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RECENT LITERATURE

Edited by Danny J. Ingold

RESEARCH TECHNIQUES

(see also 24, 31)

BEHAVIOR

(see also 4, 5, 6, 12, 15, 16, 18, 19, 21)

1. **The value of objects to Satin Bowerbirds *Ptilonorhynchus violaceus*.** C. P. Hunter and P. D. Dwyer. 1997. Emu 97:200–206.—The mating success of male Satin Bowerbirds has been shown to be correlated with the numbers and kinds of decorative objects present in bowers. The relative abundance of objects suitable for bowers between localities should also influence male fitness such that where objects are plentiful the potential contribution of any one object towards the future fitness of a male should be less than in an area where objects are less common. The authors observed 17 active bowers at two locations at Manorina National Park in Queensland, Australia, to test this hypothesis. The visitation rates of females and immature individuals to bowers was positively correlated with the number of objects in bowers, only within areas. The average rate of theft of objects from bowers was 0.17 across all bowers; within study areas, theft rates were significantly higher at bowers with lower mean numbers of objects. Bower destruction, between areas, increased relative to the investment in stealing with an increase in the average number of objects present at bowers. The authors suggest that the importance of display behavior and competition for objects within bowers in male Satin Bowerbirds is influenced by variation in environmental conditions between nesting locations. [Dept. of Psychology, Univ. Of Liverpool, P.O. Box 147, Liverpool L69 3BX, UK.]—Danny J. Ingold.

2. **Fighting behaviour and strategy of Rock Pipit, *Anthus petrosus*, neighbours: cooperative defence.** S. T. Elfstrom. 1997. Anim. Behav. 54:535–542.—Several hypotheses have been put forth to explain territorial fighting strategies. One such hypothesis suggests that males should enter an armistice (temporarily suspend hostility) and possibly cooperate during intrusions. Elfstrom examined fighting behavior in the Rock Pipit (*Anthus petrosus*) after territorial establishment but before breeding commenced to determine if neighboring males entered an armistice and cooperated in evicting a territorial intruder. Fighting behavior of established owners in situations where they were intensely challenged by a persistent intruder (24–83 min) was recorded. When intrusions occurred along shared border zones, both territorial owners simultaneously chased and/or relieved each other in harassing the intruder (92.3%, 12 of 13 intrusions) without harassing each other. Likewise, when intrusions were away from a shared border the territory owner and neighbor both attacked the intruder but not each other. These neighbors also cooperated (12 of 24 intrusions) by relieving each other in harassing the intruder. Elfstrom gives suggestions as to how this behavior may have arisen in his study population. [Herbarium GB, Goteborg Univ., Carl Skottsbergs gata 22B, S-413 19 Goteborg, Sweden.]—Jeffrey P. Duguay.

3. **Aggression among female Lapwings, *Vanellus vanellus*.** A. Liker and T. Szekely. 1997. Anim. Behav. 54:797–802.—The "competition for male parental care" hypothesis, where already mated females (residents) attempt to monopolize parental care of their mates by acting aggressively toward other females, has been proposed to explain female–female aggression. To examine female aggression in Lapwings (*Vanellus vanellus*), Liker and Szekely presented incubating females with either a female or male Lapwing dummy placed 10 m from the nest. If females act aggressively to monopolize male parental care, then resident females should be more aggressive toward a female conspecific than a male. Also, resident females should be more aggressive toward other females at the beginning of incubation than later on because they would be most at risk of losing their mate's help if a new female begins nesting shortly after the resident. Female Lapwings acted in a manner consistent with the competition for male parental care hypothesis. Resident females attacked the female dummy significantly more than the male dummy. Aggression toward the female dummy decreased over the incubation period, whereas there was no correlation between aggression toward the

male dummy and incubation period. [Zoology Centre, Univ. of Veterinary Science, P.O. Box 2, H-1400 Budapest, Hungary; e-mail: aliker@ns.univet.hu.]—Jeffrey P. Duguay.

FOOD AND FEEDING

(see also 9, 11, 12)

4. **Foraging patterns of the Least Tern (*Sterna antillarum*) in north-central Oklahoma.** S. H. Schweitzer and D. M. Leslie, Jr. 1996. Southwest. Nat. 41:307–314.—Observations were made on the foraging and feeding behavior of Least Terns at the Salt Plains National Wildlife Refuge during the 1992–1993 nesting season. Terns foraged over a broad span, usually away from the salt flat (up to 12 km) at nearby ponds, the reservoir and fish hatchery. Conversely, during the incubation and brooding period in July. Terns did not venture from the salt flat to forage. Seventeen nests, with nestlings of a mean age of 3 days, were monitored for feeding activity. Nestlings were fed at a mean rate of 2 fish per hour with 58% of the fish offered directly to the chick. The mean estimated length of fish brought to the nestlings was 2.9 cm which is smaller than the overall length of the fish collected in waterways (3.7 cm) and found uneaten in the colony site (6.7 cm). The authors suggest that since the bodies of water in and around the salt flat remained full during 1992 and 1993, there was enough food available for the energy demands of nesting. [Nat. Biol. Service, Oklahoma Coop. Fish and Wildl. Research Unit, Dept. of Zool., Oklahoma State Univ., Stillwater, OK 74078, USA; e-mail: schweitz@smokey.forestry.uga.edu.]—Tom Leiden.

5. **Do Tengmalm's Owls see vole scent marks visible in ultraviolet light?** M. Koivula, E. Korpimaki, and J. Viitala. 1997. Anim. Behav. 54:873–877.—Densities of small rodents and rodent-eating avian predators vary nearly synchronously in northern Europe. The authors conducted a laboratory experiment with Tengmalm's Owls (*Aegolius funereus*) to determine if they are able to see field vole (*Microtus agrestis*) scent marks in ultraviolet (UV) light and thus use these scent marks as cues when selecting feeding areas. No significant differences in hunting behavior of the owls were detected between treatments (arenas with and without vole scent marks and either ultraviolet light or visible light). It is suggested that the laboratory protocol was valid because, among other reasons, the same experimental protocol and room were used to demonstrate diurnal Kestrel (*Falco tinnunculus*) preference to hunt on an arena with vole urine and feces in UV light. The authors suggest Tengmalm's Owls rely on acoustic cues to locate prey and that they may use a win-stay strategy to determine suitability of a particular area for hunting. [Laboratory of Ecological Zoology, Dept. of Biology, Univ. of Turku, FIN–20014 Turku, Finland; e-mail:minkoi@utu.fi.]—Jeffrey P. Duguay.

6. **The foraging behaviour of avian nectivores in a monsoonal Australian woodland over a six-month period.** D. C. Franklin. 1997. Corella 21:48–54.—In this study, which ran from late in the rainy season to the middle of the dry season (March to September, 1994), the author compared the foraging behavior of 7 species of nectivores (a few data are presented for 4 additional species), comparing nectar dependence, flower types used, and non-nectar foraging. The woodland was structurally and floristically diverse. During data collection only one foraging act was recorded per individual bird in order to insure independence of data points. A total of 1181 foraging acts were recorded and the seven species fell into three groups on the basis of their foraging behavior: (1) larger honeyeaters: Silver-crowned (*Philemon argenticeps*) and Little (*P. Citreogularis*) Friarbirds, Yellow-throated Miner (*Manorina flavigula*) and Blue-faced Honeyeater (*Entomyzon cyanotis*), (2) small honeyeaters: Dusky (*Myzomela obscura*) and Brown (*Lichmera indistincta*) honeyeaters, and (3) the Rainbow Lorikeet (*Trichoglussus haematodus*). All species had at least a moderate dependence on flowers (54%–74% of foraging observations). The lorikeets and large honeyeaters foraged primarily on eucalypts, the small honeyeaters on a broad diversity of flowering species. Lorikeets fed almost exclusively on flowers and harvested both nectar and pollen. All other species took insects as well as nectar, small honeyeaters frequently by snatching from non-eucalypt foliage, while friarbirds also prey-snatched but largely from eucalypts, and the other large honeyeaters frequently gleaned eucalypt foliage and bark. Seasonal patterns were analyzed for three species. Lorikeets and Little Friarbirds were consistent in their use of eucalypt flowers, but Brown Honeyeaters showed a significant and sustained decrease in eucalypt usage after May. This

is an interesting study of resource partitioning by nectiverous birds. I recommend it to those interested in avian foraging ecology. [Wildlife Research Unit, Parks and Wildlife Commission of the Northern Territory, P.O. Box 496, NT 0831, Australia.]—William E. Davis, Jr.

