Identifying Mourning and MacGillivray's Warblers: Geographic variation in the MacGillivray's Warbler as a source of error

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The very similar Mourning and MacGillivray's Warblers *(Oporornis philadelphia, O. tolmiei)* are often difficult to differentiate even when in the hand. Reports of possible hybridization between them in southern Alberta (Cox 1973), and the occasional sightings and captures of MacGillivray's Warblers in the eastern United States (Peterson 1958, Hailman 1968, Mahler 1977) further complicate the task of identifying these birds. Using specimens from localities where only one or the other species would be expected to occur, Lanyon and Bull (1967) found that most Mourning and MacGillivray's Warblers could be separated on the basis of wing and tail length, with 98% of Mourning Warblers having a wing minus tail length of 10 mm or more, and 98% of MacGillivray's Warblers having an equivalent measurement of 11 mm or less. Examining a large amount of museum material, Hall (1979) found that this method worked for most of the specimens he examined but was unreliable in some cases.

I recently had the opportunity to examine a small series of both forms from the collection at the Field Museum of Natural History, a series not examined by Hall or Lanyon and Bull. I also examined the Cox series from Alberta. In this paper I suggest that geographic variation in the MacGillivray's Warbler decreases the reliability of the wing minus tail method for separating these two species.

Methods

In making wing and tail measurements I used the method suggested by both Lanyon and Bull (1967) and Hall (1979). The wing length was taken from the flattened wing, and the tail was measured with calipers. It must be emphasized that the common method of making tail measurements with a ruler inserted between the retrices will not yield accurate or consistent results.

Wing and tail measurements were taken from 30 male MacGillivray's and 50 male Mourning Warblers collected on the breeding grounds. The locations for MacGillivray's Warblers were Oregon, Vancouver Island and southcentral British Columbia, Idaho, eastern Montana, southern Alberta, and southwestern Saskatchewan. The Mourning Warbler specimens were from southern Alberta, northeastern North Dakota, northcentral Wisconsin, southern Ontario, and from western New York, Massachusetts, and Maine. Regression analysis was performed on measurements from these two groups of specimens to explore the possibility that wing and tail lengths of the two species vary with longitude.

From this sample of 80 male birds, 27 MacGillivray's and 34 Mourning Warblers were chosen, and the 98% confidence intervals for the range of variation of the wing minus tail length were calculated for both species ($\bar{X}\pm2.3$ x standard deviation). These two samples consisted of birds from areas closest to the area of sympatry in southern Alberta. The Mourning Warblers in this sample were from southern Alberta and northeastern North Dakota, and the MacGillivray's Warblers were from southern Alberta, southwestern Saskatchewan, eastern Montana, Idaho, and southcentral British Columbia.

Results and discussion

The lower limit for the range of the wing minus tail length for the Mourning Warblers in my sample of 34 birds was 10.3 mm. This compares favorably with the bottom limit of 10.0 mm reported for this species by Lanyon and Bull (1967). However, the upper limit for the MacGillivray's Warblers in my sample was 14.6 mm, giving an overlap of 4.3 mm between the species for the wing minus tail length. This suggests that the Mourning and MacGillivray's Warblers in my sample are more similar than those of Lanyon and Bull, who reported an overlap of only 1 mm. A comparison of means also shows that my sample of MacGillivray's Warblers differs significantly from theirs ($t=9.4$, $df=112$, $p<<.001$).

There are two possible reasons for this difference between my sample and Lanyon and Bull's. Firstly, it is

possible that there is some sort of systematic error in my measurements. To explore this possibility, I compared the means of my wing and tail lengths with those reported by Lanyon and Bull. The mean wing and tail lengths for the Mourning Warblers in my sample were 63.1 mm and 47.5 mm, respectively, which is very close to their reported means of 62.3 mm and 48.8 mm. The mean wing length for my MacGillivray's Warblers was 61.2 mm, while Lanyon and Bull reported 60.8 mm. However, the mean tail length for my sample of this species was 50.5 mm. This is significantly less than the mean of 54.3 mm given by Lanyon and Bull ($t=6.7$, $df=115$, $p<<.001$). The fact that only one of my measurements differs markedly from those of Lanyon and Bull leads me to conclude that the difference between my confidence intervals and theirs does not result from systematic error in measurement.

The second, and I think, more likely reason for the observed difference between my sample of MacGillivray's Warblers and that of Lanyon and Bull is the geographic locations from which the birds in my sample were collected. These birds are from areas near the northern and eastern extent of the species' range. While the Mourning Warbler is monotypic, the MacGillivray's Warbler is geographically variable, with two subspecies being currently recognized (Mayr and Short 1970). In his discussion of geographic variation in the MacGillivray's Warbler, Phillips (1947) notes a trend of decreasing tail length from south to north in the breeding range. This trend was also evident in my sample of MacGillivray's Warblers. Birds from British Columbia, Alberta, and Saskatchewan had significantly shorter tails than birds from Oregon, Idaho, and Montana ($t=2.21$, $df=28$, $p<.05$).

The regression analysis performed on my sample of Mourning Warblers detected no trends in wing and tail length with longitude. Similarly, there was no such trend in tail length in MacGillivray's Warblers. However, the wing length of the MacGillivray's Warblers in my sample was found to increase from west to east ($r^2=.29$, $df=29$, $p<.003$). Similar clinal variation in wing length has been described in a number of other species (James 1979, Lunk 1952, Owen 1963, Power 1969). The overall effect of these trends in wing and tail length would be for populations of MacGillivray's Warblers from the northeastern portion of the breeding range to average larger wing minus tail lengths than those from more southern and western portions of the species' range. Although my sample of females was too small for meaningful analysis, I consider it likely that female MacGillivray's Warblers exhibit similar trends in wing and tail lengths.

My findings suggest that geographic variation of wing and tail length in the MacGillivray's Warbler affects the reliability of the wing minus tail length method for separating this species from the Mourning Warbler. A bander working in an area where both species might occur may, for example, mistakenly identify an HY-M MacGillivray's Warbler as an HY-F Mourning Warbler, if he were to use the confidence intervals given by Lanyon and Bull (1967). Until more wing and tail measurements for these species become available from areas near the overlap zone, I think that it would be prudent for banders working in such areas to forego banding ambiguously plumaged birds with a wing minus tail length between 10 mm and 15 mm.

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