

## FUNGAL FEEDING BY YELLOW-TAILED BLACK-COCKATOO

Larvae of wood-boring insects and seeds of trees and shrubs are believed to compose the major part of the diet of the Yellow-tailed Black-Cockatoo *Calyptorhynchus funereus* (McInnes and Carne 1978 and references therein).

In March 1989, two Yellow-tailed Black-Cockatoos were observed in Blackwood *Acacia melanoxylon* swamp near Togari in north-west Tasmania (grid reference 3205 54689). One bird perched on a thin vertical stem and called as the other fed. The feeding bird clung to a broken dead *Leptospermum* trunk 5 m in height and approximately 20 cm diameter at breast height. It fed by ripping small pieces (4×2 cm) of bark from the trunk with its beak. The pieces of bark were turned over and the inner surface of the bark was scraped by the lower beak. Examination of pieces of bark dropped at the base of the trunk revealed a layer of white material about 0.5 mm thick covering the inner surface. Strips of this white material had been removed where the birds bill had scraped the surface. Around 20 per cent of the material had been removed by this scraping. Microscopic examination of the white material (by Alan Mills, University of Tasmania) showed it to be composed of hyphomycetes fungi and slime mould growing in the cambium of the bark.

Peter Brown (cited in Blakers *et al.* 1984) has observed Yellow-tailed Black-Cockatoos in Tasmania cutting open and eating heartwood of regenerating eucalypts. This behaviour may also be associated with fungal feeding. Martin (1979) has concluded that the composition of fungal tissue makes it a desirable resource either as a dietary staple or as a minor dietary component which provides some particular nutrient missing from the rest of the diet.

## REFERENCES

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## BOOK REVIEW

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**Ecology of Birds — an Australian Perspective.** Hugh A. Ford, 1989. Surrey Beatty & Sons Pty Limited, Chipping Norton. \$36.90.

I was recently told the circumstances surrounding Doug Dow's first encounter with co-operative breeding when he came to Australia to carry out a study of Australian birds. Having arrived in Australia, Doug (one time RAOU President) began searching for a suitable subject to study. Noisy Miners were common around the campus of the University of Queensland where Doug was stationed and he began observing nests. As he watched young being fed in the nest he noticed that an adult carrying food was in moult. This was surprising since experience from the northern hemisphere told him that birds usually never breed and moult at the same time, as this was not energetically efficient. However, not only was there one adult in moult feeding young at this nest, but there were several different adults in different moult states. Doug had discovered that Noisy Miners were co-operative breeders and that the moulting birds were in fact helpers at the nest.

Doug Dow was not the first to discover co-operative breeding in Australia (the honour, according to Hugh Ford, goes to Ian Rowley) but since his work, there have been many more Australian species added to a growing list of birds that breed in this way. In fact, as Ford tells us in his book, approximately one-third of Australian landbirds are co-operative breeders, far more than on any other continent. Why so many species? Could it be that the Australian avifauna is affected by dramatically different environmental forces than their counterparts in the northern hemisphere? Are there other significant differences in the behaviour and ecology of the Australian avifauna compared with that of the northern hemisphere?

It is questions such as these that are addressed in the book; but essentially it is not about providing definitive answers. Indeed, as Ford points out, the answers are not simple, nor is the data sufficiently abundant to allow a full and thorough appraisal. In fact, the book generates so many questions about Australian avifauna that the reader is left with the realization of how little is known of Australian birds and how far we have yet to go with our studies. Hugh Ford's book is a highly stimulating one, which appears at a time when we are being bombarded with field guides, which are, of course, taxonomically essential, yet do nothing towards providing a deeper understanding of bird ecology in Australia.

'Ecology of Birds' is by no means a complete review of all Australian studies (nor does it pretend to be) but the book is well researched and highly readable for the professional ecologist, botanist, zoologist and layperson alike. A glossary at the back ensures that any jargon will be understood. Each chapter contains a summary at the end. Tables and figures usually appear either on the same or an opposite page to the text that makes reference to these, so that unnecessary page turning is eliminated and reading is made that much more enjoyable.

Hugh Ford paints a picture of the Australian environment in the first chapter of his book. He describes a continent with forests and woodlands (largely evergreen) principally on the margins and of large arid areas in the centre extending in places to the coast.

Ford points out that it is the arid regions, rather than the high mountain ranges or water barriers of the northern hemisphere, that are important in limiting species distributions within Australia (Chapter 2). While habitat can be used to explain the distributions of species, only in a few cases have the exact habitat requirements of a species been defined. Food and competitors may limit the range of some species but according to Ford most are generalized feeders and there has been no experimental proof of interspecific competition where the ranges of two species abut.

Chapter 3 deals with food and foraging behaviour of Australian birds. The available data suggest that food is sometimes limited in Australian habitats and that this leads to differences in foraging behaviour between species within a guild and among sexes. In general, both insectivores and nectarivores strongly defend territories, although the honeyeaters show their strongest territorial behaviour at intermediate abundances of food.

Avifaunal assemblages are discussed in the context of the community in Chapter 4. It is clear that birds are important as controllers of insect herbivores, as pollinators of sclerophyllous plants and as dispersers of rainforest plants. Diversity is discussed with reference to structural complexity of the habitat, productivity of the habitat, proximity to similar environs, fire and to changes in environmental conditions over time.

Chapter 5 may dispel a few myths concerning our views of breeding patterns within Australia. It is proposed that there has been a general misconception that opportunistic breeding patterns are the rule in our land of extremes. However, the data suggest that breeding seasons are, in the main, long, with repeated nesting attempts, small clutches and low productivity; in fact the overall impression is one of restrained breeding. Surprised? Then read on. Hugh Ford promises more surprises, particularly with respect to mating strategies and parental behaviour (Chapter 6).

Co-operative breeding receives a whole chapter of discussion (Chapter 7); not surprising since it seems to represent an extremely important breeding system within the Australian environment. Why? There are probably many reasons; co-operative breeders are a diverse collection, ecologically speaking, and Hugh Ford holds little hope for a universal explanation. Nevertheless, he does have a pet theory which you must read for yourself. It is a theory that Ford himself hopes will in the future be critically examined and refined.

Chapter 8 deals with population ecology and alludes to an overall theme of stability in the Australian environment. Stability is attributed to population control by adjustment of per capita birth rate through behavioural means, rather than through high density-dependent death rate.

Australia is a destination for many migratory wader and seabird species but within Australia few landbirds cross continental boundaries, in the manner of the massive invasions of birds of Africa and Central America from the north. In Australia, movements tend to be over short distances. Chapter 9, dealing with the subject of migration, points to the numerous holes in our "mist net" of understanding.

Finally, superimposed upon the natural forces that shape and have shaped bird ecology within Australia, bird populations are forced to deal with the depredations of European settlement, e.g., hunting pressure, changing of the landscape and introductions of feral animals (Chapter 10). Fortunately for the Australian avifauna, bird species have not suffered as badly as the mammals. Nevertheless, Hugh Ford is still able to provide a long list of threatened species (Chapter 11).

Chapter 12 provides the final synthesis and prognosis for future research. Who knows what sort of results might be found by carrying out some simple observational work; Doug Dow went on to discover complex systems of co-operative mating strategies. Ford gives all who have some interest in Australian avifauna a future direction.