VERSLAGEN EN TECHNISCHE GEGEVENS

Instituut voor Taxonomische Zoölogie (Zoölogisch Museum)

Universiteit van Amsterdam

No. 50

The Status and Distribution of the Spoonbill *Platalea leucorodia* A review of its past and present status, migration routes, and wintering areas

J.C.J. VAN WETTEN

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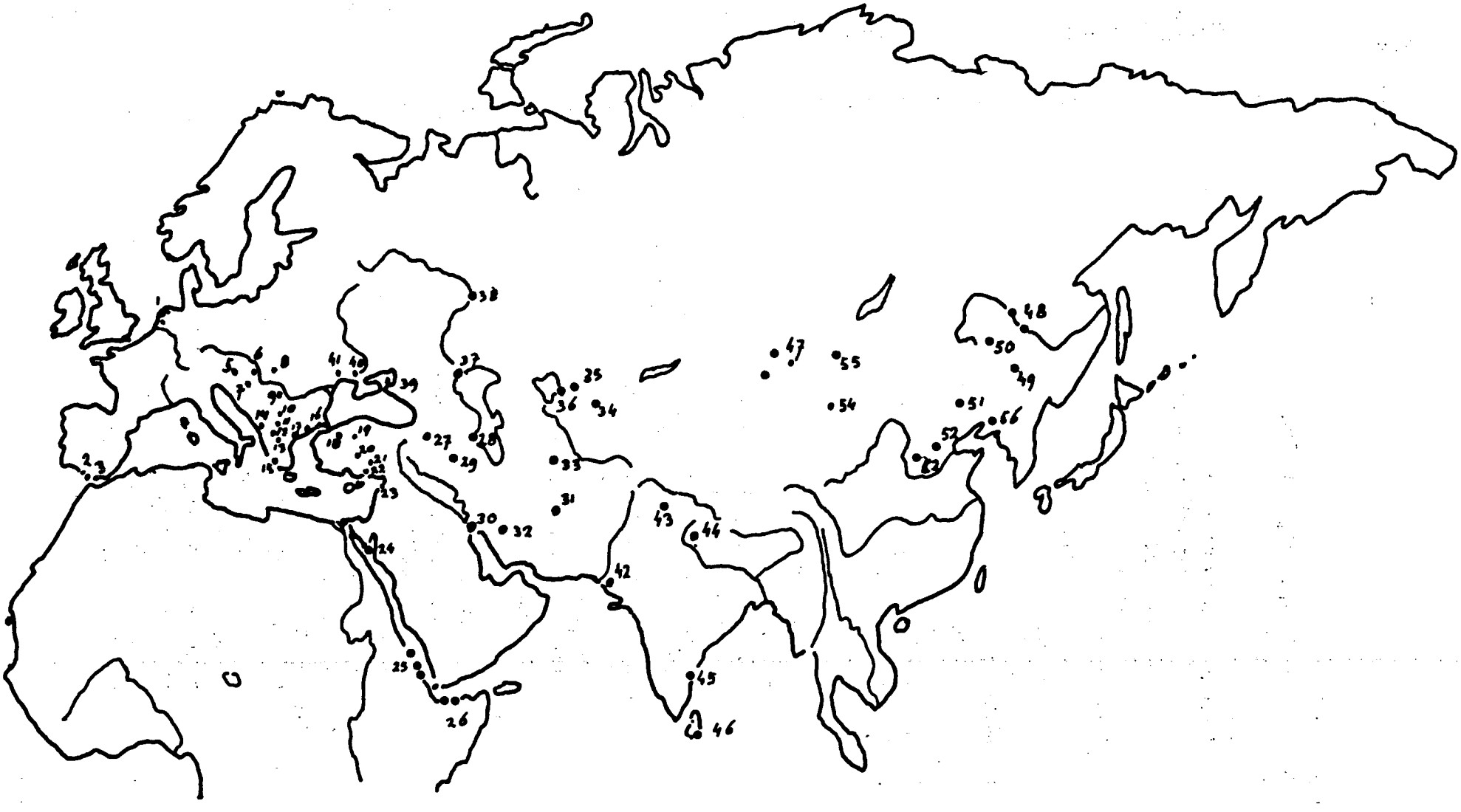

Figure 1 : The situation of the colonies. The numbers in the figure correspond with the numbers and names in Table 1. For the colonies in Rumania see Brouwer (1964)

I Introduction

a Nesting ecology and food

The spoonbill *Platalea leucorodia* is a colonial waterbird with a wide distribution in the Palearctic. The colonies are situated close to areas with shallow water near the edges of lakes, rivers, pools, lagunes, mangroves, and deltas where some quiet undisturbed places with reedbeds or low trees occur. As the spoonbills are very shy, due to prosecution by mankind, it is important that during the courtship and nestbuilding period the colony site occurs is not disturbed.

The nests are build at a distance of some 50 -100 cm from each other and are made of branches and reeds. When breeding in reedbeds the nests are situated close to the waterfront and young spoonbills are, after becoming able to walk, often found strolling in the water.

When the nests are build in trees the spoonbills also use branches and build heavy nests of 20-40 cm height, placed a few metres from the ground.

The foraging areas of spoonbills contain a variety of habitats. with shallow water not exceeding a depth of 30 centimetres. In deltas and estuaries the spoonbills forage on the muddy banks and edges of rivers and streams or on shallow flooded areas when a high water level in the river occurs. They are also found in shallow parts of the tidal areas. In a few occassions spoonbills forage on the tidal flats of coast like in the Dutch Waddensea or at the Banc d'Arguin in Mauritania.

Spoonbills which are breeding far inland forage in shallow lakes, marshes and in temporary flooded ares. In Kazakhstan spoonbills also forage in alkaline and salt lakes.

The food of the spoonbill is catched by a sweeping movement of the bill. When a prey is detected by this sweeping movement it is caught with a quick grasp of the bill and swallowed. The broad spoon-shaped bill is highly functional when grasping the prey during these sweeping movement out of the water. Very unmanageable armed preys are easily crushed between the broad mandibles. Although the spoonbill is eating many species of prey it seems that small fishes up to 10 cm, prawns and shrimps form the major diet . Aquatic insects and even amphibians can be taken as well.

As the preys are not too big it is necessary that they occur in high densities in order to supply the spoonbill a profitable foraging place.

Especialy flooded areas or tidalflats were high prey densities occur in the remaining pools and waters, form such places.

Spoonbills are mainly tactile foragers and forage for a great part during the night. Muddy and untransparant waters as well as clear, streaming fresh or salt waters are visited by foraging spoonbills.

Spoonbills are often foraging in groups and show social feeding behaviour. Information transfer and the profitability of foraging in groups might be an important factor in the development of colonial life in spoonbills. Although it is the most profitable when the foraging areas are near the colony, spoonbills made flights up to 30 km. It may be computed that the maximum distance between the foraging area and the colony should not exceed 35 km.

Migration

At latitudes higher than 30 degrees North the spoonbills are all migratory. Large flocks of spoonbills occur in gathering places before the long distance migration starts. The crossing of seas like the Mediterranean or the Gulf of Cadiz has been observed. During migration the spoonbills often visit small halting places in order to rest and forage before going further. Most flocks seen during migration are not exceptionaly large and mostly contain 10 -100 birds.

Chapter II Distribution

East and Southeast Asia

China

No recent data are available on the numbers of breeding or wintering birds.The spoonbill is wintering in the south and south-east of China, and has been recorded in winter from Fukien and Kwantung (Cheng, 1976; Martens ,1910; Vaughen and Jones 1913). The species breeds in the north and north-eastern parts of China. Cheng (1976) gives a rough indication about the situation of the colonies shown in Fig 1. It is uncertain if the spoonbill breeds in the north-western part of China in Sinkiang as indicated by Cheng (1976), because Etchecopar and Hue (1978) do not record the spoonbill for this area. But they state that the Spoonbill probably breeds in the Cantong and Hopei districts. In the lower Yangtze Basin or the Shanghai district the spoonbill is only seen on migration (Styan, 1891).

Korea

The spoonbill is only known as a rare winter visitor or migrant bird, probably on it's way from China and Mongolia to Japan (Gore and Won, 1971)

Taiwan

The spoonbill does not breed here but is only a winter visitor from China (Swinhoe ,1863)

Japan

In Japan the spoonbill is a rare winter visitor . It occurred in October in the north of Japan near Hako (Whitley, 1867) and small flocks up to 40 birds are seen near Tokyo in the Anasaki Nat. Res.(Anonymus, 1974) .The spoonbill was formerly a very regular winter visitor from the mainland of Asia, but has become rare since the end of the last century (Austin and Kuroda ,1953).

Mongolia

The Spoonbill is breeding in the western part of Mongolia on the banks of lake Orok-Nor and other lakes on the northern foot of the Altai mountains (Kozlova, 1932).

Soviet Union

Two breeding places are known near the Amur close to the Chinese border east of Blagoveshschenk (Kozlova, 1932).

Vietnam

Although the spoonbill is said not to occur in Vietnam (Delacour, 1940; Dickinson, 1970; Anonymus, 1940) there is a report in which the spoonbill is said to be numerous in the mangroves near Vinh (Delacour and Jabouille, 1925).

Comments

The breeding places of the spoonbill in East-Asia seem to be restricted to China and Mongolia. As it is uncertain, weather the spoonbill breeds in Central China, the population breeding in the north-east and east of China seems to be quite separated from the population of western Mongolia This population and the spoonbills breeding in Kazakhstan together form the Central Soviet Union population. It seems that two wintering areas exist. The main one is the coastal region of Fukien, Kwantung and Taiwan. The other is Korea and Japan. The Manchurian bird may winter partly in Japan and migrate through Japan. The Spoonbills breeding in the Inner-Mongolia and Hopeh district will probably migrate in a southward direction to south-east China.

No accurate data are available on the places and numbers of colonies. The wintering grounds are roughly indicated as estuaria and riverbanks in certain districts but exact places and figures are not available.

As no data are available of Spoonbills occuring south of Hong Kong (except the rather vague note in Delacour and Jabouille (1925) which is not repeated by Delacour later on (Delacour, 1940) it is doubtfull if the species winter also in Vietnam.

South Asia

Burma

Only a rare visistor (Smythies, 1953)

Pakistan

The spoonbill is both a summer and winter visitor to Pakistan. There are a few indications about breeding places with small colonies of ±20 birds, near Lahore (North-West Punjab) in the beginning of this century (Whistler, 1916,1922) . In the Indus delta near Karachi the spoonbill is also said to be breeding (Ripley, 1961). As Russian birds from the Wolga and Caspian region are partly wintering in India in Uttar Pradesh and Maharastra spoonbills from the Soviet Union must migrate through the southern part of Pakistan.

