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# Color Variation Among Northern Flickers Collected in Oklahoma

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**The eastern (yellow-shafted) race of the northern flicker (*Colaptes auratus auratus*) is resident in Oklahoma. Except at the western end of the panhandle where it breeds, the western (red-shafted) race (*C. a. cafer*) occupies the state only during migration and winter. The two races interbreed widely. A total of 179 northern flicker (*Colaptes auratus*) specimens from Oklahoma were examined for introgression of six characters. Each specimen was ranked on a scale from 0 to 1, with 0 representing the pure yellow-shafted race, 1 the red-shafted race, and fractions between, intermediates. Fifty-seven percent were yellow-shafted, 13% red-shafted and 30% intergrades. Most intergrades resembled the red-shafted race more closely than the yellow, and a majority were from Zone 3, the southwestern quadrant of the state. ©2002 Oklahoma Academy of Science**

## INTRODUCTION

*Colaptes auratus auratus*, the yellow-shafted eastern subspecies of the northern flicker, is a year-round resident throughout most of Oklahoma. *Colaptes auratus cafer*, the red-shafted western subspecies, is a transient and winter resident except in Cimarron County of far western Oklahoma where it breeds (1). The yellow-shafted is distinguished by its red nape patch; gray crown; tan face; and, as its name implies, yellow wing linings and rectrices. Males show black malar stripes. By contrast, the red-shafted exhibits no nape patch; brown crown; gray face; and reddish wing linings and rectrices. Males have red malar stripes. There are also slight differences between the subspecies in breast and back color and in the striping on the breast and tail (3). Despite differences in physical appearance, there appears to be no barrier to their interbreeding, therefore both are lumped into one species, *C. auratus* (4). In sympatric areas of their ranges the races interbreed, resulting in intergrade offspring (*C. a. auratus* X *C. a. cafer*) that to varying degrees show characteristics of both.

Specimens of intergrade northern flickers collected in Oklahoma from 1921 to 1998 housed at the Cameron University Museum of Zoology (CUMZ) and the Sam Noble Oklahoma Museum of Natural

History at the University of Oklahoma (OMNH) were examined to determine the extent of deviation in physical characteristics from the two pure subspecies.

## METHODS

All of the flickers in the CUMZ collection were examined as well as each of the intergrades and the red-shafted flickers in the OMNH collection. To determine the number of yellow-shafted flickers in the OMNH collection, the number of intergrades and red-shafteds were subtracted from the total flickers in that collection.

By concentrating on the intergrades, we scored each bird by using the method outlined by Short, but modified slightly to allow for differences between the sexes (5). This method was chosen because there are differences induced by diet and age even among pure red or yellow-shafted flickers that make judging fine color variation difficult (6). Short's method uses a scale of zero to four to rank each of the following color variation characters: crown color; ear covert color; throat color; shaft color; size of nuchal patch; and malar stripe color. The rank depends on how close a particular character is to either of the pure subspecies, with zero indicating a character that is

TABLE 1. Indexes of 53 northern flicker intergrades collected in Oklahoma.

Specimen	Color Characteristics <sup>a</sup>											Index	Zone	Date <sup>c</sup>
	Sex	Crn	Cov	Thrt	Nuch	Shaft	Malar	Total <sup>b</sup>						
CUMZ 0202	M	2	3	4	3	4	4	23	0.96	3	W			
CUMZ 0614	M	4	4	4	3	4	4	23	0.96	3	W			
CUMZ 0915	M	2	4	4	3	4	4	23	0.96	3	W			
OMNH 08778	F	4	3	4	4	3	0	19	0.95	3	W			
OMNH 13282	F	2	4	4	4	3	0	17	0.85	1	Sp			
OMNH 02146	M	3	3	4	4	3	3	20	0.83	1	Sp			
OMNH 05124	M	2	4	4	2	3	4	19	0.79	3	W			
OMNH 07257	M	2	3	3	4	4	3	19	0.79	3	W			
OMNH 01578	M	1	4	4	1	4	4	18	0.75	2	F			
OMNH 17597	M	1	4	4	4	1	4	18	0.75	1	Sp			
CUMZ 0918	F	2	3	4	4	2	0	15	0.75	3	W			
CUMZ 0922	M	2	3	4	3	4	2	18	0.75	3	W			
OMNH 02120	M	4	2	3	2	3	3	17	0.71	1	Sp			
OMNH 03504	M	1	4	4	3	1	4	17	0.71	1	Su			
CUMZ 1061	M	2	4	2	4	1	4	17	0.71	3	W			
CUMZ 1092	F	3	2	2	4	3	0	14	0.70	3	W			
OMNH 03480	F	2	3	4	4	1	0	14	0.70	2	W			
OMNH 08779	F	2	2	4	4	2	0	14	0.70	3	F			
OMNH 02203	M	1	2	2	4	4	3	16	0.67	5	F			
OMNH 06061	M	1	3	4	3	1	4	16	0.67	1	Sp			
OMNH 08790	M	1	4	4	2	1	4	16	0.67	3	F			
OMNH 04927	F	3	3	2	4	1	0	13	0.65	3	F			
CUMZ 1086	F	4	2	2	4	1	0	13	0.65	3	Sp			
OMNH 08804	M	1	3	3	0	4	4	15	0.63	3	F			
CUMZ 1047	M	2	4	3	2	1	3	15	0.63	3	Su			
CUMZ 0873	F	1	3	3	4	1	0	12	0.60	3	W			
CUMZ 1156	F	2	3	2	4	1	0	12	0.60	3	F			

TABLE 1. (contd.) Indexes of 53 northern flicker intergrades collected in Oklahoma.

