# SHORT COMMUNICATIONS

## INTERSPECIFIC AGGRESSION BETWEEN YELLOW-HEADED BLACKBIRDS AND LONG-BILLED MARSH WRENS

JARED VERNER
Department of Biological Sciences
Illinois State University
Normal, Illinois 61761

Interspecific aggression among birds has been the subject of an increasing number of publications in recent years (see Orians and Willson 1964, Cody 1969, Murray 1971, and Voigts 1973 for summaries of current hypotheses and literature). In all this literature only Fautin (1940) and Orians and Willson (1964) refer to personal observations of Yellow-headed Blackbirds (*Xanthocephalus xanthocephalus*) forcing compression in the size of territories of the Long-billed Marsh Wren (*Telmatodytes palustris*). Since no documenting evidence is presented, it is my purpose here to present evidence I have accumulated on interactions between the two species in Washington State, in the hope that it will stimulate the intense sort of investigation required to confirm or deny aggressive behavior between these species.

### OBSERVATIONS

At Turnbull National Wildlife Refuge, 9.5 km S of Cheney, Spokane County, Washington, the marsh wrens return to the marshes and begin nesting before the blackbirds. Many marsh wrens establish breeding nests in marshes later chosen as nesting sites by blackbirds, so it is not uncommon to find the nests of both species located only a few meters apart. During the spring of 1962, in the course of studies of the population ecology of marsh wrens at Turnbull Refuge, I found nine cases of marsh wren nest failure coincident with the construction of blackbird nests in the vicinity. Three occurred along the north edge of Lower Turnbull Lake, where I only occasionally visited the marsh; consequently, I cannot compare failure rate with success rate where blackbirds just moved into occupied wren territories. The three nests at Lower Turnbull Lake contained full clutches (6, 6, and 7 eggs) in advanced stages of incubation; all clutches were cold but undamaged when I determined they no longer were being tended, hence the females either had died or deserted their nests. Newly constructed blackbird nests were located 3–5 m from the wren nests.

At Blackhorse Lake four marsh wren territories were visited usually on alternate weekends (once on two consecutive weekends). Progress of wren breeding was carefully checked at least once during each weekend visit, and nesting activities of Yellow-headed and Red-winged Blackbirds (*Agelaius phoeniceus*) were noted. During the period when Yellow-headed Blackbirds occupied the marsh for nesting (late April through June), seven marsh wren breeding nests were in progress; six failed, five failures occurring during the period between visits when new Yellow-headed Blackbird nests were constructed nearby (1–12 m away). The sixth failure occurred about 2 weeks following construction of a Yellow-headed Blackbird nest in the vicinity. In two cases young disappeared, and the opening to one of the two nests had been enlarged. In three cases eggs disappeared, and the opening to one of those nests also had been enlarged. Eggs in the sixth nest were left intact in the nest. Yellow-headed Blackbird eggs were punctured in a nest located 5 m from one of the marsh wren nests which failed. The holes suggested marsh wren activity.

The only marsh wren nest in the four territories at Blackhorse Lake which fledged young when Yellow-headed Blackbirds were breeding there was located 12 m from the nearest blackbird nest, and it had young at the time the blackbird nest was built.

Factors other than Yellow-headed Blackbird aggression might account for the wren nest failures cited here; however, I believe it likely that most failures resulted directly from blackbird interference. Yellow-headed Blackbirds did not nest at Beaver Pond (located 0.8 km from Blackhorse Lake) in 1962; 13 marsh wren breeding nests were initiated there between late April and early June of that year and 10 of them produced fledged young. Beaver Pond provided a marsh situation markedly different from that at Blackhorse Lake so it may not be a fair comparison in this case, but the fact remains that wrens there bred successfully in the absence of Yellow-headed Blackbirds while others nearby failed to do so in the presence of blackbirds. Further evidence that blackbird interference was involved came from detailed observation of interspecific interactions associated with one of the abandoned nests at Blackhorse Lake.

