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INTERNATIONAL UNION FOR CONSERVATION OF NATURE AND NATURAL RESOURCES

The Role of Natural Reserves in Support of Bird Migration Across the Mediterranean Basin

by

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Introduction

The basis of any consideration of bird migration in the Mediterranean is that the Mediterranean basin is an integral part of the palearctic system. The number of birds reaching the Mediterranean from the Ethiopian (south of the Sahara), from the Nearctic (northern America) or from the Oriental region (India and beyond) is minimal, both in terms of species and of individuals. In bird terms, the lands round the Mediterranean are essentially the southern part of the great Eurasian land mass; they experience, just as colder regions of Europe and Asia do, the twice-yearly tide of migratory birds which flows northwards in spring towards the breeding grounds and southwards in autumn to winter quarters. For some species, this tide stops short in the Mediterranean, which offers a suitable wintering area; for others the Mediterranean is only a brief stopping-place - if that - on the way to wintering quarters across the Sahara.

The volume of this trans-Mediterranean and trans-Saharan migration should be emphasized. Moreau (1961) calculates the number of land birds alone involved each autumn at about 600 million; in his work devoted to African bird faunas (1966) he notes

> "Every year birds that have rested in Europe and Asia begin flooding into Africa in August and some of them remain as late as the following May. ... Africa south of the Sahara in fact provides a winter home for more than one quarter of all the species that breed in the Palaearctic Region, especially all the insectivorous birds of Europe and many from the Near East and Siberia, with some from even as far east as the Bering Straits. ... In Europe the characteristic summer birds - the swallows, the nightingales, the turtle doves, the cuckoos, and many more that have caught the imagination and enriched the lives of human beings down the ages - could not exist if Africa were not there to provide them with a winter home."

The present meeting, being concerned with marine parks and wetlands, will be more involved with waterfowl than with land birds; nevertheless any wetland reserve, established primarily for waterfowl, will also provide sanctuaries for this twice annual flow of land birds, most of them insectivorous.

Nor should it be imagined that the Sahara provides a fundamental barrier to waterfowl; the great majority of palearctic waterfowl - swans, geese, ducks, cranes, rails, waders - breed in the northern part of Eurasia, many of them in tundra and other areas where the snow melts only for a few brief months; these species too flood southwards in autumn and while many find congenial winter grounds in the Mediterranean, many regularly cross the Sahara to winter in the great African wetlands of the Sudan, Lake Chad, the Niger and Senegal basins. Indeed Roux (in press - 1) has indicated that at least a quarter of all waterfowl breeding in the palearctic winter south of the Sahara.

The Mediterranean basin thus forms an integral part of the vast area across which palearctic bird migrants move; being at the southern end, its greatest importance is as a wintering area, yet it also has its importance as a staging-point at migration times, as a breeding area for a special range of species (some of them in particular danger at present because of an alarming decrease in their total number), and also as a moulting area and a 'loafing' area for immature birds. These different roles fulfilled at different periods of the year will be studied individually; throughout, however, the concept of palearctic migration as a whole must be retained: natural reserves established on breeding sites and migration staging-points in northern and central Eurasia are a powerful factor in bird conservation, but unless complemented by a representative range of reserves in the Mediterranean and sub-Saharan Africa their role will be limited. Some major wetlands of the northern Mediterranean are now beginning to receive proper consideration in conservation terms; the process is, however, much less advanced in wetlands on the southern shore of the Mediterranean (many of them equal to, if not surpassing those of the northern coast) and south of the Sahara. In these areas a major effort is required at international as well as national level to conserve at least a representative selection of wetlands.

