

LITERATURE REVIEW

Compiled by B. Baker

This section is compiled from journals which are often not available to non-professional ornithologists in Australia. The following criteria are used to select papers for review:

- They relate to species which occur in Australia and its Territories;
- They provide details of techniques and equipment that may be of use in Australia;
- They provide details of studies that may be of general interest to Australian ornithologists.

Journals perused: *Auk* 113, 114; *Australian Raptor Studies* II; *Behav. Ecol. Sociobiol.* 41; *Functional Ecology* 11; *Journal of Animal Ecology* 66, 67; *Journal of Avian Biology* 27, 29; *Journal of Wildlife Management* 61, 62; *Wildlife Research* 24.

SOCIAL BEHAVIOUR

Offspring sex and parental care in the Clamorous Reed Warbler. Berg, M. L. (1998) BSc. Honours Thesis, Zoology Department, Univ. of Melbourne, Victoria. (In many animals, parents bias their investment towards offspring of a particular sex. However, it is unclear if such bias is due to sexual differences in the demand for resources by offspring or to parental manipulation. Furthermore, few studies have investigated this topic in monogamous species. Here the author reports on parental feeding in a wild population of socially monogamous Clamorous Reed Warblers *Acrocephalus stentoreus*. Molecular techniques were used to determine the sex and parentage of offspring, and parental feeding to individual offspring was recorded. Paternal feeding was found to be significantly biased towards male offspring, while maternal feeding was not biased towards either offspring sex. Both paternal and maternal feeding were independent of brood size and brood sex ratio. In addition, the observed paternal feeding bias was independent of offspring size. These results strongly suggest that males invest more heavily in sons than in daughters.)

Dominance, age, and reproductive success in a complex society: a long-term study of the Mexican Jay. Brown, J. L., Brown, E. R., Sedransk, J. and Ritter, S. (1997) *Auk* 114(2): 279–286. (Observations of mate guarding by males and robbing of nest material by females suggests the hypothesis that the dominance should be related to reproductive success in the Mexican Jay *Aphelocoma ultramarina*. We analysed the probability of successful reproduction in this plural-breeding, group-territorial species with respect to variation in social rank, sex, age, flock territory, and year. We examined the correlates of dominance rank at two stages of nesting, early (before and during laying) and late (after laying). The correlates of rank differed between the sexes and nesting stages. In the early or prelaying stage, success in getting a mate and initiating laying was correlated with rank in males but not in females, and with age in both females and males. In the late stage, given that a bird had a nest with eggs, fledging success was not significantly related to rank overall. In females, however, a significant interaction was found between rank and age such that top rank was associated with greater success in older but not younger females. These effects of dominance at two stages of the nesting cycle (i.e. before and after laying) are consistent with the mate-guarding behaviour of males and the nest-robbing behaviour of females during nesting.)

Are avian hematocrits indicative of condition? American Kestrels as a model. Dawson, R. D. and Bortolotti, G. R. (1997) *Journal of Wildlife Management* 61(4): 1297–1306. (Diseased animals or those in poor condition are known to have reduced hematocrits. Many investigators have assumed that hematocrit levels thus reflect condition and disease status of an animal. This study tested these assumptions by examining the relation between hematocrits of American Kestrels *Falco sparverius* during several stages of the breeding season, and condition, prey abundance, and blood parasite load. We also examined the potential effects of a number of intrinsic and extrinsic influences on hematocrit. Hematocrits did not differ between the sexes, or between the pre-laying and incubation periods. Among females, hematocrit did not vary with the date of sampling, breeding chronology, prey abundance, condition, age, or molt. During incubation, male hematocrit increased with the date of sampling and ambient temperature.

Hematocrits of both sexes declined with the time of day that the sample was taken, and increased with the level of infection of the blood parasite *Haemoproteus*. The use of hematocrits to assess the health and condition of clinically normal kestrels is therefore questionable, and given the positive association with parasite loads, may even lead to erroneous conclusions.)

