The Migration of Sand Martins *Riparia riparia* from Denmark and Southern Scania

By

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(Med et dansk resumé: Danske og skånske Digesvalers Riparia riparia *træk)*

INTRODUCTION

The introduction of mist-nets as trapping implement for ringers by the end of the 1950's brought about a rise in the fieldwork on many passerine and hirundine species. The movements of many little known migrants have been made clear since this work began.

One species that has been subject to intense, more or less coordinated study in most European ringing schemes is the Sand Martin *Riparia riparia.* Massringing in the breeding areas combined with ringing in roosts along the migratory route in Africa as well as in Europe, has provided much information on this formerly practically unknown species. (See for example ERARD 1965, 1966, MEAD 1963, BUB and KLINGS 1968).

The recovery percentage for ringed Sand Martins was very low up till 1960; MEAD (1963) gives a value of 0,2% for the British scheme. One reason for this is the winter ecology of the species; the feeding-grounds are situated along the shores of great African lakes such as Lake Chad and Lake Victoria. The roosts can be found in the same type of terrain. For this reason the Sand Martin is seldom confronted with man during its tropical sojourn. If ringers were to rely exclusively upon the public for information, very little would be known about the species today.

The intensified study began with the »Sand Martin Enquiry« in Britain in 1960. Cooperation with the French yielded well from 1964 and onwards; this year also marks the start of the Danish and Scanian enquiries. French and English expeditions to the Sahara have furnished much information, especially on the migration in spring.

Our present dependence upon ringing stations and expeditions has probably given some bias to the information collected; the recoveries reflect the location of ornithological activity as much as they do reflect the migration of the Sand Martin. This limitation should be kept in mind when we meet with the absence of birds from southern Scandinavia in Spain, Morocco and the western Sahara.

The study area: Habitat and breeding period

During the last glacial period the whole of Scandinavia except W. Jutland was covered with ice. The first stage of the melting of the ice uncovered the Danish Isles and southern Scania, leaving a variety of drift formations behind, suitable for Sand Martin settlement. Man-made incisions in the ground have laid these formations bare, thus furnishing the species with ample breeding habitat in the whole area. This has probably caused a strong population growth during the last decades, as the gravel industry has expanded. As a matter of fact the whole settlement – with a few exceptions, e.g. the isle of Hven in Öresund

Foto Arthur Christiansen.

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with 1000 nest-holes in eroded slopes – is completely dependent on man. The relative uniformity of the area and the breeding habitat warrants a treatment of its Sand Martins as a close unit, *one population.*

The bird is two-brooded in our area, but with one important limitation; it seems as if first-time breeders are capable of laying only in May and June. All birds carrying eggs in July and August have been females in their second breeding or more (PERSSON in prep.). The first brood is fledged from midsummer and onwards, replacement broods (an important contribution in our type of habitat) from the end of July, while late broods may be heard begging for food as late as the middle of September.

The departure of Scanian birds in autumn

One characteristic of the »dead-ice«-area in SW Scania is the abundance of small ponds with a surface of a few hundred square metres or more. There are more than a thousand such ponds in the main breeding area of the Sand Martin. Males from disturbed colonies roost in these ponds throughout the breeding season, and the young also appear here as soon as they are beginning to get independent. Ringing carried out by LENNARTH BLOMQUIST in one such pond near Lockarp (55.32 N, 13.02 E) has revealed that birds from the most nearby colony dominate, this probably being the case in each single pond (see Fig. 1). The time distribution for males and females of certain local origin is shown in Fig. 2. Only four juveniles of known origin have been taken in Lockarp, all four in the period 20th-25th July.

Many juveniles obviously leave the breeding-grounds as soon as possible and assemble in large roosts in some distance from the traditional roosts of their parents. Such roosts are situated in Lake Krankesjön, Lake Börringe and Lake Yddingen, also in Foteviken 20 kms S of Malmö and in Utterslev Mose in Copenhagen. The latter roost serves the Scanian birds too; an interesting fact is that many birds fly NW in order to reach it.

Table 1 compiles all recoveries from major roosts, two birds from lee-flight in stormy weather have also been included. International symbols and abbreviations have been used.

The earliest juvenile caugt in a roost originates from Lockarp, 23 July, while the latest bird was taken in Utterslev, 24 September. The earliest female occurs in Lockarp, 24 July, while the latest females have been caught in Albäck (colony) on 4 September. The latest male was taken on migration in Ljunghusen on 5 September.