SONGS AND VOCALIZATIONS

7. **Use of song amplitude for song ranging in Carolina wrens (*Thryothorus ludovicianus*).** M. Naguib. 1997. Ethology 103:723–731.—Territorial birds can use auditory information to determine the distance of conspecifics, an aspect of signal processing which likely facilitates territory defense. Research on the components of acoustic signals used in distance discrimination (ranging) has been limited to signal degradation rather than to signal amplitude. This is because signal degradation is a product of the acoustic environment and cannot easily be manipulated by the sender. Amplitude is considered a less reliable indicator of distance because individuals can vary the amplitude of their signals and because environmental conditions (e.g., wind) can cause irregular variations in amplitude. However, under many conditions (e.g., when senders do not vary the amplitude of their signals and when wind conditions are relatively constant) amplitude could provide reliable information on distance. This study uses a playback experiment to test whether Carolina Wrens are capable of using amplitude to discriminate distance. The experiments consisted of presenting pairs of songs to territorial males. One treatment group was played a loud song followed by a quiet song (6 dB quieter) (simulated retreat), the other treatment group was presented with a quiet song followed by a loud song (simulated approach). In general, stronger responses were recorded for the simulated approach group than for the simulated retreat group. Furthermore, when birds presented with the simulated retreat flew toward the playback speaker they had a stronger tendency to fly a further distance beyond the speaker (overestimate distance). The results are discussed in terms of three alternate interpretations: that the birds merely perceived the simulated approach as a more aggressive signal, that the birds were alerted by the first song and responded to the second song which would illicit greater response in the loud song second treatment (simulated approach), or that the birds appropriately interpreted the treatments as approach or retreat by a conspecific. The last explanation is favored primarily because the two treatment groups were characterized by responses that differed in orientation and in the resultant locations of the responding individuals. These differences were most consistent with the hypothesis that the birds were interpreting the changes in song amplitude as changes in the location of the source. [Freie Universitat Berlin, Institut fur Verhaltensbiologie, Haderslebenerstr. 9, D-12163 Berlin, Germany.]—Jeffrey G. Kopachena.

8. **Song development by Grey Catbirds.** D. E. Kroodsma, P. W. Houlihan, P. A. Fallon, and J. A. Wells. 1997. Anim. Behav. 54:457–464.—How Grey Catbirds (*Dumetella carolinensis*) acquire their large repertoires is unknown. The authors collected Gray Catbirds from nature and hand-reared them in 3 different environments (tape-tutored with a 10-s or 16-min segment of normal catbird song, or not tape-tutored at all) to address how Grey Catbirds acquire their repertoires. The catbirds also heard songs of other species housed in the same rooms as the catbirds. The developed repertoire size was not directly related to the repertoire size heard during tutoring. Few of the songs of lab-reared catbirds were imitated from the tape-tutors. In addition, imitation of neighboring caged birds in the laboratory played a minor role in song development of these catbirds. The authors conclude that the catbirds under study can rely largely on an inborn program to improvise or invent large repertoires of seemingly normal catbird sounds. [Dept. of Biology, Univ. of Massachusetts, Amherst, MA 01003-0027; e-mail: kroodsma@bio.umass.edu.]—Jeffrey P. Duguay.

NESTING AND REPRODUCTION

(see also 1, 3, 22, 24, 28, 29, 30, 31)

9. **Breeding success, nestling diet and parental care in the White-backed Woodpecker *Dendrocopos leucotos*.** O. Hogstad and I. Stenberg. 1997. J. Ornithol. 138:25–38.—The White-backed Woodpecker has declined in range and numbers in Europe and is now considered endangered. Furthermore, as with the North American Red-cockaded Woodpecker (*Picoides*

borealis), habitats have been so manipulated that recent data collected may not be relevant to the species in its natural habitat. Hogstad and Stenberg provide a very useful data set for the breeding ecology of the species spanning 70 pairs and 10 breeding seasons from a relatively pristine region of western Norway. Most birds began laying during late April, but those living closer (<2 km) to the coast initiated egg-laying earlier than those farther (2–15 km) inland, and laying began earlier in warmer springs. Clutch size averaged 4 eggs and, as with most woodpeckers, breeding success was high (0.63 fledglings/egg; 2.4/nest). At age 20 days, nestling males averaged heavier (87.8 g) than nestling females (84.2 g) and both sexes were heavier in coastal than in inland habitats. Feeding rate increased with nestling age, but rate per nestling did not vary with brood size. Most (72% by dry weight) food items were wood-living beetle larvae. [The Museum, Univ. of Trondheim, Norway]—Jerome A. Jackson.

10. **The phenomenon of hatching asynchrony in altricial birds and different hypotheses for its evolution. [Az aszinkron keles jelensege a feszekrako madaraknal es kialakulasanak hipotezisei.]** E. Ludwig. 1996. Ornis Hungarica 6:23–41. (Hungarian, English abstract).—It would be nice if more of this review was in English, but the abstract is lengthy and useful. Ludwig reviews 17 hypotheses that have been suggested to explain the occurrence of asynchronous hatching in altricial birds. One hypothesis suggests that hatching asynchrony is simply an accident of hormonal imbalance. The remaining 16 hypotheses suggest that the asynchrony is an adaptive strategy maintained through natural selection. Most widely considered is the Adaptive Brood Reduction hypothesis, which suggests that in the event of food shortage, the parents can rear the larger, older young. A modification of this is the High Quality Offspring hypothesis, suggesting that although parents of asynchronous broods may fledge the same number of young as parents of synchronous broods, at least some of the chicks from the asynchronous broods will be larger, hence of "higher quality" and more likely to survive. [Dept. of Genetics, Eotvos Univ., Budapest, Muzeum krt. 4/a., H–1088, Hungary.]—Jerome A. Jackson.

11. **Laying date, egg volumes and chick survival in Lapwing (*Vanellus vanellus L.*), Redshank (*Tringa totanus L.*), and Black-tailed Godwit (*Limosa limosa L.*).** Z. Hegyi. 1996. Ornis Hungarica 6:1–7.—Between 1988 and 1995, Lapwings, Redshanks, and Black-tailed Godwits were studied in Kiskunsagi National Park, Hungary, where annual fall flooding of meadows created good early successional feeding and nesting habitat by spring. Nesting of Lapwings and Redshanks began in early March, with Redshank laying reaching a peak during late March and Lapwing laying peaking during early April. Black-tailed Godwits began nesting in late March, peaking in late April. Egg volume was less for replacement clutches of all species, but increased with the length of time between loss of the first clutch and initiation of the replacement clutch. Egg volume was also greatest for those clutches laid during the peak of egg-laying and less for both early and late clutches. A positive correlation was found between egg volume and chick hatching weight for all species. Mean interval between loss of the first clutch and laying of a second clutch was 17 days for Lapwings and Redshank, and 20 days for Black-tailed Godwits. Mean incubation periods were: Lapwing, 27.76 g; Redshank, 25.61 g; and Black-tailed Godwit, 28.54 g. [Dept. of General Zoology, Eotvos Univ., H-1445, Pf/330 Budapest, Puskin u. 3, Hungary.]—Jerome A. Jackson.

