mainly beetles, plus grasshoppers and bugs	0.17
Fruit bats			
Little red flying fox	<i>Pteropus scapulatus</i>	Predominantly nectar and blossom	***

* Source: Strahan (1995), Churchill (1998).

** Average number of passes per evening of each species (definite identifications only) across all habitats on LWW Monitor farms.

*** Only recorded on one Case Study farm in 2002-03.



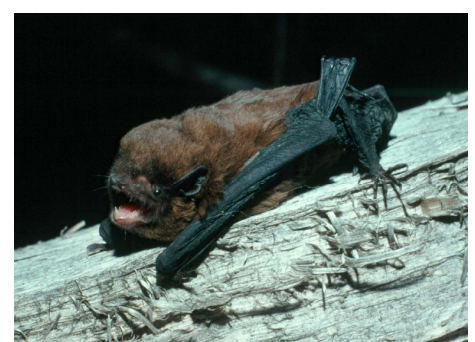
Above—Gould's wattled bat, the most widespread and abundant microbat on New England wool properties.

Below—Common bentwing bat.



Above—Gould's long-eared bat (*Nyctophilus gouldi*), one of several long-eared bat species in southern New England farmland.

Below—Chocolate wattled bat. Photo—Lindy Lumsden.



Tablelands Project (2002-06) (NSW) recorded at least 13 different species of microbat on wool properties in southern New England, as well as a large fruit bat, the little red flying-fox, over two summers (Table 1).

How common are they?

Bats are common on New England wool properties even though most people are unaware of them. The LWW Northern Tablelands Project recorded microbats on all 18 wool properties surveyed in the summers of 2002-03 and 2004-05. A minimum of 2 species and a maximum of 9 species (average 6 species) of microbat were recorded per property.

Why don't we hear more about bats?

Microbats often go unnoticed because they are small, mostly silent (to our ears at least), only feed at night and hide in roosts during the day. They roost in hollows and crevices in trees, under loose bark and in farm buildings and caves, so we tend not to see them.

Our understanding of bats is not as advanced as of other Australian mammals, and we are only starting to appreciate just how valuable these native animals are to farmers. We are still building libraries of the calls and sorting out the taxonomy of the different species, hence the uncertainty in Table 1 about some of the species recorded on New England farms.

Where are bats found on New England farms?

Microbats favour timber and surface water on New England wool properties (Figs 1 & 2).

In the LWW research, riparian timber was the preferred habitat for most species, with an average of 4 species and 115 microbat passes per evening. Open treeless pasture was the least favoured habitat, with an average of only 1 species and 11 passes per evening.

Scattered large trees and young windbreaks in pasture held some surprises. Microbats were almost as abundant and diverse around paddock trees as riparian timber, with an average of over 3 species and 71 passes per evening in the vicinity of scattered trees in pasture.