The passage over the European mainland in autumn

All long-distance recoveries are listed in the appendix. Nineteen of these range under the heading »European mainland«; a number too small to allow final conclusions to be drawn. It is striking, however, how close they are ac-

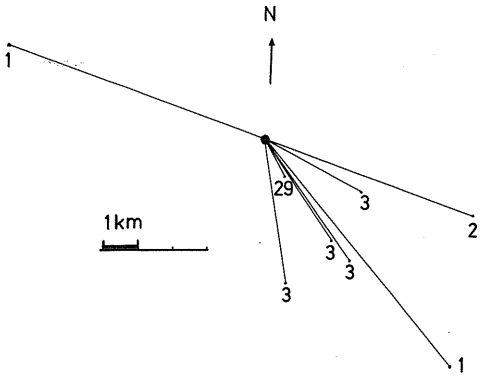

Fig. 1. Origin of birds caught in the roost at Lockarp. The numbers caught are stated for each colony. Directions and distances according to the scale.

Fugle med kendt opholdssted fanget på overnatningsstedet ved Lockarp. Det fundne antal er angivet for de enkelte kolonier. Retning og antal kilometer ses på figuren.

cumulated along a line from Scania to the Balearic Islands.

Ten of these recoveries fall between 55° N and 50° N. With one exception the longitude lies between 10° E and 13° E. The mean course angle is 5,2° StE. Extreme dates are 19 August and 12 September.

Seven recoveries fall between 50° N and 45° N. The longitude lies between 6° E and 10° E. The mean course angle is 19,4° StW. Extreme dates are 19 August and 19 September.

The passage over the Mediterranean and North Africa in autumn

Only five recoveries, 20-24 in the appendix, belong to this category. Three of them (Tunisia, Malta and Sicily) with mean course angle 3,7° StE point towards the passage Fessan Oasis – the pass between Ahaggar and Tibesti – Tiniri Oasis. A fourth bird in the prolongation of this direction has reached Equatorial Africa in October. A fifth bird on the SSW course, that is taken by most birds in Europe, has reached the Republic of Mali in November (See map, Fig. 3).

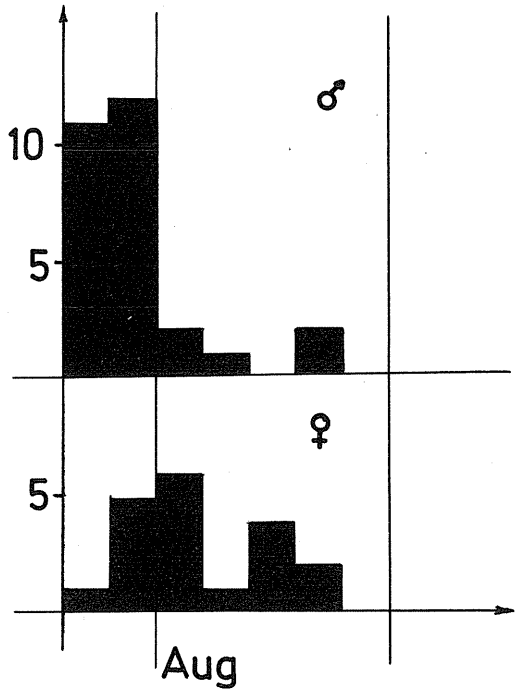

Fig. 2. Occurance of males and females from nearby colonies in the roost of Lockarp. The birds have been grouped in 6-day-intervals. The month of August is marked out with two vertical lines.

Tilsynekomst af hanner og hunner fra de nærtliggende kolonier på overnatningsstedet ved Lockarp. Fuglene er grupperet i intervaller på 6 dage. August er markeret med 2 vertikale linier.

