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STUDIES OF MACROPODIDAE IN QUEENSLAND

9. REPRODUCTION OF THE RUFOUS RAT-KANGAROO (AEPYPRYMNUS RUFESCENS (GRAY) IN CAPTIVITY WITH AGE ESTIMATION OF POUCH YOUNG

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SUMMARY

A study of the rufous rat-kangaroo (*Aepyprymnus rufescens* (Gray)) was undertaken using wild-trapped animals as the nucleus of an enclosure colony. Growth and development of the pouch young were followed from birth to eviction from the pouch.

The gestation period was 22·0 to 23·6 days and the oestrous cycle was 21·0 to 25·0 days with a post-partum mating usually following birth; the resultant quiescent embryo developed and was born after 18·0 to 20·8 days if the pouch young was prematurely removed.

The pouch life is approximately 4 months and both sexes are sexually mature at 12 months; breeding continues throughout the year.

I. INTRODUCTION

The rufous rat-kangaroo (*Aepyprymnus rufescens* (Gray)) is the largest and the most abundant species of Potoroinae. It occurs as far north as Cooktown in northern Queensland; Calaby (1966) lists the Dungog area of New South Wales as the southern limit of its range. Little is known of the biology of the species.

Enclosure studies were commenced at Townsville in July 1973 and have continued to the present.

II. MATERIALS AND METHODS

Nine adult female and three adult male rat-kangaroos were collected at night using a long-handled net and spotlight. Enclosures and relevant husbandry have been described (Johnson 1978). To facilitate observations at night when the animals were active, each enclosure was fitted with two 40-watt 12-volt suspended lights, powered by two 12-volt motor vehicle batteries. The low intensity of the lights apparently did not disturb the animals. Observations were made for 3 hours per night for 100 consecutive nights. Animals were identified with small vinyl collars individually marked with coloured reflective paint and secured around the neck. The lights were turned on 20 minutes before darkness and turned off after each night of observations.

Daily inspections of pouches of all females were made and the date of each birth recorded for each female. The lengths of the tail and each hindfoot of all pouch young were measured at weekly intervals. The ages at which the following occurred were also recorded: eyes opened; detached from teat; fur present; pouch vacated.

III. RESULTS

Age estimation of pouch young

POUCH YOUNG. Measurements of lengths of tail and mean lengths of hindfeet of five pouch young, sired by three different males and born to four different females, are given as a scatter diagram in figure 1. Estimated ages at specified lengths of tail and hindfeet, with reliability of these estimated ages at 20, 50 and 100 days are presented in table I. Observations of nine pouch young showed that eyes opened at a mean age of 85.2 days, range 82 to 91 days; body hair appeared at a mean age of 87.5 days, range 79 to 92 days, and the pouch young became unattached from the teat at a mean age of 87.3 days, range 84 to 92 days. Of the five pouch young that completed pouch life, permanent vacation of the pouch occurred at a mean age of 114 days, range 105 to 119 days. The young at foot were suckled for about another 50 days.

Reproduction

OESTROUS CYCLE. Duration of the oestrous cycle, as indicated by the interval between successive matings, ranged from 21.0 to 25.0 days in five observations recorded from four animals.

