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The Common Grackle *(Quiscalus quiscula)* is one of the most frequently banded North American passerines (Klimkiewicz and Futcher 1987) but relatively limited morphometric data have been published concerning its clinal variations, sexual size dimorphism, or changes with age. The *North American Bird Banding Manual* (1984) contains no age-sex key for this species. Wood (1969, and as amended by Sheppard and Klimkiewicz 1976) and Pyle et al. (1987), two references widely used by banders for age and sex determination, provide pooled measurements that appear to emphasize the purple race *(Q. q. stonei)*. I took wing-chord measurements on 2,359 adult grackles I banded in Wisconsin and Illinois between 1963 and 1990 and on 963 recaptures. These data have enabled me to report chord differences pertaining to banding location, sex, and age in the Midwestern bronzed race *(Q. q. versicolor)*.

METHODS

Banding activities were conducted in Kenosha, Wisconsin (42°30'N, 87°50'W) and Charleston, Illinois (39°29'N, 88°11'W) with nearly all adult grackles handled between early April and late June. For each capture I recorded the sex based upon plumage iridescence, especially on the abdomen. I also noted the occurrence of a brood patch or cloacal protuberance. Birds of unknown sex and local or hatch-year birds are ignored in these analyses. I measured the unflattened right wing chord to the nearest 1 mm with an "unstopped" wing rule unless primaries were conspicuously bent, broken, frayed or wet (see Yunick 1986).

RESULTS AND DISCUSSION

Of 382 adult grackles from Wisconsin and 1,977 adults from Illinois, I identified 1,196 females and 1,163 males (Table 1). A brood patch occurred in 70.2% of the females, either when banded or when recaptured, but appeared on none of the males. I detected a cloacal protuberance on less than half the males identified by their plumage, making this a less useful tool for further verification of sex.

Female grackles in Wisconsin had significantly longer wings on average than those in Illinois, but male wing chords from the two populations were nearly identical and length ranges for each sex were very similar (Table 1). In grackles (Huntington 1952), Eastern Meadowlarks *(Sturnella magna)*, Red-winged Blackbirds *(Agelaius phoeniceus)*, and several other passerines (James 1970,1991), wing lengths increased significantly with latitude; but the geographic separation of my two populations may be insufficient to produce marked differences.

Wing-chord differences between females and males were very highly significant at both sites (Table 1) but at each site the ranges of the sexes overlapped contrary to a statement by Pyle et al. (1987) that "local populations show no overlap between the sexes." When same-sex chords were pooled and their distributions plotted (Fig. 1), both rounded means and medians were 125 mm for females and 139 for males. With samples of less than 10 birds, Ridgway (1902) found means of 126.5 mm for females and 134.9 mm for males of the bronzed race, both smaller than his figures for the purple race; however, Meanley (1967) reported considerably larger means for both sexes of *Q. q. stonei*, again from extremely small samples. Using Ridgway's 1902 data for 10 blackbird species, Searcy and Yasukawa (1981) found that geographic variation had little effect on male:female size relationships; their male:female wing-length ratio of 1.13 for the Common Grackle nearly matched my 1.11 ratio.

Table 1. Wing chords (mm) of 2359 adult Common Grackles banded in Wisconsin, 1963-1967, and in Illinois, 1968-1990.

Banding Site (coord)	Females				Males				t-test
	N	mean	SE	Range	N	mean	SE	Range	
Kenosha, WI (423-0875)	177	125.8	0.2	115-132	205	138.9	0.3	128-150	38.87***
Charleston, IL (392-0881)	1019	124.7	0.1	116-134	958	139.1	0.1	129-148	109.28***
t-test	4.80***				0.69 ns				

*** P< 0.001

Male and female wing chords show overlap between 128 and 134 mm, representing 12.4% of all birds banded (Fig. 1). Among the 295 birds in this range, the three largest females with wings of 133 or 134 mm all developed brood patches. Wing chords less than or equal to 130 mm included 98.4% of all females and only 0.8% of the males, while wing lengths greater than or equal to 132 mm included 98.3% of the males and 0.4% of the females. Wood (1969) indicated a sex unknown range of 132-141 mm, representing 20% of a population reported by Meanley in a 1964 EBBA workshop manual. In their amendments to Wood's guide, Sheppard and Klimkiewicz (1976) gave "less than-greater than" chord values for sexing grackles in the Southeast U.S. and Florida but none for the Midwest.

