Weight, fat class and wing measurement of Gray Catbirds during migration

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This analysis of the measurements of Gray Catbirds *(Dumatella carolinenis)* is the fifth in a series of papers dealing with birds captured and banded during migration at a coastal and an inland banding station in New Jersey. Measurements recorded during the same monthly periods at both sites, Island Beach and Pennington, provide an opportunity to determine if differences occur as well as to add information on the species concerned. My findings on other species were summarized in papers on the over-wintering Tree Sparrow *(Spizella arborea)* (Prescott 1976) and Dark-eyed Junco *(Junco hyemalis)* (Prescott 1978) and 3 species migrating through New Jersey, the Ruby-crowned Kinglet *(Regulus calendula)* (Prescott 1980a), the Golden-crowned Kinglet *(Regulus satrapa)* (Prescott 1980b) and the Yellow-rumped Warbler *(Dendroica coronata coronata)* (Prescott 1981).

Since Gray Catbirds are summer residents in New Jersey, the problem of separating resident birds from those passing through or returning to the 2 New Jersey banding sites during migration need be addressed. In this paper, measurements were compiled only on birds banded during the migration periods of 1 September - 25 October and 4 April - 1 June. It is hoped that these data deal primarily, if not exclusively, with non-local migrants.

During a 6-year period (1967-1972), I recorded weight (g), fat content (0-3), and wing length (mm) of Gray Catbirds captured during the fall at Island Beach (2 September - 25 October) and Pennington (1 September - 12 October) and during the spring at Island Beach (5 May - 1 June) and Pennington (4 April - 5 May). Not all data for each individual were recorded. I weighed 143 catbirds (63 at Pennington, 80 at Island Beach), measured 92 wing lengths (right wing of each individual) (41 at Pennington, 51 at Island Beach), and scored 152 birds for fat (67 at Pennington, 85 at Island Beach). Trudy Prescott, my sub-permittee, assisted at both locations but processed approximately 1% of the catbirds. All individuals were banded and processed within 5-20 minutes after capture. Weights were taken from an Ohaus Harvard Trip Balance scale to the nearest 0.1 g; wing lengths (chord) were measured to the nearest 0.5 mm by holding the partially opened wing loosely against the right-angled base of a steel millimeter ruler. Fat class designations were scored based on a visual estimate of the amount of fat present in the furculum according to a scale of 0 (none) to 3 (very fat). Age of fall birds was based on the degree of skull ossification observed "by eye" after wetting the skin with water, and birds were designated HY (birds of the year) or AHY (at least one year old). Catbirds of questionable age were excluded in this study. When necessary, a laboratory table lens (25x) was used to assist in determining the degree of skull ossification.

Weights

Weight data for 6493 Gray Catbirds from the literature are summarized in Table 1. The extremes in range of these weights (23.2 - 54.5 g) is close to those I recorded (26.4 - 56.5 g) (see Table 2) although the range of means (31.1 - 45.3 g) from the literature is wider than that which I found (34.25 - 40.76 g). The heaviest birds (54.5 g) from the literature were reported by Raynor (1979) from large samples and at least one was an adult bird. Similarly, my heaviest bird was an adult and was captured in the fall at Island Beach.

Of the 143 catbirds weighed at both localities, HY birds (52) were heavier than AHY (91) but not significantly so (37.90 to 37.02 g, t = 1.486). Fall HY birds at inland Pennington (12) were not significantly heavier than those at coastal Island Beach (40) (38.51 to 37.72 g, t = 0.849). All inland migrant AHY catbirds (51) were also heavier than all AHY coastal birds (40) (37.10 to 36.76 g, t = 0.414) but not significantly so. Fall AHY birds at Pennington (5) were heavier than those at Island Beach (17) (40.76 to 40.35 g, t = 0.165) as was the case for spring adults, Pennington (46) Island Beach (23) (36.69 to 34.25 g, t = 3.320) but not significantly for either season. Considering all catbirds captured inland (63) and those captured on the coast (80), there was no significant difference between the weights of all migrants (37.37 to 37.33 g, t = 0.068). Comparing all fall migrating AHY catbirds (69) with AHY spring birds (22), fall migrants were significantly heavier (40.43 to 34.26 g, t = 6.909). The spring birds returning from the over-wintering areas (southern United States, Bahamas, Cuba, eastern

Table 1. Weights (g) of Gray Catbirds (from the literature).

