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## THE USE OF MIST NETS AND RADIOTELEMETRY IN THE STUDY OF THE GROUND PARROT *Pezoporus wallicus* IN BARREN GROUNDS NATURE RESERVE, NEW SOUTH WALES

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Methods for trapping and radio-tracking Ground Parrots were examined at Barren Grounds Nature Reserve, Jamberoo, NSW. Two methods, involving mist nets, were successful in capturing the parrots. A technique for attaching radio transmitters to the birds is described, and the operating lives of two battery types are compared.

### INTRODUCTION

The Ground Parrot *Pezoporus wallicus* is a rare bird found in the coastal heathlands of south-eastern and south-western Australia and Tas-

mania (Pizzey 1980). Due to the parrot's secretive nature, and the dense vegetation cover of its habitat, very little is known about the species' behaviour or ecology (Meredith, Gilmore and Isles 1984). One means of overcoming the observ-

ation problems is by the use of radiotelemetry. Radio transmitters have been successfully used on the Kakapo *Strigops habroptilus*, a large, flightless parrot of New Zealand (Best and Powlesland 1985). Several techniques for attaching transmitters have been tested (Bray and Corner 1972; Perry, Haas and Carpenter 1981) but most studies have employed either glue-mounts or harnesses. Adhesive techniques usually result in short attachment times (Raim 1978) while harnesses may provide longer times, especially on quite large birds such as the Screech Owl *Otus asio* (Smith and Gilbert 1981).

The use of radiotelemetry to study an animal involves the capture of the animal and the attachment of the transmitter. This paper examines two methods for trapping Ground Parrots and one method for tagging the birds with radio transmitters, using two different types of batteries. The decision to trial a glued attachment rather than a harness was based on three reasons. First, the parrots are difficult to capture, and so the chances of retrapping a tagged bird to remove the harness would be low. Second, the harness could damage the bird either by abrasion on the body, or possible snagging on vegetation. Third, the glued tag eventually falls off with moult of the feathers, thus avoiding the need to further stress the bird by attempting to recapture it.

### STUDY SITE

The capture and tagging of Ground Parrots were undertaken in Barren Grounds Nature Reserve (34°40'S., 150°43'E.) near Jamberoo, New South Wales between November 1985 and January 1986. The parrots inhabited the low heath which cover the undulating, eastern edge of the Illawarra escarpment at approximately 600 m above sea level. For further descriptions of the study site see Jordan (1987).

### METHODS

#### *Capture techniques*

Two methods, involving mist nets, were used to capture Ground Parrots. In both methods it was found that the standard 3 cm mist nets were too fine, and a larger mesh should be used if possible. Also, the nets should be set with rather slack tension. Calm days should be selected for netting since wind can decrease the chances of

capture (birds see and avoid moving nets, and birds that hit the net fail to become enmeshed).

i) Daytime capture: A long row of mist nets was erected along a ridge in an area where Ground Parrots occurred in good numbers. The easiest way to select a site was by listening to the calls of the birds at dusk. During the day the area around the mist nets was walked by a line of human beaters. Beaters were spaced 10 m apart. When a bird was flushed the position where it landed was noted, and an attempt was made to drive the bird towards the net line. The Ground Parrot always flew low (1-2 m) and could be guided towards the net line by strategically placed observers. Nine parrots were caught by this method.

ii) Capture at dusk: An alternative method, which was the only feasible one to use when only one or two people were available, was to set the nets at dusk as per the previous method. Ground Parrots flew around in the half-light and sometimes hit a net. At Barren Grounds approximately half the birds striking the nets became enmeshed long enough to be captured. Eight birds were captured this way. Birds captured at dusk were kept in a holding cage overnight and released at dawn. Those released after dark made no attempt to move away from the observer, and appeared disoriented, whereas in a holding cage Ground Parrots roosted quietly, and any faeces voided overnight could be collected for dietary analysis.

#### *Technique for attaching Radio Transmitters*

Four SR-1 radio transmitters were obtained from Biotrack\* of the United Kingdom. Two of these were fitted with zinc/air cells with a rated life of 120 days, and two with mercury cells with a rated life of 80 days. The complete tag, with power source weighed 4.8 g (zinc/air) or 5.6 g (mercury). The average body weight of the Ground Parrot at Barren Grounds was 80.4 g (range 70-94 g, n=16 birds). The tags therefore represented about 5 to 8 per cent of the bird's body weight. The devices supplied had approximate dimensions of 20 × 10 × 8 mm with an antenna 250 mm long made of steel (tiger tail)

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\*Biotrack, Stoborough Croft, Grange Road, Stoborough, Wareham, Dorset, BH20 5AJ, United Kingdom.

wire, with silicone rubber covering the first 50 mm. The transmitter and power cell were encased in a generous quantity of epoxy-resin.

The method used to attach the transmitter to the bird was a variation of that described by Raim (1978). A piece of surgical gauze dressing was cut to a size slightly larger than that of the transmitter. A patch of feathers the size of this gauze was trimmed in the interscapular region of the parrot using small, finely pointed scissors, to leave feather stubs about 1 mm long (Figure 1). The gauze was saturated with eyelash cement (Eylure 'lashfix') and placed on the trimmed area.

