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The Occurrence of Slender-billed Curlews *Numenius tenuirostris* in Greece

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ABSTRACT

The occurrence of slender-billed curlews Numenius tenuirostris *in Greece is examined based on 80 records from 1857 to 1988. Up to the mid-20th century, 9 out of 12 records were of shot birds. All the remaining came from the last 30 years. The highest numbers of slender-billed curlew occur in April and early May (spring migration). This picture is largely due to the records from the Evros delta (48% of the total). Apart from the spring months slender-billed curlews were present in greater numbers in September and January than any other month; there are no records in November and December and few in other months. Slender-billed curlews have been recorded in 16 Greek wetlands; 88% of the records come from Northern Greece. These sites lie along well-known migration routes and slender-billed curlews were recorded there more frequently during spring and autumn migration (the latter for Eastern Greece) than at any other season. Most records (n = 38) were from the Evros delta. The birds mainly used the seaward part of the delta and, in most of the 28 cases for which details are available, salt marshes and coastal flats. For this area both the frequency of records and numbers of birds seen suggest that it may be one of the most important sites for slender-billed curlews in the Western Palaearctic. The evaluation of the patterns of occurrence and distribution of slender-billed curlews in Greece may have been subjected to*

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some errors due to the differences in effort put into surveying various sites over the years, the preference by ornithologists to visit Northern Greece, and the great number of wetlands and other potentially appropriate sites in Greece which have never been surveyed. The most urgent need for the conservation of the slender-billed curlew in Greece is the effective protection of the wetlands where it has been regularly observed. Other measures are also suggested.

INTRODUCTION

The slender-billed curlew *Numenius tenuirostris* is today the rarest migratory bird in the Western Palaearctic and also a globally threatened species with a population which appears to be small, scattered and declining (Cramp & Simmons, 1983). Consequently it remains a poorly known species, particularly in terms of its breeding biology and distribution; the most recent nests were found about 60 years ago and even today its breeding distribution is hardly known. It breeds only in the USSR east of the Ural mountains in the taiga-steppe zone of Western Siberia; breeding has only been proved from the Tara river and Barnaul region south of the river Ob (Borodin *et al.*, 1984).

The slender-billed curlew migrates across the Caspian steppes, Turkmeniyia, Transcaucasia, Ukraine, the Balkans and Italy (Cramp & Simmons, 1983). Perhaps its most important wintering area has been the Maghreb region (Cramp & Simmons, 1983; van den Berg, 1988) and to a lesser extent the rest of the Mediterranean including Greece (this study).

Available information suggests that this species was a relatively common bird in parts of its 19th century range (Cramp & Simmons, 1983) but due to various reasons such as increasing destruction of stop-over wetlands, hunting, climatic changes, behavioural changes and possibly other factors not yet fully understood, it has undergone a dramatic decline throughout this century (A. J. Prater & D. A. Scott, pers. comm.

The purpose of this paper is to present all available information on the presence, numbers and distribution of slender-billed curlews in Greece since 1857 in order to contribute to the till now rare and scanty knowledge on this endangered bird.

METHODS

Data on the occurrence of slender-billed curlews in Greece were systematically collected (a) through published literature, (b) from unpublished information, mainly bird reports kindly sent to us especially by foreign birdwatchers and/or ornithologists visiting Greek bird areas, and (c)

by our own observations in the wetlands especially of Northern Greece. Due to logistical and infrastructural problems, it was not possible to carry out systematic surveys. However, as the Evros delta is the most important of all Northern Greek wetlands (Dorikos, 1981; Heliotis, 1988) and has attracted our research efforts during the last ten years, surveys were more frequent there. Such surveys were carried out mainly within the framework of other research on waders (e.g. Goutner, 1983, 1985) and during waterfowl counts. From 1979 to 1981 the whole delta area was surveyed at least twice a week during spring and summer months and many important habitats for slender-billed curlews were visited almost daily.