Locality	Season	N	Range	Mean	S.D.	Age/Sex	Source
Alabama	April	1	—	35.0	—	ad. male	Stewart and Skinner 1967
	June	1	—	33.0	—	ad. female	Stewart and Skinner 1967
Bahamas	March	2	30.9-33.3	32.1	—	ad.	Walkinshaw 1961
Connecticut & Massachusetts	Fall (?)	11	34.7-44.4	38.50	—	ad.	Wetherbee 1934
	Fall (?)	43	32.3-40.6	36.04	—	imm.	Wetherbee 1934
Massachusetts	Spring (?)	15	—	39.05	—	male and female	Whittle 1927
	Sept.	1	—	33.32	—	imm.	Broun 1933
Michigan	?	10	31.2-39.0	35.1	± .5	?	Becker & Stack 1944
New Jersey	Fall	494	23.2-45.3	35.25	±2.8	?	Murray and Jehl 1964
	Fall	97	23.3-45.3	34.7	±3.1	?	Murray and Jehl 1964
New York	Sept.-Aug.	2584	27.4-54.5	39.9	±3.15	ad. & imm.	Ray
	Sept.-Aug.	1767	27.4-50.1	39.9	±2.99	imm.	Raynor 1979
	Sept.-Aug.	665	31.6-54.5	40.1	±3.57	ad.	Raynor 1979
	Sept.-Aug.	126	31.9-48.7	38.3	±3.52	ad. male	Raynor 1979
	Sept.-Aug.	79	31.6-54.5	40.9	±4.38	ad. female	Raynor 1979
	Spring & Fall	5	—	45.3	—	male	Stegeman 1955
	Spring & Fall	3	—	40.8	—	female	Stegeman 1955
Ohio	?	2	—	31.1	—	male	Stevenson 1933
	?	1	—	38.1	—	female	Stevenson 1933
	?	5	34.0-39.8	35.55	—	?	Stewart 1937
	Spring/Summer	13	—	35.9	—	ad.	Nice 1938
	Spring	13	32.0-41.7	36.0	—	ad.	Nice 1938
	May	24	—	35.3	—	ad. male	Baldwin and Kendeigh 1938
	May	43	—	38.4	—	ad. female	Baldwin and Kendeigh 1938
	Sept.	3	—	40.7	—	ad. male	Baldwin and Kendeigh 1938
	Sept.	1	—	37.1	—	ad. female	Baldwin and Kendeigh 1938
	Sept.	7	—	40.5	—	ad. (?)	Baldwin and Kendeigh 1938
	Sept.	6	—	35.5	—	imm.	Baldwin and Kendeigh 1938
Ohio & Maine	?	10	—	37.9	±3.8	?	Hartman 1946
Pennsylvania (?)	?	1	—	39.0	—	?	Poole 1938
Midwest, NE,SE, S	Oct.	6	32.9-39.2	36.4	—	ad. female	Johnston 1957
	Oct.	16	34.0-42.9	38.0	—	ad. male	Johnston 1957
	Oct.	6	35.4-39.0	37.5	—	imm. male	Johnston 1957
?	?	1	—	36.8	—	male	Johnson 1968

Table 2. Weights (g) of migrating Gray Catbirds.

Areas	N	Median	Mean	S.D.	Range
Pennington & Island Beach					
All	143	37.4	37.83	±3.512	26.4-56.5
HY	52	38.0	37.90	±2.572	31.9-44.0
AHY	91	36.8	37.02	±3.798	26.4-56.5
Spring					
AHY	69	35.7	34.36	±3.309	26.4-42.6
Fall					
All	74	38.5	38.65	±3.456	31.9-56.5
HY	52	38.0	37.90	±2.572	31.9-44.0
AHY	22	39.5	40.43	±4.540	34.0-56.5
Pennington					
All	63	37.4	37.37	±2.951	30.8-44.6
HY	12	38.9	38.51	±3.309	33.3-42.1
AHY	51	37.2	37.10	±2.906	30.8-44.6
Spring					
AHY	46	36.2	36.69	±2.901	30.8-42.6
Fall					
All	17	38.9	39.17	±2.845	33.3-44.6
HY	12	38.9	38.51	±3.309	33.3-42.1
AHY	5	39.9	40.76	±2.559	38.3-44.6
Island Beach					
All	80	37.5	37.33	±3.865	26.4-56.5
HY	40	38.0	37.72	±2.660	31.9-44.0
AHY	40	36.6	36.76	±4.865	26.4-56.5
Spring					
AHY	23	35.0	34.25	±2.826	26.4-37.7
Fall					
All	57	38.1	38.50	±3.558	31.9-56.5
HY	40	38.0	37.72	±2.660	31.9-44.0
AHY	17	39.5	40.35	±5.389	34.0-56.5

Mexico, Central America, Panama, etc.) would have travelled a longer distance than the fall birds, some of whom presumably were from neighboring areas in the northeastern United States and Canada.

