probability of obtaining one value more extreme than the 13 others if they all come from the same population is $1/2^{12}$ or 0.00025. Thus, it is highly unlikely that the decrease in harem size in Redwing Slough is due to nothing more than normal between-year variation.

In a study of interactions between red-wings and grackles nesting on a cattail marsh Wiens (1965) concluded that red-wing female reproductive success was not adversely affected by the presence of grackles on the marsh. This conclusion was supported by Snelling (Auk 85:560–585, 1968), whose data suggested that red-wings and grackles do not compete for food. Although Wiens did not have data on harem size before and after the arrival of grackles on the marsh, far fewer nests were found on his marsh during the years of his study than had been found 15 years earlier when no grackles nested on the marsh (Beer and Tibbits, Flicker 22:61–77, 1950). Data from this study support the contention of the above two studies that female reproductive success may not be decreased by the presence of grackles. If, however, female red-wings consider marshes containing grackles undesirable places to nest, reproductive success of male red-wings would be considerably reduced due to the decrease in harem size. On Redwing Slough the mean number of young fledged per male was 9.8 in 1974 and 5.1 in 1978. As one might expect, male red-wings in this study, as well as on the marsh studied by Wiens (1965), were aggressive toward grackles.

It is not, however, evident why female red-wings should avoid nesting on marshes containing grackles. One possible reason for this avoidance may be the predatory behavior of grackles noted by several authors (Davis, Auk 61:139–140, 1944; Poor, Proc. Linn. Soc. N.Y. 54-57:54–55, 1946; Bent, U.S. Natl. Mus. Bull. 211:1–549, 1958; Meanley and Webb, Chesapeake Sci. 4:90–100, 1963). Although there was no evidence in either this study or that by Wiens (1965) that grackles preyed on red-wing nests, Meanley and Webb (1963) considered grackles to be the principal predators on red-wing nests in the Chesapeake Bay region. This behavior on the part of grackles may result in aggression on the part of red-wing males toward grackles attempting to nest on a marsh and female avoidance of nesting in marshes containing grackles. Because it would probably be impossible for red-wings to know in advance whether or not in any given instance grackles would or would not prey on nests, the agonistic behavior of red-wings toward grackles may be manifested even in situations in which grackles represented little or no threat to red-wing nesting success. The aggressive behavior of the male might further contribute to the decrease in harem size since males would have less time to court females.

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Incidence of Brown-headed Cowbird parasitism on Red-winged Blackbirds.—A high incidence of Brown-headed Cowbird (*Molothrus ater*) parasitism on the Red-winged Blackbird (*Agelaius phoeniceus*) appears to be a localized phenomenon (Friedmann, The Cowbirds, Charles C. Thomas Co., Springfield, Illinois, 1929). Friedmann et al. (Smithson. Contrib. Zool. 235, 1977) report that the incidence of parasitism on red-wings is greatest in the central United States and Canada. Within this geographic region the literature shows a wide range in rates of parasitism. Berger (Wilson Bull. 63:26–35, 1951) reported that only 5% (N = 99) of the red-wing nests he examined in Michigan contained cowbird eggs, and Wiens (Wilson Bull. 75:130–138, 1963) observed no parasitism in 33 nests in southern Okla-

TABLE 1
NUMBER OF RED-WING AND COWBIRD EGGS

	Total nests	Red-wing eggs/nest	Nests with cowbird eggs (no. of eggs)				
			0	1	2	3	>3
	26	0	0	17	5	2	2 (4, 4)
	34	1	23	2	7	1	1 (6)
	34	2	22	6	5	1	
	64	3	32	22	4	5	1 (9)
	92	4	65	18	7	1	1 (7)
	8	5	7	1	0	0	
Totals	258		149	66	28	10	5

homa. In Nebraska, however, Hergenrader (Auk 79:85–88, 1962) found that 54% (N = 59) of the Red-winged Blackbird nests were parasitized and had 1–3 cowbird eggs per nest.

While banding red-wings in conjunction with a blackbird-sunflower project, we found 258 red-wing nests during May and June 1979. All nests were in cattails (*Typha* spp.) in roadside ditches in Cass County, North Dakota. Of the 258 nests, 109 (42%) contained at least one cowbird egg. Of the parasitized nests, 61% had one cowbird egg; 26% had two; 9% harbored three cowbird eggs (Table 1). Two of the parasitized nests had no red-wing and four cowbird eggs. Three other nests had red-wing to cowbird egg ratios of 1:6, 4:7 and 3:9. We flushed the female red-wing off the 3:9 nest. The eggs were warm, indicating that incubation was in progress. Friedmann (U.S. Natl. Mus. Bull. 233, 1963) reports that using all available data, 60% of all parasitized nests contain one cowbird egg.

Using calculations given by Mayfield (Condor 67:257–263, 1965), our sample does not show a random distribution of cowbird eggs. Looking at all nests and combining nests with more than four cowbird eggs in order to maintain adequate cell size, $\chi^2 = 50.8$ and randomness is rejected at the $P < 0.0001$ level (df = 5). Using just the subsample of parasitized nests and combining all nests with more than five cowbird eggs, $\chi^2 = 42.7$ and randomness is rejected at the $P < 0.001$ level (df = 5). Mayfield used figures adjusted for desertion to show that some rejected groups actually fit a random distribution. For these calculations, however, he excludes data from species with other mechanisms of defense besides desertion, which includes Red-winged Blackbirds.

One curious aspect about cowbird parasitism on red-wings is the variability in the percentage of affected nests. Red-wings are accepter species (Friedmann et al., 1977) but also are markedly aggressive towards cowbirds, often mobbing in groups (Robertson and Norman, Can. J. Zool. 55:508–518, 1977). Robertson and Norman (1977) found significantly higher rates of parasitism in low density populations in which the aggressive behavior towards cowbirds may only serve to notify cowbirds of the location of red-wing nests. Friedmann (1963) reports that red-wings are less parasitized in cattail marshes than in upland bushes and that most parasitism in marshes occurs on the perimeter of the marsh.

Like Hergenrader (1962), we found a high incidence of parasitism in roadside ditches. The ratio of perimeter area to the total area of nest habitat in roadside ditches is large. This factor, combined with low red-wing densities, may have contributed to the high incidence of parasitism and the non-random distribution of cowbird eggs in our sample. Information comparing parasitism in large continuous marshes and roadside strips of marsh would be of value in further clarifying red-wing/cowbird relationships.

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Western Kingbird nests in abandoned woodpecker cavity.—Most nests of the Western Kingbird (*Tyrannus verticalis*) are in trees against the trunk, in a crotch, or on a horizontal branch (Harrison, A Field Guide to Western Birds' Nests, Houghton Mifflin Co., Boston, Massachusetts, 1979). Some Western Kingbird nests are placed on towers, buildings, or utility poles (Bent, U.S. Natl. Mus. Bull. 179, 1942). Eastern Kingbirds (*T. tyrannus*) occasionally nest on hollowed tops of fence posts or dead stubs (Pettingill, Jack-pine Warbler

FIG. 1. Adult Western Kingbird at its nest in an abandoned woodpecker cavity, Dunn County, North Dakota.