

The Migration routes of Purple Herons (*Ardea purpurea*) ringed in France

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12116 Purple Herons were ringed in France between 1930 and 1982 in the Camargue, as well as in the western, central and eastern parts of the country. Every recovery outside France has been marked on maps in order to find the most commonly used migration routes. During autumn migration, Purple Herons ringed in western France mainly follow the Atlantic coast towards Spain. Purple Herons ringed in the three other areas also migrate through Spain as well as through Italy. However, the ones ringed in eastern France and which fly through Italy, follow the Po valley eastward to the Adriatic whereas the ones ringed in the Camargue and in Central France also follow the western coast of Italy southwards. Having reached Tunisia, Purple Herons are known to cross the Sahara to the river Niger. However most of them seem not to take this difficult route and follow instead the coast of North Africa westward, joining Purple Herons coming from Spain. Many birds seem to leave the Mediterranean to reach the Atlantic coast of Africa flying south of the High Atlas mountains. 7 recoveries show that Purple Herons winter in January and February in the coastal areas of tropical west Africa from Senegal to Dahomey. In the spring, they fly back to Europe, either following the coast of west Africa or, reaching the river Niger, they cross the desert to Tunisia from where they fly to Italy. Spring recoveries are particularly numerous in Italy. Purple Herons wintering in West-Africa have thus the choice between several migration routes; however the most commonly used one seems to follow a very large loop. In the autumn, they fly through Spain and Morocco to reach the Atlantic coast which they follow to winter south of 10° N. In spring they fly to the Niger river and cross the desert to reach Italy and France by the shortest route.

Recoveries are very numerous along the Adriatic coast of northern Italy but there are still no recoveries from East Africa. However, a spring recovery from inland Croatia shows that this bird probably came from the Danube river. Such a bird may have wintered along the large rivers of southern Irak.

Purple Herons follow the coasts rather than cross the seas. In particular, they do not seem to leave France or northern Italy heading directly out to sea in order to reach the coast of north Africa by the shortest route as recoveries from coastal areas in Spain and Italy are numerous and no recoveries are to be found in Corsica or Sardinia. They do not seem either to favour crossing mountains but are able to do so, as shown by one observation of 3 Purple Herons flying over a pass (1284 m) in the Pyrenean mountains. This observation, added to the observations of small groups of Purple Herons landing on Cyprus during migration, shows that Purple Herons often migrate together in small parties.

Key words: Purple Herons (*Ardea purpurea*), migration routes.

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1. Introduction

Purple Herons are long distance migrants. They leave Europe soon after breeding from July to October in order to winter south of the Sahara as far away as Sierra Leone, the Ivory Coast and Ghana. In spring a few Purple Herons are already back on their breeding grounds in March but most of them come back not before April or even May (CRAMP & SIMMONS 1977, VOISIN 1991).

Purple herons have been ringed in France for 52 years from 1930 to 1982. As they are no longer ringed in this country it is time to take into account the rich research material stored at the French Ringing Centre (C.R.B.P.O.). Do they migrate over a very broad front, straight from their breeding grounds in Europe to their wintering grounds in West Africa as formerly thought (MOREAU 1972, KOOU 1976), or do they follow migration routes which are not the shortest way and which for many individuals seems to be a large loop ?

2. Methods

The total number of Purple Herons ringed in France is 12, 116. The number of recoveries is 401, among which 283 come from France and 118 from other countries.

Recoveries outside France have been marked on maps as precisely as possible. Recoveries inside France are very numerous as many young birds were killed by hunters soon after leaving the nests. They show mostly post breeding dispersal behaviours which are not studied in this paper. Purple Herons use somewhat different migration routes, depending upon which region in France they came from. I have therefore examined separately four areas where all recoveries have been taken into account, except one in Germany with no data and one in Spain as the locality has not been found. The first region is situated to the west, along the Atlantic coast („départements“ of Vendée and Charente-Maritime), the second is in the centre of France („départements“ of Cher, Indre and Creuse), the third lies in eastern France („départements“ of Côte d'Or, Saône-et-Loire, Jura, Ain et Loire) and the fourth comprises only the Camargue in southern France („département“ des Bouches du Rhône).

Six „départements“ have not been taken into account, as no recoveries, or only a very few outside of France, come from birds ringed in these areas. The reason is the small number of Purple Herons ringed in those „départements“ which are Loire-Atlantique, Haute-Savoie, Vienne and Haute Vienne with no recoveries at all from outside of France, Hérault with only one and Maine-et-Loire with two. Not taking these three recoveries into account does not alter our results. A list of all recoveries is available from the author.

3. Migration

3. 1. Recovery areas (fig. 1)

In Italy nearly all recoveries are to be found in only 5 areas.

The two most important ones come from the coastal area bordering the Adriatic sea from Rimini to Trieste (10 recoveries) and from the Pô valley with its tributaries (8 recoveries and in addition 1 in Ticino (Swiss) near the Italian border).

The three other areas are situated along the western coast of Italy. The first is the coastal area from the French border to Genova (4 recoveries). The second one is the delta of the Arno river and the two coastal plains bordering it on each side from Marina Carrara to Cecina (5 recoveries). The third one, still more southward, are the coastal areas along the bays of Gaeta and Naples (6 recoveries). In Italy only two recoveries are to be found outside these areas.

