

INTERSPECIFIC AGGRESSION IN WESTERN MEADOWLARKS (*STURNELLA NEGLECTA*): RE-DIRECTED AGGRESSION?

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Abstract.—During 180 h of observation on 22 territorial male Western Meadowlarks (*Sturnella neglecta*), I saw males attack four other grassland species. In 31 of 32 instances, the attacks were preceded or followed by aggressive or sexual interactions with conspecifics. Such temporal association suggests that the attacks were cases of re-directed aggression, and may have had an ecological or signal function.

AGRESIÓN INTERESPECÍFICA EN *STURNELLA NEGLECTA*: AGRESIÓN REDIRIGIDA?

Resumen.—Durante 180 h de observación de 22 especímenes machos de *Sturnella neglecta* que defendían sus territorios, observé atacar otras especies de aves. En 31 de las 32 ocasiones, el ataque interespecífico fue antecedido por interacciones agresivas o sexuales con otros miembros de su especie. Esto sugiere que los ataques pueden ser casos de agresión redirigida, y que podrían o no tener una función ecológica.

Interspecific aggression often results from competition for limited resources (Cody 1974). However, some workers report cases of interspecific aggression that seem to have no direct ecological function. For example, Moynihan (1955) reported that Black-headed Gulls (*Larus ridibundus*) attack other species as part of a display toward conspecifics (the “Pursuit Flight Performance”). These attacks are especially frequent during early pair formation. Because aggressive and sexual drives are presumably conflicting during this stage, Moynihan suggested that the attacks occurred because thwarted aggression was re-directed toward heterospecifics. Here I report interspecific aggression in Western Meadowlarks (*Sturnella neglecta*) that may have a similar cause.

METHODS

The subjects held territories along the Assiniboine River Diversion near Oakland, Manitoba. I observed activities in 22 territories over three field seasons, for a total of over 180 h observation. Observations all occurred between sunrise and 1000 CST. They started in mid-April and ended during the first week of June, with sporadic observations continuing to mid-July in 1983 and 1984. Territories were established in mid-April and young of most broods hatched by the first week in June. I identified males by their distinctive song repertoires and their relatively constant territory boundaries.

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RESULTS

Male meadowlarks chased Savannah Sparrows (*Passerculus sandwichensis*, $n = 19$), Bobolinks (*Dolichonyx oryzivorus*, $n = 5$), Horned Larks (*Eremophila alpestris*, $n = 3$), and Killdeers (*Charadrius vociferus*, $n = 5$). I never saw females chase these species. Incidents ranged in severity from sudden swoops toward a bird ($n = 5$), to supplantings ($n = 13$), to more prolonged (1 to 5 s) chases ($n = 14$).

All but one of the 32 incidents were preceded or followed within 5 min by aggressive or sexual interactions with other meadowlarks. Aggressive interactions included visual displays at a boundary ($n = 10$), an intrusion by the male into his neighbor's territory ($n = 1$) and sexual chases ($n = 3$), an aggressive component of courtship. A special class of aggressive situation occurred when the male was displaying aggressively by sham foraging ($n = 2$), or when a boundary interaction or chase was occurring in a neighboring territory ($n = 6$). Sham foraging often occurs long after boundary disputes or while an interaction is occurring in a neighboring territory. In the latter situation, males also change perches and song types frequently near the shared boundary. Thus in both these situations, males appear to behave aggressively even though no other males are nearby. Sexual interactions included solicitation notes by the female ($n = 3$), precopulatory display by the male ($n = 5$), or actual copulation ($n = 1$).

I saw 179 intraspecific aggressive or sexual interactions. Each interaction lasted less than ten minutes, so a liberal estimate of the rate of intraspecific interactions is 179/180 h, or 0.17 interactions per 10-min period. The expected frequency of association between these interactions and interspecific attacks is therefore 32×0.17 , or 5.44, which is significantly less than the observed frequency of 24 ($\chi^2 = 63.3$, $df = 1$, $P \ll 0.001$).

Although sample sizes were too small to test statistically, some trends are apparent in the temporal relationship between intra- and interspecific interactions (Table 1). Relative to other types of interaction, aggressive interactions that included the focal male tended to precede interspecific attacks. Intrasexual displays in which the male was not involved or had no conspecific nearby tended to occur during attacks, and precopulatory displays and copulation usually followed attacks.

DISCUSSION

The species that were attacked do not resemble meadowlarks, so the attacks could not have happened simply because heterospecifics were misidentified as conspecifics (Murray 1971). Attacks seemed too infrequent to serve any ecological function, although I cannot exclude this possibility. However, this would still not explain the temporal associations between inter- and intraspecific interactions.

The associations are those one would expect if interspecific aggression were caused by re-directed aggression, as in Moynihan's study. Most attacks occurred when aggression was high but thwarted, either because

TABLE 1. Occurrence of interspecific attacks relative to interactions with conspecifics.

Conspecific interaction	Timing relative to attack		
	Within 5 min before	During	Within 5 min after
Aggressive	7	5	3
Aggressive, male alone	1	7	0
Copulatory	1	0	8

an interaction was over, because it was happening in the next territory, or because the male was about to interact sexually.

Unlike the attacks seen in Moynihan's study, the ones I observed do not conform to the usual concept of a display. For example, they did not appear to be part of a stereotyped sequence of behaviors. However, some of the attacks were followed by sexual interactions, suggesting that they may have served to stimulate sexual behavior in females. Thus, a signalling function cannot be ruled out.

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