

RECENT LITERATURE

Edited by Danny J. Ingold

RESEARCH TECHNIQUES

(see also 22)

1. Band discomfort on Rufous Treecreeper *Climacteris rufa*. A. M. Rose. 1997. *Corella* 21:25.—This note describes several instances when Rufous Treecreepers, while ascending tree trunks, indicated discomfort by stopping and pecking at their bands. However, no wear or sores were found on the legs of any recaptured banded treecreepers. A trunk-ascending bird has its aluminum or color band pulled by gravity down to the intertarsal joint, where it gets squeezed between the tibia and tarsus when the leg is closed. Band-caused irritation of this sort is a potential problem that could be looked for in any trunk-ascending banded bird. [Dept. of Conservation and Land Management, Locked Bag 104, Bentley Delivery Centre, Bentley, WA 6983, Australia.]—William E. Davis, Jr.

2. Aerial photography techniques to estimate populations of Laughing Gull nests in Jamaica Bay, New York, 1992–1995. R. A. Dolbeer, J. L. Belant, and G. E. Bernhardt. 1997. *Colon. Waterbirds* 20:8–13.—The objective of this study was to evaluate aerial photographic and video surveys as means of estimating populations of nesting Laughing Gulls (*Larus atricilla*). Mark-relocate ground surveys are considered more reliable but are labor intensive, expensive, difficult in some habitats and cause extensive disturbance to nesting birds. Black-and-white photographs were taken along transects flown by fixed-wing aircraft and video recordings were made from a helicopter. Thirty × 30 m plots, visible in the photographs, were ground surveyed for comparisons to photographic counts. Comparisons were used to determine correction factors by which photographic counts should be multiplied to estimate mean and 95% confidence intervals for estimated nest numbers. Video counts were made from a monitor screen while on “pause” and then forwarded to the adjacent area and the “pause” and count repeated. The 1993–1995 photographic counts differed from the ground counts by –9% to +1%. Video counts (1992 only) were made of 934 monitor screens (5.5% of marsh area) and interpolated numbers of nests for the entire marsh were similar to those from photographic counts. The total cost was about \$2100 for an aerial video survey, \$4000 for a photographic survey, and \$6700–\$9600 for a ground survey. High levels of nest occupancy observed in photographs and video suggest minimal disturbance to nesting gulls. The authors conclude that photographic and video surveys are suitable techniques for estimating nesting populations of many colonial waterbirds as long as nests are not obscured by vegetation or widely dispersed. [U.S. Dept. of Agriculture, National Wildlife Research Center, 6100 Columbus Ave., Sandusky, OH 44870, USA.]—William E. Davis, Jr.

3. Does colour-banding affect the survival of adult honeyeaters? M. Brooker and P. De Rebeira. 1996. *Corella* 20:145–146.—Color-banding is an important technique used in a wide variety of ornithological studies, but little is known about what affects color-banding may have on bird survival. This paper reports on an experiment in which alternate newly captured New Holland Honeyeaters (*Phylidonyris novaehollandiae*) and Brown Honeyeaters (*Lichmera indistincta*) were color-banded on one leg and received an aluminum band on the other, or given only an aluminum band. The relative survival of the color-banded birds was measured by comparing the proportions of the two groups recaptured and the elapsed time to latest recapture. For the New Holland Honeyeaters there were no significant differences in the proportions of birds recaptured once, more than once, after 20 days, or 100 days. Both mean and median time elapsed comparisons between the color-banded and non color-banded birds suggested that color-banded birds were surviving longer, although the differences were not statistically significant. The numbers of recaptures of Brown Honeyeaters were not sufficient for meaningful statistical comparison. The authors conclude that banding New Holland Honeyeaters with orange and blue color-bands does not affect their survival compared to honeyeaters banded with aluminum bands alone [CSIRO, Div. Of Wildlife and Ecology, LMB 4, Midland, WA 6056, Australia.]—William E. Davis, Jr.

BEHAVIOR

(see also 1, 8, 9, 10, 12, 14, 15, 17, 20, 29, 35, 39, 40)

4. **Dawn chorus and female behaviour in the Willow Tit *Parus montanus*.** P. Welling, K. Koivula, and M. Orell. 1997. *Ibis* 139:1-3.—The dawn chorus in Willow Tits has been correlated with female fertility such that males increase their singing when their mates approach their fertile period and decrease their singing afterwards. This study tested the experimental conditions where females were temporarily prevented from leaving their nest cavities at dawn, and in control conditions where females emerged when they wanted. Dawn song by the male lasted longer when the female's emergence was delayed. This study provides experimental evidence that male Willow Tits adjust their singing specifically to the behavior of their mate and not to other environmental factors that coincide with fertile periods (e.g., time of sunrise). The authors conclude that singing at dawn is important for intra- and intersexual signaling, and therefore is probably linked to sperm competition. [Dept. of Zoology, Univ. of Oulu, Linnanmaa, Fin-90570 Oulu, Finland.]—Karl E. Miller.

5. **Behavioural ecology of the North Sulawesi Tarictic Hornbill *Penelopides exarhatus* during the breeding season.** T. G. O'Brien. 1997. *Ibis* 139:97-101.—The breeding biology of the cooperatively-breeding North Sulawesi Tarictic Hornbill was studied in a 460-ha study area in North Sulawesi, Indonesia. Nests of two hornbill groups were monitored for one breeding season (April-July). One hornbill group consisted of four birds: an adult male, a smaller male presumed to be a subadult, a nonbreeding female and a breeding male. The second group consisted of six birds: two adult males, a presumed subadult male, a juvenile male, a nonbreeding female and a breeding female. Using observations from blinds, the frequency of visits by each group member and the number and type of food items delivered were recorded. Fruits accounted for 85% of all food items delivered, with *Ficus* sp. the most common fruits. Nonbreeding males acted as helpers, bringing food to the nest throughout the nesting period. The male with three helpers brought food to the nest less frequently than did the male with a single helper. The male with three helpers also steadily decreased his food delivery rate over time, while the male with a single helper increased his food delivery rate. The nestling period lasted 55 days for the nest with three helpers and 68 days for the nest with only one helper. Each nest fledged two young. The results of this study suggest that provisioning by helpers may allow breeding males to reduce parental investment and may accelerate development rates in chicks. However, the author cautions that a larger sample size is needed before definitive conclusions can be drawn about the role of helpers. Behavioral observations indicated that hornbill groups maintained non-overlapping territories of 72 ha and 139 ha. Maintenance of large territories year-round could result in habitat saturation and limited dispersal opportunities for young North Sulawesi Tarictic Hornbills. [International Programs, Wildlife Conservation Soc., 185th and Southern Blvd., Bronx, NY 10460, USA.]—Karl E. Miller.

6. **Principles of females' perspectives in avian behavioral ecology.** P. A. Gowaty. 1997. *J. Avian Biol.* 28:95-102.—Gowaty's "Point-of-View" is another in the splendid series of commentaries on hot topics in avian research provided by JAB. Here, she presents her views on "females' perspectives" and provides guidelines for the incorporation of females' perspectives into studies of mating systems and reproductive behavior. The highlight of the piece is an annotated list of 10 "Facts and Myths About Females." Perhaps the best way to entice you into reading the article is to list (with some paraphrasing) these principles and their accompanying myths. Principle 1: Females are interesting in their own right; Myth: Females are interesting only in relation to males. Principle 2: There are more than two kinds of females; Myth: Females are either virgins (i.e., long-term mates) or whores (i.e., short-term mates). Principle 3: Most females seek copulations; Myth: Females are universally coy. Principle 4: Females are the architects of sperm competition; Myth: Females are receptacles for sperm wars. Principle 5: Variance in reproductive success has selective force on females; Myth: Sexual selection does not act on females. Principle 6: Quality of offspring is more important than quantity; Myth: The number of offspring equals fitness. Principle 7: Male choice of mates occurs even in "typical" species; Myth: Males aren't choosy. Principle 8: Females compete among one another; Myth: Females are universally pacific and cooperative. Principle 9:

Females can take care of themselves and their young; Myth: Females are universally dependent. Principle 10: Females and males "duke it out"; Myth: Intersexual competition does not occur. Gowaty's commentary should result in a more balanced incorporation of females' perspectives into our research. [Inst. of Ecology, 711 Biological Sciences Building, Univ. of Georgia, Athens, GA 30602, USA.]—Jeff Marks.