Evidence that wing chords increased with age in Bobolinks *(Dolichonyx oryzivorus)* (Bollinger and Gavin 1989), wood warblers (Francis and Wood 1989) and several sparrow species (Bedard and LaPointe 1984; Smith et al. 1986; Piper and Wiley 1991) prompted me to compare wing lengths at banding with subsequent recaptures (Table 2). Between 1981 and 1990, I remeasured 202 individuals 376 times within 1-90 days of initial capture that year (repeats), and from 1969-1992, chords of 393 birds were recorded 587 times, 1-10 calendar years after originally banded as adults (returns). Individuals repeating during a season had their wing data compared to their first capture that same year while returning birds were compared to their initial banding size. The greater number of females in both categories may have been due to a stronger response to baited traps during nesting rather than to any differential dispersal or mortality.

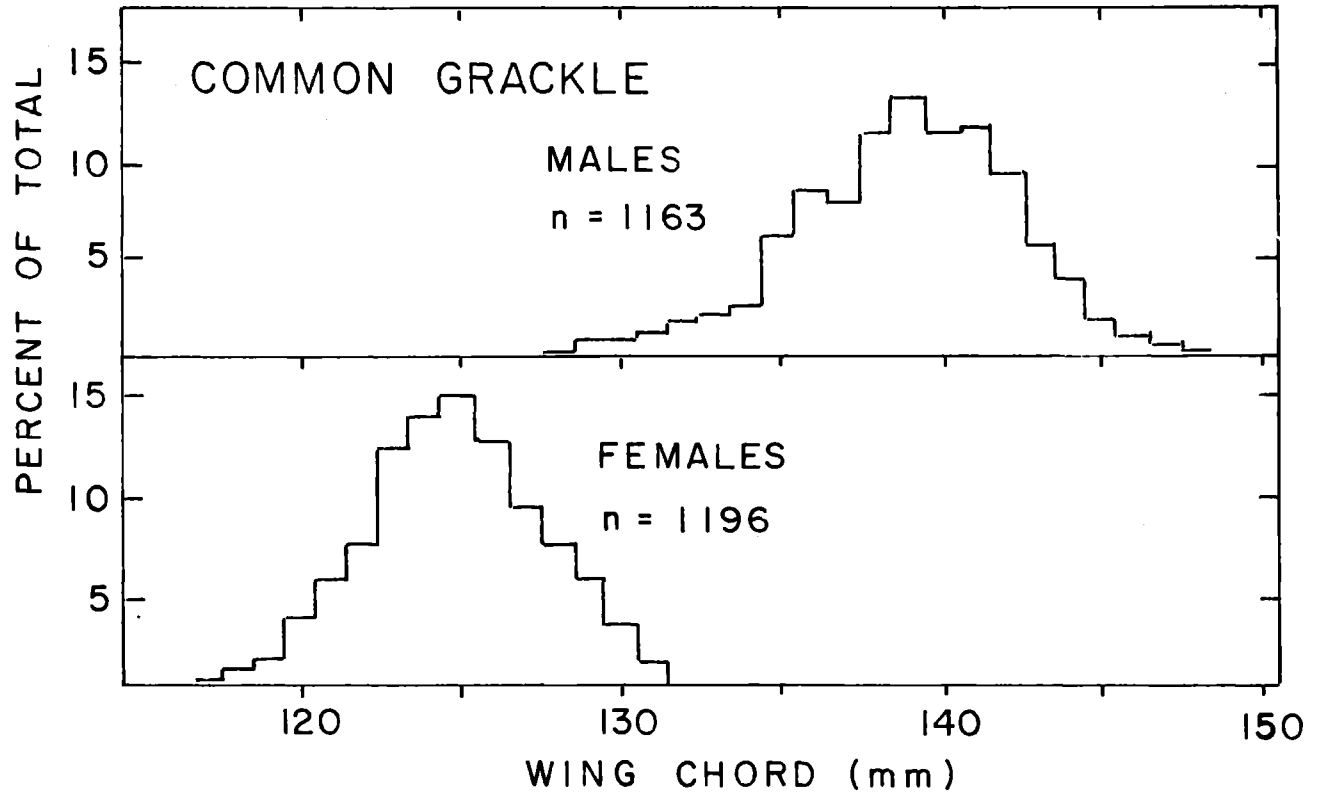
Table 2. Wing chord (mm) changes after banding in adult Common Grackles recaptured at Charleston, IL, 1969-1992. Same year measurements were from 1981-1990 banding seasons and included repeats of returning birds.

