

GROWTH RATE OF THE PRIMARIES OF CAPTIVE HATCHING-YEAR RED-WINGED BLACKBIRDS

GEORGE M. LINZ¹

*Colorado Cooperative Fish and Wildlife Research Unit
Colorado State University
Fort Collins, Colorado 80523 USA*

Laurie J. Linz²

*Department of Agronomy
North Dakota State University
Fargo, North Dakota 58105*

Abstract.—We studied the growth rate of the primaries of captive hatching-year male and female Red-winged Blackbirds (*Agelaius phoeniceus*). Individual primaries grew an average of 4.4 mm/d in males and 3.8 mm/d in females. The average fully grown length of the 9 primaries was 85.8 mm for males and 72.8 mm for females. By dividing the average primary length by the daily rate of feather growth, we found that primaries of both sexes are replaced in about 19–20 d. The estimated duration of molt was 49 d and 57 d for males and females, respectively.

TASA DE CRECIMIENTO DE LAS PRIMARIAS DE JUVENILES DE PRIMER AÑO DE *AGELAIUS PHOENICEUS* EN CAUTIVERIO

Sinopsis.—En cautiverio, se estudian los juveniles del año de *Agelaius phoeniceus*, en relación al crecimiento de las primarias. Estas plumas crecieron a una razón promedio de 4.4 mm/d en machos y de 3.8 mm/d en hembras. El tamaño promedio de la 9na primaria ya completamente desarrollada, lo fue de 85.8 mm en los machos y de 72.8 mm en las hembras. Al dividir el largo promedio de la primaria por la tasa diaria de crecimiento de la pluma se encontró que las primarias se remplazan cada 19–20 d en ambos sexos. El periodo estimado de muda para estas aves es de 49 d para los machos y de 57 d para las hembras.

The duration of the prebasic molt of Red-winged Blackbirds (*Agelaius phoeniceus*) has been studied by capturing many birds a single time throughout the period of molt in nonmigratory (Payne 1969) and migratory populations (Linz 1986, Linz et al. 1983, Meanley and Bond 1970). Estimates of the duration of red-wing molt obtained in this manner may be biased by population turnover (Linz 1986, Linz et al. 1983). The duration of molt can be more precisely estimated if the rate of growth of the feathers is known. To our knowledge, no data on the growth rate of individual primaries of Red-winged Blackbirds have been reported. These data are best if obtained from free-living birds. However, molting red-wings are difficult to capture and recapture in the wild. The alternative is to study molt progress in captive birds.

During a study to evaluate bird-resistant sunflower varieties, we captured hatching-year (HY) red-wings and held them in outdoor enclosures

¹ Current address: USDA/APHIS/ADC, Denver Wildlife Research Center, Bldg. 16, Denver Federal Center, Denver, Colorado 80225 USA.

² Current address: University of North Dakota, School of Medicine, 501 Columbia Road, Grand Forks, North Dakota 58201 USA.

(Fox and Linz 1983). As a by-product of this experiment, we determined the growth rate of individual primaries during the first prebasic molt of male and female Red-winged Blackbirds. This information, coupled with data on the number of primaries growing concurrently, enables a more precise estimate of the duration of remige molt of individual red-wings.

METHODS

From August–October 1982, we captured HY red-wings with decoy traps (Seubert 1963) and mist nets in Cass County, North Dakota (46°51'N, 96°50'W). Birds ($n = 350$) in various stages of molt were banded with numbered leg bands and placed in one of four 0.04-ha enclosures. Each enclosure was planted with oil and confectionery varieties of sunflower. In addition to sunflower seeds (achenes), water, weed seeds (largely Fox-tail, *Setaria* spp.), cracked corn, and grit were provided.

Plumages of red-wings have been described by Dwight (1900), Selander and Giller (1960), and Meanley and Bond (1970). All feathers are normally replaced during the first prebasic molt, however, some individuals may retain a few underwing coverts (Selander and Giller 1960). Primaries are replaced in sequence from 1 (innermost) through 9. They are considered a good indicator of overall molt progress (Evans 1966, Newton 1966).