7. Arrival and departure behavior of Common Murres at colonies: evidence for an information halo? A. E. Burger. 1997. *Colon. Waterbirds* 20:55–65.—This paper reports on observations of Common Murre (*Uria aalge*) arrival and departure behavior from 1982–1985 during the chick-rearing period at a colony in Witless Bay, Newfoundland. Common Murres feed on patchily distributed, highly mobile schools of fish and crustaceans, and hence information exchange among colony members would seem desirable. This study tests the information center hypothesis (ICH) which suggests that birds might benefit from observing or following successful birds returning to the colony carrying fish, and that birds sitting on the water near the colony might be gaining information on foraging patches rather than birds in the colony itself. A sub-colony of marked (picric acid) birds provided most of the data. The data did not support the ICH for birds in the colony itself. Incubating and brooding murres faced the sea only 11% of the time, and a swarm of birds circling near the cliffs made observation of incoming birds problematic. Few departing birds joined conspecifics and departure intervals between birds of the sub-colony were generally more than a minute, indicating that most birds did not follow their neighbors. Birds that had been at the colony for less than one h usually flew directly to sea suggesting that they were returning to a foraging site. The authors suggest an "information-halo hypothesis" in which birds on the water detect incoming birds carrying food and assess the direction from which they came. The authors caution that the data offer only indirect evidence for this hypothesis; nonetheless, 60% of departing birds landed in the water, usually 100–600 m from the colony. Moreover, the longer a bird had been at the colony the more likely it was to land on the water rather than fly directly to sea. Further, murres with chicks brought back food in 69% of the cases where they landed on the water before going out to sea. This paper is well written and well argued, and should be of interest to those interested in colonial waterbirds or the information center hypothesis. [Dept. of Biology, Univ. of Victoria, Victoria, BC, V8W 2Y2, Canada.]—William E. Davis, Jr.

FOOD AND FEEDING

(see also 5, 16, 20, 32, 33, 35)

8. Food supply for settling male Rock Pipits affects territory size. B. Arvidsson, C. Askenmo, and R. Neergaard. 1997. *Anim. Behav.* 54:67–72.—Theoretical analyses of optimal size of breeding territories predict that territory size should increase with an increase in food abundance under certain conditions. Yet studies have revealed that under most conditions territory size decreases with an increase in food abundance. The authors provided supplemental food to Rock Pipits (*Anthus petrosus*) during the period of territorial establishment to examine the effect of food abundance on breeding territory size. The extra food was concealed to minimize any confounding effects of changing intrusion pressure. Fed males spent less time foraging (18% vs. 60%) and had significantly larger territories than unfed males. A previous study on the Rock Pipit revealed that males provided extra food later in the season did not enlarge their territories. The authors suggest it may be too costly for a male to increase his territory size after boundaries are established. Benefits to male Rock Pipits from holding a large territory are still unknown at this time. [C. Askenmo, Section of Animal Ecology, Dept. of Zoology, Univ. of Goteborg, Medicinaregatan 18, S-143 90 Goteborg, Sweden; e-mail: conny.askenmo@zool.gu.se.]—Jeffrey P. Duguay.

9. Feeding flights of Cattle Egrets nesting in an agricultural system. M. A. Mora. 1997. *Southwest. Nat.* 42:52–59.—A large breeding colony of Cattle Egrets (*Bubulcus ibis*) (more than 4000 adults) was studied from mid-July through August 1988, in the Mexicali Valley, Baja, Mexico. The colony was near the middle of a large (182,000 ha) agricultural ecosystem, comprised of a somewhat homogenous distribution of cotton (40%), fallow fields, mostly harvested wheat (40%), alfalfa (8%) and miscellaneous crops and pastures (12%). However,

feeding flight (departure) vectors were not random during most days, but had a significant north-northeast directional component on 7 of 11 days. The basis for the egrets' directional choice towards the northeast may have been related to more irrigation and better foraging prospects in this direction, but irrigation occurred throughout the valley and the frequency of irrigation by direction was not known. Flocks foraged as far away as 35 km but most flocks foraged within a 15 km radius of the heronry. Nearly 90% of departing and arriving egrets were in flocks of 2 to 35, but more than 75% of the flights were groups of 2 to 4 individuals. Choice of particular foraging patches was apparently influenced by (1) previous experience (i.e., learned) and (2) by cuing on feeding flocks. [National Biological Service, Midwest Science Center, % Dept. of Wildlife and Fisheries Sciences, Texas A&M Univ., College Station, TX 77843, USA; e-mail: mmora@tamu.edu.]—Don Ingold.

10. Foraging habits of Crab Plovers *Dromas ardeola* overwintering on the Kenya coast. M. Fasola, L. Canova, and L. Biddau. 1996. *Colon. Waterbirds* 19:207–213.—This paper describes the habitat, roosting, dispersing, and foraging behavior of the little-known Crab Plover on its wintering grounds at a coastal inlet near Mombasa, Kenya. Activity was controlled by tide cycles and during daylight low tides up to 900 Crab Plovers foraged on the tidal mudflats for up to 6 h. Crab Plovers are largely visual feeders using the “walk/run-pause-search-walk/run” technique. They take any of the prey available in the upper 25 cm of substrate, but are crab specialists with crabs constituting 55% of prey items taken and 80% of the food mass. They also probe but with poor success rates. Juveniles detected prey as well as adults, but had lower capture rates, took smaller prey, and had less total food intake. Adults took significantly larger individual prey items among those available. Crab Plovers always foraged within 200 m along the receding water line. They maintained regular intraspecific spacing of 5–15 m by aggression and were aggressive towards other waders that were preying on crabs. This is a quantitatively based foraging ecology study that should appeal to anyone interested in shorebirds. [Dipartimento Biologia Animale, Pz. Botta 9, 27100 Pavia, Italy.]—William E. Davis, Jr.

11. Spring prey use by Double-crested Cormorants on the Penobscot River, Maine, USA. B. F. Blackwell, W. B. Krohn, N. R. Dube, and A. J. Godin. 1997. *Colon. Waterbirds* 20: 77–86.—Concerns have been expressed by Canadian anglers and others about predation of Double-crested Cormorants (*Phalacrocorax auritus*) on sport fisheries, including the Atlantic Salmon (*Salmo salar*) which is under consideration for listing under the Federal Endangered Species Act. The authors present the results of a study of stomach contents of 780 cormorants shot from 1986–1988 and 1992–1993 on the Penobscot River in Maine, which is a key location in the restoration attempts for salmon in New England. The study was aimed at determining the relationship between salmon smolt migration and cormorant predation. The specific objectives were to determine the spacial and temporal dimensions of cormorant predation on smolts during spring smolt migration. For analysis, the river was divided into three sections: mainstream dams, river sections above the head of tide and below head of tide. Results indicated that salmon smolt were not taken in April or the first week of June, but were among the 5 most frequently occurring diet items in 1986–1988 and in 1992–1993. In addition, they were the highest ranking prey item (using 3 parameters) across all river sections during May. The authors suggest that dams constructed in the 19 century contributed to declines in other fish species that might have been alternative prey for cormorants, and discharge rates at dams cause delays and backups in smolt migration making them more vulnerable to cormorant predation. Interestingly, the 780 cormorants in this study were shot by personnel from a variety of organizations: the Maine Atlantic Sea-run Salmon Commission, Penobscot Indian Nation, U.S. Department of Agriculture (Animal Damage Control), and the Maine Cooperative Fish and Wildlife Research Unit. This is a paper that should be read by those interested in potentially conflicting economic, political or conservation initiatives. [Dept. Of Wildlife Ecology, 5755 Nutting Hall, Univ. of Maine, Orono, ME 04469–5755, USA.]—William E. Davis, Jr.