Although the windbreaks we sampled were only 10-15 years old, they

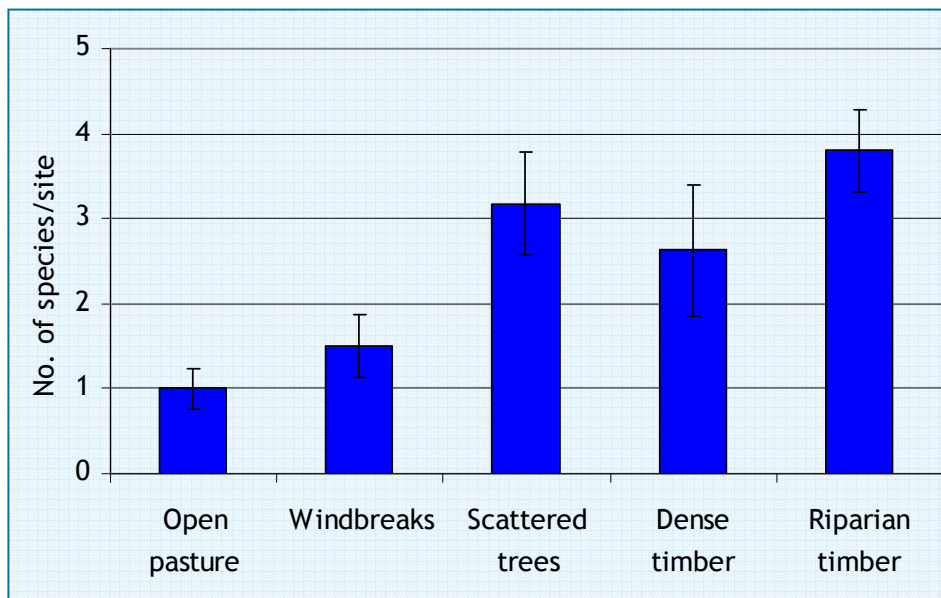


Figure 1. The average number of species of microbat (± 1 s.e.m.) detected by Anabat recordings in different habitats on southern New England Monitor wool properties in summer 2004-05. Scattered trees were areas with projected foliage cover of trees < 10%; projected foliage cover of trees in dense timber was $\geq 10\%$. Sample sizes: open pasture ($n = 18$); windbreaks ($n = 16$); scattered trees ($n = 17$); dense timber ($n = 16$); riparian timber ($n = 10$).

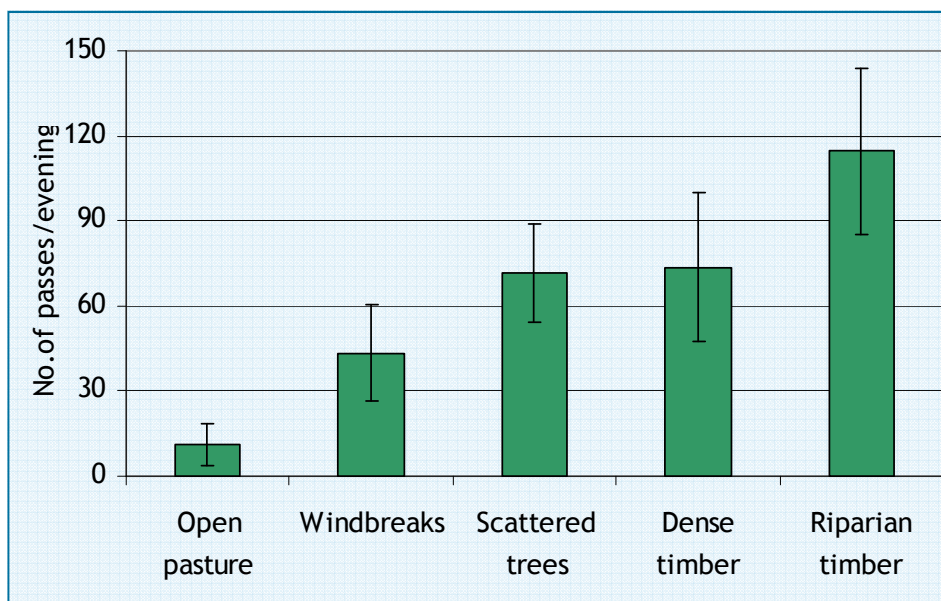


Figure 2. The average number of passes by all microbats (± 1 s.e.m.) detected by Anabat recordings in different habitats in southern New England, summer 2004-05. Sample sizes as in Figure 1.

Below—The lesser long-eared bat (*Nyctophilus geoffroyi*) is one of the long-eared bats found in farmland in southern New England.



Below—Little forest bat. Photo—Lindy Lumsden.



Table 2. The abundance of 12 microbats on Monitor farms in various habitats on southern New England, summer 2004-05. Only definite records are included.

Abundance	Open Pasture	Planted Windbreak	Scattered Trees	Dense Timber	Riparian Timber
Broad-nosed bat or pipistrelle	0	0	0.5	0.5	1.3
Chocolate wattled bat	0	0.3	1.5	0.7	0.1
Common bentwing-bat	0	0	0.2	0.5	0.8
Eastern or little forest bat	0.1	2.3	4.5	5.9	8.5
Freetail-bat sp. 2	0	0	0	0	0.1
Gould's wattled bat	4.4	1.6	16.5	2.7	6.2
Large forest bat	0	0.5	1.1	2.4	4.8
Little broad-nosed bat	0	0	0.5	0.1	0.2
Long-eared bat	0.1	0.3	1.1	0.8	2.3
Southern forest bat	0	0.6	1.5	3.4	3.0
White-striped freetail-bat	0.6	2.2	0.4	0.6	0.3
Yellow-bellied sheath-tail-bat	0	0	0.2	0.4	0.2

Ave. No. of Passes per Evening	
0.0	
0.1	
0.2-0.3	
0.4-0.7	
0.8-1.5	
1.6-3.0	
3.1-8.0	
8.1-16.5	

Microbat survey methods

Microbats were surveyed on the three Case Study farms in the summer of 2002-03 (Fact Sheet 6) and on 17 Monitor farms between November 2004 and January 2005. We used electronic ('Anabat') detectors at night to record the ultrasonic calls of microbats. Each call represents one 'pass' of a microbat flying near the recorder.

