

MOVEMENTS AND BURROW USE BY PLATYPUSES, *ORNITHORHYNCHUS ANATINUS*, IN THE THREDBO RIVER, NEW SOUTH WALES

T.R. GRANT¹, G.C. GRIGG², L.A. BEARD² AND M.L. AUGE¹

¹School of Biological Science, University of NSW, P.O. Box 1, Kensington, 2033 and ²Department of Zoology, University of Queensland, St. Lucia, 4067.

ABSTRACT

During studies of temperature regulation in 1981 and 1988/89 11 males and 16 female platypuses were captured in the lower Thredbo River, with 30% of these being recaptured. Eight animals were followed for several days using radiotelemetry, with five being monitored remotely over 2 to 5 months. Although short-term radio-tracking showed that most animals foraged within 1 km of where they were caught, one individual moved 1.3 km in 36 hours and four others ranged over 1.3 - 2.3 km during the study. Males appeared to be more mobile than females. Implications of these results for mark and recapture studies are discussed. Individuals occupied a number of burrows during the study. One burrow complex was occupied simultaneously by two adult males and, at a different time, by two adult females. Animals rested in burrows for between 5.25 and 15.1 hours at a time and most emerged between the hours of 1815 and 2100.

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INTRODUCTION

Grant and Carrick (1978) outlined observations of movements of marked platypuses in the upper Shoalhaven River in New South Wales. This work was later extended by radiotelemetry, during a study of body temperature regulation, when the use of burrows was also considered (Grant 1983). The data from this study indicated considerable individual variation in movements and the use of burrows in the same area by several animals. More recently, Grant (1989 and this vol.) has described the results of 18 years of research on the Shoalhaven River population. Burrell (1927) discussed the use of burrows by platypuses, and made the distinction between what he called "camping-burrows" or "resting-burrows", which he indicated are much shorter and less complex than the "nesting-burrows" used by females in the breeding season.

This current paper describes observations made on movements, resting-burrow use and activity gathered during

investigation of winter temperature regulation of platypuses in the Thredbo River in the alpine region of New South Wales.

METHODS AND STUDY AREA

The study was undertaken in a 2.5 km section of the Thredbo River, at an elevation of 920 m, adjacent to the Gaden Trout Hatchery during January and June 1981, April-October 1989 and in March 1989. Platypuses were captured and marked with stainless steel leg bands, using the methods of Grant and Carrick (1974) in two pools in the grounds of the hatchery and in the intake pool (Fig. 1).

During 1981 one female and two male platypuses had radiotransmitters (Minimitter Model L, with P modification) taped to the ventral sides of their tails, and were tracked over periods of 1-3 days using a receiver (Lafayette HA 420) and loop antenna (Grant 1983, Spencer and Grant 1983). During 1989, implantation of calibrated

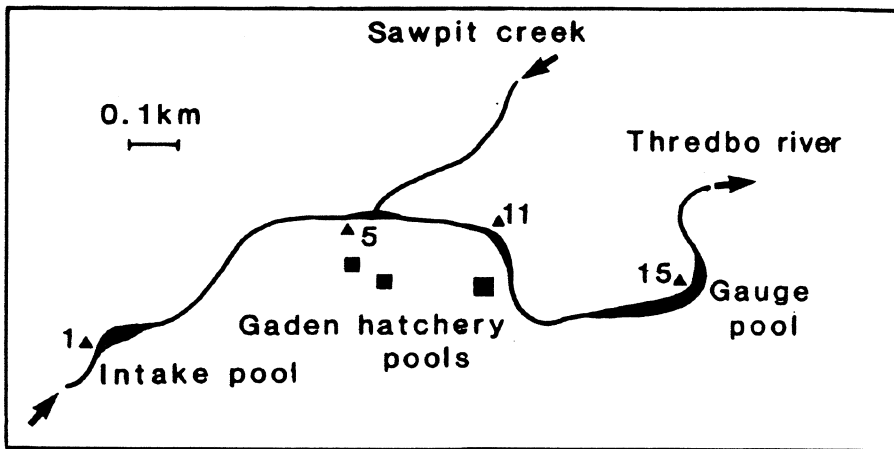


Figure 1. Map of study area. (Solid triangles) burrows, (solid squares) buildings.

battery-operated frequency scanner-receiver system, switched on at predetermined intervals by an electronic timer. With this latter set-up signals from animals could be received and recorded whenever they were within 100-200 m of their point of capture. Occasional failures of the remote monitoring equipment meant that not all days during the total time an animal carried a functional transmitter produced usable data.

