Skull Pneumaticization and Retained Juvenal Greater Coverts of First-year Great Crested Flycatchers during Fall Migration

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ABSTRACT

Banders commonly use the extent of skull pneumatization and the presence of molt limits as characters to recognize hatching-year (HY) passerines during fall migration. The first prebasic molt of the Great Crested Flycatcher (*Myiarchus crinitus*) is nearly complete but is interrupted during migration (Pyle 1997a, 1997b). Consequently, molt limits in this species may be particularly evident during fall passage. Our objective was to describe skull pneumatization and the number of retained juvenal greater coverts of HY Great Crested Flycatchers during fall migration. We captured these birds on the Alabama gulf coast from late Aug to mid-Oct. Eighty-six percent of HY individuals (n = 88) had fully pneumatized skulls. Even two first-year birds captured in late August had complete skull pneumatization, earlier than the dates given by Pyle (1997a) by three to seven weeks. The numbers of retained juvenal greater coverts ranged from one to ten with a median of six. We suggest that banders use the relatively obvious molt edge in the greater coverts to recognize HY Great Crested Flycatchers during fall migration.

INTRODUCTION

Banders have used the extent of skull pneumatization as a character to determine the age of passerine birds for decades (e.g., Miller 1946, Baird 1964, Stewart 1972, U.S. Fish and Wildlife Service and Canadian Wildlife Service 1977, Yunick 1979, Wood and Beimborn 1992, Jenni and Winkler 1994). Cranial examination, known as "skulling," remains a common technique to age birds, particularly during the autumn (Pyle 1997a). For accurate age determination when using this technique, it is important to know the date at which the first young birds complete pneumatization (hereafter, "skull date"). Beginning on this date, it is no longer possible to classify individuals as after-hatch-year/after-second-year (AHY/ASY) based solely on complete skull pneumatization. Ideally, the skull date should be when no more than 5% of young birds would have completed pneumatization because this maintains the accuracy of the technique at ≥95%. Pyle (1997a) gives skull dates for all North American passerines, but banders can refine these dates by collecting and analyzing data on skull pneumatization.

Recently, banders have made increasing use of the presence of molt limits to determine the age of birds as a growing volume of information on the subject has become available (e.g., Mulvihill 1993; Pyle 1997a, 1997b; Froehlich 2003). Much of the information on the extent of molt given by Pyle (1997a) was based on museum specimens. Because it is difficult to examine all of the wing feathers on traditionally prepared specimens, Pyle (1997a, 1997b) encouraged banders to refine the information presented in his guide by publishing the results of studies based on live birds.

The first prebasic molt of the Great Crested Flycatcher is nearly complete but is interrupted during fall migration (Pyle 1997a, 1997b). During

this molt, all greater coverts, but no primary coverts, are replaced (Pyle 1997a, 1997b). Pyle (1997a), therefore, indicated that contrast or lack of contrast between these two groups of feathers is one of the chief characteristics that distinguish hatch-year/second-year (HY/SY) and AHY/ASY individuals of this species. However, during fall migration when the first prebasic molt is interrupted, contrasts within the greater coverts should provide a more visible characteristic to separate age groups. The purpose of this investigation is to present data on skull pneumatization and molt limits within the greater coverts of HY Great Crested Flycatchers during fall migration.

METHODS

We conducted this investigation at Bon Secour National Wildlife Refuge on the Alabama Gulf Coast (30°13' N, 88°10' W) from late Aug through Oct 1993–2000. The study site was 2 km from the tip of a peninsula extending from east to west across the mouth of Mobile Bay. All Great Crested Flycatchers captured were examined by us or by assistants trained by us. We skulled each bird and examined the greater coverts to determine whether feathers from the juvenal plumage were present. We considered the age of birds to be HY if (1) the skull was not pneumatized completely or (2) juvenal greater coverts were present. For a subset of HY birds, we counted the number of retained juvenal greater coverts. We recognized juvenal feathers by their color. The edges and tips of the outer vanes of juvenal coverts are cinnamon in contrast to the pale yellow edges and tips of feathers grown during the first prebasic molt Additionally, juvenal greater coverts are shorter than first prebasic coverts often creating a small "step" in covert length at the molt limit.

RESULTS

We captured HY Great Crested Flycatchers with both completely and incompletely pneumatized skulls throughout the period from late Aug to mid-Oct. The latest individual with an incompletely pneumatized skull was captured on 11 Oct, the second latest date on which we captured any Great Crested Flycatcher. However, throughout