In Spain, not including the Mediterranean islands, recoveries come from two main areas. The first one is situated along the Atlantic coast, from the French border to Bilbao (7 recoveries) and the second one along the Mediterranean coast from the French border to the delta of the Ebro river (6 recoveries). Three other recoveries, not very far from each other, come from inland Spain. They are on the route to Portugal: one near Salamanca, one near Zamora and one in the province of Avila. Only one recovery is to be found outside these areas.

The only recovery from Portugal comes from the delta area of the Mondego river near Figueira Da Foz.

Among the Mediterranean islands recoveries have been found only on the Balearic islands (2 recoveries) and on Malta (2 recoveries).

In eastern Europe two recoveries come from Croatia, one near the coast a little south of Rijeka and one far inland a little east of Zagreb.

In North Africa the recoveries are all to be found on the coastal area from Cherchel to Bizerta (8 recoveries), in the interior of East Algeria and Tunisia (4 recoveries) and along the the coast at the Gulf of Gabès (1 recovery) and in Morocco. In this last country the recoveries come from three areas: along the Atlantic coast (3 recoveries), south east of the High Atlas mountains (6 recoveries) and north west of these mountains (2 recoveries).

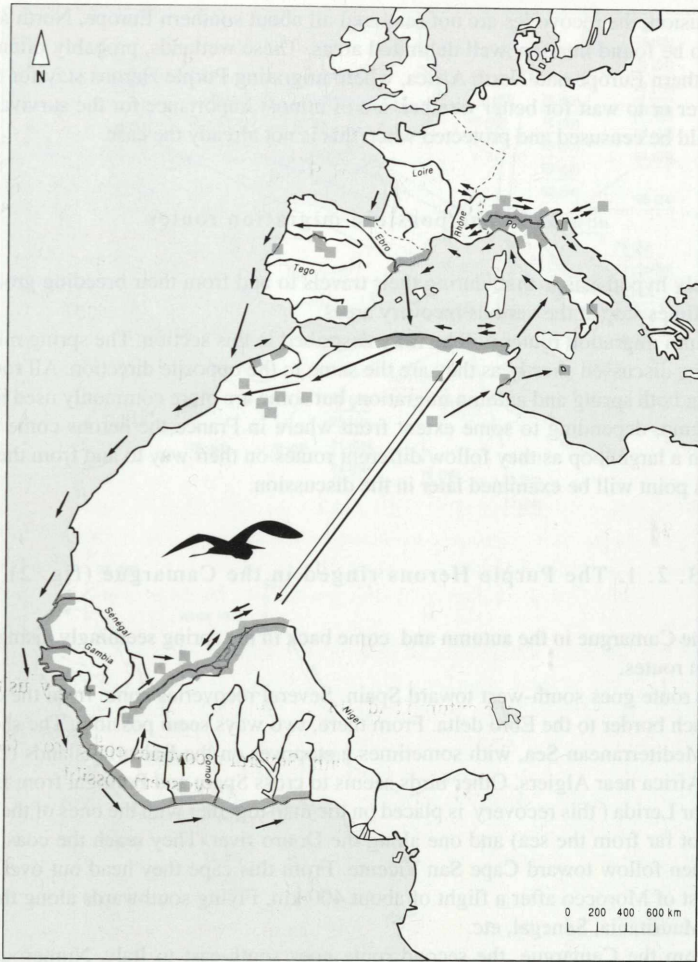


Fig. 1: Recovery areas and probable main migration routes of Purple Herons ringed in France, based on rings recoveries. - Double arrows routes commonly used both ways; single arrows: routes mainly used in the direction of the arrows; grey: recovery areas.

Abb.1: Wiederfindungsgebiete (grau unterlegt) und wahrscheinliche Hauptzugrouten von in Frankreich beringten Purpurreihern. Doppelpfeile stehen für Zugrouten, die in beiden Richtungen genutzt werden, Einzelpfeile für Zugrouten, die vorwiegend nur in Richtung des Pfeils verlaufen.

In West-Africa recoveries come mostly from two main areas. One extending from Senegal to Dahomey where 12 recoveries are to be found on a coastal strip about 150 km wide and the other one situated along the Niger river from Bamako to Gao (4 recoveries along or near the river and one in the desert).

Recoveries are also found along the numerous streams and rivers which run from the mountains of the interior to the sea (one from Gambia, one from Guinea, one from Liberia and one from the Ivory Coast) or to the flood zone of the Niger river (three such recoveries come from Mali: two from the upper Niger valley near Kouroussa and one from the upper Senegal valley near Kita).

In conclusion, the recoveries are not scattered all about southern Europe, North and West Africa but are to be found in a few well delimited areas. These wetlands, probably often quite small places in southern Europe and North Africa, where migrating Purple Herons stay for one or a few days to recover or to wait for better weather, are of utmost importance for the survival of the species and should be censused and protected when this is not already the case.

3. 2. The possible migration routes

The most likely hypothesis is that, during their travels to and from their breeding grounds, Purple Herons sometimes stop at the various recovery areas.

The autumn migration routes will be fully described in this section. The spring migration routes will only be discussed shortly as they are the same in the opposite direction. All routes seem to be used during both spring and autumn migration, but some are more commonly used in spring and others in autumn, depending to some extent from where in France the herons come from. Many birds travel on a large loop as they follow different routes on their way to and from their wintering grounds. This point will be examined later in the discussion.

