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: *Animal Behaviour* **54, 56;** *Auk* **114;** *Biological Conservation* **88;** *Bird Study* **43, 45;** *Emu* **98, 99;** *Journal of Wildlife Management* **62, 63;** *Pacific Conservation Biology* **4;** *Pavo* **36;** *Polar Biology* **20;** *Wildlife Research* **25;** *Wildlife Society Bulletin* **26.**

SOCIAL BEHAVIOUR

Laying order affects incubation duration in the Black Kite *Milvus migrans:* counteracting hatching asynchrony? Vinuela, J. (1997) *Auk* **114**(2): 192–199. (Variation in the duration of the incubation period of Black Kites *Milvus migrans* was studied with respect to laying order, egg size, clutch size, and timing of the start of incubation. The author estimated the duration of the incubation period and the effect of the onset of incubation by experimentally advancing or delaying the start of the incubation. Egg mass and clutch size had no clear effect on incubation duration. First-laid eggs in clutches where the start of incubation was delayed had the longest incubation periods. Hatching in these experimental clutches occurred in the reverse order to that of laying. High environmental temperatures during the period that eggs were maintained unincubated prolonged the duration of the incubation. Third-laid eggs in clutches where the start of the incubation had been advanced had the shortest incubation periods.)

WATERBIRDS

Does available foraging area, location or colony character control the size of multispecies Egret colonies. Baxter, G. S. and Fairweather, P. G. (1998) *Wildlife Research* **25:** 23–32. (The available area of saltmarshes proved to be a significant predictor of colony size for great, Intermediate and Little Egrets *Ardea alba, A. intermedia* and *Egretta garzetta.* Saltmarshes may be stable, long-term feeding habitats for these three native aquatic feeders, but not for the terrestrially feeding Cattle Egret *Ardea ibis.* Nest numbers of this latter species were related positively to the area of saltmarshes, and negatively to latitude, suggesting that nest numbers of this exotic species may be influenced by climate, with proximate factors such as colonial nesting with the three native species also being important. Because of the numerical dominance of cattle egrets, the numbers of nests of all species followed the same pattern as that for Cattle Egrets.)

GENERAL INTEREST

Seasonal changes in diet of pied currawongs *Strepera graculina* at Wollongong, New South Wales. Wood, K. A. (1998). *Emu* **98:** 157–170. (Data on the diet of pied currawongs *Strepera graculina* were acquired from incidental records from 1984 to 1996 and 165 hours of observation at four nests. In the non-breeding season, fruit from native and introduced trees was the major component of diet. In the breeding season, breeding currawongs switched to a diet consisting mostly of insects (91% by weight) before eggs were hatched and mostly of nestling and juvenile birds (55% by weight) when feeding their own nestlings. Estimated food consumption rates were 0.56 g per currawong-hour (parents only) for insect prey in the incubation period and 0.67 g per currawong (parents and nestlings) for passerine prey in the nestling period. During a breeding episode, a breeding pair of currawongs may capture up to 2 000 g of young passerines. The method of dismembering prey is described.)

Impact of environmental lead pollution on the physiology of birds. George, J. C. (1998). *Pavo* **36:** 1–14. (Studies on the effects caused by environmental lead pollution in the natural habitats of birds, and on the effects of experimentally induced lead toxicity in captive wild birds, are reviewed with a view to obtaining a better understanding of the effects of lead toxicity on birds, the sites of action and the mechanisms involved in the physiology of the avian body.)

Report on the Australian Bird and Bat Banding Scheme, 1996–97. Baker, G. B., Dettmann, E. B., Scotney, B. T., Hardy, L. J. and Drynan, D. A. D. (1999). Australian Bird and Bat Banding Scheme, Environment Australia: Canberra.

