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HYBRIDIZATION BETWEEN MOURNING AND MACGILLIVRAY'S WARBLERS

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The exact status of the two taxa currently known as *Oporornis tolmiei,* MacGillivray's Warbler, and *O. philadelphia,* Mourning Warbler, has been a matter of debate. The two forms have usually been considered to be two species but some recent writers (e.g., Mengel, 1964) have considered them to be dubiously distinct, and one authoritative source (Mayr and Short, 1970) has combined them specifically. No one has made any detailed behavioral and nesting studies in the region in central Alberta where the two forms meet or overlap, and the possible conspecificity of these forms has been judged on the basis of a few specimens thought to be hybrids. Taverner (1919) reported collecting a breeding pair in the Red Deer country of Alberta in which the male was *philadelphia* but the female was thought to be *tolmiei,* based on the white eye markings (eye arcs). However, on the basis of measurements this female specimen (NMC) is now considered to be *philadelphia* (W. E. Godfrey, in litt.). The first published report of hybrids was made by Cox (1973), who considered five of seven males collected in two localities in southern Alberta to be hybrids. This judgment was made solely on plumage characters and no measurements were reported, although wing and tail measurements have been considered major specific characters (Lanyon and Bull, 1967). One of the plumage characters used was described in a somewhat ambiguous manner, which has led some later observers to mistaken conclusions. Bird-banders have reported two birds that were trapped but not preserved, and which were thought to be hybrids (Patti and Myers, 1976; Beimborn, 1977), and occasionally reports have been made of possible MacGillivray's Warblers in the East based on birds netted and banded that were not typical Mourning Warblers according to the accepted descriptions (Peterson, 1958; Hailman, 1968; Mahler, 1977). These reports indicate that not only is there confusion on the part of banders and birders as to what characters can be used to distinguish between the two taxa but also that the two forms are often genuinely difficult to separate. I have reconsidered the characters of the two forms and examined all the supposed hybrid specimens.

METHODS

I have examined extensive series of both forms in the Carnegie Museum of Natural History (CM), the Delaware Natural History Museum

(DNHM), the Museum of Vertebrate Zoology (MVZ), and the National Museum of Natural History (USNM). A smaller number of specimens from the American Museum of Natural History, the National Museum of Canada (NMC), and the Royal Ontario Museum were also examined. I have reexamined the whole series of specimens collected by Cox, currently in the San Diego Natural History Museum (SDNHM) and individual specimens from the Bell Museum of Natural History, University of Minnesota (UM), and the private collection of K. W. Haller of Sherman, TX. Through the courtesy of S. Patti and D. Beimborn I have examined Kodachrome slides of two of the banded birds thought to be hybrids.

THE CHARACTERS

One mensural character and three plumage characters, the presence or absence of an eye-arc (i.e., an incomplete eye-ring), the color of the lores, and the distribution of black on the chest, have been used to distinguish between males in the breeding season. Breeding season females can usually be distinguished by the presence or absence of the eye-arcs but some breeding season females and first-year birds of either sex in the fall can be distinguished only by the mensural character.

The Wing-minus-tail Measurement

It was first pointed out by Phillips (1947) and then reemphasized by Lanyon and Bull (1967) that the most reliable distinction between these two taxa is the difference between wing length and tail length (W−T). The wing measurement is of the flattened wing, and the tail measurement should be made with calipers or dividers. The method often recommended to banders of inserting a (usually thick) ruler between the rectrices will not give an accurate value. According to Lanyon and Bull (loc. cit.) 98% of male *tolmiei* will have W − T = 11 mm or less, whereas 98% of male *philadelphia* will have W − T = 10 mm or more. In female *tolmiei* 98% will have W − T = 10 mm or less, and 98% of female *philadelphia* have W − T = 10 mm or more. This character is thus usually useful in separating the two forms, but will fail in some specimens. Specimens of males whose measurements are in the overlap region and which also show a mixture of the other characters may be considered possible hybrids.

