J. Field Ornithol., 65(1):135–148

RECENT LITERATURE

Edited by John A. Smallwood

RESEARCH TECHNIQUES

1. Compositional analysis of habitat use from animal radio-tracking data. N. J. Aebishcer, P. A. Robertson, and R. E. Kenward. 1993. Ecology 74:1313–1325.—In the old days, radio tracking involved bulky, heavy collars attached to large, dangerous mammals. In recent years, radio tags have grown smaller and more sophisticated. They have been attached to a great variety of birds, including passerines, such as the Wood Thrush (*Hylocichla mustelina*). Although the radio tags themselves are more sophisticated than ever, the statistical analyses of data from radio tags are often inadequate and/or inappropriate. In this article, the authors outline four common problems in analyzing radio-tracking data. After explaining these problems, they advocate a method of analysis that focuses on individual animals and the proportion of each type of habitat they use. They demonstrate this approach by analyzing radio-tracking data from Ring-necked Pheasants (*Phasianus colchicus*) and Gray Squirrels (*Sciurus carolinensis*). The authors determined home ranges and the rank-order of habitat preferences of the animals. They show how this approach deals with missing data, and suggest ways to use this approach to analyze questions ranging from age and/or sex differences in habitat use to effects of food abundance on home range size. Particular attention is given to making sure that the statistical analysis is appropriate for the question at hand (inappropriate pooling of data to inflate sample size is a common mistake in analyses of radio-tracking data). This densely-written article is not the easiest to read, particularly for those unfamiliar with statistical procedures like MANOVA or MANCOVA. However, the issues it deals with are important for anyone using radio tags, or anyone relying on conclusions from radio-tracking studies. [The Game Conservancy, Fordingbridge, Hampshire SP6 1EF, United Kingdom.]—Peter D. Smallwood.

BEHAVIOR

(see also 26, 32)

2. Preferences of female American Goldfinches (*Carduelis tristis*) for natural and artificial male traits. K. Johnson, R. Dalton, and N. Burley. 1993. Behav. Ecol. Sociobiol. 4:138–143.—There are many different approaches to the study of female mate choice in birds. Here, the authors group these diverse opinions into two general views: adaptive and aesthetic. Adaptive models assume that the male traits chosen by females indicate ecologically adapted males (i.e., "good genes" models). Aesthetic models do not assume that preferred male traits indicate ecological fitness; these traits may be preferred "simply because females find them attractive" (i.e., the initial stage of Fisherian runaway selection). The authors interpret female goldfinch preferences for naturally occurring male traits as evidence for the adaptive view, and preferences for artificial traits as evidence for the aesthetic view.

Preference trials were conducted with wild-caught goldfinches in an experimental aviary. The rectangular aviary was divided in half lengthwise by wire mesh. On one side of this division was the experimental female, while the other side contained four males, each in its own separate compartment. While the males could not see each other, the female could view each male, and perch near (or even contact, through the mesh) the male of her choice. After testing 33 female goldfinches with this trial procedure using several sets of males, the authors report a preference for males with brighter bills and brighter plumage. They cite other studies (some published, some unpublished) suggesting brighter bills and plumage indicate more robust males (e.g., successful foragers, lower parasite loads, higher dominance status). Thus, they conclude that these results support the adaptive view of female preferences. The authors conducted these experiments again, this time with males wearing either orange, yellow, blue, or no color bands. The authors found a significant preference for males with orange color bands. As this color does not quite match any colors naturally found on the birds, the authors count this as evidence for the aesthetic view of female preferences. [Ecology and Evolutionary Biology, Rice Univ., Houston, TX 77251, USA.]—Peter D. Smallwood.

3. Female preference for apparently symmetrical male sexual ornaments in the Barn Swallow *Hirundo rustica*. A. P. Motler. 1993. Behav. Ecol. Sociobiol. 32:371–376.—

The length of the outer tail feathers in Barn Swallows, which is negatively correlated with tail asymmetry, has been shown to be a reliable indicator of male phenotypic quality. The author conducted an experiment to test the effects of apparent tail asymmetry of male Barn Swallows (without altering aerodynamic properties of birds) on mate acquisition and reproductive success by painting the outer tail feathers with white correction fluid. Apparent tail asymmetry prolonged the duration of the premating period since it took males with the asymmetrical treatment significantly longer to acquire a mate ($P < 0.05$) than it did symmetrically-treated or control males. Both apparent tail asymmetry and tail length affected the timing of laying of female Barn Swallows in both first and second clutches. No statistically significant effects of the experimental treatments on clutch size, brood size at hatching, or brood size at fledging were detected in either first or second clutches. However, there were differences between groups in the tendency for females to lay two clutches. Females mated to control and symmetrical males laid a second clutch significantly more often than females mated to asymmetrical males ($P = 0.0001$). Moreover, male Barn Swallows with the asymmetrical treatment raised fewer offspring per season than symmetrical males which in turn raised fewer offspring than control males ($P < 0.05$). These data demonstrate that female Barn Swallows prefer males with symmetrical tail ornaments even when the symmetry properties of the tail have no effect on male flight maneuverability. [Dept. of Zoology, Uppsala Univ., Box 561, S-751 22 Uppsala, Sweden.]—Danny J. Ingold.

4. Natal philopatry in the Cory's Shearwater (*Calonectris d. diomedea*) on Lavezzi Island, Corsica. J-C. Thibault. 1993. Colon. Waterbirds 16:77–82.—This study was designed to see if gender related differences occur in the pattern of natal philopatry in Cory's Shearwaters. From 1978–1985 485 chicks were banded in subcolonies of a 225–440 pair colony on 66-ha Lavezzi Island, situated between Corsica and Sardinia. Twenty percent of banded birds were recaptured by 1991, of which ¾ were males (significantly different from the expected ratio). Males were recaptured prospecting (birds not yet associated with a breeding site) or breeding near their natal site more often than females, and more females changed subcolonies. Movement between subcolonies was highest to the subcolony with the highest number of fledglings/pair. Males returned to the colony and nesting burrows earlier than females, which may explain their location closer to natal nests, although greater male philopatry may be related to burrow defense.

This paper demonstrates the advantage in marking individual birds in long-term studies. [Parc Natural Régional de la Corse, rue Général Fiorella, B. P. 417, F-20184, Corsica, France.]—William E. Davis, Jr.