TECHNIQUES AND ANALYSES

Development of playback census methods for storm petrels *Hydrobates pelagicus*. Ratcliffe, N., Vaughan, D., Whyte, C. and Shepherd, M. (1998). *Bird Study* **45:** 302–312. (The factors affecting the probability of nest site attendance and response to playback were examined on Mousa, Shetland, to develop a standard technique for censusing storm petrels using diurnal playback. Nest site attendance by breeding birds peaked at 90 per cent during July. Site attendance by non breeding birds was much lower at 15 per cent and this increased as the season progressed. The average laying dates at colonies throughout Britain and Ireland were in late June, but those at Mousa were on average two weeks earlier, and at Inish Glora one week later. Site attendance was highest in mid July and so this represents the best time of year to conduct playback censuses at colonies in Britain and Ireland. Rates of response to playback of the male purr call were highly variable, with evidence for effects of the environment, colony location, playback equipment and year. This suggests that the application of a single correction factor to playback survey data collected at different colonies is likely to result in serious errors in estimation of population status. It is recommended that the probability of detecting a nest is examined during each survey so that a colony-specific correction factor can be applied to the census data.)

Autocorrelation of location estimates and the analysis of radiotracking data. Otis, D. L. and White, G. C. (1999). *Journal of Wildlife Management* **63:** 1039–1044. (The wildlife literature has been contradictory about the importance of autocorrelation in radiotracking data used for home range estimation and hypothesis tests of habitat selection. By definition, the concept of a home range involves autocorrelated movements, but estimates or hypothesis tests based on sampling designs that predefine a time frame of interest, and that generate representative samples of an animal's movement during this time frame, should not be affected by length of the sampling interval and autocorrelation. Intensive sampling of the individual's home range and habitat use during the time frame of the study leads to improved estimates for the individual, but use of location estimates as the sample unit to compare across animals is pseudoreplication. We therefore recommend against use of habitat selection analysis techniques that use locations instead of individuals as the sample unit. We offer a general outline for sampling designs for radiotracking studies.)

Wood duck eggshell membranes predict duckling numbers. Davis, J. B., Kaminski, R. M. and Stephens, S. E. (1998). *Wildlife Society Bulletin* **26:** 299–301. (The inner layer of avian eggshells is composed of 2 membranes; 1 of these becomes exposed after hatch and enables estimation of number of young. The authors counted the number of wood duck *Aix sponsa* eggshell membranes to estimate number of hatched ducklings. Number of membranes counted within 24 hours after hatch was a reliable predictor of ducklings produced.)

On the use of demographic models of population viability in endangered species management. Beissinger, S. R. and Westphal, M. I. (1998). *Journal of Wildlife Management* **62:** 821–841. (Examines why demographic models should be used cautiously in Population Viability Analysis (PVA) with endangered species. Reviews the structure, data requirements, and outputs of analytical, deterministic single-population, stochastic single-population, metapopulation, and spatially explicit models. Predictions from quantitative models for endangered species are unreliable due to poor quality of demographic data used in most applications, difficulties in estimating variance in demographic rates, and lack of information on dispersal (distances, ages, mortality, movement patterns). Unreliable estimates also arise because stochastic models are difficult to validate, environmental trends and periodic fluctuations are rarely considered, the form of density dependence is frequently unknown but greatly affects model outcomes, and alternative model structures can result in very different predicted effects of management regimes. It is suggested that PVA 1. evaluate relative rather than absolute rates of extinction, 2. emphasize short-time periods for making projections, 3. start with simple models and choose an approach

that data can support, 4. use models cautiously to diagnose causes of decline and examine potential routes to recovery, 5. evaluate cumulative ending functions and alternatives reference points rather than extinction rates, 6. examine all feasible scenarios, and 7. mix genetic and demographic currencies sparingly. Links between recovery options and PVA models should be established by conducting field tests of model assumptions and field validations of secondary model predictions.)

