



THE WORLD OF BIRDS

Explore the wonders of the avian world with this ultimate reference. Highly respected ornithologist and wildlife expert Jonathan Elphick presents a comprehensive survey of the world's 29 orders and 200 bird families, including extinct species, and describes every aspect of bird life.

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- Describes bird evolution since the age of the dinosaurs
- Fact boxes and photographs
- Explores all aspects of bird life
- Reflects the most recent edition of *The Howard and Moore Complete Checklist of the Birds of the World*
- Explains bird classification
- Special photography from award-winning wildlife photographer David Tipling

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The World of Birds

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JONATHAN ELPHICK

traps, and the large-scale dropping from helicopters of food pellets laced with a biodegradable poison, sodium fluoroacetate.



Small Guam rat, *Callosia exoni*, held by researcher, *Exoni* species, Guam, Pacific Ocean island.

Mammals also threaten bird populations by competing with them for food. Goats and deer are not virtually any vegetation and destroy native plants that may provide staple food for birds. Just as the native birds on many islands evolved in the absence of predatory mammals, and thus developed no defenses against them, native plants are often vulnerable to invading grazing mammals.

Statens, two can play havoc with breeding birds. On the small island of Aruba in the southern Caribbean 20 km (12 miles) from Venezuela, for instance, some of the *Bon* *Constructors*, *Bon* *Constructors*, that were introduced as pests from 1999 escaped from captivity. Numbers on the small island are now estimated at 2,000–6,000, and they are having a serious effect on the local birds, including oaks, mockingbirds and orioles, swallowing adults and young while also constricting them. They are estimated to kill more than 17,000 birds each year.

An earlier introduction of a different snake, the Brown Tree Snake, *Bruce* *irregularis*, to the small island of Guam in the western Pacific Ocean was even more disastrous. A native of northeastern Australia and New Guinea, it was accidentally introduced as cargo shipments to the island not long after World War II, but its effects were not realized until the 1960s when biologists noticed some native bird populations declining dramatically. By 1987, all native bird species native to the island's forests were seriously threatened, and ten of those became extinct on the island. The remaining two are now hanging on only in small areas where they are protected by intensive snake trapping. The list includes five that were endemic to species or subspecies level, such as the Guam race of the Bridled White-eye, *Zosterops capillaris capillaris*, one of the most abundant birds on the island but probably



Small Brown Tree Snake, *Bruce* *irregularis*, among with tongue in the cardboard, introduced to Guam, Micronesia, Pacific Ocean island.



the first to be wiped out by the snakes, but two of the Guam species that were extirpated in the wild survive in captivity: the Guam Rat, *Callosia exoni*, and the Guam race of the Micronesian Kingfisher, *Todirostrum cinerascens cinerascens*, and reintroduction attempts are ongoing despite problems.

Harmful introduced animals also include other birds. Over 70% of all bird introductions have been to islands. Some species were introduced to control insect pests; examples include various species introduced to many islands in the Indian and Pacific oceans and House Sparrows taken to many regions, including North and South America. Others were taken to their new homes by settlers who wished to be surrounded by familiar birds. In New Zealand alone, 133 bird species have been introduced, of which 41 have successfully established wild populations. As well as causing crop damage or other problems, many have competed with native birds, to the detriment of the latter.

Only one other island group has experienced a larger invasion than that in New Zealand, and that is Hawaii, where 142 species were introduced. Some of those have been partly responsible for the extinction of many of the islands' native species of bird, especially the honeycreepers, more than half of which have disappeared in historic times. In some cases they competed for food or nesting territory, adding to the major threats from predation by rats and the loss of habitat from deforestation and introduced grazing mammals that caused extinctions in the nineteenth century. Later, though, the main threat came not from the introduced birds themselves but from the disease they brought in. The avian malaria parasite, *Plasmodium relictus*, was probably introduced with game birds and cage birds brought to the islands in the first half of the twentieth century. Another disease, this time caused by a virus called avian pox, *Avipoxvirus*, was more likely to have come in with wild migratory birds. Neither of these debilitating diseases could have spread so widely had they not had a ready vector of transmission in the mosquitoes that were inadvertently introduced to the islands from 1820 onwards.