SONGS AND VOCALIZATIONS

(see also 4)

12. Nest-vicinity song exchanges may coordinate biparental care of Northern Cardinals. S.L. Halkin. 1997. *Anim. Behav.* 54:189–198.—Halkin examined the vocal interactions of

Northern Cardinals (*Cardinalis cardinalis*) in the vicinity of their nests to test the hypothesis that female songs change the male's probability of coming to the nest with food. Vocalizations of 22 individuals in 13 pairs were recorded during May–August 1981 to 1986. During the egg period, female song had little effect on the male's probability of coming to the nest. However, during the nestling period, males were more likely to come to the nest if the female sang after the male called than if she did not. Males also were more likely to come to the nest if a female responded to male song with a non-matching song than if she responded with a matching song. It is suggested that matching song by the female when the male is away from the nest sends a specific message, 'stay away from where I am'. Thus, female song in this species appears to be important in coordinating biparental care. [Dept of Biological Sciences, Central Connecticut State Univ., New Britain, CT 06050-4010, USA; e-mail: halk-ins@ccsu.ctstateu.edu.]—Jeffrey P. Duguay.

13. Song, sperm quality and testes asymmetry in the Sedge Warbler. T. R. Birkhead, K. L. Buchanan, T. J. Devoogd, E. J. Pellatt, T. Szekely, and C. K. Catchpole. 1997. *Anim. Behav.* 53:965–971.—The phenotype-linked fertility insurance hypothesis states that functional fertility covaries with male phenotype. A related idea, the directional asymmetry hypothesis, states that the degree of directional asymmetry in testes size in birds is a measure of male quality. The authors tested for correlations between song repertoire size of 15 male Sedge Warblers (*Acrocephalus schoenobaenus*), a species in which females prefer males with larger repertoires, and both sperm features and directional asymmetry in testes size to test these two hypotheses. Neither ejaculate quality nor sperm numbers in the seminal glomera covaried with song repertoire size. Likewise, repertoire size and directional asymmetry in testes size did not covary. However, directional asymmetry in testes size and repertoire size were positively correlated with age. It was suggested that males with these traits survived better than other males and that females may use repertoire size as a cue to select higher quality males. [Dept. of Animal and Plant Sciences, Univ. of Sheffield, Sheffield S10 2TN U.K.]—Jeffrey P. Duguay.

NESTING AND REPRODUCTION

(see also 7, 24, 30, 31, 34, 35, 39, 41)

14. The development toward independence of the offspring of Carrion Crow (*Corvus corone*). S. Nakamura. 1997. *J. Yamashina Inst. Ornithol.* 29:57–66. (Japanese, English abstract, figure and table captions).—One aspect of the behavioral ecology of birds that has received little attention for most species is the transition from fledging to independence of young. Ornithologists are exhausted from breeding season studies, many have to return to classes in the fall, and individual birds often move more widely from the breeding territory, may become more secretive with the onset of molt, and vocalize less. Add to these the difficulties of quantifying such behavior and you can understand why we have such gaps in our knowledge. Clearly this is a link in our understanding of the lives of birds that deserves study. Nakamura provides us with an effort to understand the transition from fledging to independence in the Carrion Crow and some methodology for conducting such studies. The English abstract and captions do not tell us how many broods were studied or how many pairs of adults; he recorded data for the transition for 3 birds in 1990 and 2 in 1991—presumably one brood each year. Curiously for each bird, there was an initial decrease in the amount of time spent in the parents' territory (to about 70%), followed by a return to 90% about 90 days post fledging, followed by a steady decline in time spent in the parents' territory to 20–40% by about 4.5 months. Between 4.5 and 7 months post fledging there was considerable variation among individuals but by 10 months 3 of 4 birds were no longer seen in the parents' territory.

In addition to percent time in the parent's territory, Nakamura recorded the percent of time young spent within 30 m of a parent, and scored the level of aggressiveness (0 = no aggression, 4 = heavy attack) of parents toward offspring during each encounter. The male parent was consistently more aggressive than the female. Sex of young was not identified. [Abuno High School, 2–20 Himurocho, Takatsukishi, Osaka, 569-11 Japan.]—Jerome A. Jackson.

15. Common Goldeneyes adjust maternal effort in relation to prior brood success and

not current brood size. H. Poysa, J. Virtanen, and M. Milonoff. 1997. *Behav. Ecol. Sociobiol.* 40: 101–106.—In birds parental investment in offspring should be correlated with the reproductive value of the current brood. Two hypotheses proposed to further expound on this theory, are antithetical. The “brood-size” hypothesis predicts that parents may provide more care to larger broods as a result of the direct effect of brood size per se on reproductive value; the “brood success” hypothesis poses that past mortality, reflected in current brood size, predicts future mortality, and thus overall reproductive value. In order to test these hypotheses, the authors studied female Common Goldeneyes (*Bucephala clangula*) during six breeding seasons in southern Finland. Although brood size at the time of female desertion and brood mortality were inter-correlated, when the former was held constant, infant mortality rated during the period of maternal care was still significantly correlated with brood desertion. Conversely, when brood mortality was held constant, brood size was not significantly associated with brood desertion. Brood desertion was not found to be affected by such uncontrolled factors as clutch or brood size at the time of hatching. These findings suggest that brood mortality, the main measure of maternal care, is more than just a reflection of female quality as calibrated by brood hatching date; moreover, these data support theoretical work by demonstrating for the first time, that brood mortality serves as a key proximate indicator for parental reproductive effort. [Finnish Game and Fisheries Research Inst., Evo Game Research Station, Kaitalamintie 75, Fin. 16970 Evo, Finland; e-mail: hannu.poysa@rktl.fi.]—Danny J. Ingold.

16. Adjustment of parental effort in the puffin; the roles of adult body condition and chick size. Kjell Einar Erikstad, Magne Asheim, Per Fauchald, Laila Dahlhaug, and Torkild Tveraa. 1997. *Behav. Ecol. Sociobiol.* 40:95–100.—In order to learn more about how seabirds balance their current investment in young and their chances of future survival and reproduction, the authors randomly redistributed Atlantic Puffin (*Fraterecula arctica*) chicks of the same age among parents whose body condition was determined at the beginning of the nesting period. The study was conducted on Hornoya Island in north-eastern Norway from May through August. After 20 days, chicks raised by parents in good body condition early in the nestling period, were larger than chicks raised by parents in poor body condition. Adults that received a small chick in the cross-fostering experiment were more likely to abandon it than parents that received a large chick. In addition, those parents which had a smaller chick of their own were more likely to abandon their new foster chick. There was a significant positive correlation between the weight gain of fostered chicks and the parent's body condition; conversely, a negative correlation was detected between chick weight gain and the original size of the chick. These data support the notion that both parent body condition and chick demands influence chick growth and the extent to which parents adjust their feeding effort. These data are in contrast to those from studies of various Procellariiformes in which adult provisioning rates are not influenced by chick demands. [Norwegian Institute of Nature Research, Dept. of Arctic Ecology, Storgt. 25, N-9008 Tromsø, Norway; e-mail: nintker@tromso.npolar.no.]—Danny J. Ingold.

17. Breeding synchrony and extra-pair mating in Red-winged Blackbirds. P. J. Weatherhead. 1997. *Behav. Ecol. Sociobiol.* 40:151–158.—Weatherhead studied Red-winged Blackbirds (*Agelaius phoeniceus*) during a six-year period in eastern Ontario to test two alternative hypotheses both of which predict that the rate of extra-pair paternity will be effected by the level of breeding synchrony. One hypothesis suggests that if females control extra-pair mating and if breeding synchrony promotes the advantages that females obtain from outside copulations, then extra-pair mating should increase as the breeding synchrony of females increases. On the other hand, if males control extra-pair mating and if increased breeding synchrony constrains extra-pair copulation efforts by males who are forced to guard their mates, then females that breed asynchronously with other females should produce a higher percentage of extra-pair young. The results of this study failed to support either hypothesis. No association between the frequency of first egg dates of nests with extra-pair young and all nests initiated on the same marshes during the same years was detected. In addition, in nests with extra-pair young, the proportion of offspring produced by extra-pair males fluctuated relatively little with the number of synchronous nests both on the same territory and on the same marsh. The data also demonstrated that differences in nesting synchrony among ter-

ritories did little to predict which nests had extra-pair young and which nests did not. In contrast to these data though, Weatherhead did detect an association between nesting synchrony and those pairs of males involved in each case of cuckoldry. In the majority of instances (84%), at the time of extra-pair mating, the male that was cuckolded had more females nesting synchronously than the cuckold, suggesting that males were constrained from extra-pair activity when their own females were fertile, or that males were better able to circumvent other male's mate-guarding efforts as the number of synchronous females increased. In addition, older males were not as constrained as younger individuals by breeding synchrony, particularly when cuckolded non-neighboring males. These data suggest that older males are less likely to be cuckolded perhaps because their mates are less likely to cheat. Thus, they are seemingly able to spend significantly less time guarding their mates. Taken as a whole, these data demonstrate that breeding synchrony influences extra-pair mating; however, since such influences were not detectable over the entire population, Weatherhead suggests that differences in nesting synchrony alone are not sufficient to produce extra-pair matings. Additional research which addresses why older male Red-winged Blackbirds are less constrained by breeding synchrony should help elucidate the underpinnings of extra-pair mating in general. [Dept. of Biology, Carleton Univ., 1125 Colonel By Dr., Ottawa ON K1S 5B6, Canada; e-mail: pweather@biology.queensu.ca.]—Danny J. Ingold.