Table 1

The roost in Foteviken (55.27 N, 12.59 E):
V ad♀14.8.65. – o ALBÄCK, 11 km SE, 26.6.65
V 2y♀28.8.65 – V with egg HÖKÖPINGE, 6 km NE, 19.7.65.
V ad♀5.8.69. – o ALBÄCK, 11 km SE 14.6.69.
. juv 7.8.69. – V ALBÄCK, 11 km SE, 6.7.71.
The roost in Utterslev (55.43 N, 12.31 E):
. juv 24.9.65. – (♀) ÅLABODARNA, 30 km NNE, 26.6.67.
. juv 24.8.67 – x HVEN, 23 km NNE, 20.6.68.
V juv 29.8.67. – o ALBÄCK, 52 km SE, 30.7.67.
. juv 31.8.67. – V♂ ÖNSVALA, 44 km ESE, 5.6.68, breeding TÖRRINGE 30.6., 18.7.68.
. juv 31.8.67. – V♂ ÅLABODARNA 26.6.68.
V *juv* 1.9.67. – o *ad* ÅLABODARNA 21.6.67.
. juv 4.9.67. – V♂ ARRIE, 44 km SE, 9.8.70.
. juv 6.9.67. – V♂ KÄGLINGE, 42 km SE, 13.6.68.
. juv 10.9.67. – V♂ BARA, 46 km ESE, 22.7.68.
All recovery localities in Sweden.
Roost at Falsterbo (55.23 N, 12.50 E):
. juv 27.7.64. – V♂ ALBÄCK, 17 km ESE, 25.6.65.
Lee-flight in stormy weather:
. juv MALMÖ 12.9.64. – V♂ MALMÖ 16.7.65.
V LJUNGHUSEN 5.9.71. – ♂ V. KÄRRSTORP, 20 km NE, 25.6.71.

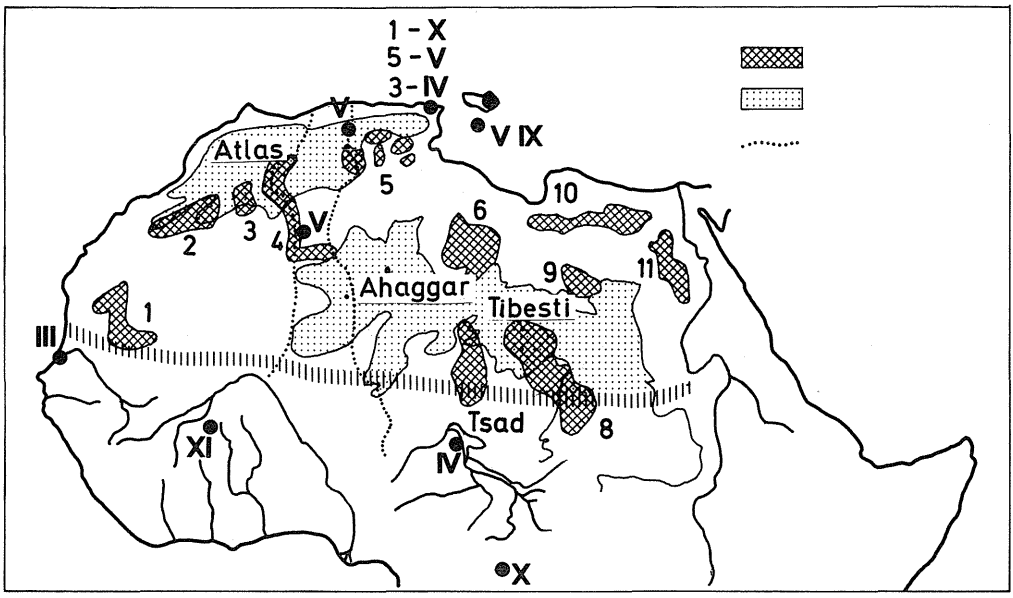

Fig. 3. Map showing the northern half of Africa. The oases are numbered from West to East. 1 = The Mauretanian Oases, 2 = Draa-Tal Oasis, 3 = Tafilalet Oasis, 4 = »The Way of Palms«, beginning at Figuig Oasis, ending with Tuat Oasis and Tidikelt Oasis, 5 = (clockwise from the W.) Msab, Ziban, Djerid, Nefsaua and Rir Oases, 6 = Fessan Oasis, 7 = Tiniri Oasis, 8 = Tibesti - Ennedi Oases, 9 = Kufra Oasis, 10 = North Libyan Oasis, 11 = Egyptlan Depression Oases. Recoveries are marked out with black dot and month of recovery in roman figures. The map is partly drawn after SCHIFFERS (1950).

Kort over den nordlige halvdel af Afrika. Oaserne er nummererede fra vest til øst. 1 = Mauretansk Oase, 2 = Draa-Taloase, 3 = Tafilalet-oase, 4 = »Palmevejen«, der begynder ved Figuig-oasen og slutter ved Tuat-oasen og Tidikelt-oasen, 5 = (med uret fra venstre) Msab-, Djerid, Nefsau- og Rir-oaserne, 6 = Fessan-oasen, 7 = Tiniri-oasen, 8 = Tibesti-Ennedi-oasen, 9 = Kufra-oasen, 10 = Nordlibiske oase, 11 = oaserne i Egypten. Kortet er tegner efter SCHIFFERS (1950).
Genfangster er angivet med sort prik og måneden for genfangsten er angivet med romertal.