3. 2. 1. The Purple Herons ringed in the Camargue (fig. 2)

They leave the Camargue in the autumn and come back in the spring seemingly using three different migration routes.

The first route goes south-west toward Spain. Several recoveries come from the coastal area, from the French border to the Ebro delta. From there, two ways seem possible. The shortest one is to cross the Mediterranean Sea, with sometimes a stopover on the Balearic islands (2 recoveries) and to reach Africa near Algiers. Other birds seems to cross Spain and Portugal from East to West: a recovery near Lerida (this recovery is placed on the map together with the ones of the coastal area as it is still not far from the sea) and one along the Douro river. They reach the coast of Portugal which they then follow toward Cape San Vicente. From this cape they head out over the sea and reach the coast of Morocco after a flight of about 400 km. Flying southwards along the coast they reach at last Mauritania, Senegal, etc.

Again from the Camargue, the second route goes south-east to Italy. Numerous recoveries shows that the Purple Herons follow the western coast of this country about to Naples (13 recoveries) where they leave to cross the Mediterranean sea, reaching Tunisia after a flight of about 250 km.

The third route goes straight eastward following the Po river valley toward the Adriatic sea. How do the birds reach the Po valley ? A recovery near Cuneo of a young bird ringed two months earlier in the Camargue, shows that the birds may not bypass the Alps following the coast, but cross the mountains flying along rivers upstream to reach an alpine pass toward Italy. However, one recovery is not enough to be sure of this route. Four birds have been recovered along the Pô valley and along the Adriatic sea there are 6 recoveries north of Rimini. On the contrary, not a single recovery has been found along the coast south of that town. As one recovery comes from the coast of Croatia, a migration route along the coast to Albania and Greece, and after a flight over the sea to the Nile valley seems possible. However during the 50 years of ringing, not a single recovery has comes from East Africa. On the contrary a spring recovery along the Sava river near Zagreb points to a far more easterly migration route.

Only two recoveries of birds ringed in the Camargue come from outside the above mentioned areas; both are in Italy. One bird was found in spring in the upper Sièva valley and another one was

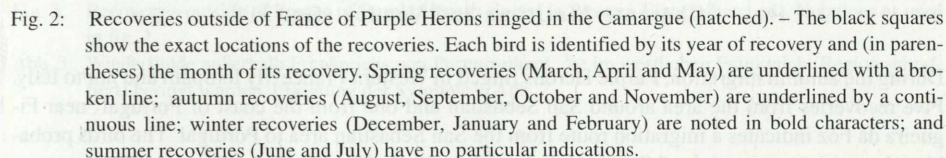


Abb. 2: Wiederfunde außerhalb Frankreichs von Purpureihern, die in der Camargue (Region schraffiert) beringt wurden. - Die schwarzen Markierungen kennzeichnen jeweils die exakten Wiederfundlokalitäten. Jeder Vogel wurde durch das Wiederfundjahr und (in Klammern) den Monat der Rückmeldung gekennzeichnet. Frühjahrsfunde (März, April, Mai) wurden unterbrochen unterstrichen, Herbstfunde (August, September, Oktober und November) durchgezogen unterstrichen; Winterfunde (Dezember, Januar, Februar) sind fett gedruckt; Sommerfunde (Juni und Juli) erhielten keine Extrakennzeichnung.

found in Calabria. This recovery is the only winter recovery in Europe of a Purple Heron ringed in France, which shows they do not usually winter in southern Europe.

In North Africa recoveries are numerous in the coastal areas from Bizerta to Algiers (9 recoveries). As, in addition, two of them are near the sea at Cherchel and Annaba and one is on the beach at Jijel, a possible route seems to fly directly over the Mediterranean sea from France. However, as not a single recovery is to be found on Corsica or Sardinia and as they are numerous along the coast of western Italy, I think that a direct flight from France to North Africa is too long to be undertaken, at least commonly, and that the birds rather follow the coast of Italy which they leave at the bays of Gaeta and Naples to reach Tunisia.

From Tunisia two migration ways are possible to reach West Africa. The first one crosses the Aurès mountains (1 recovery) and the desert (1 recovery) to reach the Niger river area (3 recoveries). The desert becoming broader each year, this way is more and more difficult for the birds which are perhaps progressively choosing another way. This second route follows the coast to Alger, and then cuts through the arid regions south-east of the High Atlas mountains (3 recoveries) to reach the Atlantic coast in the Sous river area a little south of Agadir. This migration route has perhaps become much more used than it was before because taking into account all recoveries and not only those of the birds ringed in the Camargue, there was no recovery in the Ksar es Souk and Ouarzazate areas before 1959, only one between 1960 and 1969 and 6 between 1970 and 1979 (the number of birds ringed during these three periods being respectively 1,341, 5,228 and 5,206).

Having reached the Atlantic coast the Purple Heron follows it to tropical West Africa where birds ringed in the Camargue are numerous in the coastal areas from Senegal to Dahomey (8 recoveries).

Following streams first, upstream and then downstream, they reach the Niger river valley. Among the birds ringed in the Camargue only one recovery in the area of Gagnoa, Ivory Coast come from inland, (however, still not far from the coast; about 100 km) but recoveries between the coastal areas and the Niger river valley are in fact quite numerous (6 recoveries) when taking into consideration the recoveries from all ringing areas in France.

