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Morphometrical data from 30 bird species on spring migration in northern Tunisia

Morfometriska data från 30 fågelarter under vårflyttning i norra Tunisien

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In spring, billions of Palaearctic birds that have spent the winter in sub-Saharan Africa, cross the desert in a giant migratory leap on the journey to their breeding grounds (Moreau 1972). Despite more than hundred years of ringing, we still don't have fully conclusive evidence on how these birds cope with the crossing of the Sahara. Birds could either cross the desert and the Mediterranean Sea directly in a non-stop flight, or use an intermittent flight strategy, e.g. to stopover in one of the few available oases or to seek shade during the heat of the day in whatever shelter that may be available (caves, stones, vegetation etc.). For most individuals, the widely scattered oases are not available as stopover sites, but studies in the Algerian part of the desert have shown that some birds do utilize these places during the spring migration (Bairlein 1985, 1992). Of the birds studied in these oases, lean individuals fed intensively and put on migratory fuel deposits, while already fat birds mainly rested before continuing their migration the following night.

Swedish ringers from Ottenby Bird Observatory trapped birds on the coast of northern Tunisia during two consecutive springs, 1989 and 1990, with emphasis on the study of northbound trans-Saharan migration. Fieldwork was conducted at two coastal sites: Sidi Ali El Mekki c. 60km N of Tunis (7°10'46" N; 10°16'54" E) and Hergla c. 25km NNW of

Sousse (36°2'0" N; 10°30'0" E). Fieldwork was carried out between 7 April and 14 May 1989 (7–17 April at Sidi Ali El Mekki, and 18 April – 14 May at Hergla), and between 6 April and 13 May 1990 (Hergla). Birds were trapped in mistnets, ringed with individually marked aluminium rings and subjected to standard biometrical measurements. These included the wing length, measured to the closest mm (maximum chord; Svensson 1992), the visible fat load (in the tracheal pit and on the abdomen), measured on a scale from 0–6 (Hasselquist & Petterson 1985), and the body mass, measured to the closest 0.1g, using a Pesola spring balance.

In total, 1130 birds of 51 species were ringed, of which 1017 of 30 species were non-residents. The morphometrical data from these migratory birds are shown in the Appendix, and median dates of passage for species with more than 30 trapped individuals are found in Table 1. The majority of Robins *Erithacus rubecula*, Song Thrushes *Turdus philomelos*, Chiffchaffs *Phylloscopus collybita* and Blackcaps *Sylvia atricapilla* had most probably wintered north of the desert, and were thus not regarded as trans-Saharan migrants.

Birds measured in Tunisia had moderate fat deposits, the mean of 1046 scored individuals across all species was 3.2 (St. dev. = 1.6), and many had fat scores above 4 (Table 2). The data at hand offers some interesting comparisons. For instance, Garden Warblers *Sylvia borin*, in the process of putting on fat loads for migration at Jos in Central Nigeria (at the starting point for the desert crossing of this species), weighed on average 21.8 g (n = 196; Ottosson et al. submitted), with some individuals as heavy as 31.3 g. At the end of the barrier crossing, on the island Capri in southern Italy – which the birds reach after crossing both Sahara and the Mediterranean Sea – the average body mass of Garden Warblers is 15.5 g (1986–1990, n = 489, st.dev. = 2.1; Petterson et al. 1990). The 76 Garden Warblers measured in Tunisia

Table 1. Median date of passage for species with more than 30 trapped individuals.

Medianfångstdatum för de fågelarter med mer än 30 fångade individer.

Species Art	Median date Mediandatum
<i>Hirundo rustica</i>	3 May
<i>Ficedula hypoleuca</i>	26 April
<i>Muscicapa striata</i>	5 May
<i>Luscinia megarhynchos</i>	21 April
<i>Phoenicurus phoenicurus</i>	20 April
<i>Phylloscopus trochilus</i>	26 April
<i>Phylloscopus sibilatrix</i>	23 April
<i>Sylvia melanocephala</i>	20 April
<i>Sylvia atricapilla</i>	17 April
<i>Sylvia borin</i>	4 May
<i>Sylvia cantillans</i>	20 April
<i>Sylvia communis</i>	26 April

Table 2. Frequency distribution of fat scores in migrants trapped in N Tunisia, 1989–1990.

Fördelning av fettklasser hos flyttfåglar fångade i norra Tunisien, 1989–1990.