FOOD AND FEEDING

(see also 16, 32, 33)

5. Food and feeding ecology of breeding Silver Gulls (*Larus novaehollandiae*) in urban Australia. G. C. Smith and N. Carlile. 1993. Colon. Waterbirds 16:9–17.—Silver Gulls have dramatically increased in numbers in Australia during the last 50 years, and it is generally assumed that this has resulted largely from increased food availability at human refuse dumps. The authors examined the questions of whether gulls spent more time at landfill depots during the breeding season, and whether a proportional shift to natural foods correlated with breeding chronology or chick densities. During two breeding seasons (1988–1991) a study was made at Big Island, where 50,000 pairs nest, and at Whytes Gully landfill, which services the city of Wollongong, near Sydney. Counts of gulls flying to and from the landfill were recorded year-round and regurgitates collected during the breeding season at Big Island from adults and chicks. Gull counts were highest in the breeding season with a peak at 6800/hour leaving the landfill, with non-breeding season counts generally under 1000. Of 90 wing-tagged birds from Big Island, 72% were observed feeding at Whytes Gully, with a few birds making four visits per day. Only 15% of 467 regurgitates contained nonhuman refuse (natural) food. Meat constituted 63% of refuse food items. The percentage of natural food, however, correlated positively with chick numbers and was greatest in September when first eggs of the season were hatching. The authors suggest that this shift to natural foods can be explained by older, more experienced gulls, which are better hunters, nesting first. Presumably, the higher percentage of natural foods benefits the chicks. They

further suggest that human refuse is important because it enhances survival from fledging through the third year of life. If superabundant gull populations are to be controlled, access to landfills must be reduced.

This is a well written paper that should be of interest to anyone studying gulls or the problems of superabundant bird populations. [Environmental Survey and Research Branch, NSW National Parks and Wildlife Service, P.O. Box 1967, Hurstville, NSW 2220, Australia.]—William E. Davis, Jr.

6. Foraging ecology of Wood Storks (*Mycteria americana*) in east-central Georgia: 1. characteristics of foraging sites. M. C. Coulter and A. L. Bryan, Jr. 1993. Colon. Waterbirds 16:59–70.—Wood Stork populations have been declining in southern Florida, possibly due to water management practices, but increasing in northern Florida, Georgia, and South Carolina. From 1986–1989 192 individual Wood Storks from the Birdville colony near Millen, Georgia, were followed in fixed-wing aircraft until they landed and began to forage, and ground parties subsequently measured foraging habitat parameters (e.g., water depth, prey density; $n = 192$). Paired similar habitats with no foraging storks were sampled at 30 sites. Storks generally foraged in small groups (range 1–171, median 2, mean 6.3), and 86% of the sites were within 20 km of the colony. Storks showed a preference for ponds and marshes, sparse vegetation, and even in swamps preferred sites with less canopy. Wood Storks are tactile feeders and preferred still or slow-moving water with depths of 10–25 cm. Prey densities were generally low (median density 2.67 items/m^2) and evenly distributed. The prey densities were lower than in foraging areas of southern Florida, but prey were generally larger. There were few differences between used and unused sites, and the authors suggest that large areas of suitable habitat are unused, and that the small average size of foraging flocks may reflect this abundance of habitat with similar low prey densities. [Savannah River Ecology Lab., Drawer E, Aiken, SC 29802, USA.]—William E. Davis, Jr.

7. Response of insectivorous birds to emerging aquatic insects in riparian habitats of a tallgrass prairie stream. L. J. Gray. 1993. Am. Midl. Nat. 129:288–300.—The relationship between densities of insectivorous birds (flycatchers and gleaners) and the emergence of aquatic insects was examined at six sites along Kings Creek, Kansas, during three summers from 1987–1990. Mean net daily emergence production at the gallery forest sites was 10.6 g/reach and 2.5 g/reach at the prairie/shrub sites. The most important taxa included Chironomidae (53% of total emergence biomass at the forest sites and 94% at the prairie/shrub sites), Ephemeroptera, and Plecoptera. The Eastern Wood-Pewee (*Contopus virens*) was the most commonly observed flycatcher along Kings Creek (57% of all flycatcher sightings) and was seldom seen far from the stream channel. Great Crested Flycatchers (*Myiarchus crinitus*) and Eastern Kingbirds (*Tyrannus tyrannus*) also were observed, the latter only at prairie/shrub sites. The Black-capped Chickadee (*Parus atricapillus*) was the most abundant gleaner in the forest sites (54% of total gleaners recorded), while Common Yellowthroats (*Geothlypsis trichas*) were most frequently observed along the prairie/shrub sites (71% of total gleaners). The densities of insectivores in the gallery forest were highly correlated with insect emergence (gleaners, $r = 0.80$; flycatchers, $r = 0.89$), while flycatcher densities only were correlated with insect emergence in the prairie/shrub habitat ($r = 0.93$). Densities of both guilds decreased greatly in both habitats when the stream channel dried and emergence ceased. Direct feeding observations of both flycatchers and gleaners showed that a variety of both aquatic and aerial insects were taken. These data support the idea that emerging aquatic insects represent an important food source for insectivorous birds in riparian habitats of tallgrass prairies. [Dept. of Biology, Ottawa Univ., Ottawa, KS 66067, USA.]—Danny J. Ingold.

8. Harvest and food habits of waterfowl wintering in Sinaloa, Mexico. R. Migoya and G. A. Baldassarre. 1993. Southwest. Nat. 38:168–171.—During the hunting season from 30 October 1987 to 28 February 1988, the authors examined and quantified the esophageal contents of hunter-killed waterfowl on the upper mainland west coast of Mexico. At the larger of two study sites, the Santa Maria (133,200 ha), 10,447 waterfowl were retrieved by 564 hunters. When crippling-loss (16%) was accounted for, the total waterfowl hunting mortality for the season was estimated at 12,437 birds. Fifty-five percent of the

ducks harvested were Green-winged Teal (*Anas crecca carolinensis*) followed by Northern Shovelers (*A. clypeata,* 20%), Cinnamon Teal (*A. cyanoptera,* 9%) and Northern Pintails (*A. acuta,* 9%). The ducks at this location fed predominantly on natural foods with alkali-bulrush (*Scirpus maritimus*) the most frequently used item (33.5–78.2%) among the five most common species. Plant foods were consumed more than animal foods with chironomid larvae and gastropods being the most frequently selected animal foods. At the second study site, Pabellon (80,000 ha), nearly 7000 ducks were killed during 26 recorded days. When these data were extrapolated over the entire season and a 16% crippling loss was incorporated, an estimated 33,361 ducks were killed by hunters. Pintails were taken most frequently (31%), followed by Cinnamon Teal (22%), Green-winged Teal (15%), and Black-bellied Whistling Ducks (*Dendrocygna autumnalis,* 10%). Esophageal contents of ducks were not examined at this site. These data support the contention that the estimated annual number of waterfowl harvested in Mexico (130,600 to 168,516) is low compared to the United States and Canada, but the species composition of waterfowl harvested can become significant if dominated by species whose populations are declining. [Dept. of Zoology and Wildlife Science, Auburn Univ., Auburn, AL 36849, USA.]—Danny J. Ingold.