One recovery on Malta points to another possible way for the birds crossing the desert in the spring which instead of crossing the Aurès mountains may turn North-East toward Chott Djerid and reach the coast of the gulf of Gabès. Among the birds flying from that area to Italy a few will stop at Malta which is on the way.

3. 2. 2. Purple Herons ringed in western France: Charente-Maritime and Vendée (fig. 3)

During the autumn migration, Purple Herons ringed in Western France fly to Spain and not to Italy. Five recoveries from the area around San Sebastian and one from the coast of Portugal near Figueira da Foz indicates a migration route from the San Sebastian area to Portugal. The birds probably take a shortcut over inland Spain joining up with Purple Herons coming from the Camargue.

A recovery from Caniles near Baza suggests another migration route going straight over Spain from the San Sebastian area to the gulf of Almeria. From there the coast of Morocco at the Moulouya river area is only about 200 km away; a quite short distance for the birds to fly over the sea.

Reaching the coast of Morocco two slightly different ways are possible. The birds may follow the Moulouya river southwestwards and, leaving the river after about 300 km, fly straight southward to reach the migration route used by the Purple Herons ringed in the Camargue which goes south-east of the High Atlas mountains (2 recoveries) and reaches the Atlantic coast of West Africa in southern Morocco. However, from the Moulouya river it seems easier to follow a tributary west-

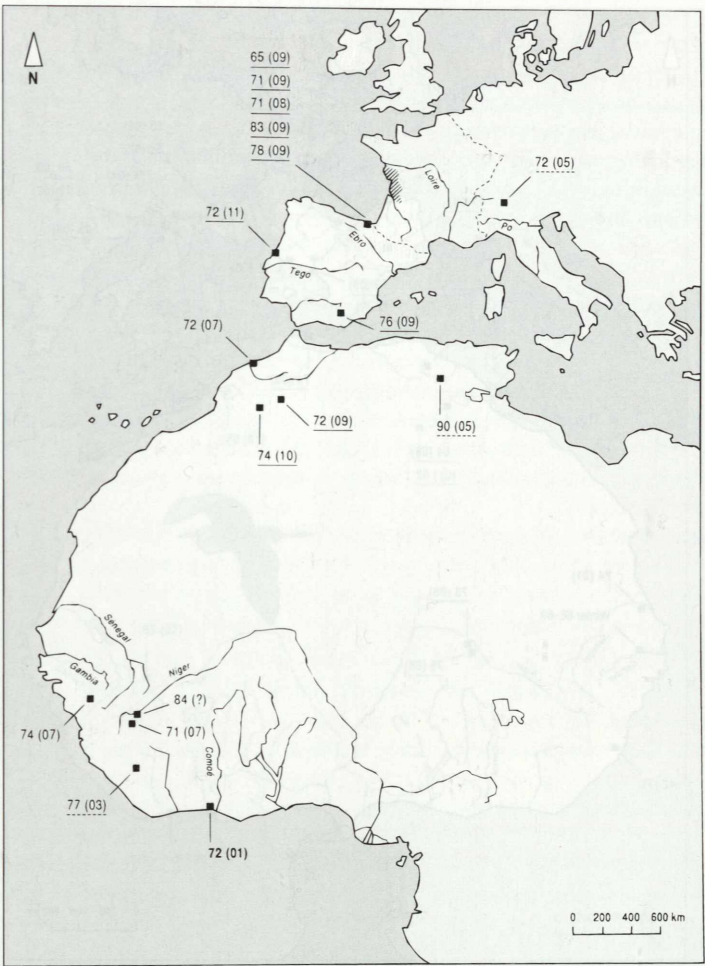


Fig. 3: Recoveries outside of France of Purple Herons ringed in Western France (hatched). Notations as used in fig. 2.

Abb. 3: Wiederfunde außerhalb Frankreichs von Purpurreihern, die im westlichen Frankreich (Region schraffiert) beringt wurden. Erklärung der Symbole s. Abb. 2.

ward to reach the plain of the Sebou and Beth rivers in order to follow the Atlantic coast sooner from north Morocco. The bird found near Casablanca may either have flown this way or have come from Portugal.

In West Africa several recoveries come from inland and show that Purple Herons leave the coastal areas to follow the rivers upstream (2 recoveries) to reach the upper Niger valley (2 recoveries) which suggests a return migration toward Europe crossing the desert. One spring recovery comes from the Aurès mountains.

Lastly, a spring recovery from Ticino in Switzerland suggests a migration route over the Alps from the Po valley which is probably more used by the Purple Herons ringed in eastern France (see next paragraph).