12. **Breeding biology of the Lapland Longspur *Calcarius laponicus*, Horned Lark *Eremophila alpestris* and Snow Bunting *Plectrophenax nivalis* in the Arctic tundra of West-Taymyr (Siberia). [Brutbiologie von Spornammer Calcarius laponicus, Ohrenlerche Eremophila alpestris und Schneeammer Plectrophenax nivalis in der arktischen Tundra West-Taimyrs (Sibirien).]** D. Ehrich. 1997. Ornithol. Beob. 94:209–224. (German, English summary and figure and table captions.)—The nesting biology of these three species, studied along the western coast of the Taymyr peninsula of Siberia, was similar to other Arctic locations. The breeding densities of Snow Buntings was 9.4 pair/km^2, for Horned Larks 4.3 pairs/km^2, and 3.8 pairs/km^2 for Lapland Longspur. All three species began nesting in the last half of June as soon as there was snow-free locations available. The nestling period coincided with the peak availability of arthropod prey. Insects and collembola were the primary prey, but spiders were also taken. Nest success was lower for Snow Buntings (0.13 Mayfield estimate) and Horned Larks (0.27) than for Lapland Longspurs (0.37) because of high ground pre-

dation rates. There was no significant difference in the rates of growth for the three species. The rates of growth were negatively correlated with age (i.e., older birds grew slower than younger birds) and positively correlated with air temperature. [Zoologisches Inst. der Univ. Basel. Rheinsprung 9, CH-4051 Basel, Switzerland.]—Robert C. Beason.

13. **Laying dates, breeding success and annual breeding of Southern Royal Albatrosses *Diomedea epomophora epomophora* at Campbell Island during 1964–1969.** S. M. Waugh, P. M. Sagar and D. Paull. 1997. Emu 194–199.—The authors examined various aspects of the breeding biology of Southern Royal Albatrosses and drew comparisons between them and the more thoroughly studied Wandering and Northern Royal Albatrosses (*D. exulans* and *D. e. sanfordi* respectively). The breeding cycle of Southern Royal Albatrosses in this study was 17–22 days behind the more northerly nesting Northern Royal Albatrosses. The 62% nesting success rate for this population is similar to the long-term success rate for that of Wandering Albatrosses. Egg mortality was relatively constant among years while nestling survival was quite variable; these data suggest that environmental conditions may have been more variable after hatching. Although two pairs of albatrosses were observed breeding during consecutive years, not previously observed in this species, the majority of pairs undertook nesting every other year. Mate fidelity among Southern Royal Albatrosses in this study was high, as it is with most petrel species. [NIWA P.O. Box 8602, Christchurch, New Zealand.]—Danny J. Ingold.

14. **Reproductive success of Grasshopper Sparrows in relation to edge.** J. M. Delisle and J. A. Savidge. 1996. Prairie Nat. 28:107–113.—Increasing fragmentation of habitat has resulted in higher densities of habitat edges in many areas. Recent research has suggested that nesting success for some passerines is lower near edges, particularly field-forest edges, due to elevated levels of predation and cowbird nest parasitism. However, most research has focused on forest-nesting birds, even though grassland birds are experiencing the greatest population declines of any group. To address this, the authors tested whether nest success differed for Grasshopper Sparrows with edge territories (at least 50% of the territory within 100 m of an edge) and those holding interior territories (less than 50% within 100 m of an edge). The study area consisted of Conservation Reserve Program (CRP) fields bordered by wooded fencelines, roads, and draws (the edges). Rather than monitor nests to measure success directly, the authors compared an index of nest success, based on behavioral cues. They found no difference in nest success between edge (n = 17) and interior (n = 14) territories. Of the 10 nests found, none was within 50 m of an edge; eight were >100 m from an edge. Grasshopper Sparrows appear to avoid edges, perhaps because of their evolutionary history, which included contact with edge-favoring Brown-headed Cowbirds. Since edge effects, such as elevated rates of predation and nest parasitism, rarely extend as far as 100 m from an edge, Grasshopper Sparrows seem to be free from the negative impacts of edges. However, their need to nest far from edges is difficult to meet in highly fragmented habitats; the authors recommend retaining fields of at least 20–40 ha. [Nebraska Game and Parks Commission, 2200 N. 33rd St., Lincoln, NE 68503, USA.]—Scott W. Gillihan.

15. **Protective association and breeding advantages of Choughs nesting in lesser kestrel colonies.** G. Blanco and J. L. Tella. 1997. Anim. Behav. 54:335–342.—Blanco and Tella tested the protective nesting association hypothesis, where a species of bird breeds close to an aggressive predator to reduce the likelihood of predation by a more dangerous predator, by studying solitary Choughs (*Pyrrhocorax pyrrhocorax*) breeding within or outside Lesser Kestrel (*Falco naumanni*) colonies. Twenty-seven predator species predate both Choughs and Lesser Kestrels, but Lesser Kestrels do not prey on Choughs. A clear selection by Choughs for Lesser Kestrel colonies was found during both years (1993 and 1994) of this study. Choughs breeding within Lesser Kestrel colonies had higher breeding success than Choughs not breeding within Lesser Kestrel colonies. This higher breeding success may be due to nest defense by kestrels. When presented with a stuffed Eagle Owl (*Bubo bubo*), kestrels were more efficient at detecting and attacking the owl than were Choughs. In addition, Choughs may benefit by diluting the risk of predation by nesting in colonies with kestrels. As colony size increased, the percentage of predated nests decreased. [Departmento de Biologia Animal, Universidad de Alcala de Henares, 28871 Alcala de Henares, Madrid, Spain; e-mail: bnjps@bioani.alcala.es.] —Jeffrey P. Duguay.

16. **Infanticide in Great Reed Warblers: secondary females destroy eggs of primary females.** B. Hansson, S. Bensch, and D. Hasselquist. 1997. Anim. Behav. 54:297–304.—Female–female aggression may be the result of conflict over male parental investment in polygynous systems. In Great Reed Warblers (*Acrocephalus arundinaceus*), the predation rate of primary females' nests during incubation has been shown to be higher than that of secondary females. Secondary females may get increased male assistance if they destroy the nest of the primary female on their male's territory. The authors conducted an artificial nest experiment using plasticine eggs that matched Great Reed Warblers eggs in color, size, and pattern to create a situation in which a female Great Reed Warbler settling on a territory would find herself in a territory with a more advanced nest. If female Great Reed Warblers commit infanticide to monopolize male parental care, then the artificial nests should show signs of infanticide. It appears as though female Great Reed Warblers in the population studied do commit infanticide by destroying eggs of other females. Using a reference collection of peck marks, it was determined that predation by small-billed birds (likely to be Great Reed Warblers) was more common in territories occupied by a male than in unoccupied territories. This was not the case with large-billed predators. Also, predation by small-billed predators was significantly associated with arrival of a female in the experimental territory and the probability of predation was higher when the arriving female had previous breeding experience than when she did not. [Correspondence: S. Bensch, Dept. of Animal Ecology, Ecology Bld., Lund Univ., S-223 62 Lund, Sweden; e-mail: staffan.bensch@zooekol.lu.se.]—Jeffrey P. Duguay.

