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,** *Auk* **114,** *Auk* **115,** *Australian Journal of Ecology* **20,** *Behavioral Ecology* **7,** *Condor* **98,** *Condor* **99,** *Emu* **97,** *Emu* **98,** *Raptor Research* **31,** *Wildlife Research* **25.**

GENERAL INTEREST

Native grasslands and the plains-wanderer. Baker-Gabb, D. (1998) Birds Australia Conservation Statement No. 1. (Lowland native grasslands are among the most depleted ecosystems in south-eastern Australia, and contain a disproportionately large number of threatened plant species. Threatened grassland fauna such as the plains-wanderer have suffered a similar decline.)

Molecular assessment of the taxonomic and genetic status of the Christmas Island hawk-owl ***(Ninox squamipila natalis).*** Christidis, L. and Norman, J. (1997) Final Report to RAOU. Unpublished. (The Christmas Island hawk-owl should be treated as a separate species *Ninox natalis.*)

AUSTRALIAN SPECIES

Social organization and nesting biology of the cooperatively-breeding Varied Sittella ***Daphoenositta chrysoptera*** **in north-eastern New South Wales.** Noske, R. A. (1998) *Emu* **98:** 85–96. (In north-eastern New South Wales, varied sittellas occur in sedentary groups or clans holding weakly-defended territories of 13–20 ha. Average group size at one site where several birds were colour-banded was 5.4, while groups observed elsewhere averaged 4.9. Simple pairs occurred in 20% of cases. However, group size varied over the year, some breeding groups amalgamating into clans during the non-breeding season. Density in the region varied 0.2 to 0.5 birds per ha. Sex ratios were skewed towards males in samples from two separate districts. Five distinct vocalizations were recognized. Roosting was communal, one colour-banded group using 13 different trees over 120 nights. The group roosted consistently earlier, and awoke later, than other local small passerine species. The breeding season was long, from August to January and second broods were occasionally attempted. Because five out of eight birds disappeared in September–October, mortality and/or dispersal seemed highest during the early breeding season. Most nests were built on dead branches of broad-leaved stringybarks *Eucalyptus caliginosa.* Most clutches (74%) were of three eggs, the remainder being two. Nest success was low (20%; n = 49). Nesting attempts in two groups failed four times per season, although some nests were abandoned before laying. Large territories, feeding of the incubating female, and long periods of incubation, nestling and juvenile dependency, as well as a specialized foraging niche and cryptic prey all suggest that food may be limiting for this species. Thus, helpers may normally be required to provide young with sufficient food. However, I argue that group-living and philopatry in this species probably developed to increase foraging efficiency and reduce vulnerability to predators. The species offers exceptional scope for studies of the influence of habitat on sociality and cooperative breeding, and the effects of group size on foraging success.)

TECHNIQUES AND ANALYSES

Misuse of data from mist-net captures to assess relative abundance in bird populations. Remsen, J. V. and Good, D. A. (1996) *Auk* **113(2):** 381–398. (Capture data from mist-nets are used frequently to quantify the relative abundance of birds. In spite of onvious confounding variables, most of which have been mentioned previously in the literature, relative capture of birds typically is equated directly to relative abundance. Through modeling, the authors quantify the potential magnitude of the effect of those variables among species and between age/sex categories, including differences below the resolving power of visual estimates, can produce substantial differences in the capture rates of birds with identical abundance. To simulate capture on the horizontal plane, the authors designed a computer program that models how frequently birds strike nets with respect to home-range size and overlap, number of flights, and mean flight distance. The quantitative results of these simulations show that differences in spacing system, flight distance, and flight frequency have strong effects on capture rates. The authors also list additional problems with interpretation of differences in capture data, and believed that these influences on capture data combine to preclude quantitative comparisons of relative abundance of birds, either among species or within species in different habitats, by use of mist-net capture data under most current research protocols. Although analyses refer directly only to birds and mist-nets, the outcomes of the analyses are relevant to any method that estimates relative abundance from captures of mobile organisms by stationary traps during brief sampling periods.)

Vocalizations of the marbled frogmouth II. an assessment of vocal individuality as a potential census technique. Jones, D. N. and Smith, G. C. (1997) *Emu* **97:** 296–304. (Using recorded vocalizations of *Podargus ocellatus* from southern Queensland, an assessment was undertaken of the extent of vocal individuality and its potential as a census technique. The 'Kerloo', an apparently territorial vocalization, was selected as being most likely to demonstrate individuality. Qualitative comparisons of spectrograms were abandoned due ot the inability of workers to distinguish between birds. A detailed quantitative analysis employed 11 measures taken from on-screen spectograms. Discriminant Function Analysis were able to separate almost all individuals reliably for both males and females. Three variables were of particular importance in the functions derived for both sexes: the duration of the Kerloo; the frequency range; and the number of elements included in a call. The ability of the technique to separate individual birds was high and its applicability to field studies appears possible provided workers are proficient with the analysis and that the behavioural context of the calls is appreciated.)