Fat score Fettklass	Number Antal	%
0	54	5,2
1	108	10,3
2	161	15,4
3	264	25,2
4	222	21,2
5	155	14,8
6	82	7,8
Total	1046	100%

had body masses ranging between 13.6–24.7 g (Appendix), with an average of 18.5 g. Assuming a lean body mass of 15 g, the Tunisian trapped Garden Warblers in this study had fuel loads of c. 23% of lean body mass, most likely sufficient for continued migration across the Mediterranean Sea. Some individuals, however, had very small reserves or none at all and needed to put on new fat before continuing their migration.

The trapping figures at these sites in Tunisia were moderate, an indication that the majority of migrants passing the northern coast of Tunisia refrain from stopping over. However, the data presented here,

although limited, is one of the still rather few samples of morphometrical data collected from migratory birds in North Africa (e.g. Ash 1969, Bairlein 1985, 1992, Moreau & Dolp 1970, Moreau 1972, Smith 1968) and should thus be regarded as additional base-line knowledge, adding to the pool of body mass and fat score data of trans-Saharan migrants.

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References

- Ash, J. S. 1969. Spring weights of trans-Saharan migrants in Morocco. *Ibis* 111: 1–10.
- Bairlein, F. 1985. Body weights and fat deposition of Palaearctic passerine migrants in the central Sahara. *Oecologia* 66: 141–146.
- Bairlein, F. 1992. Recent prospects on trans-Saharan migration of songbirds. *Ibis* 134, suppl. 1: 41–46.
- Hasselquist, D. & Pettersson, J. 1985. Fat deposition and migration capacity of Robins *Erithacus rubecula* and Goldcrests *Regulus regulus* at Ottenby, Sweden. *Ringing & Migration* 6: 66–76.
- Moreau, R. E. & Dolp, R. M. 1970. Fat, water, weights and wing-lengths of autumn migrants in transit on the northwest coast of Egypt. *Ibis* 112: 209–228.
- Moreau, R. E. 1972. *The Palaearctic-African Bird Migration Systems*. Academic Press, London & New York.
- Smith, K. D. 1968. Spring migration through southeast Morocco. *Ibis* 110: 452–492.
- Svensson, L. 1992. *Identification Guide to European Passerines*. 4th Ed. Stockholm, private publisher.
- Ottosson, U., Waldenström, J., Hjort, C. & McGregor, R. Timing of migration and body mass changes in the Garden warbler *Sylvia borin* at three sites in sub-Saharan West Africa. *Submitted manuscript*.
- Pettersson, J., Hjort, C., Gezelius, L. & Johansson, J. 1990. *Spring Migration of Birds on Capri*. Special report, Ottenby Bird Observatory.

Sammanfattning

Under två vårsäsonger (1989–1990) studerade ringmärkare från Ottenby Fågelstation trans-Saharasträcket av tättingar i norra Tunisien. Syftet med studierna var, bland annat, att samla in morfologiska data från tropikflyttare efter ökenpassagen. Därför

fångades fåglar med hjälp av slöjnet i två buskrika områden: Sidi Ali El Mekki c. 60km N om Tunis (37°10'46" N; 10°16'54" E) och Hergla c. 25km NNV om Sousse (36°2'0" N; 10°30'0" E). Fångade fåglar ringmärktes, vinglängden mättes till närmsta mm (maxmetoden, Svensson 1992) och fåglarna vägdes (noggrannhet 0,1 g, Pesolavåg). Mängden lagrat fett (ett mått på fågelns tillgängliga energiresurser) bedömdes efter en sjugradig skala (Hasselquist & Petterson 1985). En sammanfattning av data från 1017 individer av 30 arter kan ses i Appendix. Det råder en brist på liknande data från Nordafrika – merparten av vår kunskap rörande flyttfåglar kommer från studier utförda i Europa. Mediandatum för de arter som fångades med mer än 30 individer kan ses i Tabell 1.

Troligtvis utnyttjar endast en mindre andel av tropikflyttarna den nordafrikanska kusten som rastningslokal under vårsträcket. De individer som fångades i Tunisien varierade från magra till feta (Tabell 2), med ett medelfettskalevärde på 3,2 (alla

arter sammanslagna, $n = 1046$, st.av. = 1,6). Dessa värden kan användas för jämförelser med data från andra lokaler längs flyttsträcket. Exempelvis vägde trädgårdssångare fångade under flyttning vid Jos i centrala Nigeria i snitt 21,8 g ($n = 196$; Ottosson et al., inskickat manuskript), medan en del individer kunde väga så mycket som 31,3 g. Den fettfria vikten hos trädgårdssångare har bedömts till 15 g, vilket betyder att de tyngsta nigerianska fåglarna hade dubblerad kroppsvikt. De 76 trädgårdssångarna fångade i Tunisien vägde i snitt 18,5 g, vilket motsvarar ett fettlager på ca 23% av den fettfria vikten. Detta kan sättas i relation till medelvikten på den syditalienska ön Capri, 15,5 g (1986–1990, $n = 489$, st.dev. = 2.1; Petterson m.fl. 1990), dit fåglarna kommer på slutet av en resa över Sahara och Medelhavet.