Mediterranean wetlands as wintering areas

Hitherto, 'Mediterranean wetlands' have been mentioned en bloc, without any effort to demonstrate their great variety - variety both from one wetland to another and in the same wetland from one year to another. The great deltas - Ebro, Rhône, Po, Evros/Meric, Menderes, Nile - remain much the same from one year to another; but there are, especially in the Maghreb, great flood basins which may be full to overflowing one year and practically dry the next if rainfall fails. Lakes on the northern shores of the Mediterranean may provide prime waterfowl habitat in one winter and be totally frozen over in the next. In years of very heavy rain, great salty depressions, the desert itself may provide suitable conditions, so that the very volatile nature of Mediterranean wetlands must also be emphasized; a site that has remained unattractive, even inimical, to waterfowl over a period of years, may support vast concentrations at a critical period when other sites are dry or frozen up.

Of the grebes wintering in the Mediterranean, the Great Crested Podiceps cristatus is widespread in moderate numbers, but the Black-necked Podiceps nigricollis is found in large numbers and has its major wintering area here. Some pelicans and cormorants winter, and a few herons, mainly Grey Heron Ardea cinerea and Little Egret Egretta garzetta, but most palearctic herons winter south of the Sahara, together with palearctic storks.

The Flamingo Phoenicopterus ruber on the other hand winters in considerable numbers - some in the Camargue, but over 50,000 in Tunisia, with more in Algeria and Morocco. Only a few swans reach the Mediterranean, mainly Cygnus olor in Greece and Turkey, but with the Camargue flock of Cygnus columbianus bewickii increasing in recent winters. Geese on the other hand winter in large numbers: 30,000 or more Greylags A. anser in the Marismas of the Guadalquivir, up to 10,000 in northeast Algeria and northwest Tunisia, with considerable numbers in Greece and Turkey. The White-fronted Goose Anser albifrons winters particularly in the eastern Mediterranean, from Italy eastwards, with huge numbers in Greece and Turkey, and is still found in Egypt. The Bean Goose Anser fabalis is found in several thousands in Spain and Yugoslavia.

The group for which the best recent numerical data are available in winter are the ducks. The international counts organized in January between 1967 and 1973 under the auspices of the International Waterfowl Research Bureau (IWRB) have amassed 40,000 records from 12,750 sites in 55 countries of Europe, Africa and Asia. They give a clear idea of the importance of the Black Sea and Mediterranean wetlands as wintering grounds for palearctic ducks (Atkinson-Willes, in press - 1). In almost every case, as the table shows, the numbers of shelducks, dabbling ducks and diving ducks wintering are appreciably higher than the numbers found along the Atlantic coastline of Europe between Spain and Sweden.

Table. Total midwinter populations of selected duck species in NW Europe (column A) and the Black Sea-Mediterranean (column B) - after Atkinson-Willes (in press - 1)

	A	B
Teal Anas crecca	150,000	750,000
Wigeon Anas penelope	450,000	450,000
Pintail Anas acuta	50,000	250,000
Shoveler Anas clypeata	20,000	150,000
Scaup Aythya marila	150,000	75,000
Tufted Duck Aythya fuligula	500,000	325,000
Pochard Aythya ferina	250,000	750,000
Smew Mergus albellus	10,000	65,000
Shelduck Tadorna tadorna	130,000	75,000
Ruddy Shelduck Tadorna ferruginea	Nil	50,000

As far as the sea ducks are concerned (as the figures for Scaup and Tufted Duck suggest) the picture is very different; such species as Common Scoter Melanitta nigra, Velvet Scoter Melanitta fusca, Eider Somateria mollissima, Long-tailed Duck Clangula hyemalis or Goldeneye Bucephala clangula are essentially Atlantic species, which scarcely if ever appear in the Mediterranean (though several thousand Common Scoter regularly winter as far south as Atlantic Morocco!). On the

other hand special mention must be made of Marbled Duck Anas angustirostris, which winters in small numbers in the southern Maghreb, and White-headed Duck Oxyura leucocephala; the world population of this species probably does not exceed 15,000, and 9,000 are regularly found on one Turkish lake with another 1,000 in Tunisia.

