

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

by

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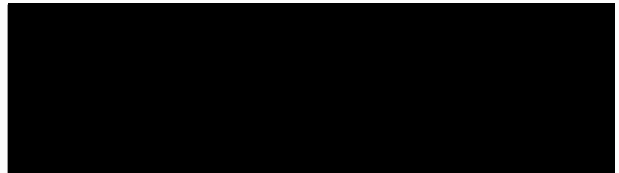
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## Preface

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.

## Table of Contents

Preface  
Acknowledgements  
Summary  
List of Tables  
List of Plates  
List of Figures

| Chapter  | Page |
|--|------|
| <b>1. Introduction</b>   | 1    |
| 1.1 General  | 1    |
| 1.2 The Macropodoidea  | 4    |
| 1.3 The red-necked wallaby                                     | 6    |
| <i>1.3.1 Taxonomy, distribution and habitat preferences</i>    | 6    |
| <i>1.3.2 Ecology and behaviour</i>                             | 7    |
| <i>1.3.3 Breeding biology</i>                                  | 9    |
| <i>1.3.4 Growth and sexual dimorphism</i>                      | 10   |
| <b>2. Materials and Methods</b>                                | 12   |
| 2.1 The study area   | 12   |
| <i>2.1.1 Location, topography and soils</i>                    | 12   |
| <i>2.1.2 Climate</i>   | 12   |
| <i>2.1.3 Vegetation</i>  | 13   |
| <i>2.1.4 Land use</i>  | 14   |
| <i>2.1.5 Fauna</i>   | 16   |
| 2.2 Data collection, and classification of animals             | 16   |
| <i>2.2.1 Individual recognition</i>                            | 16   |
| <i>2.2.2 Collection of records</i>                             | 18   |
| <i>2.2.3 Age, reproductive and size classes</i>                | 19   |
| 2.3 Note on statistical analysis                               | 22   |
| <b>3. Habitat Use and Home Range</b>                           | 23   |
| 3.1 Introduction   | 23   |
| 3.2 Data analysis  | 23   |
| <i>3.2.1 Home ranges</i>                                       | 23   |
| <i>3.2.2 Distributions</i>                                     | 24   |
| 3.3 Characteristics of home ranges                             | 25   |
| <i>3.3.1 Size, and heterogeneity of use</i>                    | 25   |
| <i>3.3.2 Stability</i>   | 26   |
| 3.4 Habitat preferences  | 26   |
| 3.5 Seasonal variation in habitat use                          | 27   |
| 3.6 Differences in habitat use between classes of wallabies    | 28   |
| 3.7 Habitat preference and reproductive performance by females | 31   |
| 3.8 Discussion   | 32   |
| <b>4. Group Size and the Dynamics of Grouping</b>              | 41   |
| 4.1 Introduction   | 41   |