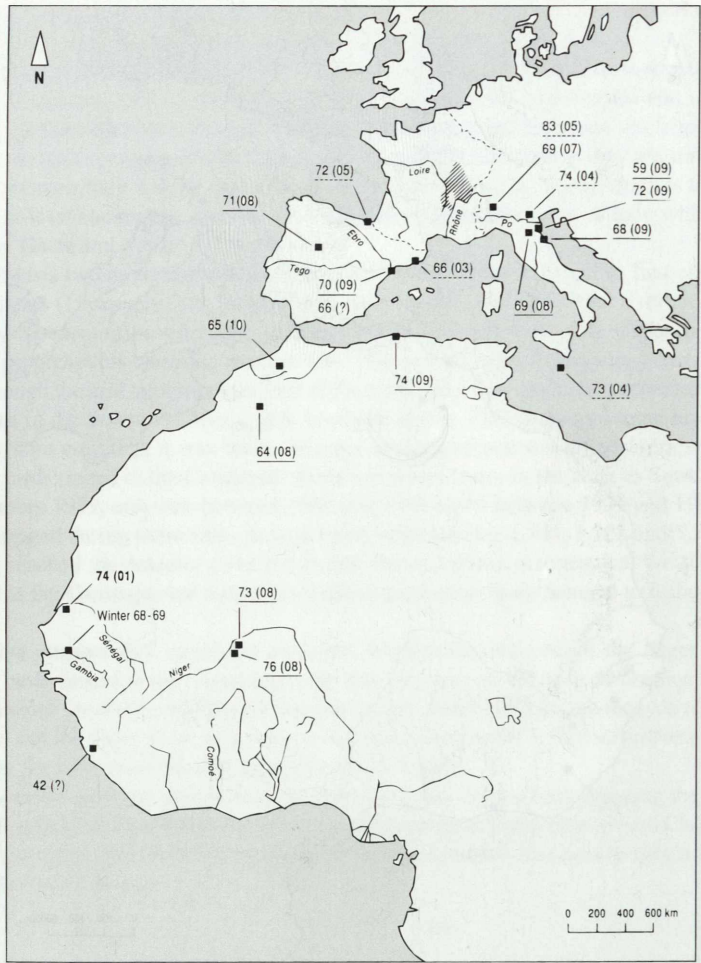


Fig. 4: Recoveries outside of France of Purple Herons ringed in Eastern France (hatched). Notations as used in fig. 2.

Abb. 4: Wiederfunde außerhalb Frankreichs von Purpureihern, die im östlichen Frankreich beringt wurden. Erklärung der Symbole s. Abb. 2.

3. 2. 3. Purple Herons ringed in eastern France: Côte d'Or, Saône-et-Loire, Jura, Ain and Loire, (fig. 4)

On migration these herons, which fly either over Italy or over Spain, are numerous but unlike the ones ringed in the Camargue, they do not seem to follow commonly the coast of west Italy, as not a single recovery comes from that area. Instead many of them reach the Adriatic sea (3 recoveries) following the Po river valley (4 recoveries).

Others fly over Spain (5 recoveries) following the same migration routes as the Purple Herons ringed in the Camargue and western France. A spring recovery in the San Sebastian area indicates

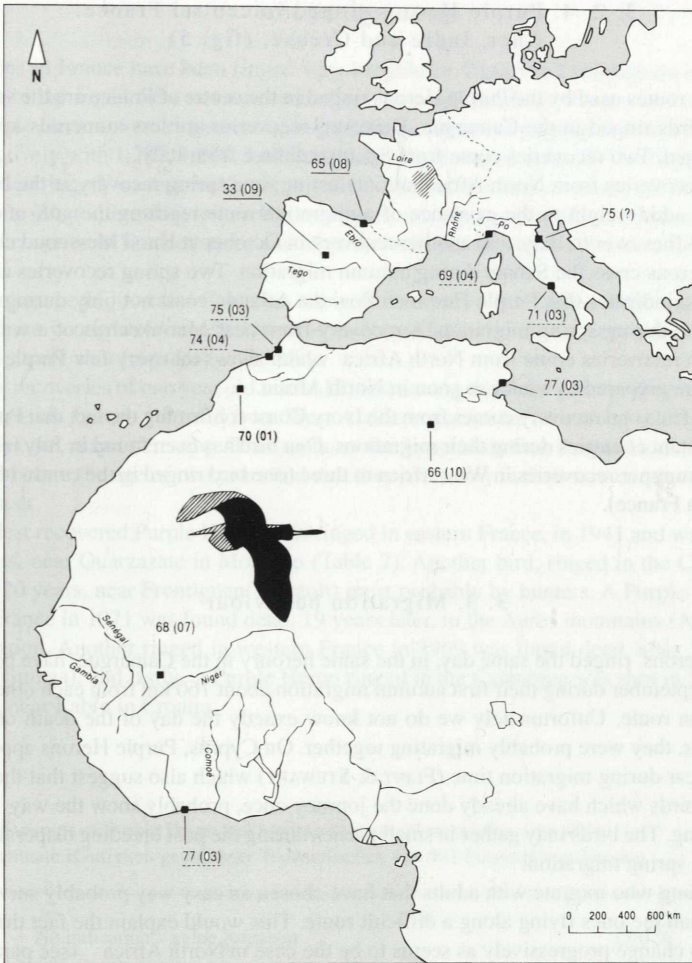


Fig. 5: Recoveries outside of France of Purple Herons ringed in Central France (hatched). Notations as used in fig. 2.

Abb. 5: Wiederfunde außerhalb Frankreichs von Purpurreihern, die in Mittelfrankreich (Region schraffiert) be-ringt wurden. Erklärung der Symbole s. Abb. 2.

that even the most westerly migration route is used at least to some extent by birds ringed in eastern France and a recovery from Malta suggests a spring migration over the Italian peninsula.

The migration routes in North Africa seem to be the same for the Purple Herons ringed in eastern France as for those previously described. The recoveries come from the Algiers area (1 recovery), the Ouarzazate area (1 recovery) and a little south west of Meknès (1 recovery).

In West Africa, two recoveries in August, in the flood zone of the Niger river, suggest a migration route over the desert in autumn, the birds having in this case just arrived.