Due to the rarity of the slender-billed curlew and the interest in the conservation of this species (international conservation project now being coordinated by the International Council for Bird Preservation), we felt that it would be of interest to present all the available Greek records. In Table 1 we provide all Greek records except those for the Evros delta, which are given separately in Table 2. They are separated to indicate the importance of the latter area, and because these data are more valid in terms of frequency of observations as more effort was put into surveying this area.

TABLE 1

Known Records of Slender-billed Curlews from Greece from 1857 to 1988, excluding the Evros Delta

Number of birds	*Place*	*Date*	*Reference*
2 (+)[a]	Corfu island	September 1857	Powys (1860)
1 (+)	Phalericon delta, Attica	8 April 1859	Reiser (1905)
1 (+)	Phalericon delta, Attica	22 April 1896	Reiser (1905)
1 (+)	Phalericon delta, Attica	30 March 1897	Reiser (1905)
1 (+)	Phalericon delta, Attica	April 1897	Reiser (1905)
1 (+)	Phalericon delta, Attica	31 May 1897	Reiser (1905)
1 (+)	Lixouri, Kefallinia island	22 March 1897	Reiser (1905)
2	Potamos, Corfu island	2 May 1897	Reiser (1905)
1 (+)	Mouria lagoon, Ileia, Peloponissos	21 May 1898	Reiser (1905)
1 (+)	Trichonis lake	30 March 1897	Reiser (1905)
1	Marathon marsh	14 April 1939	R. B. Sibson (pers. comm.)
1	Lake Koronia	4 June 1944	Makatsch (1950)
1	Axios delta	17 April 1957	Rathmayer & Remold (1958)
2	Lake Koronia	23 April 1959	Schuster *et al.* (1959)
1	Thermopylae marshes (Spercheios delta)	12 February 1963	J. Swift & I. C. T. Nisbet (pers. comm.)
1	Porto Lagos	15 September 1963	Bezzel & Müller (1964)

(*continued*)

TABLE 1—*contd.*

Number of birds	*Place*	*Date*	*Reference*
1	Axios delta	23 September 1963	Bezzel & Müller (1964)
5	Messolonghi wetland	10–11 January 1969	M. Hodge & A. Johnson (unpubl. IWRB report)
1	Porto Lagos	17 August 1973	Louette *et al.* (1977)
1	Corfu island	April or May 1974	Cox and King's Tours (pers. comm.)
1	Anghelochori salines	10 May 1977	Rowbottom (pers. comm.)
2	Porto Lagos	27 May 1987	C. Winn & J. Ward (pers. comm.)
1	Porto Lagos	17 September 1977	G. Ouweneel (pers. comm.)
1	Porto Lagos	28 September 1977	Magerl & Francis (1979)
1	Messolonghi	16 February 1979	Britton (1979)
1	Xirolimni lagoon	23 June 1979	H. Thomson (pers. comm.)
1	Porto Lagos	24 June 1979	H. Thomson (pers. comm.)
1 or 2	Porto Lagos	23 September 1979	H. Thomson (pers. comm.)
3	Porto Lagos	3 October 1979	H. Thomson (pers. comm.)
1	Porto Lagos	22 October 1979	H. Thomson (pers. comm.)
3	Loudias delta	30 March 1980	T. Akriotis (pers. comm.)
7	Messolonghi	6 January 1982	Tsounis (1985)
1	Anghelochori salines	7 May 1984	R. L. Flood (pers. comm.)
14	Porto Lagos	28 September 1984	G. Ashton & J. Fergusson-Lee *et al.* (pers. comm.)
1	Porto Lagos	10 May 1986	B. Combes (pers. comm.)
1	Tsoukalio lagoon, Amvrakikos Gulf	23 May 1986	P. Dragoumis (pers. comm.)
1	Porto Lagos complex	19 April 1987	J. Potter & C. Winn (pers. comm.)
1	Aghios Mammas marsh	16 July 1987	H. W. Wallis (pers. comm.)
1	Axios delta	3 April	P. Dragoumis & S. Bourdakis (pers. comm.)
1	Tsoukalio lagoon	14 April 1988	S. Bourdakis & C. Papakonstantinou (pers. comm.)
2	Porto Lagos	13 May 1988	F. Scheppers & H. Athanassiou (pers. comm.)
1	Aghios Thomas, Preveza	13–15 August 1988	L. B. Thomson (pers. comm.)