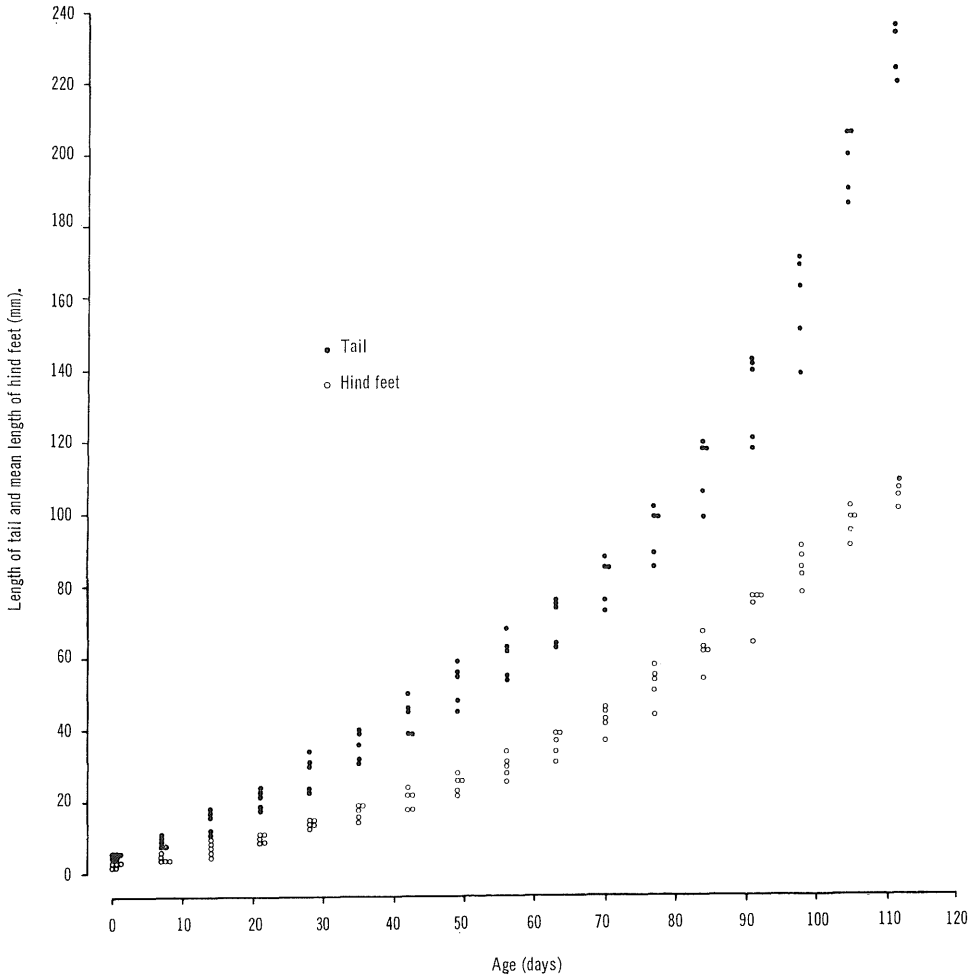

Figure 1.—Pouch young of the rufous rat-kangaroo: length of tail and mean length of hind feet plotted against age. Mean duration of pouch life, 114 days.

TABLE 1

AGES OF POUCH YOUNG ESTIMATED FROM LENGTH OF TAIL AND MEAN LENGTH OF HIND FEET

Length of Tail (mm)	Age (Days)	Days Added per Additional mm	Mean Length of Hind Feet (mm)	Age (Days)	Days Added per Additional mm
5	0	1·6	3	1	2·5
10	8	1·1	10	19	2·2
20	19	1·0	20	41	1·3
40	39	0·8	40	67	0·8
60	55	0·8	60	83	0·6
70	63	0·5	80	95	0·6
110	83	0·4	100	107	0·8
120	87	0·3	110	115	0·8
150	96	0·2			
190	104	0·2			
240	114				
Standard deviations (days) at ages:	20	± 3	Standard deviations (days) at ages:	20	± 1·0
	50	± 6		50	± 2·5
	100	±13·5		100	± 5·0

GESTATION PERIOD. The interval between mating and birth ranged from 22.0 to 23.6 days in five observations recorded from five animals.

PARTURITION. Birth was not observed and this may have occurred in the nest. All young were found within 24 h of birth as a result of the daily inspections.

POST-PARTUM OESTRUS. In captive animals, oestrus was usually observed on the same day as the birth and on occasions appeared to follow within a few hours of birth. Seven reproductive systems of field-collected females were examined, and of these one female with a pouch young of estimated age 110 days had an embryo with a tail measurement of 4 mm in the left uterus.

DEVELOPMENT OF THE QUIESCENT EMBRYO. Pouch young of known ages 17.5, 21, 52, 83 and 91 days were removed from females which had mated post-partum and then had been immediately removed from the presence of the male. Replacement young were born, from quiescent embryos, 18, 18.8, 20.8, 18 and 18 days later respectively. Pouch young of ages 5, 12, 69 and 70.5 days were removed from other females that did not give birth to replacement young, and these adults came into oestrus at 18, 19.3, 24 and 21 days respectively after the removals. Pouch young of four females that had mated post-partum and then had been immediately removed from the presence of the male were allowed to develop to pouch eviction. The second young were born from quiescent embryos in 115, 116, 121 and 124 days from the birth of the first young.

MINIMUM BREEDING AGES. The known age of the youngest captive male to reproduce successfully was 379 days and the known age of the youngest female to mate successfully was 313 days.

BREEDING SEASON. Monthly distribution of pouch young born in captivity is given in table 2. Births occurred in every month of the year but data were insufficient to suggest the occurrence of a breeding season.

IV. DISCUSSION

Tail length and mean hind feet length are acceptable indicators of age in pouch young of rufous rat-kangaroos. As in other Macropodidae (Kirkpatrick 1965, Kirkpatrick and Johnson 1969), the method of age estimation is unreliable beyond pouch life. In practice, the average of ages estimated for both measurements should be used; there was no difference between sexes.

TABLE 2
MONTH OF BIRTH OF 27 CAPTIVE POUCH YOUNG

Month	No. Born
Jan	1
Feb	2
Mar	2
Apr	2
May	4
Jun	4
Jul	3
Aug	4
Sep	2
Oct	2
Nov	1
Dec	1

Reproduction follows the usual macropod pattern (Sharman, Calaby and Poole 1966), with a gestation period of similar length to the oestrous cycle and a parturition usually followed closely by a post-partum mating from which a quiescent embryo can result.

These results are similar to the findings of Tyndale-Biscoe (1968) who reported that *Bettongia lesueur* (Quoy and Gaimard) had a post-partum oestrus and, after removal of the pouch young, returned to oestrus in a slightly shorter time than the normal oestrous cycle. However, the results differ from Moors' (1975) findings that *A. rufescens* differs in reproduction from other Potorinae in that it lacks a post-partum oestrus and returns to oestrus 7 to 8 days after removal of the pouch young.

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