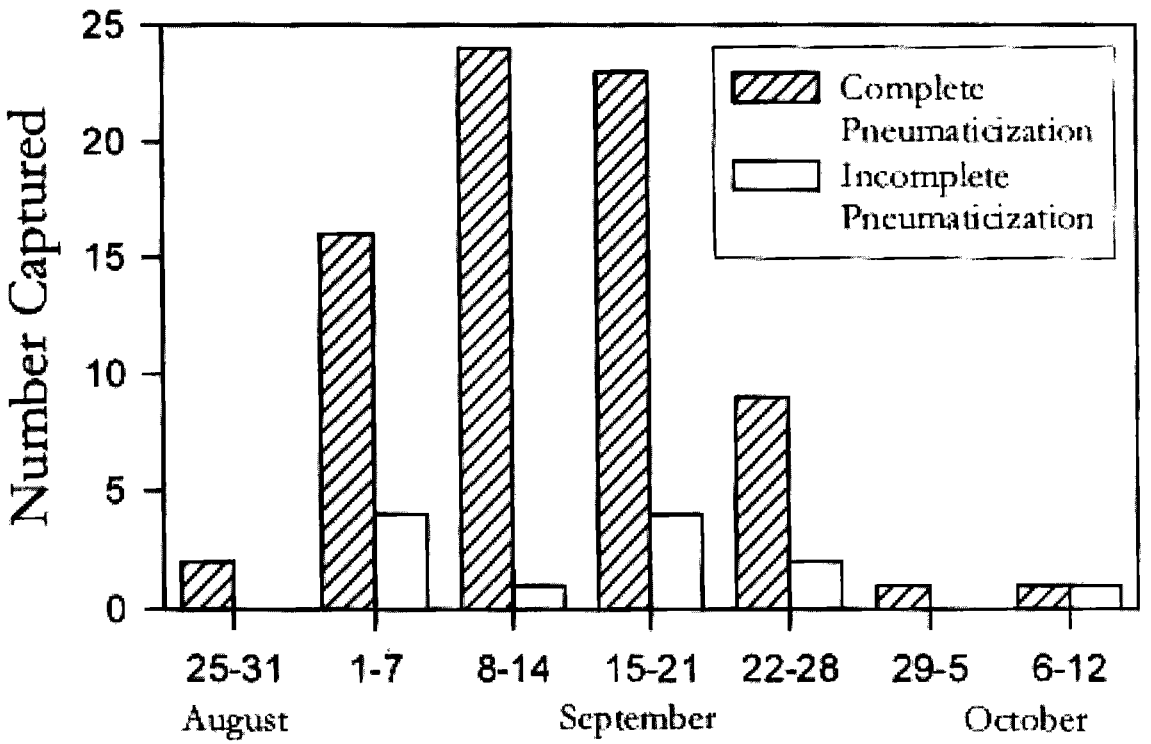

Fig. 1. The skull pneumatization of hatching-year Great Crested Flycatchers captured each week during fall migration at Bon Secour National Wildlife Refuge, Alabama.

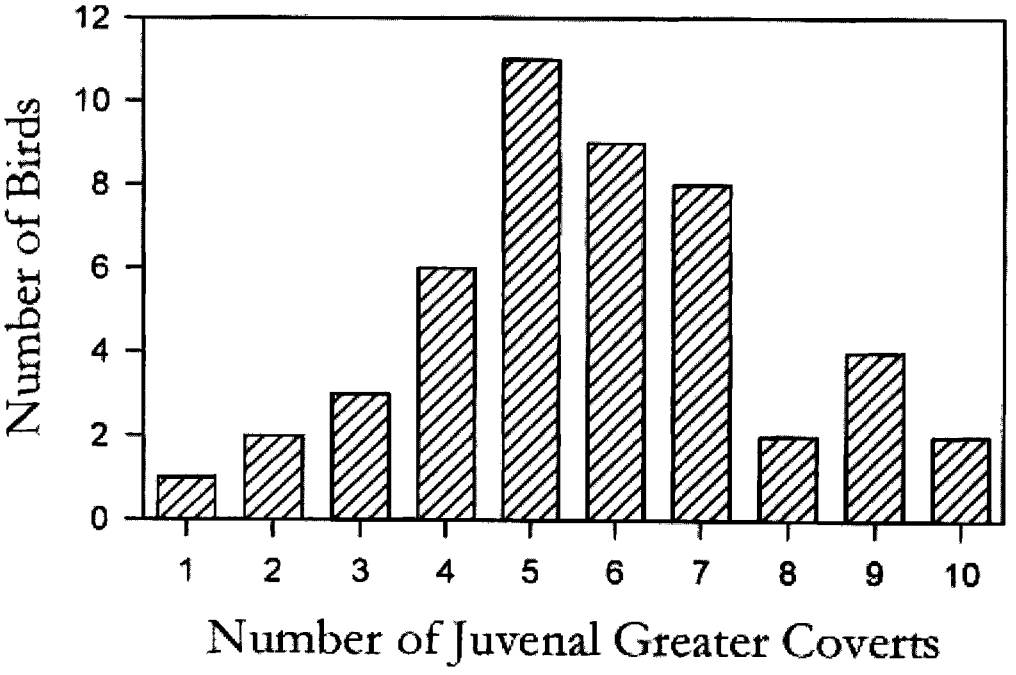

Fig. 2. The number of juvenal greater coverts on hatching-year Great Crested Flycatchers captured during fall migration at Bon Secour National Wildlife Refuge, Alabama.

the period, individuals with fully pneumatized skulls predominated (86% of the 88 birds captured) (Fig. 1). Furthermore, 89% (n = 47) of HY individuals captured before 15 Sep had completely pneumatized skulls, including the two captured in late August.

