

# BIRD-BANDING

A JOURNAL OF ORNITHOLOGICAL INVESTIGATION

VOL. 49, No. 3

SUMMER 1978

PAGES 201-300

## A METHOD FOR AGING FEMALE YELLOW-HEADED BLACKBIRDS

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Plumage differences between Second Year (SY) and After Second Year (ASY) male Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*) are well known (e.g. Ridgway, 1902). Bent (1958: 112) described SY Yellow-head females as being "much like the adults, but colors are more veiled." Bent's method of distinguishing ages of females apparently is not well understood or widely used by field investigators. While one of us (Crawford, 1977) was studying age-specific breeding biology of Yellow-headed and Red-winged blackbirds (*Agelaius phoeniceus*) in Iowa, the opportunity existed to study further aging methods for Yellow-head females.

The purpose of this paper is to describe plumage and size differences of SY and ASY female Yellow-heads. The study was conducted from 1972-1974 on Dewey's Pasture and Dan Green Slough, two glacial marsh systems in northwestern Iowa described by Bennett (1938) and Sooter (1941), respectively.

### METHODS

Birds were trapped with funnel traps (Reeves et al., 1968) or mist nets from May to July. In years subsequent to their initial banding, 11 females returned to the study areas as SY birds and 10 as ASY birds. Using the procedures of Baldwin et al. (1931), we took external measurements of exposed culmen and right middle toe with a vernier caliper recorded to the nearest 0.1 mm; measurements of wing chord and tail were recorded to the nearest 1.0 mm. Weight to the nearest 0.1 g was taken with a triple-beam balance. Color photographs were taken of most females.

Specimens of several Yellow-heads were obtained from the University of Michigan Museum of Zoology (UMMZ). Most of these specimens were collected in northwestern Iowa from 1933 to 1935. On the basis of plumage characteristics, 12 were recorded as SY and 5 as ASY females. Morphological measurements were taken from the specimen tags when possible; otherwise, measurements were taken by us with a vernier caliper.

### RESULTS

#### *Description of Plumages*

SY and ASY females were similar in plumage except for the amount and intensity of yellow on the breast, auricular-malar region, and su-

perciary stripe. The following descriptions pertain mainly to these areas. Topographic designations are from Pettingill (1970). Color descriptions are based on Smithe (1975), in which he gives swatch color names and numbers, and corresponding Munsell color descriptions. The Munsell system is a quantitative description of color in which, for example, (8/6 2.5Y) stands for (Value/Chroma Hue). The utility of the Munsell system for avian study was described by Wood and Wood (1972). The following color names are from Smithe (1975), and his swatch color numbers and corresponding Munsell numbers are given in parentheses the first time a color name is used.

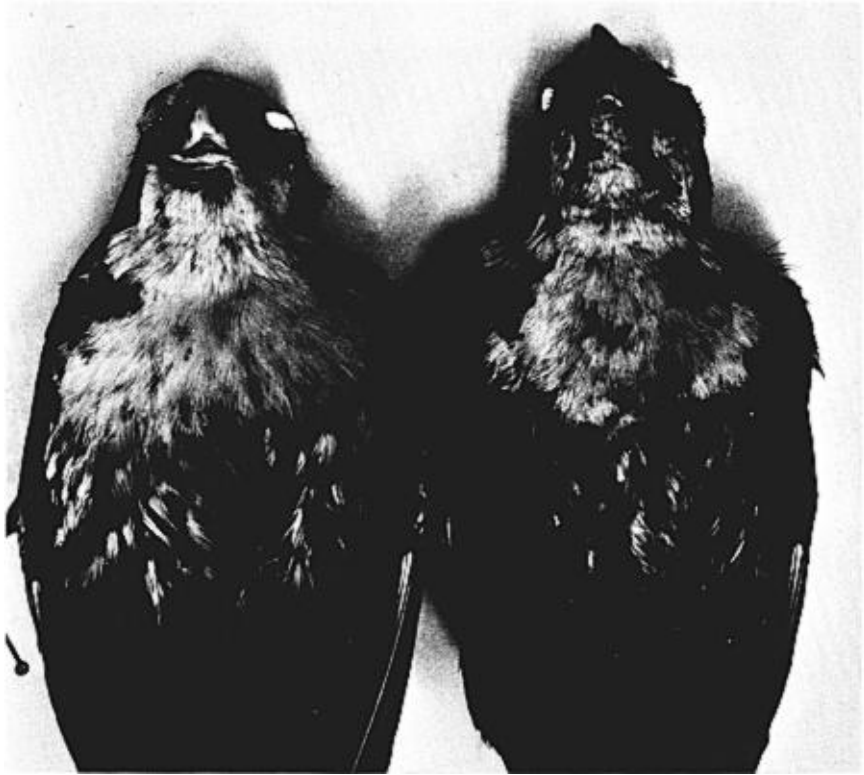


FIGURE 1. Ventral view of ASY (left) and SY (right) female Yellow-headed Blackbirds.