9. Food habits of nesting Common Ravens in the eastern Mojave Desert. R. J. Camp, R. L. Knight, H. L. Knight, M. W. Sherman, and J. Y. Kawashima. 1993. Southwest. Nat. 38:163–165.—Pellets from 39 active Common Raven (*Corvus corax*) nests located in California and Nevada were analyzed for food content. Forty-eight percent of the total weight of raven food items consisted of vertebrates, and mammals were the most important taxon in terms of weight and numbers of species consumed. Conversely, although reptiles were relatively unimportant by weight, they were found in 73% of the pellets. Iguanid lizards comprised 44.1% of the reptile food items, while desert tortoises (*Gopherus agassizi*) were found in pellets from only two nests. Invertebrates, represented mostly by ants and beetles, were found in 86% of all pellets, while human refuse (e.g., paper towels, aluminum foil) was found in 22% of the pellets (likely scavenged from garbage sites). Although the threatened desert tortoise was an infrequent prey item, this species may have been underrepresented by these data since tortoise parts may be highly digestible. [Dept. of Fishery and Wildlife Biology, Colorado State Univ., Fort Collins, CO 80523, USA.]—Danny J. Ingoid.

10. Diets of Ring-necked Ducks wintering on Catahoula Lake, Louisiana. M. S. Peters and A. D. Afton. 1993. Southwest. Nat. 38:166–168.—Catahoula Lake, a 12,000-ha wetland basin in central Louisiana, is an important wintering site for Ring-necked Ducks (*Aythya collaris*) that migrate along the Mississippi Flyway. The authors obtained food samples from 21 Ring-necked Ducks collected on this lake during the winter of 1990–1991. Plant material comprised 99.7% of the diet and tubers from chufa flatsedge (*Cyperus esculentus*) were the largest single component (55.2%). Other important food items included seeds from bearded sprangletop (*Leptochloa fascicularis,* 17.6%), tubers from common arrowhead (*Sagittaria latifolia,* 14.4%), and millet (*Echinochloa* sp.) seeds (11.7%). Chufa tubers are a high energy food source that likely facilitate fat production throughout the winter in Ring-necked Ducks, preparing them for the subsequent spring migration and breeding season. [School of Forestry, Wildlife and Fisheries, Louisiana State Univ., Baton Rouge, LA 70803, USA.]—Danny J. Ingold.

11. Ash-throated Flycatcher eats a *Cnemidophorus* lizard. M. A. Gurrola-Hidalgo. 1993. Southwest. Nat. 38:179.—The author reports a sighting from February 1984 in the Mexican state of Jalisco in which an Ash-throated Flycatcher (*Myiarchus cinerascens*) captured and almost completely swallowed a small lizard (*Cnemidophorus communis*; length = 65 mm, weight = 2.3 g) before being captured in a nearby mist net. The normal diet for this flycatcher consists mostly of insects and some fruits. The feeding behavior of this individual was likely an opportunistic response to the large number of small reptiles in the area, perhaps combined with a paucity of insects during this extreme drought year. [Inst. de Biologia, Dept. de Zoologia, Coleccion Ornithologica, UNAM. Ap. Postal 70-153, Del. Coyoacan, DF 04510, Mexico.]—Danny J. Ingold.

NESTING AND REPRODUCTION

(see also 3, 4, 5, 16, 21, 25, 27, 28, 32, 33)

12. Use of the Mayfield method to predict daily survival for Eastern Bluebirds in Jackson County, Michigan. T. M. Schmidt. 1993. Sialia 15:83–90.—Pairs of nest boxes placed 90 m apart were monitored on a weekly basis during six breeding seasons (1987–1992) in order to determine nest, egg, and nestling survival rates for Eastern Bluebirds (*Sialia sialis*). The percentage of nests that survived until at least one nestling was fledged ranged from 62.9% in 1989 to 91.7% in 1987, while overall survival probabilities (based on egg and nestling survival and hatching rate) ranged from 68.3% in 1992 to 96.9% in 1990. A mean overall probability of daily survival of 83.5% suggests that bluebird populations in this region are at the very least recovering. However, these data were almost certainly influenced by the availability of nest boxes that were protected from predators and parasites. In order to determine more precisely what effects these protections are having on the survival of the greater bluebird population, it will be necessary to establish trails that serve as strict control areas. [1251 White Oak West, Jackson, MI 49201, USA.]—Danny J. Ingold.

13. A successful, elevated Gambel's Quail nest in a suburban area. B. C. Thompson. 1993. Southwest. Nat. 38:174–175.—On 2 June 1991, a nest of a Gambel's Quail (*Callipepla gambelii*) with 15 eggs was discovered in a stack of alfalfa (*Medicago* sp.) bales in a residential area near Las Cruces, New Mexico. The nest was positioned 134 cm off the ground and 30 cm inside the nearest edge of the stack. The nest site was located near an occupied horse corral and two houses; several people and domestic dogs and cats lived in the immediate area. Despite the apparent vulnerability of this nest to human or animal disturbance, the site was active for about 40 days and on 24 June 11 eggs hatched. The elevated location of the nest may have afforded it protection from predation and demonstrates a notable instance of nest-site plasticity in this species. [U.S. Fish and Wildlife Service, New Mexico Cooperative Fish and Wildlife Research Unit, New Mexico State University, Las Cruces, NM 88003, USA.]—Danny J. Ingold.

14. Reproductive success of Least Terns in the Mississippi River valley. J. W. Smith and R. B. Renken. 1993. Colon. Waterbirds 16:39–44.—Traditional sandbar and sand island nesting habitat for the interior Least Tern (*Sterna antillarum*) has been drastically reduced in the Mississippi and Missouri River valleys by flood control and navigation projects. From 1986–1989 tern colonies were located and nesting success monitored along the Mississippi River in Missouri, Illinois, Kentucky, and Tennessee. Because of censusing difficulties related to the long breeding season and frequent renesting after nest failure, the authors calculated indices to estimate numbers of breeding pairs, fledging success, and other nesting parameters. Estimates for the four years ranged from 275–499 nesting pairs, with 0.2–1.4 (average 0.7) fledglings/pair. Factors which influenced reproductive success included predation by coyotes, raccoons, dogs, and American Crows (*Corvus brachyrhynchos*). When river levels were low all-terrain vehicles reached islands and caused nest failure and mortality. Natural flooding, however, was a greater cause of nest failure than all other factors combined, with up to 40% of 436 nests lost in 1989. Nevertheless, the reproductive rates in this area are better than in some interior Least Tern breeding areas and consistent with reports from others. The population appears to meet at least some of the goals set in the USFWS interior Least Tern recovery plan. However, the possibility of further deterioration of sand bar/sand island nesting habitat makes the situation precarious. The authors recommend that colony islands be posted as seasonal refuges, existing potential habitats be enhanced, and that potential habitat north of the current breeding range be restored to acceptable habitat conditions (above water level 15 May through 31 August). [Missouri Dept. of Conservation, Wildlife Research Center, 1110 S. College Ave., Columbia, MO 65201, USA.]—William E. Davis, Jr.