17. **Effect of brood mixing on location and survivorship of juvenile Canada Geese.** A. J. Nastase and D. A. Sherry. 1997. Anim. Behav. 54:503–507.—Nastase and Sherry observed 25 broods of Canada Geese (*Branta canadensis*) to determine if predation rates decreased on the natural goslings of the adopting adults by adding adopted offspring to their brood. Goslings were marked within 24 h after hatching and returned to the nest. Of the 25 broods observed, 7 were mixed, 2 were unmixed and had only adopted goslings, and 16 were unmixed with only natural goslings. Although not significant, adopted goslings tended to be further from adults than natural goslings. Natural goslings in mixed broods survived longer than either adopted or natural goslings in unmixed broods. Nastase and Sherry thus concluded that adopting goslings may increase the reproductive success of adoptive parents by enhancing the survival of their natural offspring, results consistent with the selfish herd effect. [114 Weyandt Hall, Indiana Univ. of Pennsylvania, Indiana, PA., USA; e-mail: tnastase@grove.iup.edu.]—Jeffrey P. Duguay.

18. **Polygynous male starlings allocate parental effort according to relative hatching date.** M. Bruun, M. I. Sandell, and H. G. Smith. 1997. Anim. Behav. 54:73–79.—In many bird species polygynous males do not invest equally in parental care of all broods, but often invest predominantly in the primary female's brood. To investigate whether polygynous males invest in a predetermined way or are sensitive to changes in the relative age of broods, the authors studied male investment in the facultatively polygynous male European Starling (*Sturnus vulgaris*) by switching the order in which primary and secondary female's clutches hatched. Clutches of the primary and secondary female were switched 3 days before the primary female's clutch was expected to hatch. Seven trios (1 male and 2 females) were manipulated and 6 additional trios were used as controls. Males allocated more of their incubation effort to the primary female's clutch for both the control and experimental birds. Males invested more in first hatched broods irrespective of whether it was the primary or secondary female's brood. The authors suggest that males use the hatching order of the broods as a cue to determine the relative reproductive value of the brood, with first hatched broods having the highest probability of recruiting young. [M. I. Sandell, Ecology Bld., S–223 62 Lund, Sweden; e-mail: maria.sandell@zooekol.lu.se.]—Jeffrey P. Duguay.

19. **Copulation and mate-guarding patterns in polygynous European Starlings.** R. Pinxten and M. Eens. 1997. Anim. Behav. 54:45–58.—To increase certainty of paternity, copulations should occur at the time of day when chances of successful fertilizations are highest. The insemination window hypothesis predicts a switch from copulation occurring at all times of the day prior to the first ovulation, to copulations occurring primarily after oviposition during the egg-laying period. Pinxten and Eens examined the timing and frequency of cop-

ulation and mate-guarding behavior during the fertile period in relation to day of first ovulation and time of day in the European Starling (*Sturnus vulgaris*). All within-pair solicitations were female-initiated. During the ovulatory period, copulation rates did not differ between the early and late morning (when female starlings are most fertile) although solicitation rates were significantly higher in the early morning (when females are less fertile). The authors suggested males refused more copulations during the early morning than during the later morning to try to take advantage of a putative insemination window. Mate guarding appeared to deter extra-pair copulation attempts; extra-pair copulation attempts occurred only when the male mate was away. [Dept. of Biology, Univ. of Antwerp, U.I.A., Universiteitsplein 1, B-2610 Wilrijk, Belgium; e-mail:eens@uia.ua.ac.be.]—Jeffrey P. Duguay.

HABITAT USE AND TERRITORIALITY

(see also 1, 2, 3, 6, 12, 14, 24)

20. **Relationship of riparian reserve zone width to bird density and diversity in southeastern British Columbia.** T. A. Kinley and N. J. Newhouse. 1997. Northwest Science 71:75–86.—Forest management guidelines in the U.S. and Canada mandate a protected zone of riparian forest along streams adjacent to timber cuts. Within this zone little or no harvesting can occur, in order to maintain water quality, and recreational and wildlife values. Several studies have demonstrated a positive relationship between riparian corridor width and bird species density and diversity, while other studies have failed to find such a relationship. The authors examined the relationship for birds in the montane forest of British Columbia. They compared the bird communities between riparian and upland forest in unlogged areas, and between three width classes of protected riparian zones adjacent to clearcuts: wide, medium, and narrow, with average widths of 70, 37, and 14 m, respectively. Species richness was similar for riparian and upland forest, but species diversity, equitability, and bird density were higher in the riparian forest, even though this forest covered less area. Among riparian zone widths, species diversity and equitability did not differ. Total bird density was positively correlated with zone width, although density calculations for the medium and narrow zones included bird counts in the clearcuts, where density is typically much lower than in forested areas. The authors concluded that riparian forests in this area support disproportionately high bird abundance and diversity, and they recommend that protected zones should be wider than the current minimum, with zone width based on the extent of riparian habitat rather than a set width for all streams. [Sylvan Consulting, Box 249, Invermere, British Columbia, V0A 1K0, Canada.]—Scott W. Gillihan.

ECOLOGY

(see also 4, 6, 9, 10, 14, 15, 20, 28, 29, 30, 31, 33)

21. **Ecological differences in social learning between adjacent, mixing, populations of Zenaida Doves.** P. Carlier and L. Lefebvre. 1997. Ethology 103:772–784.—Social learning of novel food types correlates with ecological context. Species that defend intraspecific feeding territories but feed socially with heterospecifics are more likely to learn to exploit novel food sources from a heterospecific tutor than from a conspecific tutor. Species that feed in conspecific flocks without heterospecifics are more likely to learn to exploit novel food sources from a conspecific tutor than from a heterospecific tutor. This study examines social learning in a population of *Zenaida* Doves that exhibit a mixed feeding strategy. In this population, individuals normally defend intraspecific feeding territories and feed socially with heterospecifics (mainly Carib Grackles). However, when food resources become ephemeral and abundant they will feed in conspecific groups. The study is divided into 3 parts. The first part demonstrates the facultative nature of social feeding in this population by demonstrating intraspecific territoriality and heterospecific feeding associations during unprovisioned observation periods and by demonstrating conspecific feeding associations when additional food was provisioned. The second part of the study tests the ability of captive individuals from this population to learn a novel feeding task from either a conspecific or a heterospecific tutor. Consistent to predictions these birds were equally likely to learn the task from either conspecific or heterospecific tutors. This differs from earlier data collected from other

populations of *Zenaida* Doves that were either entirely territorial and fed with heterospecifics or fed entirely in conspecific groups. In those cases, birds from populations with heterospecific associations learned a novel feeding task more readily from a heterospecific tutor. Those birds from a population that formed conspecific groups learned the task more readily from a conspecific tutor. The third portion of this study was designed to determine whether it was possible that social learning strategies could have a genetic component. Marked individuals from the mixed feeding strategy population and an adjacent population that fed only in conspecific groups were observed to determine whether any mixing of populations occurred. About 4 percent of the marked birds were observed to disperse between the populations. It is concluded that this level of mixing among populations is sufficient to refute the possibility that social feeding strategies have a strong genetic basis. Thus social feeding strategies are probably learned; a mechanism, which should impart plasticity to feeding behavior and allow populations to modify social feeding strategies according to changes in resource distribution. [Department of Biology, McGill Univ., 1205 Avenue Doctuer Penfield, Montreal, Quebec, H3A 1B1, Canada.]—Jeffrey G. Kopachena.