The yellow area on the breasts of SY females is more reduced and lighter than in ASY females (Fig. 1). Colors are from spectrum yellow (55, 8.5/12 6Y) to buff yellow (53, 8/6 2.5Y) in SY females, and orange yellow (18, 8/14 10YR) in ASY females. The amount of white streaking on the breasts of SY females is reduced as well (Fig. 1). The chin is cream yellow (54, 8.5/4 3.5Y) in both age classes, but SY females have a distinct narrow band of blackish feathers on either side of the gular region. The auricular-malar region is cream yellow with orange yellow

TABLE 1  
Measurements of SY and ASY female Yellow-headed Blackbirds.

	SY females			ASY females			t-value		
	N	Mean	Range	SE <sup>1</sup>	N	Mean		Range	SE
<b>Known-age specimens:</b>									
Weight (g)	11	43.4	41.1-45.3	0.48	10	48.9	46.8-51.6	0.60	7.24**2
Wing chord (mm)	11	110	107-113	0.59	10	121	118-124	0.60	12.60**
Exposed culmen (mm)	11	17.1	16.8-17.8	0.09	10	19.5	19.0-21.1	0.24	9.62**
Tail (mm)	11	84	82-85	0.30	10	90	88-93	0.69	8.32**
Middle toe (mm)	11	17.5	16.2-18.3	0.20	10	20.8	19.9-22.0	0.26	10.22**
<b>UMMZ specimens:</b>									
Weight (g)	5	45.5	43.9-46.8	1.19	4	51.4	48.8-56.7	3.59	3.47*
Wing chord (mm)	12	111	105-116	3.35	5	116	114-118	1.48	2.93*
Exposed culmen (mm)	12	18.7	17.8-19.4	0.37	5	19.9	19.4-21.7	1.04	3.70**
Tail (mm)	11	78	72-83	3.73	4	82	81-84	1.29	2.22*
Middle toe (mm)	12	19.5	18.7-20.0	0.50	5	20.5	20.0-21.2	0.61	3.50**

<sup>1</sup> SE = Standard Error.

<sup>2</sup> \*\* stands for significance at the  $P < 0.01$  level; \* is significance at the  $P < 0.05$  level.

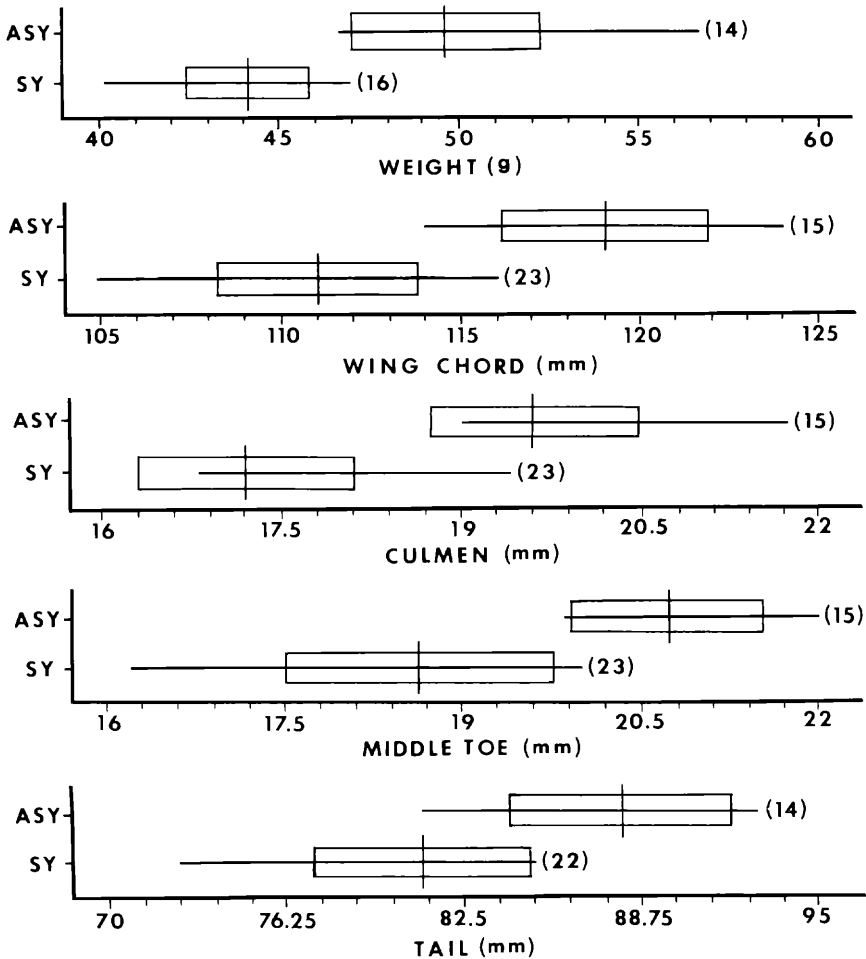


FIGURE 2. Comparison of selected morphological measurements of SY and ASY female Yellow-headed Blackbirds. SY females were significantly ( $P < 0.01$ ) smaller than ASY females for all characters. See text for discussion.

on the distal tips of a few feathers on SY females, and orange yellow on ASY females. The superciliary stripe is buff yellow and indistinct in SY females, and orange yellow and distinct in ASY females.