The spring migration in Africa

Two birds are just south of the southern border of the Sahara in March (Senegal) and April (Nigeria). The bird from Senegal suggests that some birds avoid the dangers of the Sahara by following the Atlantic coast. Two birds from the main caravan routes in the Algerian Sahara (Tidikelt Oasis 3 May, Djelfa in the Atlas Mountains 9 May) suggest that some birds return along the SSW route from the autumn (See map, Fig. 3).

Eight birds from Tunisia in April and May and one from Malta in May form impressing evidence of Trans-Sahara passage in spring. Especially interesting is that six of these birds are from May against three from April. The accumulation of recoveries in Tunisia should not be taken as evidence for the dominance of the S-direction among our Sand Martins; seven of nine recoveries originate from the French »mission« to Lac Kelbia in the spring of 1968. In the discussion will be shown, that 1968 was a year when the Sand Martins were quite out of phase in several aspects; birds were excavating in Scania when the first migrants were caught in Tunisia.

The spring migration in Europe

Five recoveries from spring add little to our knowledge. Two birds in the SSW-direction were in Switzerland in April, two late migrants in W. France and SW Germany on 25 May. A fifth bird was found dead in Austria on 13 May.

Discussion

Adult Sand Martins begin to disappear from the local roosts in Scania by the first week of August, the males maybe leaving a few days before the females. Late breeders may be present in the colony till the middle of September, however. The first adult bird recorded on the continent is a female in Germany on 20th August.

The quick departure of newly fledged juveniles from the surroundings of the colony is mentioned already by MEAD (1963). Two British juveniles were in France on 47.54° N, 1.50° E already on 7th August. Among juveniles of Danish origin we find one in Switzerland on 20th August. This seems to be rather extraordinary performance however; most juveniles probably assemble at the most nearby lake or marsh for tome time. Such behaviour must be advantageous to the species, diminishing competition for food in the vicinity of a colony, where late broods are stille being fed by the parents.

1967 was a good year with a good second (or rather: replacement) brood. In the major roost of Utterslev eight birds of probable Scanian origin are caught between 24th August and 10th September. The main fledging period in Scania this year falls approximately between 20th July and 10th August, that is to say one month earlier.

In Utterslev the dominance of the juveniles is overwhelming: for the years 1965-1966 ANDERSEN-HARILD (1967) gives a value of 97%. Earlier in the season we meet with the amount of adults expected in local roosts like Lockarp. Adult birds are obviously as easy to catch as the juveniles here. The assumption, that adults depart directly from the colony or the local roost and therefore do not show up at major roosts in great numbers, seems to be justified. What role then do the big roosts play for the juveniles?

The process in which fat is deposited before the departure probably takes longer time for the unexperienced juveniles left on their own, than it takes for the adults. This explains the gathering of young birds in suitable feeding-grounds. Useful routines like feeding-flight over water, avoiding of rain and thunderstorms, crowding as an act of defense against raptors may also be trained in this phase for later benefit.

There is little evidence for migration along two major routes across the European mainland; it rather seems as if Erzgebirge (the northern border of Czechoslovakia) effectively puts a stop to a movement originally directed due south, and links it into the valley of the Rhone. The recoveries from the passage over the European mainland fall between 19th August and 20th September.

Two autumn recoveries from Sicily (communication: October) and Malta (September) reveal that part of the migrants go due south anyhow, maybe passing across the mountain ranges of Central Europe, or more likely: entering Italy via Switzerland. Evidence for passage across the Erzgebirge is supplied by the recovery of a bird from Västergötland, Sweden on 50.05° N, 15.37° E in Czechoslowakia on 24th August (ÖSTERLÖF, 1965).

The sparse recoveries from Africa give the same impression as the one from Europe; that the Sand Martin avoids mountain chains and follows river valleys and flat country as long as this is possible. One bird frozen to death in Algeria in spring (our material) and one frozen to death in Austria in spring (BUB and KLINGS 1968) illustrate the dangers that this relatively delicate species meets with at high altitudes.

Earlier in the text it was suggested that migration across the Sahara goes mainly along two major routes. Before the discussion turns to this subject, one or two strong reservations should be made. MOREAU (1953) stresses that migration can be seen and expected at practically every point in the Mediterranean area. This is important, for it means that at least the most able migrants may also be expected at practically every point of the North African coast.

