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Two Species of Marsh Wren (*Cistothorus palustris*) in Nebraska

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TWO SPECIES OF MARSH WREN *(Cistothorus palustris)* IN NEBRASKA?

The consequences of a grand evolutionary experiment are evident throughout Nebraska. During the Pleistocene, many taxa were apparently separated into eastern and western populations. Today many of these eastern and western counterparts meet in the Great Plains, especially in Nebraska. Some pairs now hybridize freely (towhees, orioles, flickers), while others do not (buntings, grosbeaks, meadowlarks) (see Rising 1983).

The Marsh Wren is still another, previously unrecognized, taxon that consists of an eastern and western counterpart. Data from Nebraska and elsewhere in North America suggest that there are two forms of the Marsh Wren, perhaps as vocally different from each other as are the two *Sternella* meadowlarks. These two forms meet in Nebraska, and are perhaps sufficiently different and distinct that they should be called two separate species.

METHODS

During 5 through 13 June 1986 I tape-recorded Marsh Wrens at 11 localities in Nebraska, South Dakota, and Iowa (Fig. 1.). I also had recordings of

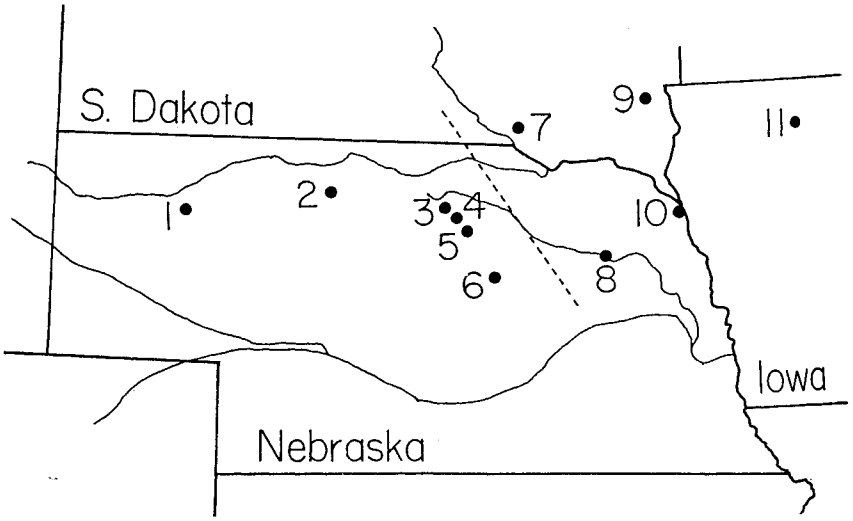

Figure 1. The 11 localities in Nebraska, South Dakota, and Iowa where Marsh Wrens were recorded. (1) Smith Lake, about 36 km south of Rushville; (2) Watts Lake and Hackberry Lake on the Valentine NWR; (3) Pony Lake, 23 km south of Newport; (4) Doolittle Lake, 21.5 mi (on county map) south and 5 mi east of Stuart; (5) Swan Lake, about 43 km south of Atkinson; (6) Ericson Lake, about km. south of Ericson; (7) Owens Bay at Lake Andes NWR; (8) privately-owned marshes on old oxbow of the Elkhorn River, about 7 km west-southwest of Stanton; (9) small marshes near Tea; (10) Crystal Cove State Park at South Sioux City; and (11) Deweys Pasture and Smiths Slough State Game Management Areas. Western Wrens are especially abundant and readily observed at locations 1-4; eastern Wrens tend to occur in smaller numbers within a given marsh, and they can be most readily observed at locations 7 and 9-11. The dashed line through O'Neill, Nebraska, is at the approximate center of a 100-km wide gap between the distributions of the western and eastern song populations of the Marsh Wren.

Marsh Wrens from a number of other locations in western (Colorado, California, Washington) and eastern (Manitoba, Illinois, New York, North Carolina, eastern Texas) North America. In the laboratory I made graphs of the songs on a digital spectrum analyzer. Film clippings of each bird were then measured and sorted as described in Kroodsma and Canady (1985).