|           |  |           |
|-----------|--|-----------|
| 4.2       | Data collection and analysis   | 42        |
| 4.3       | Inter-population variation in group size   | 43        |
| 4.4       | Seasonal variation in grouping behaviour at Wallaby Creek                          | 43        |
|           | 4.4.1 <i>Group size</i>  | 43        |
|           | 4.4.2 <i>Spacing of individuals within groups</i>                                  | 44        |
|           | 4.4.3 <i>Rates of progression of feeding wallabies</i>                             | 44        |
|           | 4.4.4 <i>Group flux</i>  | 44        |
| 4.5       | Feeding activity in relation to group size   | 44        |
| 4.6       | Discussion   | 45        |
| <b>5.</b> | <b>Inter-Birth Intervals and Seasonal Breeding in Relation to Sex of Offspring</b> | <b>50</b> |
| 5.1       | Introduction   | 50        |
| 5.2       | Data collection and analysis   | 52        |
| 5.3       | Seasonal variation in frequencies of births, and continuity of breeding            | 52        |
| 5.4       | Variation in the durations of pouch lives  | 53        |
|           | 5.4.1 <i>Breadth of variation</i>  | 53        |
|           | 5.4.2 <i>Seasonality of variation</i>  | 54        |
| 5.5       | Timing of inter-birth intervals  | 55        |
| 5.6       | Seasonal variation in infant survival  | 55        |
| 5.7       | Timing of dates of first parturition of young females                              | 56        |
| 5.8       | Discussion   | 56        |
| <b>6.</b> | <b>Relationships Between Mothers and Infants</b>                                   | <b>61</b> |
| 6.1       | Introduction   | 61        |
| 6.2       | Data collection and analysis   | 61        |
| 6.3       | Relationships between mothers and pouch young                                      | 62        |
|           | 6.3.1 <i>Activities of pouch young</i>   | 62        |
|           | 6.3.2 <i>Interactions between mothers, pouch young, and other females</i>          | 63        |
| 6.4       | Permanent vacation of the pouch  | 64        |
| 6.5       | Relationships between mothers and young-at-foot                                    | 65        |
|           | 6.5.1 <i>Frequencies of association</i>  | 65        |
|           | 6.5.2 <i>Maintenance of association</i>  | 65        |
|           | 6.5.3 <i>Separations</i>   | 67        |
| 6.6       | Behaviour of lone infants  | 69        |
| 6.7       | Suckling and weaning   | 70        |
| 6.8       | Other social interactions  | 72        |
| 6.9       | Activity budgets of mothers and young  | 74        |
| 6.10      | Home ranges of young-at-foot   | 74        |
| 6.11      | Hiding and following in macropods and ungulates                                    | 75        |
| <b>7.</b> | <b>Philopatry, Dispersal and Association</b>                                       | <b>83</b> |
| 7.1       | Introduction   | 83        |
| 7.2       | Philopatry and dispersal   | 84        |
|           | 7.2.1 <i>Females</i>   | 84        |
|           | 7.2.2 <i>Males</i>   | 85        |
| 7.3       | Association between mothers and young  | 86        |
| 7.4       | Companion preferences  | 87        |
|           | 7.4.1 <i>Identification of social groups</i>                                       | 87        |
|           | 7.4.2 <i>Characteristics of social groups</i>                                      | 90        |

|            |  |            |
|------------|--|------------|
|            | <i>Size</i>  | 90         |
|            | <i>Structure</i>   | 90         |
|            | <i>Stability</i>   | 91         |
|            | <i>Integrity : inter-individual distances and breeding synchrony</i> | 92         |
| 7.5        | Home range overlap between social groups                             | 93         |
| 7.6        | Effects of season and reproductive state on sociality of females     | 94         |
| 7.7        | Association between males  | 95         |
| 7.8        | Association between males and females                                | 96         |
| 7.9        | Social interactions  | 98         |
| 7.10       | Discussion   | 98         |
| <b>8.</b>  | <b>Social Interactions and Reproductive Success of Males</b>         | <b>109</b> |
| 8.1        | Introduction   | 109        |
| 8.2        | Non-reproductive agonistic interactions                              | 111        |
|            | <i>8.2.1 Description of interactions</i>                             | 111        |
|            | <i>8.2.2 Body size and dominance rank</i>                            | 114        |
|            | <i>8.2.3 Characteristics of the dominance hierarchy</i>              | 115        |
|            | <i>Frequencies of interaction</i>                                    | 115        |
|            | <i>Partner preferences</i>   | 115        |
|            | <i>Interaction type</i>  | 115        |
|            | <i>Reversals of dominance status</i>                                 | 116        |
| 8.3        | Body size and access to oestrous females                             | 117        |
| 8.4        | Spatial partitioning of access to mates by dominant males            | 118        |
| 8.5        | Discussion   | 120        |
| <b>9.</b>  | <b>Courtship and Mating</b>  | <b>128</b> |
| 9.1        | Introduction   | 128        |
| 9.2        | Duration of oestrus  | 128        |
| 9.3        | Interactions between males and oestrous females                      | 130        |
| 9.4        | Dynamics of groups of consorting males                               | 131        |
| 9.5        | Movements of oestrous females  | 132        |
| 9.6        | Interactions among consorting males                                  | 133        |
| 9.7        | Discussion   | 137        |
| <b>10.</b> | <b>Social Organisation and Reproductive Success of Females</b>       | <b>141</b> |
| 10.1       | Introduction   | 141        |
| 10.2       | Reproductive success and association with subadult offspring         | 142        |
| 10.3       | Reproductive success and sociality                                   | 143        |
| 10.4       | Reproductive success and experienced density                         | 144        |
| 10.5       | Other variables  | 144        |
| 10.6       | Discussion   | 145        |
| <b>11.</b> | <b>General Discussion and Conclusions</b>                            | <b>153</b> |
| 11.1       | Synthesis : social organisation of the red-necked wallaby            | 153        |
| 11.2       | Ecological determinants of group size                                | 158        |
| 11.3       | Philopatry and dispersal   | 160        |
| 11.4       | Female dispersion and male reproductive behaviour                    | 166        |
| 11.5       | Reproductive success and social behaviour of females                 | 171        |