Males and females used in this study were in similar stages of molt; averaging 1.2 new primaries ($n = 68$, $SD = 1.7$, range 0–6). Individual primaries of the right wing of each bird were measured to the nearest millimeter from the point of emergence from the skin to their tips. Only primaries <20% grown at the time of initial measurement were analyzed for rate of growth. These primaries averaged 3.5 mm for males ($n = 53$, $SD = 4.2$, range = 1–14) and 3.8 mm for females ($n = 31$, $SD = 4.0$, range = 1–14). The average daily growth rate of primaries (mm/d) was obtained by dividing the increase in feather length by the number of days between measurements. Average length of fully grown primaries was determined from all HY red-wings captured in 1982.

RESULTS AND DISCUSSION

Males and females recaptured with remiges meeting the stated criteria averaged about 13 d ($n = 41$, $SD = 3.9$, range 7–20) and 14 d ($n = 27$, $SD = 3.0$, range = 7–18) between the initial and final measurements, respectively. Males averaged 3.6 ($SD = 0.9$, range = 2–5) and females 3.0 primaries growing concurrently ($SD = 1.1$, range = 1–6). Each primary of the males grew a mean of 56 mm ($n = 53$, $SD = 15.0$, range = 24–79) and each primary of the females grew a mean of 54 mm ($n = 31$, $SD = 9.7$, range = 26–67). Thus, individual primaries grew an average of 4.4 mm/d ($SD = 0.62$, range 3.1–6.2) in males and 3.8 mm/d ($SD = 0.41$, range = 2.9–4.7) in females. The average fully grown length of the 9 primaries was 85.8 mm ($n = 1531$, $SD = 0.11$) for males and 72.8 mm ($n = 1163$, $SD = 0.10$) for females. By dividing this average primary

length by the daily rate of feather growth, we found that primaries of both sexes are replaced in about 19–20 d.

To calculate the average duration of molt, we divided the total length of all 9 primaries by the daily growth of the primary feathers. Thus the estimated duration of molt for males is 49 d ($772 \text{ mm}/[4.4 \text{ mm/d} \times 3.6 \text{ primaries growing concurrently}]$) and for females 57 d ($655 \text{ mm}/[3.8 \text{ mm/d} \times 3.0 \text{ primaries growing concurrently}]$). The sexual difference in the duration of molt is due to the number of primaries grown concurrently.

Data conflict on the effect of captivity on growth rate of feathers. Newton (1967) concluded that feather growth of captive Bullfinches (*Pyrrhula pyrrhula*) and Greenfinches (*Carduelis chloris*) was not altered by confinement. Similarly, Chilgren (1978) suggested that the growth rate of White-crowned Sparrow (*Zonotrichia leucophrys*) feathers was “unalterable under conditions of adequate nutrition.” On the other hand, Mewaldt and King (1978) found that the feather growth rate of caged White-crowned Sparrows was depressed during the first 10 d of captivity. Our methodology was not sensitive enough to detect changes in the rate of growth of the primaries.

Primaries of female red-wings we studied were about 15% shorter but grew about 14% slower than those of the males. Hence, it appears that the duration of growth of individual primaries is the same for both sexes. Mewaldt and King (1978) and Chilgren (1978) found that the growth rate of feathers of White-crowned Sparrows slowed significantly in the final days of development. Because we measured only the rate of growth of the first 66% (males) to 75% (females) of the primaries' total length, the duration of growth of each feather may be slightly longer than 19–20 d.

Hatching-year red-wings that begin molt early in the season (July and August) tend to grow fewer primaries concurrently than those that begin molt late in the season (September) (Linz 1986). Linz (1986) reported that, as a population, HY males in Cass County, North Dakota grew more remiges concurrently than did females. Selander and Giller (1960) noted that a higher percentage of female red-wings undergo complete first prebasic molt than males. Whether HY males begin molt later than HY females of similar age is unknown. A capture/recapture study of males and females of known age is still needed to clarify their molt strategies.