18. A test of the Skutch hypothesis: does activity at nests increase nest predation risk? J. J. Roper and R. R. Goldstein. 1997. *J. Avian Biol.* 28:111–116.—Nearly 50 years ago, Alexander Skutch argued that high rates of nest predation selected for small clutch sizes in tropical passerines. The reasoning is that smaller clutches result in less activity at the nest and thus less risk of attracting nest predators. Toward evaluating this idea, the authors studied Slaty Antshrikes (*Thamnophilus punctatus*) in central Panama to test the hypotheses that activity at nests is greatest during the nestling stage (vs. the incubation stage) and that nest predation is greatest during the stage of greatest activity. Slaty Antshrikes are suitable for such a study because they suffer high rates of nest predation, invariably lay a two-egg clutch, and attempt to renest frequently. Activity rates, defined as the number of arrivals or departures at nests per hour, were recorded at 26 nests for 30–60 min during each of three periods of the incubation and nestling stages (6 observation periods per nest). Rates of nest predation at 179 nests were calculated using the Mayfield method. Daily nest survival averaged 0.913 in the larger sample of nests. Only 30 nests survived to fledging and all nest failures appeared to result from predation. As one would expect, activity at nests was greater during the nestling stage (5.3 moves per hour) than during incubation (0.81 moves per hour). Daily nest survival during incubation (0.928) was not significantly different from that during the nestling stage (0.923). Surprisingly, evidence suggested that the most important nest predators were small, nocturnal marsupials and not snakes or larger mammals. Because activity at passerine nests is highest during the day, it would appear that nest activity would have little influence on rates of nest predation, at least in central Panama. [Dept. of Biology, Utah State Univ., Logan, UT 84322, USA.]—Jeff Marks.

19. Host responses to cowbirds near the nest: cues for recognition. S. A. Gill, D. L. Neudorf, and S. G. Sealy. 1997. *Anim. Behav.* 53:1287–1293.—The authors used a control and experimental female Brown-headed Cowbird (*Molothrus ater*) model near the nest of breeding Yellow Warblers (*Dendroica petechia*) to determine whether bill shape contributed to recognition of cowbirds by female Yellow Warblers (the experimental cowbird model was equipped with the bill of a juvenile European Starling [*Sturnus vulgaris*]). To determine if female Yellow Warblers are able to use auditory cues to recognize cowbirds, female cowbird chatter calls and male cowbird perch songs were played 1 m from warbler nests during the laying stage. Songs from male Song Sparrows (*Melospiza melodia*) were used as a control. Female warblers gave "seet" calls and performed nest protection behavior more in response to the control cowbird than the experimental cowbird. In contrast, they performed more behaviors given in response to predators when the experimental cowbird was presented. Female warblers exhibited more nest protection behavior to the calls of female cowbirds than either male cowbirds or Song Sparrows. Thus, the authors suggest that Yellow Warblers use both bill shape and vocalizations in identifying cowbirds. [S. G. Sealy, Dept. of Zoology,

Univ. of Manitoba, Winnipeg, MB R3T 2N2, Canada; email: sgsealy@ccm.umanitoba.ca.]—Jeffrey P. Duguay.

20. Predation on eggs and nestlings of Common Murres (*Uria aalge*) at Bluff, Alaska. J. H. S. Schauer and E. C. Murphy. 1996. *Colon. Waterbirds* 19:186–198.—This study examines predation by Common Ravens (*Corvus corax*) and Glaucous Gulls (*Larus hyperboreus*) on eggs and nestlings of Common Murres at Bluff, Alaska in 1987, 1988 and 1991, and the relationship between human disturbance and predation. The authors recorded a raven flying with an egg in its beak 251 times and witnessed 91 raven attacks on incubating murres. Typically, murres were dragged from their nest by raven, mostly in situations where the murre had no breeding neighbors. Raven predation activity peaked in late morning. Glaucous Gulls preyed almost exclusively on unattended eggs and 11 unsuccessful attacks when murres were present were observed. There was little predation on nestling murres by ravens or gulls. Losses of eggs to ravens on the 7 study plots was highest early in the season and for individual pairs early in the incubation period. Raven predation thus selected against early breeding, although murres which lost an egg early could lay a replacement egg. Two pairs of ravens accounted for about half of the predation while about 300 gulls accounted for the remainder. Human disturbance played an active role in predation. Eggers and the discharge of firearms by hunters flushed large numbers of murres and on two occasions in each of the first two years of the study, disturbance produced peaks in absolute numbers of eggs lost on the study plots. Six of 10 observations of gulls taking unattended eggs occurred when a boat passing close to the cliffs flushed incubating murres. Eggers and hunters were absent in 1991 and hatching success increased to 80% from 62% in 1987 and 58% in 1988. Anyone interested in seabird conservation or the interactions of human disturbance and predation will want to read this paper. [Inst. of Arctic Biology and Dept. of Biology and Wildlife, Univ. of Alaska Fairbanks, Fairbanks, AK 99775-0180, USA.]—William E. Davis, Jr.

21. Short breeding season of Figbirds *Sphecotheres viridis* in Darwin, Northern Territory. R. A. Noske. 1997. *Corella* 21:44–47.—The author presents the results of an opportunistic study of 55 active Figbird nests over 7 years on the campus of Northern Territory University. Nesting was highly synchronized and quasi-colonial. The usual clutch size was 2 eggs, which differs from the 3 previously reported. The egg-laying peak was mid-September, with a nestling period of about two weeks and a total nesting cycle of about 5 weeks. The rainy season usually began in November and most Figbird young had fledged by its onset. The author addresses the question of why Figbirds breed synchronously beginning in September, and why they breed over such a short period (honeyeater species on campus breed 8–10 months a year). He suggests that initiation of breeding may be related to the availability of cicadas which are super-abundant during this season, or the avoidance of the onset of the rainy season. He further suggests that the restricted breeding season promotes quasi-colonial breeding which may aid in predator defense. Breeding Figbirds may be largely sedentary, nesting in the same tree and often on the same branches despite an abundance of potential nesting sites, suggesting that there may be some advantage to retaining a place in the colony. Young Figbirds form large mobile flocks which utilize patchily distributed fruiting trees, and synchronized fledging may facilitate formation of these flocks. The author concludes that further demographic studies using individually marked birds are necessary to evaluate these hypotheses. In addition to the natural history information (the natural histories of many Australian bird species are poorly known) this paper should have heuristic value because of the many questions it raises. [Science Faculty, Northern Territory Univ., P.O. Box 41046, Casuarina, NT 0811, Australia.]—William E. Davis, Jr.

