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January 1985

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Richard A. Dolbeer

U.S. Fish and Wildlife Service, Denver Wildlife Research Center

Cynthia R. Smith

U.S. Fish and Wildlife Service, Denver Wildlife Research Center

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SEX-SPECIFIC FEEDING HABITS OF BROWN-HEADED COWBIRDS IN NORTHERN OHIO IN JANUARY¹

RICHARD A. DOLBEER and CYNTHIA R. SMITH², U.S. Fish and Wildlife Service, Denver Wildlife Research Center, Sandusky, OH 44870

ABSTRACT. We examined the stomach contents of 57 brown-headed cowbirds (*Molothrus ater*) collected from a roost in Erie Co., Ohio, on 12 January 1983. Corn was by far the predominant food, averaging 66% of the stomach contents by weight. Seeds from at least five grasses, but primarily *Setaria* spp., were the second most abundant food category, averaging 21% of the stomach contents. Ragweed (*Ambrosia artemisiifolia*) seeds (2.6%) were third. Male cowbirds consumed more corn than did the smaller females, whereas females consumed more of the smaller grass seeds. The abundance of corn in harvested fields and feedlots, combined with mild winter conditions, probably were the primary reasons cowbirds could overwinter several hundred kilometers north of their usual winter range.

OHIO J. SCI. 85 (3): 104-107, 1985

INTRODUCTION

The brown-headed cowbird (*Molothrus ater*) was native to the grasslands west of the Mississippi River, moving eastward into the Great Lakes region about 1840 (de Vos 1964). It is now an abundant breeding bird throughout most of North America although its highest densities during the nesting season are still found in the Great Plains region from Oklahoma to North Dakota (Dolbeer and Stehn 1979, 1983). Most cowbirds migrate to the southern United States (below 38° lat.) in winter, joining other blackbird (Icterinae) species and European starlings (*Sturnus vulgaris*) in roosting congregations (Meanley 1971, Meanley and Royall 1976, Coon and Arnold 1977, Dolbeer 1982). However, some cowbirds remain in northern areas during the winter months, often roosting with starlings (Kessler et al. 1967).

Several studies have provided information on the feeding habits of cowbirds in winter in the southern United States (Godard 1969, Meanley 1971, Dolbeer et al.

1978, White et al. 1985), but no data are available for northern populations. Also, cowbirds are sexually dimorphic with females weighing about 78% that of males (Clench and Leberman 1978), but no information is available on sex-specific feeding habits for the species. The objectives of our study were to (1) document the feeding habits of cowbirds overwintering in a locality north of the traditional winter range of the species and (2) examine digestive system contents by sex to determine if differences in feeding habits occur between sexes.

STUDY AREA AND METHODS

In early January 1983, we located a roost of starlings and cowbirds in Erie Co., Ohio, five km east of Milan (41° 30' lat.) and one km north of the Huron Co. line. The birds roosted in two to three ha of a deciduous woodlot containing primarily second-growth maple (*Acer* spp.).

On 12 January, four persons used 12-gauge shotguns with No. 8 shot to collect birds as they settled into the roost at dusk. The collected birds were placed in a burlap bag and frozen until the following morning. The contents of the esophageal-proventricular region and gizzard (hereafter collectively referred to as the stomach) were removed from each bird, placed in a labeled plastic vial, and refrozen.

The samples were analyzed in June and July 1984. Vials were removed from the freezer, five at a time, and placed, with caps removed, in a 40°C

¹Manuscript received 29 October 1984 and in revised form 5 February 1985 (#84-50).

²Present Address: Department of Zoology/Entomology, Auburn University, Auburn, AL 36849

drying chamber for five h. The dried contents of each vial were placed in a petri dish, and the various items were sorted with the aid of a 10× binocular microscope. Items were identified with the aid of a previously assembled reference collection of seeds and taxonomic keys (Fernald 1950, Delorit 1970). In addition, representative seeds of various species were sent to C. R. Gunn, U.S. Department of Agriculture, Beltsville, MD, for identification or confirmation. After being sorted, each food type was removed separately from the petri dish and weighed to the nearest 0.001 g. *T*-tests were used to statistically examine differences between males and females in mean weights of food items per bird. Chi-square tests were used to test for differences between males and females in frequency of birds containing various food items.

RESULTS

On the evening of the collection we subjectively estimated that the roost contained about 10,000 birds. We collected 190 birds: 132 starlings, 57 cowbirds (33 males, 24 females), and one common grackle (*Quiscalus quiscula*). The mean weight of the female cowbirds (45.0 ± 1.9 g, $\bar{x} \pm$ SD) was 79.6% that of the males (56.5 ± 3.8 g).

The stomach contents of the 57 cowbirds contained seed or plant material from at least 15 genera representing 9 families, insect parts, grit, feather pieces, and miscellaneous unidentified material. To facilitate data analysis, the items were organized into eight categories (table 1).

Corn was the most abundant food in each of the 57 birds. Corn averaged 0.588 g per bird, 65.5% of the total stomach contents by weight (table 1). Miscellaneous grass seeds from at least five species were the second most abundant category, averaging 0.195 g per bird or 20.6% of the total stomach contents. *Setaria* spp. was the most abundant grass seed, comprising 67% by weight of the identified seeds from this category. Ragweed (*Ambrosia artimisiifolia*) was the next most abundant food category, but these seeds averaged only 2.6% of the stomach contents per bird. Insect parts and seeds from four species of Amaranthaceae, pokeweed (*Phytolacca americana*), and several miscellaneous families each averaged <1% of the stomach contents of the birds (table 1).