The lack of significant difference in weights of inland and coastal migrating catbirds does not fit the pattern which I found for other migrating passerines (Prescott 1981, 1980a, 1980b) nor does it fit the hypothesis discussed by Murray and Jehl (1946:221). They hypothesized that coastal birds had flown longer distances — and over water — than inland birds and had expended, consequently, more energy and stored fat than those migrating over the land.

Fat deposits

The fat content in the furculum of 152 catbirds was scored from none (0) to very much (3). The percentages of visual fat in each category are given in Table 3. In my paper on over-wintering Dark-eyed Juncos (Prescott 1978) I discussed my procedure and reviewed the role of fat storage and weight increases of passerines in relation to migration. The data for migrant catbirds at both localities show that there is an inverse relationship of the percentage of fat content by season with more very

fat (3) individuals in the fall (22.5%) than in the spring (9.9%) and more non-fat (0) in the fall (41.3%) than fat in the spring (60.6%). Combining 0 with 1, and 2 with 3 categories, the percentages are even more indicative (61.3 and 38.7% to 78.9 and 21.1%). The fall birds migrating southward have more stored fat than those arriving in the spring who, presumably, arrive in New Jersey, having flown greater distances and expended more stored fat in flight. This pattern holds for both AHY and HY birds at Island Beach; however, for AHY and HY individuals at Pennington, there was relatively the same percentage of non-fat scores (0 or 1) in the fall (84.2%) as in the spring (83%) and approximately the same percentage of fat birds scores (2 or 3) in the fall (15.8%) as in the spring (17%).

Examining fat content data for AHY and HY birds at both localities, we find that it is the immatures at Pennington that skew the data, with 100% of HY birds non-fat scores (0 or 1) while only 65.9% of HY catbirds at Island Beach were non-fat. Adults at Island Beach as a group were fatter in the fall than in the spring and this was the case for those at Pennington. In general, then, comparing fat content of catbirds at the coastal and inland areas, the data do not fit the Murray-Jehl hypothesis (1964) which suggests that coastal migrants expend more stored fat than inland migrants. However, my fat scores are based solely on visual fat in the furculum and not elsewhere on the body and may not be, therefore, an accurate indicator of total amount of stored fat.

Table 3. Visual fat at the furculum of migrating Gray Catbirds: percentage of individuals by fat class*

	N	0	1	2	3
Pennington & Island Beach					
All	152	50.0	19.8	13.8	16.4
HY	52	53.9	19.2	15.4	11.5
AHY	100	48.0	20.0	13.0	19.0
Spring					
AHY	72	60.6	18.3	11.2	9.9
Fall					
All	80	41.3	20.0	16.2	22.5
HY	52	53.9	19.2	15.4	11.5
AHY	28	17.8	21.4	17.8	43.0
Pennington					
All	67	65.7	17.9	6.0	10.4
HY	11	90.1	9.9	0.0	0.0
AHY	56	60.7	19.7	7.1	12.5
Spring					
AHY	47	66.0	17.0	8.5	8.5
Fall					
All	19	68.4	15.8	0.0	15.8
HY	11	91.0	9.0	0.0	0.0
AHY	8	37.5	25.0	0.0	37.5
Island Beach					
All	85	37.6	21.2	20.0	21.2
HY	41	43.9	22.0	19.5	14.6
AHY	44	31.8	20.5	20.5	27.2
Spring					
AHY	24	50.0	20.8	16.7	12.5
Fall					
All	61	32.8	21.3	21.3	24.6
HY	41	43.9	22.0	19.5	14.6
AHY	20	10.0	20.0	25.0	45.0

*0—none; 1—little; 2—moderate; 3—very much

Wing length

Table 4 gives data on wing length measurements of 5270 Gray Catbirds from the literature. Most measurements were taken from fall migrants. Excepting Walkinshaw's 2 wing measurements (mean 89.0 mm) taken from March catbirds measured in the Bahamas, the mean wing lengths range from 90.4 to 113.68 mm. The low mean recorded by Raynor was for a large sample of immatures, although his means for adult males (92.1 mm) and adult females (91.4 mm) are not much longer. Ridgeway's measurements for 10 catbirds (91.1 mm) fit within that given for living birds although his, presumably, are from skins. The range of all these birds (80.0 - 102.0 mm) is close to that which I found in measurements of 150 catbirds (82.5 - 105.0 mm). My mean length