[a] (+) denotes collected specimens.

TABLE 2
Known Records of Slender-billed Curlews from the Evros Delta: 1965–1988

Number of birds	*Date*	*Reference*
1	16–18 January 1965	Bauer & Müller (1969)
2	21 January 1965	Bauer & Müller (1969)
1 (+)[a]	April 1966	G. Handrinos
3	15–16 January 1968	F. Koning & R. Visser (pers. comm.)
1	22 April 1969	M. Hodge & J. Custer (pers. comm.)
9	31 May 1973	W. Wartman (pers. comm.)
2	23 July 1975	Ritzel (1977)
c. 150	20 October 1978	J. Lumby, in Cramp & Simmons (1983)
3	23 April 1979	V. Goutner
5	24 April 1979	V. Goutner
1	25 April 1979	V. Goutner
8	28 April 1979	V. Goutner
1	1 May 1979	V. Goutner
1	8 May 1979	V. Goutner
5	9 May 1979	V. Goutner
1	11 May 1979	V. Goutner
2	19 May 1979	V. Goutner
1	27 March 1980	V. Goutner
9	2 April 1980	T. Akriotis (pers. comm.)
1	3 April 1980	T. Akriotis (pers. comm.)
1	18 April 1980	V. Goutner
2	19 April 1980	V. Goutner
2	25 April 1980	V. Goutner
1	3 May 1980	V. Goutner
c. 250	4 April 1981	C. Goutner (Goutner, 1983)
3	8 April 1981	V. Goutner
1	15 April 1981	V. Goutner
7	15 April 1981	V. Goutner
6	15 April 1981	V. Goutner
1	15 April 1981	V. Goutner
1	6 May 1982	V. Goutner
8	7 May 1982	V. Goutner
1	8 August 1982	M. Iseli & M. Frey (pers. comm.)
1	1 October 1984	G. Ashton, J. Ferguson Lees *et al.* (pers. comm.)
4	16 January 1986	G. Handrinos
9	5 March 1988	V. Goutner
7	4 April 1988	G. Handrinos, H. Alivizatos & G. Condylis
2–3	11 April 1988	M. Iseli & M. Frey (pers. comm.)

[a] (+) Denotes a collected specimen.

RESULTS

The slender-billed curlew was first recorded in Greece in September 1857 when two birds were shot on Corfu (Powys, 1860). Subsequently, and until the end of the last century, all known records were of shot birds which were collected on nine different occasions (Reiser, 1905); of these, four came from western coastal Greece and five from the Phalericon delta near Athens (Table 1, Fig. 1).