MIGRATION, ORIENTATION, AND HOMING

(see also 25, 37)

22. Linking breeding and wintering grounds of neotropical migrants songbirds using stable hydrogen isotopic analysis of feathers. K. A. Hobson and L. I. Wassenaar. 1997. *Oecologia* 109:142–148.—Starting from the premise that the stable hydrogen isotope ratios in the tissues of animals are correlated with the same ratios in local precipitation, the authors compared the stable hydrogen isotopic ratios in the feathers of 140 individual birds from 6

species (Least Flycatcher, *Empidonax minimus*; Swainson's Thrush, *Catharus ustulatus*; Wood Thrush, *Hylocichla mustelina*; American Redstart, *Setophaga ruticilla*; Tennessee Warbler, *Vermicora peregrinus*; Ovenbird, *Seiurus aurocapillus*), from 14 breeding locations across North America, with the stable hydrogen isotopes in the growing season precipitation. They found a strong correlation between the two ratios. This relationship provided the potential for determining the breeding location of transient and wintering migrants away from the breeding grounds. The stable hydrogen ratios were obtained from the feathers of 64 birds from 5 species of migrants (Gray Catbird, *Dumetella carolinensis*; Wood Thrush; Worm-eating Warbler, *Helmitheros vermivorus*; Hooded Warbler, *Wilsonia citrina*; Ovenbird) at a wintering location in Guatemala. The results were consistent with what was predicted based on the known breeding ranges of the species. This is another new tool that will permit researchers to answer the question of where specific wintering migrants breed. Little information is provided in the paper on the difficulty or accuracy of the technique and no references are provided to the literature. Although it may be a common technique in hydrology, it is novel in biology. A major drawback to the technique is that it is very large scale. The stable hydrogen isotope ratios vary slowly across 100s km. Thus, although the technique can provide information on the general breeding grounds, it cannot reduce the error down to a few km. [Prairie and Northern Wildlife Research Centre, Environment Canada, Saskatoon, SK S7N 0X4, Canada.]—Robert C. Beason.

HABITAT USE AND TERRITORIALITY

(see also 9, 11, 33, 35, 37)

23. Asymmetric territorial contests in the European Robin: the role of settlement costs. J. Tobias. 1997. *Anim. Behav.* 54:9–21.—Three hypotheses have been proposed to explain why territory holders are usually dominant over nonterritory holders when they compete for a resource. The resource-holding potential hypothesis states that residents acquire territories because they are of higher intrinsic quality than nonresidents. According to the value asymmetry hypothesis, knowledge of a territory improves a competitor's chances of territory acquisition. The uncorrelated symmetry hypothesis proposes the existence of arbitrary conventions in settling contests, i.e., 'owners always win'. Tobias conducted removal experiments on 75 European Robins (*Erithacus rubecula*) to test these hypotheses. Length of removal did not appear to influence the probability of an original territory owner ousting a newcomer. In winter, dominance shifted from removed owner to newcomer with increasing time of newcomer residence, supporting the value asymmetry hypothesis. In spring, however, even after a single day of absence an original owner never regained the bulk of his territory. Tobias suggests that reductions in settlement cost for newcomers and increases in territory value accelerate dominance reversal in spring. [Dept. of Zoology, Univ. of Cambridge, Downing Street, Cambridge CB2 3EJ, U.K.; e-mail:jat 1005@cam.ac.uk.]—Jeffrey P. Duguay.

24. A non-lekking population of Black Grouse *Tetrao tetrix*. J. Höglund and S. Stöhr. 1997. *J. Avian Biol.* 28:184–187.—Black Grouse usually are considered to be obligate lek breeders. On a 4400-ha study area in central Sweden, however, Black Grouse exhibited a distinct propensity for non-lekking during a 2-year period. In 1995, 2 of 19 males displayed in a lek and the others displayed solitarily. In 1996, each of the 30 to 35 males on the study area displayed solitarily. Nearest-neighbor distances averaged 1.1 km in 1995 and 0.6 km in 1996. A dispersion index revealed that displaying males were randomly distributed in the study area each year. The most likely explanations for the seemingly aberrant behavior involve a low density of grouse and altered habitat structure. Estimated densities were at the low end of the spectrum of values from the literature and forestry practices have created a scarcity of open areas typically preferred for display sites. The relationship between dispersion strategy and grouse density would be a fruitful area of research in this population. [Dept. of Zoology, Uppsala Univ., Villavägen 9, S-752 36 Uppsala, Sweden.]—Jeff Marks.

25. A concentration of small Canada Geese in an urban setting at Lubbock, Texas. J. D. Ray and H. W. Miller. 1997. *Southwest. Nat.* 42:68–73.—Most urban populations of Canada Geese (*Branta canadensis*) involve large subspecies and occur within the breeding ranges of these large subspecies. Small to intermediate-sized Canada Geese have taken up winter res-

idence in and around Lubbock, Texas, a city of about 200,000 people in the Playa Lakes Region of the Southern High Plains of Texas. Population estimates ranged from 5600 geese in December, 1990 to 97,300 in January, 1993. These geese take refuge on about 100 playa lakes within the city as well as on two reservoirs in an adjacent suburban setting. These playa lakes and the two reservoirs offer wintering geese permanent, open-water for roosting. The geese forage in nearby fields of grain sorghum, corn and winter wheat. The first large populations to winter in this city probably occurred because of lack of open water (drought and/or freezing of surface waters) in the traditional wintering areas north of Lubbock in the Texas Panhandle. Geese apparently have become conditioned to the sanctuary of the suburban habitat around Lubbock, since they reappear now even when habitat conditions are favorable to the north. [Texas Parks and Wildlife Dept., P.O. Box 569, Canyon, TX 79015, USA.]—Don Ingold.

26. Importance of yellow box-Blakely's red gum woodland remnants in maintaining bird species diversity: Inferences from seasonal data. K. B. H. Er, and C. R. Tidemann. 1996. *Corella* 20:117–128.—Urbanization, agricultural activities, and plantation forestry have led to the fragmentation of the yellow box (*Eucalyptus melliodora*)-Blakely's red gum (*E. blakelyi*) forest in the lowlands of the Australian Capital Territory. The authors present the results of a study designed to ascertain seasonal changes in bird species usage of forest remnants and provide information necessary for the development of a conservation strategy. Fixed-width transects were located in 10 study sites that ranged from 2 to 600 ha, and bird species composition was sampled during the four seasons of 1994. A total of 94 species were seen of which 53% were resident, 43% migrant, and 4% nomadic. The number of species increased from a low of 50 species in autumn to a high of 75 in spring, with a decrease in summer to 68 probably reflecting the inconspicuousness of some nesting birds rather than their absence. Bird density was also lowest in autumn and highest in spring with an overall density of 22.8 birds ha⁻¹. The densities in the forest lowland remnants were higher than in adjacent habitats suggesting that the remnants were important bird refuges. High densities in winter largely reflected an influx of thornbills (Genus) from surrounding habitats, perhaps because of more abundant food and better cover to protect against predators and wind. The high percentage of resident birds underscores the importance of the woodland remnants as breeding areas. During the study extreme drought conditions prevailed which suggests that these forest remnants may be important bird refuges for nomadic and migrant species under extreme weather conditions. This interesting paper emphasizes the importance of recognizing that birds may utilize habitats in different ways at different times of the year, and thus the importance of gathering information from all seasons before making management decisions. [Dept. of Forestry, School of Resource and Environmental Management, Australian National Univ., Canberra, ACT 0200, Australia.]—William E. Davis, Jr.

27. Spring foraging distribution and habitat selection by Double-crested Cormorants on the Penobscot River, Maine USA. B. F. Blackwell and W. B. Krohn, 1997. *Colon. Waterbirds* 20:66–76.—Double-crested Cormorant (*Phalacrocorax auritus*) populations have increased in recent years along the New England coast (ca. 28,000 pairs in Maine) and pose a perceived threat to the restoration efforts of Atlantic Salmon (*Salmo salar*), particularly on the Penobscot River and its tributaries. This paper quantitatively documents the temporal and habitat use of cormorants in this sensitive area during spring. From 1992–1994 cormorants were counted along 288 km of the Penobscot River and its two main tributaries by fixed wing aircraft from April to June, the period of salmon smolt stocking and migration. Cormorants began to arrive in mid-April and were present in maximum numbers by the second week of May. Cormorants were consistently found in higher than expected numbers in the proximity of mainstream dams and in the estuarine section of river closest to Penobscot Bay. The tributaries were used by fewer cormorants than expected. The authors suggest that the stocking of salmon smolts may have influenced the increased use of the river system by cormorants, and that the heavy use of major dam sites may be related to concentrations of migrating smolts at bottlenecks created by the dams. They also suggest that dams may have reduced the runs of other fish species which might otherwise have buffered the cormorant predation on salmon smolts. They attribute the heavy use of the estuarine portions of the river to greater abundance and availability of freshwater and estuarine prey in the

river compared to prey available in Penobscot Bay. This paper highlights the problem of conflicting conservation priorities and the problem of increasing populations of cormorants throughout much of North America. [Dept. of Wildlife Ecology, 5755 Nutting Hall, Univ. of Maine, Orono, ME 94469, USA.]—William E. Davis, Jr.

