SEX DIFFERENCES IN THE TENDENCY FOR BROWN-HEADED COWBIRDS AND RED-WINGED BLACKBIRDS TO RE-ENTER A DECOY TRAP[1]

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Abstract. Female Red-winged Blackbirds and Brown-headed Cowbirds re-entered a decoy trap with greater frequency than did the males. It appeared that this difference in behavior was due to the location of the trap in the breeding territories of these two species. Although the Brown-headed Cowbird is a nest parasite, it does exhibit many of the same breeding territorial relationships between the sexes as the Red-winged Blackbird, which is polygynous. The female Red-winged Blackbird does all of the nest building, incubation of the young, care of the nestlings, and most of the fledging of the immatures while the males desert their breeding territories for a time each day. This behavior alone would explain females' greater re-entry in the trap. The trap, with its decoys, is a social stimulant and the female may be more susceptible to such a stimulus.

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The advent of the decoy trap, which operates by captive birds calling in birds that are flying over the trap [Burtt and Giltz, 1971], provided us with literally thousands of Common Grackles [*Quiscalus quiscula*], Red-winged Blackbirds or Red-Wings [*Agelaius phoeniceus*], Brown-headed Cowbirds or Cowbirds [*Molothrus ater*], and Starlings [*Sturnus vulgaris*]. We initiated an extensive banding program in 1963 and concurrently studied the directional trends, stability, and migrations of the birds following banding [Giltz and Burtt, 1970]. The practice of these same species to gather in conspecific and mixed flocks, where they sometimes destroy crops [Giltz, 1960; 1967b], desecrate residential areas with their droppings and endanger aircraft [Gauthreaux, 1974], suggests a need for an understanding of the social relationships which bring them together.

In order to determine some of these social relationships, we analyzed the species differences in the tendency of some of the banded birds to re-enter the decoy trap one or more times [Burtt and Giltz, 1970a]. The present paper deals with sex differences in the tendency to re-enter the trap on the part of the Red-winged Blackbird and the Brown-headed Cowbird. We are concerned here with the fact that, with equal ability to re-enter the trap, one sex re-entered more than the other, and the implications of this behavior variable.

METHODS

In this study the term *repeater* refers to an individual bird that re-enters the trap any number of times. The term *repeat* means any re-entry. Thus if a banded bird re-enters the trap five times it is recorded as one *repeater* and five *repeats*. The birds were sexed by plumage according to Wood [1969] and/or Hill [1967]. The trap was operated daily at approximately 1:30 P.M. EST throughout the year. The trap was located on the Ohio State University Farms 0.5 mile east of 2163 North Star Road. Data were available for 8 years between 1965 and 1974 [except 1966 and 1967], and included the number of birds of each sex banded in the given year [table 1]. Inasmuch as the banded samples are of different sizes, we considered *repeaters* or *repeats* relative to the sample size. Accordingly, the number of *repeaters* or *repeats* was divided by the number banded.

The methods used to determine the statistical significance of the differences between male and female are the critical ratio [Zar, 1974] and the Chi-square test of the number of *repeaters* and *non-repeaters* of each sex.

RESULTS AND DISCUSSION

COWBIRDS. A sample of 28,726 banded Cowbirds indicated a greater tendency to re-enter on the part of the females [table

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1]. Both the sex difference in the proportion of *repeaters* relative to the number banded and the sex difference in the proportion of *repeats* relative to the number banded were significant at the 1% level in every year from the standpoint of both critical ratio and Chi-square [table 1]. The difference between the sexes in re-entering the decoy trap was more pronounced with *repeats* than with *repeaters*. This same thing was found by us in a study of species differences [Burtt and Giltz, 1970a]. It is probable that *repeats* constitute a more sensitive indicator of the tendency to re-enter. While every *repeater* does manifest this tendency, the multiple *repeater* does so to a greater degree. It is understandable that the record of *repeats*, being a more complete indicator of the tendency in question, would reveal the sex differences more clearly.

TABLE 1
Sex Differences in Tendency to Re-enter Decoy Trap.

Year	No. Banded		No. Repeaters		No. Repeats		Repeaters/No.		Repeats/No.	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
					BROWN-HEADED COWBIRDS					
1965	2898	716	329	136	621	351	.114	.190*	.214	.490*
1968	1425	559	136	103	321	283	.095	.184*	.225	.506*
1969	3926	1011	472	223	1133	835	.120	.221*	.289	.826*
1970	4280	1407	624	334	1223	742	.146	.237*	.286	.527*
1971	2155	741	398	186	1142	590	.185	.251*	.530	.796*
1972	3568	898	573	233	1368	633	.161	.259*	.383	.705*
1973	1789	556	300	133	577	351	.168	.239*	.323	.631*
1974	2150	647	292	148	562	306	.136	.229*	.261	.473*
					RED-WINGED BLACKBIRDS					
1965	5886	720	394	61	590	160	.067	.085	.100	.222**
1968	3784	2571	176	144	423	635	.047	.056	.112	.247*
1969	4146	1211	202	78	609	331	.049	.064**	.147	.273*
1970	3979	1521	213	128	584	477	.053	.084*	.147	.314*
1971	567	769	49	95	158	348	.086	.124**	.279	.453*
1972	773	355	43	14	79	29	.056	.039	.102	.082
1973	268	90	15	5	49	32	.056	.056	.183	.356*
1974	256	107	23	16	44	18	.090	.150	.172	.168

*$P<0.01$ as tested by critical ratio or Chi square test.
**$0.05>P>0.01$.