The gauze was held in place for 15 to 20 minutes until the adhesive was dry to touch. The bird was placed in a holding cage overnight to allow the adhesive to dry thoroughly. During the night it appeared to ignore the gauze pad on its back. At dawn the transmitter was attached with a drop of glue (Selleys "Supa Glue") and the bird immediately released. The transmitter was aligned so that the antenna lay along the line of the tail (Figure 1).

The ground Parrot is very docile when handled compared with other parrots, and the attachment procedure is easily carried out by two persons; one to hold the bird and the other to make the attachment.

## RESULTS AND DISCUSSION

When released, all tagged birds flew off strongly, with no perceptible disability, and they behaved normally on all subsequent flushings. The birds were tracked using a Telonics receiver (150-152 MHz frequency range) and a three-element hand-held Yagi antenna. The transmitters showed some frequency instability, but did not vary more than 4 KHz from nominal. They could always be tuned-in by quickly scanning near the nominal frequency.

The position of a bird was fixed by triangulation from three known positions. This proved rather inaccurate, especially with undulating topography. Fixes were therefore sometimes confirmed by flushing the bird. The effective range of the transmitters varied from around 1.5 km (with line-of-sight) to 9.2 km where there was intervening high ground. This proved adequate for the study.

One transmitter was recovered intact after 35 days attachment, and showed no evidence of damage from either the bird or the elements. This indicates that the amount of encapsulating material could be reduced, giving a weight reduction which may result in a longer period of attach-

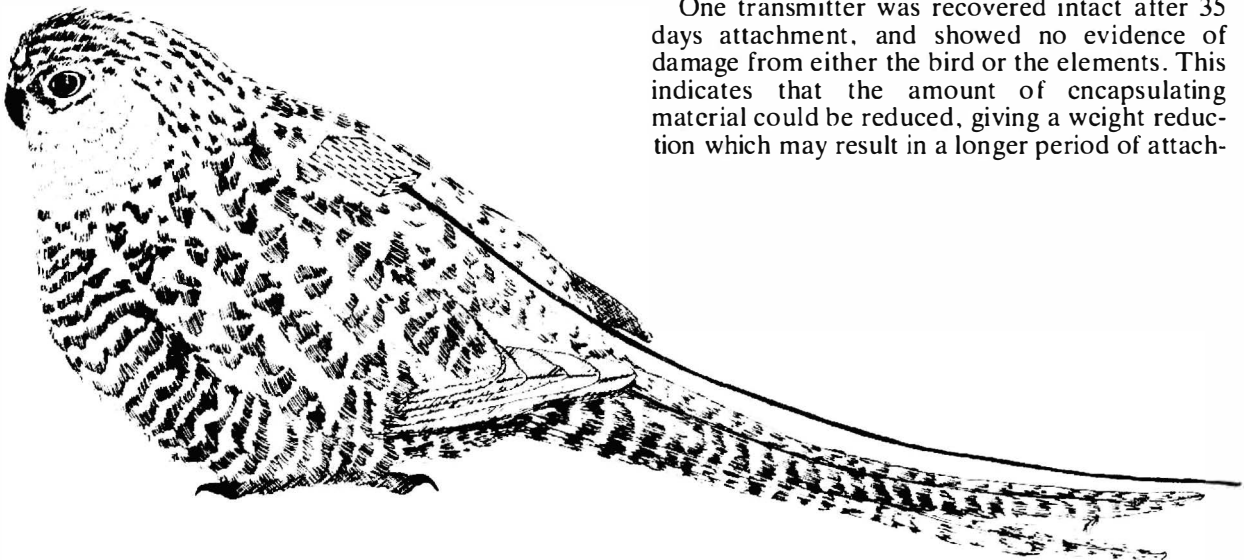


Figure 1. Dorsolateral view of Ground Parrot showing interscapular position of transmitter (broken line) and trailing antenna (continuous line).

ment. The recovered tag was still firmly attached to the gauze, and a number of feather stubs were also adhering to it. This indicates that detachment occurred due to moult. One previously tagged bird was recovered five months after transmitter attachment and the feathers had almost fully regrown over the trimmed area. Based on transmitting times, the duration of attachment of transmitters for Ground Parrots (range 17-35 days) is better than those recorded by Raim (1978) and Duffy (1982) using an adhesive method on the Brown-headed Cowbird *Molothrus ater* (range 3-24 and 3-21 days respectively).

Two alternative power sources were used for the transmitters. The zinc/air cell is very light, and was rated to last 120 days in the tag supplied. However, it proved susceptible to damp conditions. In rain it would cease operating, but recover later on drying. After two or three such events it would stop working altogether. The two zinc/air cells operated for 17 and 21 days ( $\bar{x}$  = 19 days) and both apparently failed due to rain. The mercury cell, although heavier and only rated for 80 days, proved more reliable. The two mercury cells lasted 35 and 65 days ( $\bar{x}$  = 50 days). The reasons for eventual failure in these tags was either transmitter failure or battery exhaustion. The cell with the 65-day life was used on two birds consecutively.

This study, although limited in scope, has already produced a wealth of information on the movements and behaviour of the Ground Parrot. The value of radiotelemetry was shown when one tagged bird was found incubating two eggs six days after transmitter attachment. Tracking data indicated that the eggs were laid between two and four days after the bird was released. Another led us to the nest of its mate, which was incubating eggs. The Ground Parrot has proved an ideal subject for this technique, and the study is continuing.

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