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## Exotic Birds: A Growing Problem with No Easy Solution

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In the Western Hemisphere, it began at least 1,400 years ago in Polynesia and has continued at an ever-accelerating rate since then; it has resulted in the extinction of indigenous species and the disruption of natural communities; it has caused untold economic losses and other hardships for some human beings while bringing joy, recreation and profit to others; it has been both promoted and condemned by governments and by common citizens; and, finally, it has generated enough controversy to warrant the attention of the AOU Conservation Committee, which is preparing a detailed report. It is the establishment of free-living populations of bird species outside their natural ranges as a result of human activities. Many of these exotic birds, now established components of the American avifauna, have been imported from distant zoogeographical realms, but others have been translocated within the Nearctic region. In all cases, these alien birds have had help—sometimes substantial—from human beings and would not have immigrated or dispersed naturally.

The first exotic bird in what is now the United States almost certainly was the Red Junglefowl (*Gallus gallus*) imported by Polynesians from southeastern Asia to the Hawaiian Islands and to other islands throughout the Pacific. Since then, the number of free-living exotic birds in the United States and its territories has grown by an estimated 75 species imported from other countries and 22 species translocated within U.S. territory (S. A. Temple and D. M. Carroll, unpubl. manuscript). Many additional species have been imported or translocated, but they failed to become established as self-sustaining wild populations.

Figure 1 traces the historical accumulation of non-native bird species in the United States. The rate of importation of exotics remained low until the mid-

1800s, when steamships and then airplanes provided ways to rapidly transport birds to the United States from distant places. Many of these imported species successfully established wild populations. The acceleration in the rate of importation and establishment of new species shows no signs of slowing; the apparent leveling of the rate during the last decade reflects only my uncertainty about which exotic species first detected in the wild during the 1980s have actually become established as self-sustaining populations.

The origins of imported exotics that are now established in the United States are diverse with 26% from the Neotropics, 47% from Eurasia, 22% from Africa, and 4% from other regions. Imported and translocated exotics have not become established uniformly throughout the United States. Hawaii and Florida have the highest proportions of their breeding avifaunas composed of exotics (18% and 9%, respectively). In most states, exotic birds account for less than 5% of the breeding avifauna.

How did the 97 exotic birds become established in regions outside their natural geographic range? Some exotic species have been able to expand their ranges into new areas because human activities inadvertently removed previous range limitations or barriers to dispersal. Many were intentionally imported or translocated in accordance with existing laws, while others were introduced intentionally but illegally. In many cases, establishment in the wild was accidental, involving escapes from captivity.

Birds that have expanded their geographic ranges in response to human-caused changes in the environment are examples of natural dispersal made possible by unnatural events. In the United States, northward range expansions in response to new sources of winter food, such as bird feeders, and eastward dis-

persal across the Great Plains in response to the planting and regrowth of trees are examples of such range extensions. Within the United States and its territories, 7% of the exotic birds fall into this category.

Human beings have had a much more direct hand in the importation and translocation of other birds. At least 61% of the exotics were introduced purposely and legally. The 1948–1970 federal/state programs in Foreign Game Importation were responsible for the importation and translocation of many game birds (Bump 1968). Private efforts have also promoted the introduction and spread of exotics (Laycock 1966). The Brooklyn Institute between 1850 and 1853 succeeded in introducing the House Sparrow (*Passer domesticus*); the Cincinnati Acclimatization Society introduced over 3,000 birds of 20 species between 1872 and 1874; and the Hui Manu group in Honolulu was organized in 1930 for the expressed purpose of introducing exotic songbirds to Hawaii, a task at which they were notably successful (Berger 1981). Translocation programs for endangered species, such as Whooping Cranes (*Grus americana*; Drewien and Bizeau 1978), are recent examples of intentional, legal translocations.

In addition to these organized efforts, 38% of the exotics are pet birds that accidentally escaped from captivity after having been imported or translocated legally. Inevitably, enough escapes of popular species that are commonly kept as pets occurred at the same place over a short enough period of time. They eventually formed founding wild populations that then expanded. Monk Parakeets (*Myiopsittus monachus*) and Mute Swans (*Cygnus olor*) are examples of this pathway of introduction that inevitably accompanies a heavy trade in exotic pet birds (Long 1981).

A few exotics, 3% of the total, have been introduced through deliberate activities that were carried out in violation of federal or state laws designed to curtail the spread of exotics. The escape of illegally possessed House Finches (*Carpodacus mexicanus*) in New York (Elliot and Arbib 1953), with their subsequent establishment and spread across the Northeast and the Midwest, provides a recent example of how illegal activities can result in the establishment of an exotic.

Once established in the wild, exotic birds become part of the local biotic community, and they inevitably have environmental and economic impacts. Although exotic birds can have a variety of impacts—a few positive, but the overwhelming majority negative—most species have been so poorly studied that many of their alleged environmental impacts remain largely undocumented. In other cases, even known impacts are difficult to assign to a particular exotic species. For example, which exotic bird brought exotic avian diseases to Hawaii and caused the extinction of so many endemic birds? Economic damage caused by exotics is often extensive but poorly documented; how much of the crop damage assigned to “blackbirds” is caused by European Starlings (*Sturnus vulgaris*) as opposed to native icterids?

Although it is inappropriate here to review the long list of impacts attributed to exotic birds, I would judge 56% of the exotic birds in the United States to be primarily harmful, 5% to be primarily beneficial, and 39% to have mixed impacts that may be both harmful and beneficial, depending on the situation (S. A. Temple and D. M. Carroll, unpubl. manuscript).