Time-budget studies of marsh wren Male 4 were underway when the Yellow-headed Blackbirds returned to the marsh for breeding in 1962. My observation point was in a tree about 6 m up and 8 m from the north shore of Male 4's territory. Observations were conducted from about daylight for varying periods into the morning. All activities of the male were recorded in detail in shorthand notation, on a minute-by-minute basis (see Verner 1965). After the blackbirds returned and began building nests in Male 4's territory, within 9 m of the only active marsh wren breeding nest in the territory, I recorded many instances of direct interference by the blackbirds in routine of both the male and female wrens, although more than 95% of the observations involved the male wren.

Table 1 summarizes observations of the chasing of Male 4 by Song Sparrows (*Melospiza melodia*) and Yellow-headed and Red-winged Blackbirds. While the sparrows and Red-winged Blackbirds typically just chased the male wren, Yellow-headed Blackbirds actively chased or methodically followed the wren and sometimes perched above him, thus preventing his usual routine of active singing from the tops of cat-

TABLE 1. Percentage of time spent by Song Sparrows, Red-winged and Yellow-headed Blackbirds pursuing or otherwise harassing marsh wren Male #4, Blackhorse Lake, 1962.

| Observations | | | Percent time harassed by other species | | | |
|---|---|---|---|---|---|---|
| | | | | Blackbirds | | |
| Date | Time (PST) | Total min. | Song Sparrow | Red-winged | Yellow-headed male | Yellow-headed female |
| 8 Apr | 05:00–12:00 | 420 | * | * | 0 | 0 |
| 22 Apr | 04:30–14:00 | 270 | * | * | 8.8 (6.5) | * |
| 6 May | 04:30–08:00 | 120 | 0 | 0 | 16.9 (5.5) | 4.0 (1.5) |
| 13 May | 04:30–08:00 | 120 | 0 | * | 12.8 (3.0) | 1.3 (0.5) |
| 27 May | 03:30–07:00 | 120 | 0 | 5.7 (2.8) | 3.1 (1.0) | 0 |
| 10 June | 03:15–06:45 | 120 | 0 | * | 0 | * |
| 1 July | 03:25–06:55 | 120 | 0 | 0 | 0 | 0 |

Numbers in parentheses indicate the longest recorded duration, in minutes, of any single harassment period.
* = < 1% of observed time.

tail (*Typha latifolia*) stems. At other times either the male or one of the female Yellow-headed Blackbirds perched on the wrens' breeding nest or sat in front of it, thus preventing the female wren's return to incubate her eggs. Comparison of the percentage of time spent by both sexes of Yellow-headed Blackbirds in chasing Male 4 (table 1) with the phenology of nesting by the blackbirds (fig. 1) shows that peak effort was given to this behavior at a time coincident with nest construction by the blackbirds (6 May). On that date fewer individual instances of harassment were recorded than on 13 May; however, the mean duration of the instances on 6 May was longer than that on 13 May. In any case, it appears that the pattern of the relationship between the two species was established early in the period of mutual occupancy of the marsh, probably being maintained thereafter by subtler, less conspicuous forms of behavior by the Yellow-headed Blackbirds.

Of particular significance are the independent means for assessing the area to which Male 4 confined his activities during the Yellow-headed Blackbird breeding season. The dashed outlines on the various maps in figure 1 depict the observed ranges of the male marsh wren's activity during time-budget observations on each of the reported dates. Marsh wren nest locations show positions of newly constructed nests between each successive visit to the marsh. It can be seen that on all dates except 10 June the observed activity area incorporated the locations of new nests. The smallest observed area to which Male 4 confined his activities was on 27 May, a time when the blackbirds had eggs in their three active nests. It was probably more than coincidence that this was the period when the blackbirds were most vulnerable to marsh wrens, via egg-puncturing.

Not until after the Yellow-headed Blackbirds fledged their young and left the marsh did Male 4 expand his area of activity almost to its former extent, secure a mate (perhaps the one who apparently deserted brood nest #1), and raise young. Wren brood nest #2 contained one egg on 1 July but no further activity was noted there. Wren brood nest #3 contained four eggs on 1 July, five young about 3 days old on 19 July, and definitely had fledged young by 31 July.

