Tenth Primary Length as a Character for Ageing the Black-capped Vireo

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ABSTRACT

I investigated the utility of tenth primary length as a character for ageing the Black-capped Vireo (*Vireo atricapilla*). First, I determined whether second-year (SY) and after second-year (ASY) Black-capped Vireos differed in tenth primary length. Next, I determined the range of tenth primary lengths for both age groups and used these to establish cut-off values for distinguishing between them. I captured and measured 91 Black-capped Vireos on Fort Hood Military Reservation in central Texas. I classified the age of each bird as SY or ASY based on the fact that they were banded in a previous year or by comparing the condition of their greater and primary coverts. SY individuals had longer tenth primaries than ASY individuals, but the overlap in the ranges of the two groups was great. The cut-off values I determined allowed the classification of the ages of only 4% of the birds based on tenth primary length alone. Any adjustment of the cut-off values to allow classification of more birds would result in error rates >5%. I conclude that tenth primary length provides very limited information about the age of Black-capped Vireos, and banders should use this measurement only in combination with other more reliable age characters.

INTRODUCTION

The Black-capped Vireo (*Vireo atricapilla*) was added to the federal endangered species list in 1987. Because of this status, researchers focus much attention on this species. The ability to distinguish various age/sex groups could enhance these efforts by allowing the investigation of the relationship of age or sex to survival, habitat use, and other aspects of behavior.

Currently, several characters are used to determine the age of the Black-capped Vireo during the breeding season. The existence of a molt limit between the greater and primary coverts of birds in first basic plumage is perhaps the most useful age character. Other helpful characters include the extent of black in the caps of males and rectrix shape. Unfortunately, the molt limit can be subtle and often requires experience to recognize Also, Black-capped Vireos replace all greater coverts simultaneously relatively early in their prebasic molt. These feathers are lost in late June or early July and it is no longer possible to assess this character afterward. The other age characters are problematic as well. Both rectrix shape and the extent of black in the caps of males are quite variable and intermediates that cannot be aged based on these characters are common.

Thus, another age character would be helpful Pyle (1997) suggested that the length of the tenth primary might be useful for separating age groups in 10 vireo species, including the Black-capped Vireo. The goal of this investigation was to evaluate tenth primary length as a character for ageing Black-capped Vireos during the breeding season (late Mar to early Jul). To achieve this goal, I had two specific objectives: (1) determine whether second-year (SY) and after second-year (ASY) Black-capped Vireos differ in tenth primary length; and (2) determine the range of tenth primary lengths for both age groups to establish cut-off values for distinguishing between them.

METHODS

I conducted this study at Fort Hood Military Reservation in Bell and Coryell counties, Texas (ca. 31° 14' N, 97° 43' W). I captured both male and female Black-capped Vireos from Apr through Aug of 2003 and 2004. I determined tenth primary length on the right wing of each bird by measuring (as indicated by Pyle 1997) from the tip of the longest primary covert to the tip of the tenth primary to the nearest 0.5 mm. Each bird was aged SY or ASY based on contrast in wear and color between primary and greater coverts, or based on the fact that the bird had been banded in a previous year. I did not include data from birds that I could not age by these means.