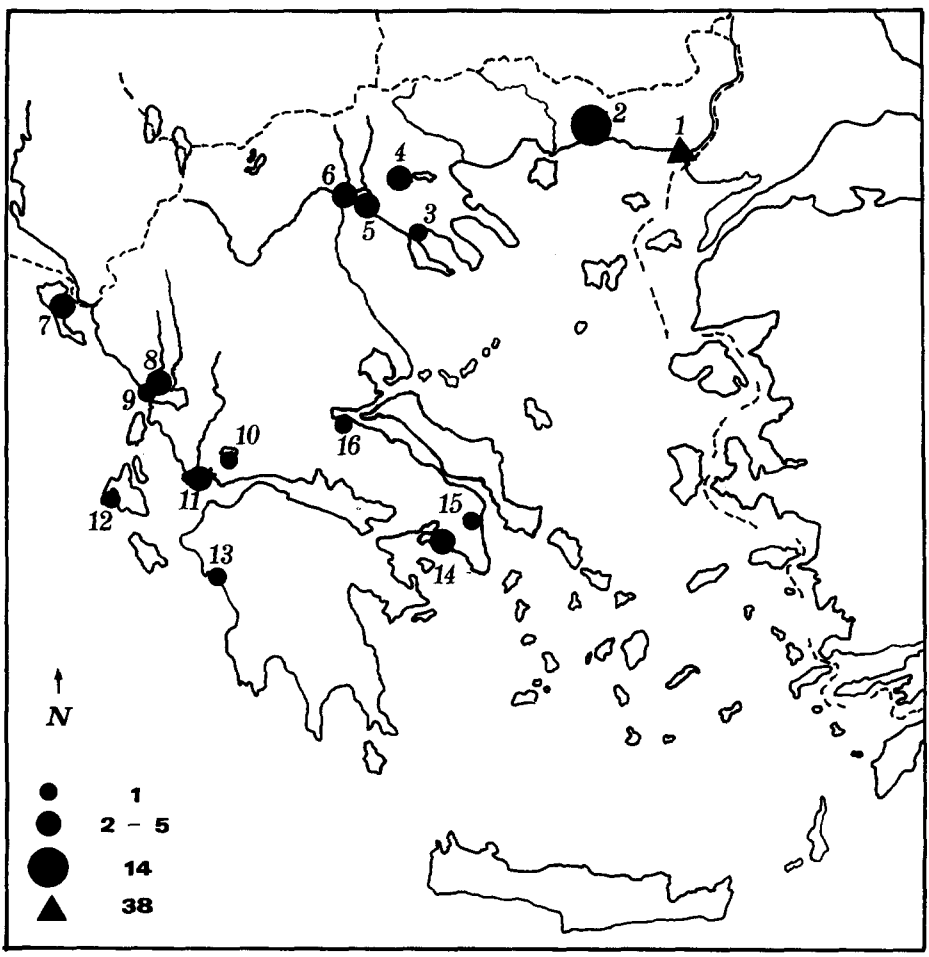

Fig. 1. Distribution of slender-billed curlew records ($n = 80$). Dots indicate the number of records per area. The numbers on the map denote the following areas: 1, Evros delta; 2, Porto Lagos-Xirolimni; 3, Aghios Mammas marshes; 4, Lake Koronia; 5, Anghelochori salines; 6, Axios-Loudias delta; 7, Corfu island; 8, Amvrakikos Gulf; 9, Aghios Thomas; 10, Lake Trichonis; 11, Messolonghi wetlands; 12, Lixouri (Kefallinia island); 13, Mouria lagoon (Peloponissos); 14, Phalericon delta (Attica); 15, Marathon marsh; 16, Thermopylae marshes (Spercheios delta).

Within the first half of the present century there were only two records of slender-billed curlew: one bird in the Marathon marshes and one at Lake Koronia (Table 1, Fig. 1). Thus, almost all known records were made after the middle of the present century, within the last 30 years.

By arranging the numbers of slender-billed curlews from all the Greek records into ten-day periods, throughout the year, a certain pattern appears (Fig. 2). This figure suggests the following:

(1) Slender-billed curlews have been recorded in Greece in all months except November and December.

(2) More birds appeared during spring migration. These movements started at the beginning of March and peaked in April and early May. However, the pattern of spring migration occurrence is mainly due to the contribution of the Evros delta, which constituted 48% of the Greek records.

(3) Apart from the spring migration period it seems that slender-billed curlews were present at the end of September and in the middle of winter (January) in greater numbers than in other months. The few other records were widely scattered throughout the rest of the year.

The sites in Greece where slender-billed curlews have been recorded and the number of records in each are mapped in Fig. 1. The species has been recorded at 16 sites, most of which are wetlands in Western and Northern Greece. At seven sites the species was recorded only once; at a further seven sites 2–5 times, and at the easternmost wetlands in the Porto Lagos region and Evros delta 14 and 38 times, respectively. Six of these sites are wetlands