We counted the number of retained juvenal greater coverts on 48 HY Great Crested Flycatchers. Counts ranged from one to all ten of these feathers (Fig. 2). The median was six and most (71%) of the birds retained four to seven juvenal coverts.

DISCUSSION

Our results suggest that the true skull date for the Great Crested Flycatcher is considerably earlier than 15 Oct, the date given by Pyle (1997a). Pyle also indicated that individuals of this species may complete skull growth as early as 15 Sep in southern populations; but, because 89% of the HY Great Crested Flycatchers we banded before this date had fully pneumatized skulls, the true skull date must be earlier even than this. The two HY birds with completely pneumatized skulls in late August provided further evidence of an early skull date. It is not clear from our data precisely what the true skull date should be because few of the birds we handled had incomplete skull pneumatization, and these were captured throughout the period during which we banded at the study site. Data on birds banded earlier in August than the start date of our study would be needed to resolve this issue. Until such data become available, we suggest that banders use a skull date of 15 Aug for the Great Crested Flycatcher.

We observed that HY Great Crested Flycatchers retained from one to all of their juvenal greater coverts. It remains unclear whether any HY individuals replaced all 10 of these feathers before fall migration. The only way that we could have recognized that the age of such a bird was HY rather than AHY would have been if it had an incompletely pneumatized skull and we captured no such individual. The low frequency (only one out of 48 birds) with a single retained juvenal covert suggests that it would be relatively rare for HY birds to replace all greater coverts before migration in the fall. The fact that most of the birds we captured had

retained approximately half of their juvenal greater coverts along with the relatively obvious color and length differences between juvenal and first prebasic coverts makes the molt limit relatively easy to recognize in this species. Due to the early completion of skull pneumatization by many HY individuals, we recommend that banders rely on the presence of this molt limit in the greater coverts rather than skulling to determine the age of Great Crested Flycatchers during fall migration.

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LITERATURE CITED

Baird, J. 1964. Aging birds by skull ossification. *EBBA News* 27:162-163.

Froehlich, D. 2003. Ageing North American landbirds by molt limits and plumage criteria. Slate Creek Press, Bolinas, CA.

Jenni, L. and R. Winkler. 1994. Moult and the ageing of European passerines. Academic Press, London, UK.

Miller, A. H. 1946. A method for determining the age of live passerine birds. *Bird-Banding* 17: 33-35.

Mulvihill, R. S.1993. Using wing molt to age passerines. *N. Am. Bird Bander* 18:1-10.

Pyle, P. 1997a. Identification guide to North American birds. Slate Creek Press, Bolinas, CA

Pyle, P. 1997b. Molt limits in North American passerines. *N. Am. Bird Bander* 22:49-89.

Stewart, R. M. 1972. The reliability of aging some fall migrants by skull pneumatization. *Bird-Banding* 43:9-14.

U.S. Fish and Wildlife Service and Canadian Wildlife Service 1977. North American bird banding manual. Vol. II. Bird banding techniques. Canadian Wildlife Service, Ottawa, ON.

Wood, M. and D. Beimborn. 1992. A bird-bander's guide to determination of age and sex of selected species. Afton Press, Minneapolis, MN.

Yunick, R. P. 1979. Variation in skull pneumatization patterns of certain passerines. *N. Am Bird Bander* 4: 145-147.

News, Notes, Comments

An Unusual Nest Location for Dark-eyed Junco

The Dark-eyed Junco *(Junco hyemalis)* is generally considered a ground nesting bird, but instances of elevated and unusual nest locations are known. Forbush (1929) mentions a Massachusetts nest on a shelf over a door inside a woodshed and a Nova Scotia nest on a ledge 10 ft (3.05 m) above ground beneath a gable of a house; and Eaton (1968) describes a nest in New York state in a bird feeder on a pipe 8 ft (2.44 m) above ground and another at the same height in a vine-overgrown trellis. Nolan et al. (2002) in a more extensive review of the species' nesting behavior, based largely on Virginia montane data for *J. h. carolinensis,* which they state are very similar to *J. h. hyemalis,* indicate that locations include variable ground sites, but with elevated sites not uncommon. The highest was in a tree at 15 m, while other locations included window ledges, beams, light fixtures, and hanging flower pots. "Among 317 nests, 41 (12.9%) were elevated, 24 of these in or under buildings."

Here we report a nesting in a flower-bearing planter atop a railing on a deck in front of the glass windows of the Chamberlin's Adirondack camp, in close proximity to human activities both inside the camp and on the outside deck, located at Jenny Lake near Corinth, NY. The planter was located 2.3 m above ground on a deck railing, the deck extending out 2.46 m southeast from the full-length, first-story glass windows on the front of the