DISTRIBUTION, SIZE AND MOULT OF MIGRANT WARBLERS IN THE SOUTHERN TRANSVAAL

PART ONE

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Migrant warblers are well represented in the southern Transvaal in contrast with common belief and most of the warblers are much more common than sightings really suggest. Eight of these species of warblers are regularly caught in mistnetting sessions. Over the period 1987 to 1994 approximately 1 000 warblers were caught, measured and ringed. Moult cards were completed for 196 birds in active moult and a further 121 birds which had just completed moult. More than 200 African Marsh Warblers were also examined for moult.

The purpose of this paper is to make some of the data, collected over the past seven years, available to interested people. There are very little data available on warblers for South Africa and most publications have incorporated very little or no data for South Africa.

The area in which the study was undertaken is approximately 180 km long and 30 km wide, falling between the coordinates 26°30'S to 26°45'S and 27°30'E and 29°15'E. This is from Secunda in the east to Vanderbijlpark in the west. A total of 13 ringing sites were visited at fairly regular intervals.

The eight warblers that will be discussed in this two part paper are:

Part One
Garden Warbler *Sylvia borin*
Whitethroat *S. communis*
Icterine Warbler *Hippolais icterina*
Great Reed Warbler *Acrocephalus arundinaceus*

Part Two
European Marsh Warbler *A. palustris*
European Sedge Warbler *A. schoenabaenus*
African Marsh Warbler *A. baeticatus*
Willow Warbler *Phylloscopus trochilus*

All the data used in this paper were recorded by the authors, although the moult data were compared with the moult cards on record at SAFRING.

Wing measurements were all done according to the longest chord method and culmen measurements are from bill tip to union with skull.

All length measurements are in mm and mass is in grams. A new measurement, the head length in mm from bill tip to the rear of the skull, was also introduced. This measurement is more repeatable than the culmen length.

Of the eight species of warblers, seven are Palearctic migrants whilst the African Marsh Warbler is an Afrotropical migrant.

In this study no attempt was made to identify subspecies or to sex any of the birds.

All the warblers have 10 primaries with the outermost very much reduced or minute and this was not taken into account in the moult study.

Table 1.1. Mensural data for the Garden Warbler.

	Wing	Tail	Tarsus	Culmen	Head	Mass
Min	75,0	50,0	18,6	12,1	31,3	15,4
Max	86,0	52,0	23,1	16,8	34,2	27,7
Mean	80,1	57,6	20,8	14,5	32,8	19,7
SD	2,34	2,19	0,97	1,12	0,83	2,04
n	75	87	92	91	19	91

The following were some of the most important observations made during the study:

- The distribution data for the Whitethroat as given in the fieldguides was totally wrong.
- Most warblers are more common than generally believed.
- Sexing of birds on wing length according to European measurements should be done with utmost care as wing measurements change significantly from arrival to departure (pre and post moult).
- Moult duration based on recaptures and scatter diagrams correspond fairly well for some of the species and should thus not be too far off the mark for the species where recapture data does not exist.

1. GARDEN WARBLER *SYLVIA BORIN*

1.1. Distribution

The Garden Warbler is a fairly common to common bird over the whole of the study area wherever suitable habitat exists. Common on wooded koppies and in riverine bush and fairly common in urban gardens. Also occurs in areas with tall weeds and herbaceous plants.

The earliest date the Garden Warbler was netted in the area was 12 October and the last was netted on 31 March.

The Garden Warbler also shows ortstreue (site fidelity) and ringed birds were recaptured after at least one migration at four of the ringing sites.

1.2. Mensural data

Measurements for the Garden Warbler (Table 1.1) compare favourably with the measurements for Europe except for wing size and mass. Although Williamson states that the wing size is rarely above 82 mm, 20 % of our measurements were above 82 mm, whilst a further 11 % were 82 mm

From Table 1.2. it can be seen that the wing size is shortest just after arrival and increases from January onwards when moult is being completed. An average of 79,0 mm for October, November and December is recorded, against an average of 80,7 mm for February and March.

