Potential Dangers of Exotic Waterfowl Introductions

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Introduction

The emigrations of man have resulted in redistribution of much of the world's fauna, both accidentally and intentionally. Early intentional movements of desirable species of birds often were due to a desire to bring a little of the 'old home' to the 'new home', or to introduce a 'known quality' as opposed to an 'unknown'. More recently, these introductions have been for sporting purposes and have emphasized gallinaceous game birds. The Ring-necked Pheasant *Phasianus colchicus* and Gray Partridge *Perdix perdix* have proved especially successful in the wild in North America and certain countries in the southern hemisphere as well. These successes seem to reflect the occurrence of niches created by man as a result of his destruction of niches of native game birds (Gullion 1965). Such introductions of game birds have induced demands by sportsmen for more foreign species, with a resultant investment in time and money which has been questionable (Grinnell 1925, Leopold 1938, King 1942). Such releases have been questioned on other scientific and aesthetic grounds as lucidly presented by the above - mentioned authors.

Currently, at least in North America, interest is switching from gallinaceous game birds to waterfowl. This includes not only much expanded interest and efforts in aviculture but also the desire by sportsmen to have harvestable populations of waterfowl regardless of the species or the origin of that species. This interest apparently has been aroused by dwindling numbers of waterfowl, and more specifically, from the feeling that the south-eastern states have few resident species and little diversity for harvest. I also *suspect* that the sportsmen's desires for new ducks as targets stems from experience with certain species such as Muscovys which are easily harvested in large, dramatic 'shoots'.

Whatever the original incentive, several South American species now are under consideration by south-eastern states for possible introduction: Rosy - billed Pochard *Netta peposaca*, Yellow-billed or Chilean Pintail *Anas georgica*, Bahama Pintail *Anas bahamensis*, Ringed Teal *Anas leucophrys*, Brazilian Teal *Amazonetta brasiliensis* and Muscovy *Cairina moschata*. In fact, small numbers of Muscovys have already been released in Florida. My own experience with some of these species in Argentina (Weller 1967, 1968), and my concern over the biological and professional implications of such introductions, have prompted me to summarize my own observations and opinions on introductions of exotic waterfowl. I have chosen a journal of international scope because this is a widespread and significant problem. My remarks concern mainly introduction of waterfowl into the wild for the establishment of self-reproducing, harvestable populations, but certain types of avicultural practices also should be evaluated.

Previous introductions of waterfowl

Aviculturists or zoological gardens have on numerous occasions imported and released free-winged waterfowl after the stock has become conditioned to the pond or pen facilities. In such cases, free-flying birds associated with waterfowl flocks have not presented problems of dispersal because the food and water as well as the captive waterfowl flock formed a 'centre of attraction' and presumably provided all the needs of the birds. Moreover, such facilities often have been associated with urban or rural areas not suitable for establishment of wild breeding populations. However, small feral populations have become established: Mandarin Ducks *Aix galericulata* in England (Atkinson-Willes 1963), and Mute Swans *Cygnus olor* in New Zealand and Australia (Frith 1967). The Black Swan *Cygnus atratus* from Australia became extremely numerous in parts of New Zealand within a few years of being introduced. It now has to be strictly controlled (Miers and Williams 1969). Canada Geese *Branta canadensis* have survived on a substantial scale in England (Ogilvie 1969) and in New Zealand (Williams 1964, Imber and Williams 1968). Apparently these have created no serious problems with native species, although they have come into conflict with agricultural interests.

The situation for the aggressive and adaptable Mallard *Anas platyrhynchos* is

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somewhat less satisfactory. It was introduced into both New Zealand and Australia. In New Zealand, its habitat utilization, nest success, and relatively lower death rate, probably due to greater wariness, have resulted in a gradual increase in numbers of Mallard over the New Zealand Grey Duck *Anas superciliosa* (Balham and Miers 1959). Although this may have increased the total harvestable waterfowl, the real issues are hybridization and competition between the two species.

