

**THE SQUIRREL GLIDER:
AN AUTECOLOGICAL STUDY IN A FRAGMENTED
LANDSCAPE**

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B.Sc. (Hons)**

A thesis submitted in fulfillment of the requirements
of the degree of Doctor of Philosophy in the
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Declaration

This work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

The contents of Chapter 5 has been published:

Rowston, C. (1998) Nest and refuge tree usage by squirrel gliders, *Petaurus norfolcensis*, in south east Queensland. *Wildlife Research* **25**: 157-164.

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Abstract

The primary aim of this study was to investigate the ecology of the squirrel glider in a region where the potential habitat of the species exists in fragmented landscape. Aspects of the population ecology of the glider within the south east Queensland region were studied through a trapping program spanning 27 sites, each site representing a particular size category of bushland remnant, and located in a specific altitude category. Four size classes of bushland remnant: 10-20 ha, 50-120 ha, 200-1000 ha, and >2000 ha; and three altitude categories: 0-60 m, 80-300 m and >300 m; were chosen. The habitat requirements of the squirrel glider within the region were investigated. These included the vegetation communities that supported squirrel gliders, nest and retreat trees, the minimum area of bushland remnant, and altitudinal restrictions. Diet of the squirrel glider in south east Queensland was determined through faecal analysis of samples from 59 gliders from 13 of the study sites.

Each of the study sites was situated in eucalypt open forest or woodland, although the vegetation communities varied among sites. A total of 171 captures of squirrel gliders was made which represented 91 individuals in 15 of the study sites. Three sugar gliders were captured in three of the study sites. Male squirrel gliders (140-260 g, mean 197 g) weighed significantly more than females (130-225 g, mean 177 g). The squirrel glider sex ratio fluctuated between male and female biased, but overall was not significantly different from parity. Births in squirrel gliders occurred in almost all months of the year over the 2.5 year trapping program, with a mean litter size of 1.6 and a natality rate of 1.8 young per year.

Squirrel gliders showed a negative association with plant species that occurred in high rainfall areas, in or near rainforest, or along creeks and drainlines. Conversely, squirrel glider numbers were positively associated with plant species that are typical of drier open forest and woodland. The vegetation communities in which squirrel gliders were detected varied but usually contained one or more species of iron-barked eucalypts (*E. crebra*, *E. melanophloia*, or *E. fibrosa*) and / or *Corymbia maculata* often with some other eucalypt species. Stags (standing, dead trees) and iron-barked eucalypts were the preferred tree types used for nesting or refuge sites by squirrel gliders in the south east Queensland study area and are an important component of their habitat in the region.

Squirrel gliders were found in all the size categories of remnant area provided that the habitat was suitable, although higher densities of gliders occurred in bushland remnants that were greater than 200 ha in size. No gliders were detected at altitudes higher than 240 m above sea level suggesting that only low altitude remnants are suitable for squirrel gliders.

The diet of the squirrel glider in south east Queensland consisted of invertebrates, nectar and pollen, and tree and insect exudates. Lepidoptera and Coleoptera (adult and larvae) made up the bulk of the insect component in the diet. Termites were also present in 18% of the 56 faecal samples. Eucalypt flowers were heavily used for pollen and nectar, with *Acacia* and *Banksia* also common pollen types. Exudates were used in most seasons although the relative contribution to the diet was hard to infer from faecal analysis alone. Feeding observations of five individual gliders during summer 1996 indicated that, in this season, invertebrate foraging was the primary feeding activity (74.5% of time) while feeding at flowers and exudates totalled 14.5% and 11.0% of the feeding times respectively. This diet was in broad terms, similar to the diet of the squirrel glider in other areas of their distribution and similar to the other petaurid gliders and Leadbeater's Possum, although there exists a spatial and temporal variation in the exact composition of the broad dietary items between species, locations and seasons.

A comparison of the records of sugar gliders and squirrel gliders according to the distribution of rainforest in the south east Queensland region showed that sugar gliders occurred commonly in closed forest complexes. Conversely, the squirrel glider occurred mainly in non-rainforest bushland areas. It is argued that this partitioning of habitat is, at least partly, a consequence of interspecific competition between the congeneric glider species. Many aspects of the local ecology and the biogeographical distribution of sugar and squirrel gliders are consistent with the hypothesis that there is asymmetrical competition between the two species in which the squirrel glider is competitively dominant to the sugar glider.

The dry eucalypt forests and woodlands that provide the habitat for squirrel gliders throughout their distribution, including the south east Queensland study region, have been dramatically reduced in area in the last 200 years. Dry eucalypt forests now represent less than 50% of existing vegetation in the south east Queensland area in which they survive only in a fragmented landscape with few large areas remaining. This habitat type, particularly at low altitudes, is also highly threatened because of its position in the landscape. There are two aspects to the management of the remaining habitat of the squirrel glider in the south east Queensland region, both of which are important for the long term, regional survival of the squirrel glider. One is the management of local populations within individual remnant patches, and the second is the management of the regional glider population or metapopulation over the series of remaining patches. Management of local populations and the regional metapopulation of squirrel gliders requires that remnants which support, or potentially support, gliders are identified and no net reduction in the area of these remnants occurs. Retention of nest trees within local populations is also an issue that requires attention if local populations are to be conserved.

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