Almost the entire European breeding population (and a good deal of the Asian breeding population) of the Crane Grus grus winters in the Mediterranean - in Spain, Morocco, Algeria, Tunisia, Greece and Turkey. By day the species may feed on arable land far from the wetland where it roosts; here the question of conservation of feeding grounds some distance away from the wetland arises. Another species occurring en masse in winter is the Coot Fulica atra, often the most numerous water bird on freshwater wetlands.

Numbers of wintering waders are now almost as well documented as those of ducks, thanks to IWRB's wader research group (Prater, in press). In general, waders feed on intertidal mudflats, so that the Atlantic shores harbour many more in winter than the non-tidal Mediterranean. Nevertheless, the Gulf of Gabès in southwest Tunisia experiences considerable tidal movements, and hence has an 'Atlantic' spectrum and concentration of waders - a total of 30,000 or more Dunlin Calidris alpina, Curlew Numenius arquata and Grey Plover Pluvialis squatarola, together with smaller numbers of such untypical Mediterranean winter waders as Oystercatcher Haematopus ostralegus, Turnstone Arenaria interpres, Knot Calidris canutus and Bar-tailed Godwit Limosa lapponica. (The tidal Gulf of Gabès also provides a winter home for 1,000 or more Spoonbills Platalea leucorodia drawn from the Hungarian and Austrian breeding populations). Elsewhere in the Mediterranean, numbers of wintering waders are relatively low, with a few thousand in the Camargue, the Greek and Turkish lakes and deltas and the great lakes and saltpans of the Maghreb; nowhere do numbers begin to approach the tens of thousands of wintering waders found in Atlantic Morocco (particularly on the Merja Zerga and at Puerto Cansado) nor the three-quarters of a million of Mauritania's Banc d'Arguin.

The catalogue of wintering waterfowl in the Mediterranean is completed with the gulls and terns; no concerted attempt has so far been made to census them, but very large numbers of some gulls - notably the Black-headed Gull Larus ridibundus, the Slender-billed Gull L. genei and (appropriately) the Mediterranean Gull L. melanocephalus - are found together with some tern species, mainly Caspian Hydroprogne caspia and Sandwich Sterna sandvicensis.

Mediterranean wetlands as staging-points on spring migration

As early as mid-February, those waterfowl which have been wintering in the Mediterranean begin to move north. In March and April those which had wintered in West Africa appear in considerable numbers: some Garganey Anas querquedula (a duck species which, in an apparent paradox, winters almost exclusively south of the Sahara) and large numbers of two wader species - Ruff Philomachus pugnax and Black-tailed Godwit L. limosa. In April and May it is the turn of other waders which have wintered much further south (as far as the Cape of Good Hope) - Little Stint Calidris minuta and Curlew Sandpiper C. ferruginea. Nearly all these waders appear in larger numbers in spring than in autumn - partly because in autumn they use a different southward route along the Atlantic coast, partly because conditions in Mediterranean wetlands are much more favourable in spring after the wet winter than in autumn after the long dry summer.

The numbers of waterfowl (and indeed of land birds) noted in spring in the Mediterranean is much greater than the autumn total; even so, many must pass straight over Sahara and Mediterranean on their way north, and recent recoveries of Garganey ringed in Senegal and recovered six days later in Italy emphasize the speed of migration (Roux, in press - 2). It is particularly regrettable that many Mediterranean countries (notably those on the northern shores, where shooting pressure is much higher than in the south) permit shooting of waterfowl until the end of March, when many adult birds in breeding condition are returning to their nesting grounds: this is the period when shooting will have maximum detrimental effect on populations.

Mediterranean wetlands as breeding sites

As previously indicated, many palearctic birds quit the Mediterranean to nest in more northerly latitudes; yet this general tendency must not be over-emphasized even for northerly-breeding geese, ducks and waders. Small numbers of many species breed in the Mediterranean, a few in the Maghreb, very many more in the eastern Mediterranean, especially Turkey where 'continental' influences are strongest and where many typically northern palearctic breeders nest regularly in fair numbers - Great Crested Grebe, Cormorant Phalacrocorax carbo, Greylag Goose, Mute Swan, Gadwall Anas strepera, Red-crested Pochard Netta rufina, Tufted Duck Aythya fuligula, Velvet Scoter, Crane, Lapwing Vanellus vanellus, Redshank Tringa totanus to mention only a few.