EFFECTS OF MARKING & RESEARCH TECHNIQUES

Effects of radiotransmitters on survival and reproductive success of gray partridge. Bro, E., Clobert, J. and Reitz, F. (1999). *Journal of Wildlife Management* **63:** 1044–1051. (Because of the recent decline in gray partridge *Perdix perdix* populations in northern France, we conducted a fiedl study in 1995–97 by using radiotelemetry to examine mortality causes. We investigated the effects of radiotransmitters on survival, reproductive success, and body mass of gray partridge. We captured 260 hens in spring 1995, 99 in autumn 1995, and 358 in spring 1996 and tagged them with a 10 g necklace radiotransmitter. We found no effects of radiotags on survival (P = 0.101), reproductive success (P = 0.375), and body mass (P = 0.990) in spring 1995. In contrast, adverse effects were observed in spring 1996 on survival (P < 0.001), reproductive success (P = 0.006), and body mass (P = 0.013). The postrelease effect on survival observed in spring 1996 varied among populations (P < 0.001), between radio types (P = 0.036), and with regard to body mass at time of capture (P = 0.046). The differences observed between years and across study areas were correlated to weather and predator abundance but not to habitat features we measured. Our findings suggest that radiotelemetry data must be carefully interpreted with regard to potential radiotag effects, all the more that these effects are influenced by environmental conditions.)

Coloured leg bands affect male mate-guarding behaviour in the Bluethroat. Johnsen, A., Lifjeld, J. T. and Rohde, P. A. (1997). *Animal Behaviour* **54:** 121–130. (Free-living male Luscinia s. svecica with ornamental bands guarded mates less and sang more than controls with non-ornamental bands.)

Is penguin banding harmless? Froget, G., Gautier-Clerc, M., Le Maho, Y. and Handrich, Y. (1998). *Polar Biology* **20:** 409–413. (Thousands of penguins are banded annually world-wide, even though little is known about the potential impact of these flipper bands. In this paper, the possible effect of banding on the survivorship, breeding frequency and other ecological factors on king penguins was investigated. The extended laying period (3–4 months) of the king penguin allows the observation of non-lethal effects that could influence the time of laying and thus the reproductive success. Three hundred and eighty-three breeding king penguins on a colony on Possession Island, Crozet Archipelago were either single or double flipper banded. The results show that the returning birds were laying late the following breeding season, and that double banded birds lay significantly later than single banded birds. Furthermore, our data suggest a lower return rate for double banded birds than for single banded birds (45% as opposed to 76%). The low return rate of single banded birds, when compared to an interannual survivorship estimated to be 96.5 per cent, also raises questions concerning the potential impact of single banding.)

Effects of implanted radiotransmitters on captive mourning doves. Schulz, J. H., Bermudez, A. J., Tomlinson, J. L., Firman, J. D. and Zhuoqiong, H. E. (1998). *Journal of Wildlife Management* **62:** 1451–1460. (Previous mourning dove telemetry studies using transmitter glue attachment have found the technique to be relatively short term (<10 weeks), and that transmitter harnesses possibly have deleterious effects on doves. To improve attachment methods, we developed and refined surgical techniques for implanting subcutaneous and intra-abdominal radiotransmitters with external whip antennas in mourning doves, and determined physiological and pathological responses to the transmitter implants. We used a captive colony of 200 wild caught doves to develop and test procedures for subcutaneous implants (SC1), subcutaneous surgeries without implants (SC2), intra-abdominal implants (IA1), intra-abdominal surgeries without implants (IA2), and a control group without surgeries or implants (CNT); 20 males and 20 females were assigned to each experimental group. Surgeries for IA1 took less time than SC1 surgeries. Heterophil: lymphocyte ratios showed that IA1 and IA2 doves had higher (P = 0.024) post treatment changes compared with SC1, SC2, or CNT groups. At 4–6 days postsurgery, 153 of 160 doves with surgical treatments showed closed or healed surgical sites with no complications. At 14 days post treatment, 34 (87%) SC1 implants were located in the thoracic inlet. Gross necropsy findings at 10 weeks post surgery found that 36 of 39 (92%) SC1 and 36 of 39 (92%) IA1 implants showed little or no tissue response to the implants. Functioning transmitters began failing 2 weeks post treatment, and 85% were not working at 10 weeks post treatment. Our data suggest subcutaneous implants with external antennas were a better alternative compared to intra-abdominal implants with external antennas, but further testing is needed to compare subcutaneous implants to conventional attachment techniques.)