In 2004-05, 71 sites stratified by habitat were surveyed across 17 Monitor farms. On some farms, we recorded up to 427 passes by microbats in an evening (21:00-06:30 hours) of ultrasonic recording. Recordings were identified by comparison with a library of recordings compiled by G. Ford in southern Queensland and northern NSW.

For maximum diversity of microbats, a mix of wooded habitats in farmland is best, including planted windbreaks, old scattered paddock trees, dense timber and wooded creeks and streams.

Below—A Gould's wattled bat roost tree. Inset—The actual roost site. Photos—Lindy Lumsden.



attracted significantly more microbat passes (43/evening) than open pasture. Some windbreaks were purely native trees and shrubs and others were a mix of native and introduced species.

Do all bats like the same habitats?

You've heard the adage, 'horses for courses'. Well, various bats prefer different habitats, too (Table 2).

In the LWW research on local wool properties, six microbats were most frequently recorded in riparian timber: broad-nosed bat or pipistrelle, common bentwing-bat, eastern or little forest bat, freetail-bat (sp. 2), large forest bat, and the long-eared bat.

Two microbats were most frequent in dense timber: the southern forest bat and the yellow-bellied sheath-tail bat.

Three microbats were most frequent around scattered pasture trees: chocolate and Gould's wattled bats, and the little broad-nosed bat.

And one bat was most frequent around young windbreaks: the white-striped freetail-bat.

No species was most frequent in treeless pasture, but the few microbats recorded in open pasture were almost all Gould's wattled bat.

Thus for maximum diversity of microbats, a mix of wooded habitats in farmland is best, including planted windbreaks, old scattered paddock trees, dense timber and wooded creeks and streams.

Note that in comparison to treeless pasture (Figs 1 & 2), any mature trees or on-farm timber will attract significantly more species and numbers of bats. Even young windbreaks will increase the numbers of bats in open pasture.

Below—Lesser long-eared bat maternity roost. Photo—Lindy Lumsden.



Below—Gould's long-eared bat roosting in a nestbox in farmland near Armidale.



Below—Wooded riparian zone. Photo—Nick Reid.



Below—Dense timber. Photo—Nick Reid.



Below—Windbreaks. Photo—Nick Reid.



Below—Scattered trees. Photo—Nick Reid.



Below—Pasture. Photo—Nick Reid.



How do I conserve bats on my farm?

The LWW results show that timber is important for all microbat species.

Scattered paddock trees are almost as good as riparian timber in terms of numbers of bat species. This may be because scattered eucalypts in New England pastures are plagued by large numbers of defoliating insects, which are prey for various microbats. Even young planted windbreaks increase microbat diversity and habitat in otherwise open pasture.

Maintaining timber is important for bats to forage around, including trees near water and scattered paddock trees. However, every tree in farmland has value, since work in northern Victoria shows that bats are very mobile and can fly more than 10 km in a night.

The other key habitat requirement is roost sites. The work in northern Victoria shows that microbats commonly roost in tree hollows in scattered paddock trees and dead trees, as well as denser stands of timber, farm buildings and caves.

Every large old or dead hollow tree is a potential roost site, so special care should be taken of these on farm. Eucalypts can take up to 100 years to form hollows. So although replanting and natural regeneration are important for restoring on-farm foraging habitat, existing mature trees, particularly large trees, are disproportionately valuable.

Below—Lesser long-eared bat roost tree. Photo—Lindy Lumsden.



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Land, Water & Wool (LWW) is the most comprehensive natural resource management research and development program ever undertaken for the Australian wool industry. LWW is a partnership between Australian Wool Innovation Limited and Land & Water Australia, and has seven core sub-programs. The Native Vegetation and Biodiversity sub-program is working with woolgrowers and demonstrating that biodiversity has a range of values, can add wealth to the farm business and can be managed as part of a productive and profitable commercial wool enterprise.

The Land, Water & Wool Northern Tablelands Project is led by Associate Professor Nick Reid, University of New England, in collaboration with Southern New England Landcare Ltd, and the Centre for Agricultural and Regional Economics.

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Date—December 2006.

Acknowledgements—The Project Team is indebted to the Case study and Monitor woolgrower families who allowed us to record bats on their farms, and to Cate Macgregor for help with field data collection. Special thanks to Lindy Lumsden, Jann Williams, Mike Wagg, Renelle Jeffrey and Jane Thomas for commenting on drafts.

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