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# Wing Measurement Data of Bank Swallows from Southeastern Wisconsin

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Wing measurements of many passerine species show differences between males and females (see Anonymous 1977, Wood 1969, Pyle et al. 1987). Bank Swallows (*Riparia riparia*) have been studied intensely. Birds are easy to access in breeding colonies (Hoogland and Sherman 1976, Hensen and Johnston 1955, Howell 1975, Youngman 1972). I studied dispersal and survival of this species in southeastern Wisconsin between 1959 and 1972 (MacBriar and Stevenson 1976). I recorded, also, weight and wing measurements (MacBriar 1988). Here I summarize, again, wing measurement data of Bank Swallow of southeastern Wisconsin. Since the literature rarely indicates which wing is being measured, I investigated variation between left and right wings (see also Wiseman 1970, MacBriar 1971).

## METHODS

I routinely measured wing length on birds handled for banding from 1968 to 1972 using a 150 mm steel rule with a perpendicular metal stop at zero. The left unflattened wing chord was measured by holding the bird in the left hand on its back, placing

the rule on the dorsal side of the wing with the right hand fingers, holding the bend of the wing against the stop and reading the longest flight feather. The right wing was similarly measured by holding the bird in the right hand and using the left hand to make measurements. Initially only the left wing chord was measured (5 June 1968 through 18 June 1970,  $n = 1666$ ); both wings were measured thereafter (30 June 1970 through 28 June 1972,  $n = 790$ ). All measurements were performed by the author.

## RESULTS

A total of 2459 wing measurements were taken; this number includes repeats and returns (Table 1). Left wing measurements for AHY male, AHY females and HY categories were used in analyses (Table 2). Mean wing length for AHY male was 100.0 mm (SD = 2.07,  $n = 914$ ); for AHY females, 100.0 mm (SD = 2.59,  $n = 1005$ ), and for unsexed HY, 93.1 mm (SD = 4.19,  $n = 360$ ). A t-test comparison showed no statistical difference in wing length between males and females ( $t = 0.46$ ,  $P > 0.10$ ; see Table 2).

**Table 1.** Distribution of Bank Swallow captures from southeastern Wisconsin (includes repeats and subsequent returns).

SEX	AHY	HY	ASY/SY	ATY/TY	A4Y	A5Y	A6Y
M	916	3	58/4	16/0	1	3	-
F	1009	2	45/3	15/2	17	-	1
U	9	360	-	-	-	-	-

<b>Table 2.</b> Distribution of Bank Swallow left wing chord measurements.			
<b>Measurement</b>	<b>AHY-M</b>	<b>AHY-F</b>	<b>HY-U</b>
80-81	-	-	3
82-83	-	-	1
84-85	-	-	14
86-87	-	-	19
88-89	-	-	35
90-91	-	-	64
92-93	1	4	57
94-95	26	33	69
96-97	108	110	37
98-99	239	231	37
100-101	301	307	23
102-103	165	227	1
104-105	66	77	2
106-107	8	15	-
108-109	-	3	-
110-111	-	1	-
<b>TOTAL</b>	914	1008	360
<b>MEAN</b>	100.0	100.0	93.1
<b>SD</b>	2.40	2.59	4.19

Left-right wing comparisons are summarized in Tables 3. Left and right wing measurements showed statistically significant differences within each sex. For males, left wings were 1.17 mm longer than right wings ( $t = 12.02$ ,  $P < 0.001$ ,  $n = 268$ ); for females, left wings were 1.15 mm longer ( $t = 11.47$ ,  $P < 0.001$ ,  $n = 298$ ). The pattern of differences of right wing length minus left are shown in Table 3.

## DISCUSSION

My data show the range of left wing chord to be from 93 mm to 107 mm in males and 89 mm to 111 mm in females. HY birds show a wider measurement range (80 mm - 105 mm) which could be attributed to incomplete feather growth. Roberts (1955) reported Bank Swallow wing chord ranged from 96 mm to 111 mm (measurements probably taken from specimens in the University of Minnesota collections). Pyle et al. (1987) give data for wing chord of 100 males (range 96 mm to 107 mm) and 100 females (93 mm to 104 mm), and suggested birds with extreme measurements could be sexed: males having wing lengths greater than 105 mm and females with wing lengths less than 95 mm.

There was no difference between left and right wings of 32% of males and 37% of females; 70% of males and 76% of females were within 1 mm of the same measurement (Table 3). Greater differences might be due to differences in development or differential wear. Right wing minus left measures are skewed to negative differences; males had 161 negative differences versus 24 positive; females with 164 negative versus 23 positive. This pattern may simply be caused by my technique in measuring wings. Wing measurement techniques and reliability have been discussed previously (Arendt and Faaborg 1987, Francis and Wood 1989, MacBriar 1970, 1971, Nisbet et al. 1970, Wiseman 1969, Youngman 1972, Yunick 1986). Paired t-tests show statistically significant differences in these data.

My data show Bank Swallows cannot be sexed by wing measurement. The only reliable method of sexing Bank Swallows remains presence of cloacal protuberance for males or of an incubation patch for females during the breeding season. To further evaluate the possibility that right and left wing lengths are not the same, it would be helpful for field workers to measure both wings during data collection, or, at least, indicate which wing is being measured.

<b>Table 3.</b> Differences in wing measurements (right wing minus left wing) of Bank Swallows.									
	<b>&gt;.4</b>	<b>-3</b>	<b>-2</b>	<b>-1</b>	<b>0</b>	<b>+1</b>	<b>+2</b>	<b>+3</b>	<b>+4&lt;</b>
AHY-M	5	15	57	79	89	19	3	1	0
AHY-F	5	16	50	89	111	24	2	1	0

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