MIGRATION, ORIENTATION, AND HOMING

(see also 17)

15. Red light disrupts magnetic orientation of migratory birds. W. Wiltschko, U. Munro, H. Ford, and R. Wiltschko. 1993. Nature 364:525–527.—The search for the

elusive magnetoreceptor continues. There are two prominent, competing (but not mutually exclusive) hypotheses regarding the biophysical mechanism of detecting magnetic fields: magnetic particles and photopigments. In this paper, the authors present strong evidence that illumination by monochromatic red (633 nm) light prevents migratory Australian Silvereyes (*Zosterops lateralis*) from using their magnetic compass for orientation. These results are consistent with the use of a photopigment mechanism to transduce the magnetic field to the nervous system. Previous work on the mechanism by Phillips and Borland (1993, Nature 359:142–144) indicates that the light-based magnetic compass will also respond to specific wavelengths of light by showing a 90-degree rotation. Such a rotation was not exhibited by the silvereyes, but because only three wavelengths were used in the experiment, the critical wavelength easily could have been missed. [Fachbereich Biologie Univ. Frankfurt, Zool., Siesmayerstr. 70, D-6000 Frankfurt, Germany.]—Robert C. Beason.

HABITAT USE AND TERRITORIALITY

(see also 1, 4, 6, 7, 14, 32)

ECOLOGY

(see also 24, 33)

16. Energy expenditure by Black Guillemots (*Cepphus grylle*) during chick-rearing. F. Mehlum, G. W. Gabrielsen, and K. A. Nagy. 1993. Colon. Waterbirds 16:45–52.—Black Guillemots normally feed inshore during the breeding season, typically lay 2-egg clutches, and raise both chicks until fully grown (30–40 days). Since brood size in alcids is probably restricted by the quantity of food parents can provide, and because flight costs are energetically expensive (especially for alcids where wing loading is high), the authors assess the hypothesis that guillemots restrict their foraging to inshore waters because of energy considerations, and that this influences brood size. A "maximum sustained working level" or field metabolic rate (FMR) of about 4 × basal metabolic rate (BMR) has been suggested for adult birds raising young. The authors used a doubly-labeled water technique to measure the FMR of nine guillemots tending mostly two young, and estimated food consumption from FMR values. The average FMR was 3.17 × resting metabolic rate (RMR, measured in another study on different birds). BMR and RMR are considered equivalent. Their calculations suggest that a guillemot feeding young would have to consume 61% of its body weight per day to supply its own energy demands. Calculations which assume that guillemots feed offshore and that the energy costs of flight are 11.3 × BMR suggest that the energy expenditure would be 6.2 × BMR, or well above the "maximum sustained working level" of 4 × BMR. These data support the hypothesis that the higher energy demands of raising 2-chick broods may be overcome by feeding inshore and that this reduced energy investment in flight and raising two chicks instead of one may be linked. [Norwegian Polar Research Inst., P.O. Box 158, N-1330, Oslo Lufthavn, Norway.]—William E. Davis, Jr.

17. Factors influencing size of the wintering Mallard population in the San Luis Valley, Colorado. C. W. Jeske. 1993. Southwest. Nat. 38:155–156.—The author examined winter temperatures, precipitation, and size of breeding population in relation to the number of wintering Mallards (*Anas platyrhynchos*) at this intermountain basin in south-central Colorado. The number of wintering Mallards was significantly related to the breeding population ($P = 0.0002$), December temperature ($P = 0.0077$), and total December precipitation ($P = 0.0102$). The relationship between breeding and wintering populations in the region supports band-recovery data which demonstrate that most Mallards in the San Luis Valley are resident. These data do not preclude short-term movements of Mallards from the valley in response to severe weather or birds replaced by migrants from more northerly wintering areas. [Dept. of Fishery and Wildlife Biology, Colorado State Univ., Fort Collins, CO 80523, USA.]—Danny J. Ingold.

POPULATION DYNAMICS

(see also 24, 29, 32)

18. Population viability analysis for a small population of Red-cockaded Woodpeckers and an evaluation of enhancement strategies. S. M. Haig, J. R. Belthoff, and

D. H. Allen. 1993. Conserv. Biol. 7:289–301.—Population and pedigree analyses were performed to evaluate the viability of a small Red-cockaded Woodpecker (*Picoides borealis*) population at Savannah River Ecology Lab, South Carolina. The population grew from four birds in 1985 to 25 in 1990 due to translocation. Genetic diversity was measured by OGENES, a gene-drop pedigree technique. Population viability was analyzed with VORTEX to project persistence for 200 years. The models predicted heterozygosity averaging 50% and extinction within 42 years. Thus, supplementation would be necessary to retain Red-cockaded Woodpeckers at SREL, assuming low environmental and genetic stochasticity. Practical considerations in translocations include creation of nest cavities, development of clustered nest sites, pair formation that promotes outbreeding, linkage of subpopulations, and provision of suitable habitat devoid of hardwood mid-story. [U.S. Fish and Wildlife Service, South Carolina Cooperative Wildlife Research Unit, G08 Lehotsky Hall, Clemson University, Clemson, SC 29634, USA.]—Kristin E. Brugger.

ZOOGEOGRAPHY AND DISTRIBUTION

(see also 30)

19. Minnesota's second record of Garganey. P. Backstrom. 1993. Loon 65:55–57.—On 1 May 1993, a single male Garganey (*Anas querquedula*) in alternate plumage was discovered with a flock of waterfowl consisting mostly of Blue-winged Teal (*A. discors*) on a small pond near Lakefield, in Jackson County. The bird, which was last seen on 5 May, was only the second record of this Eurasian duck in Minnesota. Captive Garganeys raised by waterfowl breeders in Minnesota are rare; moreover, this individual's early May appearance coincides well with the established pattern for this species in North America. Thus, it is highly probable that this individual was a genuinely wild vagrant. [3409 Emerson Ave. S., Minneapolis, MN 55408, USA.]—Danny J. Ingold.

SYSTEMATICS AND PALEONTOLOGY

20. Mallard × American Wigeon hybrid on the Southern High Plains of Texas. A. M. Fedynich and O. E. Rhodes, Jr. 1993. Southwest. Nat. 38:179–181.—In February 1989 a male Mallard × American Wigeon (*Anas platyrhynchos* × *A. americana*) hybrid was collected near Bovina, Texas, from a flock of about 50 ducks consisting of Mallards, American Wigeon, and Northern Pintails (*A. acuta*). Only two previous accounts of this hybrid combination (both over 85 years old) are reported in the literature. The authors present comparative data on the measurements of several Mallards and wigeons also collected in the region, as well as provide a detailed description of the plumage of the hybrid which is now stored in the Texas Tech University Museum in Lubbock, Texas. [Dept. of Range and Wildlife Management, Texas Tech Univ., Lubbock, TX 79409, USA.]—Danny J. Ingold.