A comparison of the breeding ecology of birds nesting in boxes and tree cavities. Purcell, K. L., Verner, J. and Oring, L. W. (1997) *Auk* 114(4): 646–656. (We compared laying date, nesting success, clutch size, and productivity of four species that nest in boxes and tree cavities to examine whether data from nest boxes are comparable with data from tree cavities. Western Bluebirds *Sialia mexicana* gained the most advantage from nesting in boxes. They initiated egg laying earlier, had higher nesting success, lower predation rates, and fledged marginally more young in boxes than in cavities but did not have larger clutches or hatch more eggs. Plain Titmice *Parus inornatus* nesting in boxes had marginally lower predation rates, hatched more eggs, and fledged more young. They did not have higher overall nesting success, nor did they initiate clutches significantly earlier in boxes. House Wrens *Troglodytes aedon* nesting in boxes laid larger clutches, hatched more eggs, and fledged more young and had marginally higher nesting success and lower predation rates. Ash-throated Flycatchers *Myiarchus cinerascens* experienced no apparent benefits from nesting in boxes versus cavities. No significant relationships were found between clutch size and bottom area or volume of cavities for any of the species. These results suggest that researchers should use caution when extrapolating results from nest-box studies of reproductive success, predation rates, and productivity of cavity-nesting birds. Given the different responses of these four species to nesting in boxes, the effects of the addition of nest boxes on community structure also should be considered.)

Extreme sexual size dimorphism, sexual selection, and the foraging ecology of *Montezuma oropendolas*. Webster, M. S. (1997) *Auk* 114(4): 570–580. (Sexual differences in body size usually are considered to be a product of either sexual selection or ecological divergence between the sexes. I tested the predictions of these hypotheses to explain extreme sexual dimorphism in size in a Neotropical Blackbird, the *Montezuma Oropendola* *Psarocolius montezuma*. Sexual dimorphism was more pronounced in wing length and relative mass, traits that appear to be important in courtship and competition for mates, than in bill length or tarsus length. Male dominance rank, which is an indicator of mating success, was positively associated with body size (i.e. high-ranking males were larger than low-ranking males). These results suggest that sexual selection acts to increase male body size, and hence contributes to sexual size dimorphism in this species. Differences in foraging behaviour and diet also existed between the sexes and were related to sexual size differences. The small size of females allowed them to forage on food resources that were difficult for the larger males to reach (e.g. insects in rolled leaves at the ends of branches). Females, though, did not appear to be restricted from those resources exploited by males (primarily epiphytal bromeliads). Although it was not possible to reject the ecological-divergence hypothesis, my results suggest that sexual foraging differences are a consequence rather than a cause of sexual dimorphism in size in this species.)

Food supplementation induces provisioning of young in cooperatively breeding White-winged Choughs. Cullen, N. J., Heinsohn, R. and Cockburn, A. (1996) *Journal of Avian Biology* 27(1): 92–94. (Cooperatively breeding White-winged Choughs have an extremely long period of post fledging care, they will provision young for up to eight months. During winter, however, provisioning ceases despite evidence that young continue to have difficulty finding food themselves. A provisioning experiment was designed to determine whether food availability played a role in the termination of care. Groups of White-winged Choughs were observed before, during, and after food was supplied in both small and large amounts. The supply of large amounts of food switched on provisioning behaviour in both breeders and helpers, and begging behaviour in juveniles. Helping behaviour is therefore influenced by the costs of supplying food.)