Hybridization

Possibly because of their elaborate courtship behaviour, their recent and dynamic evolution, and their forced concentration in water areas, waterfowl have shown greater propensity toward hybridization than any other group of birds (Gray 1958, Johnsgard 1960). Although much hybridization has occurred under the conditions of confinement, such crossing has shown that there are few genetic limitations and that most hybrids are fertile (Gray 1958).

Hybridization in most birds is limited to intrageneric crosses but waterfowl hybrids are both intergeneric and intertribal. The observations of Dilger and Johnsgard (1959) on species identification suggest that the interactions of two species not normally in contact may result in abnormally high rates of hybridization. Hence, the North American Wood Duck or Carolina *Aix sponsa*, a member of the tribe Cairinini, has hybridized with 26 species including 16 species of dabbling ducks (tribe Anatini), 5 species of diving ducks (Aythyini) and one shelduck (Tadornini) (Dilger and Johnsgard *loc. cit.*).

It is impossible to forecast the significance of this hybridization to wild populations of species not normally in contact, but the single dramatic example of hybridization of Mallards and Grey Ducks should produce hesitancy on the part of anyone concerned with the preservation of a native fauna: both the New Zealand subspecies (Sage 1958) and the Australian Black Duck *Anas superciliosa rogersi* apparently hybridize freely with Mallards and are being genetically swamped (Frith 1967). This could mean the elimination of these species if the Mallard continues to expand its range.

Of the species in question, the Rosybilled Pochard has commonly been kept in captivity. It has been known to hybridize with both diving ducks and dabblers in captivity but there is an example of a wild hybrid with a Yellow-billed Pintail (Weller 1969). The possibility of hybridization of Rosy-billed Pochards with Redheads or Canvasbacks, is a frightening if remote possibility because the status of both North American ducks is already poor due to loss of habitat.

Movements and habitat selection

Waterfowl are renowned for their powerful flight and long distance migrations. Even tropical and sub-tropical waterfowl not influenced by seasons move long distances in response to water availability (Frith 1959). Both Rosy-billed Pochards and Yellow-billed Pintails are strong flyers and migrate long distances (Weller 1968). Rosybills move mostly to seek suitable water conditions but southern populations of Yellow-billed Pintails have a clear-cut annual migration in response to dramatic seasonal climatic changes in Patagonia. The other species under consideration for importation are sub-tropical in distribution and the movements have not been observed or at least reported.

The introduction of any species into a new climatic and habitat situation may produce unpredicted results. The introduction of waterfowl into any southern state is an introduction to North America and potentially to the entire northern hemisphere! Thus, the desires of a small group of individuals may influence the faunal picture for large groups of people who have no choice in the situation.

Competition

Competition of introduced and native species is more probable than not, especially considering the fact that most species evolve well-defined preferences in nest site and food selection. The fact that a habitat does not exist in the area where the species in question lives is no measure of the duck's response to a situation where that habitat does exist. Rosybilled Pochards in Argentina normally nest over water in marshes similar to those of the western or south-eastern United States but these potholes differ little from the prairie pothole marshes of the midwestern United States and Canada. With the known migratory potential of this species, and exposure to a new dramatic seasonal climatic change, what will prevent this species from moving to any and all water areas in the northern and especially western United States where they might compete directly with Redheads and Canvasbacks for territories, nest sites and brood-rearing habitat?

Competition for nest sites by hole-nesting species may be of even greater significance because, in the case in question,

several *probable* hole-nesters are involved. Species like Ringed Teal and Brazilian Teal probably nest in holes as they do in captivity, but we know very little about them. Muscovys certainly do. Hole-nesters might compete directly with North American Wood Ducks, about which there is already grave concern due to loss of habitat (Trefethen 1966). Can we take a chance to produce further competition or is the native species of too little significance to have our concern or investment?