In the north of Pakistan there are a few observations of spoonbills trying to pass over the Mountains of the Peshawar. Meinertzhagen (1920) observed flocks up to 100 birds at 5000 feet near Kushdil, and in April Whitehead (1909) saw 20 birds trying to top the Pewar Kotal (8200 feet) near the Khyber pass, on their way north.

The southern part of the Indus in the Sind district near Karachi is an important wintering area of spoonbills. Huge flocks appear from November till April and as stated by Ticehurst (1923) the vaste concourses are only migratory and wintering birds. At the Chenab and Sutlej rivers near Multan, large flocks of many thousand individuals (once estimated to contain about ten thousand individuals) appear from October till December (Ripley, 1968).

India

The spoonbill is wintering and breeding in India. A part of the Indian spoonbills migrate in wintertime to Sri lanka. Large colonies exist in India for example Baratphur but no data are available on the exact number of breeding pairs in India (Ali and Ripley, 1968). A census made in 1935 by Stuart-Baker (1935) came to a minimal number of some 650 pairs, but a few colonies were not counted and the census was quite incomplete. The next status was given:

-Etowah ?	
-Beenan	30 pairs
-Mynpoore	200 pairs
-Binghan	20 pairs
-Cingleput	400 pairs

Birds from the Soviet Union are wintering in India. One record of a bird ringed at the Wolga near Bombay (Dementiv and Gladkov, 1960) and four of birds from the Caspian region (between 40-50 N / 45-55 E) in Kolhapur district, Maharastra (17 N / 75 E) in Monghyr district, Bihar(25 N / 86 E) in Tonk, Rajasthan(26 N / 76 E), Mandhya district, Madhya Pradesh(24 N / 75 E). In Uttar Pradesh vast flocks are observed in October (old observations from 1887) (Ali and Ripley, 1968)).

As only data about birds migrating in the north of Pakistan are available one might presume that the Soviet birds wintering in India and Pakistan migrate through Uzbekistan and Peshawar to Pakistan and India. Especially

birds wintering in the Uttar Pradesh(26 N / 80 E) and Bihar(24 N / 85 E) will face a much shorter migrating route by taking the northern pathway, instead of flying along the Iran-Afghanistan border to the south and turning away east to Pakistan.

Sri Lanka

In Sri Lanka the spoonbill is breeding in many places. Wintering birds from India are present from December till April.

Most spoonbills are breeding in the south of Sri Lanka near the Yala Nature Reserve(400 pairs) (pers comm. Mr Samarakoon). In various small sanctuaries south of Yala near Hambantota and Bundala some very small colonies of ten pairs might exist near small lagoons and estuaries. In Wilpattu only a few incidental colonies are known. Not more then 60 pairs are said to be breeding here (pers.comm. T. Hoffmann). Flocks are seen on migration near Jaffna going to India. The total numbers of breeding pairs on Sri Lanka should be a little more then 400 pairs. The total number of Indian birds wintering on Sri Lanka is not known.

As many old freshwater tanks in the inland of Sri Lanka are no longer been kept a potential foraging area is vanashing as shown in Wilpattu National Reserve. The extending cultivation of land for rice and the draining of certain saltwater marshes in the south diminish the breeding and foraging availability of the spoonbills. Freshwater which formely streamed towards estuaria and lagoons is more and more used for irrigation of rice-fields, and potential feeding areas with brackish conditions and flooded circumstances are vanishing (own observations).

Middle East

Iran

The spoonbill is said to breed near Basra, Zabol Darya-cheh-ye and Shiraz (Scott,Moravey-Hamadani and Mirhossegni 1975). In the last few years spoonbills are only reported from the Darya-cheh-ye, where about 100 pairs are breeding (Pers. Comm.).This might partly be due to the fact that Basra is on Iraq territory. Iranian spoonbills winter on the south coast of Iran from Bandar-e- Bushehr to Chah Bahar.

Iraq

In Iraq both breeding birds and migrants from other countries appear. Near Basra and Kurna the spoonbill is breeding (Chapman and McGeogh, 1965) but no exact data about the numbers are available. Along the Tigris and the Euphrates various records are available of migrating birds. Marchant (1967) reported migration near Bagdad in spring and autumn. Chapman and McGeogh (1965) reported birds flying north along the Euphrates in March. Large flocks of wintering bird appear in the marshes of Sammara (Meinertzhagen, 1914) and near the Ramadi marshes, where some 200 birds were observed (Chapman and McGeogh, 1965).

Three ringed birds from Mayas Golu in north-west Turkey were found in the Basra marshes in winter . Probably most Spoonbills from Iraq winter in this area or on the south coast of Iran. The recent war between Iran and Iraq might have a negative effect on the wintering and breeding conditions of these birds. But the new dam building activities of the Iraq army (for preventing Iranian invasions) north of Basra creates a vaste area of hundreds of square kilometres with shallow waters which might form a very suitable foraging and breeding area for spoonbills in the near future.

Turkey

In Turkey the spoonbill is breeding in some four to five colonies. The largest ones are laying in the north-west at the Manyas Golu (400 pair) and on the Central Plateau near Eregli (250 pair). Other colonies are found near Yarma (100 pair) and Kurbaga Golu (30 pair). Summer observations of spoonbills near Hotamis (60,75) might indicate a colony in the close surroundings (Beaman, 1975,1978) The spoonbill might be breeding as well in the Sakarya valley (Wadley 1950) but no recent data are available about this colony. Meinertzhagen (1935) reported a little colony of 10 pairs in Lake Antioch. Migrating birds are seen regulary on the south-west and south coast of Turkey. Up to 100 birds are recorded from the Menderes delta in April and near the Goksu delta 74, 62 and 122 birds were seen on migration (Beaman, 1978). In 1975, 27 birds were seen flying north in March near Iskenderun coming south from Syria . In the south-east corner of Turkey near Hakkari 6 birds were seen on migration in March (Beaman, 1975).

Six recoveries from ringed birds of the Manyas Golu are known (Brouwer, 1968) Two were found in Israel,one in Egypt,one in Sudan, three in Iraq near Basra and one near Karachi.

The total number of breeding pairs in Turkey may vary between 800 to

900 pair. It is obvious that the population is wintering in two distingct regions, Egypt and Sudan as the western wintering region and Iraq and Pakistan as the eastern wintering region. Data about migrating birds along the Euphrates and the Tigris indicate the occurrence of an eastern migration route.

The spoonbill is wintering only in small numbers and it is not clear if this are Turkish birds or birds from other countries.

Lebanon Israel Cyprus

Recorded on migration in Lebanon (up to 70 birds) (Hollom,1959). Data from Israel are from spring and autumn. Recorded from Gaza in May and September (single birds) (Meinertzhagen, 1920). Recorded passing over Elat in September October and November in flocks (Safriel, 1968). A rare and irregular species, sometimes remaining in summer and winter on Cyprus, but mostly only migrating in spring and autumn (Bannerman, 1971). Only small flocks up to 14 birds are recorded from March till May but hardly any in autumn (Flint and Stewart, 1983).

Central and East Europe

Soviet Union

The spoonbill in the Soviet Union occurs in three regions. One in the east close to the Chinese border near the Amur. Another in the middle of the Soviet Union in Kazakhstan and a third west of the Ural mountains. Fig 1 shows the colonies named by Dementev and Gladkov (1960) and by A.Kuznetsov (pers. comm.). Most colonies are found near the border of the Black Sea. In the estuaries of most large rivers colonies are recorded. But Dement'ev and Gladkov (1969) also mentioned colonies far upstream the Wolga near Ilek and Perm. In Kazakhstan the spoonbill is said to breed at the border of salt and alkaline lakes.

A. Kuznetsov stated that the spoonbill is rare in the estuaries of the rivers which flow into the Black Sea, but that in the Wolga delta the spoonbill is numerous. Within the borders of the Astrakhan Reservate in the Wolga delta some 500-800 spoonbills are found, which indicates that 100-140 pairs are breeding here, this number has not changed much since 1960 when Dementev estimated the colony at 140 pairs as well. An old colony at Charka Island does no longer exist and only migrating spoonbills are seen here. The numerous mentioned colonies should contain a reasonable population. One might expect that the circumstances near the rivers in the south-west of the Soviet Union are comparable with the circumstances of the Danube delta and Danube Valley.

Although no records are available about the exact numbers of birds breeding in the Soviet Union the occurrence of many thousands of birds at the wintering grounds in Pakistan might suggest that a least some 1000 pairs breed in the central Soviet Union.

Migrating spoonbills are recorded from the west side of the Black Sea (A. Kuznetsov pers. comm.). From Kazakhstan in the Kisyl-Kum Desert (Sarudny , 1925).

At the south-east side of the Caspian Sea big numbers of spoonbills are recorded during migration in the Atrek delta. Other migrating spoonbills are from Tschikischlar in spring and Askhabad in autumn. Although ringing recoveries from the Soviet Union are rare, one recovery from a Wolga ringed bird in Bombay (Dementev and Gladkov, 1960) and two recoveries from birds ringed near Odessa in the Sudan (G. Nikolaus pers. comm.), indicate that the Soviet population is wintering in various countries. It may well be possible that the birds from the western population are mainly wintering in the Sudan and Iran, while the population from the Wolga and Kazakhstan migrates to Pakistan and the north of India. The spoonbills breeding near Blagoveshchensk in the east of the Soviet Union probably go to Japan or south-east China.

Rumania

The Rumanian population has shown a rapid decline in the last decennia. The Danube delta and the Danube valley once contained numerous colonies and at the beginning of this century over 400 pairs must have been breeding in Rumania (Vasiliu, 1968; Vespremeanu, 1968). Already in 1915 a colony of 50-80 birds was destroyed near Banat. In the Danub delta, where between 1940-1945 some 250 pairs were breeding (Vespremeanu, 1968), some 15

colonies existed on various places in the marshes (Brouwer, 1964). In the Danube valley Brouwer reported 4 colonies with some 160 pairs in total. The next table has been made from various sources .

	Danuba delta	Danuba valley
1955	5 pairs	115 pairs
1956	10	30
1957	25	45
1958	30	120
1959	35	30
1960	5	75
1961	5	15
1962	15	0
1963	65	160
1968	100	?
1984	0	0

At present no spoonbills breed in Rumania (pers. comm. Botond J. Kiss) which means that two very important breeding areas (the Danube delta and Danube valley) of the Balkan population have vanished. Now only flocks from Sovjet territory occur sometimes in the Danube delta. The destruction of suitable breeding places by human activities in the Danube delta and the occurrence of natural catastrophes (flooding of breeding ground) was already mentioned in 1968 by Vespremeanu as a threat to the population. It is not known which is the main reason for the disappearance of breeding spoonbills from Rumania. The pollution of the Danube and the regulation of the floods by building dams in the rivers may be one of the reasons. The pollution with pesticides like DDT has caused a drastic decline in the number of spoonbills in Western-Europe from 1963-1970 and might still have such an effect in Rumania when these pesticides are still in use.