RED-WINGED BLACKBIRDS. The results for 27,003 banded Red-winged Blackbirds showed the same sex difference in the tendency to re-enter the decoy trap that was found with the Cowbirds, but it was not as consistent. While the Cowbirds indicated significance at the 1% level in all tests, there was only one year [1970] where this was true of Red-wings [table 1]. However, the differences in the sexes of the *repeats* were at the 1% level by Chi-square in all years except 1972 and 1974. The difference in the *repeaters* was significant at the 5% level by both tests in 1969 and 1971.

POOLED SAMPLE. When the difference in the tendency of the sexes of all Red-winged Blackbirds and all Brown-headed Cowbirds, regardless of year, to re-enter the decoy trap was analyzed by both Chi-square and critical ratio tests, the females of both species showed the greater tendency and the differences were all significant at the 1% level. The sex difference is still more pronounced for Cowbirds than for the Red-wings [table 2]. We believe that this difference between the females of these two species was associated with the destruction of proximal nesting habitat of the Red-

TABLE 2
Pooled Sample Sex Differences in Tendency to Re-enter Decoy Trap.

	Cowbirds		Red-wings	
	♂	♀	♂	♀
Repeat/No.	.141	.229*	.057	.074*
Repeats/No.	.313	.626*	.129	.276*

*Significantly different ($P<0.01$).

winged Blackbird with little or no change in the nesting habitat of the Cowbird's host species.

In the early years of this study [before 1970] many Red-wings nested in alfalfa fields near the trap. More recently the alfalfa fields have been abandoned in favor of other crops and several college buildings and parking lots have been built nearby. In the years since these changes, our tests showed lower significance, especially with *repeaters* [table 1], for the Red-wings as well as between the two species. In other words, the significance was lower because there were not as many Red-wings in the vicinity of the trap after 1970.

Another explanation for more female Red-winged Blackbirds repeating at the traps was associated with differences in the social behavior of the sexes in their breeding territory. One such difference, which existed before and after nesting, has been described by Goldman [1969]. He found that the males abandoned their breeding territories during part of each day and formed sizeable feeding flocks in neutral territory. Furthermore, he found that the males never left their breeding territories in groups and formed groups only when they were away from their breeding areas. This behavior would isolate males for a portion of each day, making them unlikely subjects for a decoy trap in their breeding territory. The females, then, were the more likely subjects to decoy trapping in the vicinity of their breeding territory because their activities kept them nearby. It is well-known that the female does all of the nest building, incubation of the eggs, feeding of the young in the nest, and most of the fledging and feeding of the immatures after they leave the nest [Allen, 1914; Nero, 1956a; Orians and Christman, 1968].

In contrast to the previous explanation of some variable which kept females near the trap is the hypothesis that there is some variable that made the trap more appealing to the females. The birds in the decoy trap may serve as a social stimulus and the birds outside the trap may vary in their susceptibility to such a stimulus. A socially-inclined bird may be more apt to enter the trap to join the decoys, then, if it does so, the social experience immediately after entering may serve as a positive reinforcement and facilitate learning to re-enter the trap. It is possible that the females of these two species have more of this social inclination than do the males.

Some other observations of the behavior of Red-winged Blackbirds and Cowbirds around their breeding territory indicated that the female was more socially-inclined than the male and would be likely to re-enter the trap more than the male. It has been shown by Holm [1974] that it is the female who chooses the male on the basis of the quality of his territory in comparison with, rather than on, other attributes, and Nero [1964] has found that the actual pairing takes place when the female enters the male's territory. Although we have evidence that all females in a male's territory do not exhibit territoriality when disturbed by the broadcast of an alarm cry [Giltz, 1967a], Nero [1956b] has evidence that the females are highly territorial and will defend their territory against all other females.

It has been noted by Burtt and Giltz [1970b] that birds differ in their attachment to or orientation toward a given place [topophilia]. Species differences in topophilia were found in reference to the vicinity of the trap for Blackbirds and Starlings. It is possible that the female Cowbirds and Red-winged Blackbirds have more of this topophilia than do the males, resulting in proportionally more females in the vicinity of the trap.

There are, of course, more specific social behaviors, such as elevating and bowing that were described by Nero

[1964] and which we interpreted as female solicitation of the attention of foraging males, or the well-known sexual chasing of both male and female Redwings [Allen, 1914; Beer and Tibbitts, 1950; Orians and Christman, 1968]. The female Cowbird also solicits the attention of male Cowbirds by strutting, elevating, and bowing occasionally while searching for host's nests [Friedmann, 1929]. It seems possible that the social factors in the present context are more general and are functional throughout the year.

Although the stimuli noted above are primarily visual, vocalizing plays a part in attracting females of both species.

We have repeatedly observed trapped birds "calling down" birds flying over just as we have observed large feeding flocks decoy flocks flying over cornfields or cattail marshes [Giltz, 1967a], and the descent is always accompanied by a rapid series of vocal "cheks" by the stationary flock and slower "cheks" from those flying over. Although we have not considered the sexes of the decoys or the decoyed, it is possible that the females drop out of the flock in response to vocal stimuli more than the males.

We considered the possibility that the season of banding or re-entry might influence the results. In a previous study, the species differences in repeating at the trap were analyzed for repeats throughout the year and indicated no seasonal bias [Burtt and Giltz, 1970a]. More specific analysis of the data for the breeding season or the migration season yielded equivocal results. It is apparent from these findings that crops, which are used for food by these species, like decoy traps, will be re-visited more often by the females than by the males. Crops susceptible to destruction near breeding territories will be re-visited, during and just after breeding, when these populations are at maximum numbers.

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