Apart from these birds at the southern limits of their breeding ground however, there are other breeding waterfowl which give the Mediterranean basin an altogether more exotic, less stolidly palearctic air: the herons, the ibises, the storks, and the group of salt-loving species, many of Sarmatic origin, many nesting in colonies on open ground.

Few of the heron family winter in the Mediterranean; most cross the Sahara to winter, but those that return across the desert in spring do not go far beyond the northern shores of the Sahara to nest. Most palearctic colonies of Night Heron Nycticorax nycticorax, Squacco Heron Ardeola ralloides, Cattle Egret Bubulcus ibis, Great White Egret Egretta alba and Little Egret E. garzetta are in the southern part of the area, with good numbers in the immediate surrounds of the Mediterranean; other heron species in which the tendency to breed colonially is not so strong - Bittern Botaurus stellaris, Little Bittern Ixobrychus minutus and Purple Heron Ardea purpurea are also essentially 'southern' breeders, found in large numbers in the Mediterranean. Some of the very obvious, noisy, messy colonies have been given special protection (for example in the Coto Donana, Spain; Camargue, France; Scholarion, Greece; Kuscenneti, Turkey), but other such vulnerable sites require permanent guarantee for their status.

Special mention should also be made of the few remaining pelican colonies in the eastern Mediterranean; throughout their Eurasian range White Pelican Pelecanus crispus and Dalmatian Pelican P. onocrotalus are in decline as breeding species and particular efforts should be paid to securing safe breeding sites.

One Mediterranean species teetering on the brink of total extinction is the Bald Ibis Geronticus eremitica, whose only known breeding colonies, each holding a few dozen pairs, are in Turkey and Morocco.

A much more widespread and familiar breeding species is the White Stork Ciconia ciconia, found in the Maghreb, in Greece and Turkey. Yet the Stork too in many parts of its range is undergoing a drastic decrease; it may be that, like the herons, it is particularly vulnerable to pesticides, for it feeds extensively in agricultural land. Recent attempts in Algeria and Turkey to capitalize on its popularity and familiarity by organizing censuses of breeding birds carried out by schoolchildren and local amateur ornithologists are therefore particularly welcome, since they should help at least to demonstrate any decrease.

Another departure from the straightforward pattern of palearctic birds may be seen in a whole group of species which nest in the great salt lakes and depressions, notably in the Maghreb and Turkey. They tend to nest in colonies, on the bare ground, with little cover to hide them; some are of wide, even cosmopolitan distribution - Flamingo, Kentish Plover Charadrius alexandrinus, Avocet Recurvirostra avosetta, Black-winged Stilt H. himantopus, Gull-billed Tern Gelochelidon nilotica - others notably Slender-billed Gull Larus genei are relics of the fauna of the Sarmatiic sea, which once covered the area of the Black, Caspian and Aral Seas. To protect their eggs, such birds must nest in very inaccessible sites; flamingos choose sites in the middle of treacherous salt deposits, while for many others an island is a sine qua non for

breeding - but in an area of such meretricious rainfall, lakes with islands may not be forthcoming each year. When there is some thicker vegetation, they may be joined by other Sarmatic species like Marbled Duck and White-headed Duck, whose numbers on a world scale are very small.

These 'salt-loving' species, together with more orthodox species of freshwater marshes at the southern limit of their palearctic range all suffer great disturbance during the short breeding season: their nesting islands - in the years when such exist! - are visited by human egg collectors; nests in thicker vegetations may be systematically robbed or trampled by cattle in search of water. A short period of protection and surveillance during the critical weeks of the breeding season could ensure immeasurably increased nesting success.