Austria

The only colonies in Austria are laying at the Neusiedlersee in a well protected area. It is not clear how long these colonies are already in existence but Brouwer (1964) wrote that a total of 200-250 nests was found in these two colonies.

Hungary

At the beginning of this century the first breeding records of spoonbills in Hungary were made. In 1912 9 pairs were breeding in Kis Balaton (Plattensee) (Keve, 1975). This colony growed rapidly in the next years and contained some 30-60 pairs from 1920-1930. In 1930 a new colony was reported at lake Velencei where some 25 pairs were breeding. A new colony was also recorded near the fish pounds of Hortabagy where some 75 birds were breeding in 1964 (Brouwer, 1964). Hommannay (1982) stated that already in 1951 some 60 pairs were breeding here. The next very incomplete table can be made to show the numbers of breeding spoonbills in Hungary. (Sovago, 1966, 1967; Jozsef and Josip, 1971; Keve, 1975; Kovacs, 1975; Hommannay, 1982)

Year	Hortobagy pairs	Kis Balaton pairs	Velencei pairs	Karakaton pairs
1912	5			
1930		60	25	
1941		14	70	
1948		120	70	
1951	60	24	150	
1954				10
1962	75	75	17	
1967		76		
1979	220			
1982	220			

The data are very incomplete and no data are available about the last 9 years from other colonies then Hortobagy, so it is very hard to say anything about the present state of the population which has varied in former years somewhere between 200 and 300 breeding pairs.

No records exist about wintering birds in Hungary, and it seems that the Hungarian spoonbills use the same wintering area as the Austrian spoonbills. The birds follow a south-westerly route, sometimes reaching France. There, in autumn 1941 two groups were seen, in which one ringed bird from Hungary was observed (Glegg 1941).

Thirteen juvenile spoonbills were ringed in the colonies of Velencei and Hortobagy and were recovered from Yugoslavia (2 times), Calabria, Italy (2 times), Sicily (1 time), Libya (3 times), Tunis (3 times),and Lake Chad Niger(1 time) (Keve, 1959; Patkai , 1967). This last recovery is quite exeptional and indicate that the spoonbill must have traversed the Libyan and Chad deserts before reaching Lake Chad.

Yugoslavia

At the beginning of this century many spoonbills were breeding in Yugoslavia and this country must have been a very important breeding area. Brouwer (1964) gives figures for the Obedska Bara, one of the main colonies near the Sava (40 km from Belgrado):

1883	300 pairs
1896	350 pairs
1902	500 pairs
1908	1000 pairs
1930	60 pairs

About other colonies in Yugoslavia onlya few data are available. In the Kara Su marshes in the south of Yugoslavia some 160 pairs bred in 1938 and some 200 pairs in 1939 (Brouwer, 1964). This colony was still mentioned in 1950 by Makatsch (1950) together with the colonies of the Lake Skutari. Makatsch also mentioned a colony in Lake Ajvatovac where some 30-40 birds were breeding in 1938. This colony contained about 30-40 pairs (Brouwer, 1964) in 1950. In 1955 some 100 spoonbills had been breeding in the

Uzdin-woods in Vojvodina north of Beograd (Pelle, 1967). The last report about the status of the spoonbill in Yugoslavia is from a personal communication with J. Muzinic who stated that only a small colony of some 10-20 birds is known somewhere between Zagreb and Beograd .

Already in 1964 Brouwer wrote that most colonies were declining due to human activity like draining of traditional feeding grounds in marshes and flooded areas. Considering that in the beginning of this century at least 1000 pairs were breeding in Yugoslavia and that in 1938 at least 300 pairs, it is clear that the population is now only a humble remain .

Greece

Brouwer (1964) reported that in Greece the spoonbill is only a migratory bird and not breeding. In contrast, Kanellis (1969) published a list of places where spoonbills were breeding. The roaring history of Greece and the many changes of names from Turkish to Macedonish and vice versa may have led Brouwer astray. In the Prespansko Jezero (Crna-Reka) Makatsch (1950) found 200 pairs breeding in four colonies. In 1969 the spoonbill was breeding in the Gulf of Arta, and at Nitrikoi Sea and before 1969 already in the Evros delta.

A recent census of the Spoonbills in Greece by Ben Hallmann (1984) showed that approximately some 200-310 pairs are breeding each year, in the following colonies. Evros delta (40), Mitrikou lake (20), Kerkini (120), Mikra Prespa (2-3), Amvrakikos (5-10), Kalamas delta, Axios and Vistonis.

On the Ionic Islands the spoonbill sometimes winters in small numbers (Kanellis, 1969). No data are available about the the wintering areas of the spoonbills from Greece.

Albania

Recorded on migration in the Humsko-Blato (Ticehurst and Whistler, 1932).

Bulgaria

Not recorded as a breeding species (Brouwer, 1964).

Italy

A rare bird, which does not winter in Italy (Salvadori ,1872; Alexander, 1927).

Malta

A rare spring and autumn visitor (De Luccia, 1969) on Malta, there is only one spring observation of a flock of 40 birds flying off the coast in a north-westerly direction (Payn, 1938).

North and Northeast Africa, and Red Sea

Algeria

Not many data are available about wintering birds. Jourdain (1915) reported three birds in April in Lake Fetzara. Brouwer (1964) stated that in 1926 one incomplete clutch was found at Lake Fetzara. Algeria is probably only an incidental wintering place of spoonbills from the Balkan. It may even be that spoonbills from Spain or the Netherlands occasionally visit Algeria.

Tunisia

Ring recoveries indicate that the spoonbills wintering in Tunisia come from Hungary and Austria (see these text of countries). Britton (1969) spotted with radar, a flock of 29 birds coming from Italy in November. The spoonbill is not uncommon in Tunisia, and possibly nests in limited numbers near the Regency. In the Regency and near Lake Tunis the spoonbill is more abundant in winter and during migration. In certain localities the species may be quite numerous in autumn (Whitaker, 1905).

Libya

From September till March spoonbills appear. Some are seen near Tripoli but they are more common near the Tunisian border. Three ringed birds from the Neusiedlersee where recovered in Libya (Bundy, 1976) and one may presume that like in Tunisia the spoonbills in Libya are wintering birds from Austria, Hungary and Yugoslavia.

Egypt

Along the coast of the Red Sea the spoonbill is breeding on various islands. The population belongs to the subspecies *Pl. l. archeri* (Balman, 1944). Near the Nile large groups of spoonbills are seen on migration. The spoonbill is not uncommon on Lake Menzalah in spring Loat (1906) found the spoonbill not uncommon near Lake Menzalah in the winter of 1903. Jourdain (1936) observed 150 birds in March near Birket Qaron. Taylor (1967) stated that the spoonbill is not uncommon and appears in flocks during the winter. Recent observations in the Nile delta and near Port Said showed that hardly any spoonbills do winter in this area (Meininger and Mullie, 1981). For the European and Asian spoonbills Egypt is probably only a country through which the species migrates on its way to the Sudan in autumn, and to Europe and Asia in spring.

Sudan

In Sudan breeding spoonbills occur near the mangroves and little islands of the Red Sea. (pers.comm. G. Nikolaus). On the rivers near Khartoum the spoonbill is used to be very common during the winter (Butler, 1905). The birds that appear near the large rivers of Sudan in winter are Palearctic migrants (White, 1965).

Nikolaus (pers.comm.) estimated the number of wintering birds in Sudan to be 500-1000 birds.

Ring recoveries from Palearctic spoonbills show that the birds from many

countries winter in the Sudan; two from Hungary, one from Rumania, one from Turkey (Manyas Golu), one from Austria and one from the Sovjet Union (Ukraine) (pers. comm. G. Nikolaus).

Nigeria

In the north east corner of Lake Chad the spoonbill sometimes appears during the winter in very small numbers (Elgood, 1982). At Lake Chad spoonbills are common in winter. This may be breeding birds from Hungary and Austria.

Mali

Spoonbills are recorded from Upper Niger and Tombouktou (Moreau, 1967).

Saudi Arabia

The spoonbill is a local breeding bird of the Red sea coast (*Pl. l. archerii*) (Jenning,1981)). In April migrating flocks going north (up to 200 birds) have been seen near Jizan. This may indicate that migrating Palearctic birds not only travel through the Nile valley but take also a more eastern route over Saudi Arabia.

Ethiopia

Resident and breeding from April to October (*Pl. l. archerii*) in north-east Ethiopia in coastal regions of the Red sea (Urban and Brown, 1971). Spoonbills also breed in the mangrove areas of Eritrea (Moreau ,1950; Smith,1951). The importance of some lakes situated far from the coast, as wintering areas is not yet known. Cheesman and Sclater (1935) observed 30 birds in May at Wuhasa Abo (8400 feet).

Somalia

The spoonbill *Pl l. archeri* is very common on the north west coast of Somalia (Ash and Miskell, 1983), and breeds there from May to August (Moreau, 1950). There is only one record of *Pl. leucorodia* from Juba in the south of Somalia. Not is known if this bird was a *Pl.l.leucorodia* or *Pl.l.archerii* . No records are available of wintering Paleartic birds.

West Europe and Northeast Africa

Denmark

The spoonbill has bred several times in Denmark but never has become a regular breeding bird there. In 1900, nests were found in West Jutland (Løppentin, 1948) and afterwards several breeding spoonbills were recorded at different places throughout Denmark. From 1963-1967 spoonbills were breeding in a very small colony of 3-4 nests in Nortwest Jutland (Kortegaard, 1973). From 1968 till 1969 only one nest was found and after 1969 no breeding attemps of spoonbills are known. The decline and vanishing of the spoonbills took place at the same time the Dutch population declined drastically due to pesticide pollution with chlorated hydro-carbons. At latitude 57 North in Denmark the spoonbills are found at the most northern border of their range.

The Netherlands

The spoonbill used to breed here close to freshwater marshes, in the centre of Holland. Large colonies of 1000 or even more birds are recorded from the Middle-Ages. Untill the end of the 19th century a large colony of over 1000 pairs existed at the Horstermeer (Brouwer, 1953). After draining of the marshland of the Horstermeer, the spoonbill spread to various new colonies in the course of the 20th century (Brouwer, 1964).

At present the spoonbill breeds in seven well protected colonies. Pesticide pollution of the foraging areas caused a rapid decline of the population from 1962 till 1968. Now the population is steadily growing, but modern agricultural methods change the foraging conditions in most foraging areas (van Wetten and Wintermans, 1986). Recent pollution of ditches by mercury compounds used for agricultural purposes may retard the restoration of the population (Osieck, 1986).

In the immediate future the Dutch population may not be endangered. The growth of the colonies on the Waddensea islands is considerable. It seems that the Dutch spoonbills become more and more dependent on the tidal flats of the Waddensea, due to the loss of suitable freshwater foraging areas on the mainland of North-Holland and the isle of Texel.