Table 1. Captures and recaptures of platypuses in the Thredbo River between Jan 1981 and Mar 1989.

Recaptures	Males		Females		Total
	adults	juveniles	adults	juveniles	
0	7	1	9	2	19
once	2	0	4	0	6
twice	1	0	0	0	1
3 times	0	0	1	0	1
% > once	30%	0	36%	0	30%

temperature transmitters (Austec Electronics) into the peritoneal cavity was undertaken under sterile conditions at the Gaden Trout Hatchery, using Halothane anaesthesia in two females and three males, following guidelines approved by the University of Sydney's Animal Care Committee. Animals were tracked over 6-9 days using a Telonics TR-2 VHF receiver and directional antenna, and were remotely monitored over longer periods using an omni-directional whip antenna mounted in a tree beside the river and connected to a weather-proof box enclosing a

Table 2. Catch per unit effort of platypuses on various field trips to the Thredbo River between 1981 and 1989. *1 net-hour = 1 X 50 m net in water for one hour.

Month	Year	Net-hours*	Animals caught/net-hour
Jan	1981	28	0.18
Mar	1989	56	0.11
Early Apr	1988	18	0.39
Late Apr	1988	22	0.29
June	1981	129	0.09
Nov	1988	40	0.03
Total	-	-	0.12

Table 3. Distances moved, details of monitoring and emergence times of platypuses in the Thredbo River. MA = male adult; FA = female adult, EST = Eastern Standard Time.

Animal	Max. distance moved (km)	%days in capture pool	Monitoring days		Emergence time (EST)
			manual	remote	
MA 130	0.41		2		0715, 2015
MA132	1.29		2		
MA280	1.67	80%	9	49	1815,1855,1910, 1920,2103
MA281	1.67	100%	9	12	1855,1915,2045, 2100,2103
MA282	2.30	61%	6	142	1900
FA199	0.56	100%	3	30	2045
FA204	0.56		1		1820
FA377	0.37	95%	3	132	1815

RESULTS

During the study 27 individual platypuses were captured. Of these, 30% of adult males and 36% of adult females were recaptured at least once, while none of the three juvenile animals was recaptured (Table 1). One adult

male was recaptured twice and one adult female three times. Table 2 shows that catch per unit effort was variable between field trips.

Animals whose movements were tracked using hand-held equipment ("manual monitoring", Table 1) were found to move between 0.37 and 2.30 km during the 1 to 9 days over which they were followed, with most of this movement occurring during normal foraging activities in single 24 hour periods. Remote monitors detected signals from animals close to their pool of capture during 61-100% of the days in which monitoring was carried out (Table 3). Distances moved by the eight individuals are shown in Table 3 and Figure 2. Most males moved further than females. Figure 2 also shows the position of burrows in the study area.