In 1969 I had another opportunity to observe the probable results of interaction between marsh wrens and blackbirds, this time at Hilltop Lake, 8 km SW of George, Grant County, Washington. Marsh wrens began nesting at the lake later than usual in 1969; three males established territories and had begun buliding nests there by early April. By 8 May all were paired and had brood nests underway; two were bigamists, one was a monogamist. On 8 May I located a new Yellow-headed Blackbird nest only 6 m from a marsh wren brood nest which had contained five young 2–3 days old on 6 May. The young were missing from the nest on the 8th, and the top of the nest was flattened down so that the opening was squashed shut. Of 11 wren courting nests in the same territory, 6 had been similarly flattened, and all were located from 1 to 6 m from a new blackbird nest; the 5 unflattened courting nests were more than 6 m from any blackbird nest. In the same territory another brood nest located approximately 8 m from a new blackbird nest held six nestlings about 2 days old. That nest had failed by 15 May.

That Yellow-headed Blackbirds were responsible for the flattening of these nests is possible—I believe probable. The fact that the only affected nests were in the immediate vicinity of newly constructed blackbird nests is suggestive. While I have no records of similar flattening of marsh wren nests at Turnbull Refuge, I observed blackbirds perching on wren nests there. One of my research assistants, Stephen B. Layman, once reported to me that he had seen an adult male Yellow-headed Blackbird at Caliche Lake, 1.5 km E of Hilltop Lake, vigorously hopping up and down on a marsh wren nest. This was observed before the Hilltop Lake experience, so Layman did not continue the observations to determine whether or