Three recoveries, two from the coastal areas and one from inland, of two wintering birds and one with no indication of season, corroborate our previous descriptions of wintering areas in West Africa and mouvements toward the Niger river.

3. 2. 4. Purple Herons ringed in central France: Cher, Indre and Creuse, (fig. 5)

The migration routes used by the Purple Herons ringed in the centre of France are the same as those used by the birds ringed in the Camargue. However, recoveries are less numerous as fewer birds have been ringed. Two recoveries come from Spain and three from Italy.

Several recoveries from North Africa are interesting; one spring recovery at the border of the gulf of Gabès adds weight to the existence of a migration route reaching the gulf of Gabès from where the bird flies over to Italy, and another recovery in October at Hassi Messaoud clearly shows that Purple Herons cross the Sahara during autumn migration. Two spring recoveries along the coast of Morocco indicates that Purple Herons follow the Atlantic coast not only during autumn migration but also during spring migration. A recovery from near Marrakech is of a wintering bird. Only two such recoveries come from North Africa which shows that very few Purple Herons leaving Europe are prepared to winter so soon in North Africa.

In West Africa one recovery comes from the Ivory Coast confirming the fact that Purple Herons reach these distant countries during their migrations. One bird has been found in July in Mali, bringing the total summer recoveries in West Africa to three (one bird ringed in the centre of France and two in western France).

3. 3. Migration behaviour

Two Purple Herons ringed the same day, in the same heronry in the Camargue, have both been found dead in September during their first autumn migration about 160 km from each other, along the same migration route. Unfortunately we do not know exactly the day of the death of one of the birds. However, they were probably migrating together. On Cyprus, Purple Herons appear in small parties each year during migration time (FLINT & STEWART) which also suggest that they travel together. Older birds which have already done the journey once, probably show the way to the inexperienced young. The birds may gather in small parties during the post breeding dispersal in autumn and before the spring migration.

Those young who migrate with adults that have chosen an easy way probably survive in greater numbers than the ones flying along a difficult route. This would explain the fact that migration routes seem to change progressively as seems to be the case in North Africa (see paragraph Purple Herons ringed in the Camargue).

Birds from a given heronry often seem to winter in the same area and to follow the same migration route even if a few individuals may winter in quite different areas. In fact the young which do not disperse much after breeding have a greater chance to meet other birds from the same area or even from the same heronry. As long as no difficulty alters the way, they probably migrate along a route which is always the same, having been learned from generation to generation. This hypothesis is corroborated by the fact that 2 birds born in the same heronry were found in two nearby localities in Africa within a space of 13 years.

Two recoveries in the Alps seem to show that Purple Herons fly over mountains and in fact on the 19 th September 1992, 3 Purple Herons flew over the pass of Organbidexka (1284 m) in the Pyrénées mountains. They flew together with 9 Grey Herons (DESPERT in lit.). This is a very important observation as it proves that Purple Herons are able to cross mountains using passes and that they migrate in small parties, in this case together with Grey Herons. However, the few Purple Herons seen at Organbidexka (only 3 from the 15/7 to the 15/11 1992) and the numerous recoveries along the coast from the French border to Bilbao shows that they follow the coast rather than cross the mountains.

4. Mortality and age

Purple Herons in France have been ringed very irregularly. Until 1962 ringing did not occur each year and the birds ringed were not numerous (less than two hundred). From 1962 to 1974 several hundred Purple Herons were ringed each year with a maximum of ringing in 1968, 1970, 1971 and 1972, respectively with 1,282, 1,379, 1,424 and 1,109 birds ringed. After 1975, Purple Herons have no longer been ringed, except 339 birds in 1982 ! This sudden stop of nearly all ringing is unfortunate. Among other interesting research possibilities, it has prevented any comparison between the number of recoveries in France before and after the time the species had become totally protected in 1975.

The percentage of juveniles (less than one year) recovered is 64.3% and the one of adult birds is 35.7%. These young were mostly killed by hunters (Table 1). Those, very numerous, killed in France (87%) were shot from July to October.

The few recoveries of one year old birds (17) and among these the great proportion of those coming from outside France (12) and from West Africa in particular (6 among which 3 were recovered in July) are very interesting. This sustains the hypothesis that Purple Herons do not commonly breed before the age of two years and that they often stay in their winter quarter during their second summer.

The oldest recovered Purple Heron was ringed in eastern France, in 1941 and was found dead, after 23 years, near Ouarzazate in Morocco (Table 2). Another bird, ringed in the Camargue, was killed, after 20 years, near Frontignan(Hérault) most probably by hunters. A Purple Heron ringed in western France in 1971 was found dead, 19 years later, in the Aurès mountains (Algeria) during spring migration. Another ringed in western France in 1969 was found dead, after 15 years, near Kouroussa (Guinea), and lastly, a Purple Heron ringed in the Camargue was shot in November, after 14 years, near Labin in Croatia.

Table 1: Death causes of Purple Herons taking into account all recoveries (n = 401).
Tab. 1: Prozentuale Häufigkeit gemeldeter Todesursachen von 401 Purpurreihen-Funden.

