# Reed Warbler Biometrics

## From three sites in Southeast England

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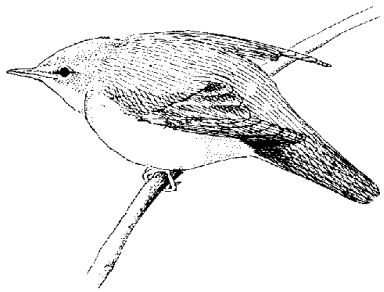
The Reed Warbler *(Acrocephalus scirpaceus)* is one of the more numerous members of this genus and as such has often been referred to as the typical unstreaked acrocephalus warbler. The breeding range is from the British Isles east to the Volga and from Morocco north to southern Sweden, Finland and the Baltic countries; it winters in tropical Africa. In the breeding season it is found chiefly in reed beds but on passage may be found in scrub and other rank vegetation. By virtue of its tendency to colonial nesting and site faithfulness the Reed Warbler has made an ideal subject for study and over the last three decades many papers have been published on its breeding biology.



This paper does not set out to break new ground, but to add to the sum of our knowledge by analysing some of the data held by ringers operating in this area of southeast England and will hopefully encourage other ringers to look at the data they have collected.

**Study area and methods**

The Dartford Ringing Group has ringed a total of 6,359 Reed Warblers during the period 1968 to 1995 in a variety of sites in Kent and southwest Essex. This short paper uses data from three of these sites (West Thurrock Marsh, Essex; Littlebrook, Dartford, Kent and Lea Bridge, Hackney, Gtr London) where a total of 1,037 records of adult birds of this species have been collected during the years 1989-1995. This total is made up of the sub groups shown in Table 1.

**Table 1**. Breakdown of capture totals for adult Reed Warblers at three sites in Southeast England (1989-1995).

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **New Ringed** | Males | 91 | 24% | **Retraps** | Males | 239 | 36% |
| | Females | 89 | 23% | | Females | 198 | 30% |
| | Unsexed | 201 | 53% | | Unsexed | 219 | 34% |

The data was collected during mist netting sessions carried out in accordance with the BTO's Constant Effort Ringing Scheme, whereby nets are set in fixed positions within or around the reed beds on at least 12 visits during the period 1 May to 31 August. All new birds were fitted with a BTO ring and a standard set of biometrics taken. The wing length was measured to the nearest millimetre using the 'maximum cord' method (Svensson 1992) and the weight taken using a 0-50 g 'pesola' spring balance. The birds were aged using the criteria set out in Svensson (1984 & 1992). Where possible the adult birds were also sexed by the presence of a brood patch or cloacal protuberance.

The breakdown of capture totals in Table 1. shows that on initial capture the sexes are approximately evenly distributed amongst the sexed population. However, the retrap records indicate that males predominate (55% of sexed birds). When the data is adjusted to include all birds of known sex irrespective of if they were sexed at any particular capture, the proportion of males amongst the sexed population rises to 59% (Figure 1.). There may be several reasons why males were caught more often than females at certain periods, these include; territory seeking and defence, the feeding of females whilst they incubate, moving between multiple mates (polygyny) and a more aggressive and adventurous role in gathering food for the young. Whilst every effort was made to ensure that the sexing of

birds was carried out with the utmost care and it is unlikely that males were mis-sexed as females, there is a possibility that a small number of non-breeding birds were incorrectly sexed as males.