The native birds had no resistance to the diseases and so were severely affected, unlike the introduced species. The threats posed to birds by diseases whose spread is made more and more likely by the increase in global travel by humans and livestock, are not confined to islands. (For instance, the spread of West Nile virus right across the USA during the last 15 years affects over 250 bird species.) Plants form the biological foundation of all land and freshwater ecosystems, and alien invaders can have a profound effect on native plant communities, by replacing or displacing native vegetation. This affects birds that depend on plants for food, shelter from predators and nesting

sites. Alien plants are often unpalatable or of poorer nutritional quality than the native plants, with which many of the birds have co-evolved, and they may also be rejected by (or even toxic to) insects that feed on them, with knock-on effects on insect-eating birds. The spread of invasive plants can also modify the structure of a habitat to a way that makes for more frequent, posing an additional threat to resident birds. Inevitably, the birds themselves can act as the agents of spread of the invading plant species, as when fruit-eating birds spread the seeds far and wide.



Small American Boreal Owl, *Nyctaleus borealis borealis*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.

THREATS 3: HUNTING AND THE CAGE BIRD TRADE

Direct exploitation by hunting and egg collecting for food or other purposes and capturing birds for the cage bird trade are, after habitat destruction and introduced alien species, generally the next most important factors posing a threat to many of the world's birds. Each onslaught has played a major part in reducing numbers of over one-third of the total of about 1,313 globally threatened species.

Hunting

Wild birds and their eggs have been exploited as food since the earliest times, often sustainably but in many cases resulting in serious diminution or extinction. This includes the plunder by sailors of many flightless birds, especially during the great ages of exploration and colonisation from the early sixteenth to the nineteenth centuries. Hunting is, along with the arguably even greater effect of introduced predators, largely responsible for the extinctions of the Dodo,



Small Pigeon, *Columba palumbus*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.

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Small Quail, *Capelinus lobatus*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.

a feature associated mainly with arid environments, and is mainly a result of the variable and sporadic nature of the rainfall. Where drought is especially prolonged, many birds are forced to move. Areas in which rain falls, allowing a suitable flush of plant or invertebrate food to build up, attract great numbers of birds. About half of all bird families breeding in such habitats contain monadic species. In Africa and Asia, the families most often involved are sandpipers (of which all 16 species are monadic), larks, sparrows, weavers and finches; in the Americas, it is the finches.

Australia, with its huge areas of desert or semi-desert occupying much of the heart of the country, is where monadism is best developed. Here at least 45% of species found in arid areas are regarded as primarily monadic. They include various pigeons, parrots, honeyeaters and crows. As so often with bird movements, the situation is usually complex. Some populations of a species may be true migrants and some nomads. In others, such as the ant-eater Eucalypt, *Dromicops melanoleucus*, the sand-eating Redbacked, *Meliphaga radiata*, Cockatiel, *Nymphicus hollandicus*, and flame-eating Black Honeyeater, *Callisitta pacifica*, a monadic lifestyle is superimposed on regular north-south migrations, resulting in the birds becoming concentrated in different latitudes at different seasons, but unevenly distributed, as they roam about in search of locally abundant food supplies.

This type of migration is not restricted to birds in deserts. For instance, in woodlands, thickets and fields in North America, species that are monadic include the Cedar Waxwing, *Bosciparus carolinensis*, and various finches such as Lawrence's Goldfinch, *Carduelis lawrencei*, and crossbills, *Loxia*, as well as the Dickcissel, *Spiza americana*, in the cardinal grosbeak family.

Small Redwing, *Agrotis junco*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.



Small Redwing, *Agrotis junco*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.

In Africa little waterbirds called Red-billed Quail, *Quail quail* – the world's most numerous wild bird species and major agricultural pest (see p. 400) – are nomadic breeders. Vast flocks roam across the savannah grasslands, following the rains which stimulate the growth and development of the grasses. To get into condition for breeding these birds need a supply of fresh, milky young grass seed and small insects, and this is available about 2 months after the rain falls. Their breeding cycle is very rapid – only 5 weeks – but they move on and nest again, as the food supply does not last long. After breeding several times, they rely on dry seeds that have fallen on the ground.

Disruptions

Also called irruptions, irruptions are seasonal movements of birds out of breeding areas. However, unlike classic migrations, in which the birds' counts and going generally show an impressive regularity that would be the envy of many rainbow companions, with irruptive species there are great differences from year to year in both the numbers of individuals in a population that make the journey and the distances they travel. (Strictly speaking, the term 'irruptive' refers to the birds becoming concentrated in different latitudes at different seasons, but unevenly distributed, as they roam about in search of locally abundant food supplies.)