28. Western Grebe and Clark's Grebe: habitat necessity versus phenology. D. F. Parmelee and J. M. Parmelee. 1997. *Colon. Waterbirds* 20:95–97.—This paper describes the effects of radical fluctuations in water levels of Lake Mead, Nevada, on the reproductive behavior of Western (*Aechmophorus occidentalis*) and Clark's (*A. clarkii*) grebes. Lake Mead is impounded by the Hoover Dam and water levels are strongly influenced by power, residential, and agricultural demands. In 1995, reduced water levels during spring when grebes traditionally breed resulted in substantial habitat changes. In one Clark's Grebe colony the traditional nesting area was a dry lake bed. The grebes remained nearby and began nesting in August when water levels rose and ambient temperatures were very high, and continued into September when high winds destroyed most nests. A second colony visited in October had also apparently had a late nesting season. In a third colony both Clark's and Western grebes nested in fall and winter at least through December, when nighttime temperatures often dipped below freezing. The authors conclude that the abundant food resources of Lake Mead and relatively hospitable climatic conditions allow grebes to compensate for adverse water level changes by extending their breeding season. [Marjorie Barrick Museum of Natural History, Univ. of Nevada Las Vegas, NV 89154–4012, USA; e-mail: parmelee@nevada.edu.]—William E. Davis, Jr.

ECOLOGY

(see also 5, 6, 7, 18, 22, 26, 36, 38, 41)

29. Bright plumage in the Magpie: does it increase or reduce the risk of predation. F. Götmark. 1997. *Behav. Ecol. Sociobiol.* 40: 41–49.—Bright coloration in birds in often the result of sexual selection pressures; however, some evidence suggests that conspicuous color patterns in birds may serve an aposematic role which helps to deter predators. In order to determine if the black-and-white plumage in Magpies (*Pica pica*) helped reduce the risk of predation, the author conducted a series of field experiments over four years in Sweden using stuffed normal-colored Magpies, Magpies dyed brown, and cryptic Jays (*Garrulus glandarius*). Stuffed birds were mounted on poles and exposed to wild Goshawks (*Accipiter gentilis*). Goshawks attacked normal-colored Magpies significantly more often than brown Magpies, contradicting the predictions of the aposematism hypothesis. The author suggests though that brown Magpies are a novel prey item and predators often avoid prey items that they are unfamiliar with. Goshawks attacked normal Magpies and Jays with about equal frequency, again suggesting that the coloration in Magpies is not aposematic. During two years, normal Magpies and Jays were mounted father apart; during one of the two years there was a significant influx of migrating Jays. During this year, Goshawks attacked Jays significantly more often than Magpies; however, in the second year when Jay densities were closer to normal, Magpies were attacked more frequently. These data strongly support the notion that there is no aposematic role in the coloration of Magpies. Moreover, the bright plumage of Magpies may place them at a greater risk of predation. [Dept. of Zoology, Univ. of Göteborg, Medicinaregatan 18, S-413 90 Göteborg, Sweden; e-mail: f.gotmark@zool.gu.se.]—Danny J. Ingold.

30. Does nest defense deter or facilitate cowbird parasitism? A test of the nesting-cue hypothesis. S. A. Gill, P. M. Grief, L. M. Staib, and S. G. Sealy. 1997. *Ethology* 103:56–71.—This study was designed to test the hypothesis that cowbirds (*Molothrus ater*) might use host nest defense responses to locate nests to parasitize (nesting-cue hypothesis). The hypothesis predicts that if cowbirds cue in on the defense responses of potential hosts then those potential hosts that have strong defense responses should be more likely to experience parasitism than those potential hosts with weak defense responses. This prediction is based on two assumptions: first, that potential hosts respond to cowbirds when not directly near their nest, and second, that the intensity of the response gets stronger as distance from the nest decreases. To test the model prediction and assumptions, nest defense behaviors of 6 host

species were measured when female cowbird models were placed at three distances from the nest. The results varied considerably within and among species. In general, the data supported the first assumption of the hypothesis in that all six host species exhibited defensive behavior when the model was placed away from their nest (4.5 m). Although several defensive behaviors were measured, most of these behaviors did not vary significantly with distance from the nest, and thus, would not provide useful cues for cowbirds trying to locate host nests. One response, host distance from the model, did vary positively with distance from the nest and could possibly be used by cowbirds to locate host nests. However, the nest defense responses of birds that were subsequently parasitized did not differ from the defense responses of birds from nests that did not become parasitized. This latter finding does not support the overall prediction of the nesting-cue hypothesis. Based on these results and other considerations, the authors conclude that host nest defense responses are probably not an important cue used by cowbirds to locate host nests. [Dept. of Zoology, Univ. of Manitoba, Winnipeg, Manitoba, Canada, R3T 2N2.]—Jeffrey G. Kopachena.

31. The effect of observers visiting the nests of passerines: an experimental study. H. Mayer-Cross, J. Q. P. Crick, and J. J. D. Greenwood. 1997. *Bird Study* 44:543–565.—The authors concluded that nest visitation by an observer had no effect on the chance of that nest failing to produce at least one young. This conclusion is interesting in view of the numerous papers that indicate increased nest predation rates with frequent visitations. Specific groups appeared to be affected differently. Thrushes and insectivorous species appeared to benefit from nest visitation because visited nests suffered lower predation rates than control nests (thrushes, control 75%, visited 68%; insectivores, control 62%, visited 54%). Finches, on the other hand, suffered higher losses at visited nests (81% versus 71%). There were no differences between habitats. These results are interesting and should stimulate further careful study of the problem. [British Trust for Ornithology, The Nunnery, Thetford, Norfolk, IP24 2PU, UK; email: H.Crick@bto.org.]—Robert C. Beason.

32. Non-territorial 'floaters' in Great Horned Owls: space use during a cyclic peak of snowshoe hares. C. Rohner. 1997. *Anim. Behav.* 53:901–912.—Rohner equipped 55 juvenile and 21 territorial adult Great Horned Owls (*Bubo virginianus*) with radio transmitters during a peak of the snowshoe hare (*Lepus americanus*) population cycle to study the ecology and behavior of floaters. Non-territorial owls had stable home ranges that were approximately 5 times the size of an average owl territory. Although non-territorial owls intruded onto several territories they were concentrated on the periphery of established territories, suggesting that population growth of Great Horned Owls during this study was limited by territorial behavior. Movements and home ranges of non-territorial owls did not show consistent changes during courtship and egg laying by territorial birds, suggesting that male floaters were not seeking extra-pair copulations. [Centre for Biodiversity Research, Dept. of Zoology, Univ. of British Columbia, Vancouver, B.C. V6T 1Z4, Canada.]—Jeffrey P. Duguay.

33. Winter mortality of Northern Bobwhites: effects of food plots and weather. R. J. Robel and K. E. Kemp. 1997. *Southwest. Nat.* 42:59–67.—Winter mortality data for Northern Bobwhites (*Colinus virginianus*) were obtained by monitoring 403 coveys on the Fort Riley Military Reservation in northeastern Kansas each month, from December through March for 18 winters (1961–1967 and 1968–1980). Mortality data were studied in relation to (1) proximity of coveys to food plots (mostly planted sorghum), (2) number of days with at least 5 cm of snow cover, and (3) duration of periods in January during which the high temperature did not exceed 0 C on the study area. The average mortality for bobwhites in 198 coveys within 600 m of food plots was 34.1% while that for birds in 205 coveys farther than 900 m from food plots was significantly higher, at 50.1% ($P < 0.001$). Nineteen of these 205 coveys dwindled from a mean of 11.3 in December to zero in March. None of the coveys nearer to food plots disappeared by March. Total days with snow cover of 10 cm or more in January was significantly correlated with mortality in coveys near to and far from food plots. Percent winter mortality was also positively correlated with duration of periods in January during which temperatures did not exceed -5° C. This temperature criterion provided the best prediction equation, which was not improved significantly by incorporating the 10 cm snow cover statistic. [Div. of Biology, Kansas State Univ., Manhattan, KS 66506-4901, USA; e-mail: rjrobel@ksuvm.ksu.edu.]—Don Ingold.