EVOLUTION AND GENETICS

21. Fluctuating environments and clutch size evolution in Great Tits. L. W. Liou, R. Price, M. S. Boyce, and C. M. Perrins. 1993. Am. Nat. 141:507–516.—Fitness, measured as the number of young surviving to one year, was measured for 4306 Great Tit (*Parus major*) nests between 1960 and 1985. The clutch size with the greatest arithmetic mean fitness (0.8) was larger (12 eggs) than the average clutch size (8.66 eggs). A geometric mean of the same data shows that the most productive clutch size was about nine eggs, close to the average clutch size. The authors consider the geometric mean a more appropriate measure of fitness than the arithmetic mean because it incorporates the arithmetic mean and variability into a measure of fitness. The coefficients of variation in fitness across all years was lowest for clutch sizes of 7–10 eggs, indicating that the fitness associated with these clutch sizes is more predictable between years. The results of this paper are a good argument for the use of geometric means rather than arithmetic means in assessing the fitness associated with various clutch sizes. [Dept. of Biology, Univ. of California San Diego, La Jolla, CA 92093, USA.]—Robert C. Beason.

PHYSIOLOGY AND DEVELOPMENT

(see also 15, 16)

22. Airflow sensors in the avian wing. R. E. Brown and M. R. Fedde. 1993. J. Exp. Biol. 179:13–30.—Recordings were made of individual nerve fibers of the radial nerve responding to stimulation of individual feathers. Mechanoreceptors that respond to stimulus of the alular quills are located in the joint tissues rather than associated with the feather follicles. There was an increase in the number of action potentials produced with an increase in the angle of feather deflection. Some of the secondary covert receptors were directly associated with the feather follicle, and others were located between follicles. Two-thirds of these receptors were slowly adapting types and ⅓ were rapidly adapting receptors. These receptors responded to changes in the angle their shafts made with the wing. Rapidly adapting mechanoreceptors were associated with the follicles of secondary flight feathers, but not between the follicles, and responded to changes in the velocity of the air flowing over them. These results indicate that birds are able to constantly monitor changes in the airflow over their feathers. This information is probably used to maintain constant airspeed and to sense the separation of airflow from the wing. Such information would allow the bird to correct the wing's angle of attack and prevent stalling. [Dept. of Anatomy and Physiology, College of Veterinary Medicine, Kansas State Univ., Manhattan, KS 66506, USA.]—Robert C. Beason.

23. Muscle performance in hovering hummingbirds. D. J. Wells. 1993. J. Exp. Biol. 178:39–57.—Metabolic rates were calculated for hovering flight in Broad-tailed (*Selasphorus platycercus*) and Rufous (*S. rufus*) hummingbirds. An open-flow feeder-mask was used to measure oxygen consumption and metabolic rates were calculated based on the assumption that carbohydrates were used as metabolic fuel. In the species used for this study, the pectoralis and supracoracoideus made up 23.4% of the body mass, with a supracoracoideus to pectoralis ratio of 0.54 for both species. The rate of oxygen consumption varied between individuals from 44 ml/g/h to 60 ml/g/h, but did not differ significantly between species. The calculated efficiency for power generation would be more than 30% without elastic storage, higher than expected. Calculations support the presence of highly efficient elastic storage of kinetic energy in the tendons and sarcomeres of the muscles. [Dept. of Zoology and Physiology, Univ. of Wyoming, Laramie, WY 82071, USA.]—Robert C. Beason.

MORPHOLOGY AND ANATOMY

(see 20)

PLUMAGES AND MOLTS

(see 20)

PARASITES AND DISEASES

(see also 33)

24. The impact of Brown-headed Cowbird parasitism on populations of the Nuttall's White-crowned Sparrow. P. W. Trail and L. F. Baptista. 1993. Conserv. Biol. 7:309–315.—Nesting populations of Nuttall's White-crowned Sparrow (*Zonotrichia leucophrys nuttalli*) in the San Francisco Bay Area currently are subject to a 40–50% parasitism rate by Brown-headed Cowbirds (*Molothrus ater*), up from 5% only 15 years ago. The maximum rate of parasitism that will allow a host population to replace itself (p_c) was projected to be 16%, suggesting that long-term survival of White-crowned Sparrows in San Francisco is at risk. Standardized censuses are not available to verify population declines; however, it is predicted that at 50% parasitism, it could take 10 yrs to reduce a model population to half its original size. Nuttall's White-crowned Sparrows are thought to have behavioral mechanisms that resist effects of cowbird parasitism; thus, these models may overestimate rates of population decline in some, but not all, passerine species. [Dept. of Ornithology and Mammalogy, California Academy of Sciences, Golden Gate Park, San Francisco, CA 94118, USA.]—Kristin E. Brugger.

WILDLIFE MANAGEMENT AND ENVIRONMENTAL QUALITY

(see also 5, 8, 12, 14, 18, 32, 33)

25. Human disturbance affects parental care of Marsh Harriers and nutritional status of nestlings. C. Fernández and P. Azkona. 1993. J. Wildl. Manage. 57:602–608.—Breeding pairs of Marsh Harriers (*Circus aeruginosus*) were observed from April to July 1991 at Dos Reinos Lake, Spain, in order to examine the hypothesis that low-level human disturbance does not affect annual breeding success but can affect the nutritional condition of nestlings and energy expended by adults. Harriers took a mean of 17.9 min to return to their nest after human disturbance. Time spent in the nesting area by adults decreased during disturbed periods, especially among incubating females. The number of food items delivered during disturbed periods was less than ⅓ of that brought under normal conditions. The proportion of defended intrusions and the frequency of alarm calls, high circling flights, and territorial displays all increased during disturbed periods. Moreover, males spent three times as much time in flight and females spent 10 times as much time in flight during disturbed periods. However, there was no difference in breeding success between disturbed and undisturbed pairs, averaging 3.2 chicks/pair. Levels of blood urea were higher in chicks from disturbed nests ($\bar{x}$ = 13.9 mg/dl) than those of undisturbed nests ($\bar{x}$ = 10.01 mg/dl).

Due to the short-term results of human disturbance shown, the authors suggest that further research is necessary to determine long-term effects, which could include a reduction in the life span or lifetime breeding success of stressed adults and the survival probability of nestlings in poorer physiological condition. [Sociedad Ugarra Tafalla 34, 4-I, 31003 Pamplona, Spain.]—Robin J. Densmore.

26. Influence of vehicular traffic on time budgets of nesting Burrowing Owls. D. Plumpton and R. Lutz. 1993. J. Wildl. Manage. 57:612–616.—In order to determine if vehicular disturbances from environmental clean-up activities at Rocky Mountain Arsenal affected nesting Burrowing Owls (*Athene cunicularia*), owl time budgets were studied at the site during 1990 and 1991. Sixty-nine owls were banded and 200 hours of time budget data were collected. Vehicular disturbance ranged from 0–16 vehicles/15 minutes.