|  |     |
|--|-----|
| <b>References</b>  | 175 |
| <b>Appendix I.</b> Aspects of survivorship and mortality                               | 202 |
| <b>Appendix II.</b> Variation in sex ratios of infants                                 | 207 |
| <b>Appendix III.</b> Dendrogram for association among females and subadult males, 1983 | 210 |

## List of Tables

| Table |   | Page |
|-------|---|------|
| 1.1   | Group sizes in various species of macropods   | 11   |
| 3.1   | Seasonal variation in home range use, females   | 37   |
| 3.2   | Seasonal variation in home range use, males   | 38   |
| 3.3   | Correlations between distributions of classes of wallabies  | 39   |
| 3.4   | Patchiness of distributions of classes of wallabies   | 39   |
| 3.5   | Reproductive condition and home range use by females  | 40   |
| 4.1   | Group sizes in several populations of red-necked wallabies  | 49   |
| 4.2   | Group size and feeding activity of wallabies  | 49   |
| 5.1   | Passage of landmarks by infant wallabies, in relation to length of pouch life                               | 60   |
| 5.2   | Monthly variation of infant survival rates  | 60   |
| 6.1   | Suckling rates, and durations of suckling bouts   | 82   |
| 7.1   | Regressions of association index on distances separating centres of activity for females and subadult males | 106  |
| 7.2   | Strengths of association preferences within social groups   | 106  |
| 7.3   | Percentages of time spent by classes of males with females  | 107  |
| 7.4   | Percentages of time spent by males with females as only male present  | 107  |
| 7.5   | Percentages of time spent by dominant and subordinate large males as only large males with females          | 108  |
| 8.1   | Matrix of agonistic interactions between males  | 125  |
| 8.2   | Numbers of interactions between males of the major size classes   | 126  |
| 8.3   | Interaction type and size differences between interactees   | 126  |
| 8.4   | Body size classes of interactees, and interaction type  | 127  |
| 9.1   | Durations of tending by males in the courtship of several species of ungulates                              | 140  |
| 10.1  | Socialisation indices and reproductive success of females   | 151  |
| 10.2  | Survival rates of infants born into social groups   |      |

|      |   |     |
|------|---|-----|
|      | of various sizes  | 152 |
| 10.3 | Experienced density and reproductive success of females                     | 152 |
| 11.1 | Species included in Fig. 11.1   | 175 |
| 11.2 | Species included in Fig. 11.3 and Fig. 11.5                                 | 176 |
| 11.3 | Species included in Fig. 11.6   | 177 |
| I.1  | Ages at death of red-necked wallabies at Wallaby Creek                      | 206 |
| I.2  | Sex ratios of red-necked wallaby age-classes                                | 206 |
| II.1 | Sex ratios of infant red-necked wallabies according to climate and locality | 210 |

### List of Plates

- Plate 1. Forest at Wallaby Creek, facing Chapter 3.  
Plate 2. Pasture/woodland at Wallaby Creek, facing Chapter 3.  
Plate 3. Mother and infant red-necked wallabies, facing Chapter 6.  
Plate 4. Adult males fighting, facing Chapter 8.