With experience most field workers will have little difficulty distinguishing ages in the hand or in the field. In the field, SY females have the general appearance of being smaller (see below) and much lighter in color than ASY females. Caution should be taken, however, not to confuse Hatching Year (HY) and SY females, which apparently are similar during August and September.

### *Morphological Measurements*

A two-tailed *t*-test (Steel and Torrie, 1960) with 19 degrees of freedom indicated that weight, wing chord, exposed culmen, tail, and middle toe of SY were significantly smaller ( $P < 0.01$ ) than ASY for our known-age females (Table 1). For the UMMZ specimens, values for exposed culmen and middle toe were significant ( $P < 0.01$ ); weight and wing chord were significant ( $P < 0.02$ ); and tail was significant ( $P < 0.05$ ) (Table 1). When we combined measurements from both samples, values were again significant ( $P < 0.01$ ) for all characters (Fig. 2).

### DISCUSSION

We have shown that, based on a sample of 21 known-age females, plumage differences exist between year-old and older female Yellow-headed Blackbirds. Several studies indicate that most female Red-winged Blackbirds can be aged on the basis of wing covert and chin feather coloration (Nero, 1954, 1961; Payne, 1969; Meanley and Bond, 1970; Holcomb, 1974). Payne (1969: 57) found a 20% error in this method, but he aged his birds by using skull ossification. In another segment of the present study (Crawford, 1977), no error was made in determining ages of 18 known-age female Red-wings.

We initially felt that size could be used to corroborate age classifications based on plumage color. No overlap of measurements was found for our known-age females, but much overlap was found in the UMMZ specimens (Table 1). Apparently, little overlap of weight occurs (Fig. 2), but assigning age classes on the basis of weight may be misleading because of varying reproductive conditions, possible geographic variations, and other factors. We recommend using size characteristics only in conjunction with plumage color to age female Yellow-heads.

When SY female Yellow-heads assume the plumage color of ASY females is unknown, but Meanley and Bond (1970) suspect that some SY Red-wing females begin assuming ASY appearance sometime in July. They also state that feathers on the ventral tract begin falling out sometime in early July. Observations on the UMMZ specimens seem to corroborate Meanley and Bond's (1970) findings. Three SY female Yellow-heads that were molting ventral feathers were dated 14 and 27 July and 13 August. Twelve other SY females collected between 1 July and 6 August showed no signs of molting ventral feathers. On the basis of these observations, the aging scheme proposed here probably can be used during the entire breeding season.

Nero (1956) and Willson (1966) felt that color differences between SY and ASY male Red-winged and Yellow-headed blackbirds was significant because it aided older males in establishing territories and excluding younger males. Females of both species also defend territories against trespass by other females of the same species (Nero, 1956; Willson, 1966). It follows that age-specific plumage differences might also aid older Yellow-head females in this regard, an hypothesis to be verified.

With investigator experience, the aging scheme outlined here can be used for field determination of age without capturing the females. This technique has been used in analyzing age-specific breeding characteristics of Yellow-head females (Crawford, 1977) and has potential for use in other studies. It is hoped that this paper will stimulate further analyses of plumage color and size in relation to age for Yellow-head females, and thereby further our knowledge of this potentially useful tool.

## SUMMARY

Data on 21 known-age female Yellow-headed Blackbirds indicate that Second Year females can be distinguished from older adults on the basis of the amount and intensity of yellow on the chin, face, and breast. Weight, exposed culmen, wing chord, middle toe, and tail were not found to be completely reliable as aging criteria. Comparison between this aging technique and the similar technique for aging Red-winged Blackbirds is made, and the possible significance of age-specific plumage differences is discussed.

## ACKNOWLEDGMENTS

We would like to thank Dr. M. W. Weller, Department of Entomology, Fisheries, and Wildlife, University of Minnesota, for suggesting to the senior author that age-specific plumage patterns existed in female Yellow-heads, and for reading the manuscript. Our sincere thanks are extended to Dr. R. B. Payne and the University of Michigan Museum of Zoology for use of specimens under their care. This is Journal Paper No. J-8915 of the Iowa Agriculture and Home Economics Experiment Station, Ames, Iowa, Project No. 1969.

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