ACKNOWLEDGMENTS

We thank G. Fox for his assistance throughout the study. J. Besser; I. Brisbin, Jr.; J. Cummings; M. Jaeger; T. Klett; L. Mewaldt; and B. Searcy provided helpful criticism of the manuscript. Support was provided by the U.S. Fish and Wildlife Service (Project 14-16-0009-79-037).

LITERATURE CITED

- CHILGREN, J. D. 1978. Effects of photoperiod and temperature on postnuptial molt in captive White-crowned Sparrows. *Condor* 80:222–229.
- DWIGHT, J. 1900. The sequence of plumages and moults of the passerine birds of New York. *Ann. New York Acad. Sci.* 13:73–360.

- EVANS, P. R. 1966. Autumn movements, moult and measurements of the Lesser Redpoll, *Carduelis flammea carbarex*. Ibis 108:183-216.
- FOX, G., AND G. LINZ. 1983. Evaluation of Red-winged Blackbird resistant sunflower germplasm. Pp. 181-189, in Proc. Ninth Bird Control Sem. Bowling Green State University, Bowling Green, Ohio.
- LINZ, G. M. 1986. Temporal, sex, and population characteristics of the first prebasic molt of Red-winged Blackbirds. J. Field Ornithol. 57:91-98.
- , S. B. BOLIN, AND J. F. CASSEL. 1983. Postnuptial and postjuvinal molts of Red-winged Blackbirds in Cass County, North Dakota. Auk 100:206-209.
- MEANLEY, B., AND G. M. BOND. 1970. Molts and plumages of the Red-winged Blackbird with particular reference to fall migration. Bird-Banding 41:22-27.
- MEWALDT, L. R., AND J. R. KING. 1978. Latitudinal variation in prenuptial molt in wintering Gambel's White-crowned Sparrows. N. Am. Bird Bander 3:138-144.
- NEWTON, I. 1966. The moult of the Bullfinch *Pyrrhula pyrrhula*. Ibis 108:41-67.
- . 1967. Feather growth and moult in some captive finches. Bird Study 14:10-24.
- PAYNE, R. B. 1969. Breeding seasons and reproductive physiology of Tricolored Blackbirds and Red-winged Blackbirds. Univ. Calif. Publ. Zool. 90.
- SELANDER, R. K., AND D. R. GILLER. 1960. First-year plumages of the Brown-headed Cowbird and Red-winged Blackbird. Condor 62:202-214.
- SEUBERT, J. L. 1963. Research on methods of trapping the Red-winged Blackbird (*Agelaius phoeniceus*). Angewandte Ornithologie 1:163-170.

Received 11 Aug. 1986; accepted 25 Jan. 1987.

NOTES AND NEWS

CALL FOR ASSISTANCE

PRAIRIE-NORTHWEST TERRITORIES SHOREBIRD SURVEY PROGRAM

In 1987, the Canadian Wildlife Service, Western and Northern Region will be initiating a program to survey major shorebird staging and nesting areas in the prairie provinces and the Northwest Territories. This project is part of the International Shorebird Surveys Program.

Similar surveys in Atlantic Canada have identified a number of significant staging areas in the Bay of Fundy. Many of these sites are now proposed for protection through the Ramsar Convention and the shorebird "Sister Reserves Program" (a hemisphere wide system of reserves for shorebird protection). However, very little data exist on shorebird use in the prairie provinces or the Northwest Territories.

For this program to accomplish its objectives the Canadian Wildlife Service will have to rely heavily on the efforts of outside individuals, organizations and government agencies. Through your participation in this project, determination of potential Sister Reserves in these regions of Canada will be possible. So if you are interested in surveying shorebird staging and/or nesting habitats in the prairie provinces or the Northwest Territories, please contact **H. Loney Dickson**, Wildlife Biologist, Canadian Wildlife Service, Western and Northern Region, 2nd floor, 4999 - 98 Ave., Edmonton, Alberta, Canada T6B 2X3. Telephone #: (403) 420-2525. Everyone who takes part in the program will receive the annual summary of the Canadian survey results (provincial breakdowns are included).