Years After Banding	Females			Males		
	N	mean	SD	N	mean	SD
same year	299	-0.2	1.2	77	-0.2	1.3
1	114	0.6	1.9	80	0.8	2.0
2	101	1.1	2.1	52	0.8	1.8
3	50	0.5	1.7	44	0.7	1.7
4	38	1.1	1.7	20	0.5	1.9
5	18	0.8	2.1	17	1.7	2.7
6	14	1.0	1.7	9	1.0	1.9
7	12	0	2.5	8	0.1	3.4
>7	4	1.8	2.5	6	0.3	2.9

Among the same-year measurements of repeats (Table 2), mean differences and variability were less than nearly all between-year comparisons. With the sexes of repeats pooled, 41% decreased, 25% increased, and 34% were unchanged. During the seasons of this study, when no spring molt was expected, many recorded differences were likely the result of investigator technique, a variable discussed in some detail by Arendt and Faaborg (1989) and Francis and Wood (1989). However, these authors also commented on seasonal abrasion as a source of chord reduction, an explanation consistent with my short-term decreases out-numbering increases. The single grackle with an apparent decrease of 5 mm between late March and early June represented the maximum change; for all other repeats, the change was less than 3 mm.

Among the 227 females and 166 males that I retrapped in the years after banding (Table 2), 270 returned only once while the others returned multiple times including two that returned six times over 9 and 10 years. The small average yearly changes relative to actual chord lengths and the degree of variability within each sample year resulted in no statistically significant differences. The general pattern of long-term increases after the banding year suggests that most of the previously unbanded birds may have been SY adults that added to their wing length in their first postnuptial molt but without continuous growth thereafter. Unfortunately, averaging of chord changes for each return year tends to obscure individual growth responses. In fact, three returns banded as SY birds based on eye and underwing covert color had increases of 3, 3 and 2 mm the following year with the latter having added another 1 mm when it returned four years after banding. On the other hand, state of health may have retarded primary growth in two seventh-year returns, thus affecting the averages for that year. An AHY female added 2 mm by the second year after banding but had then lost 4 mm when I noted her as having "1/2 upper bill missing;" a male that added 1 mm earlier had lost 5 mm and exhibited "severe foot pox."

Fig. 1. Distribution of wing chord measurements of Common Grackles banded at Kenosha, Wis., and Charleston, Illinois.



SUMMARY

Wing chords of 2,359 adult Common Grackles banded in Wisconsin and Illinois showed only slight differences regionally, but differences between females and males in both populations were very highly significant. Wing chords 130 mm or less included 98.4% of all females and chords 132 mm and greater included 98.3% of all males. Average wing lengths for both sexes tended to decrease slightly in repeat captures during the same year, while their average chords usually increased in return captures one or more years after banding. These short-term and long-term changes were not statistically significant, however.

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