Present colonies	
Naardermeer	100 pairs
Oostvaardersplassen	50 pairs
Zwanenwater	70 pairs
De Geul	8 pairs
De Muy	22 pairs
De Schorren	22 pairs
Vlieland	25 pairs
Terschelling	30 pairs

Belgium and France

Dutch spoonbills migrate in spring and autumn through these countries. The estuaries and marshes of the Atlantic and North-Sea coasts are important halting places (Poorter, 1982b). Spoonbills do not breed in these countries except for one occasion in 1981 when three nest where found in Lac de Grand-Lieu in France (Marion and Marion, 1982). First and second year Dutch spoonbills are regulary recorded from France in summer (Poorter, 1982b). Juvenile birds are inaccidentally wintering in France.

Spain

In the past the spoonbill used to be numerous in the south of Spain near the estuary of the river Guadalquivir. At present the spoonbill is breeding in two colonies. One is situated in the well protected area of the Coto Donana where some 150 pairs are breeding (pers. comm. L. Garcia). The other is found near Huelva in the salt marshes of the estuary of the river Oraque where some 400 pairs are breeding. In the past spoonbills were breeding in a small lagoon south of Huelva (Brouwer 1964), but recent exploitation of the area for industrial purposes has ruined this site. The Coto Donana colony is not endangered directly, but deterioration of the freshwater supply of the marshes may become a problem. The use of the scarce freshwater during the dry spring and summer for agricultural activity in the surroundings of the Coto Donana, reduces the foraging area of this colony. Botulism, which can easily occur in the shallow waters of the marshes, already threatened this colony in 1973.

The colony near Huelva is recently put under protection by ICONA. The colony is situated in the middle of extensive impenetrable saltwater marshes and is in this way well protected against human disturbance. The pollution of the estuary and the extension of industrial activity near Huelva might influence the size of the colony in the future. When the salinas and extensive mudbeds at the edges of the estuary and river are not destroyed, this important colony can remain healty (own observ. and pers comm. L. Garcia).

In early spring and in autumn, the Coto Donana forms an important halting place for Dutch spoonbills . First and second year Dutch birds often remain in this area during the summer. It is not clear if Dutch spoonbills are regulary breeding in Spain and vice versa, but this has been once observed (Poorter, 1982b).

Wintering and migrating birds are sometimes observed in the Ebro delta at the east side of Spain (Brouwer, 1964; Poorter, 1982b).

Portugal

No recent breeding records are known from this country. Spoonbills sometimes winter in Portugal in very small numbers. During migration spoonbills are recorded from the Atlantic coast but also from the east side of Portugal near the border with Spain (Poorter, 1982b).

Morocco

On their way from and to the wintering places the European spoonbills migrate along the west coast of Morocco. In autumn most birds are halting some time in the estuary of the Oued Sous. Other places, which are mainly used in spring by migrating spoonbills are Merja Zerga, Merja Sisi-Bou-Rhaba, and the lagoons between Sidi-Moussa and Oualidia. Occasionally spoonbills are recorded from the Algerian-Moroccin border, indicating that also an eastern migrating route exist on which spoonbills pass Gibralter at the east side (Poorter, 1982b).

Mauritania

At the Banc d'Arguin some 1000-1200 pairs are breeding. The spoonbills here belong to the subspecies *Platalea leucorodia balsaci* which does not migrate. Only sub-adulte birds are occasionally found further south in the Senegal delta, but the numbers do not exceed more then 5% of the spoonbills found on the Banc d'Arguin.

The total population of the subspecies is estimated to be 6000 birds. During most winters the total number of spoonbills can vary between 4000 and 10000 birds. This means that in some years about 3600 birds from Europe are wintering at the Banc d'Arguin and in some years almost no European birds are wintering here (Poorter, 1982a). The Banc d'Arguin is at the moment a well protected area and is not endangered in the near future.

Senegal

In the Senegal delta some 1000 spoonbills are wintering. It seems that the majority of the spoonbills found in the Senegal delta belongs to the spanish breeding population, which suggests that the Dutch spoonbills must winter somewhere else.

As the Spanish population is breeding far more to the south than the Dutch population, one could pressume that the Dutch population is wintering for a greater part at the Banc d'Arguin (Poorter, 1982a). At the Mauretanian side of the Senegal river the natural conditions (in which flooding regulary occur) are quite good. Here some 130.000 acres of temporarily flooded areas exist. At the Sengalese side of the river the building of dams and other hydrological works are quit extensive and large areas are becoming less and less favourable for wintering waterbirds (Poorter, 1982a).

Comments

Although much is known about the wintering areas of the West European spoonbills through the research of E.P.R. Poorter, it is still not known where the majority of this population is wintering. As stated above, there are years in which hardly any European spoonbills are found at the Banc d'Arguin. Poorter estimated the total European population to be 4500 birds and as only some 1000 birds are wintering in the Senegal delta still some 3500 birds are missing. This means that other areas, for example Gambia or Guinea Bissau are important wintering areas as well. It is clear that most of the breeding localities in the Netherlands, Spain and Mauritania are well protected. Nevertheless good care should be taken for the conservation of the foraging areas in the Netherlands and Spain.

During migration, the spoonbills are dependent on a string of small and

larger estuaries along the coast of Belgium, France, Spain, Portugal and Morocco. It is very important to protect this areas. Pollution and draning of small estuaries and salt marshes in the south of Spain is already in progress, (Zahara de los Atunes, Barbata de Franco, own observ.). An other threat is the shooting of spoonbills in Spain and France, especially wandering juvenile birds (Poorter, 1982a and pers. comm. L. Garcia).

Discussion

Subspecies

The breeding range of the Spoonbill *Platalea leucorodia* is situated between the 10° and the 57° of Northern latitudes. The species is widely but discontinously spread over Africa, Europe, and Asia. The species can be divided into three subspecies :

Platalea leucorodia leucorodia which breeds in Europe and Asia.
Platalea leucorodia balsaci which breeds at the Banc d'Arquin in Mauretania.
Platalea leucorodia archeri which breeds on the coasts of the Red Sea and the Gulf of Aden.

The two subspecies *P. l. archeri* and *P. l. balsaci* are non migratory in contrast with the *P. l. leucorodia*. The only exception is the population on Sri Lanka which is said to be non migratory as well.

Steinbacher (1979) considered *P .regia* of Australia conspecific with *P. leucorodia,* making it a fourth subspecies of this species

Migration routes and Wintering areas

In winter the Spoonbill does not go south the latitude of 6° North, but is widespread in Africa, Arabia, and Asia. Although the data are very poor it is possible to extract a few general conclusions from this winter range (see Fig. 2 in which the figures next to the arrows correspondend with the figures in text).

-Spoonbills from the Netherlands and Spain are wintering at the west side of Africa in Mauretania, Senegal and probably in Gambia and Guinea Bissau (1). Perhaps only a few birds winter in Algeria or even Tunisia (but this is not generally accepted (Brouwer, 1964).

-The spoonbills from the Balkan and Austria show a much more complicated pattern of migartion and wintering. The spoonbills breeding in Austria and Hugaria a migrate in a south-westerly direction to Tunis and Lybia. They migrate over Italy and Sicily (2). A part of them migrates also in a more eastward direction and are found in the Sudan (3). As most ringing recoveries indicate a south-westerly direction of migration it may be concluded that Tunisia and Lybia form the main wintering ground for the Austrian and Hungarian birds.

- Spoonbills from Turkey and the Black Sea area migrate in two directions. One is to Egypt and Sudan and the other is to Iran and Iraq .In the first case the spoonbills follow the south coast of Turkey and transverse the Mediterranean by using Cyprus as a stepping stone (4), or they fly along the coast of Lebanon and Israel (5). As there also exist data of migrating birds along the coast of the Red Sea and wintering records are available from lakes in Ethiopia, the

Spoonbills wintering further to the south in East Africa may follow two alternative routes. One alongside the Nile-valley up to Sudan (4a, 5a) and the other along the Red Sea up to Ethiopia (4b, 5b). Wether this last group is a substantial part of the population is not known. It is even possible that these birds ultimately winter in Sudan as well.

In the second case the spoonbills migrate along the Euphrates and Tigris to the marsh area near Basra (6). It is not known if these spoonbills migrate further east along the south coast of Iran perhaps even to Pakistan.

-Spoonbills from Yugoslavia and Rumania have been found wintering both in Tunisia and Egypt, suggesting that these populations are somewhere intermediate between the Austrian-Hungarian population and the Black Sea-Turkish population.

-Iranian spoonbills are wintering at the south coast of Iran and in the Basra marshes. It is not known if these spoonbills also partly follow their way further eastward to Pakistan (7).

-Spoonbills from the Wolga valley and Kazakhstan go south. Two possible routes might be followed.

The first one is along the eastern edges of the Kaspian Sea into Iran. Via the lakes in the east of Iran these birds may reach the Gulf of Oman and may turn eastwards to Pakistan (8).

The second one is over the Kyzil Kum desert towards the north-eastern border of Afghanistan where the birds may follow the Amu Darya until they have to top the high mountains in order to reach northern Pakistan (9), and the Peshawar and continu their way to the north of India. The Indus valley and Uttar Pradesh in India seem to be two major wintering areas for the population from the central Soviet Union.

-Indian spoonbills are said to migrate partly to the south and even reach to Sri Lanka (10).

-Spoonbills from China and the eastern part of the Soviet Union migrate in a south to southeasterly direction. It is quite possible that birds seen on migration in Korea and Japan (11) are mainly the birds from the Soviet Union which breed near the Amur.

Chinese spoonbills all leave their breeding grounds and winter in the south east of China (12) .