Specimen	Color Characteristics <sup>a</sup>											Index	Zone	Date <sup>c</sup>
	Sex	Crn	Cov	Thrt	Nuch	Shaft	Malar	Total <sup>b</sup>						
OMNH 07304	F	1	4	3	3	1	0	12	0.60	3	F			
OMNH 08780	F	1	2	3	4	2	0	12	0.60	3	W			
OMNH 01715	M	1	3	4	1	1	4	14	0.58	3	W			
OMNH 05791	M	1	2	2	4	3	3	14	0.58	3	W			
CUMZ 0573	M	2	3	3	1	1	4	14	0.58	1	Sp			
OMNH 17060	M	2	2	4	1	1	2	12	0.50	1	Sp			
CUMZ 0828	M	1	1	1	3	4	2	12	0.50	3	F			
OMNH 08678	M	1	2	2	3	2	1	11	0.46	3	F			
OMNH 03505	F	2	3	3	0	1	0	9	0.45	1	F			
OMNH 10775	F	1	0	0	4	4	0	9	0.45	3	W			
OMNH 01773	M	1	0	0	2	3	4	10	0.42	5	W			
OMNH 04917	M	3	0	0	2	1	4	10	0.42	3	F			
OMNH 05315	F	1	3	3	0	1	0	8	0.40	3	F			
OMNH 01005	M	1	0	2	1	3	2	9	0.38	3	W			
OMNH 05674	M	0	3	4	1	0	1	9	0.38	1	Sp			
OMNH 08781	F	1	2	3	1	0	0	7	0.35	3	F			
OMNH 08803	M	1	0	2	1	0	4	8	0.33	2	F			
CUMZ 1089	F	0	2	3	0	0	0	5	0.25	3	W			
OMNH 02137	M	1	0	2	1	0	2	6	0.25	1	Sp			
OMNH 02296	F	1	0	0	4	0	0	5	0.25	3	W			
OMNH 05309	F	0	1	3	1	0	0	5	0.25	3	W			
OMNH 02131	M	0	0	2	1	1	1	5	0.21	1	Sp			
OMNH 05164	M	0	0	2	0	0	2	4	0.17	1	W			
OMNH 05046	M	0	0	0	1	0	1	2	0.08	1	Su			
OMNH 16561	M	0	0	0	0	0	1	1	0.04	3	Sp			
CUMZ 1048	F	0	0	0	1	1	0	2	0.10	3	W			

<sup>a</sup> Crn=crown color; Cov=ear covert color; Thrt-throat color; Nuch=nuchal patch; Nuch=nuchal patch; Shaft=color of underside of wing and tail feathers; Malar=moustache mark.

<sup>b</sup> In males, 24 points are possible, in females only 20.

<sup>c</sup> Date by season: Sp=spring, Su=summer, F=fall, W=winter.

purely yellow-shafted and four a character that is totally red-shafted. Using these six characters, a pure yellow-shafted flicker would have a total score of 0, while a red-shafted would be either 20 or 24, depending on its sex (males have six differing characteristics, but females have only five). The resulting scores are uneven, so each red-shafted flicker's score was divided by the number of total possible points (20 or 24) to give an index score. Based on this index, zero represents a pure yellow-shafted flicker, one a pure red-shafted flicker, and numbers in between indicate introgression between the two types. The closer the index number is to 0.0 or 1.0, the more similar in appearance the intergrade is to a particular subspecies. A value of 0.50 would indicate exact intermediate characteristics. The index for each intergrade is shown in Table 1.

Oklahoma was divided into five zones from west to east so that provenance of each specimen could be geographically assessed. Zone 1 included the panhandle. The remainder of the state was quartered, with the northwest quadrant being Zone 2, the southwest Zone 3, the northeast Zone 4, and the southeast Zone 5 (Table 1). The season in which each specimen was collected is also indicated in Table 1.

## RESULTS and DISCUSSION

Of the 179 flicker specimens examined, we found 102 yellow-shafted (57%), 24 red-shafted (13%), and 53 intergrades (30%). The yellow-shafted subspecies predominated, which is to be expected because it is resident.

However, most intergrades resembled the red-shafted type more closely. Only two birds of the 53 intergrades showed exact intermediate characteristics (Table 2).

Geographically, 34 of the 53 intergrades were from Zone 3, 14 from Zone 1, three from Zone 2 and two from Zone 5 (one each from Johnston and Marshall counties). Specimens tend to accrue in regions proximal to universities. This is borne out in Zone 3 by the fact that virtually every CUMZ specimen was collected there as well as several OMNH specimens taken in Cleveland County.

Most (23) intergrade flickers were collected in the winter months, nearly equal numbers (15 and 12 respectively) during fall and spring. These times correspond to the seasons that the "pure" red-shafted form is in the state. Only three birds were taken in summer when relatively little collecting takes place, and during a time when the birds are very secretive.

The Oklahoma intergrades more closely resembled the red-shafted subspecies than the yellow-shafted. This might indicate that intergrade flickers show preference for the red form when choosing a mate, or that the red-shafted race is simply less selective in mate choice. It is also possible that red alleles have some adaptive advantage. Among nesting pairs of intergrades studied in British Columbia, both males and females appeared more like the red-shafted type (6). Wiebe (7) noted a correlation between rectrix color and nonrandom mating and concluded that a difference in laying dates of the two subspecies was largely, but not entirely,

TABLE 2. Color variations among 179 northern flicker specimens collected in Oklahoma.

Variants	Index range	Number of specimens	% of total
Yellow-shafted	0.0	102	57
Red-shafted	1.0	24	13
Intermediates			
More yellow	0.1-0.46	19	11
Exact intermediate	0.50	2	1
More red	0.58-0.96	32	18

responsible. On the other hand, birds with atypical characteristics (intergrades) would probably be more noticeable and therefore, more highly prized and more likely to be collected.

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