Chronology of nesting

A somewhat unique characteristic of southern anatids not restricted by clear-cut climatic seasons is their flexibility in time of nesting. Many species nest in response to water in Australia (Frith 1959), and those in Argentina may nest in rainy autumns or winters rather than in dry springs because of water availability (Weller 1968). How they will adapt to North American conditions is a moot question. Normally, southern species adapt to northern time cycles when brought to the northern hemisphere. However, we are unable to predict the responses to variable water conditions and temperature by species not normally influenced by light cycles. If birds were introduced which subsequently nested in the autumn in the southern United States rather than in the spring, this could create great complication in timing of hunting seasons. Hypothetically, this could reduce rather than increase potential waterfowl harvest in a given area!

Diseases

Introduction of diseases which may influence native species is a possibility which demands consideration regardless of its likelihood. (See Warner (1958) who deals with the problem in relation to the extinction of Hawaiian avifauna.) The diversity of parasites and diseases in waterfowl and variations in mortality dependent on stress seems a potential danger in introducing tropical forms into less tropical climates.

Some professional and ethical considerations

When considering introductions of waterfowl into an area lacking significant numbers of waterfowl, several basic questions must be asked. First, what is wrong with the habitat in question? Why doesn't it contain more duck species and why aren't resident species more successful? Does the area really have the food resources and other needs to be highly productive of waterfowl? It is possible that the general rule of great diversity of species in the tropics infers lower productivity of any given species? Are we trying to feed ten ducks in a pond large enough for only two or three? If so, can added species do anything but add competition or reduce the least adaptable of birds? Although we cannot answer these questions at present, they do provide 'food for thought'.

Professionally, should wildlife managers proceed in such endeavours when the welfare of native species is in question? Sometimes the best management is none. Always, understanding and evaluation of values and needs must precede action. Too often, 'do something' managers have a long tally sheet of efforts but with little measurable progress. If the role of wildlife managers is only to release targets, then any method is fair. If, however, they are applied ecologists with interests in conservation of native fauna as well as sensible utilization of that fauna for food and recreation, they cannot and will not encourage experimental releases because the outcome is scientifically unpredictable by current methods.

Even if an intensive investigation is made of the species in its native habitat or in captivity, can we predict what will happen when it is introduced to the wild? Captive birds do not behave as do wild ones, and climatic conditions are only a gross clue to the evolutionary history of the birds in its native range. Add new variables and the situation is unpredictable. Moreover, there is no such thing as a 'local' experimental release. Any release of free-flying birds designed to study species interactions and habitat usage is a *release*, not an experiment! It may prove impossible to control.

Perhaps the most serious matter in concerning ourselves with the search for the perfect duck to satisfy all our waterfowl problems is that we continue to avoid the facts concerning management problems of native waterfowl. We avoid encouraging hunters to face facts by responding to their pleas for cure-alls. Might it not be better to develop hunter interest in and ability to identify under-harvested species —rather than always leading them to 'greener pastures'?

Even if an exotic species is established, is not harmful, and is a 'great success' for sportsmen, there are aesthetic and ethical questions which cannot be ignored. There are many biologists who feel that man already has sufficiently modified the fauna that he should not endanger additional

native species. Others feel that the situation is now so unnatural that there is little need to retain or protect the native forms. Indeed, they believe that any species that can survive in harvestable levels is desirable. Regardless of one's personal convictions concerning introductions of birds to certain locales, waterfowl introductions do differ from those of other game birds. These birds are strongly migratory and no citizen of the United States has the right to introduce migratory birds into Canada — or England — or Russia. And no biologist can predict where an introduced species will become established once it is brought across the equator. Do we have the right to make this decision for others? This is an international issue of great importance to those interested in their natural avifaunas.

Summary

Many South American waterfowl species are being considered for release in the south-eastern United States. There are serious dangers in such action, including hybridization and competition with native species. Such dangers must be recognised before introductions are made.

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