A new application for transponders in population ecology of the common tern. Becker, P. H. and Wendeln, H. (1997) *Condor* **99:** 534–538. (Describes the use of passive integrated transponders to mark *Sterna hirundo* adults and chicks at a colony. Microtagged terns could be identified for life, not only at the nest, but also at resting places by fixed antennas at distances of <11 cm.)

POPULATION MONITORING

Re-evaluation of adult survival of black-headed gulls ***(Larus ridibundus)*** **in presence of recapture heterogeneity.** Prevot-Julliard, A.-C., Lebreton, J.-D. and Pradel, R. (1998) *Auk* **115:** 85–95. (In long lived species annual adult survival is the demographic parameter that has the strongest influence on population growth rate. Adult survival is often estimated by capture-recapture methods under the restrictive assumption that all individuals have the same survival and capture probabilities. Violation of this assumption i.e. heterogeneity among individuals, tends to bias survival estimates. In particular, heterogeneous capture probabilities independent of survival probabilities tend to negatively bias survival estimates. However, a cautious use of capture-recapture methods allows recognition of the problem and an accurate estimation of survival. We estimated adult survival in a population of black-headed gulls *(Larus ribibundus)* breeding in central France based on resightings banded birds. The estimated survival was lower in the year after the first re-sighting than afterwards. We did not find any substantial biological explanation for this result (in particular, it was difficult to connect it with the existence of prospecting individuals). However, heterogeneity in the resighting probability, which is very likely in this population, could explain why apparent survival seemed lower in the year immediately after the first resighting. The higher value of the survival estimate (0.90) when capture rate heterogeneity is accounted for is discussed relative to the growth regime of the population and habitat instability.)

BIRDS AND LANDSCAPE ECOLOGY

A protocol for classifying regional dynamics, exemplified by using woodland birds in southeastern Australia. MacNally, R. C. (1995) *Australian Journal of Ecology* **20:** 442–454. (Communities of forest and

woodland birds are usually studied intensively at only one or a few locations. This provides a perspective that perhaps emphasises local phenomena at the expense of placing local dynamics in the context of processes operating at the landscape or regional scale. The present paper seeks to redress partially this imbalance by studying the dynamics of individual bird species among several habitat types (all Eucalyptus-dominated forests or woodlands) over the annual cycle. This regional-scale (250 km), continental study reveals that species exhibit idiosyncratic dynamics of various kinds: restricted or more ubiquitous occupation of habitats and three forms of seasonal dynamics at the regional scale (resident, migrant and itinerant). By using this classificatory scheme, it becomes evident that the bird communities found in different habitats consist of diverse collections of strategists and that the level of diversity differs among habitat types. The difficulties that many field workers have had in reconciling their observations with community theory most likely reflect the underlying dynamism of bird communities, especially in the temperate regions on continents where seasonal fluxes are pronounced.)

Predicting essential habitat for forest owls in Tasmania Bell, P., Mooney, N. and Wiersma, J. (1996) Tasmanian Environment and Heritage Technical Committee: Tasmania (Examines the distribution and habitat preferences for Tasmanian forest owls.)

EFFECTS OF MARKING AND RESEARCH TECHNIQUES

The effect of carrying devices on breeding royal penguins. Hull, C. L. (1997) *Condor* **99:** 530–534. (The impact of Time Depth Recorders (TDRs) and VHF transmitters, deployed on Royal Penguins *(Eudyptes schlegeli)* to examine foraging behaviour, was assessed during all stages of the breeding season. Models of the devices were attached to penguins and compared to control birds with no devices. There were no impacts from transmitters on probability of return from a foraging trip, foraging trip duration, mass gained, water influx, or body composition, but substantial impacts from the TDRs. Attachment of TDRs (1) reduced the likelihood that penguins would continue the breeding attempt, (2) increased foraging trip duration, (3) increased water influx, and (4) decreased fat levels. The effects varied with sex and stage in the breeding season, which appeared to be related to the energetic demands of the stage in the breeding season. TDRs probably increased drag, affecting swimming speed and foraging success. The differential impact of the devices is most likely related to their cross-sectional area and streamlining, with TDRs being larger and less streamlined than transmitters.)

Productivity of golden eagles wearing backpack radiotransmitters. Marzluff, J. M., Vekasy, M. S., Kochert, M. N. and Steenhof, K. (1997) *Raptor Research* **31:** 223–227. (Examines the association between the presence of backpack radiotransmitters and golden eagle *(Aquila chrysaetos)* reproduction (percentage of occupied territories producing young, and number of nestlings produced) over three years. The association between radio-tagging and nesting success and the number of nestlings produced varied significantly among years. A negative association with tagging was observed in one of three years, which coincided with low prey (jackrabbit) populations and a cold spring. However, small sample size and breeding by subadults may confound this result.)