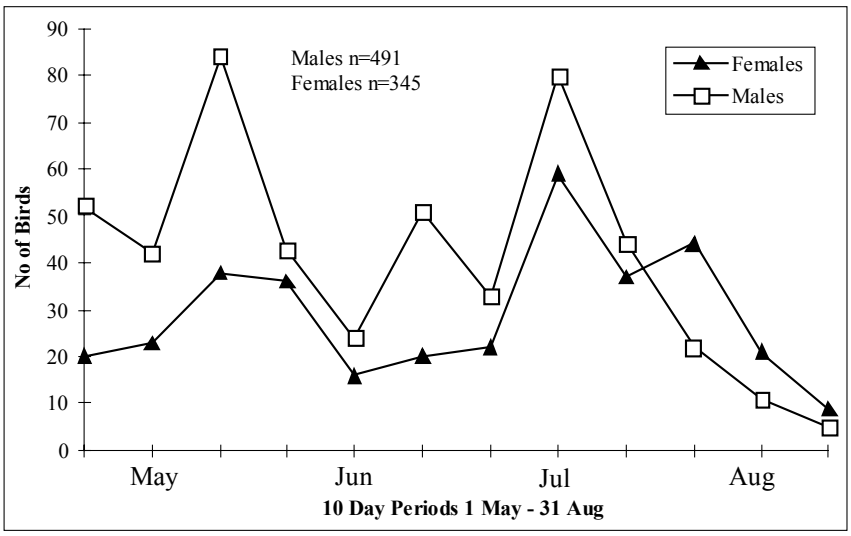



**Figure 1**. Capture totals for adult Reed Warblers of known sex in 10-day periods.

The capture totals for adult birds of known sex (Figure 1.) show that the 836 records are not evenly spread throughout the period. There are peaks for both sexes in late May and mid to late July, falling off rapidly in late August.

**Wing Length.**

Over the past few years it has become common practice to attempt to sex some non-sexually dimorphic passerines by reference to the length of the wing taken by the 'maximum cord' method and this has proved successful for some species (Norman 1983). The range of wing lengths for Reed Warblers is given by Witherby et al. (1938) as 62-70mm for males and 62-68mm for females. Cramp (1992) gives figures for adult males in Western Europe (mainly Netherlands) with a range of 64-69mm and adult females 63-69mm. Catchpole (1967) in a study of a breeding population at Attenborough, Nottinghamshire gives a range of 63-67mm for males and 59-64mm for females and calculates that up to 70% of adult birds may be successfully sexed on wing length alone. However, there are many variables contained within a sample of wing lengths i.e. live birds or skins, method of measurement, race, age structure (Thorne 1974), sex, moult, state of wear of the wing point, accuracy and consistency of measurement (Pienkowski & Minton 1973).

For the purpose of this analysis I have tried to eliminate as many of the variables as possible. The sample has been limited to adult birds of known sex, which were breeding at three sites within a 10-mile radius of Dartford, Kent. The data does include new ringed birds and both their subsequent retrap records and those of birds ringed in previous periods, which were not sexed at the time of ringing. So it is possible that the same individual bird will appear in the records not only in subsequent months, but also in subsequent years to its original ringing date.

When looking at the variation in wing lengths over time (1 May to 31 August) the data has been pooled to include all sexed birds (Figure 2.). The mean wing lengths are grouped in 10-day periods and there is a clear division throughout between those of males and females. The mean wing length was found to vary between 66.27mm and 68.08mm in males and between 64.27mm and 66.11mm in females *(one-way ANOVAR: males* $F_{11,479}=6.65$, $P<0.001$; *females* $F_{11,333}=3.97$, $P<0.001$*)*. Furthermore, a statistically significant inverse correlation was found between wing length decrease over time for both sexes *(males* $r=0.675$, $P<0.05$; *females* $r=0.587$, $P<0.05$*)*. As this data set includes all sexed birds and is not calibrated for individual measurers, care should be exercised in interpreting the results (a

variation of 1.0% was found between the aggregate mean wing lengths measured by the ringers involved in collecting the data for this study).