Adult males spent more time resting and alert during the pre-hatch period, indicative of their role relative to incubating females at this time. Adult females spent more time out-of-sight during the pre-hatch period, indicative of their role of laying and incubating eggs. During the post-hatch period, males spent less time alert and at the burrow and more time out-of-sight, while females did the opposite, indicating a probable shift to chick provisioning for the males and decreasing necessity of chick brooding for the females. Vehicular disturbance was not correlated with feeding, resting, comfort, courtship, agonistic, or out-of-sight behaviors, and was only weakly correlated with locomotion and alert behaviors. Productivity of owls was not linearly related to any of the behaviors except resting, which showed a weak positive correlation to productivity. The levels of vehicular disturbance witnessed had little impact on Burrowing Owl reproductive success. However, the authors caution that an increase in vehicular disturbance could affect their productivity. [U.S. Fish and Wildlife Service, Rocky Mountain Arsenal Field Office, Bldg. 613, Commerce City, CO 80022, USA.]—Robin J. Densmore.

27. Cross-fostering New Zealand's Black Stilt. C. Reed, R. Nilsson, and D. Murray. 1993. J. Wildl. Manage. 57:608–611.—Nest-site protection, multiple clutching, and cross-fostering were attempted with endangered Black Stilts (*Himantopus novaezelandiae*) in Mackenzie Basin, New Zealand, during the period of 1981–1987 in an attempt to increase fledging success and recruitment of juveniles into the breeding population. Black Stilts, Pied Stilts (*H. himantopus*), and Black/Pied hybrids all were used as foster parents. Black Stilts are a nonmigratory species, while Pied Stilts and hybrids are migratory.

Fledging success ranged from 20–42%, compared with 2% for unmanaged nests. Fifty-eight percent of 73 fledglings were raised by at least one Pied Stilt or dark hybrid foster parent, while 42% were raised by pure black parents. Resightings of chicks were greater for those fostered by black × black parents than those fostered by hybrid pairs. Two birds raised by Black Stilts, three birds raised by black × hybrid parents, and one (of 21 birds) raised by non-black parents were recruited into the breeding population. Thus, the low rate

of juvenile return after migration indicates that cross-fostering was ineffective in increasing Black Stilt numbers and possibly detrimental to long-term species survival due to the acquisition of learned migratory behavior from the foster parents. [Dept. of Conservation, Private Bag, Twizel, New Zealand.]—Robin J. Densmore.

28. The effects on bluebird productivity of not monitoring boxes. W. H. Davis. 1993. Sialia 15:93–95.—In order to establish the effect of infrequent visits to nest boxes on Eastern Bluebirds (*Sialia sialis*), the author erected four lines of boxes on fences along several major highways in central Kentucky. At different times during a 17-month period before the 1992 breeding season, three of the lines were treated with an ant barrier (Tangle Trap®) and cleaned; the fourth line was left unattended throughout the period. All boxes were then examined during late July 1992. Forty-three percent of the boxes that were treated in July 1991 and cleaned in February 1992 fledged some bluebirds (the most successful line), while 29% of the boxes not treated or cleaned at all fledged some young (the least successful). Tangle Trap® was an effective ant barrier throughout the season when applied in January of that season; however, it did not prevent mice from using the boxes (2% of the January-treated boxes had ants and 9% had mice). On the other hand, 43% of the untreated boxes were invaded by mice and/or ants. The treatment and cleaning of boxes had no effect on House Sparrow (*Passer domesticus*) use which was quite low on all lines (2% of all boxes fledged sparrows). These data suggest that although treating and cleaning nest boxes prior to the breeding season results in more bluebird fledglings than in unattended boxes (no statistical analyses were presented to show significance levels), unattended lines can also be useful to bluebirds, particularly in areas where House Sparrows are absent. [School of Biological Sciences, Univ. of Kentucky, Lexington, KY 40506, USA.]—Danny J. Ingold.

29. The wintering of the Great Cormorant (*Phalacrocorax carbo*) in the upper Rhone valley. [Le systeme hivernal du Grand Cormoran (*Phalacrocorax carbo*) dans le haut bassin du Rhone.] P. Geroudet. 1991. Nos Oiseaux 41:145–164. (French, English and German summaries.)—The history of cormorant populations around the world has been punctuated with dramatic declines as a result of direct persecution by humans, and indirect poisoning of cormorant food chains by persistent pesticides, PCBs, and other contaminants. More recently, in North America, populations of both the Double-crested (*P. auritus*) and Great cormorant have increased dramatically such that the Double-crested is once again being labelled as a serious pest and control measures are being taken to limit its populations. The Great Cormorant has expanded its winter range and shows up with increasing regularity in Florida and Gulf coast states. In trying to understand the dynamics of these population changes, researchers should look beyond North America to simultaneous and similar changes taking place in other cormorant populations. This paper documents a dramatic increase in winter populations of Great Cormorants in the upper Rhone basin of Switzerland and France between 1980 and 1991 and discusses these changes in light of changes in nesting populations in northern Europe since 1920, the social behavior of the birds, eutrophication of lakes, protection by man, and development of conditions favoring certain species of fish. [Av. de Champel, CH-1206 Geneve, Switzerland.]—Jerome A. Jackson.

BOOKS AND MONOGRAPHS

30. Florida bird species: an annotated list. W. B. Robertson, Jr., and G. E. Woolfenden. 1992. Florida Ornithological Society Special Publication No. 6, Gainesville, Florida. ix + 260 pp. $22.95, hardcover; $17.95, softcover. Available from Florida Ornithological Society, Archbold Biological Station, PO Box 2057, Lake Placid, FL 33852.—At the 1975 fall meeting of the Florida Ornithological Society (FOS) a committee was appointed to prepare an annotated checklist of Florida birds. The authors state that this volume, in a sense, represents the committee's report. Certainly they have drawn on the input of various members who served on the FOS Checklist Committee at times, but the present list is primarily the work of the two authors who prepared it during the period 1988–1992.

Included in the list are 671 species, both native and exotic, which have been reported as occurring in the wild in Florida through 31 December 1991. The accounts of verified species (461) comprise the major part of the book. Their inclusion is based on archived data. For all species on this list, at least one of the authors examined a specimen or photograph.

Catalog numbers are given for species which are little known in Florida, for which verifiable evidence was not included in previous accounts, or for which seasonal or regional status is poorly known. In addition to species considered to have occurred naturally, included are 11 exotic species which currently have self-sustaining populations in the state. Species accounts contain seasonal and geographical distributions as well as abundance, frequency, and habitat. All the previous terms are well defined. Changes in patterns of occurrence are summarized generally in addition to being reported in the species accounts. Many of both the expanded ranges and the receding ranges are associated with altered habitats.