SEABIRDS

Population change among Pacific, kelp and silver gulls using natural and artificial feeding sites in south-eastern Tasmania. Coulson, R. and Coulson, G. (1998) *Wildlife Research* **25:** 183–198. (The kelp gull *L. dominicanus* has become established in Australia only in the last half-century. The greatest numbers are now found in SE Tasmania in sympatry with Pacific gull *Larus pacificus* and silver gull *L. novaehollandiae*. Surveys of rubbish tips and specific shorelines were surveyed in 1981 and again in 1992. Between the two survey periods, the number of Pacific gulls and the total number of all gulls present at refuse tips remained unchanged. There was, however, a marked increase in the number of kelp gulls at tips, equivalent to an annual rate of increase of 22.8%, and a corresponding decrease in the number of silver gulls. Kelp gulls of all ages were over-represented at refuse tips, while adult Pacific gulls fed preferentially at more natural shoreline sites. As shoreline sites, adult Pacific gulls appeared to exclude kelp gulls from small bays in 1981, but kelp gulls were present in most of these bays eleven years later. Reducing access to food at refuse tips may be an effective means of controlling the kelp gull population in this area.)

Flexible growth rates in fork-tailed storm-petrels: a response to environmental variability. Boersma, P. D. and Parrish, J. K. (1998) *Auk* **115:** 67–75. (Examines the degree that growth in *Oceanodroma furcata* chicks varies among individuals and years. Data on wing chord and body mass were collected on 10 or more chicks per year on the Barren Islands, Alaska, during 7 years over 2 decades. In contrast to the apparently uniform growth rates in other storm-petrels, fork-tailed storm-petrel chicks displayed a two-fold variation in both wing growth and mass gain. Variation in growth rate was apparent both within and among years. Correlations between wing growth and mass gain were significant in only 4 of 7 years, a finding interpreted as indicative of the importance of changes in food quality and quantity on growth. The decadal changes in growth rate of this species between the 1980s and the 1990s are consistent with the regulating role that environmental variation appears to play in the growth and survival of storm-petrels. It is suggested that the wide range of observed growth rates among individuals, years, and between decades is a response to environmental variability.)

SOCIAL BEHAVIOUR

Fruit color choices of captive Silvereyes *(Zosterops lateralis).* Puckey, H. L., Lill, A. and O'Dowd, D. J. (1996) *Condor* **98:** 780–790. (Fleshy fruits occur in many colours in nature, but red and black predominate. One popular hypothesis to explain the adaptive significance of fruit colouration is that it attracts frugivorous birds that disperse seeds. Silvereyes were presented with choices in the avairy between both artificial (made from gelatin) and actual fruits *(Rhagodia parabolica)* of three different colours (red, yellow and white). Silvereyes exhibited a strong overall preference for red among both artificial and real fruits).

An alternative hypothesis for heavier parasite loads of brightly colored birds: exposure at the nest Garvin, M. C. and Remsen, J. V. (1997) *Auk* **114**(2): 179–191. (Hamilton and Zuk proposed that bright plumage in birds evolved as an advertisement of parasite resistance in response to heavy parasite loads, and they predicted that sexual dichromatism should be strongly correlated with parasite loads across species. To test their hypothesis, we sampled 935 individuals of 19 species of passerine birds in Louisiana for the presence of blood parasites. Nest height, a variable generally not considered in most recent literature on the Hamilton-Zuk hypothesis, was as good or better a predictor of parasite prevalence as was sexual dichromatism or plumage brightness. Because certain ornithophilic vectors are most common in the canopy, the relationship between nest height and parasite prevalence may follow from the natural history of parasitism. Ecological conditions may influence blood-parasite loads in the species studied, suggesting that genetically based resistance is less important. If parasite vectors are more common in the canopy, then more colourful bird species will be more heavily parasitized, on average, than less colourful species, because bird species that live high in the trees tend to be more colourful than those that live closer to the ground.)

RAPTORS

An evolutionary explanation for seasonal trends in avian sex ratios. Daan, S., Dijkstra, C. and Weissing, F. J. (1996) *Behavioral Ecology* **7:** 426–430. (An extensive set of data for five species of raptorial birds is presented to demonstrate that some raptor species produce an excess of daughters early in the season and an excess of sons in late nests, while others show the reverse. By means of a simulation model we investigate an evolutionary explanation for this phenomenon in terms of sex-specific differences in the relation between age at first breeding and date of birth. The model predicts that the gender should be produced first in the season whose age of first breeding is more strongly accelerated by an early birth date. We argue that this tends to be the male gender in species such as the common kestrel *Falco tinnunculus,* which tend to breed early in life, while it is the female gender in larger species with later onset of breeding, such as the marsh harrier *Circus aeruginosus.* The empirical evidence is qualitatively consistent with this hypothesis. Our model is quite general in that it makes no assumptions about the mechanism (primary sex-ratio bias at egg laying or secondary sex-differential mortality before fledging) by which the bias is generated. Yet it is able to create quantitative predictions for species where sufficient demographic and life-history data are available. From the available data set in the common kestrel we derive a quantitative prediction for the seasonal trend in brood sex ratio. The observed trend is in good agreement with this prediction.)