No indication – keine Angaben	15,0 %
Shot – geschossen	37,5 %
Found dead – tot gefunden	29,0 %
Wounded – verwundet	6,8 %
Caught alive – lebend gefangen	2,4 %
Killed by electric-wire – Verdrahtungs-Opfer	2,2 %
Exhausted– erschöpft	1,0 %
Killed by accident – Unfalltot	0,5 %
Killed by dogs – getötet durch Hund	0,5 %
Dead, probably poisoned – vermutlich Vergiftung	0,5 %
Controlled– Ringnummer kontrolliert	2,2 %

Other causes : Injured by a musk-rat trap, found dead in a trap, found dead a leg caught in a fishing line, killed in France by a poacher to be mounted, killed in Africa to be eaten, hit by a car, caught by a fishing net, caught by a fishing hook, fallen dead on the ground, killed by a bird of prey.

Table 2: Age of Purple Herons ringed as immatures and found dead or injured.

Tab. 2: Alter der tot oder verletzt gefundenen Purpurreiher (alle Vögel wurden nestjung – als „immature“ – be-ringt).

age (in years) Alter (in Jahren)	Number of recoveries Anzahl der Rückmeldungen		
	in France in Frankreich	outside France außerhalb Frankreichs	total insgesamt
immatures	221	34	255
1	5	12	17
2	17	18	35
3	13	10	23
4	6	13	19
5	5	5	10
6	7	6	13
7	1	1	2
8		1	1
9	1	2	3
10	1	2	3
11	2	2	4
12	1		1
13	1	1	2
14		1	1
15		1	1
16			
17			
18			
19		1	1
20	1		1
21			
22			
23		1	1

In addition 8 birds were controlled and released: four juveniles, one aged 3 years, one aged 4 years and two aged 7 years.

5. Discussion

MOREAU (1972) delimited the breeding and wintering areas of the sub-species *Ardea p. purpurea* based on observations and ringing recoveries, presupposing, however, that recoveries from East Africa would occur eventually. For MOREAU, the whole European and Asiatic population of *Ardea p. purpurea* winters in the Sahel south of the desert and in East Africa.

KOOIJ (1976) studied mostly the post-breeding dispersal of Purple Herons. However recoveries from tropical West Africa being numerous, he noticed that Purple Herons commonly winter south of 10° N in that area but not in East Africa as still no recovery has come from that part of Africa.

The great drought in the Sahel which drastically changed living conditions in that part of the world began in the Senegal river area in 1968 and in the Niger river area in 1970 (these events are dated after the annual rate of flow of the Senegal and Niger rivers). MOREAU (1972) described the situation before the drought and KOOIJ (1976) the new conditions during it, as Purple Herons probably wintered commonly in the flood zone of the Niger river before the drought and as their tur-

ning up in number in tropical West-Africa, probably became a common behaviour only after 1970 (1 recovery in that area before 1970 and 13 from that year and after; number of Purple Herons ringed before 1970: 6,486; number ringed 1970 and after: 5,575). This change seems to be an adaptation to new conditions.

I have shown that migrating Purple Herons seem to follow migration routes instead of migrating on a large front from their European breeding ground to their African winter quarters. During the autumn migration, Purple Herons ringed in western France mainly follow the Atlantic coast toward Spain. Purple Herons ringed in the three other areas migrate through Spain as well as through Italy. However, the ones ringed in eastern France and flying through Italy, follow the Po valley eastward to the Adriatic Sea whereas the ones ringed in the Camargue and Central France also follow the western coast of Italy southwards.

The commonest migration route of Purple Herons seems to follow a very large loop. Taking into account all recoveries of Purple Herons flying over Spain and along the western coast of Italy, the number of autumn recoveries is 13 in Spain and only 1 in Italy and the number of spring recoveries is 4 in Spain and 14 in Italy (Purple Herons migrating eastward along the Po valley to the Adriatic sea have not been taken into account as they do not winter in West Africa. In any case, autumn and spring recoveries nearly balance each other along this route: 7 spring recoveries and 9 autumn recoveries). Most of the birds heading to West Africa thus seem to fly over Spain, to Morocco (9 autumn recoveries in Morocco and West Algeria and only 3 spring recoveries). In Morocco, Purple Herons have been observed in numbers at the mouth of the Moulouya river in August and September (HEIM DE BALZAC & MAYAUD 1962). Crossing Morocco, either south or north of the High Atlas mountains they reach the Atlantic coast which they follow to tropical West Africa, from where they reach the Niger river. Flying over the Sahara in the spring, they reach Algeria and Tunisia (5 recoveries in the spring and 3 in the autumn) where spring observations are numerous (HEIM DE BALZAC & MAYAUD 1962). Heading out over the sea they join Italy and finally their breeding ground in France, having probably been on the move, along this large loop, nearly all the time since they left the previous autumn.

CURRY-LINDAHL (1981) underlined the importance of the Purple Heron population of the subspecies *Ardea p. purpurea* belonging to Africa. These birds, which cannot be told apart from the European ones also migrate, but nothing is known about their movement. Moreau's hypothesis, very likely correct and therefore nowadays often quoted as certain, of an important migration route between Asia and Africa is based upon the observations of SMITH (1957). He saw Purple Herons flying southward along the coast of Eritrea in the autumn, landing to feed during the day, but as no further study has been undertaken in that country the origin of the herons is not known.

DEN HELD (1981) established a correlation between the rate of flow of the Niger and Senegal rivers and the number of breeding pairs of Purple Herons in the subsequent breeding season in two large Dutch colonies. No such correlation could be established with the Purple Herons breeding in the Camargue. The reason may be that the Purple Herons which breed in the Camargue and migrate to the Adriatic sea do not winter in West-Africa and are thus not affected by the drought in that area.