Experimental manipulation of brood reduction and parental care in cooperatively breeding White-winged Choughs. Boland, C. R. J., Heinsohn, R. and Cockburn, A. (1997) *Journal of Animal Ecology* 66:

683–691. (White-winged Choughs *Corcorax melanorhamphos* (Vieillot), are obligate cooperative breeders. Only very large groups routinely fledge all their brood of three to four chicks, while small groups usually lose young during the nestling period. Hatching asynchrony generates a weight hierarchy within the brood, and small, late-hatched chicks are most susceptible to mortality. In order to examine the effects of food availability on parental care and brood reduction, the authors provided supplementary food to groups during late incubation and the nestling period. Food supplementation increased the rate of food delivery to the nest by both breeders and helpers, leading to increased chick survival and fledging, and reduced variance in chick size at fledging. Helpers with supplemental food appeared more responsive to the need of chicks, increasing food delivery rates as the chicks grew older, and as brood size increased. Control groups fed larger chicks preferentially, while supplemented groups favoured smaller chicks. This suggests that choughs deliberately manipulate the survival of individual young to maximize the fledging of healthy chicks, consistent with Lack's hypothesis for hatching asynchrony. These data support the hypothesis that choughs must breed in groups because they cannot provide enough food to nestlings without help. Hatching asynchrony and behavioural control over brood reduction allow choughs to maximize offspring production according to group size and food availability.)

Deception by helpers in cooperatively breeding White-winged Choughs and its experimental manipulation. Boland, C. R. J., Heinsohn, R. and Cockburn, A. (1997) *Behav. Ecol. Sociobiol.* **41**: 251–256. (White-winged Choughs *Corcorax melanorhamphos* are obligate cooperative breeders, living in groups which may contain up to 20 birds. Although breeding is dominated by a single pair, all birds contribute to rearing young, including the provisioning of nestlings. However, some birds which have carried food to the gaping mouth of a nestling, consume the food themselves rather than provision the nestlings. Birds which fail to feed nestlings are typically young, and are only likely to fail to deliver food when they cannot be observed by other group members. Birds which have just failed to deliver food are more likely to engage in alternative helping behaviours such as allopreening the nestlings than are helpers which have just delivered food in the conventional manner. Failure to deliver food is almost eliminated when foraging constraints are experimentally reduced by supplemental feeding of the group. Collectively these observations suggest that young white-winged choughs act deceptively by simulating helping behaviours without sacrificing food supplies.)

RAPTORS

Sexually dimorphic eggs, nestling growth and sibling competition in American Kestrels *Falco sparverius*. Anderson, D. J., Reeve, J. and Bird, D. M. (1997) *Functional Ecology* **11**: 331–335. (American Kestrel nestlings are sexually dimorphic, with daughters larger than sons. The larger daughters have an advantage during sibling competition for food in excess of their per capita food requirements, and we predicted that parents would reduce this competitive disparity by differentially enhancing the growth of sons, specifically by laying them in large eggs. In a captive breeding population, eggs producing sons were significantly larger than eggs producing daughters; laying order effects were controlled. The influence of sibling egg size ratios on post-natal size relationships persisted through the nesting period, providing parents with a tool to manipulate size-related phenomena in their offspring.)

The effect of age at first breeding on Ural Owl lifetime reproductive success and fitness under cyclic food conditions. Brommer, J. E., Pietiäinen, H. and Kolunen, H. (1998) *Journal of Animal Ecology* **67**: 359–369. (Examines how the fluctuations in food supply interacted with Ural Owls age at first breeding, lifetime reproductive success (LRS) and fitness. Cyclic fluctuation in food supply clearly constrained the option as to during what phase and at what age to start breeding. In terms of fitness, the optimal age to start breeding depends on the phase of the vole cycle at hatching.)

Lifetime reproductive success in Barn Owls near the limit of the species' range. Marti, C. D. (1997) *Auk* **114**: 581–592. (The author studied 357 nesting attempts by a minimum of 473 Barn Owls *Tyto alba* in northern Utah from 1977 to 1995 and documented lifetime reproductive success (LRS) for 262 owls. Longer lived owls produced more eggs and fledglings in their lifetimes, but age that breeding began did not strongly affect LRS. Habitat variability did not affect LRS, but sites with higher usage were correlated with higher nesting success. Variability in the severity of winter weather had a strong influence on

LRS through mortality of adults, reduction in clutch size, and in the likelihood of producing two broods in one season. Age and sex of owls had very little influence on individual LRS.)