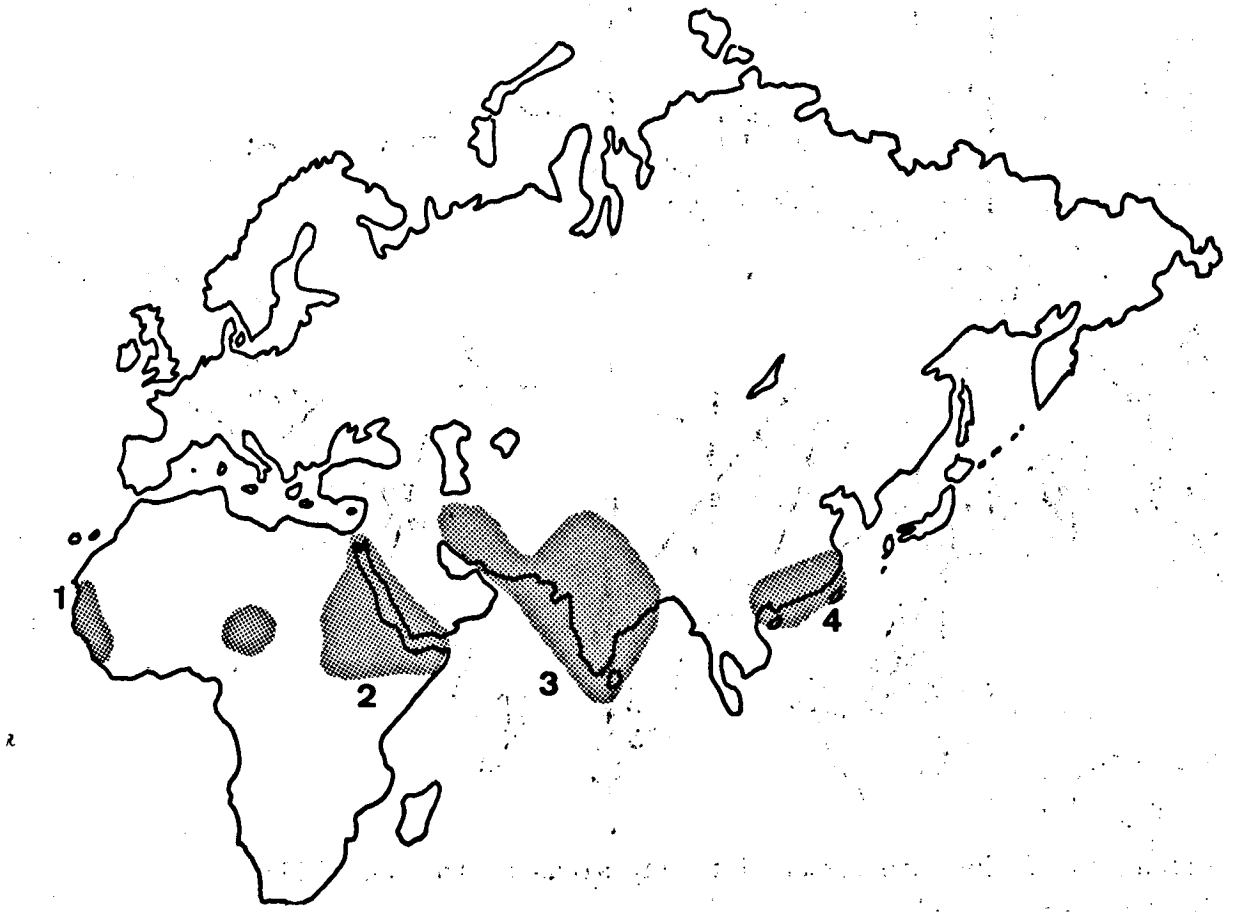

Figure 3 : The situation of the four glacial refugia of the spoonbills.
(The numbers correspond with the text in "Discussion").

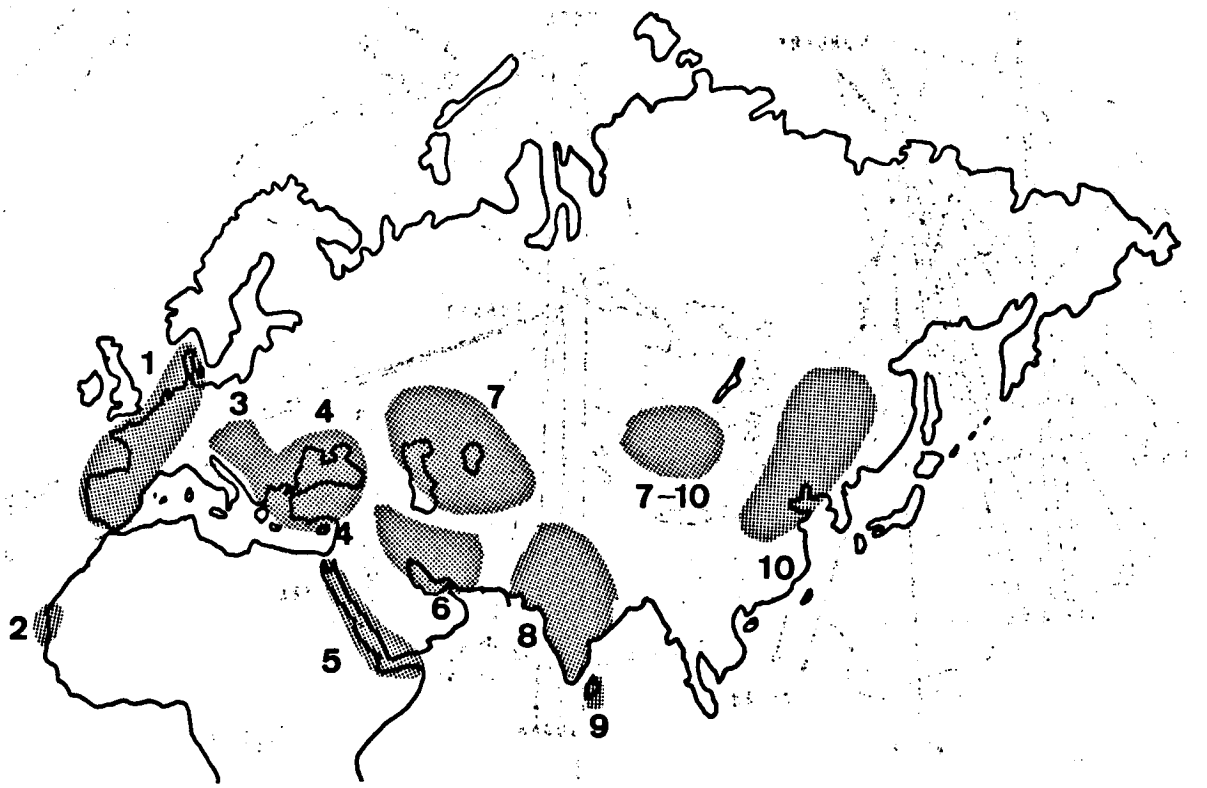

Figure 4 : The situation of the distinguished populations.
(The numbers correspond with the text in " Discussion").

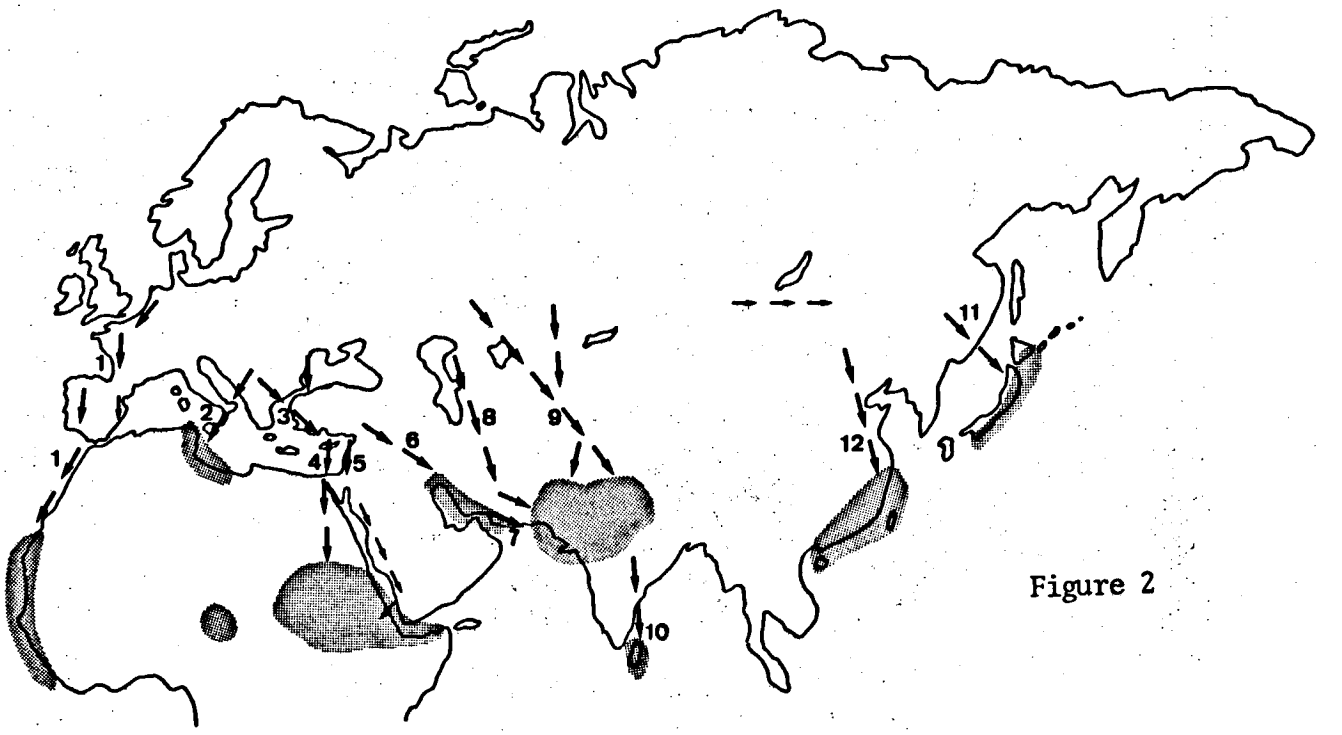

Figure 2

The situation of the main known wintering areas of the spoonbill and the migration routes to these areas.
(The numbers in the figure correspond with the text in "Discussion").