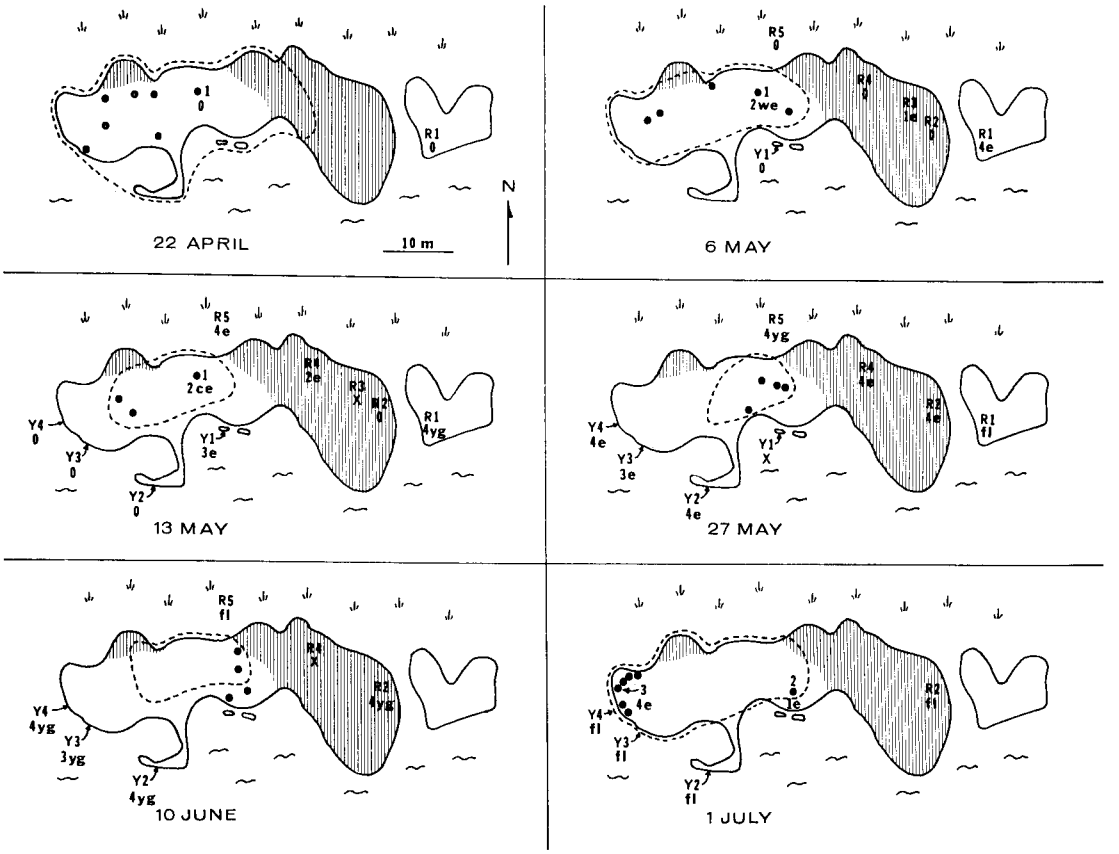


FIGURE 1. Phenology of nesting among marsh wrens, Red-winged, and Yellow-headed Blackbirds in an isolated stand of marsh with one territorial male of each species, Blackhorse Lake, 1962. For each species, only active or recently deserted breeding nests are shown on any map. Locations of marsh wren courting nests show only those new nests added between visits except that brood nest #1 is shown on three successive dates, after which it was clearly a failure. The dashed outlines show observed ranges of male wren activity during time-budget observations on each date indicated. The male marsh wren first occupied his territory on or about 1 April and had completed six courting nests by 22 April. Early on the morning of 22 April, he began what was to be brood nest #1, and by 14:20 the nest was about 70% completed.

Key: ● = wren courting nest; ●1–●3 = wren brood nests; R1–R5 = Red-winged Blackbird nests; Y1–Y4 = Yellow-headed Blackbird nests; 0 = nest empty; 2e = 2 eggs, 2we = 2 warm eggs, 2ce = 2 cold eggs, etc; 3 yg = 3 young; fl = young fledged from nest; X = nest abandoned with eggs punctured, probably by wren. Shaded area denotes bulrush (*Scirpus acutus*); unshaded area denotes cattail (*Typha latifolia*).

not the blackbird actually crushed the dome of the marsh wren nest.

In a second marsh wren territory at Hilltop Lake, a new Yellow-headed Blackbird nest was located on 8 May within 10 m of a wren nest which held four young on 6 May. The opening to the wren nest had been enlarged by 8 May, in a manner similar to that observed in some of the nest failures at Turnbull Refuge, and the young were dead in the water beneath the nest. Three of the young had holes picked into the back of their skulls in a size and shape that a blackbird might make with its beak. The fourth had its head removed. None had been eaten in any way, so that predation is ruled out as an agent in nest failure.

Only two male marsh wrens nested at Caliche Lake in 1969; both were bigamists; both held territories not later occupied by blackbirds; and three of five breeding nests started there eventually fledged young.

Pursuit of marsh wrens by blackbirds of both species apparently has been of sufficient importance in the biology of the wrens that a call note (fig. 2) has evolved to be associated regularly with such pursuits. Only three stimulus situations have been specifically associated with the call: pursuits by Red-winged Blackbirds, pursuits by Yellow-headed Blackbirds, and the occasion of a person walking through a wren's territory. I have heard it under circumstances where the stimulus could not be determined, so possibly the same call is given in the presence of smaller mammalian species in the territory.

## CONCLUSIONS

The data presented here suggest, but do not show conclusively, that Yellow-headed Blackbirds, as a general rule, aggressively exclude Long-billed Marsh Wrens from the immediate vicinity of their nests, particularly during the critical period of incubation. That this was true in the single instance (viz. marsh wren Male 4) reported here is strongly suggested. The evidence that marsh wrens regularly desert breed-