The seed-eaters are mainly finches, such as Brambling, *Fringilla monticola*, in Europe and Evening Grosbeak, *Hesperiphona virens*, in North America. Both species are mainly insects in winter. The seed-eaters are mainly finches, such as Brambling, *Fringilla monticola*, in Europe and Evening Grosbeak, *Hesperiphona virens*, in North America. Both species are mainly insects in winter. The seed-eaters are mainly finches, such as Brambling, *Fringilla monticola*, in Europe and Evening Grosbeak, *Hesperiphona virens*, in North America. Both species are mainly insects in winter.

Small Snow Owl, *Nyctaleus scandiaca*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.



Small Hock of Burrowing, *Fringilla monticola*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.

summer and seeds in winter. Others are seed-eaters all year round, but depend on different tree seeds in different seasons. Another bird with a similar dietary pattern that is renowned for its dramatic irruptions is the aptly named Bohemian Waxwing, *Bombus gilvohabitus*. Following shortages of tree fruit in the northern forests where this species breeds in both Europe and North America, periodic mass movements bring these lively and unusual birds to reach of birdwatchers farther south, where they do not otherwise occur. Surprisingly tame, they can be seen gorging themselves on berries in trees and shrubs in city streets, shopping malls, parks and gardens.

In an analogous way but with very different diets, various species of owl and raptor in northern Eurasia and North America also experience dramatically fluctuating food supplies that periodically force them to forsake the arctic tundra and disperse farther south. These include the huge Great Gray Owl, *Syrnium nebulosus*, the Snowy Owl, *Nyctaleus scandiaca*, and the Northern Hawk Owl, *Nyctaleus scandiaca*, all of which occur to the far north of Eurasia and of North America, in the taundra (Snowy Owl) and the great belt of coniferous forest to its south (the other two). This time-honored strategy of dispersing to escape periodic shortages of food is also used by various species of owl and raptor in northern Eurasia and North America also experience dramatically fluctuating food supplies that periodically force them to forsake the arctic tundra and disperse farther south.

Permanent or temporary territories

In relatively few birds, such as some diurnal raptors or owls, and some passerines, a breeding pair may remain in their territory all year, often for many years in total or even for life. Others are territorial only when breeding, and may return to a different territory each year, although many – even those that migrate great distances – show a definite attachment to the area in which they first bred (a phenomenon known as philopatry). A third group establish separate territories outside the breeding season.

Non-breeding territories

Many birds also maintain separate non-breeding territories. These may be concerned mainly with roosting sites or with feeding areas. For instance, European Starlings defend a territory around their nest hole in the breeding season, whereas afterwards they defend an even smaller territory at their dense communal roosts, which are typically a long way from where they breed. Some species, such as some hummingbirds and passerines including European Robin, chaffinches and warblers, defend feeding territories outside the breeding season. In the European Robin, males and females defend separate territories, and when they choose a mate in spring, the females leave their winter home to move in to the male's territory.

FUNCTIONS OF TERRITORIAL BEHAVIOUR

Territorial behaviour involves a competition between individuals for limited resources within a particular area. The result is that it tends to space out breeding pairs throughout a habitat. This may in turn have the effect of reducing the chance of a pair laying eggs or

Small Golden-crowned Kinglet, *Troglodytes aedon*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.



young to a predator; generally, the nearer that nests are to one another, the more likely it is that a predator finding one will then move on to plunder another. However, there are important exceptions: colonial breeders always gain a benefit from group vigilance and collective defence (see Chapter 6) that may outweigh the risks.

Spacing may also prevent overcrowding, ensuring that each pair has enough resources – food, nest sites, roosting pools, cover to afford protection from predators, and so on – although usually this is not too much of an issue, as few species seem to rely solely on their territory to meet their needs. This is especially true in colonial birds in which individuals outside the very small family nesting area. Researchers have been able to demonstrate that for some species, it is clearly worthwhile to defend an exclusive area for the resources it provides. Examples of such studies involve measurements of the relation between energy costs and energy rewards in seabirds and hummingbirds that defend patches of nectar-rich flowers. These demonstrate that the birds defend a clump of flowers big enough to ensure a net gain in energy, and that when they are unable to ensure this, they do not defend a territory at all.