The Eye-arcs

MacGillivray's Warbler has a prominent interrupted white eye-ring or eye-arc and male Mourning Warblers typically lack this character. All of the approximately 300 specimens of male *tolmiei* that I examined showed this character. Hailman (1968) reported that none of 70 male *philadelphia* at USNM that he examined had this character, and W. E. Lanyon (in litt.) reported that no spring males at the American Museum of Natural History show this character. However, I have found four out of approximately 80 specimens of eastern *philadelphia* (three CM and

one MVZ) that have a few feathers of a white eye-arc. These breeding-season specimens came from Quebec, Ontario, and Pennsylvania. In most of these cases the eye-arc was visible only by careful examination with a magnifying glass. Apparently the presence or absence of eye-arcs is only a moderately good field character for separating adult males of the two species, but the presence of a pronounced eye-arc in a bird otherwise characteristic of *philadelphia* may be considered to be one factor indicating possible hybridization. However, a few white feathers around the eyes cannot be used as such evidence.

First-year *philadelphia* of either sex in fall often have eye-arcs and even an occasional spring female will have them. For these birds the presence or absence of eye-arcs is of no use for identification.

The Color of the Lores

The presence of black lores in *tolmiei* and gray or nonblack lores in *philadelphia* has been used to distinguish between the two forms. The presence of black lores in birds otherwise resembling *philadelphia* was used by Cox (1973), by Patti and Myers (1976), and by Beimborn (1977) to indicate possible hybridization. All male *tolmiei* specimens that I have seen show this dark-lore character. However, 40 out of 177 male *philadelphia* also have black lores. The population of *philadelphia* occurring in northern Ontario near James Bay seems to be predominantly black-lored, but black-lored individuals have been taken in all parts of the breeding range of *philadelphia* from Edmonton, Alberta (near the range of *tolmiei*) to eastern Ontario and to West Virginia at the southern extremity of the range. I consider this character to be of no value in distinguishing between the two forms or in judging the existence of hybrids. Chapman (1917) pointed out its unreliability many years ago, but recent workers have overlooked his remarks.

The Black "Apron"

Males of both forms have gray hoods covering the head, throat, and breast in breeding plumage. In both forms a variable amount of black occurs on the throat. Many of these black feathers have gray tips often producing a mottled gray-black appearance. In *philadelphia* the black feathers are usually, but not always, concentrated near the posterior boundary of the hood producing what has been called an "apron." However, the black often extends up to the bill. Typically a rather sharp line of demarcation is found between the apron and the rest of the throat. This is easily observed in living birds, but specimens must occasionally be held at arm's length in order to see this effect. In some individuals the amount of black is limited, producing a small or nearly absent apron. In typical *tolmiei* the black feathers are uniformly distributed between the posterior edge of the hood and the bill, often producing a breast that is nearly solid black, but usually one that is mottled gray-black throughout and lacks the sharp separation that produces the apron. However, a few *tolmiei* specimens (two out of approximately 220 at the

MVZ) do show a fairly sharp separation, and a living bird that I saw at Glacier National Park, Montana and assumed to be *tolmiei* appeared to have an "apron" as distinct as any in *philadelphia.* Many eastern *philadelphia* show a fairly uniform black on the throat and breast and in this character some eastern *philadelphia* can be matched almost exactly with *tolmiei* specimens from the Pacific Coast. On the basis of these data I consider the "apron" or lack of it to be of little value in distinguishing the two forms or in judging an individual to be a hybrid.

Cox's remarks about the absence of a black "apron" in *tolmiei* have been misinterpreted by Patti and Myers (1976) and by Beimborn (1977) to mean that *tolmiei* lacks any black, and these reporters have used the near absence of black, which occasionally occurs in *philadelphia,* as evidence of possible hybridization.

POSSIBLE HYBRID SPECIMENS

Of all the specimens examined that have been thought at some time to be hybrids, I consider only four to have a high probability of being hybrids. These are briefly described below:

UM 12316—Lac Qui Parle County, Minnesota, 5 June 1956. Male. Eye-arcs as pronounced as in most *tolmiei.* Lores dark, but not completely black. Some black on the throat and a very indistinct apron. W − T = 11.5 mm.