Finally, mention must be made of some birds nesting on offshore islands, shearwaters and more especially Audouin's Gull Larus audouinii; this, one of the few Mediterranean species to appear in IUCN's Red Data Book, nests exclusively on Mediterranean islands; all its nesting sites - notably the Chaffarine Islands off the Moroccan coast and La Galita off northern Tunisia - merit full protected status.

Mediterranean wetlands as moulting sites:

The birds most at risk in the moulting period are those which lose their flight feathers all at once and are thus flightless for a short period of a few weeks - the geese and ducks; since most palearctic geese and ducks nest and moult in the far north before moving to the Mediterranean, this aspect is only of minor significance in the area which concerns us.

Many waders on the other hand leave their breeding grounds, migrate part of the way, then stop to undertake their moult; the replacement of their flight feathers is a gradual process, so that they do not totally lose the power of flight; at the same time as their moult however, they are putting on extra weight to enable them to undertake a long migration across the Sahara and perhaps as far as southern Africa. Hoffmann (1957) showed that the Camargue is an important moulting and refuelling point for Wood Sandpipers Tringa glareola before the main part of their autumn passage and Johnson (1974) has shown the same is true for otherwaders, notably Little Ringed Plover Charadrius dubius, Little Stint and Redshank. The numbers of waders which appear on the northern shores of the eastern Mediterranean immediately after the breeding season probably also moult (though further research and ringing here would be highly desirable). Catches of waders in heavy wing moult in Tunisia clearly indicate that some stop on the southern shore of the Mediterranean as well.

Mediterranean wetlands as staging-points on autumn migration

In autumn, the number of birds carried on the tide of southward migration is swelled by young birds born a few months previously; at first sight it would seem therefore that autumn migration should be much more noticeable in the Mediterranean than spring migration. Such is not, however, the case either for land birds, or for waterfowl. Some (notably waders) follow the Atlantic coast, but many must cross the Mediterranean and Sahara 'in one hop'; this would help to explain the paucity of water bird records over the Sahara (Moreau 1967), for although there is a marked passage of some waders and of Black Tern Chlidonias niger in autumn, other species like Pintail - which nevertheless must cross the Mediterranean to reach their sub-Saharan winter quarters - do not show any very marked increase.

Mediterranean wetlands as a summer loafing ground for immature birds

In some species which take more than one year to mature, adolescents require 'loafing' areas until they are able to breed, particularly during the summer period. In most palearctic species which visit the Mediterranean, the immatures seem to follow their elders at least some of the way, for the number of summering immatures is infinitesimal: practically no ducks or geese; in waders very few - though careful study is required to show this, since the last northbound migrants have scarcely moved through in early June before the first southbound returnees appear. Some immature gulls may hang on through the summer, but the species principally involved is the Flamingo, sizeable flocks of which may be found in immature plumage in suitable habitat in summer.

The need for natural reserves

The above review, necessarily generalized, nevertheless demonstrates the major role played by Mediterranean wetlands in the vast tapestry of palearctic bird migration. Their overriding importance is in providing winter quarters, though their role as breeding sites for certain species - many of which may be classed as endangered - is also crucial. Because of birds' capacity to undertake long-range migrations encompassing both sea and desert, the significance of these sites as staging-points is perhaps not on the same plane, though their value as moulting areas for waders suggests that this aspect would repay further study.

There is constant and increasing pressure on these wetlands from a variety of forms of development - agriculture, industrialization, tourism - all of which are clearly essential for the social and economic development of the peoples of the area. It is greatly to be hoped, however, that a representative selection may be set aside as nature reserves before their present status is irremediably altered. The immediate and yet lasting impression derived from many Mediterranean wetlands is of vast areas in pristine natural state - such sites as have been drained and developed out of existence in other countries by short-sighted régimes which are now desperately striving to re-create a pale shadow of their former riches.

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