

SEX RATIO AND SEX DETERMINATION OF IMMATURE BROWN-HEADED COWBIRDS

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INTRODUCTION

An unbalanced sex ratio with a predominance of males in the Brown-headed Cowbird (*Molothrus ater*) has been documented by Friedmann (1929), McIlhenney (1940), and others. These workers did not investigate sexes in different age groups. Recently Darley (1971) found the sex ratio to be equal in second-year birds. I therefore investigated the sex ratio of more than 7,000 immature (first-year) cowbirds captured in westcentral Kansas.

A protracted postjuvinal molt often complicates sexing of immatures by plumage during late summer. Wing length criteria proposed by Wood (1969) were not accurate for this study, so I propose alternative criteria.

METHODS

A total of 7,011 immature cowbirds was trapped and banded in Ellis County, Kansas between 28 June and 31 October 1974. Wing chord measurements taken from every 10th bird handled are reported from 6,601 birds captured during July and August—the period during which the greatest number could not be sexed by plumage. It was not determined whether one sex was more trap prone than the other. The proposed sexing criteria were individuals with wing chords of 99 mm or less being females, and those with wing chords of 103 mm or more being males.

RESULTS

The sex ratio of immatures was 1:1 because 2,160 males and 2,156 females were captured. An additional 2,695 birds could not be sexed by plumage. The proportion of both sexes remained relatively constant throughout the trapping period. A chi-square goodness of fit test revealed no significant difference (95% confidence level) between the observed and expected sex ratio of cowbirds captured during July, August, and October (Fig. 1). The difference between numbers of males and females trapped in September was significant at the 95% level but not at the 90% level—probably due to a small sample size.

Wing measurements of 388 immatures sexed by plumage revealed that 99% of those with wing chords of 99 mm or less were females and 98% with wing chords of 103 mm or greater were males. Of the immatures sexed by plumage 35 (9%) had wing chords of 100 to 102 mm. Slightly over one half (57%) were females (Table 1). Wing measurements of immatures that could not be sexed by plumage (255) showed similar proportions having wing chords of 99 mm or less and 103 mm or greater. Using these criteria approximately 90% of all birds measured could be sexed by wing length alone. The accuracy of sexing by plumage at initial stages of molting is supported by the fact that of 373 immatures captured

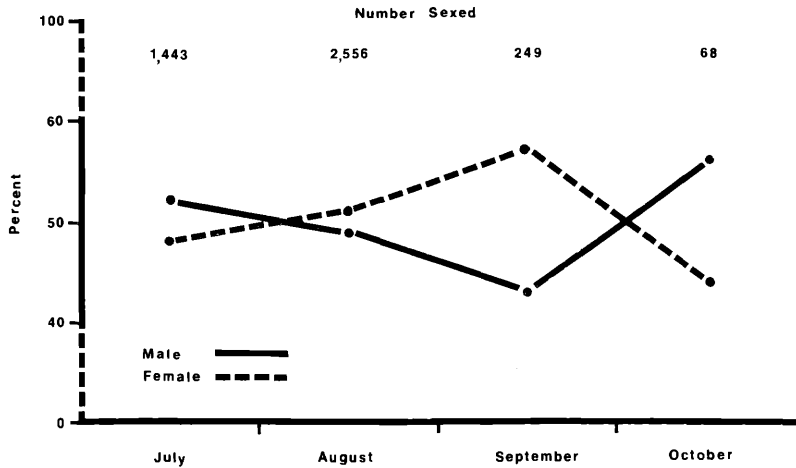


FIGURE 1. Percent of immature male and female cowbirds trapped in Ellis County, Kansas, 1974.

more than one time (and independently resexed) only 1% was judged incorrectly at banding.

DISCUSSION

A 1:1 sex ratio agrees with Darley (1971) who found the proportion of second-year males and females to be the same. Reports of excess males by Friedmann (1929) and McIlhenney (1940) led Darley to suggest that excessive mortality must occur after the first spring migration, possibly as a result of the excessive strain of egg laying. This in turn affects the chances of survival during the migration at the end of the breeding season. This study reinforces Darley's findings since an unbalanced sex ratio was not apparent in the first few months of life. Thus some selective factor must occur at a later time in life.

TABLE 1.

Comparison of wing length and sex of immature Brown-headed Cowbirds trapped in Ellis County, Kansas, 1974.

Wing length	Males	Females	Sex unknown
91-99	1	175	113
100-102	15	20	40
103-115	174	3	102
Total	190	198	255

Wood (1969) stated that immature cowbirds with all-gray plumage and wing chords of 94 mm or less are usually females and

those with wing chords of 95 mm or more are usually males. If these criteria were used only 9% of all immatures captured would be females—and sexing by plumage disproves this. It thus appears that the use of wing chords of 99 mm or less as females and 103 mm or greater for males is more accurate. Since the proportion of immature cowbirds of unknown sex having wing chords of 99 mm or less and 103 mm or greater was almost identical to the proportion sexed by plumage I have assumed that wing chords (with juvenal primaries) of birds in postjuvinal molt did not vary greatly from younger (all-gray) birds.

The great majority of cowbirds present in Ellis County during July and August are known migrants (Hill, 1974). Thus most measurements are probably a reflection of the wing length of the larger northern race, *M. a. artemesia*. This could account for the difference in wing measurements reported by Wood (1969).

SUMMARY

The sexing by plumage of 4,316 first-year cowbirds showed a 1:1 sex ratio. An additional 2,695 birds could not be sexed by plumage. First-year birds sexed by plumage revealed that 99% of the females had wing chords of 99 mm or less and 98% of the males had wing chords of 103 mm or greater. Using these criteria approximately 90% of all birds could be sexed by wing length alone.

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