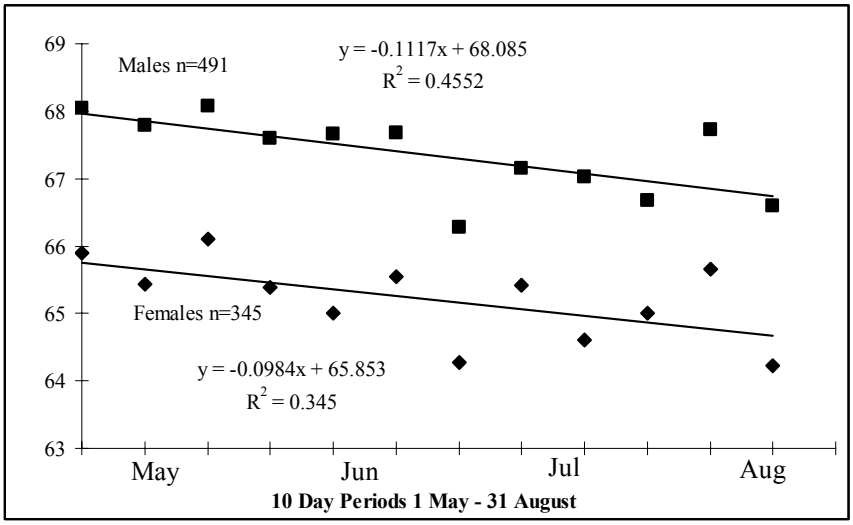



**Figure 2**. Mean wing lengths of sexed Reed Warblers grouped in 10-day periods.

Notwithstanding the variables mentioned earlier, it would appear that there is an indication of loss of wing length due to abrasion over the four months of 1.23mm for males and 1.08mm for females. This loss by abrasion was found by Thorne (1974) to be 0.3mm per month for adult Reed Warblers at Wicken Fen. It was not possible to verify this from my data due to the lack of a reasonable sample size of birds measured by one individual over any given moult year. Records from subsequent years appear to show an increase in wing length at each moult (Thorne 1974) and should be excluded. Figure 2. is therefore, not a snapshot of wing lengths at a given time, but more the product of a constantly updating measurement of the population past and present.

In order to obtain a more accurate picture of the mean wing lengths of sexed birds the data set was adjusted to include only those birds whose wings had been measured by one individual. There is an obvious difference in the wing lengths of the sexes (Figure 3.), with males tending to be longer winged than females. A statistical test of this sample shows a significant difference in the mean wing lengths with males at 67.85mm and females at 65.73mm *(z=13.31, P<0.001)* (see Table 2.).

**Table 2**. Mean wing lengths (mm) of adult Reed Warblers (measured by one ringer) at three sites in South-east England. *(Figures in brackets denote 95% confidence limits of the mean).*

| | **Sample size** | **Mean** | **Range** | **Std. Dev.** |
|---|---|---|---|---|
| Males | 192 | 67.85 (±0.197) | 65-71 | 1.39 |
| Females | 135 | 65.73 (±0.242) | 62-69 | 1.44 |

At Wicken Fen, Cambridgeshire (Thorne 1974) found that the mean wing length for males was 64.8mm and for females 63.3mm. However, Cole (in lit.) in a study at Tewinbury, Herts found that a sample of sexed birds captured during the years 1988-1994 gave a mean of 67.57mm for males and 65.59mm for females.

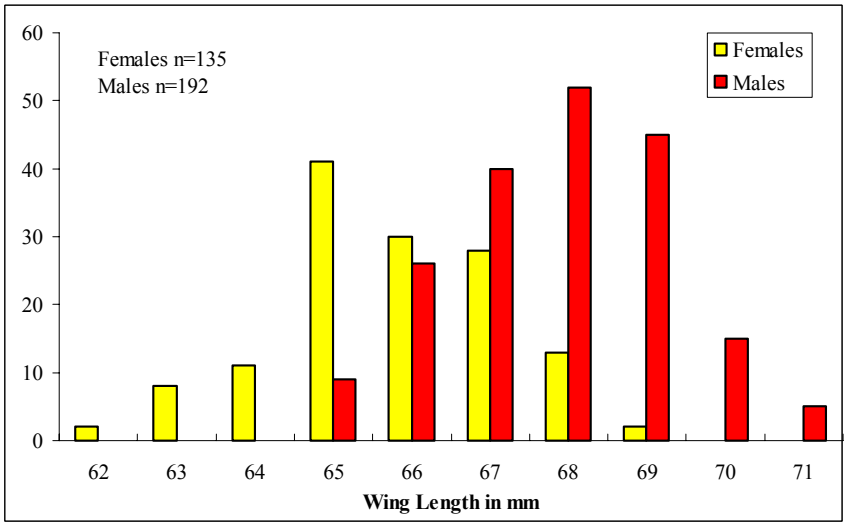



**Figure 3**. Wing lengths of adult Reed Warblers measured by one ringer.

**Body Mass**

As the weight of small passerines taken using a 0-50g 'pesola' balance was found to be repeatable between ringers, all the data for sexed birds was pooled and adjusted to include all the records of birds of known sex. The mean weight of males was found to be 11.21g and females 11.36g ($z=2.58$, $P<0.005$).