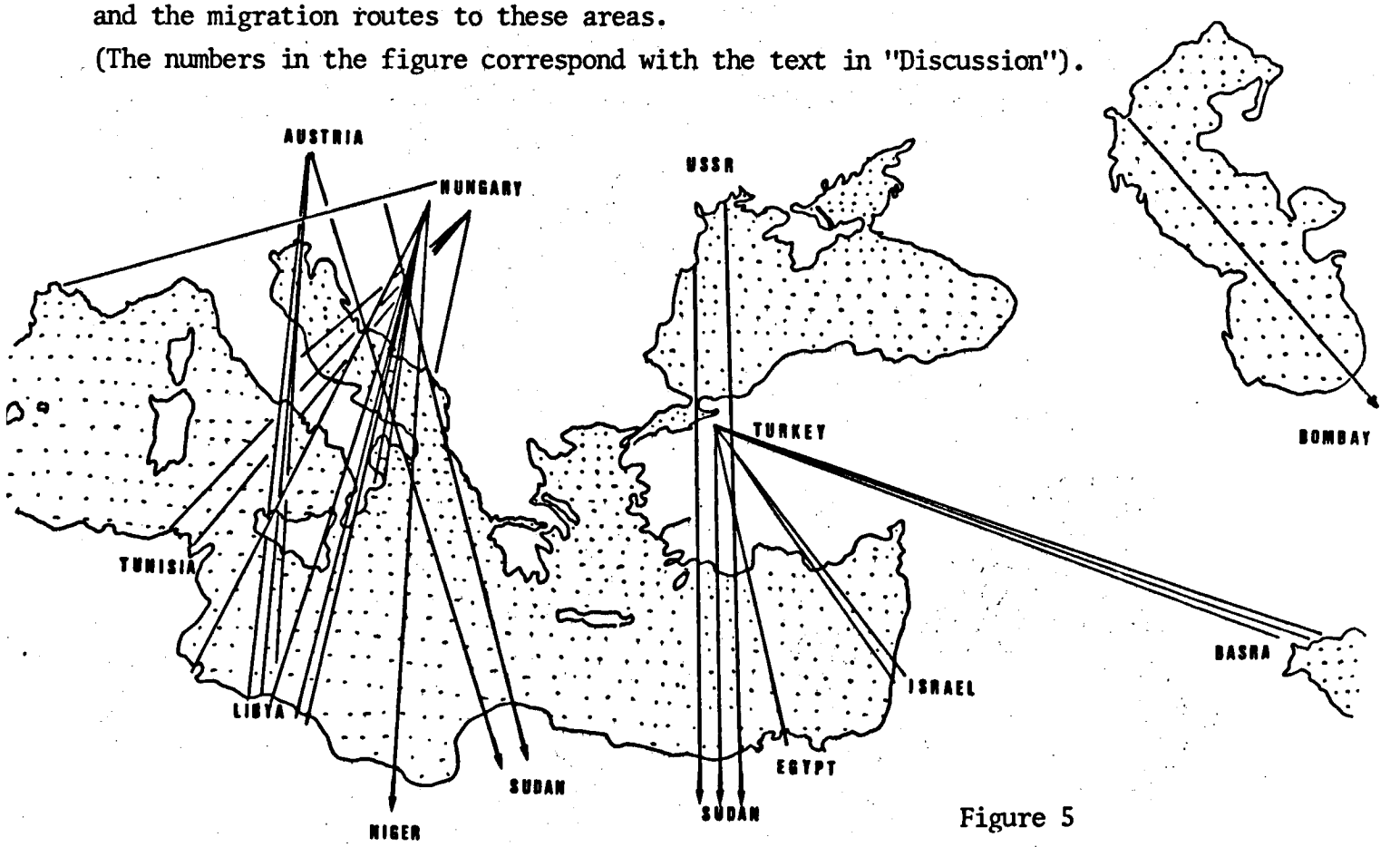

Figure 5

A survey of the ringing recoveries of European spoonbills.

Refuges

From the distribution pattern of the breeding populations and from the wintering areas, four refuges which probably have existed during the last glacial, can be distinguished (see Fig. 3)

-The west coast of Africa (1)
-Sudan, Ethiopia and Somalia (2)
-Iran, Pakistan, India , Sri Lanka (3)
-Southeast China (4)

It is obvious that in the three first named regions breeding populations of non migratory spoonbills occur.

In West and East Africa these populations are even considered seperate subspecies. The population of Sri Lanka which is up to now not considered as a subspecies, is also situated at the southern range of the Spoonbill. This population does not migrate either.

That no such population exist in South China requires an explanation. South China is the only place where wintering *Pl. leucorodia* coexists with another species of spoonbill *Platalea minor.* Although this species is nearly extinct it may have competed with *Pl. leucorodia* during the glacial periods and perhaps have prevented *Pl.leucorodia* from establishing a breeding population in the subtropical regions of China in the post glacial period.

Populations

When the patterns of migration and the situation of the refugia are taken into account, the following populations of *Platalea leucorodia* may be discerned :

- West-European population of Spain and the Netherlands, (and France and Danmark).(1)
- West-African population of Mauretania.(2)
- South European population of Austria and Hungary, (and Yugoslavia and Greece).(3)
- Black Sea-Turkish population of Turkey and the coasts of the Black Sea , (and Yugoslavia and Greece).(4)
- Red Sea-Gulf of Aden population.(5)
- I ran-Iraq population.(6)
- Central Soviet Union population of the Wolga area and Kazakhstan.(7)
- India-Pakistan population.(8)
- Sri Lanka population.(9)
- China-Mongolia population.(10)

N.B. It is not clear whether the population of Yugoslavia and Greece should be incorperated with the Southeast European population or with the Turkish population. The same problem occurs with Rumania, which can be incorporated with the South European population or with the Black Sea -Turkish population.

Population sizes.

Poorter (1982a) estimated the total population size by assuming a ratio of adults to sub-adults to juveniles of 2:2:2.

-The West-European population was estimated to consist of 3600-4500 birds. Because in the 19 th century a few large colonies in Holland have disappeared and in the 15th,16th and 17th century colonies were recorded from France, Britain and Portugal (Cramp, 1968) it is clear that this population must have been much larger and would perhaps have consisted of over 10.000 birds. The drainage of the swamps and the regulation of rivers and the collecting of birds and eggs for food may have been the main reason for the drastic decline.

-The West-Africa population consist of about 6000 spoonbills. As it seems that nothing has changed in the last decades and will not in the next this population seems to be fairly stable, and for the moment well protected.

-The Southeast European population of Austria and Hungary consists of at least 3000 birds. When the spoonbills of Yugoslavia (120) and of Greece (1860) are partly belonging to this population as well, the Southeast European population is comparable in size with the population of West-Europe.

It is not quite clear if this population has undergone a decline in this century. The large colonies in Rumania at the beginning of the century (representing about 2400 spoonbills) have vanished.

On the other hand new colonies are reported from Hungary (representing at the moment 1500 spoonbills). One may suppose that the decline of the Rumanian spoonbill is partly compensated. Nevertheless the developments having occurred in Rumania where extensive swamps and temporary flooded areas are vanishing is a strong warning for other countries not to reclaim without offering compensation for the loss of these habitats.

-The Black Sea-Turkish population consist at least some 5100 spoonbills in Turkey. As no data are available about the excact number of Soviet spoonbills along the Black Sea, it is hard to make an estimation. The total population might well reach 10000 birds when each of the mentioned colonies in the Soviet Union contain about 100 nests (Considering the occurrence of many deltas, rivers, lagoons and shallow coastal waters in the Black Sea area one may assume that this number is fairly reasonable). If no big changes will be planned in the lakes and marsh areas of Turkey and the Soviet Union the population is at a save level.

-The Red Sea-Gulf of Aden population is hard to count. Many small colonies on islands or on the coast have been reported . The only quantity once mentioned is "very common" in the north of Somalia.

As the spoonbill is mentioned everywhere in literature in this area the population might consist of at least 1000 birds. The exploitation of the eggs by fisherman who easily can find the nests on the deserted islands (pers. comm. S. Suaretz) and the deterioration of mangrove areas on the coast of Ethiopia and Somalia can be a threat for this population. But better counts are necessary.

-The Iran-Iraq population is also hard to estimate. At least 600 birds belonging to the Iranian colonies belong to this population. As no recent data are known from the east of Iran, the population might face a decline when the colonies at this side of the country have vanished. Before more data become available about the breeding spoonbills in Iraq, the population may be estimated to consist of 600-1000 spoonbills.

- The Central Soviet Union population is not well known. The reports from Pakistan, where sometimes at least 10.000 spoonbills are wintering, indicate that this population is quite large. When taken into account that Turkish, Iranian, Iraqi and Pakistani birds may be wintering there as well an save approximation of the population size is hard to make. When of these 10.000 birds some 1000 are from Pakistan,1000 from Iran -Iraq and 3000 from Turkey-Black Sea the population of the Central Soviet Union consist of some 5000 birds.

-The Indian-Pakistani population consists of at least some 3900 birds. In the large and extensive Indus delta in Pakistan spoonbill colonies do exist, but no data about the numbers are available.

The total population should exceed over 4000 birds and might when the colonies in Pakistan are quit large easily contain 5000-6000 birds. As no good recent data are available of the breeding numbers in India it is recommendable to organise a new census. The fast population growth of the Indian people may have a negative effect on the number of breeding spoonbills here.

-The Sri Lanka population contains about 2500 birds. Recently the numbers of breeding spoonbills in the north of Sri Lanka have declined and as the same developments occur at the moment in the south, where also swamps are drained or water is used for acricultural purposes, the number will become lower in the near future.

-The Chinese-Mongolian population consisted of many colonies situated far apart. No good estimate of the population size can be made. There are no signs at the moment that the spoonbill is an endangered species in China.

When the minimal estimation and rough maximal estimations are put together the world population of the spoonbill Platalea leucorodia may consist of 31.000-34.500 birds.

Conclusions

The spoonbill *Platalea leucorodia* breeds in some 50-100 colonies widespread over Europe, Asia and Africa. The lack of recent data about the existence of colonies and the number of breeding birds in many countries (Soviet Union, Iran , Pakistan, India, China) makes it hard to say much about the threats to this species.

The rapid decline and vanishement of the Rumanian population made clear that the deterioration of swamp and flooded areas influences the spoonbills strongly. Pollution of the environment with chlorinated-hydro-carbons nearly extincted the Dutch population between 1962 and 1968.

As the above stated developments are still going on in other countries the population size-estimation in this paper may well be out of date. A new census of the spoonbills especially in the above mentioned countries can be very usefull in the near future.

J.C.J. van Wetten 1986

Acknowledgements

This paper is made with the help of many data from other countries kindly supplied to me by various people. I wish to thank them all for their effort to help me. I am very grateful to Dr. J. Wattel who inspired me to this paper and helped with the corrections and final text. The use of the books form the library of the Nederlandse Ornithologische Unie was esential for this paper.

Literature :

Alexander H.G. 1927 On the Birds of Latium
Ibis Vol 3 No 4:659-690

Ali S. and Ripley S.P. 1968 Handbook of the birds of India and Pakistan.Vol. 1
Oxford Univ. Press.

Anonomus Catalogus Faunae Yugoslavia

Anonymus 1940 Exp. Ornith. en Indochina francaise.
L'oiseaux et la Revue
francaise d'Ornithology Vol 10

Anonymus 1974 Check list of Japanese birds.
Ornith. Soc. of Japan.
Tokyo.