RESULTS

I found no Marsh Wrens in a 100-km. wide corridor centered on O'Neill, Nebraska (Fig. 1). To the west of this corridor, all Wrens (except for two individuals) were of one singing style, and to the east all Wrens were of a very different singing style. The two exceptions among western birds were two males singing with pure eastern behaviors, one at Pony Lake and one at Doolittle Lake.

Most eastern birds introduced their songs with a unique nasal note, the same note that a nest-building male often gave repeatedly without the song. The song itself typically consisted of a few brief introductory notes, a "trill" of repeated syllables, and perhaps a brief concluding note. Songs were relatively "musical", and with a slowed-down tape recording could be heard to consist of a series of these very brief tonal (i.e., musical) notes.

Songs of western males, on the other hand, consisted of a much greater variety of sounds. They contained tonal sounds of greater duration and intensity, as well as more harsh, grating, broad-band noise. Western males would often sing these contrasting sounds back to back within the same song, or often string a number of contrasting songs together to produce "multiple songs".

To quantify these behaviors I measured all of the sonagrams (song graphs) of each male. I found that the behavior of males changed abruptly in northeastern Nebraska. The western males, for example, consistently repeated some song syllables within songs at slower rates and some at faster rates than did the more moderately-paced eastern males. The songs of western males thus contained not only a greater variety of sound quality but also a greater variety of temporal patterning. Western males also presented that greater variety of songs in a more invigorating performance. They tended to race through their repertoires without repeating each song type, so that as many as 50 different songs might be presented in a row. Eastern males, on the other hand, tended to savor each song type, and on average sang every other song type one extra time.

My estimates of song repertoire size (the number of different songs that an individual male is capable of singing) also differed markedly for the two styles of songsters. For eight western Marsh Wrens from the western Nebraska locations (1-6) an index of repertoire size ranged from 134 to 919 (median 211 song types). In contrast, for 12 eastern Marsh Wrens (locations 7-11) the index of repertoire size ranged from 30 to 58 (median 48 song types). The one eastern songster at Doolittle Lake and his immediate western-style neighbor revealed this east/west contrast especially well: estimates of repertoire size were 46 and 254, respectively, for those two males. The contrast in data from the eastern male and his immediate western-style neighbors from Pony Lake, Nebraska, was similar. The Doolittle Lake male and the Pony Lake male were pure eastern songsters not only in repertoire size but in all other aspects of their singing behaviors as well.

DISCUSSION

The behavioral differences between these two Marsh Wren song populations are both genetically and culturally based (Kroodsma and Canady, 1985). As determined in a laboratory experiment, eastern males are not capable of developing the large song repertoire of western males (genetic difference), but males can learn the individual songs of the other singing style (cultural difference).

In the central Great Plains of the United States there is minimal contact between these two Marsh Wren song populations. The 100-km Wrenless corridor in northeastern Nebraska contains little suitable habitat, and this lack of suitable habitat may be an effective isolating barrier between the two populations. On the western side of this barrier, among the easternmost populations of western Wrens, I did find two pure eastern songsters among about 80 western songsters at Pony and Doolittle Lakes. The origin of these two males is, of course, unknown, but I believe it is most likely that these two males hatched

and learned their songs among eastern populations and, after migration, they dispersed to the western populations.

The data for the Marsh Wren appear similar to those for the two meadowlark species. Both the Marsh Wrens and the meadowlarks lack striking plumage differences to distinguish them. Like the Marsh Wrens, Eastern and Western Meadowlarks can learn each others' songs in the laboratory (Lanyon 1957), and both tonal quality of songs and repertopire size differ markedly between the two meadowlark species (Falls and d'Agincourt, 1981). Additional surveys of Marsh Wrens will be needed to determine if one can occasionally find, as among meadowlarks (e.g., Rohwer, 1972), mixed pairings, morphologically intermediate individuals, and individuals singing both eastern and western songs. Whether or not these two Marsh Wrens should be classified as two species will depend on these surveys, perhaps in Saskatchewan, where the two songsters may also co-occur.

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