There were no significant ($p > 0.05$) differences between sexes in the frequency of birds containing each of the eight categories of stomach contents in table 1. However, some quantitative divergences in stomach contents between sexes were noted. The mean weight of corn per stomach was significantly ($p < 0.05$) greater for males (0.707 g) than for females (0.425 g) whereas the mean weight of miscellaneous grass seeds per stomach was significantly ($p < 0.05$) greater for females (0.292 g) than for males (0.124 g). Grass seeds also comprised a significantly ($p < 0.05$) higher percentage of the total weight of stomach contents for females (31.3%) than for males (12.7%). The mean total weight of stomach contents was not significantly ($p > 0.05$) different for males (0.956 g) and females (0.846 g).

DISCUSSION

Corn is a major field crop in the region surrounding the roost. In 1982, about 40,000 ha were planted to corn in Erie and Huron counties, 20% of the total land area (Carter 1983). The widespread availability of waste corn in harvested fields plus the availability of corn at livestock feedlots were probably the primary reasons cowbirds could overwinter north of their usual winter range. The mild early winter of 1982-83 may also have contributed to the sizeable cowbird population at the roost; the mean temperature in December at Norwalk, Ohio, eight km from the roost, was 4°C, 5°C above normal (NOAA 1982). There was no snow cover.

Dolbeer et al. (1978) and White et al. (1985) found that corn from harvested fields and livestock feedlots comprised 22-46% of the cowbird's diet in winter in Tennessee. However, other agricultural crops are eaten in winter where corn is not available. Meanley (1971) found that rice comprised 47% of the cowbird's diet in winter in eastern Arkansas and Goddard (1969) noted that grain sorghum was the most frequently found food in cowbird digestive tracts in winter in western Oklahoma. The range expansion and popula-

TABLE 1

Stomach contents of 33 male and 24 female brown-headed cowbirds in northern Ohio, January 1983.

Food item	Sex	% of birds with item (No. of birds)	Weight (g) of food item/ stomach		% of total food weight/ stomach	
			\bar{X}	SD	\bar{X}	SD
Corn	male	100 (33)	0.707	0.520	73.7	13.0
	female	100 (24)	0.425	0.205	54.2	19.3
	combined	100 (57)	0.588	0.438	65.5	18.5
Miscellaneous grasses*	male	100 (33)	0.124	0.109	12.7	8.8
	female	100 (24)	0.292	0.229	31.3	19.0
	combined	100 (57)	0.195	0.188	20.6	16.7
Misc. stomach contents**	male	100 (33)	0.072	0.067	8.8	9.2
	female	96 (23)	0.081	0.094	10.1	10.3
	combined	98 (56)	0.075	0.079	9.4	9.6
<i>Ambrosia artemisiifolia</i>	male	58 (19)	0.041	0.081	2.7	4.4
	female	83 (20)	0.021	0.029	2.4	3.6
	combined	68 (39)	0.033	0.065	2.6	4.1
<i>Phytolacca americana</i>	male	48 (16)	0.007	0.010	0.6	0.8
	female	25 (6)	0.005	0.012	0.5	1.4
	combined	39 (22)	0.006	0.011	0.6	1.1
Miscellaneous seeds***	male	9 (3)	0.004	0.019	1.3	6.1
	female	13 (3)	0.000	0.000	0.0	0.1
	combined	11 (6)	0.002	0.014	0.8	4.6
Amaranthaceae [†]	male	39 (13)	0.001	0.003	0.2	0.3
	female	50 (12)	0.002	0.004	0.2	0.5
	combined	44 (25)	0.002	0.003	0.2	0.4
Insects	male	15 (5)	0.000	0.001	0.0	0.1
	female	21 (5)	0.001	0.004	0.1	0.3
	combined	18 (10)	0.001	0.003	0.1	0.2
Total	male	100 (33)	0.956	0.637	100.0	0
	female	100 (24)	0.846	0.395	100.0	0
	combined	100 (57)	0.910	0.547	100.0	0

*Includes: *Sorghum halepense*, *Panicum miliaceum*, *Digitaria ischaemum*, Wheat, *Setaria* spp., and grass caryopses. *Setaria* spp. and grass caryopses were the most abundant items of the category.

**Includes: Feather pieces, grit, unidentifiable material.

***Includes: *Hypericum perforatum*, *Stellaria* sp., *Solanum* sp., *Juncus* sp., and two species of *Polygonum*.

[†]Includes: *Acnidia altissima* and three species of *Amaranthus*.

tion increase of cowbirds in eastern North America in the past century is probably explained, at least in part, by their ability to exploit the diverse and abundant supplies of waste grain and livestock feed made available through agricultural development.

The differences noted in feeding habits between male and female cowbirds suggest that the sexes exploit slightly different feeding niches in winter, thereby reducing intraspecific competition for food during a critical period of the year (Selander 1966).

Females may not be as adept as the larger males in manipulating and consuming corn kernels; conversely, females may be more adept at manipulating smaller grass seeds. McNicol et al. (1982) noted a similar difference in feeding habits for male and female red-winged blackbirds (*Agelaius phoeniceus*) in late summer; the larger males consumed a greater proportion of corn and a lesser proportion of small grass seeds than did females. Thus, sexual differences in feeding habits may also help explain the success, as measured by their numerical

abundance, of cowbirds and other blackbirds of the subfamily Icterinae in North America.

ACKNOWLEDGMENTS. We thank P. P. Woronecki, R. A. Stehn, and E. B. Butler who helped with the collection and dissection of the birds. M. E. Laderach typed the manuscript.

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