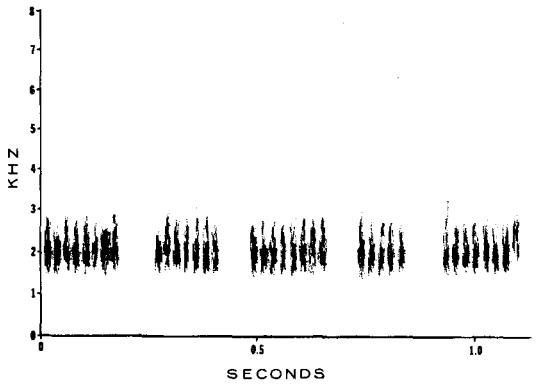


FIGURE 2. Audiospectrogram of marsh wren call associated with their pursuit by blackbirds and humans. The call lasts varying periods, sometimes several seconds, with intermittent short pauses.

ing nests when their territories are occupied by blackbirds is virtually all circumstantial. Even the possibility that blackbirds actively crush wren nests and kill young wrens is only inferred from examination of wren territories after the acts were completed by some agent. Nonetheless, it is my strong contention that the relationships between these two species are as suggested here.

Extensive discussion of the significance of these presumed interactions is inappropriate, given the small sample sizes and/or circumstantial nature of the documentation. Any future effort to investigate interspecific aggression between these species should give special attention to the various proposed models relevant to the topic. For example, Orians and Horn (1969) have built a strong empirical case for overlap in food resources as a major component in interspecific competition among Yellow-headed Blackbirds, Red-winged Blackbirds, and Brewer's Blackbirds (*Euphagus cyanocephalus*). I do not propose here that marsh wrens exhibit extensive overlap in food resources with any of these species; this possibility needs investigation. I do suggest, however, that consumption by marsh wrens of newly emerged Odonata could, particularly in times of food shortage, create a circumstance of hardship for the Yellow-headed Blackbirds, which specialize on Odonata as a food source for their young (Orians and Willson 1964, Willson 1966, Orians and Horn 1969).

Murray's (1971) suggestion that cases of interspecific territoriality represent nonadaptive responses to generalized releasers of territorial behavior between closely related, morphologically and behaviorally similar species does not apply in this case. Indeed, this may be a case satisfying Murray's (1971) criteria for adaptive interspecific territoriality, at least to the extent that blackbirds exclude marsh wrens. Selection for this exclusion might stem (1) from competition for newly emerged Odonata, and/or (2) from the wrens' behavior of puncturing the eggs of other species nesting within their territories. Since it appears that the marsh wrens regularly lose in competition with the blackbirds, if option #2 above explains the evolution of blackbird aggressiveness toward wrens, then the puncturing of blackbird eggs by wrens would be dysgenic (Murray *in litt.*). Its maintenance in the behavioral system of the marsh wrens may depend upon its clearly adaptive value in connection with Red-winged Blackbirds (Orians and Willson 1964, Verner unpubl. data) and perhaps other marsh-nesting passerines.

I am indebted to the U.S. Fish and Wildlife Service and to the management of Turnbull National Wildlife Refuge for their cooperation during my field work on the refuge. B. G. Murray, Jr., made many constructive suggestions on an early draft of this paper. Funds for part of this work were provided by NSF GB-5241 and NSF GB-8122.

## LITERATURE CITED

CODY, M. L. 1969. Convergent characteristics in sympatric species: A possible relation to interspecific competition and aggression. Condor 71: 222–239.

FAUTIN, R. W. 1940. The establishment and maintenance of territories by the Yellow-headed Blackbird in Utah. Great Basin Nat. 1:75–91.

MURRAY, B. G., JR. 1971. The ecological consequences of interspecific territorial behavior in birds. Ecology 52:414–423.

ORIANS, G. H., AND H. S. HORN. 1969. Overlap in foods of four species of blackbirds in the potholes of central Washington. Ecology 50:930–938.

ORIANS, G. H., AND M. F. WILSON. 1964. Interspecific territories of birds. Ecology 45:736–745.

VERNER, J. 1965. Time budget of the male Long-billed Marsh Wren during the breeding season. Condor 67:125–139.

VOIGTS, D. K. 1973. Food niche overlap of two Iowa marsh Icterids. Condor 75:392–399.

WILLSON, M. F. 1966. The breeding ecology of the Yellow-headed Blackbird. Ecol. Monogr. 36:51–77.

Accepted for publication 3 April 1974.