Where are the winter quarters of the numerous Purple Herons flying west-east in the autumn to the Adriatic sea? East Africa seems the most likely destination but still not a single recovery has been found in that area. Three recoveries point to a still more eastern route; one is of a bird ringed in France and found near Zagreb and two are of birds ringed in ex-Yugoslavia and found in Turkey, one of them in the Kelkit river area (KOOIJ 1976). Do Purple Herons ringed in western France cross the Adriatic sea to reach the Danube river and the Black sea, reaching, after having flown over the mountains of northern Turkey, the delta of the Euphrates and Tigris and finally the Persian Gulf? A little population of wintering Purple Herons has been found at Bahrain in Arabia (CRAMP & SIMMONS, 1977) which shows that the wintering of the subspecies *Ardea p. purpurea* in Asia is already a reality.

Zusammenfassung

In den Jahren von 1930 bis 1982 wurden in der Camargue sowie in den westlichen, mittleren und östlichen Landesteilen Frankreichs insgesamt 12116 immature Purpurreiher (*Ardea purpurea*) beringt. Die vorliegende Zusammenstellung über die Zugrouten der in Frankreich markierten Purpurreiher berücksichtigt alle Wiederfunde außerhalb Frankreichs.

Der Herbstzug des Purpurreihers führt zunächst nach Spanien bzw. Italien. Dabei folgen die im westlichen Frankreich beringten Vögel zunächst vor allem der Atlantikküste in Richtung Spanien und die im östlichen Frankreich beringten dem Po-Tal in Richtung Adria, während die in der Camargue und im zentralen Frankreich beringten die Westküste Italiens südwärts ziehen. Von den Purpurreihern, die in Tunesien eintreffen, durchquert ein kleiner Teil die Sahara in Richtung Niger-Fluß; die meisten folgen jedoch der nordafrikanischen Küste westwärts und treffen später mit den über Spanien ziehenden Purpurreihern zusammen. Doch verlassen viele Purpurreiher anscheinend auch die Pyrenäenhalbinsel über den Atlantik hinweg und erreichen die afrikanische Küste südlich des Hohen Atlas. 7 Rückmeldungen aus den Monaten Januar und Februar sind Hinweise auf eine Überwinterung im Küstenbereich des tropischen Westafrika (Senegal bis Dahome). Der Heimzug nach Europa kann sowohl entlang der westafrikanischen Küste als auch - nach Erreichen des Niger-Flusses - durch die Sahara in Richtung Tunesien erfolgen, von wo die Vögel dann nach Italien weiterziehen (von dort stammen auffällig viele Frühjahrsfunde). In den meisten Fällen dürften Weg- und Heimzug in der Form eines „Schleifenzuges“ erfolgen (im Herbst durch Spanien und Marokko zur Atlantikküste und von dort weiter zu den Überwinterungsgebieten südlich 10° N, im Frühjahr aber auf dem kürzesten Weg über die Niger-Flußregion und quer durch die Sahara nach Italien und Frankreich).

Von der norditalienischen Adriaküste gibt es zahlreiche Rückmeldungen, während aus Ostafrika (Überwinterungsgebiet?) bislang noch kein einziger Fund vorliegt. Ein aus dem Landesinneren Kroatiens stammender Frühjahrsfund könnte einen Purpurreiher betreffen, der im südlichen Irak überwinterete.

Offenbar folgt der Purpurreiher beim Verlassen Frankreichs oder Nord-Italiens lieber der Küste, als das offene Meer zu überfliegen, was die zahlreichen Rückmeldungen aus den Küstenbereichen Frankreichs und Spaniens erklären dürfte, während von Korsika und Sardinien kein einziger Wiederfund vorliegt. Normalerweise dürften höhere Berge kaum überflogen werden, doch sind Purpurreiher dazu grundsätzlich in der Lage, was die Beobachtung von drei über einen 1284 m hoch gelegenen Pyrenäenpaß ziehende Vögel gezeigt hat. Daß beim Purpurreiher oft mehrere Individuen gemeinsam ziehen, belegen auch Beobachtungen über das Eintreffen kleiner Zugtrupps auf Zypern.

References

- Cramp, S., & K.E.L. Simmons (1997): The birds of Western Palearctic. Handbook of the Birds of Europe, the Middle East and North Africa, vol.I. Oxford University Press, Oxford. * Curry-Lindahl, K (1981): Bird Migration in Africa. Academic Press, London. * Heim de Balzac, H., & N. Mayaud (1962): Les oiseaux du Nord-Ouest de l'Afrique. Ed. Paul Lechevalier, Paris. * Flint, P., & P. Stewart (1992): The birds of Cyprus. B.O.U. Check-list n°6 (Second Edition). * Den Held, J.J. (1981): Population changes in the Purple Heron in relation to drought in wintering area. *Ardea* 69: 185-191. * Kooij, H. van der (1976): De trekwegen en overwinteringsgebieden van vogel 400 (*Ardea purpurea*) L.H. Wageningen, Vakgroep Natuurbeheer, Rapport nr. 359. * Moreau, R.E. (1972): The Palaearctic-African Bird Migration Systems. Academic Press, London. * Smith, K.D. (1957): An annotated check list of the birds of Eritrea. *Ibis* 99: 16-26 * Voisin, C. (1991): The Herons of Europe. T & A.D. Poyser, London.

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