34. The effects of rat (*Rattus rattus*) predation on the reproductive success of the Bonin Petrel (*Pterodroma hypoleuca*) on Midway Atoll. N. W. H. Seto and S. Conant. 1996. *Colon. Waterbirds* 19:171–185.—Black rats (*Rattus rattus*) are considered responsible for the extirpation of several introduced bird species and severe declines in shearwater (*Puffinus* sp.) and petrel populations on Midway Atoll in the Northwestern Hawaiian Islands. The authors report on a study which compared the nesting success of Bonin Petrels (*Pterodroma hypoleuca*) in 3 areas treated with rodenticide (Bromothalin—"VengeanceTM") with 3 paired (control) areas that were not, to ascertain the effects of rat predation. During the two years of the study 79% of nest failure of known causes was attributed to rat predation. All rat predation nest failure occurred during the egg (incubation) stage. Rat activity was monitored by direct observation at night, trapping, and tracking boards (vinyl tiles covered with lamp-black). In two of the three paired areas, Bonin Petrel reproductive success was significantly higher, and the rat activity lower, in the treated plot. The authors suggest that rat eradication is essential for the conservation of Midway Island's seabird population, and that until an eradication program is initiated, intensive control programs should be pursued, in the case of the Bonine Petrel especially during the incubation period. They further suggest that rodenticides are successful in controlling rat predation on nesting petrels, but that better techniques for measuring rat densities are needed and further study is advisable. [U.S. Fish and Wildlife Service, Midway Atoll National Wildlife Refuge, P.O. Box 4, FPO AP 96516, USA.]—William E. Davis, Jr.

35. Some observations on the ecology of the Rainbow Lorikeet *Trichoglossus haematorus* in Oatley, South Sydney. R. D. Waterhouse. 1997. *Corella* 21:17–24.—Rainbow Lorikeets were common birds in the Sydney, Australia area in the 19th century, but largely disappeared early in this century due to clearing of vegetation and trapping for the cage bird market. In the past 15 years they have once again become a common bird in southern Sydney. This paper reports on an attempt to determine the reasons for the species' local recovery. The author monitored foraging lorikeets in the suburb of Oatley in 1993–94 and concluded that planted exotics provide the bulk of lorikeet food throughout the year. For example, the coral tree (*Schefflera actinophylla*) is important in summer and autumn, and broad-leaved paperbarks (*Melaleuca quinqueruvia*) in autumn. In addition, backyard feeders, dispensing mostly sunflower seeds, are locally important for lorikeets. Figs provide the major fruit taken. Rainbow Lorikeets appear to successfully compete for nesting sites in hollows in old trees in Oatley bushland reserves, and occupied more hollows than any other species. The author concludes that some Rainbow Lorikeets are fully suburbanized, feeding, roosting and breeding locally. They have successfully recolonized the southern Sydney area by using a broad spectrum of exotic food resources throughout the year. [4/1-5 Ada Street, Oatley, New South Wales 2223, Australia.]—William E. Davis, Jr.

POPULATION DYNAMICS

(see also 37, 38)

36. The role of competition and introduction effort in the success of passeriform birds introduced to New Zealand. R. P. Ducan. 1997. *Am. Nat.* 149:903–915.—Introduction effort, the number of birds released or arriving, was the most important factor in determining invasion success. This suggests that communities composed of introduced birds may be composed of those species that arrived in large enough numbers to successfully colonize. Without data on introduction effort, however, the influence of potential competitors would have been over estimated. It is important in assessing the factors that determine introduction success that the size of the initial introduction be known. [Dept. of Plant Science, P.O. Box 84, Lincoln Univ., Canterbury, New Zealand; email: duncanr@lincoln.ac.nz.]—Robert C. Beason.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 25, 26, 27, 32, 35, 36)

37. Migration chronology and distribution of Redheads on the Lower Laguna Madre, Texas. C. M. Custer, T. W. Custer, and P. J. Zwank. 1997. *Southwest. Nat.* 42:40–51—This study focuses on factors associated with the autumn arrival and winter distribution of Red-

heads (*Aythya americana*) on the Lower Laguna Madre (LLM) during two winters (1987–1988, 1988–1989). Since about 80% of Redheads winter on the Laguna Madre (LM) of Texas and Mexico, the latter constitutes an indispensable winter habitat for this species. The LLM is a shallow (average depth less than 1 m), hypersaline habitat that covers 690 km². Redhead distribution data collection involved 97 aerial surveys during the two winters. Distribution and habitat utilization by Redheads was influenced by season, water depth, sediment compactness and proximity of freshwater (until the Redheads were able to acclimate via hypertrophy of their salt glands, by about mid-December). The central portion of the LLM was most heavily utilized by Redheads, with east-west movements across the LLM (influenced by tides), in order for ducks to remain in water of optimum depth (12–30 cm) for feeding via tipping and head dipping.

Although not a stated objective of the study, the authors emphasized that the presence and distribution of shoalgrass (*Halodule wrightii*) meadows was a major influence on the distribution of Redheads in the LLM. Most Redhead flocks (71%) were located in monotypic shoalgrass meadows, even though shoalgrass constituted only 32% of the vegetated area of the LLM. In addition, 22% of the flocks were in areas of mixed manatee grass (*Syringodium filiforme*) and shoalgrass, and these ducks undoubtedly fed almost exclusively on shoalgrass. A similar dependence of Redheads on shoalgrass for winter forage has been reported for winter populations in Louisiana and Florida. Shoalgrass rhizome biomass declined by 75% over the winter due to Redhead grazing. Redistribution of Redheads in the LLM as the winter progressed may have been influenced by the depletion of shoalgrass rhizomes in the central LLM. Monotypic stands of shoalgrass have declined dramatically in the LLM during the past three decades (from 47,070 ha in 1960 to 22,000 ha in the 1980s). Because of the major losses since the 1960s, the admonition that “all areas on the LLM used by Redheads should be protected from further loss or degradation of shoalgrass habitat” is particularly relevant. [National Biological Survey, P.O. Box 818, La Crosse, WI 54602-0818, USA; e-mail: custerc@mail.fws.gov.]—Don Ingold.

38. Determinants of the size and location of Great Blue Heron colonies. J. P. Gibbs and L. K. Kinkel. 1997. *Colon*. *Waterbirds* 20:1–7.—This study focused on determining the factors influencing the size and location of Great Blue Heron (*Ardea herodias*) colonies in Illinois by integrating habitat data across small, medium and large spatial scales for 29 nesting colonies. The authors compared nesting habitat variables for existing sites with “null” nesting sites in randomly chosen forest sites within 15 km of the actual colonies. A second set of “null” sites were composed of randomly selected sites across Illinois to examine how wetland distribution influenced colony-site location. Small-scale factors such as characteristics of nesting vegetation were investigated in several existing colonies. The landscape near colonies had less residential development and agricultural use than null sites, and more swamp, open wetland and aggregate undisturbed habitat. About half of the variation in colony size (5 to 550 breeding pairs) was attributable to foraging habitat availability. At the largest scale the availability of suitable wetlands (particularly lacustrine and emergent wetland) was the primary determinant of colony sites. Within regions with suitable wetlands the colonies appear to be centrally located in local concentrations of wetlands. The central locations may minimize flight distances for adults and fledgling young. Within suitable wetlands, landscape characteristics which appear to be important include remoteness from roads and extent of undisturbed habitat, which may be measures of human disturbance avoidance. High levels of variability in small-scale habitat characteristics suggest that nesting substrate is not an important factor in colony size or colony-site selection. The authors present a “top-down” hierarchical model of colony-site selection in which regional wetland availability determines the general area in which birds nest, while within the suitable region the colony-site may be chosen in an area where human or predator disturbance is minimized. Herons may further be influenced locally by intraspecific competition for food. I found this application of a spatial scales perspective to habitat selection by herons an interesting and provocative approach. [Center for Environmental Research and Conservation, 1008 Schermerhorn Extension, 1200 Amsterdam Ave., Mail Code 5557, Columbia Univ., New York, NY 10027, USA.]—William E. Davis, Jr.