The concept of migration along itineraries in the Sahara is discussed at full length for the White Stork *Ciconia ciconia* by BERNIS (1959), BOUET (1935), 1938) and KULLENBERG (1956). Three

Typical Danish breeding site for Sand Martins *Riparia riparia.* Photo Arthur Christiansen.

Typisk dansk ynglelokalitet for Digesvale.

major routes: one along the Mauretanian coast, one southwards along Wadi Saoura and one southwards across central Sahara towards Lake Chad can be discerned. A lot of east-to-west movement disorders the picture, and moreover several authors stress that storks can be seen even in the most remote parts of the Sahara during their migration periods. This complexity on the part of a fairly specialized migrant of course calls for caution in other cases.

In the case of the Sand Martin we depend on a mere handful of recoveries for information. Of course no observations of birds with known origin are available. Recoveries suffer from one serious drawback, this should be remembered too; they reflect human settlement and human presence as much as they do reflect the movements of birds in many areas.

The western route that may be discerned, goes: Figuig Oasis along Wadi Saoura to Tidikelt Oasis, pointing towards the northern bend of the Niger. The eastern one goes: Fessan Oasis (arrival over Libya or Tunisia), passing between the Ahaggar and the Tibesti to Tiniri Oasis, finally reaching Lake Chad. One recovery speaks for the possibility of a third route along the Atlantic coast of Africa, while there are no recoveries from the Nile valley or other parts of East Africa.

Support for this hypothesis can be sought in the existing publications on the Sand Martin. BUB and KLINGS (1968) report of two German birds from the western route (Figuig, 4th and 14th April), and ERARD (1966) gives a third one from the same area (Figuig, 20th April). One bird on the eastern route was found dead at Tripolis, 32.53° N, 13.12° E (com-

munication: July) according to BUB and KLINGS, and a fifth German bird was ringed at Fessan Oasis, 25.59° N, 14.26° E, on 5th May (ERARD 1966). The German recoveries thus are complementary to the Danish and Scanian ones in a very satisfactory way.

Two recoveries from March and April differ by an angle 38°, this means a distance of a little more than 3000 kms between the recovery localities. Does the winter distribution of Scanian and Danish Sand Martins span a distance of the same magnitude with a fairly constant density, or can a few isolated centres of gravity be discerned? This is quite an open question.

Seven Danish and Scanian birds were caught at Lake Kelbia in Tunisia on April 30th (2), May 1st, 9th, 11th, 18th and 19th, 1968. This mass of information as a matter of fact sets us several problems.

The first arrival in Scania took place on 26th April in this year, this date being about three weeks earlier than in the preceding years! In the afternoon of the 26th displaying birds could be seen in all colonies up to 55.50° N. Birds were excavating in Albäck (55.23° N, 13.05° E) on the next day; one mist-net in this colony at dawn on 28th April gave three unringed birds and five controls: one 5y +♀, one 4y +♂, one 3y +♂ and two 2y +♂♂. No certain yearlings were present at this date, although a lot of juveniles had been ringed in the colony in 1967. It seems as if the forerunners were mainly birds beginning their second breeding or more.

From what direction did the early birds arrive? If no ringing was carried out at Lake Kelbia before 30th April, the discrepancy may be due to this fact: migration may have been going on in Tunisia throughout April for all that we know. It is possible however, that spring migration proceeds faster along the western route; the Figuig birds are all from April.

The discussion has made clear, that much study is needed if the problems are going to be solved. My intention with the somewhat speculative approach has been partly that of setting the problems for study in the future.

DANSK RESUME

Danske og skånske Digesvalers *Riparia riparia* træk

1. Moræneaflejringerne dannedes i Danmark og Sydskåne under den første afsmeltning i den sidste istid. Disse aflejringer, som danner forudsætninger for en tæt Digesvale-population i det pågældende område, er temmelig ens af opbygning. Dette forhold, samt den geografiske nærhed, forsvarer en behandling af Digesvalerne i Danmark og Sydsverige som en sluttet enhed, en population.

2. De gamle fugle begynder at forlade kolonierne omkring den første uge i august. En adult hun blev fanget i Tyskland den 20.8. Ungfuglene, som forlader reden i perioden 20.6.-15.9., bliver meget hurtige selvstændige og forlader straks kolonien og dens nærmeste omgivelser. Derefter samles de for en tid i områder med rigelig føde. De første ungfugle er rapporteret fra Schweiz den 19.8.