Despite evidence of substantial harm caused by most exotic birds, surprisingly little is done about them and the problems they generate. I offer the following suggestions of needed activities that ornithologists might pursue to help change public perceptions, policies and practices dealing with exotic birds: (1) exotic birds need to be better studied; (2) the public needs to have better information on the impacts of exotic birds; (3) the importation of exotic birds into the United States must be banned and alternative sources of pet birds explored; and (4) effective and acceptable means of eradicating established exotics must be developed and employed.

In general, birds are among the best-known species, but I have been surprised at how few American ornithologists have studied the life histories and ecological relationships of exotic birds. Although a handful of important exotics, such as Ring-necked Pheasants (*Phasianus colchicus*) and European Starlings, have been well studied in the United States, there are dozens of other exotics for which little more than their presence has been recorded in the ornithological literature. American ornithologists should overcome whatever biases exist against studying exotics, because there is a crucial need for good information that can be used to educate the public about the true impacts of exotic birds and to improve control activities.

The American public is naive about exotic birds. Many species are not even recognized by most Americans as being nonnative. Popular species—like Ring-necked Pheasants, Mute Swans and Rock Doves (*Columba livia*)—are so well integrated into the public's perception of what the American avifauna should be that there are advocacy groups promoting them and special laws protecting them. In contrast, there are few activities that advertise the negative influences of exotic birds.

Environmental educators seem to have placed such overwhelming importance on encouraging Americans to have positive feelings about birds that distinctions between exotic and indigenous species are often lost. Ornithologists should work more closely with environmental educators to get the full message about exotics conveyed to the public in an objective and intelligent way. Unless the public can be convinced that exotics usually are undesirable, motivation to deal with exotic birds will remain low.

Although there are several state and federal efforts that officially discourage the deliberate introduction of exotic birds into the United States, these regulations (e.g. the Lacey Act, Executive Order 11987, various USDA importation restrictions) are totally ineffective against what is now the major pathway of

introduction of new exotic species: the accidental escape of birds imported legally into the United States to satisfy the demand for pets. Ultimately, we should pursue international conventions to curtail the exchange of plants and animals between nations, but in the meantime a ban on the importation of birds into the United States is needed, as the AOU Conservation Committee (1991) has urged in a recent commentary.

If international agreements and national legislation were to reduce or eliminate the supply of exotic birds imported into the United States, but Americans continued to desire pet birds, large-scale illegal trafficking might well result. There is a now-taboo source of birds that might help fill this demand without many of the hazards associated with exotics. At the risk of being labelled a heretic, I cautiously offer for discussion the idea of exploiting a select group of abundant native birds as pets. The escape of these species from captivity would pose fewer risks than the escape of exotics. The likelihood of carefully regulating the exploitation of wild species is much greater in the conservation-minded United States than in developing countries where over-exploitation for the pet trade is common and now threatens some species. Many American birds are attractive and manageable and would make desirable pets (indeed, some are still popular, though illegal, with aviculturists in other countries). Clearly, such a radical idea would require careful deliberation, but it remains enigmatic and hypocritical for Americans to provide a huge market that drives the largely unregulated exploitation of foreign bird species, while imposing a virtual ban on the use of native species.

Although these activities should reduce the likelihood of additional exotic birds becoming established, they do not solve the problem of controlling exotic species already present in the wild. No matter how well justified by conservationists, programs aimed at reducing populations of exotic birds are almost invariably unpopular and controversial (Temple 1990). Americans are fond of birds, and this affection makes it difficult to condone controls, especially lethal ones. Because of increasingly vocal opposition, especially on the basis of animal-welfare-and-rights issues, few wildlife agencies are willing to risk the "bad press" that inevitably accompanies control efforts. Proposals to deal with Monk Parakeets and Mute Swans, for example, have become so contentious that many well-justified efforts have been abandoned.

Emerging technologies hold the promise of providing socially acceptable, effective and species-specific methods for controlling and eradicating exotics (Culotta 1991). If education programs can convince the public that controlling exotics should be a high-priority conservation activity, the high-technology sciences, combined with traditional approaches of wildlife management, may soon offer solutions to the seemingly intractable problem of eliminating established exotic species.

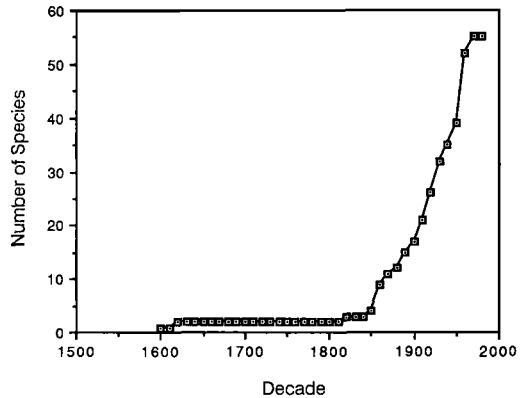


Fig. 1. Cumulative number of imported exotic bird species with established wild populations in the United States at decade intervals from 1600 to 1990 (based on 55 species for which the decade of importation into the United States is known).

Heightened public awareness and support that should result from convincing, fact-filled education programs should make it easier to institute programs aimed at eradicating established exotics and preventing further introductions. During the 1990s nothing less than a dramatic reversal of the ominous trend shown in Figure 1 should be acceptable to the AOU and concerned conservationists.

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