Ash J.S. and MiskelJ.E 1983 Birds of Somalia,their habit,status and distribution
Scopus Special Suppl. No.1

Austin O.L. 1953 The birds of Japan and Kuroda
Their status and distribution
Bull. of the Mus. of
Comparitive Zoology Harvard.
Vol. 109, No. 4

Balman J.F.H. 1944 On the Birds of Safage.
Ibis Vol 86 No 4:480-492

Bannerman P.A. 1971 Handbook of the Birds of Cyprus.
Oliver and Boyd

Batei G.L. 1937 Jiddah and Central Arabia
Ibis Vol 1No 1:47-64

Bauer W.,Helversen v O,1969 Catalogus Faunae Graecia
Hodge M. and Martens J. Part 2

Bauer K. 1963 Entwickelung und Bestand
der Osterreichischen Vogelfauna

		Mitt.der Osterr.- Vogelwarte Natur und Land No1
Beaman P	1975	Bird report 1970-1973 The Ornith. Soc. of Turkey
Beaman P.	1978	Bird report 1975-1075 The Ornith. Soc. of Turkey.
Britton P.L.	1969	Migration across the Medditerranean,spotted by radar. Ibis 109:445
Brouwer G.A.	1964	The Spoonbill in Europe Zool. Med. Deel 34:481-521
Bundy G.	1976	The Birds of Lybia B.O.U. Checklist No 1
Butler A.L.	1905	On the Ornithology of Egypt and Sudan. Ibis Vol 8 No 21:113-123
Chapman E.A. and McGeogh R.	1965	Iraq birds Ibis Vol 98 No 4:577-594
Chasen F.N.	1935	A Handlist of Malaysian Birds. Government Print. Singapore.
Cheesman R.E. and Sclater W.I.	1935	On the Birds of North-Eastern Abyssinia Ibis Vol 5 No 1:151-192
Cheng T.	1976	Distributional list of Chinese Birds Peking Institute for Zoology
Cramps S. and Ferguson-Lees J.J.	1968	Spoonbills in Roumania, a correction Ardea 56;278
Deignan H.G.	1945	The Birds of Northern Thailand. Smithsonian Inst. U.S.NationalMuseum Washington.
Delacour J. and Jabouille P.	1925	On the Birds of Quangtri Ibis Vol 1 No 1:209-259
Delacour J.	1940	List d'oiseaux a l'indo-china francaise.
Dementiev G.P and Gladkov N.A.	1960	Systema Avium Russicarum Vol 2

L.Oiseaux et la revue francaise d"Ornithology Paris.

Dickinson E.O. 1970 Birds of the legendre Indo-china Expedition 1931-1932 American Museum Novitato No 2423.

Elgood J.H. 1982 The Birds of Nigeria B.O.U. Checklist No 4

Etchecopar R.A. 1978 Les Oiseaux de Chine and Hue F.Papeete Tahiti.

Feeney A. 1968 Autumn migration in the south Caspien sea Ibis Vol 110 No 1:35-86

Flint P.R. and Stewart P.F. 1983 The Birds of Cyprus. B.O.N. Checklist No 6.

Glegg W.E. 1941 On the birds of I"Ilede Camarque Ibis Vol 5 No 4:557-610

Gore M.E.J. 1971 The Birds of Koreaand Pyong-Oh W. Royal Asiatic Society Seoul

Hollom P.A.D. 1959 Notes from Jordan,Lebanon Syria and Antioch. Ibis Vol 101 No 2:183-200

Ivanov A.J. 1929 Birds of the Yakutsk District. Acad. des sciences de USSR.

Jennings M.C. 1981 Birds of the Arabian Gulf Allen and Unwin, London

Jennings M.C. 981 The Birds of Saudi Arabia a Checklist. Mallet and Co ,Bradford.

Jourdain F.C.R. 1915 Birdlife of Eastern Algeri Ibis Vol 3 No 1:133-169

Jourdain F.C.R. 1936 Notes on Egyptian Birds

Jozsef M. and Josip M. 1971 Das bruten der Zwergscharbe am Kopascen-See Aquila Vol.78:181-183.

Kate ten C.G.B. 1932 Naar Budapest,het biologisch station te Kis-Balaton.

De levende Natuur Jrg 33.No1

Keve A. 1959 — 21 th. Bird Banding Report. Aquila 66 :135-208.

Koenig O. 1952 — Okologie und Verhalten des Vogel Neusiedlersee. Journ.Orn.93:207-289

Kortegaard L. 1973 — Skestorke i Danmark between 1963 and 1969 Dansk.Orn. Foren. Tidskr. 67(1-2):3-4.

Kozlova E.V. 1932 — On the Birds of Northern Mongolia. Ibis Vol.2 No 3:405-437

Loat W.L.S. 1906 — On the Birds from Menzalah. Ibis Vol 8 No 11:113-123

Loppentuin B. 1948 1900 — Danish Breeding Birdsin Western Jutland in Ibis Vol 90 No 1:86-89.

Luccia de C. 1969 — Birds of the Maltese Island

Makatsch W. 1950 — Die Vogelwelt Macedoniens Geest und Portig Leipzig

Marchant s. 1967 — Migration in Iraq. Ibis Vol 105 No 3:369-398

.Marian M. 1976 — Die Vogelwelt des Naturschutsgebiet Pusztaszer. Aquila Vol. 82:95-96.

Martens G.H. 1910 — Ornis Fukie Journal for Ornithology April;210-483

McGregor P.J.C. 1906 — On birds observed at Monastir,Turkey Ibis Vol 8 No 21:285-307

Meinertzhagen R. 1914 — Notes from Mesopotania Ibis Vol 4 No 3:395

Meinertshagen R. 1920 — On the Birds of Quetta Ibis Vol2 No 2:195-259

Meinertzhagen R 1920 — On the birds of Southern Palastina Ibis Vol 2 No 1:195-259

Meinertzhagen R. 1935 — On a trip to Syria and adjacent countries.

Ibis Vol 5 No 1:110-150

Moreau R.E 1950 The Breeding Season of African Birds-Sea Birds.
Ibis Vol 92 No 3:419-433

Osieck E.R. 1986 Bedreigde en Karakteristieke Vogels in Nederland
Ned. Ver. tot Bescherming van Vogels.

Patkai J. 1967 Bird banding of the Hungarian Ornithological Institute.
25 th. report.
Aquila Vol 73-74:81-109.

Payn W.H. 1938 Notes on spring migration on Malta and Gozo
Ibis Vol 2 No 1:102-110

Pelle J. 1967 Ornithological Report from East Vodjvodina.
Aquila Vol.73-74:204.

Phillips W.W.A. 1952 A revised chechlist of the Birds of Ceylon.
Nat. Hist.Series. Nat. Mus. of Ceylon.

Poorter E.P.R. 1982 Verslag van de Lepelaar
J. van der Kamp naar de Senegaldelta
en J. Jonker in de winter van 1980-1981

Poorter E.P.R. 1982 Migration et dispersion des Spatula Neerlandais.
L'oiseaux et R.F.O. Vol 52, 305-334.

Radde G und Walter A 1888 Die Vogel Transcaspiens
Ibis

Reiser von O. 1925 Die Vogel von Marburg an der Drau
Mitt. der Naturwiss.Ver. fur Steiermark Band 61.

Rickett C.B. 1903 Field Notes on the Birds of Fukien.
Ibis Vol 3 No 10

Ripley S.D. 1961 A synopsis of the birds of India and Pakistan
Bombay Nat Hist Soc.

Rothschild N.S. and 1902 On the Birds from Shendi

Wollaston A.F.R.		Ibis Vol 2 No 5:1-33
Safriel U	1968	Migration at Elat. Ibis Vol 110 No 3:283-320
Salvadpori T.	1872	Fauna d'Italia Forni Editori Bologna
Sarudny N	1925	Aus der ornithologischen Literatur Russlands Falco 2.
Schenk J.	1921	D ie Vogel Siebenburger Konig. Ungar. Ornth. Instit. Budapest.
Scott D.A.,Moravey H and Mirhossegni A.A.	1975	The birds of Iran. Department of environment of Iran
Smith K.D.	1957	Birds of Eritrea. Ibis Vol 99 No 1:1-26
Sovago M.	1966	Briefe aus der Hortobagy 1963-1964 Aquila Vol 71-72:184-185.
Sovago M.	1968	Letter from Hortobagy '65-'66 Aquila Vol 75:220-226
Stresemann E	1920	Avifauna Macedonia Verlag von Dultz und Co Munchen
Stuart-Baker E.C.	1935	The nidification of Birds of the Indian Empire. Taylor and Francis London
Styan F.W.	1891	On the Birds of the lower Yangtse Basin Ibis Vol 3 No 12:482-510
Smith M.A.	1921	Birds of South-West and Peninsular Siam. Journal of the Nat. Hist. of Siam. Vol 5 No 1.
Smythies B.E.	1953	The Birds of Birma. Oliver and Boyd Edinburgh.
Swinhoe R.	1861	Notes on Ornithology between Tahoe and Peking Ibis Vol 3 No 36:323-345
Swinhoe R.	1863	Notes on Formosian Ornithology Ibis Vol 3 No 20:377-434

Taylor E.C. 1967 Egypt revisted.
Ibis Vol 3 No 9:48-72

Ticehurst M.D. 1923 The Birds of Sind
Ibis Vol 5 No 2:235-276

Ticehurst C.B. 1932 and Whistler H On the Ornithology of Albani
Ibis Vol 2 No 1:40-93

Tomiatojc L. 1976 Birds of Poland.

Trott A.C. 1947 On Birds seen and collected at Jiddah
Ibis Vol89 No 1:77-97

Cheng 1976 Distrubutional list of Chinese Birds.
Peking Institute for Zoology.

Urban E.K. and Brown L.H. 1971 A Checklist of the Birds of Ethiopia
Haile Sellassie Univ.

Vasiliu G.P. 1968 Systema Avium Romania
Alauda Paris.

Vaughan R.E. and Jones K.H. 1913 On the Birds of South-East China

Vespremeneanu E.E. 1968 Spoonbills in Roumania
Ardea 56:161-175

Wadley N.J.P. 1950 Notes on the Birds of Central Anatolie
Ibis Vol 93 No 1:63-89

Whistler H. 1916 On the Birds of the Jhelum District.
bis Vol 4 No 1:35-117

Whistler H 1922 The Birds of Jbang District (SW Punjab)
Ibis Vol 2 No 3:401-436

Whitaker J.J.S. 1905 The Birds of Tunis
Vol 2
Porter London.

White C.M.N. 1965 A revised Checklist of African Non-passerine birds
Lusaka Government Printers.

Whitehead C.H.T. 1909 Birds of Kohat and Kurram
Ibis Vol 9 No 3:214-284.