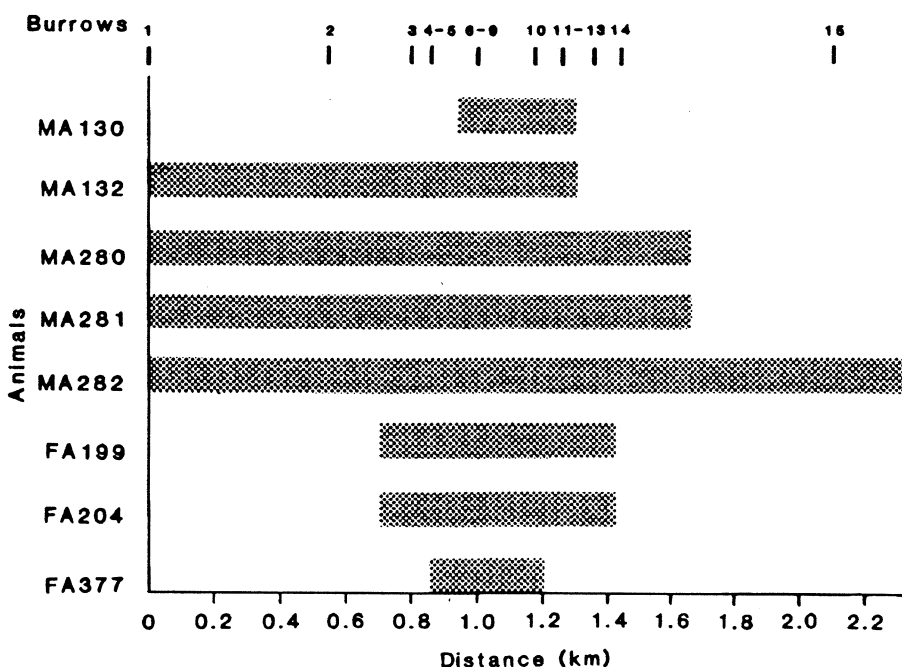


Figure 2. Distances moved by eight radio-tracked platypuses in the Thredbo River. Positions of burrows from furthest upstream to downstream are also shown.

At least two burrows were used by each animal tracked during the study. Two females and two males used the same burrow, or burrow complex in one area of bank

Table 4. Use of burrows by platypuses in the Thredbo River. (*) located in burrow; (-) not located in burrow during study. Burrow 1 is in the 'intake pool', burrows 2-14 are in the 'hatchery pools' and burrow 15 is in the 'gauge pool' (see Fig. 1).

Animal	Burrows															Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
MA130	-	*	-	-	-	-	-	-	-	-	-	-	-	*	-	2
MA132	-	-	*	-	-	-	-	-	*	-	-	-	-	-	-	2
MA280	*	-	-	-	*	-	-	-	-	-	*	-	-	-	-	3
MA281	-	-	-	-	*	-	-	-	-	-	*	-	-	-	-	2
MA282	*	-	-	-	-	-	-	-	-	-	-	-	*	-	*	3
FA199	-	-	-	-	*	-	*	-	-	-	-	-	-	-	-	2
FA204	-	-	-	*	-	-	-	-	-	-	*	-	-	-	-	2
FA377	-	-	-	-	*	*	-	*	-	-	-	-	-	-	-	3

the burrows between the hours of 1815 and 2100, although one individual entered a burrow at 2345 and did not leave until 0715, remaining active until at least 0900 and being found in another burrow at 1500, in which it stayed until 1800 (Table 3).

DISCUSSION

Half of the animals tracked foraged over

Table 5. Actual times spent by platypuses in various burrows in the Thredbo River. Burrow locations are shown in Figures 1 and 2.

Animal	Burrow Number	Time spent in burrow
MA130	9	5 hr 15 min
MA132	-	
MA280	5	10 hr 25 min
	5	13 hr 20 min
	10	10 hr 30 min
MA281	5	13 hr 15 min
	5	15 hr 7 min
	5	6 hr 10 min
	5	11 hr 5 min
	5	13 hr
MA282	13	6 hr 45 min
FA199	5	13 hr 15 min
FA204	4	6 hr 20 min
FA377	5	15 hr 5 min

less than 1 km of river during the study, with the other 50% moving from 1.3 - 2.3 km. This short-term "home range" of individuals is similar to the maximum of 2.3km reported by Serena (pers. comm.) for animals in Badger Creek in Victoria, but considerably shorter than the maximum of 5.6 km reported by Grant (this vol.) in the Shoalhaven River in New South Wales. Animals may well have moved outside the 2.3 km range during times when they were not being followed, as the fixed monitoring station could not pick up signals more than 100-200m away. However, their frequent presence near their capture sites suggests that this is a reasonable estimation of their home range, at least in the short term (i.e. less than a year).