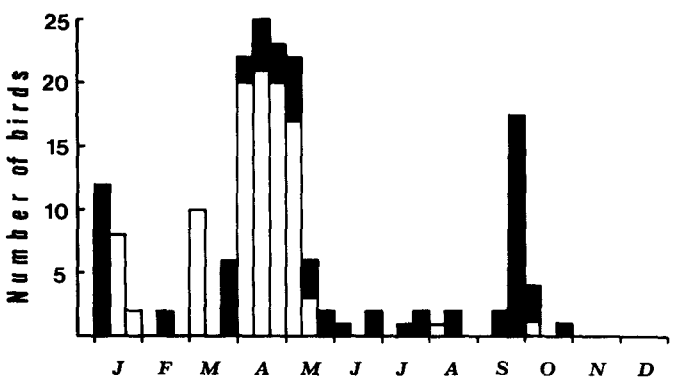

Fig. 2. Distribution of numbers of slender-billed curlews observed in Greece ($n = 177$) throughout the year. Each column represents a ten-day period. Open columns: Evros delta numbers. Closed columns: numbers from the rest of Greece. In this figure the two extreme Evros delta records of *c.* 150 and *c.* 250 birds have been excluded. Three records for which the exact day is unknown were arbitrarily put in the middle column of the relative month. The minimum count has been used for records in which a maximum and minimum figure are available.

of international importance (Amvrakikos Gulf, Messolonghi, Evros delta, Porto Lagos-Xirolimni, Axios-Loudias delta and Lake Koronia).

Figure 1 also gives an indication that the records are distributed along three zones crossing Greece almost vertically from north to south: in the eastern part of the area (sites 1 and 2); in the central part (sites 3, 4, 5, 6, 14, 15 and 16); and along the west of Greece (remaining sites, Fig. 1). If the records within these three zones are separated (Table 3), we can see that the proportion of records during the spring migration is lowest in Western Greece. According to this kind of zoning the data suggest a mostly spring migration presence of slender-billed curlews in eastern and central parts of Greece, the latter being also important for the autumn migration period.

This zoning is not accidental. As far as is known, these three zones constitute the main migration routes of birds in Greece connecting the region of the Balkans with North Africa (Handrinos, 1987; Heliotis, 1988). Of these routes, the easternmost appears to be the most important, at least for some other rare migratory waterbirds such as common cranes *Grus grus* and Mediterranean gulls *Larus melanocephalus* (Van Den Berk *et al.*, 1985; Goutner, 1986).

In no other Greek wetland has the occurrence of slender-billed curlews been recorded and mapped so accurately as in the Evros delta. Of all 38 records in the delta the precise location of 28 is known and indicated in Fig. 3. All records come from the 'lower' delta, that is, its seaward part. Here, apart from a coastal strip with sandy substrate and low psammophile vegetation, saline sandy-muddy substrates and salt marshes predominate (tidal, or formed by underground penetration of salty water), vegetated with plants

TABLE 3

Numbers (and Percentages in Parenthesis) of Slender-billed Curlew Records ($n = 80$) according to Season along the Main Greek Migration Flyways

	Flyway		
	Western	*Central*	*Eastern*
August[a]–October[b]	1 (1·2)	1 (1·2)	11 (13·7)
March–May	7 (8·7)	12 (15·0)	34 (42·5)
June–July	0 (0·0)	2 (2·5)	4 (5·0)
January–February[b]	3 (3·7)	1 (1·2)	4 (5·0)

[a] August is involved in the autumn migration period as the southward migration of slender-billed curlews seems to start this month (Cramp & Simmons, 1983). The three August records include one from the western flyway and two from the eastern flyway.

[b] There are no records in November and December (see also Fig. 2).

mainly belonging to the broad class Puccinelio-Salicornietea (Babalonas, 1980; Goutner, 1985).

Three of the records relate to birds on coastal flats (one by J. Lumby in Cramp & Simmons, 1983, site determined by communication through ICBP), 23 to birds on salt marshes, one to a bird on a temporary freshwater marsh (drained in 1983–84, site C in Fig. 3) and two to flying birds (A and B in Fig. 3). The most important area in terms of frequency of observations appeared to be the surroundings of the Drana lagoon, especially its southern and western part. This lagoon was drained by local people in May 1987 (Goutner & Jerrentrup, 1987).

Of all the Evros records two were really astonishing: a record by J. Lumby on 20 October 1978, when about 150 slender-billed curlews were seen, and one by C. Goutner (Goutner, 1983) of about 250 birds. Apart from these two records of exceptionally high numbers more birds have generally been seen per record in the Evros delta than in the rest of Greece, where most records were of single birds (Tables 1 and 2).