Whitely H. 1867 Birds collcted near Hakodadi in Japan. Ibis Vol 3 No 10:193-210

Yerburg J.W. 1896 Further Notes on the Birds of Aden. Ibis Vol 2 No 5:13-43 Ibis Vol 1 No 3:351-383

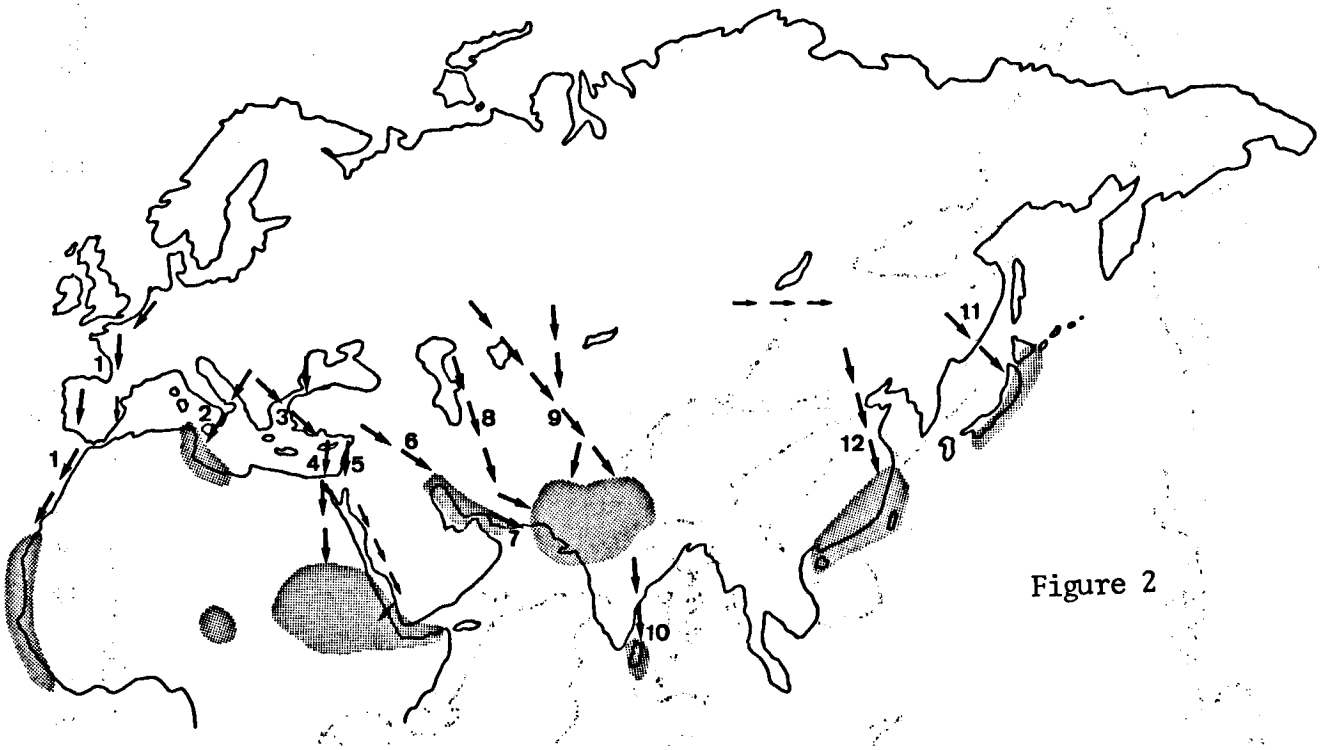

Figure 2

The situation of the main known wintering areas of the spoonbill and the migration routes to these areas.
(The numbers in the figure correspond with the text in "Discussion").

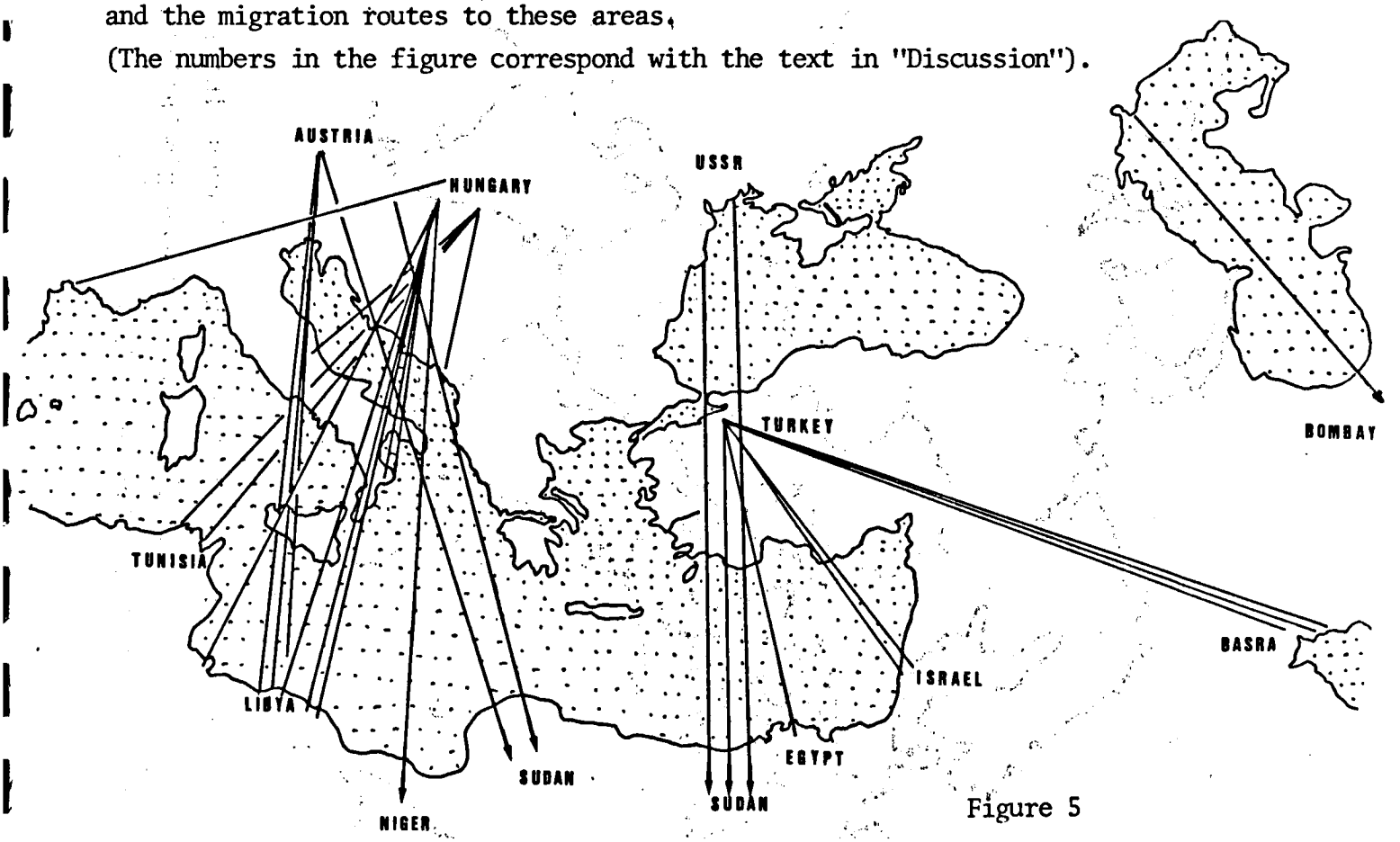

Figure 5

A survey of the ringing recoveries of European spoonbills.

Figure 1 : The situation of the colonies. The numbers in the figure correspond with the numbers and names in Table 1. For the colonies in Rumania see Brouwer (1964)

1	The Netherlands	52.5 N	5.0 E		
2	Heulva, Spain	37.1 N	6.6 W		
3	Coto Donana, Spain	37.0 N	7.3 W		
4	Banc d'Arquin, Mauretania	20.0 N	15.3 W		
5	Neusiedlersee, Austria	48.0 N	16.3 E		
6	Velencei, Hungary	47.0 N	18.3 E		
7	Kis Balaton (Plattensee) Hungary	47.0 N	18.0 E		
8	Hortobagy, Hungary	46.5 N	19.5 E		
9	Macva,Banat,Sava,Oddesha, Yugoslavia	44.5 N	19.3 E		
10	Nis, Yugoslavia	41.3 N	22.0 E		
11	Skopje, Yugoslavia	42.0 N	21.0 E		
12	Ohrndsko and Prespansko Jezero, Greece	41.0 N	21.0 E		
13	Vojvodina, Yugoslavia	40.0 N	21.0 E		
14	Scutarisi, Albania	42.0 N	19.3 E		
15	Arta (Amvrakikos Kolpos), Greece	39.0 N	21.0 E		
16	Evros-delta, Greece	41.0 N	25.5 E		
17	Kerkinites, Greece	41.0 N	22.5 E		
18	Manyas-Golu, Turkey	40.0 N	27.5 E		
19	Sakarya, Turkey	40.0 N	30.0 E		
20	Yarma,Cavascu-Golu, Turkey	38.0 N	31.3 E		
21	Eregli, Turkey	37.3 N	34.0 E		
22	Gosku-delta, Turkey	36.0 N	34.0 E		
23	Lake Antioch (Amik-Golu), Turkey	36.0 N	36.0 E		
24	Street of Tiran, Egypt	28.0 N	34.0 E		
25	Eritrea, Ethiopia	16.0 N	40.0 E		
26	Berbera, Somali	10.3 N	45.0 E		
27	Yerevan, USSR	40.1 N	44.3 E		
28	Baku, USSR	40.0 N	49.0 E		
29	Darya-cheh-ye, Iran	37.0 N	45.5 E		
30	Basra, Iraq	31.0 N	48.0 E		
31	Zabol, Iran	30.5 N	62.0 E		
32	Shiraz, Iran	29.3 N	52.3 E		
33	Dort Kuja, USSR	37.0 N	61.0 E		
34	Syr Darya, USSR	45.0 N	65.0 E		
35	Tenghis,Zaissan, USSR	45.0 N	62.3 E		
36	Aral Sea, USSR	45.0 N	60.0 E		
37	Volga-delta, USSR	46.0 N	48.0 E		
38	Ilek, USSR	51.3 N	52.0 E		
39	Azov Sea, USSR	46.0 N	36.0 E		
40	Dnepr-delta, USSR	46.0 N	31.3 E		
41	Dnestr-delta, USSR	46.0 N	30.0 E		
42	Indus-delta, Pakistan	24.0 N	68.0 E		
43	Lahore, Pakistan	32.0 N	74.0 E		
44	Rampoor (Bharatpur),Etowah, India	27.0 N	79.0 E		
45	Cingleput, India	13.0 N	80.0 E		
46	Yala,Willpattu, Sri Lanka	6.2 N	81.3 E		
47	Orok-Nor,Altai-mountains, Mongolia	48.0 N	93.0 E		
48	Daourie,Zeya, USSR	50.0 N	127.0 E		
49	Tsitsihan, China	48.0 N	124.0 E		
50	Bnyr Nuur, China	47.0 N	116.0 E		
51	Ching-p'eng, China	43.0 N	118.0 E		
52	K'o-lan, China	39.0 N	110.0 E		
53	T'ai-yuan, China	38.0 N	113.0 E		
54	Ka-shun Hu, China	42.0 N	110.0 E		
55	Arhahga, China	48.0 N	100.0 E		
56	Liao-Yana, China	41.0 N	123.0 E		

Table 1 The names of the colonies, the country where they are situated and their coordinates. The numbers correspond with the numbers in figure 1.