3. Genfangster fra det europæiske fastland ligger i tiden mellem 19.8. og 20.9. Mellem 55° N og 50° N ligger alle fund med undtagelse af ét øst for 10° E; middelværdien for kursvinkler for 10 fund er 5° syd til øst. Syd for 50° N ligger derimod alle fund vest for 10° E; middelværdien for kursvinklen er for 9 fund 20° syd til vest. Det ser altså ud til, at Erzgebirge forhindrer en oprindelig sydrettet bevægelse og fører den mod SSW ind over øvre Rhindal og senere Rhonedalen.

4. Efterårsfund fra Tunesien, Malta og Sicilien viser, at en del fugle flyver direkte mod vinterkvarteret. Det er tænkeligt, at disse fugle trods alt ikke flyver over det centraleuropæiske bjergområde i større omfang, men i stedet følger Rhindalen ind i Schweiz for til sidst at nå Italien over de schweiziske alpepas.

5. Genmeldinger fra Sahara antyder to trækveje, en østlig og en vestlig. Samme tendens genfindes i det materiale, som er publiceret af Bub & Klings (1968). Visse forbehold må dog tages overfor denne tolkning; ifølge Moreau (1953) optræder mange trækfugle praktisk taget overalt i Middelhavsområdet og Sahara. Af de europæiske fund fremgår det dog ret klart, at Digesvalen undgår bjerge og så vidt muligt holder sig til sletteland og floddale. Det er derfor sandsynligt, at oasernes og bjergkædernes ledende og afledende virkning stærkt koncentrerer Digesvalens træk over Sahara.

6. Fra perioden umiddelbart før forårstrækket findes 2 fund syd for Sahara, et fra Richard Toll i Senegal og et fra Tchadsøen. Den store afstand mellem fundene er forvirrende; spørgsmålet er, om den dansk-skånske population optræder jævnt i det mellemliggende område, eller om visse foretrukne »centre« kan påvises.

7. I foråret 1968 blev der fanget 7 Digesvaler fra vort område i Tunesien i perioden 30.4.-

19..5. Dette vidner om et stærkt forårstræk over omtalte område, fugle der rimeligvis fulgte den østlige af de to trækveje, som jeg har skitseret. Samme år ankom imidlertid et stort kontingent fugle til Skåne allerede den 26.4., og redeudgravning var i fuld gang den 28.4. Var disse fugle også fløjet over Tunesien? Eller havde de valgt den vestlige rute? Så længe vi ikke ved, hvornår forårsmærkningerne i Tunesien blev indledt i 1968, må spørgsmålet stå ubesvaret.

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APPENDIX

Foreign recoveries of Sand Martins from Denmark and S. Scania
International abbreviations and symbols have been used

1. Helgoland 0335317 . juv Wulfen (54,42 N, 11,16 E), Fehmarn, BRD 24.8.1965.
   V Birkende (55,38 N, 10,58 E), Fyn, DENMARK 27.6.1966.
   115 km – 19° NtW

2. 9178445 . fl. Keldsnor (54,73 N, 10,72 E), Langeland, DENMARK 16.6.1968.
   V Röggeliner (53,73 N, 10,93 E), DDR 28.8.1968.
   115 km – 7° StE

3. Hiddensee 90219373. juv Langenwerder (54,03 N, 11,50 E), DDR 8.9.1967.
   V Omö (55,17 N, 11,15 E), Själland, DENMARK 6.6.1968.
   130 km – 10° NtW

4. Helgoland 0108750 . migr. Langenwerder 19.8.1963.
   V Törringe (55,52 N, 13,15 E), Skåne, SWEDEN 22.7.1964.
   200 km – 32° NtE

5. 9299846 . ad♀Åbo grusgrav (56,12 N, 10,03 E), Jylland, DENMARK 10.7.1971.
   V Friederichstadt (54,37 N, 9,08 E), Schleswig-Holstein, BRD 25.8.1971.
   210 km – 16.5° StW

6. 9140271 . juv Mesinge (55,50 N, 10,65 E), Fyn, DENMARK 15.7.1967.
   x Rechlin (53,35 N, 12,73 E), DDR 10.9.1968.
   265 km – 31,2° StE

7. 9055970 . ad Hoby (54,73 N, 11,25 E), Lolland, DENMARK 7.6.1966.
   V Neuhof (51,58 N, 10,57 E), BRD 12.9.1966.
   335 km – 8,1° StW