Table 1.2. Monthly average wing length for the Garden Warbler.

	Dec	Jan	Feb	Mar
Min	75	75	77	78
Max	83	83	86	85
Mean	78,9	80,0	80,7	80,6
SD	2,17	2,42	2,17	2,43
n	24	13	33	12

The average mass that we recorded for the Garden Warbler (Table 1.3) is slightly higher than that for Europe but the highest mass recorded is substantially higher than that for European birds. The Garden Warbler has a rapid mass gain in March, masses above 27 gram have been recorded and the average

mass for March is 22,8 gram. Only one bird with a mass of less than 20 gram was recorded in March (19,7 gram).

Table 1.3. Monthly average mass for the Garden Warbler.

	Dec	Jan	Feb	Mar
Min	16,0	15,4	17,7	19,7
Max	21,6	20,5	21,8	27,7
Mean	18,8	18,6	19,8	22,8
SD	1,64	1,27	1,07	2,78
n	26	15	38	12

1.3. Moult

Moult cards for 18 birds in active moult and a further 26 cards for birds that had completed moult were available for this study.

The first Garden Warblers start moulting towards the middle of November and the last birds start moult in mid January. The first recorded moult was a bird netted on 21 November having a P-score of 7 with the first three primaries in moult. A bird from 12 December had a P-score of 23 with the first three primaries complete and P4-P6 in moult, indicating a starting date of middle November.

The first birds complete their moult towards the end of January and the late starters should complete their moult towards middle or late March. From the middle of February onwards most birds netted had completed their moult.

1.3.1. *Wing moult*

Primary moult starts with the innermost primary and is descendant towards the wing tip. Primaries moult in sequence and moult is rapid with 3 to 4 primaries in various stages of growth simultaneously.

Secondary moult normally starts with S8 at a P-score between 5 and 18. In 25 % of the cases S7 was dropped before S8. S1 is dropped soon after S8 or S7 with the latter having a S-score of 2 to 3. Secondary moult is also very rapid with up to 5 feathers in moult at the same time. Secondary moult is completed after P9 is completed.

The greater wing coverts (including the carpal covert) start moulting at a P-score between 5 and 10 and is very rapid with all dropping simultaneously. Greater covert moult is normally complete at a P-score of 18 to 20.

1.3.2. *Rectrice moult*

Rectrice moult starts at a P-score of 20 to 25 (in one case it started at P-score 5) and is completed at P-score of 35 to 40. Rectrice moult is centrifugal and very rapid, often with all feathers in moult with individual scores between 1 and 3.

1.3.3. *Body moult*

Body and head moult starts just after primary moult and is completed after primary moult.

1.3.4. *Moult duration*

Moult duration as determined by recapture data gives a period of 66 days, using a scatter diagram a period of 72 days is obtained.

2. WHITETHROAT *SYLVIA COMMUNIS*

2.1. Distribution

The Whitethroat is considered as being scarce to locally common and absent from the far southern Transvaal. It was however found that the Whitethroat is present in the southern Transvaal and fairly common.

Whitethroats were netted at two sites in Secunda and six sites around Vanderbijlpark and Vereeniging. The most Whitethroats netted in a single morning's session were seven.

The Whitethroat is a fairly common bird which is most often recorded in mixed *Acacia karoo* and *Rhus*-covered areas in the study area. It is fairly often found in gardens and it was also netted in areas with tall weeds and herbaceous plants. The earliest recorded arrival for the Whitethroat in the area is 23 November and the latest recorded date is 31 March. The Whitethroat displays site fidelity.

Table 2.1. Mensural data for the Whitethroat.

	Wing	Tail	Tarsus	Culmen	Head	Mass
Min	67	58	19,4	12,4	30,8	13,0
Max	77	68	24,1	15,6	32,6	21,0
Mean	72,2	63,6	21,4	13,9	31,5	15,2
SD	2,44	2,40	1,04	0,81	0,55	1,52
n	35	38	42	42	12	42

2.2. Mensural Data

Measurement data for the Whitethroat (Table 2.1) compares favourably with that in European handbooks. The range in wing size does not compare well to that of Williamson but is the same as given by Svensson. The average monthly wing length shows a substantial increase from December through to March with January having a minimum of 71,5 mm and March having a maximum of 73,9 mm.