## List of Figures

| Figure |   | Page |
|--------|---|------|
| 1.1    | Distribution in Australia of the red-necked wallaby   | 5    |
| 1.2    | Body growth in red-necked wallabies   | 10   |
| 2.1    | Topographic map of the study area   | 12   |
| 2.2    | Rainfall at Wallaby Creek   | 12   |
| 2.3    | Temperature and frost-fall at Wallaby Creek   | 12   |
| 2.4    | Vegetation map of the study area  | 14   |
| 2.5    | Frequencies with which known wallabies were sighted   | 18   |
| 3.1    | Relationship between sample size and estimated home range area                                    | 23   |
| 3.2    | Distribution of relative frequencies of occupation of grid cells                                  | 23   |
| 3.3    | Distribution of intensity of use within the home range  | 25   |
| 3.4    | Distribution of wallabies in the study area   | 26   |
| 3.5    | Distribution of wallabies' centres of activity in relation to the creek                           | 26   |
| 3.6    | Distribution of wallabies' centres of activity in relation to cover edges                         | 26   |
| 3.7    | Diurnal variation in wallaby distribution   | 26   |
| 3.8    | Seasonal variation in wallaby distribution  | 27   |
| 3.9    | Dendrogram of similarities between distributions of classes of wallabies                          | 29   |
| 3.10   | Locations of male centres of activity in relation to distribution of females                      | 29   |
| 3.11   | Distribution of home range sizes, males and females   | 30   |
| 3.12   | Relationship between body size rank and home range size, males                                    | 30   |
| 3.13   | Home range shifts in relation to reproductive state, females                                      | 31   |
| 3.14   | Relationship between distance of centre of activity from creek and age at first breeding, females | 31   |
| 3.15   | Seasonality of breeding of females in relation to location within the study area                  | 31   |
| 4.1    | Distribution of nearest neighbour distances within groups   | 42   |
| 4.2    | Group size and population density in red-necked wallabies and eastern grey kangaroos              | 43   |
| 4.3    | Distribution of group sizes, Wallaby Creek  | 43   |
| 4.4    | Monthly variation in average group sizes  | 44   |
| 4.5    | Monthly variation in spacing of animals within groups   | 44   |
| 4.6    | Monthly variation in rates of progression of feeding wallabies                                    | 44   |
| 4.7    | Seasonal variation in rates of group flux   | 44   |
| 4.8    | Rates of progression of feeding wallabies in relation to group size                               | 45   |

|      |   |    |
|------|---|----|
| 5.1  | Seasonal variation in birth frequencies   | 52 |
| 5.2  | Distribution of durations of pouch life   | 52 |
| 5.3  | Activity of pouch young in relation to their age  | 54 |
| 5.4  | Relationship between environmental temperature and duration of pouch life                                     | 54 |
| 5.5  | Monthly variation in mean duration of pouch life  | 55 |
| 5.6  | Distributions of durations of male and female pouch lives   | 55 |
| 5.7  | Seasonal variation in females' inter-birth intervals  | 55 |
| 6.1  | Frequencies of association by mothers with male and female young-at-foot, in relation to age of young-at-foot | 65 |
| 6.2  | Closeness of association between mothers and young-at-foot, in relation to age of young-at-foot               | 65 |
| 6.3  | Distribution of distances between mothers and young-at-foot   | 65 |
| 6.4  | Approach proportions between mothers and young-at-foot, in relation to age of young                           | 66 |
| 6.5  | Diurnal variation in frequencies of association by mothers with young-at-foot                                 | 66 |
| 6.6  | Activity budgets of young-at-foot, and their mothers  | 74 |
| 6.7  | Locations of sightings of small young-at-foot   | 74 |
| 7.1  | Displacements of maturing females from their infant centres of activity                                       | 85 |
| 7.2  | Displacements of maturing males from their infant centres of activity   | 85 |
| 7.3  | Frequencies of association by mothers with maturing male and female offspring                                 | 86 |
| 7.4  | Companion preference curves for several categories of dyads   | 88 |
| 7.5  | Relationship between home range overlap and association index, females and subadult males                     | 89 |
| 7.6  | Relationship between home range overlap and association index, males  | 89 |
| 7.7  | Inter-individual distances, within and between social groups  | 92 |
| 7.8  | Synchrony of breeding of pairs of females, within and between social groups                                   | 93 |
| 7.9  | Home range overlap of pairs of wallabies in relation to membership of social groups                           | 93 |
| 7.10 | Home ranges of social groups, 1983  | 93 |
| 7.11 | Seasonal variation in proportions of time spent by females with other females, and with males                 | 94 |
| 7.12 | Effect of reproductive state of females on time spent with other females                                      | 94 |
| 7.13 | Relationship between body size ranks of males, and the body size ranks of their closest male companions, 1983 | 95 |
| 7.14 | Relationship between body size of males, and the proportions of their time spent with other males, 1983       | 96 |
| 7.15 | Relationship between body size of males, and the proportions of their time spent completely alone, 1983       | 96 |
| 7.16 | Relationship between body size of males and the proportions of their time spent with females, 1983            | 96 |