Assortative mating in falcons: do big females pair with big males? Olsen, P., Barry, S., Baker, G. B., Mooney, N., Cam, G. and Cam, A. (1998) *Journal of Avian Biology* **29**: 197–200. (Several raptors have been shown to mate assortatively, most commonly according to age, less often in relation to various linear measurements. This paper demonstrates positive assortative mating for winglength in three falcons: the Peregrine Falcon *Falco peregrinus*, Brown Falcon *F. berrigora* and Nankeen Kestrel *F. cenchroides*. Because females showed greater variation in winglength than did males, larger females formed more dimorphic pairs than smaller females. The results suggest a possible link between assortative mating and dimorphism.)

Preliminary results of a long term study of the Nankeen Kestrel: population density and turnover. Baker, G. B., Olsen, P., McCulloch, R. and Dettmann, E. B. (1997) Pp. 108–113, In Czechura, G. and S. Debus (eds). *Australian Raptor Studies II*. Birds Australia Monograph 3. Birds Australia, Melbourne. (The Nankeen Kestrel *Falco cenchroides* is one of Australia's most common raptors, yet relatively little is known about all but its basic biology. In 1993 a long term study on Kestrels nesting around suburban Canberra was begun. Its aims are broad and include monitoring breeding density and population turnover, and pair and nest site fidelity of known individuals. Clusters of nest sites have been located and resident birds colour banded. Preliminary results indicate that within suitable habitat nest sites are spaced as close as 250 m and nearest neighbour distances average 717 m, to give a density of 108 pairs per 100 km². Mean annual survival of territorial adults was at least 60 per cent. Males showed high territory and mate fidelity; females moved to a new territory if they had lost their previous year's partner.)

Long-term counts of migrating raptors: a role for volunteers in wildlife research. Bildstein, K. L. (1998) *Journal of Wildlife Management* **62**: 435–445. (The science of conservation biology and practice of wildlife management depend upon long-term databases, but collecting such data can be difficult, expensive and labour intensive. Hawk Mountain Sanctuary in eastern Pennsylvania has used volunteer hawk watchers to help create the longest and most complete record of raptor migration in the world. The sanctuary's annual counts of migrating raptors have proved a critical resource in assessing long-term trends of raptor populations in NE North America. The extensive database played a key role in exposing the threat of organochlorine pesticide to Bald Eagles *Haliaeetus leucocephalus* and other predatory birds earlier this century, as well as tracking more recent recoveries in many of the same populations. Volunteers will play increasingly important roles in wildlife conservation wherever their efforts can be coupled with those of professional practitioners in the field.)

WATERBIRDS

Temporal and spatial variation in the distribution and abundance of the Magpie Goose *Anseranas semipalmata* in the Rockhampton region of the Queensland coast. Wilson, R. (1997) *Wildlife Research* **24**: 347–358. (Seasonal fluctuations in abundance of the Magpie Goose were correlated with the 12-month cumulative difference between rainfall and evaporation in Rockhampton. Large flocks were observed on *Eleocharis* spp and open water during the wet season, and on mud during the dry season.)

Molecular genetic (RAPD) analysis of breeding Magpie Geese. Horn, P. L., Rafalski, J. A. and Whitehead, P. J. (1996) *Auk* **113**(3): 552–557. (Magpie Geese *Anseranus semipalmata* typically form nesting trios consisting of two females and one male, an uncommon breeding arrangement for waterfowl. To study aspects of their reproductive biology, 20 reproductively active adults representing seven reproductive groupings (broods) were scored for 106 polymorphic primer-specified RAPD bands. Genetic distances between all possible adult pairs were calculated, and these values were analysed using the Mantel test. In the pairwise comparison of genetic distances, those between males were significantly less than those for other adult combinations ($P < 0.05$). Using the same analytical approach, we found that females that shared a nest were more like one another than were females that did not share a nest ($P < 0.05$). We suggest that a plausible hypothesis to account for the relative genetic homogeneity of the male population is that males seeking to enter the breeding population do so at their natal site. The females they recruit are more closely related to one another than are females in general.)