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FORAGING SUCCESS BY THE LAUGHING KOOKABURRA *Dacelo novaeguineae* IN A SUBURBAN HABITAT

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Although foraging success is an important determinant of fitness, in most species we know relatively little about energy expended during foraging or the rates of success per foraging attempt. Not only does foraging efficiency affect an individual's fitness directly but in species that have alloparental care (such as cooperatively breeding birds) it also impacts on indirect fitness.

The Laughing Kookaburra *Dacelo novaeguineae* is a large, predatory, hole-nesting kingfisher, endemic to eastern Australia (Simpson and Day 1996; Legge and Cockburn 2000). Laughing Kookaburras live in co-operative breeding groups from two to eight birds, which consist of a dominant pair and offspring from previous years (Legge and Cockburn 2000). These helpers assist in incubating eggs and feeding nestlings (Parry 1973; Legge 2000a). As the number of helpers increases, individual kookaburras decrease their workload so that the total amount of food given to nestlings remains the same, indicating that provisioning young is a costly process (Legge 2000b). Helpers thereby significantly reduce the energy expenditure of breeding pairs in provisioning food to their young (Reyer and Westerterp 1985). Laughing Kookaburras predominantly take terrestrial prey items, capturing these by perching above a foraging area and then diving down onto the intended prey item using their beak to grip it. They take a variety of prey ranging from insects to mammals, birds and reptiles (Barker and Vestjens 1984). Laughing Kookaburras are also one of the few species that have adapted well to living in 'disturbed' habitats alongside humans (providing suitable nesting sites are still available).

In the summers of 2002/03 and 2003/04, members of a family of at least five Laughing Kookaburras were observed foraging in a small Sydney suburban backyard (10 m × 6 m). The backyard is microhabitat poor, consisting of grass (5–20 cm tall depending on time since mowing), one small *Banksia* and a row of six gardenias with straw around their bases. Adjacent to the property is a patch of open eucalypt woodland from which the Kookaburras are often heard calling and are assumed to nest within. The Kookaburras perched on either a wooden fence or aluminium clothes line surveying the backyard before striking. A 'successful' strike occurred when a kookaburra dived down on to the ground and was then seen with a food item in its beak. In 'unsuccessful' strikes not only was no food item seen in the bird's beak but the bird then continued to probe the target area with its beak without success.

A total of 68 strikes were observed of which 40 (58.8%) were successful. Most of the strikes were into either grass or a layer of straw (Table 1), with a variety of prey items taken (Table 2). After a strike the birds flew back to a perch above the ground where prey items were invariably 'bashed' against the perch (i.e. the fence or clothes line) in order to kill them before consumption.

TABLE 1
Strike success by Laughing Kookaburras in various suburban microhabitats.

Prey location	Successful strikes	Unsuccessful strikes
Grass	24 (60%)	16 (40%)
Straw	10 (55.6%)	8 (44.4%)
Other	6 (60%)	4 (40%)
Total	40 (58.8%)	28 (41.2%)

TABLE 2
Number of prey items of each type taken in successful strikes by Laughing Kookaburras.

Prey item	Number caught
Juvenile Eastern Blue-Tongued Lizards	2 (5%)
Caterpillars	1 (2.5%)
Coleoptera larvae	12 (30%)
Hemiptera (Bug)	4 (10%)
Mice	2 (5%)
Worms	10 (25%)
Unidentified prey items	9 (22.5%)

This study provides data on strike success of Kookaburras in an unnatural but common habitat (i.e. the suburban garden) in which at least one out of every two strikes was successful. The only other kingfisher for which strike success has been documented is the piscivorous Amazon Kingfisher *Chloroceryle amazona*, which had an average strike success of 34 per cent (Davis and Graham 1991). This is considerably lower than that observed in this study. The kookaburras took a range of vertebrate and invertebrate prey, comparable to that observed in other non-piscivorous kingfishers (e.g. the Common Paradise Kingfisher *Tanysiptera galatea* (Bell 1980)). Whilst microhabitat can affect foraging success (Robinson and Holmes 1984), only two habitats (grass and straw) were comparable in this study, both having similar levels of strike success (60% and 55.6% respectively).

These observations provide preliminary data on foraging success in the Laughing Kookaburra in a suburban habitat. Comparable observations need to be made of strike success in a variety of microhabitats in order to investigate how such 'disturbed' habitats influence habitat quality via strike success and/or a greater range of food availability.

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BOOK REVIEW

Australian Magpie: Ecology and Behaviour of an Unusual Songbird

Gisela Kaplan. 2004. Australian Natural History Series, CSIRO Publishing. Paperback, 152 pp., colour illustrations. ISBN 064309681. $39.95 plus postage.

Professor Kaplan is a researcher for the Centre for Neuroscience and Animal Behaviour at the University of New England, New South Wales and this book is the result of ten years research into magpies. Although it is very detailed, even the most amateur birdwatcher will easily digest the wealth of fascinating information about this best known and widely distributed Australian singer.

The ten chapters cover origins and classification, anatomy, diet and feeding habits, territoriality and dispersal, bonding and breeding, physical and social development, agonistic and cooperative behaviour, song production, communication and mimicry, magpies and humans, winding up with the success of magpies. Numerous black and white photographs illustrate each section of the book and colour photographs do justice to this handsome bird. Diagrams explain other parts to make for easy understanding. The caption to the photographs in Figure 9.3 ascribes an expression of tenderness to a hand-raised juvenile with which this reviewer happily agrees. References are given throughout with a number relevant to the full list at the end of the book.

Because magpies are so well known we probably accept them as not being anything special but their whole social system is diverse and complex. Probably most of us know that breeding pairs are accompanied by one or more helpers and that they are present at all times. Not so. There are four marginal groupings and one dominant breeding group, while the four seasonal maps taken from the *New Atlas of Australian Birds* show wide seasonal fluctuations, with the widest spread in winter and least in summer.

The young that stay in the parental territory are usually female, the males joining other groups. This is contrary to the usual dispersal patterns of cooperatively breeding birds where the female leaves the parental territory and the males stay with the parents to assist with defence and rearing of the young.

The section on song reveals the real superiority of this bird, possibly one of the best singers in Australia and perhaps internationally. It is also a mimic of other species as clearly shown by the sonogram of a magpie mimicking the duetting of two kookaburras.

The section dealing with interaction with humans explains why magpies attack and how to avoid them. Magpies recognize and tolerate those who live in their territory, others being potential enemies. The wisest way for strangers to avoid attack is simply to avoid those territories occupied by breeding birds. Simple?

I detected only one very minor typo — the omission of an 'o' in 'too' in the caption accompanying Figure 10.2.

This is a book that will be treasured by anyone even slightly interested in this ubiquitous songster, whose song lasting even longer than an hour without a break, seems to be sung with joy.

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Aireys Inlet