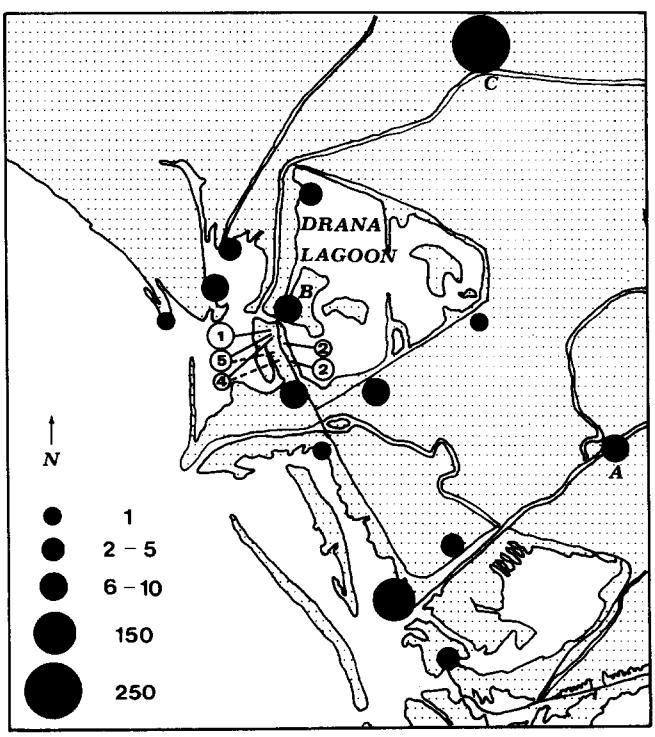

Fig. 3. Distribution and numbers (different-sized dots) of slender-billed curlews in the Evros delta (from 28 of 38 records). Numbers in open dots indicate the number of sightings made at an area, the arrow representing one of these sightings. The very fine dotted area represents land and the unmarked area water. Scale approximately 1:38 000. A, B and C are symbols explained in the text. This map presents the area as it was between 1975 and 1987.

DISCUSSION

The occurrence of slender-billed curlews in Greece is outlined on the basis of the 80 records obtained between 1857 and 1988. We recognize, however, that due to the nature of these data the general picture includes some errors. Thus, the distribution pattern of slender-billed curlews in time (throughout the year) and in space (within Greece) may be somewhat different from that presented here. First, as mentioned above, most records prior to the middle of this century are of birds shot at particular areas. Slender-billed curlews might well have been more abundant then than today and present elsewhere in Greece but due to the inaccessibility of most other parts of the country, two world wars and many local conflicts, few ornithologists visited Greece and few if any adequate surveys were carried out. Consequently, the records of that period simply reflect the presence of slender-billed curlews at particular sites and certainly do not represent a complete picture.

Secondly, the fact that most of the records were made during the last 30 years may simply be a reflection of the greater effort put into surveying Greece, and especially its wetlands. The recent increase in effort can be attributed to the publicity given to these areas and their bird diversity through scientific and other publications, which is perhaps more true for Northern Greek wetlands than other sites (e.g. Bauer & Müller, 1969; Bauer *et al.*, 1969; Gooders, 1974). Visits for scientific purposes have also increased (e.g. IWRB missions for waterfowl counts, other ornithological studies). Wetlands in Northern Greece have been preferred by foreigners, perhaps because the terrain of this region is very attractive, with a combination of mountainous areas, plains, wetlands and diverse coastline all providing possibilities for recreation and birdwatching. Thus, it is not surprising that 60 (88%) of the 68 records of this period come from Northern Greek wetlands and 32 (47%) were made by foreign observers. As mentioned above most Northern Greek records come from the Evros delta but we believe that this was not simply due to the effort put into surveying that area. The unusually high number of records of slender-billed curlews and the high average number of birds per record also suggest that this wetland is of great importance, especially during spring migration, and that it is possibly one of the most important sites for the species in the whole Western Palearctic.