POPULATION MONITORING

The use of constant effort mist-netting to measure between-year changes in the abundance and productivity of common passerines. Peach, W. J., Buckland, S. T. and Baillie, S. R. (1996). *Bird Study* **43:** 142–156. (The Constant Effort Sites (CES) Ringing Scheme of the BTO aims to provide annual measures of change in the abundance and productivity of common breeding passerines in scrub and wetland habitats in Britain and Ireland. Changes in the sizes of the annual catches, from a set of standard mist nets operated during 12 summer visits, are combined across sites to produce estimates of the percentage change in adult and juvenile numbers. The proportion of juveniles in the catch is used as a relative measure of breeding productivity. Methods are presented for calculating standard errors of between-year changes in both adult and juvenile catches, and changes in the proportion of juveniles. Present levels of precision are summarized and predictions are made concerning likely improvements in precision from a larger CES Scheme. For most of the species considered there was little evidence that between-year changes in catches of adults at CE sites have differed between habitats, regions or according to coastal proximity. For several species there was evidence of consistently higher percentages of juvenile birds being captured at sites in wet habitats compared to sites in dry habitats. However, between-year changes in the percentage of juveniles caught were generally homogeneous across habitats and regions. Implications of these findings for future analyses and interpretation of results from the CES Scheme are discussed.)

Long-term changes in the abundance of small passerines in Britain and Ireland as measured by Constant-Effort mist-netting. Peach, W. J., Baillie, S. R. and Balmer, D. W. (1998). *Bird Study* **45:** 257–275. (For most species examined, long-term changes in adult catches were similar to changes in territory counts on Common Bird Census plots, suggesting that standardised mist-netting is a reliable method for assessing extensive changes in songbird populations.)

BIRDS AND LANDSCAPE ECOLOGY

Radio-tracking revealed home ranges of black-breasted button-quail *Turnix melanogaster* in remnant vine scrub between hoop pine plantation and agriculture. Smith, G. C., Aridis, J. and Lees, N. (1998). *Emu* **98:** 171–177. Home range estimates ranged from 2.2 to 6.1 ha. (Home ranges overlapped considerably (both within and between sexes). Birds were found solely within microphyll vine forest and sometimes within lantana thickets within the vine forest. No use was made of surrounding agricultural land or young hoop pine plantation, although elsewhere in the region birds have been observed in older hoop pine plantations and a closed eucalypt forest with a well developed understorey.)

Influence of the noisy miner *Manorina melanocephala* on avian diversity and abundance in remnant grey box woodland. Grey, M. J., Clarke, M. F. and Loyn, R. H. (1998). *Pacific Conservation Biology* **4:** 55–69. (The abundance of an aggressive honeyeater, the noisy miner *Manorina melanocephala*, was reduced at four small grey box *Eucalyptus microcarpa* woodland remnants by experimental removal. The diversity and abundance of small insectivorous and nectarivorous birds increased at three of the four sites (relative to matching control sites) over the 12 months following the removal of noisy miners. These results, taken together with those from three earlier experiments where the abundance of noisy miners was reduced in mugga ironbark *E. sideroxylon* woodland remnants, demonstrate that noisy miners affect avian diversity and abundance by aggressive exclusion of other species. In five out of seven experiments, noisy miners did not reinvade the small woodland remnants during the ensuing twelve months. When noisy miner abundance was reduced, increased populations of small insectivorous and nectarivorous birds used small degraded woodland remnants. Colonizing populations of small birds have the potential to reduce insect infestations and may assist in the recovery of dieback-affected woodland remnants. Reducing the abundance of noisy miners in remnant eucalypt woodlands may also be a useful, short-term measure which could assist in the recovery of threatened or endangered bird species.)

CONSERVATION

The Rufous Bristlebird, *Dasyornis broadbenti*, at the eastern edge of its range: selected aspects of distribution, habitat and ecology. Peter, J. M. (1999). *Emu* **99:** 9–14. (The Victorian subspecies of the rufous bristlebird is classified as rare. It is mostly found in coastal areas from west of Port Phillip Bay to the mouth of the Glenelg River near the South Australian border. in the eastern part of its range, it mostly inhabits coastal scrub, the structure and floristic diversity of which are discussed. Populations in this area are threatened by fragmentation of habitat as a result of residential development, leaving them vulnerable to the effects of wildfire or longer-term change of climate.)