Three appendices follow the list of verified species. Appendix A lists 75 species of unverified stragglers. For these, no satisfactory evidence exists for their unassisted occurrence in Florida, but all are possible vagrants. Their listing calls attention to their unverified status and may prompt extra effort for documentation.

Appendix B includes 16 species, probably unestablished exotics. Only exotics that breed, or have bred, regularly in Florida are listed. The Blue-gray Tanager (*Thraupis episcopus*), which was at one time considered "established," is included in this appendix. Also listed here is the Ringed Turtle-Dove (*Streptopelia risoria*), which not only seems dependent on food provided by humans, but also hybridizes with the Eurasian Collared Dove (*S. decaocto*). Appendix C, with 119 species, aims to include all the other exotics ever observed outside captivity in Florida.

The lists follow the systematic order of the *Check-list of North American birds, 6th edition* (American Ornithologists' Union 1983) and *Check-list* supplements through no. 38 (1991) with an exception, anticipating the 7th edition of the *Check-list,* which will place American vultures after the storks. Exotic species not in the *Check-list* follow the taxonomy of Sibley and Monroe's *Distribution and taxonomy of birds of the world* (1991, Yale University Press, New Haven).

The literature cited provides an excellent bibliography of the avifauna of Florida. In the index both common names and scientific names are listed, the latter alphabetized under specific names in addition to genera. The book concludes with a supplemental checklist of Florida birds, which includes 11 established exotics and four extinct species. Among the latter is Bachman's Warbler (*Vermivora bachmanii*).

Photographs of the Sooty Tern (*Sterna fuscata*) and the Florida Scrub Jay (*Aphelocoma coerulescens*) appear on the cover. These species represent major field studies of Robertson and Woolfenden, respectively. In continental North America, the Sooty Tern breeds only in Florida. The back cover notes that east of the Great Plains, Scrub Jays occur only in Florida "where they have been determined to be a full species . . . the only bird species entirely restricted to Florida." Within the book itself, the jay is referred to only as Scrub Jay.

In 1932, just 60 years prior to publication of this volume, *Florida bird life* by A. H. Howell was published (Coward-McCann, New York). At that time, listed as verified were 350 bird species, which included three that were extinct and two established exotics. An additional 29 verified species were listed in 1963 by A. Sprunt, Jr. in *Addendum to Florida bird life* (Coward-McCann, New York). Since then 82 additional species have been verified. It was time for this excellent reference book. It simplifies finding the current status of any species in Florida. Anyone who birds seriously in Florida or does field work in the state should have a copy.—Barbara P. Muschlitz.

31. The Cambridge encyclopedia of ornithology. M. Brooke and T. Birkhead, eds. 1991. University of Cambridge Press, Cambridge, UK. 362 pp., numerous color photographs and diagrams. $49.50, hard-cover.—Thirty-nine contributors representing 33 institutions have created a comprehensive reference to everything you always wanted to know about birds but were afraid to ask, as well as everything you wanted to know about birds and were not afraid to ask. From the number of heartbeats per minute of a hummingbird (1200–1400) to the number of bird species that breed communally (about 220), the text tours ornithology from accipiters to Zosteropidae and from the evolution of ostriches to the life cycle of bird lice.

The *Encyclopedia* is divided into 11 chapters: "Introduction to ornithology"; "Anatomy and physiology"; "Movement"; "Birds ancient and modern," including a survey of modern bird families; "Daily activities of birds," including food, feathers, sleep, and disease; "Dis-

tribution"; "Migration and navigation"; "Bird populations"; "Breeding," including nests, eggs, young, and parental care; "Behavior," including mating, territoriality, and songs; and "People and birds," including domestication, exploitation, and conservation.

The text is thorough and well-written, providing extremely detailed information. For example, an explanation of the formation of an egg includes descriptions of the physiology of reproduction, egg structure, and embryonic development. As important, diagrams of a developing embryo and its anatomy enhance the description. The same section further provides a table comparing yolk formation between altricial and precocial birds, and answers any and all questions ever raised about eggs. A vivid photograph of a 21-day-old chicken embryo captures one's attention in case the detailed text does not.

Indeed, the color photographs are a highlight of the book. The beauty of Red-and-Green (*Ara chloroptera*) and Scarlet (*A. macao*) macaws flocking at a clay lick or a Sunbittern (*Eurypyga helias*) feeding a frog to its chick is brilliantly portrayed. Other photographs clarify information in the text, revealing trained cormorants catching fish in China, an Avocet (*Recurvirostra avosetta*) defending its nest, or a Wood Warbler (*Phylloscopus sibilatrix*) cleaning a fecal sac from hers. Numerous diagrams, graphs, tables, and illustrations further elucidate topics covered in the text.

The book's most disappointing section concerned bird conservation. How a book about birds written at this time can focus less than 3% of its space on conservation is baffling. The impacts of conversion of tropical forests and destruction of wetlands receive only a paragraph of mention. This section also highlights another weakness of the book—its Eurocentric outlook. In discussing bird conservation societies and legislation, European and North American entities primarily are targeted.

Because the data and charts provided in the book do not include citations, the usefulness of the *Encyclopedia* as a text or reference for college students is diminished. It is, however, a wonderful source of information for general bird enthusiasts. If you are still wondering what are zosteropids, or you want to know how nests are built or how birds sing, this book is for you.—Susan K. Jacobson.

32. Granivorous birds in the agricultural landscape. J. Pinowski and J. D. Summers-Smith, eds. 1990. Polish Scientific Publishers, Warsaw. 360 pp.—The Working Group on Granivorous Birds, a part of the International Association for Ecology (INTECOL), formerly known as the International Biological Programme (IBP), organized two symposia at the 19th International Ornithological Congress held in Ottawa, Canada, in June 1986, and at the 4th International Congress of Ecology held in Syracuse, New York, in August 1986. This book is an assemblage of papers given at the meetings that pertain to granivorous birds and agriculture. Preceding the papers is a memorial to S. Charles Kendeigh (1904–1986), one of the leading developers of the Working Group on Granivorous Birds.