Despite the fact that the frequency of visits to Greek wetlands has increased, they have been directed mainly at well-known large sites. However, Greece possesses at least 124 wetlands (Heliotis, 1988), including many minor ones which have only recently been described more or less adequately (e.g. Stubbs *et al.*, 1981; Joensen & Jerrentrup, 1988; Goutner, in prep.). There may be others (including those on islands) which have still to be recorded and/or described. Additionally, and as far as we know, no

appropriate surveys have been carried out at inland Greek sites such as temporarily flooded plains along rivers, areas of reclaimed marshes and wet grass fields where slender-billed curlews might occur especially during migration, for feeding and/or roosting, perhaps as a consequence of their tendency to join up with flocks of curlews *Numenius arquatus* or other waders (Brosselin, 1968; Cramp & Simmons, 1983; van Den Berg, 1988; A. Gretton's (pers. comm.) recent data from Morocco, our observations in inland Greece).

It is therefore possible that the distribution of slender-billed curlews in the Greek region is much wider than previously described.

We suggest the possibility that slender-billed curlews use the three known migration corridors existing in Greece. However, as these birds seem to follow a general east-northeastern–west-southwestern flyway during migration (A. Gretton, pers. comm.) rather than the north–south (and *vice versa*) of other birds, such movements may perhaps take place due to the geographic peculiarities of Greece and especially the distribution of its wetlands (see Heliotis, 1988). We recognize that in order to be more adequately supported this hypothesis needs more data not only from Greece but also from neighbouring countries, which will result from the gathering of slender-billed curlew records currently being undertaken by ICBP. It is hoped that this project will also reveal other routes followed by these birds.

CONSERVATION

Eleven of the 124 Greek wetlands have been declared sites of international importance (Heliotis, 1988) and are theoretically protected under the Ramsar convention. Despite the fact that this convention has been Greek law since 1974, very little action has been taken for wetland conservation. Management plans have been made only for Prespa Lake, designated as a National Park since 1974, and Amvrakikos Gulf but (especially in the case of the latter site) have never been adopted by the Greek government. Additionally, the Evros delta is protected by a joint decision of the Ministers of Environment and Agriculture signed in 1980 which, however, has never been effectively applied because of determined resistance by local communities.

Consequently, almost all Ramsar sites have been subjected to continuous shrinking and degradation due to various unscheduled human pressure and mismanagement practices. The same holds true for the unprotected wetlands, of which many are under imminent threat of disappearance, even before they become well-known and studied.

The most important threats to Greek wetlands are reclamation for agricultural purposes, construction work and dumping as well as the newly

imported activity of fish culture. This is greatly encouraged and supported by the Greek State, often through European Community funds aimed at increasing the local communities' income.

On the other hand, the slender-billed curlew is protected through the European Community Directive 79/409, including in Greece. Although in recent years hunting has not proved to be a serious threat to these birds, legislation in itself is not a guarantee of protection for birds in Greece, since many raptors, herons, waders and others are indiscriminately shot during the open season (15 September–10 March). Hunters cannot make the excuse of misidentification of slender-billed curlews with the common curlew and whimbrel, as all curlew species are legally protected in Greece.

Special measures are therefore necessary for the conservation of the slender-billed curlew and its habitats in Greece. First, a detailed inventory of all Greek wetlands with adequate habitat descriptions is needed. This, coupled with regular observations, may reveal more sites used by, or potentially important for, this species. This information would strengthen action for conservation and management measures. Priority should be given to sites where slender-billed curlews have already been observed more than once. Special measures should be taken for the Ramsar sites, especially the Evros delta and Porto Lagos region, where these birds occur regularly. These measures should enforce prohibition of any habitat modification, hunting and other disturbing activities in the most important areas.

As slender-billed curlews show a peak in September during autumn migration (Fig. 2), at least in Eastern Greece (Table 3), hunting in this region should start later (1 November). This measure should progressively apply to all Greek Ramsar sites.

Conservation, primarily of wetlands, should also be achieved by continuous pressure through the European Community, control of Integrated Mediterranean Programmes and local conservation action of Greek non-governmental organizations and individual conservationists, who must be encouraged and supported through the European Community.

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