The importance of behavioral studies in conservation biology. Sutherland, W. J. (1998). *Animal Behaviour* **56:** 801–809. (The exciting research developments in animal behaviour over the last two decades have had a negligible impact on conservation. I list 20 subjects in which the study of animal behaviour can make a significant contribution to conservation. Behaviour may in itself be worth conserving. I also suggest how behavioural ecologists could become more involved in conservation.)

The importance of insects and lerp in the diet of juvenile regent honeyeaters, *Zanthomyza phrygia*: implications for the conservation of an endangered woodland bird. Oliver, D. L. (1998). *Wildlife Research* **25:** 409–418. (Insects were the most common dietary items fed to juveniles (53% of items identified), followed by lerp (26.5%) and nectar (20.5%). Nestlings were fed mostly insects (58% of feeds), and carbohydrates (nectar and lerp) made up the rest of the diet. Fledglings were fed mainly carbohydrates while protein from insects was the other major component. The study highlights the importance of lerp and insects in the diet of juvenile regent honeyeaters, and the diversity of plant species on which their parents foraged. The importance of insects and carbohydrates other than nectar needs to be recognised in development of conservation strategies for the species.)

AUSTRALIAN SPECIES

Faithfulness to breeding site and birthplace in Noisy Friarbirds, *Philemon corniculatus*. Ford, H. A. (1998). *Emu* **98:** 269–275. (Noisy friarbirds are migratory near Armidale, arriving in August and departing by the end of April. Annual survival of adults is 89 per cent, with adults returning to the same breeding sites in subsequent years. In some cases individual birds use similar, even identical, nest sites over several years. Some, probably most, individuals do not breed every year, but nevertheless return to their breeding sites. In contrast, only one bird fledged at the site has returned in later years to breed.)

Nesting biology of the Golden Bowerbird, *Prionodura newtonia*, endemic to Australian upland tropical rainforest. Frith, C. B. and Frith, D. W. (1998). *Emu* **98:** 245–268.

Breeding biology, demography and success of the rufous-banded honeyeater, *Conopophila albogularis*, in Darwin, a monsoonal tropical city. Noske, R. A. (1998). *Wildlife Research* **25:** 339–356. (Nearly 20 pairs of birds were colour banded on the Casuarina campus of the NT University, where they occupied territories of 0.17–0.47 ha all year round. Six of 48 birds survived five or more years, one being nine years old at the time of writing. Males were larger. Breeding was recorded in every month of the year. Both sexes participated in nest building, and incubation and nestling periods each lasted 14 days. Clutch size was usually two (mean 2.1). Four broods were common, and two pairs successfully raised five broods in one season.)

SEABIRDS

Movements of seabirds banded at MacLennan and Moulter Cays and Sandbanks No. 7 and 8, Northern Great Barrier Reef, Australia 1979-(1998). Dobbs, K. (1999). (Report to the Raine Island Corporation and the Queensland Parks and Wildlife Service (unpublished). From 1979 through 1985 849 birds of three species were banded at Moulter Cay (also known as Pandora Cay), MacLennan Cay, Sandbank No. 7 and Sandbank No. 8: 720 brown boobies, 54 masked boobies and 75 sooty terns. Twenty birds have been recaptured away from these locations. Distances travelled ranged from 265 km (32 km from Daru, PNG) to 3 800 km (Tuvalu). Countries where banded birds have been found include Indonesia (1), PNG (18) and Tuvalu (1). Six (0.7%) banded at Moulter Cay have been recaptured in subsequent surveys of the island: 5 brown boobies and 1 masked booby. Four masked boobies originally banded at Raine Island have been recaptured at Moulter Cay.)