EVOLUTION AND GENETICS

(see also 13, 16, 17, 26, 40)

39. **Is the expression of male traits in female lesser kestrels related to sexual selection?** J. L. Tella, M. G. Forero, J.A. Donazar, and F. Hiraldo. 1997. *Ethology* 103:72–81.—Some female Lesser Kestrels (*Falco naumanni*) exhibit male plumage characteristics (grey rumps and tails). Two explanations for these apparently anomalous features in this and other species have been proposed. First, it has been suggested that females may occasionally express male secondary sexual characteristics simply as the result of genetic correlation. In this case, the expression of these traits in females would have no direct function, and therefore, should not be correlated with female fitness. A second explanation for the occurrence of male traits among females is based on the idea that females might be subject to high levels of intra- and inter-sexual selection. In this “sexual selection” argument, female competition and male mate choice might promote the expression of typically masculine plumage characters. An evaluation of the plumage color, age, survivorship, size, and reproductive parameters of 239 Lesser Kestrels in Spain failed to show any relationship between the presence or absence of male plumage traits and fitness of females. However, there was a significant correlation between the expression of male plumage traits and female age, older females being more likely to express the masculine character. These results tend to refute the argument that male secondary sexual characters may be expressed in females as a result of some form of sexual selection. Rather, it is speculated that because the genes for most secondary sexual traits are located on autosomes (and therefore present in both males and females), and because the expression of these genes is influenced by gonadal hormones, that the expression of male traits in some females might be the result of individual and age related differences in hormone titres. This variation of the genetic correlation argument provides a plausible explanation for the observed variation in the expression of male secondary sexual traits among the females of the population studied. [Estacion Biologica de Donana, CSIC, Pabellon del Peru, 41013 Sevilla, Spain.]—Jeffrey G. Kopachena.

PHYSIOLOGY AND DEVELOPMENT

(see also 12, 14)

PLUMAGES AND MOLT

(see also 29, 39, 42)

40. **When black plus white equals gray: the nature of variation in the Variable Seedeater complex (Emberizinae: Sporophila).** F. G. Stiles. 1996. *Ornithol. Neotropical* 7:75–107.—The author measured wing chord, tail length, bill depth at nostril, bill length from nostril and tarsus length; and analyzed colors and depth of gray plumage to ascertain the relationships within the complex. Based on his detailed analyses, Stiles proposes four allospecies: *Sporophila americana* (Wing-barred Seedeater), *S. murallae* (Caqueta Seedeater) *S. intermedia* (Gray Seedeater), and *S. corvina* (Variable Seedeater); with *S. americana* and *S. murallae* forming a superspecies. He also proposes that *S. “aurita”* be used only for phenotypes that are intermediate between *S. c. corvina* and *S. c. hicksii*. Each phenotype has a well defined distribution in Panama and northern South America, but hybrid swarms exist between some of the species. This is a rather extensive study on the group based on 297 museum specimens. It will be interesting to see whether molecular biology techniques can further clarify or substantiate the scheme based on plumage and anatomical characters. [Inst. de Ciencias Naturales, Univ. Nacional de Colombia, Apartado 7495, Bogota D.C., Colombia; e-mail: gstiles@ciencias.ciencias.unal.edu.co.]—Robert C. Beason.

PARASITES AND DISEASE

(see also 16, 19, 30)

41. **The effect of ectoparasite nest load on the breeding biology of the Penduline Tit *Remix pendulinus*.** A. Darolova, H. Hoi, and B. Schleicher. 1997. *Ibis*. 139:115–120.—The male Penduline Tit builds an elaborate nest that plays a major role in the female mate choice

process. Earlier studies have shown that ectoparasite loads are highly variable between nests and that females frequently desert nests prior to or during egg-laying. The objectives of this study were to determine if ectoparasite loads in Penduline Tit nests influence mate choice by females, parental effort and subsequent reproductive success. Nests were collected a few days after the chicks had fledged or right after nest predation or desertion had occurred. Deserted nests were found during all three stages of nest building (early, advanced, and finished), both with and without eggs. Nests, and thus males, were classified as "selected" only if the female had initiated egg-laying. "Unselected" nests were those which did not successfully attract the female to lay eggs. Two species of mites (*Dermanyssus hirundinis* and *Ornithonyssus sylviarum*) were the most important ectoparasites found living on Penduline Tits and in their nests. There was a significant difference in mite density on "selected" nests versus "unselected" nests after controlling for different building phases. For all building phases, "unselected" nests had mite densities three times higher than densities in "selected" nests. One would expect higher mite loads to occur in selected nests simply due to the increased activity of the female in the nest (increased opportunity for transference of mites to the nest and more rapid mite development due to increased temperature in the nest). The opposite result demonstrates that mite infestation of the male and his nest are important factors in female mate choice. Parental feeding rates were negatively related to mite loads, i.e., chicks in nests with few ectoparasites were fed more food than were chicks in more heavily parasitized nests. The authors speculate that low feeding rates may reflect the overall poor condition of the parents, and that heavier ectoparasite loads may increase the need for self-maintenance behavior and leave less time available for feeding young. Neither nestling development rates nor nestling mortality were affected by ectoparasite loads in the nest. In fact, nestling mortality was highest in nests with the lowest mite infestation rates. This apparent contradiction might be explained by parasite selection for more vigorous "good-quality" nestlings because host condition influences parasite development. [Inst. of Zoology, Slovak Academy of Sciences, Dubravska cesta 9, SK-842 06 Bratislava, Slovakia.]—Karl E. Miller.

WILDLIFE MANAGEMENT AND ENVIRONMENTAL QUALITY

(see also 11, 26, 27, 36, 37)

BOOKS AND MONOGRAPHS

(see also 29, 39, 40)

42. Flight-feather molt patterns and age in North American owls. P. Pyle. 1997. Am. Birding Assoc. Monogr. Field Ornithol. No. 2. 32 pp. \$9.95.—In this monograph Pyle builds on a strong foundation of knowledge of European owl molt patterns with age, reviews the literature on North American owl molt, and presents an analysis of his examination of 2429 specimens of the 19 owl species known from North America north of Mexico. For these species he describes and illustrates patterns of flight feather molt. For various species he also describes variation in feather barring, feather shape, and some other plumage characteristics. In general, patterns of feather replacement among species are similar, but timing varies, taking from one (e.g., *Glaucidium* and *Micrathene*) to five or six (e.g., *Tyto*, *Bubo*, *Nyctea*) years. In Barn Owls (*Tyto alba*) and Snowy Owls (*Nyctea scandiaca*), newer flight feathers tend to be lighter in color; in other species they tend to be darker. Patterns found were generally consistent with those found in European species.

As with many authors Pyle makes frequent use of the verb "to indicate"—as in "these data indicate that this is the way it is"—when in most cases the better verb to use would have been "to suggest." There are many important patterns "suggested" in this monograph, and researchers will find the approach to aging owls very useful. However, there are also many questions that remain to be answered. It would be useful to know if molt phenology differs among birds of different age classes, in birds from different regions, in birds of different species, or between the sexes within species. Is molt phenology altered by prey availability? Does it differ between resident and migrant species? Pyle raises other questions. Does the variation observed have systematic implications? Why is replacement of the owl flight feathers so slow compared to replacement in other species?

In sum, this will be a very useful guide for owl banders, a stimulus for further studies of owl molts and plumages, and a door to new dimensions in studying age-related phenomena in the behavioral ecology of North American owls.—Jerome A. Jackson.

43. North American owls. Paul A. Johnsgard. 1988 Smithsonian Institution Press, Washington, D.C. 295 pp. \$24.95, paper. 23 color plates. Numerous black-and-white line drawings, figures, and maps; glossary.—This paperback reprint of Johnsgard's popular monograph on the owls of North America is worth calling attention to once again. One reason is the collection of 10 Fuertes owl prints that grace the first pages in the book. These should be issued separately as fine art prints! The remaining color plates are a mix of photos and artwork. One unfortunate photo is of a bedraggled captive Ferruginous pygmy-owl. The text offers a good review of the state of our knowledge of North American owls in 1988, including general chapters on owl evolution and classification, ecology and distribution, morphology and physiology, behavior, reproductive biology, and folklore. The general chapters include compilations of data for easy comparison of species. Individual species accounts provide range maps and details of each species' life history. With more than 450 references in the literature cited, a glossary, and a good index, this is a volume to be used and enjoyed. It deserves a place on any owl aficionado's shelf. I only regret that the volume wasn't revised to include results of more recent research.—Jerome A. Jackson.