22. **Ecology of wading birds.** H. Hafner. 1997. Colon. Waterbirds 20:115–120.—This second paper in the "Wading Birds: Advances in Knowledge Since 1976" section of *Colonial Waterbirds* focuses on colony site and feeding habitat requirements during nesting, and feeding ecology during the non-breeding season. Colony sites are of particular importance to colonially nesting birds because the loss of a single nesting site may have an effect on an entire population segment. Much is known about the nest-site requirements of wading birds (Ciconniiformes) but feeding area requirements are still poorly understood. The author suggests that what is needed are more interdisciplinary programs which integrate studies of hydrology, botany, prey analysis and wading bird foraging. Some studies at the landscape scale have been done which relate feeding areas to numbers of nesting birds. For example, it has been demonstrated that area and quality of freshwater habitat is a major factor limiting the size and diversity of herons nesting in the Mediterranean area, and that heron species diversity is related to wetlands diversity. The author suggests that despite the research efforts of the past 20 years a number of areas remain problematic, including why mixed species nesting is so common in colonially nesting waders, the relative costs and benefits of colonial nesting, and the validity of the information center hypothesis in wading birds. He suggests that an understanding of the ecological requirements of waders outside of the breeding season is important because, for many species, populations may be limited by non-breeding season dynamics. Gaining the necessary understanding will require studies of individually marked birds. This somewhat European-focused review should be of interest to anyone studying colonially breeding wading birds. [Station Biologique de la Tour du Valat, Le Sambuc, F–13200, Arles, France.]—William E. Davis, Jr.

POPULATION DYNAMICS

(see also 20, 29, 30, 31)

23. **Demographic studies of wading birds: an overview.** F. Cezilly. 1997. Colon. Waterbirds 20:121–128.—In this review, the third in the series "Wading Birds: Advances in Knowledge Since 1976," the author discusses the essential features of the demography of wading birds (Ciconiiformes) and their relationship to conservation. He also considers the shift which occurred during the last 20 years from estimating demographic parameters to testing hypotheses which influence them. The author particularly emphasizes that adult survival, not fecundity, is of primary importance in population dynamics and the consequent importance of quantifying adult survival rates in wading bird populations. Other factors deserving attention include dispersal, recruitment, and age of first breeding. New statistical methods are available for assessing recruitment in populations of individually marked birds. Measurements of breeding success should consider fledgling quality (body condition) as well as fledgling numbers, and the relationship of chick quality to habitat parameters. The author suggests that the fruitful future study of all of these parameters will depend on long term studies of populations of banded birds, supplemented in some cases with the use of genetic markers to assess gene flow among colonies. Such studies are underway in Europe and badly needed elsewhere to provide the information necessary to develop sound models of population dy-

namics for wading birds. This review has a European bias but its assessments are applicable world-wide. [Laboratoire d'Ecologie, Universite de Bourgogne, Btiment Mirande, BP 400, 21011, Dijon Cedex-France; e-mail: fcezill@u-borgogne.fr.]—William E. Davis, Jr.

24. **Successful restoration of the Ice Island Common Tern colony requires on-going control of Ring-billed Gulls.** H. Blokpoel, G. D. Tessier and R. A. Andress. Colon. Waterbirds 20:98–101.—A substantial increase in Ring-billed Gull (*Larus delawarensis*) populations since the 1960s in the Great Lakes region and upper St. Lawrence River has led to the gull usurpation of traditional nesting sites of Common Terns (*Sterna hirundo*). The authors report on the fate of a tern colony on Ice Island (0.17 ha) in the St. Lawrence River, Ontario, Canada. Common Terns nested on the island from 1973–1988 with increasing numbers of nesting gulls. By 1988 there were 61 pairs of terns and 81 pairs of gulls nesting, and by 1989 181 pairs of nesting gulls and no terns. In order to reestablish the tern colony, from 1990–1993, an intensive gull control campaign included gull exclosures of monofilament lines and destruction of gull nests and eggs, and tern decoys were used as a tern attractant. By 1993, 135 pairs of terns nested and all gull nests were destroyed. From 1994–1996 gull exclosures were not installed and destruction of gull nests was incomplete or not attempted. In 1996 200–300 gull nests were present but only three tern nests. The authors conclude that ongoing gull control would be required to maintain the tern colony. This is very labor intensive since daily visits are required to maintain exclosures and remove entangled birds. The authors expressed the hope that local citizens would become involved in the long-term maintenance of the tern colony. This paper demonstrates the successful reestablishment of a tern colony through gull control, but also demonstrates the ephemeral nature of the colony once control measures are relaxed, and hence the long-term nature of human commitment to such a project. [Canadian Wildlife Service, Ontario Region, 49 Camelot Dr., Nepan, Ontario, K1A 0H3, Canada.]—William E. Davis, Jr.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 28, 29, 30, 31)

SYSTEMATICS AND PALEONTOLOGY

(see also 23, 32)

25. **Advances in iconiiform systematics 1976–1996.** F. H. Sheldon and B. Slikas. 1977. Colon. Waterbirds 20:106–114.—This is the first of 5 papers from the symposium "Wading Birds: Advances in Knowledge Since 1976" published in this issue of *Colonial Waterbirds*. The authors point out that in the late 1970s the question of whether the order Ciconiiformes was a "wastebasket" for "long-legged, long-necked, and long-billed" wading bird families that might be more closely related to birds in other orders than to each other, was unresolved. They describe the mid-1970s as the beginning of a new era in systematics with the ascendence of the cladists and the development of comparative molecular methodologies. In the 1980s the molecular methodologies, combined with new computer technologies, and the emergence of the field of historical ecology all led to the substantial advances in knowledge. Nevertheless, progress has not been as great as might be expected. Although it is clear that the classical Ciconiiformes is not monophyletic, much remains to be learned at the ordinal level. The authors review earlier hypotheses regarding the possible relationships of Ciconiiformes members with Charadriiformes, Gruiformes and Pelicaniformes, in the light of recent molecular work. One finding born from this comparison is that Shoebills and pelicans are probably sister taxa. Intergeneric relationships are well understood for storks, but are less understood for herons, ibises, spoonbills and flamingos. More information on the relationships among closely related species is required for all of these groups. Intrafamilial relationships of ibises and spoonbills, herons and flamingos are considered and diagrams of the phylogenies based on DNA hybridization of all but flamingos are included. The authors suggest that during the last 20 years many of the simpler problems have been solved (e.g., most basic branching structures of stork, ibis, and heron genera) but that problems still persist (e.g., at the ordinal level and with uncommon or enigmatic taxa). They conclude with the optimistic assessment that the challenges ahead are clear and the methods to meet them are available. This is a clearly presented assessment of some difficult problems in sys-

tematics. It should be read by anyone interested in ciconiiforms or their evolution. [Museum of Natural Science, 119 Foster Hall, Louisiana State Univ., Baton Rouge, LA 70803, USA; e-mail: fsheld@lsuvm.sncc.lsu.edu.]—William E. Davis, Jr.