Movements of seabirds banded at Raine Island, Northern Great Barrier Reef, Australia 1978–1997. Dobbs, K. (1998). Report to the Raine Island Corporation and the Queensland Dept of Environment (unpublished). (From 1979 through 1987 7 080 birds of 17 species were banded at Raine Island: these included 1 947 brown boobies, 2 007 masked boobies, 420 common noddies, 196 black noddies, 1 greater frigatebird, 321 least frigatebirds, 13 herald petrels, 522 red-footed boobies, 860 red-tailed tropicbirds, 524 wedge-tailed shearwaters and 75 sooty terns. Eighty-seven birds have been recaptured away from this location. Distances travelled ranged from 100 km (Wallace Island) to 4 000 km (Tuvalu). Countries where banded birds have been found include Australia (12), Caroline Islands (1), Indonesia (1), Kirabati (1), PNG (69), Solomon Islands (2) and Tuvalu (1). 1 079 (15%) birds banded at Raine Island have been recaptured in subsequent surveys of the island: 91 brown boobies, 3 herald petrels, and 627 masked boobies, 65 red-footed boobies, 252 red-tailed tropicbirds. Of the 1 079 birds recaptured, 791 have been recaptured once, 195 twice, 67 three times, 20 four times, 4 five times, 1 six times and 1 bird seven times. Four masked boobies originally banded at Raine Island have been recaptured at Moulter Cay.)

New Zealand black-browed Albatross, *Diomedea melanophrys impavida*, and grey-headed albatross, *D. chrysostoma*, banded at Campbell Island: recoveries from the South Pacific region. Waugh, S. M., Sagar, P. M. and Cossee, R. O. (1999). *Emu* **99:** 29–35. (Albatross banded at Campbell Island, New Zealand have been recovered at a very low rate over 30 years. From 24 000 NZ banded black-browed albatross *Thalassarche melanophrys*, 77 birds have been recovered from beaches and vessels around the south-west Pacific Ocean. The seasonal distribution of juvenile, sub-adult, and adult NZ black-browed albatrosses are described, and the incidence of recoveries from vessels and beaches is examined. Sub-adults were more susceptible to capture on vessels than other age-classes, whereas juveniles were found more frequently on beaches than by other means. The proportion of adult birds recovered from vessels indicated that they associate with fisheries more commonly in winter than during the breeding season. Recoveries were restricted to Australasian and western South Pacific waters. One grey-headed albatross *Thalassarche chrysostoma* was recovered from 9 000 birds banded.)

Sexing little penguins, *Eudyptula minor*, from Cook Strait, New Zealand, using discriminant function analysis. Renner, M. and Davis, L. S. (1999). *Emu* **99:** 74–79.

The influence of environmental variables and mitigation measures on seabird catch rates in the Japanese tuna longline fishery within the Australian Fishing Zone, 1991–1995. Brothers, N., Gales, R. and Reid, T. (1999). *Biological Conservation* **88:** 85–101. (Long-term fisheries observer data were used to analyse the influence of a range of environmental variables and mitigation measures upon catch rates of seabirds in the Japanese pelagic longline fishery. In the AFZ seabirds were most likely to be caught on longlines that were set in summer, in southern areas of the zone, and during daylight hours. However, interpretation of changes in catch rates resulting from the use of mitigation measures or from weather effects were problematic due to the interrelationships between the many measured factors. Interpretation and accurate assessment was further complicated by ongoing changes to fishing practices and equipment, and due to changes to the priority that fisheries observers placed on the collection of seabird data. The data relating to factors affecting seabird bycatch which is currently collected incidentally by fisheries observers are not sufficiently robust to allow confidence in statistical assessments alone to examine the efficacy of mitigation measures. Dedicated observations may allow for more confident determination of the reasons why seabirds were or were not caught, and to what degree mitigation measures are effective. The use of these observations in combination with the analyses suggested seabird bycatch rates may be lowered by the use of bird lines, bait throwing machines and thawed baits. However, appropriate use and deployment of these measures are critical if they are to be effective. Further work is required to better understand the effect of these measures, and their effect upon the catch rate of target and non-target species.)