Ornithologists interested in the biology and ecology of granivorous birds, particularly *Passer* spp., will find a broad spectrum of topics. Topics on House Sparrow (*P. domesticus*) include circadian rhythms (S. Binkley), seasonal patterns in diurnal activity (E. Gorska), population dynamics in three habitats (C. Heij and C. Moeliker), excess females in a population (T. Anderson), nest-sites and nests (P. Indykiewicz), annual reproductive cycle (R. Hegner and J. Wingfield), intra-clutch variation in egg size (P. Lowther), nestlings' diet (B. Ivanov), and the acceptance and effects of toxicants (B. Rana, B. Soni, and B. Idris). Other *Passer* papers include the impact of insecticides on nestling *P. montanus* (T. Torok), breeding ecology of *P. hispaniolensis* (M. Metzmacher), breeding ecology of *P. montanus* (P. Cordero and M. Salaet), changes in distribution and habitat utilization by *Passer* spp. (J. Summers-Smith), and food as a limiting factor in *Passer* populations (T. Anderson). Papers dealing with other granivorous species include the feeding ecology of Indian weaverbirds (M. Dhindsa and H. Toor), reproductive ecology of feral pigeons, *Columba livia* (R. Johnston and S. Johnson), and breeding ecology of *Corvus monedula* (M. Soler). Studies involving communities of birds include winter roost relationships between the blackbirds *Agelaius phoeniceus, Quiscalus quiscula, Molothrus ater,* and the starling *Sturnus vulgaris* (M. Dyer), and also relationships between roosting and foraging flocks of *S. vulgaris, Q. quiscula, A. phoeniceus,* and *Turdus migratorius* (D. Caccamise and J. Fischl). Agriculture and granivorous birds are associated in only three papers: changes of *Zenaida* dove populations due to land-use changes (E. Bucher), the relationship between finches and manakins and pastoral

practices (S. Tidemann), and agricultural foods in the annual diets of *Anas platyrhynchos* and *Grus canadensis* (R. Clark and L. Sugden). Those looking for data on the effects of granivorous birds on agriculture will be disappointed. Only one paper discusses crop loss and damage caused by birds (J. Pinowski and R. Zajac). The final paper discusses research priorities for granivorous birds (J. Wiens) and emphasizes the need for more research on the multiple adaptive pathways which determine breeding success of granivorous species and how they ultimately may become pest species.

Although much of the research was on House Sparrows outside the United States and on Old World granivorous species, the ecological, physiological, and behavioral data still are applicable toward understanding and managing pest species in the United States. Much ornithological and ecological information can be gleaned from the papers, and their separate references provide insight on the available literature regarding each topic. Each paper is preceded by an abstract and a list of key words. There is no index.—Kathleen Groschupf.

33. Nestling mortality of granivorous birds due to microorganisms and toxic substances. J. Pinowski, B. P. Kavanagh and W. Gorski, eds. 1991. Polish Scientific Publishers, Warsaw. 204 pp.—The Working Group on Granivorous Birds held its 10th international symposium entitled "The effect of microorganisms, heavy metals, pesticides, and predators on egg and nestling mortality of granivorous birds" in Slupsk, Poland, 14–17 September 1989. The primary focus at this symposium was on productivity of granivorous birds, and factors influencing mortality of their eggs and nestlings. The proceedings are published in this book, under an abbreviated title. The original title should have been retained, as predators (which are neither microscopic nor toxic) were a factor affecting breeding success in several of the studies.

In the introduction, the editors describe the historical background and purpose of the Working Group on Granivorous Birds and its relationship to the International Association for Ecology (INTECOL). Since its conception in 1966, the Working Group has held several international symposia and conferences, and has published most of their proceedings in book and monograph form. International interest in granivorous birds is reflected in the 20 papers that comprise the present book. Authors of the first 10 papers conducted studies in China, India, Ireland, Japan, Poland, Slovakia, Spain, Switzerland, and the United States. Of the last 10 papers, nine studies were performed in Poland; one study did not mention geographical location, a significant omission since the author was studying the effect of pesticides on nestling development and mortality under field conditions.

The contents of the book are represented by the following list of abbreviated titles, followed by author(s): "Egg and nestling mortality in *Columba livia,*" R. Johnston; "Population density as a regulator of egg and nestling mortality of *C. livia,*" D. Haag; "Plumage polymorphism and ornithosis in *C. livia,*" M. Janiga; "Breeding losses in *Streptopelia decaocto* and *C. palumbus* populations," W. Gorski and E. Gorska; "Effect of predation on egg and nestling mortality in *S. decaocto* and *Passer domesticus indicus,*" B. Rana and M. Idris; "Food resource utilization of *S. orientalis,*" K. Nakamura and S. Matsuoka; "Factors affecting breeding performance of *Pica pica,*" B. Kavanagh, L. Jerzak, and W. Gorski; "Breeding ecology of *Corvus monedula,*" P. Kaminski; "Breeding ecology of *Passer montanus* in Beijing," X. Ruan and G. Zheng; "Predation in *P. domesticus* and *P. montanus* nests," P. Cordero; "Effect of microorganisms on mortality of *P. domesticus* and *P. montanus* embryos," S. Kozlowski et al.; "Flora and fauna of intestinal tract of *P. domesticus* and *P. montanus,*" E. Malyszko et al.; "*E. coli* in eggs and nestlings of *P. domesticus* and *P. montanus,*" R. Pawiak et al.; "Pathogenic microorganisms isolated from *P. domesticus* and *P. montanus* eggs and nestlings," S. Kozlowski et al.; "Influence of pathogenic fungi on mortality of *P. domesticus* and *P. montanus* eggs and nestlings," S. Kozlowski et al.; "Effect of *Isospora lacazei* on nestling *P. domesticus* development," A. Kruszewicz; "Intestinal flora and fauna during development of *C. monedula* nestlings," E. Malyszko et al.; "Effects of field applications of pesticides on *P. montanus,*" B. Riedel et al.; "Chlorinated hydrocarbons in eggs and nestlings of *P. montanus* and *P. domesticus,*" M. Karolewski et al.; and "Effect of heavy metals on development and mortality of *P. domesticus* and *P. montanus,*" J. Romanowski et al.

An abstract and a list of key words precedes each paper and each has its own references. There is no index. If one ignores the numerous typographical errors, one will find this book

to be a useful source of information on factors affecting breeding success of several granivorous species and on the breeding biology of each species.—Kathleen Groschupf.

34. Wanderer on my native shore. G. Reiger. 1992. Lyons and Burford Publishers, New York. 286 pp. $19.95, softcover.—The title gives an accurate portrayal of the book's contents. Reiger, a former editor of *Field & Stream, Audubon,* and *National Wildlife,* takes the reader on an excursion down the Atlantic coast from Maine to Key West. The tales begin at selected geographic localities, such as "down east" in Maine, the New York Bight, the Chesapeake, and so on. At each stop (or chapter) Reiger shares stories that come to mind, wandering among topics of recent and not so recent history such as boyhood summer camp, mosquitoes, DDT, osprey population declines, fishing skills of man and bird, once abundant fish species, land preservation, and early natural history writings of Thoreau, Beston, and Richards. The book's pace is leisurely, offering the reader an unstructured view of biology and human history of the eastern seaboard. Reiger's observations and memories of events that shaped what we see today of the coastal Atlantic are refreshing and personal, although a nostalgic reminder of the former wealth of this potentially renewable resource.—Kristin E. Brugger.