Sharing of burrows by individuals of the same sex was noted by Burrell (1927), who found two males occupying a single "resting-burrow", but never found males and females together in burrows which were examined by excavation. This observation was also confirmed by Serena (pers. comm.), who radio-tracked animals in Badger Creek. Fleay (1944a) reported finding the skeletons of two platypuses in a single burrow in Badger Creek near its confluence with the Yarra River. They had apparently died in a sleeping position. The finding of more than one animal using a particular burrow (or burrow complex), and individuals utilising several burrows in the same area was similar to observations made by Burrell (1927) and Grant (1983). Resting periods in this study were also similar to periods of between 11.6 and 16.7 hours reported by Serena (pers. comm.), who also documented two female animals remaining in burrows for several days. Such extended times spent in burrows were also reported by Eadie (1935) and Fleay (1944b).

Grant (this vol.) suggested that the high capture rates of platypuses early in the evening indicates that this is the time when most animals first emerge to begin foraging.

concurrently, although both sexes were not present at the same time (Table 4). Individuals were estimated to be between 1 and 2 m apart when occupying this burrow (or complex). Two other burrows were utilised sequentially by more than one platypus, one in the intake pool and the other within the grounds of the hatchery (Table 4 and Fig. 1). Individual platypuses monitored from the time they entered a burrow until they re-emerged were found to occupy burrows from 5.25 to as long as 15.1 hours during a 24 hour period (Table 5). Animals normally left

Times of emergence found for individuals in the Thredbo River give some support to this suggestion.

Recaptures of marked platypuses in this study were lower than those recorded by Grant (this vol.) in the Shoalhaven River, where 40% of adult males and 49% of adult females were recaptured at least once, and by Goldney (pers. comm.), who recorded a total of 48.6% recaptures over one month after initial capture of both sexes (juvenile and adult) in the Duckmaloi River in New South Wales. Grant (this vol.) reports 13% and 34% recapture respectively of male and female juvenile platypuses in the Shoalhaven River, while none of the three juveniles captured in the Thredbo River was recaptured. As monitored animals were known to occur within the area of most netting for at least 61% of days during the study, with two individuals being in the area on 100% of monitoring days, it seems strange that recapture rates were not higher if all animals in the population showed such site attachment. Two out of five males and two of three females which were radio-tracked were also recaptured, indicating that netting did sample these apparently sedentary individuals. However, recent netting by Goldney (pers. comm.) in this area failed to recapture any of the individuals marked in the current study. Failure to catch all but one of the five animals with implanted transmitters later in the study, when these devices had failed, indicates more mobility in the longer term, loss of bands (Grant, this vol.), shortcomings of the trapping method, or a combination of these.

Like the studies of Grant (this vol.) in the Shoalhaven River, these data suggest a resident group of individuals and a more mobile group, although failure to recapture animals known to regularly frequent the area during telemetric monitoring, must make this suggestion tentative at best. Lack of frequent recaptures in the area does not necessarily indicate non-occurrence, but simply non-capture.

As in other studies (Grant 1983, Grant and Denny 1987), catch per unit effort (animals captured per net-hour) was variable between sampling times. Some of this was attributable to obvious environmental effects on the capture method. For example, high river flows in November, 1988 raised nets off the bottom, making them less effective at catching animals. However, low capture rates on some occasions (e.g. most nights in June, 1981) were not explainable in these terms.

Population data collected by mark and recapture techniques alone must be considered with caution, including population estimates, home ranges, movements and dispersal. More comprehensive radiotelemetric studies are necessary to elucidate such parameters. The effectiveness and limitations of the capture and marking techniques currently used for the platypus are discussed by Grant (this vol.), particularly with regard to catchability of individuals and loss of marks.

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