SDMNH 39095—17 mi W of Carolina, Alberta, 10 July 1963. Male. Very black lores. Very dark throat with a barely discernible apron. A few white feathers on the eyelids. W − T = 11 mm. This specimen most closely resembles *philadelphia.*

USNM 56704—Lea County, New Mexico, 7 May 1975. Male. Eye-arcs very indistinct. Lores very dark. Throat black with the "apron" region somewhat darker. W − T = 8.3. This specimen most closely resembles *tolmiei.*

MVZ 75871—Edmonton, Alberta, 14 June. Male. A few white feathers around the eyes. Lores light. Suggestion of an "apron." W − T = 10.5. This specimen most closely resembles *tolmiei.*

Several other specimens are less probable hybrids. Two of the other Alberta specimens that have been reported as hybrids (SDMNH 39092 and 39093) do show some intermediacy in characters. No. 39092 matches specimens of undoubted *philadelphia* from Quebec in almost every character but is rather different from *philadelphia* collected in Alberta. An immature winter specimen from El Volcan Chiriqui, Panama (USNM 459147) (W − T = 10.5) is close to *tolmiei* but may actually be a hybrid. Two female migrant specimens taken in Texas in the private collection of K. W. Haller show intermediate W−T measurements (11.5 and 10.5 mm) and may be hybrids. However, female and immature specimens are almost impossible to distinguish and no final decision can be made on these birds.

I have examined colored photographs of the possible hybrids report-

ed by Patti and Myers (1976) from Kansas and by Beimborn (1977) from Minnesota. Both of these are spring birds. The Kansas bird had an intermediate W−T measurement, and except for a suggestion of eye-arcs, it otherwise resembled many *philadelphia.* I consider it to be less probably a hybrid. The Minnesota bird shows no *tolmiei* characters except for the eye-arcs that are fairly well developed. No measurements were made. To my view the eye-arcs more closely resemble the eye-ring of *O. agilis* than that of *tolmiei,* and in the absence of measurements, no definite opinion should be offered on this bird.

DISCUSSION

As has been outlined above, the characters of *O. tolmiei* are fairly consistent throughout the range and very few specimens of undoubted *tolmiei* that were examined show any of the characters usually associated with *O. philadelphia.* On the other hand many specimens of *philadelphia,* taken in all parts of the range, do show some of the characters usually associated with *tolmiei.* This would suggest that *tolmiei* is more like the ancestral form that gave rise to these two forms than is *philadelphia.* Mengel (1964) proposed that *philadelphia* arose from a western ancestor whose easternmost populations were isolated by midcontinent glaciation. If this were so one might expect the present-day western form, *tolmiei,* to be most like the ancestral form, as indicated by its lesser variation in plumage characters.

The very few specimens that have a high probability of being hybrids do not permit any conclusions to be drawn at this time about the possible conspecificity of the two taxa. Only one of the probable hybrids comes from the region of possible overlap in Alberta. The specimen from Edmonton comes from nearby but the population in this area is thought to be pure *philadelphia.* The other two probable hybrid specimens, as well as three of the less probable birds, are obvious migrants. It is apparent from Cox's report (1973) that these two forms do not overlap in a broad sense, but rather meet in a very few places. Cox collected birds that appear to be representatives of the pure parent species in the same general area but at only one place did he find both "parent" species present together. Salt (1973) reported finding a MacGillivray's Warbler territorially established within about 150 yd of a Mourning Warbler near Pigeon Lake, Alberta.

If there is to be a final solution to the problem of relationship between the two taxa, it will have to come from detailed behavioral studies as well as more collecting in the very few areas in which the ranges are contiguous. Both forms are notoriously secretive and observation of possible interactions would be difficult. However, experiments using song-playback might produce results of interest. The neighboring males of the two species reported from Pigeon Lake, Alberta, did not react to the playback of the recorded songs of the other species (Salt, 1973). The songs of the two forms are quite similar but a careful worker can distinguish between them. It would be profitable to investigate the variation

of the song of each form across the respective ranges. P. B. Hofslund (pers. comm.) has told me that to his ear the song of Minnesota *philadelphia* is more like that of *tolmiei* than it is like the song of *philadelphia* from farther east.

It is entirely possible that additional probable hybrid specimens would be found if all collections of the two forms were carefully examined.

SUMMARY

A reexamination of the several plumage characters used in the past to distinguish between MacGillivray's Warbler (*Oporornis tolmiei*) and Mourning Warbler (*O. philadelphia*) in spring male specimens and to indicate possible hybridization between the two taxa indicates that none of these characters are fully reliable. No plumage characters are known that can unequivocally separate females and first-year males in fall. The difference between the wing length and the tail length is apparently the only character that will distinguish most individuals of the two forms, but this character also is not completely satisfactory.

All of the supposed hybrid specimens have been examined and only four of these have a high probability of being hybrids. Several other specimens of some intermediacy have a much lower probability of being hybrids.

Without field studies in the region of overlap, especially song-playback experiments, no conclusions can be drawn about the conspecificity of the two taxa.

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