8. 1488461 . ad♀ Kävlinge (55,53N, 13,08 E), Skåne, SWEDEN 23.6.1970.
   V Weindorfer Teich (51,72 N, 11,82 E), DDR 20.8.1970.
   445 km – 10,7° StW

9. Hiddensee 90073245 . fl. Stausee Windischleuba (51,02 N, 12,47 E), DDR 29.8.1965.
   V Ellinge (55,32 N, 10,63 E), Fyn, DENMARK 16.7.1967.
   500 km – 14,9° NtW
10. Hiddensee 90205650 . fl. Stausee Windischleuba, 12.9.1967.
   V ♂ Hobro (56,68 N, 9,80 E), Jylland, DENMARK 13.7.1968.
   660 km – 16,4° NtW
11. 9201627 . fl. Omö (55,17 N, 11,15 E), Själland, DENMARK 27.7.1968.
   V juv Reinheimer Teich (49,85 N, 8,85 E), BRD 23.8.1968.
   615 km – 15,5° StW
12. Radolfzell K397577 . juv Roxheim (49,58 N, 8,37 E), BRD 9.9.1962.
   V ♂ Limhamn (55,57 N, 12,93 E), Skåne, SWEDEN 28.6.1963.
   740 km – 26,7° NtE
13. Sempach E205243 . juv Chavornau (46,72 N, 6,57 E), SWITZERLAND 20.8.1966.
   V Keldsnor (54,73 N, 10,72 E), DENMARK 20.6.1968.
   895 km – 19,9° NtE
14. Radolfzell K230131 . ad Allensbach (47,72 N, 9,07 E), BRD 19.9.1959.
   V ♀ Limhamn (55,57 N, 12,93 E), Skåne, SWEDEN 13.7.1963.
   915 km – 18,4° NtE
15. Sempach E82356 . ad Sempach (47,22 N, 8,20 E), SWITZERLAND 5.9.1962.
   V Havrebjerg (55,43 N, 11,33 E), Själland, DENMARK 19.7.1963.
   940 km – 14,6° NtE
16. *9165126* . ad Åsum (55,40 N, 10,47 E), Fyn, DENMARK 18.7.1968.
   V Chavornay (46,70 N, 6,57 E), SWITZERLAND 16.9.1969.
   1005 km – 17,3° StW
17. 9107591 . Hove (55,72 N, 12,25 E), Själland, DENMARK 18.6.1967.
   V Yverdon (46,78 N, 6,63 E), SWITZERLAND 19.8.1967.
   1065 km – 23,7° StW
18. Paris 505327 . Tour du Valat (43,50 N, 4,67 E), FRANCE 18.9.1965.
   V Assens (55,27 N, 9,92 E), Fyn, DENMARK 29.5.1966.
   1360 km – 18,3° NtE
19. Paris 08014 . ad Tour du Valat, FRANCE 20.9.1960.
   V ♂ Limhamn (55,57 N, 12,93 E), Skåne, SWEDEN 29.6.1963.
   1465 km – 27,2° NtE
20. *1408480* . ad ♂ Önsvala (55,62 N, 13,20 E), Skåne, SWEDEN 5.6.1968.
   x Catania (37,52 N, 15,10 E), Sicily, ITALY (10.10.1969).
   2015 km – 4,9° StE
21. Paris 342388 . Lac Ishkeul (37,17 N, 9,83 E), TUNISIA 18.10.1964.
   V Langeskov (55,37 N, 10,60 E), Fyn, DENMARK 13.6.1965.
   2025 km – 2,0° NtE
22. 9193305 . ad Munkeby (54,77 N, 11,12 E), Lolland, DENMARK 21.7.1968.
   V Mgarr (35,93 N, 14,37 E), MALTA 19.9.1969.
   2110 km – 8,1° StE
23. *1474208* . ad♀Gabeljung (55,47 N, 13,38 E), Skåne, SWEDEN 23.6.1969.
   x near Kopa (13,08 N, 4,53 W), REP. of MALI 25.11.1969.
   4925 km – 25,4° StW
24. 9101800 . juv Hoby (54,73 N, 11,25 E), Lolland, DENMARK 28.8.1967.
   V Boda (4,32 N, 17,43 E), REP. of CENTR. AFR. 31.10.1968.
   5625 km – 8,0° StE
25. 9115498 . juv Vemmetofte Strand (55,23 N, 12,25 E), Själland, DENMARK 28.7.1967.
   V Lake Chad (ca.13,00 N, 14,00 E), NIGERIA 4.4.1968.
   4700 km – 2,5° StE
26. 9091572 . ad Funder (56,15 N, 9,48 E), Jylland, DENMARK 1.6.1969.
   V Richard-Toll (16,42 N, 15,70 W), SENEGAL 14.3.1971.
   4945 km – 35,6° StW
27. 9169427 . juv Keldsnor (54,73 N, 10,57 E), Langeland, DENMARK 9.8.1968.
   + Aoulef el Arab (27,00 N, 1,07 E), Sahara, ALGERIA 3.5.1970.
   3175 km – 17,9° StW
28. 1473904 . ad♀Törringe (55,52 N, 13,15 E), Skåne, SWEDEN 19.6.1969.
   x Tadmit, Djelfa (34,71 N, 3,23 E), ALGERIA 9.5.1971.
   2435 km – 22,3° StW