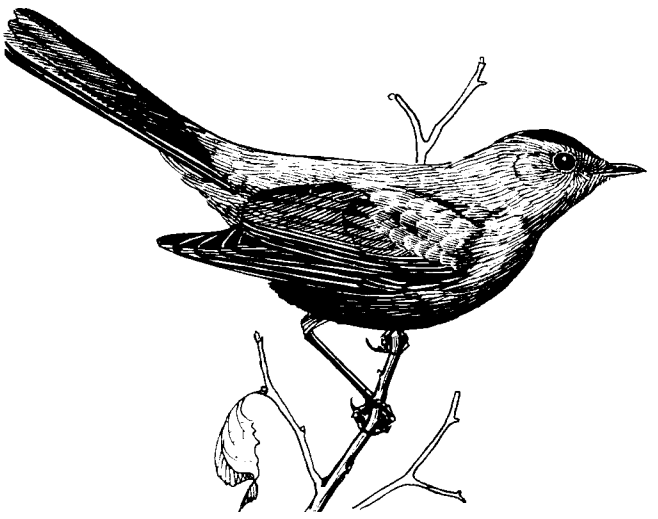

Table 4. Wing length (chord in mm) of Gray Catbirds (from the literature).

Locality	Season	N	Range	Mean	S.D.	Age/Sex	Source
New York	Sep through Aug	2,582	80.0-102.0	91.0	± 2.91	ad/imm	Raynor 1979
New York	Sep through Aug	1,767	80.0-90.0	90.4	± 2.72	imm	Raynor 1979
New York	Sep through Aug	662	83.0-102.0	92.3	± 2.99	ad	Raynor 1979
New York	Sep through Aug	125	86.0-99.0	92.1	± 3.01	ad male	Raynor 1979
New York	Sep through Aug	78	86.0-97.0	91.4	± 2.73	ad female	Raynor 1979
Bahamas	March	2	89.0-89.0	89.0	—	ad	Walkinshaw 1961
Conn. & Mass.	Fall (?)	54	—	113.68	—	ad	Wetherbee 1934

Table 5. Wing length (chord in mm) of migrating Gray Catbirds

Areas	N	Median	Mean	S.D.	Range
Pennington & Island Beach					
AHY	92	90.0	89.91	± 0.576	82.5-97.0
HY	58	89.0	89.65	± 1.383	85.5-105.0
All	150	90.0	89.81	± 0.596	82.5-105.0
Pennington					
AHY	41	89.5	90.01	± 0.563	82.5-97.0
HY	11	90.0	90.27	± 0.614	86.5-97.5
All	52	90.0	90.07	± 0.583	82.5-97.5
Island Beach					
AHY	51	90.0	89.83	± 0.584	84.0-96.5
HY	47	89.0	89.50	± 0.634	85.5-105.0
All	98	90.0	89.67	± 0.610	84.0-105.0

for the sample (89.91 mm) is less than that recorded elsewhere with the exception of that found by Walkinshaw. I also found that my 58 HY birds had a shorter, but not significantly so, wing length than the 92 AHY (89.65 to 89.91 mm, t = 1.633). Comparing AHY catbirds at Island Beach (51) with Pennington (41) the means were very close (89.83 to 90.01 mm, t = 1.484), and for HY birds, those at Island Beach (47) were shorter than the HY at Pennington (11), (89.50 to 90.27 mm, t = 3.661).

Summary

The weight, fat class, and wing measurements of migrant Gray Catbirds from coastal Island Beach and inland Pennington, New Jersey are compared. Unexpectedly, I found that HY birds were heavier, but not significantly so, than AHY catbirds. Fall AHY catbirds at Pennington were heavier than those at Island Beach although more AHY catbirds at the coast were fat than those examined at the inland site. These data do not fit the hypothesis proposed by Murray and Jehl. For both Island Beach and Pennington, adults in the fall were heavier and fatter than those in the spring, suggesting that the fall migrants had stored fat available for the continuing, long migration while returning spring birds, lighter and with less fat, had expended more fat as energy as they returned to New Jersey. In general, HY catbirds had shorter wings than the adults.

Acknowledgements

The author continues to be indebted to Mrs. Mabel Warburton, Director of Island Beach Operation Recovery, New Jersey, for her assistance and guidance during the coastal banding operation. The assistance of my co-bander, Trudy Prescott, was helpful in many ways. Again, I am grateful to Jerome A. Jackson for his advice and guidance in the preparation of this manuscript.

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