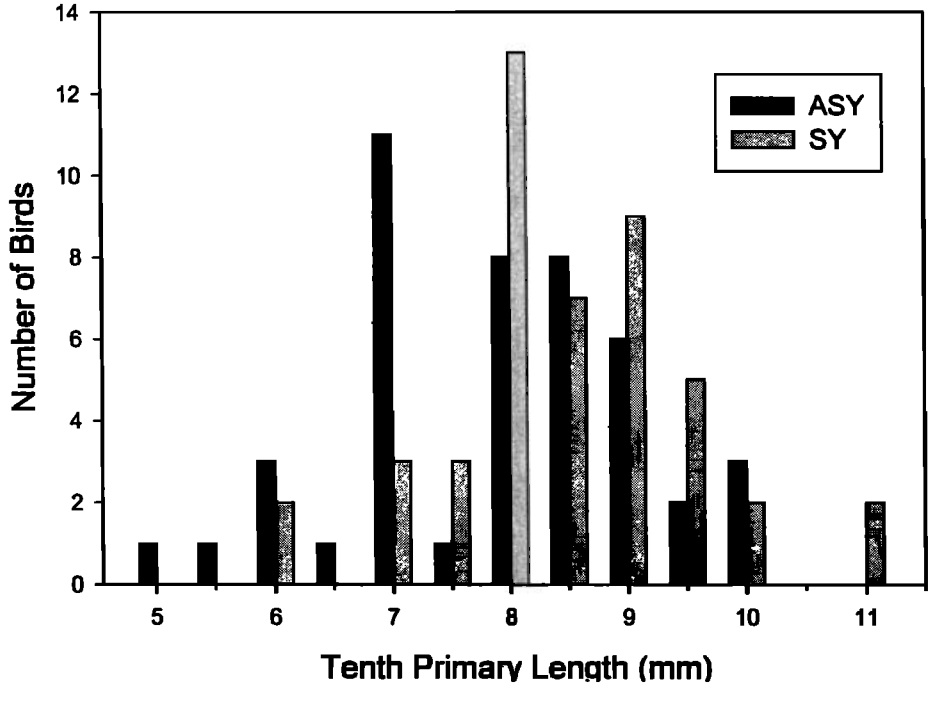
To determine whether I could combine data from both sexes, I compared the tenth primary lengths of males and females for each age group separately using 2-tailed Mann-Whitney tests (Zar 1999). To determine whether the tenth primary length of SY and ASY Black-capped Vireos differed, I compared the two age groups using a t-test (Zar 1999). This test was 1-tailed because Pyle (1997) suggested that SY birds would have greater tenth primary lengths than ASY birds. To determine cut-off points for distinguishing between the two age groups, I examined the range of measurements for each group and set cut-off values such that no more than 5% of the birds classified into either age group would be misclassified. All statistical analyses were conducted with Sigmastat (SPSS 2003) and I interpreted results at a significance level of α = 0.05.

RESULTS

I measured the tenth primary length of 91 Black-capped Vireos. The mean lengths were as follows: 8.3 mm for SY males (n = 24), 7.9 mm for ASY males (n = 30), 8.6 mm for SY females (n = 22), and 7.9 mm for ASY females (n = 15). Within age groups, I detected no difference in the tenth primary lengths of males and females (Mann-Whitney test for ASY: U = 243, P = 0.69; Mann-Whitney test for SY: U = 274, P = 0.84). Therefore, I combined sexes for further analysis and found that the tenth primaries of SY birds were indeed longer than those of ASY birds (t-test: t = -2.5, P = 0.008).

Tenth primary length was variable for both age groups and considerable overlap in ranges was evident, especially in the 7 - 10 mm range (Figure 1). Using the maximum ASY measurement and the minimum SY measurement as cut-off values, I

Fig. 1. The distribution of tenth primary lengths for second year (SY) and after second year (ASY) Black-capped Vieros at Fort Hood, Texas



obtained the following: if tenth primary length < 6, then the age is ASY and, if tenth primary length >10, then age is SY. Using these cut-off values, only four of the birds (4%) could be aged based on tenth primary length alone. A change in either cut-off value by only 0.5 mm would result in the misclassification of >5% of the birds assigned an age, an unacceptable error rate.

DISCUSSION

The results of this study support Pyle's (1997) suggestion that the tenth primary lengths of SY Black-capped Vireos are longer than those of ASYs. However, I found that the overlap between the two age groups was so great that the age of relatively few individuals could be determined based solely on this character. Thus, tenth primary length has, at best, very limited utility for age determination in this species.

It would be difficult to refine the cut-off values because so few birds (4%) had tenth primary lengths <6 or >10 mm. Based on these cut-off values, I was able to classify the age of only four out of 91 birds based on this measurement alone. A change in these values to either 6.5 mm or 9.5 mm would result in the misclassification of at least one bird. Because so few birds could be aged based on tenth primary length alone, even a single misclassification would result in error greatly exceeding 5%, an unacceptably high rate.

The true error rate of the cut-off values I suggest is unknown because I did not validate them. This could be accomplished only by applying the values to an independent data set and determining the frequency of age misclassification. Given the apparent low frequency that Black-capped Vireos could be aged based on tenth primary length, I did not consider validation to be worthwhile. Banders should consider tenth primary length to be supplemental to the more reliable age characters. The measurement provides a clue to the age of the bird only if it is extremely large or small and birds with such measurements are relatively uncommon. Even for these birds, banders should use tenth primary length only in combination with other characters to determine age.

It is unlikely that tenth primary length would have greater utility for ageing Black-capped Vireos at times other than the breeding season when I collected data for this investigation. I measured the birds in the two-to-three months prior to their prebasic molt and it is true that during this period their feathers would be relatively worn and potentially shorter than when they were relatively new. However, it seems unlikely that the relatively small changes in length caused by feather wear could greatly alter the extensive overlap in tenth primary length that I observed. Thus, tenth primary length probably has limited utility for ageing Black-capped Vireos at any time of the year.

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