|      |  |     |
|------|--|-----|
| 7.17 | Relationship between body size of males, and the distribution of their association preferences among females               | 96  |
| 7.18 | Effect of reproductive state of females on the frequency with which they are accompanied by males                          | 96  |
| 8.1  | Relationship between body size ranks and dominance ranks, males  | 114 |
| 8.2  | Relationship between body size of males and frequency of interaction with other males                                      | 115 |
| 8.3  | Relationship between body size of males, and the proportions of their interactions which they initiate                     | 115 |
| 8.4  | Relationship between body size of males, and their preferences for partners in interactions                                | 115 |
| 8.5  | Relationship between body size of males, and time spent with oestrous females  | 117 |
| 8.6  | Sightings of dominant males with oestrous females, 1981  | 118 |
| 8.7  | Sightings of dominant males with oestrous females, 1982  | 118 |
| 8.8  | Sightings of dominant males with oestrous females, 1983  | 118 |
| 9.1  | Relationship between day of oestrous, and number of males following the female   | 131 |
| 9.2  | Average size ranks of males, in order of proximity to oestrous females   | 131 |
| 9.3  | Closeness of association of dominant and secondary males with oestrous females   | 132 |
| 9.4  | Relationship between day of oestrous and rate of takeover of the dominant male position                                    | 132 |
| 9.5  | Size of males closest to oestrous females in early and late oestrous   | 132 |
| 9.6  | Closeness of dominant males to oestrous females in early and late oestrous   | 132 |
| 10.1 | Association by females with their subadult offspring, and subsequent reproductive success                                  | 142 |
| 11.1 | Relationship between diet composition and group size in macropods  | 159 |
| 11.2 | Generalised fecundity schedules of male and female mammals   | 163 |
| 11.3 | Relationship between home range overlap of females and sex-differences in ranging behaviour, in macropods and ungulates    | 167 |
| 11.4 | Body size and home range overlap of females, macropods and ungulates   | 168 |
| 11.5 | Body size and mating area, male macropods and ungulates  | 169 |
| 11.6 | Relationship between home range overlap among females and rate of decline of reproductive success with group size, mammals | 173 |
| I.1  | Survivorship ( $l_x$ ) and mortality ( $q_x$ ) schedules for young wallabies   | 202 |
| I.2  | Variation in infant survival rates throughout the study period   | 203 |

|       |  |     |
|-------|--|-----|
| I.3   | Numbers of disappearances of adult wallabies in relation to seasonal variation in dingo activity | 204 |
| II.1  | Climatic variation in sex ratios of infant wallabies   | 208 |
| III.1 | Dendrogram of association indices among female and subadult male wallabies, 1983                 | 210 |