ECOLOGY, SOCIAL BEHAVIOUR AND REPRODUCTIVE SUCCESS IN A POPULATION OF RED-NECKED WALLABIES

by

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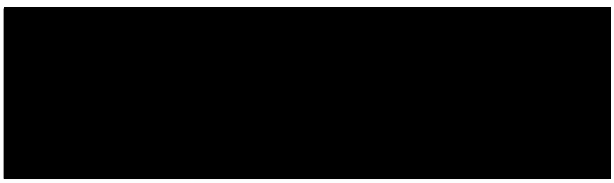
Preface

I certify that the substance of this thesis has not already been submitted for any degree and is not currently being submitted for any other degree.

I certify that any help received in preparing this thesis, and all sources used, have been acknowledged in this thesis.



C.N. Johnson

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Summary

For three years I studied the social behaviour and ecology of red-necked wallabies *Macropus rufogriseus banksianus* at Wallaby Creek in northern New South Wales. The objectives of the study were to describe the species' habitat use and social organisation, and to gather information on the behavioural and ecological determinants of reproductive success in male and female wallabies.

Red-necked wallabies spend most of their time in, or close to, the cover provided by forest or dense ground vegetation, and live in home ranges which are very stable in location from year to year. The movement patterns of sex-and-age classes differ in a number of ways, and the movements of females vary according to season and to their reproductive states. Females living in preferred habitats reach maturity earlier than females living in areas apparently of lower quality. Groups of red-necked wallabies are usually small, and, in the short term, unstable. Groups are smallest and most stable in summer; larger, more loosely coordinated groups form in winter as the wallabies concentrate on dwindling patches of good pasture.

Females may give birth in any month of the year, but most young are born in late winter and spring. This partially seasonal pattern of breeding is at least partly due to a seasonal variation in average length of pouch life, which in turn is due to the tendency for male young to remain in the pouch during cold months. Infant survival rates apparently do not vary seasonally.

During their first month out of the pouch, infant wallabies spend much of their time in dense vegetation, apart from their mothers; they follow their mothers more persistently during the subsequent four months. The distribution of "hiding" and "following" type suites of behaviour in the mother-infant relationships of macropods is compared with that in ungulates : the comparison suggests that the last period of the pouch life of the young macropod partly takes the place of the

lying-out phase in the life of the young ungulate.

Males disperse at about two years of age, but females spend their lives near their places of birth. Mothers associate regularly with their subadult offspring (especially with their sons), their adult daughters, and certain other adult females who are probably also relatives. The clusters of preferentially associating wallabies thus formed are stable social groupings, the members of which feed close together and tend to breed in synchrony. Associations between females, and between males and females, vary in frequency through the female reproductive cycle. Males, especially young males, show some preference for male companions similar to themselves in size.

Body growth in males is sustained for much longer than it is in females, and as they grow males ascend a dominance hierarchy and may eventually take up dominions and mate with females. For the most part, the sexes and social classes mix with apparent freedom, but the large dominion-holding males keep certain other males away from oestrous females. Females go through approximately seven days of heightened attractiveness to males before they become ready to mate. During this period they are followed by groups of males. The competition between attendant males and the advertisement of oestrus thus broadcast ensures that dominion-holding males find, and defend sexual access to, oestrous females.

Variation in reproductive success amongst females correlates most strongly with their sociality : the infants of females who spend much of their time with other females and subadults, and who live in large social groups, are less likely to survive to weaning age than are the infants of solitary mothers. Females are less likely to breed successfully the year after producing a surviving son than after producing a surviving daughter. These differences are probably consequences of tolerance of competition for resources between relatives.

Comparisons between red-necked wallabies and other species of mammals suggest that the wallabies' feeding style has had more influence on their grouping behaviour than has their anti-predator behaviour; that sex-differences in juvenile dispersal and philopatry may best be accounted for by considering sex-differences in the

effects of dispersal on age at first breeding; and that much of the variation between species in male reproductive behaviour and the strength of matrilineal social organisations may be due to the evolutionary consequences of the degree of overlap of the home ranges of females.

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