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Appendix. Morphometrics of birds trapped in N Tunisia during spring migration, 1989–1990. *Biometrisk data från flyttfåglar fångade i norra Tunisien våarna 1989–1990.*

Family <i>Familj</i>	Species <i>Art</i>	Variable <i>Variabel</i>	N	Range <i>Spann</i>	Mean <i>Medel</i>	Std. Deviation <i>St. avvikelse</i>
<i>Cuculidae</i>	Cuckoo	Wing/vinge	1	-	233.0	-
	<i>Cuculus canorus</i>	Fat/fett	1	-	4.0	-
	Gök	Body mass/vikt	0	-	-	-
<i>Hirundinidae</i>	House Martin	Wing/vinge	3	109-117	112.3	4.2
	<i>Delichon urbica</i>	Fat/fett	3	4-5	4.7	0.6
	Hussvala	Body mass/vikt	3	19.2-20.3	19.6	0.6
	Swallow	Wing/vinge	120	116-132	124.0	3.3
	<i>Hirundo rustica</i>	Fat/fett	119	1-5	3.3	0.8
	Ladusvala	Body mass/vikt	119	12.8-22.8	17.7	1.4
	Sand Martin	Wing/vinge	8	104-113	108.4	2.8
	<i>Riparia riparia</i>	Fat/fett	8	1-4	3.3	1.2
	Backsvala	Body mass/vikt	8	10.4-14.7	13.1	1.4
	<i>Laniidae</i>	Woodchat Shrike	Wing/vinge	25	94-108	99.4
<i>Lanius senator</i>		Fat/fett	25	0-4	2.4	1.2
Rödhuva törnskata		Body mass/vikt	25	28.7-39.0	33.1	2.8
<i>Meropidae</i>	Bee-eater	Wing/vinge	1	-	150.0	-
	<i>Merops apiaster</i>	Fat/fett	1	-	1.0	-
	Biätare	Body mass/vikt	1	-	54.0	-

Family <i>Familj</i>	Species <i>Art</i>	Variable <i>Variabel</i>	N	Range <i>Spann</i>	Mean <i>Medel</i>	Std. Deviation <i>St. avvikelse</i>
<i>Motacillidae</i>	Tree pipit	Wing/vinge	10	87-92	89.1	1.9
	<i>Anthus trivialis</i>	Fat/fett	10	3-6	4.1	1.3
	Trädpiplärka	Body mass/vikt	10	20.0-29.1	23.5	3.1
<i>Muscicapidae</i>	Robin	Wing/vinge	19	71-78	73.2	1.8
	<i>Erithacus rubecula</i>	Fat/fett	19	1-6	4.2	1.2
	Rödthake	Body mass/vikt	19	13.7-21.3	17.1	1.7
	Collared Flycatcher	Wing/vinge	12	81-86	83.3	1.8
	<i>Ficedula albicollis</i>	Fat/fett	12	0-5	2.4	1.7
	Halsbandsflugsnappare	Body mass/vikt	12	9.8-14.4	12.1	1.6
	Pied Flycatcher	Wing/vinge	68	79-84	81.1	1.3
	<i>Ficedula hypoleuca</i>	Fat/fett	68	0-6	3.1	1.3
	Svartvit Flugsnappare	Body mass/vikt	67	10.3-15.2	12.3	1.1
	Spotted Flycatcher	Wing/vinge	31	85-93	88.5	2.2
	<i>Muscicapa striata</i>	Fat/fett	31	0-5	2.5	1.2
	Grå flugsnappare	Body mass/vikt	31	12.1-18.7	14.3	1.4
	Nightingale	Wing/vinge	109	80-92	85.7	2.4
	<i>Luscinia megarhynchos</i>	Fat/fett	110	0-6	3.4	1.4
	Sydnäktergal	Body mass/vikt	110	15.9-26.2	21.1	2.0
Redstart	Wing/vinge	39	76-85	81.0	2.5	
<i>Phoenicurus phoenicurus</i>	Fat/fett	39	0-5	2.9	1.4	
Rödstjärt	Body mass/vikt	39	11.4-28.8	14.9	2.9	
Whinchat	Wing/vinge	5	75-79	77.0	1.6	
<i>Saxicola rubetra</i>	Fat/fett	5	2-6	3.8	1.6	
Buskskvätta	Body mass/vikt	5	14.8-21.1	16.7	2.5	
Song Thrush	Wing/vinge	1	-	121.0	-	
<i>Turdus philomelos</i>	Fat/fett	1	-	2.0	-	
Taltrast	Body mass/vikt	1	-	67.5	-	
<i>Oriolidae</i>	Golden Oriole	Wing/vinge	5	147-158	153.6	4.6
	<i>Oriolus oriolus</i>	Fat/fett	5	2-4	3.0	1.0
	Sommargylling	Body mass/vikt	5	64.8-73.0	67.7	3.1
<i>Picidae</i>	Wryneck	Wing/vinge	1	-	93.0	-
	<i>Jynx torquilla</i>	Fat/fett	1	-	4.0	-
	Göktyta	Body mass/vikt	1	-	38.3	-
<i>Sylviidae</i>	Great Reed Warbler	Wing/vinge	3	94-102	96.7	4.6
	<i>Acrocephalus aurundinaceus</i>	Fat/fett	3	1-3	2.3	1.2
	Trastsångare	Body mass/vikt	3	22.7-27.4	25.8	2.7
	Sedge Warbler	Wing/vinge	3	71-73	72.3	1.2
	<i>Acrocephalus schoenobaenus</i>	Fat/fett	3	3-6	4.0	1.7
	Sävsångare	Body mass/vikt	3	10.8-14.4	12.0	2.1