EVOLUTION AND GENETICS

(see also 1, 25)

PHYSIOLOGY AND DEVELOPMENT

26. **Visual pigments and oil droplets from six classes of photoreceptor in retinas of birds.** J. K. Bowmaker, L. A. Heath, S. E. Wilkie, and D. M. Hunt. 1997. Vision Res. 37:2183–2194.—Despite the amount of "conventional wisdom" to the contrary, little is known about the avian visual system, especially color vision. Modern birds have one of the most elaborate mechanisms at the retinal level for color vision of the vertebrates. The cone photoreceptors contain colored oil droplets located in the inner segment that act as filters for the light before it reaches the photopigments in the outer segments. This paper is the latest in a series by Bowmaker and his coworkers on avian color vision and contains details on the Budgeigar (*Melopsittacus undulatus*) and the zebra finch (*Taeniopygia guttata*) as well as some additional information on retina cones of the Homing Pigeon (*Columba livia*) and the chicken (*Gallus gallus*). The Budgerigar and finch contain four, spectrally distinct classes of single cones with photopigments having peak spectral sensitivities at 565, 507, 430–445, and 360–380 nm. The first three cone classes contain colored oil droplets that act as low-pass filters (i.e., they allow light of longer wavelengths to pass) with cut-offs of 570, 500–520, and 445 nm, respectively. The UV receptor contain an oil droplet that was transparent to visible and UV (at least to 350 nm) light. The results of the oil droplets combined with different pigments results in individual cone receptors being narrowly tuned to specific wavelengths of light. Both species also had double cones. Both members of the double cones contained the long wavelength sensitive pigment, but only the principal member contained an oil droplet, with a cut-off of about 420 nm. The rods of all four species contained pigments that were spectrally similar, with a peak absorbance of 506–509 nm. Both the Budgerigar and Zebra Finch had similar patterns of photoreceptor distribution, but the Budgerigar retina contained more rods than the zebra finch. The greater proportion of rods may be the result of the crepuscular activity cycle of the Budgerigar which tends to be active in the cooler parts of the day. These types of data on the sensory capabilities of birds are needed to examine many of the current ideas on the role of plumage coloration on mate choice. For example, mate choice in the Zebra Finch has recently been shown to be based at least partly on ultraviolet vision (Bennett et al. 1996. Nature (Lond.) 380:433–435). In addition to mate selection, color vision is important in food choice, detection of food items contrasting with their backgrounds, and many other avian behaviors. The results of these and previous experiments show that there is a great deal of variability between species for both the photopigments and the oil droplets. There are not enough data to make any generalizations. For example, there are only two species of Passeriformes for which there are any published data. Clearly, much remains to be learned about avian color vision. [Dept. of Visual Science, Institute of Ophthalmology, Univ. College London, Bath St., London EC1V 9EL, U.K.]—Robert C. Beason.

PLUMAGES AND MOLT

(see also 36)

PARASITES AND DISEASE

27. **Patterns in the abundance of avian lice (Phthiraptera: *Amblycera, Ischnocera*).** L. Rozsa. 1997. J. of Avian Biol. 28:249–254.—Avian lice (Phthiraptera: *Amblycera, Ischnocera*) complete their entire life cycle on the body surface of birds, and transmission is highly dependent on direct body-to-body contact. The objective of this study was to determine whether body mass and sociality influenced louse abundance. Louse abundance, body mass, and sociality data were obtained from the literature. Data analyses included controls for host phylogenetic relationships. Louse abundance was significantly correlated with body mass, but not with sociality. Rozsa suggests three non-exclusive hypotheses to explain the correlation

between body mass and louse abundance: (1) larger host individuals provide larger habitat islands" for louse to inhabit, (2) larger birds have more refugia from which louse can escape the preening that limits louse population size, and (3) larger birds live longer, which increases the longevity of the "habitat islands" and may reduce the detrimental impacts associated with dispersal. The author notes that the general trend associating avian coloniality with high parasite loads may only be true for free-ranging ectoparasitic arthropods. [Dept. of Parasitology and Zoology, Univ. of Veterinary Science, H-1400 Budapest, P.O. Box 2, Hungary.]—Kerri T. Vierling.

WILDLIFE MANAGEMENT AND ENVIRONMENTAL QUALITY

(see also 14, 20, 24)

28. **Predation at nests of two New Zealand endemic passerines; implications for bird community restoration.** K. P. Brown. 1997. Pacific Conservation Biology 3:91–98.—The author suggests that predation by introduced mammal species is the main reason for the continuing population declines of many New Zealand birds, and that accurate estimates of predation are an essential part of the development of management strategies. This study investigated temporal and spacial patterns of nest predation on 12 pairs of North Island Robins (*Petroica australis longipes*) and 12 of North Island Tomtits (*P. Macrocephala toitoi*). Seventy-five nests were located and monitored by frequent visits and/or video or still camera with infra-red light sources. Some nests were exposed by clipping foliage. Excluding nest desertion caused by investigator disturbance, about 75% of nests were preyed upon, and about 75% of the predation was by rats (*Rattus rattus*), with the remainder by owls (*Ninox novaeseelandiae*). Only 12% of nests fledged young, and 9 adult females and 2 adult males were lost. There were no significant differences between predation at exposed and concealed nests, although there was evidence that naturally exposed nests at forest edges may be more vulnerable to avian predators. The high levels of predation by rats suggests that some robin and tomtit populations may require rat control management for continued survival. Most of the predation occurred early in the nesting cycle and hence early detection of nests is imperative for accurate estimates of predation rates. Accurate estimates of adult loss are also essential for determining the impact of predation on bird populations. The author concludes by emphasizing the need for comprehensive studies of predation that identify predators, produce accurate estimates of predation rates, and incorporate experimental manipulation of predator densities to establish minimum levels of predator control required to restore avian populations. This study was conducted for only one year and in one place, but the results suggest major nest-predator problems for these two species and should be of interest to those involved in avian conservation and management. [Ecosystems Consultants, P.O. Box 6161, Dunedin, New Zealand.]—William E. Davis, Jr.

29. **Restoration of New Zealand islands: redressing the effects of introduced species.** D. R. Towns. D. Simberloff, and I. A. Atkinson. 1997. Pacific Conservation Biology 3:99–124.—The authors begin this paper by describing what has happened in New Zealand since the arrival of humans 1000 years ago as an ecological collapse. They then detail the catastrophic loss of species, including a 40% extinction of the avifauna. Introduced mammals have been a particular problem. This review paper focuses on restoration attempts on islands, that because they have clear boundaries and reduced species richness, are more suitable for experiments in applied ecology than mainland settings. The authors discuss the effects of introduced plants, herbivores, and predatory mammals, especially cats (*Felis catus*) and rats (*Rattus exulans, R. rattus, R. norvegicus*). For example, on Herekopare Island cats exterminated large populations of breeding Diving Petrels (*Pelecanoides urinatrix*), prions, and 7 species of land birds. The paper also details the effects on introduced mammals on many groups of organisms other than birds. The authors discuss ecological theories that deal with restoration and introduced species, including "keystone species" (e.g., rats, cats), the "intermediate predator" hypothesis, ecological chain reactions, "invasive species," and disturbance effects. They discuss restoration in the broad context of re-establishing plant and animal communities, rather than simply the elimination of introduced species, and include restoration of mainland communities on islands (ex situ restoration) that often is aimed at protection of threatened species. Many unexpected problems have arisen during restoration

projects, including some described as "mysterious difficulties" including the failure thus far to establish self-sustaining populations of Stitchbirds (*Notimystis cincta*) and Kakapo Parrots (*Strigops habroptilus*). The authors distinguish between problems of restoration on continental shelf islands (recently connected to the mainland and therefore having largely "marooned" inhabitants) and oceanic islands which may have very limited species richness and differ substantially from mainland communities. Case histories for restoration attempts on continental shelf islands (Mercury and Cuvier Island groups) and an oceanic island (Mangere Island) detail the destruction caused by introduced species, the results of their removal, and various attempts at reintroducing extirpated species. The latter case history focuses on attempts to save the Black Robin (*Petroica traversi*). The authors discuss the New Zealand islands as uniquely suited to test hypotheses about the effects of disturbance and introduced animals, and the compelling reasons why restoration attempts should be continued.