Table 2.2. Average monthly wing length for the Whitethroat.

	Dec	Jan	Feb	Mar
Min	67	69	70	70
Max	75	77	76	77
Mean	72,0	71,5	72,8	73,9
SD	2,62	2,88	1,96	2,37
n	8	6	12	9

The mass gain by the Whitethroat is not as prominent as that of the Garden Warbler and the increase is from 14,2 g average for December and January to 15,8 g for February and March.

Table 2.3. Average monthly mass distribution for the Whitethroat.

	Dec	Jan	Feb	Mar
Min	13,8	13,0	13,5	14,0
Max	15,4	15,0	21,0	17,5
Mean	14,7	13,7	15,7	15,8
SD	0,58	0,74	1,72	1,20
n	8	6	19	9

2.3. Moult

There were 16 moult cards available for birds in active moult and 6 cards for birds with completed moult.

The Whitethroat starts moulting between November and the end of December with the first birds completing moult in the first half of February. The earliest bird netted for the area was on 23 November and was in moult already with a P-score of 14. This would suggest the first week in November as a starting time.

The first birds caught that had completed moult were on 5 February. Most birds caught from early March onward had completed their moult.

2.3.1. *Wing moult*

Primary moult starts with the innermost primary and is sequential descendant towards the wing tip. Primary moult is rapid and normally three or four primary feathers are in various stages of moult. (One bird had five primaries in moult).

Secondary moult is not in sequence and somewhat irregular. The first secondary dropped is S8 which is followed by S9 and S7. S1 is only dropped after S7 is completely moulted. The sequence for the other secondaries is S1, S2, S6, S5, S3 and S4. In three cases S3 was dropped before S5. Secondary moult is rapid with four or five feathers in moult at the same time. (In one bird S1 to S6 were all in moult with an individual S-score between 4 and 1). The greater wing coverts also moult rapidly starting at P-score between 20 and 30.

Table 3.1. Mensural data for the Icterine Warbler.

	Wing	Tail	Tarsus	Culmen	Mass
Min	72	51	19,0	14,9	12,0
Max	82	57	22,4	17,4	18,6
Mean	78,40	53,00	20,83	16,06	14,30
SD	3,13	1,91	1,12	0,82	2,02
n	10	12	13	12	14

2.3.2. *Rectrice moult*
Rectrice moult is centrifugal and starts at a P score between 10 and 15 and is complete at P score between 35 and 45. Moult of the rectrices is rapid with often all feathers in some stage of moult.

2.3.3. *Body moult*
The onset of body and head moult seems to be just before the start of primary moult and completion is after completion of primary moult.

2.3.4. *Moult duration*
Moult duration by a scatter diagram gives a moult period of 69 days. This is in opposition to the 30 days that Stresemann suggests.

3. ICTERINE WARBLER *HIPPOLAIS ICTERINA*

3.1. Distribution
A uncommon and localised warbler in the southern Transvaal. Occurs in well-wooded areas where *Acacia karoo* and *A. caffra dominate*. This warbler was caught at six different sites around Vereeniging and Vanderbijlpark in the western part of the study area. May be more common in the area than records show as some ringing sites are visited infrequently. Earliest recorded date is 10 November and the latest recorded date is 10 March. None of the ringed birds have been recaptured up to now.

3.2. Mensural Data
Measurement data for the Icterine Warbler (Table 3.1) is the same as given in European papers.

3.3. Moult
The Icterine Warbler has 10 primaries, 6 secondaries and 3 tertials with the outer primary being minute and not taken into account. Rectrices number 12.