Family <i>Familj</i>	Species <i>Art</i>	Variable <i>Variabel</i>	N	Range <i>Spann</i>	Mean <i>Medel</i>	Std. Deviation <i>St. avvikelse</i>
	Icterine Warbler	Wing/vinge	21	78-84	81.9	1.5
	<i>Hippolais icterina</i>	Fat/fett	21	0-6	3.4	1.5
	Härmsångare	Body mass/vikt	21	10.5-16.3	13.4	1.6
	Willow Warbler	Wing/vinge	132	63-73	66.7	2.8
	<i>Phylloscopus trochilus</i>	Fat/fett	132	0-6	3.6	1.4
	Lövsångare	Body mass/vikt	131	6.3-11.5	8.5	1.2
	Chiff-chaff	Wing/vinge	4	56-58	57.3	1.0
	<i>Phylloscopus collybita</i>	Fat/fett	4	3-4	3.5	0.6
	Gransångare	Body mass/vikt	4	7-8.2	7.6	0.5
	Wood Warbler	Wing/vinge	53	73-82	77.7	2.4
	<i>Phylloscopus sibilatrix</i>	Fat/fett	53	1-6	2.9	1.2
	Grönsångare	Body mass/vikt	53	7.7-12.3	9.3	1.1
	Orphean Warbler	Wing/vinge	16	81-86	83.9	1.7
	<i>Sylvia hortensis</i>	Fat/fett	16	1-3	2.2	0.8
	Mästersångare	Body mass/vikt	14	19.5-24.3	21.3	1.2
	Sardinian Warbler	Wing/vinge	72	57-63	60.1	1.4
	<i>Sylvia melanocephala</i>	Fat/fett	48	0-5	1.3	1.3
	Sammethätta	Body mass/vikt	46	9.7-15.5	11.8	1.3
	Blackcap	Wing/vinge	44	61-81	74.2	4.0
	<i>Sylvia atricapilla</i>	Fat/fett	45	1-6	4.3	1.7
	Svarthätta	Body mass/vikt	44	10.7-26.0	19.7	3.2
	Garden Warbler	Wing/vinge	76	78-89	83.0	2.1
	<i>Sylvia borin</i>	Fat/fett	76	1-6	4.2	1.3
	Trädgårdssångare	Body mass/vikt	76	13.6-24.7	18.5	2.3
	Subalpine Warbler	Wing/vinge	82	59-67	62.3	1.6
	<i>Sylvia cantillans</i>	Fat/fett	82	0-6	3.4	1.9
	Rödstrupig sångare	Body mass/vikt	82	7.5-12.8	9.7	1.3
	Common Whitethroat	Wing/vinge	52	70-78	74.8	1.9
	<i>Sylvia communis</i>	Fat/fett	51	2-6	4.5	1.3
	Törnsångare	Body mass/vikt	51	12.9-21.4	16.0	1.9
	Lesser Whitethroat	Wing/vinge	1	-	70.0	-
	<i>Sylvia curruca</i>	Fat/fett	1	-	1.0	-
	Ärtsångare	Body mass/vikt	1	-	12.2	-