Another possible advantage gained by establishing a territory in some birds is that it facilitates pair formation. This is the case with some migrants in which males return to the breeding area in spring before females, so that they can establish a territory before the females arrive. Examples include some Old World warblers and chats, including the Kingfisher, *Luscinia sibilatrix*. However, this is clearly not the case with birds that pair in winter elsewhere before arriving on the breeding territory, such as many ducks and geese. Even then, though, it is likely to mean that a pair can mate and live with less interference from others of their species, including attempts by rivals to take over a nest site or mate with their partners.

Establishing and maintaining a territory may be important for some birds that have specialised nesting requirements. Competition for nest sites is especially intense where suitable sites for a species are limited, as they are with nest holes in trees for birds such as woodpeckers, owls, hoopoes, tits and nuthatches. In some cases (such as the Hoopoe, *Upupa epops*), pairs may zealously guard from one year to the next nest holes that offer especially good protection from predators, while woodpeckers often bore out a new nest hole each year, build up a nest of parasites imposing a burden on the successful fledging of young can be a factor in this case.

Generally speaking, the male or the pair will defend the territory only against rivals of their own species. They frequently share the habitat with other species that have broadly similar feeding and nesting

requirements, and the territories of the two species often overlap with one another. Sometimes, though, they may dispute a territory with other species, as for instance when Middle Thrushes, *Turdus sibilatrix*, defend the feeding territory in a feeding station tree from other thrush species as well as their own, or hammersmiths drive off various other nectar-feeding birds, such as honeycreepers, flower-peckers and some tanagers and icterids.

FLOCKING

Although some bird species lead a largely solitary life apart from when breeding and roosting flocks, others regularly join others of their own kind to form flocks. These vary in size from small family groups, such as those of swans, to the vast flocks of birds such as roosting waders (sharptails) and songbirds such as European Starlings or Red-winged Blackbirds, *Agelaius phoeniceus*.

Advantages of flocking

Birds may gain distinct advantages through feeding, breeding, roosting or flying as a member of a flock. On the whole, flocking species, such as geese, gannets, parrots, swallows and martins, and finches, tend to be those that also breed or roost together, and to have a staple diet of foods that are not evenly distributed in other space or time, such as aerial insects, shoaling fish, fruit or seeds. (Non-flocking species, on the other hand, tend to be those that breed alone and feed mainly on fairly evenly distributed foods – for example, the feeding on caterpillars or other abundant and widespread insects, or owls and raptors feeding on rodents or other birds.)



Small Alcock's Gallinule, *Gallinula alcockii*, from John James Audubon's Birds of America, original double-plate aquatint (1827–32), hand-colored aquatint.

The benefits of feeding in a flock relate mainly to two important aspects of survival – finding food and avoiding ending up as food for a predator. The sight of large numbers of birds gathering at a rich source of food, such as seabirds around a fish shoal or dead whale, or vultures at a large carcass, serves as a long-range visual (and perhaps aerial) signal to other birds in the vicinity. Being in a group can enhance the efficiency of foraging. This can be seen when Northern Shorebirds, *Actitis hypoleucos*, feed in small groups on small aquatic invertebrates by swimming in a circle, so that the bird in front acts as food for the one behind. It may also make it easier to catch otherwise elusive prey; for instance, when most pelicans partially encircle a shoal of fish to drive them into the shallows, and, most remarkably, groups of up to six Harris Hawks, *Pernis ptilorhynchus*, occasionally cooperate to catch prey. Mutual advantage is not always equally distributed: more experienced and dominant individuals are likely to do better than younger and subordinate ones.

Defence against predators is probably an even more basic reason for flocking. Increased vigilance and greater sensitivity to both the sight (and sometimes sound) of an approaching predator results from there being more collective eyes (and ears). In contrast to some mammals (such as the Meerkat, *Suricata suricatta*), birds do not generally coordinate defence with one or more individuals acting as lookouts, rather they act as individuals while gaining advantages from there being more pairs of eyes to spot predators. In some cases, a flock can actually repel a predator, as when songbirds gang up together to 'mob' a roosting owl or crow: drive a hawk, fox or weasel away.

- The ultimate reference book to the world's bird orders and families
- Includes extinct species
- Written by a highly regarded ornithologist and natural history expert
- A definitive guide to every aspect of bird life
- Sumptuously illustrated throughout with photographs, maps and diagrams
- A stunning selection for all bird enthusiasts