29. 9061350 . juv Birket (54,82 N, 11,63 E), Lolland, DENMARK 8.7.1966.
V Oued el Abid (36,90 N, 10,73 E), TUNISIA 27.4.1967.
1995 km – 2,3° StW

30. 9010582 . ad Hobro Österskov (56,63 N, 9,80 E), Jylland, DENMARK 20.6.1967.
V Lac Kelbia (36,83 N, 10,20 E), TUNISIA 30.4.1968.
2200 km – 0,9° StE

31. Paris 1137802 . ad Lac Kelbia, 30.4.1968.
V Åsum (55,40 N, 10,47 E), Fyn, DENMARK 1.7.1968.
2065 km – 0,7° NtE

32. 9122297 . juv Åsum (55,40 N, 10,47 E), Fyn, DENMARK 6.7.1967.
V Lac Kelbia 1.5.1968.
2065 km – 0,7° StW

33. Paris 1139678 . ad Lac Kelbia, 9.5.1968.
V ♂ Öremölla (55,40 N, 13,60 E), Skåne, SWEDEN 29.6.1969.
2080 km – 8,5° NtE

34. Paris 1143708 . ad Lac Kelbia, 11.5.1968.
V ♀ Jorlöse (55,62 N, 11,30 E), Själland, DENMARK 6.7.1969.
2090 km – 2,7° NtE

35. 1240038 . ad Törringe (55,52 N, 13,15 E), Skåne, SWEDEN 23.6.1965.
V Lac Kelbia, 18.5.1968. (Sw. ring overlooked, Paris 1157504 added).
V ♂ Gabeljung (55,47 N, 13,38 E), Skåne, SWEDEN 14.7.1968.
2090 km – 7,3° StW

36. Paris 1148339 . ad Lac Kelbia, 19.5.1968.
V ♂ Lockarp (55,53 N, 13,07 E), Skåne, SWEDEN 23.7.1969.
2090 km – 7,1° NtE

37. 9233300 . ad ♂ Svendstrup (55,37 N, 11,18 E), Själland, DENMARK 26.7.1969.
+ Sliema (35,92 N, 14,52 E), MALTA 23.5.1970.
2180 km – 8,1° StE

38. Paris 932110 . ad Ranville (49,23 N, 0,25 W), FRANCE 25.5.1968.
V ♂ Skuldelev (55,78 N, 12,03 E), Själland, DENMARK 12.7.1968.
1085 km – 51,5° NtE

39. *968528* . ad Munkeby (54,77 N, 11,12 E), Lolland, DENMARK 2.7.1962.
x Lavorgo (46,45 N, 8,85 E), SWITZERLAND 30.4.1965.
940 km – 10,7° StW

40. *9201534* . fl. Omö (55,17 N, 11,15 E), Själland, DENMARK 21.7.1968.
x Fuschertörl (47,12 N, 12,83 E), AÜSTRIA 13.5.1969.
905 km – 8,1° StE

41. *9147492* . juv Slaebek (55,12 N, 10,55 E), Fyn, DENMARK 9.8.1968.
x Niederönz (47,20 N, 7,72 E), SWITZERLAND 17.4.1969.
895 km – 13,8° StW

42. Radolfzell *K398030* . ad Neuhofen (49,43 N, 8,43 E), BRD 25.5.1963.
x Ringsted (55,43 N, 11,80 E), Själland, DENMARK 7.6.1964.
705 km – 20,2° NtE

43. Brit. Mus. HA 84394 . juv Wiggenhall (roost) (52,67 N, 0,37 E), GREAT BRITAIN 16.8.1965.
V Husby Sö (56,25 N, 8,22 E), Jylland, DENMARK 6.7.1966.
645 km – 55,8° NtE

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