3.3.1. *Wing Moult*
Only eight moult cards of birds in active moult were available for this species. The earliest moult recorded was a bird caught on 16 November with the first three primaries in moult and having a P-score of 6. Of three birds netted on 17 February one had completed primary moult but had not yet completed body and head moult. The other two had P-scores of 36 and 40 respectively. One bird netted on 3 February had a P-score of 21. Secondary moult started with S1 in some birds (two birds) while others started with S8 (two birds). Greater covert moult starts just after P1 has dropped and is very rapid with all greater coverts dropping simultaneously. The alula feathers also moult simultaneously and in three cases at a P-score between 30 and 40.

3.3.2. *Rectrice Moult*
Of the eight birds with active moult, three had not started rectrice moult and two were completed. Of the remaining three, two had replaced all feathers except the central pair which was still in moult with R-scores of 1 and 3. The other bird showed centrifugal moult with the R-scores of individual feathers between 3 and 1.

3.3.3. *Body Moult*
Body moult seems to start just before or simultaneously with primary moult.

Table 4.1. Mensural data for the Great Reed Warbler.

	Wing	Tail	Tarsus	Culmen	Head	Mass
Min	91	67	26,4	19,3	42,0	25,0
Max	101	83	33,0	25,8	46,4	39,0
Mean	95,5	76,1	29,3	22,9	44,2	31,4
SD	2,94	3,88	1,34	1,56	1,28	3,30
n	42	46	48	47	22	49

4. GREAT REED WARBLER *ACROCEPHALUS ARUNDINACEUS*

4.1. Distribution

The Great Reed Warbler is a fairly common to common bird in the study area. Occurs over the whole area where suitable habitat exists like reedbeds and riverine bush. Also occurs along reed-fringed farm dams, bushy areas and gardens.

The Great Reed Warbler is present in the area from December to March with the first and last date on which birds were netted being 5 December and 4 April, respectively.

Recapture rate is very low and apart from four birds recaptured in the same season only one bird was recaptured at the same site one year after ringing.

Table 4.2. Monthly average mass for the Great Reed Warbler.

	Dec	Jan	Feb	Mar
Min	25,1	26,5	27,6	28,5
Max	34,3	36,0	34,4	39,0
Mean	29,6	30,5	30,5	33,8
SD	3,05	3,12	1,98	3,12
n	9	13	12	16

4.2. Mensural data

Measurement data for the Great Reed Warbler (Table 4.1) does not differ from that of Europe. The sample used for the measurements was rather small and only 49 birds were measured. Even with a small sample, monthly mass distribution shows that the average mass for March is 3 to 4 grams higher than that for the other months (Table 4.2). The increase in wing length is in excess of 2 mm from January to March (Table 4.3).

Table 4.3. Monthly average wing length for the Great Reed Warbler.

	Dec	Jan	Feb	Mar
Min	92,0	91,0	93,0	92,0
Max	100,0	97,0	101,0	101,0
Mean	95,67	94,42	96,88	96,31
SD	3,28	2,35	3,04	2,81
n	9	12	8	13

4.3. Moult

Moult cards for 18 birds in active moult were available and another 16 birds had already completed moult when caught. Some birds were in new feathering very early in the season whilst others only started moult towards the middle of January.

A bird caught on 3 January had nearly completed moult with a P-score of 44 and S4-S6 having a score of 1,1 and 0 respectively. Another bird caught on 13 January had only started moult with P1 and P2 being in pin. This suggests that some Great Reed Warblers start moulting, or may even have completed moult, before they reach their wintering quarters.

4.3.1. *Wing moult*

Primary moult is descendant from P1 to the wingtip and could be reasonably fast as some

birds were caught with 5 and 6 primaries simultaneously in various stages of moult.

The first secondary dropped is either S8 or S9 with S1 soon afterwards.

4.3.2. *Rectrice moult*
It seems that rectrices are lost in very quick succession with all feathers having the same individual moult score.

4.3.3. *Body moult*
Body moult starts before primary moult and is completed some time after primary moult.

4.3.4. *Moult duration*
With the little amount of data available it is impossible to give an accurate time for moult duration. A good estimate with the data available would give a moult duration of less than 55 days.