This is a comprehensive review with nearly 200 references, and should be of interest to any conservation-minded biologist. [Dept. of Conservation, Private Bag 68 908, Newton, Auckland, New Zealand.]—William E. Davis, Jr.

30. **How secure is the Lord Howe Island Woodhen? A population viability analysis using VORTEX.** B. W. Brook, L. Lim, R. Harden, and R. Frankham. 1997. Pacific Conservation Biology 3:125–133.—The Lord Howe Island Woodhen (*Tricholimnas sylvestris*) is a flightless endemic rail which was reduced to less than 10 breeding pairs by the 1970s due to hunting, habitat destruction, and introduced predator. In the recovery initiative the last 3 breeding pairs became part of a captive breeding program, and feral pigs were eradicated. About 90 captive-bred birds were released and the population subsequently recovered and stabilized at about 200 individuals. Future threats to the population include cyclones, disease, effects of global warming, habitat loss, and new exotic plants and animals. The authors examined the effects of potential future threats on the woodhen population by making a Population Viability Analysis using VORTEX Version 7.0, a computer package that accurately predicted the woodhen's population history from 1980–1994. The severity of simulated threats was derived from a literature review and consultation with relevant experts, and inbreeding effects were simulated by altering birth and death rates. The results indicated that with no future changes the probability of extinction was 2% in 100 years, and 21% in 1000. However, a 5% rise in mortality increased the probability of extinction to 94% in 100 years. The authors concluded that the woodhen is in danger of extinction from minor changes in mortality or reproduction, and that the threat of extinction may be underestimated because future threats were examined independently and thus did not calculate potential interactive effects. They suggest that the most effective management strategy would be to establish a second population of woodhens by translocation to another island, and present reasons why the woodhen could still be considered an endangered species. [Key Centre for Biodiversity and Bioresources, School of Biological Sciences, Macquarie Univ., NSW 2109, Australia.]—William E. Davis, Jr.

31. **Translocation of the Palila, an endangered Hawaiian honeycreeper.** S. G. Fancy, T. J. Snetsinger and J. D. Jacobi. 1997. Pacific Conservation Biology 3:39–46.—The authors report on an experimental translocation of Palila (*Loxioides bailleui*), a species exhibiting strong site fidelity and hence limited dispersal capabilities in its mamane-naio dry woodlands habitat on the slopes of Mauna Kea volcano, Hawaii. The Palila's habitat is regenerating following feral ungulate control measures, and the aim of the experiment was to see if translocated birds would remain and nest, and hence colonize the site. The site was screened for the presence of avian malaria and pox, and was relatively low in mammalian predators. In March 1993, 35 color-banded Palila were released at Kanakaleonui, a site 20–35 km from where they had been captured. Eight birds remained at Kanakaleonui 4 months after translocation, and 4 pairs attempted to nest during the breeding season with two pairs fledging young. At east 16 birds returned to their capture site within a year. The authors conclude that translocation may be an effective method for establishing Palila in areas of regenerating habitat, but caution that additional habitat restoration and predator control will be necessary to ensure the long-term recovery of the species. [U.S. Geological Survey, Biological Resources Division, Pacific Island Ecosystems Research Center, P.O. Box 44, Hawaii National Park, HI 96718, USA; e-mail: sfancy@aloha.net.]—William E. Davis, Jr.

32. **Wading-bird science: A guide for the Twenty-first Century.** K. L. Bildstein. 1997

Colon. Waterbirds 20:138–142.—In the final paper from the symposium "Wading Birds: Advances in Knowledge Since 1976," the author suggests that up to the present time observational and descriptive studies of wading birds (Ciconiiformes) have dominated over experimental ones, and that wading bird scientists have not integrated their work into broader contexts of ecology and global conservation. Blidstein suggests that it will be important for wading bird biologists to form partnerships with researchers from other disciplines, and gives an example where, in his own work with ibises, partnership and experimental procedures combined to produce extended understanding of particular aspects of wading bird biology. He also suggests that integration of wading bird biology into broader contexts would be aided by presenting results at meetings of organizations such as the Animal Behavior Society, Society of Conservation Biologists and the Ecological Society of America, and publishing in their journals. Further, studies should be conducted at the appropriate spacial and temporal scale and take advantage of emerging technologies such as satellite telemetry and photography. Blidstein concludes with a challenge for wading bird biologists to be more innovative and experimental, i.e., take risks and expand the scope of their efforts. However, he adds that natural history studies will continue to be the basis for more complex research, and that new initiatives should compliment the more traditional methodologies. This is a thoughtful and well presented assessment of the present state of wading bird biology and directions for the future. [Hawk Mountain Sanctuary, 1700 Hawk Mountain Rd., Kempton, PA 19529, USA; e-mail: bildstein@say.acnatsci.org.]—William E. Davis, Jr.

33. **The conservation of wading birds.** J. A. Kushlan. 1997. Colon. Waterbirds 20:129–137.—This is the fourth paper from the symposium "Wading Birds: Advances in Knowledge Since 1976" published in *Colonial Waterbirds*. The author discusses the high visibility of wading birds (Ciconiiformes). Most live in or near wetlands along with much of the world's human population, and in North America the slaughter of these highly visible birds for the millinery trade was central to the founding of the conservation movement of the late 19th and early 20th centuries. However, despite the burst of early conservation enthusiasm and success, there was little improvement in censusing methods until the 1970s when surveys and censusing were begun on a continent-wide scale. Despite funding constraints, these efforts resulted in a data base comprehensive enough to chart regional and local shifts in the populations of several wader species. The interest in wader conservation has been world-wide, and has involved a number of organizations including the Ramsar Bureau, Wetlands International, Birdlife International and the Union for Conservation of Nature, all of which have contributed to the identification of critical wetlands and the production of action plans. Specialist groups for herons, ibises, etc., have contributed to the understanding of the biology and conservation needs of waders. Currently the areas of greatest concern are Asia and western Europe. Contaminants, especially pesticides, have been a concern and have promoted the idea that waders make good bioindicators of environmental conditions. Because of the colonially breeding nature of most waders, nesting sites have been an important conservation focus. Although in many parts of the world, government and private organizations are currently protecting many important sites, in other areas the economics associated with human population growth makes protection problematic. Future directions in wading bird conservation include scaling up research from local to landscape level, and integrating or expanding technologies such as mark/recapture, biochemical and genetic techniques. Action plans will continue to be important, and regional and cooperative biodiversity approaches involving a broad spectrum of organisms is the conservation mode of the future. This paper presents a valuable historical perspective for wader conservation and its future. [Patuxent Wildlife Research Center, 12100 Beech Forest Dr., Laurel, MD 20708–4039, USA.]—William E. Davis, Jr.

BOOKS AND MONOGRAPHS

34. **The Birds of Africa Volume V.** E. K. Urban, C. H. Fry and S. Keith, Eds. 1997. Academic Press, San Diego. CA. 669 pp, hardbound.—Two very good things have been happening to Africa in recent years. Democracy has slowly crept into the politics of several countries on the continent, and five of six volumes of *The Birds of Africa* (*BOA*) have been published. Political liberalization is beyond the scope of this review, but I will dwell on The

Birds of Africa on my celebration of the continuation of this fine handbook with the eminent release of *BOA Volume V.*

The present volume covers true thrushes, Old World warblers, Old World flycatchers, paradise-flycatchers, monarchs, shrike-flycatchers, wattle-eyes and batises. With notable exceptions (e.g., the gaudy paradise-flycatchers), this book concerns many uncharismatic, superficially dull species (over 77 pages and five plates devoted to the notorious warbler genus *Cisticola* alone), and a perusal led me first to realize what a great labor of love this series is for the dedicated editors and authors. The information herein is voluminous; to say it was difficult to compile, synthesize, and edit must be an understatement. Even brief accounts for obscure species such as Dorst's Cisticola (*Cisticola dorsti*) contain interesting and vital information on appearance, habitat and vocalizations, and such information is given in generous amounts for such species as the common and widespread Olive Thrush (*Turdus olivaceus*). The result of the *BOA* team's hard work is a beautiful, informative and ultimately very useful book.