**Table 3**. Mean weights (g) of a sample of adult Reed Warblers at three sites in Southeast England. *(Figures in brackets denote 95% confidence limits of the mean).*

| | Sample size | Mean | Range | Std. Dev. |
|---|---|---|---|---|
| Males | 491 | 11.21(±0.054) | 9.4-13.6 | 0.61 |
| Females | 345 | 11.36(±0.098) | 9.3-14.4 | 0.93 |

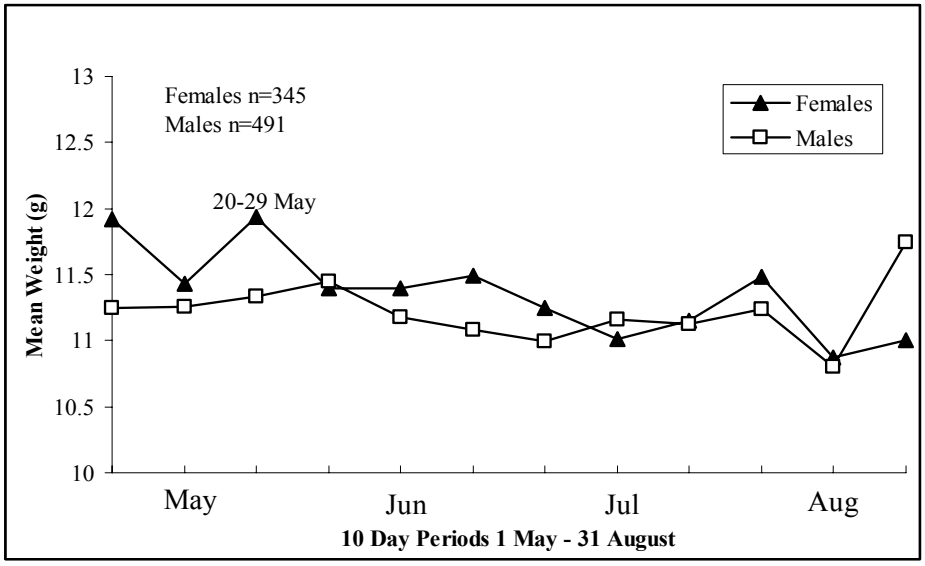



**Figure 4**. Mean weights of adult birds of known sex in 10-day periods.

Figure 4. shows the mean weights grouped in 10 day periods from 1 May to 31 August and whilst the weight of males remained relatively stable around 11.25g during the period the weights of females varied considerably. The mean weight of females is noticeably greater than that of males in the periods 1-9 and 20-29 May and the data suggests that this is as a result of weight gains immediately prior to egg laying. The mean laying date in Phragmites is given by Catchpole (1974) as early June for first clutches, with another peak in mid June due to replacements resulting from nest loss due to predation, adverse weather and desertion. Second clutches peak in early to mid July.

There is a substantial increase in the mean weight of males during the last few days of August, however, this is a very small sample and is distorted by a small number of birds with weights well above average. None of the sites included in the study appeared to be used to any great extent for pre-migratory fattening. However, a few birds in each year would be caught in late August with weights above the average, suggesting that the migratory strategy with regard to fat deposition is flexible and varied.

**Summary**

The wing lengths and weights of a sample of adult Reed Warblers caught at three sites in Southeast England were analysed to examine differences between males and females and variations over the period May to August.

It was found that the mean wing lengths of males and females were significantly different and varied over the four summer months, indicating that abrasion of the longest primaries was 1.23mm (0.31mm per month) in males and 1.08mm (0.27mm per month) in females.

A sample of wing lengths measured by one ringer gave a mean of 67.85mm for males and 65.73mm for females and it was found that at the 95% confidence level birds with a wing length greater than 68.61mm could be sexed as males and those shorter than 65.12mm as females. In practical terms using these criteria alone, approximately 29% of the adult population in this sample (wing length greater than 68.5mm) could be sexed as males and 22% (wing length of 65mm or less) as females. However, as different ringers may measure wing lengths differently, caution should be exercised before using these criteria without supporting evidence.

The mean weights of adults were also found to vary over the summer months with that of males being relatively stable around 11.25g. Females showed peaks in early and late May corresponding with weight increase prior to the approximate date of first and repeat clutches; there were less distinct peaks in late June and early July that may indicate the date of second clutches.

**Acknowledgements**

I am grateful to Dartford Borough Council and The Lee Valley Regional Park Authority for granting permission to catch and ring birds on their land. Special thanks are due to Wayne & Gail Quick and Katherine Jeffery who assisted with ringing operations and the collection of data. Robin Cole and Tom Kittle kindly provided comparative data. Andy Pratt gave invaluable help and encouragement with the analysis and commented on earlier drafts.

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