Families and genera are introduced with a few paragraphs, and maps often illustrate ranges for superspecies at the beginning of a genus. Authors included periodical literature through late 1995 (occasionally 1996) for inclusion in species accounts, which are arranged to cover the following topics: range and status, description, field characters, voice, general habits, food, and breeding habits. Information on many species of African birds continues to be sketchy, but it appears the authors of *BOA*'s species accounts have done an excellent job of drawing together available data to create coherent and interesting yet concise accounts for many birds. A couple of large pages is the size of a standard entry. Some little known species occupy less than a page, while the well-known may be given four.

If you have ever attempted to identify flycatchers in the genus *Muscicapa* in West Africa using Serle et al. (1977. A Field Guide to the Birds of West Africa. Collins, London.), you know the importance of the depiction of all these species together for comparison. The plates appear to be consistently high in quality, depicting plumages of different sexes and ages and many subspecies. Some plates appear artfully arranged and pleasing to the eye (e.g., Plates 6 and 19), while a few employ Peterson's regimentation of posture for comparison of similar plumages, and seem crowded and more utilitarian as a result (e.g., Plate 2).

The range maps continue to evolve from the rudimentary ones of the first volume, with the addition of red to illustrate breeding ranges. This is the only stylistic change of note for *BOA Volume V.* Authors have done an admirable job with most of the range descriptions and maps, considering the immensity of the task and the gaps in knowledge that must have frustrated them.

My only criticism is occasional lack of attention to incorporating available range information, or perhaps not making map and text information jibe. To illustrate, Grimes (1987. *The Birds of Ghana.* British Ornithologists' Union, London) describes the range of the Black-and-white Flycatcher (*Bias musicus*) as follows: "Not uncommon resident of forest edge, clearings and thickets along streams within forest zone. Regular at Akropong and Weija, also occurs Mampong in Ashanti, Kumasi and occasionally inselbergs on Accra Plains and Jukwa." Urban et al. modify this to "Forested areas of . . . Ghana (not uncommon, Accra Plains, Akwapim hills and Jukwa, north to Mampong, Ashanti and Kumasi) . . ." Note that the species goes from occasional on the several high inselbergs on the Accra Plains and at Jukwa to not uncommon there. Also, Ashanti is changed to a place name in between Mampong and Kumasi (in fact, Mampong and Kumasi are both in the Ashanti Region). In the range map, the species was not shown as occurring on the Accra Plains at all. It was also not shown to occur at Kumasi, Ashanti, Mampong, or the Akwapim Hills on the map. I will qualify this criticism by saying that Ghana is but one medium-small country on a big continent, and that the artist shows the Black-and-white Flycatcher as roughly occurring in the forest zone of Ghana, but I think that a better job could be done at depicting the ranges of species (at least for Ghana!), given the information available.

I propose that, after dousing one another with champagne upon publishing the final volume, Fry, Keith and Urban should undertake a complete revision of the range maps, to be published as an addendum. Much new information has come to light since the first volume was published, and this revision would afford the opportunity to correct errors and

omissions made in the range maps to date. Such an addendum would prove a very useful stand-alone publication, indispensable for a trip to the motherland!

Given the species that it covers, most sales of *BOA Volume V* will be to those already possessing one through four. It is difficult to imagine none but a stingy studier of sylviid species buying this volume along. If I have sparked your interest in this series for the first time, I strongly recommend your taking the plunge and investing in the first four splendid volumes as well as the fifth. *BOA* Volumes I to III are still available, and can be had for less than $100 each; Volume IV sells for less than $150.00, and Volume V will cost about the same (shop around if you are asked to pay more). More than most books in my collection, I continue to turn to these volumes for the multiple pleasures they offer. I hope you will treat yourselves to the same joys by purchasing all five volumes of *BOA*.—Malcolm F. Hodges, Jr.

35. **A Birder's West Indies.** R. H. Wauer. 1996. Univ. of Texas Press, Austin, TX. 238 pp. ISBN 0-292-79101-1. $19.95, paper.—This book chronicles visits to almost every island in both the Greater and Lesser Antilles, and offers a brief chapter with general tips on visiting this ornithologically fascinating and important area. Wauer also discusses the concept of endemism and why it occurs in such profusion here. One of the most useful features is a table listing the West Indian endemics by the islands on which each occur. This table is very complete and one can tell at a glance which species are restricted to only one island, only a couple or many. The only fault with this table is that it does not fully cover species also found in the Bahamas, such as the Olive-capped Warbler (*Dendroica pityophila*), listed as a Cuba-only endemic. While not a classic site guide (few specific directions are given other than general areas on each island), this is an engrossing and educational journal of both the flora and fauna of each island. Specific ecological concerns for each island are addressed, as well as some of the successes in this area. Unique features are discussed by island, in Wauer's always-interesting style. The endemic species are given the greatest attention, with species bolded in the text where first mentioned. This means that some species may not be highlighted at the first island where they occur if not mentioned in that island's text, so double-check the endemic table if planning a visit to a particular island. The descriptions of the habitats, other animal life and the birds really make the reader feel a part of the journey, and will certainly spur an interest in visiting this wonderful area. The endemism discussion alone would make the book worth obtaining, but the travel tips and individual island coverage make this book a required one for anyone interested in the West Indies.—Giff Beaton.

36. **Hybrid Ducks.** E. Gillham and B. Gillham. 1996. Published by the authors, P.O. Box 563, Wallington, Surrey SM6 9DX, England. 88 pp., 53 color photos, 3 black-and-white photos.—The accumulation and maintenance of living collections of waterfowl from around the world on large estates has led to greater understanding of Anatid biology and often major conservation efforts. It has also, usually, but not always, unintentionally, reconfigured Anatid biogeography. It has also set in motion some intended and unintended experiments with Anatid species limits.

In this small book, the Gillhams have assembled documentation for numerous instances of hybridization between and among Anatids. Some hybrids are the documented products of crosses involving three to five species! The authors examined and photographed both living birds and preserved specimens. Most of the photos are of excellent quality and of living birds. For captive birds the text often describes details of various plumages, use of the plumage in displays, and other aspects courtship behavior. Good discussion emphasizes the need for better documentation of hybrids. While emphases are placed or the authors own collection and on specimens and other collections from Britain and Europe, coverage is worldwide and the bibliography provided is excellent.

This is obviously an area of considerable interest. While reviewing this book, two journals arrived with further additions to the literature on duck hybrids (Jorgensen, J. G. 1997. Two hybrid diving ducks at Cunningham Lake, Douglas County. Nebraska Bird Review 65:135–136; and Montgomery, R. A. 1997. Comments on the parentage of a hybrid goose. Meadowlark 6:58–59). Both articles included further literature references not included in the Gillham's book—a fact resulting from the frequent publication of such notes in less available state or regional journals. It is good to have a review such as "Hybrid Ducks" to bring such references together.—Jerome A. Jackson.