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Effects of Redhead nest parasitism on Mallards.—Female Redheads (*Aythya americana*) are known to deposit eggs in nests of Mallards (*Anas platyrhynchos*). Joyner (J. Wildl. Manage. 40:33–38, 1976) attributed a high rate of Redhead parasitism on Mallard nests at Farmington Bay, Davis Co., Utah, to crowding of host and parasite into the same habitat. Weller (Ecol. Monogr. 29:333–365, 1959) stated that at Knudson Marsh, Utah, only a few deep channels and patches of water were suitable for feeding and courtship by Redheads, and nests of other ducks located near those areas were heavily parasitized; nests farther from the shore were parasitized less often. Redhead nest parasitism resulted in reduced host clutch-size (Weller 1959), displaced and broken host eggs (Joyner 1976) and increased nest abandonment (Ryder, Trans. N. Am. Wildl. Nat. Resour. Conf. 26:134–146, 1961).

Although the Prairie Pothole Region of North America is the principal breeding ground of both species, little is known concerning the extent and effects of Redhead parasitism on Mallards. Because the Mallard commonly nests in marshes in the Prairie Pothole Region (Krapu et al., Wildl. Soc. Bull. 7:104–110, 1979), potential exists for high levels of nest parasitism. This paper describes the effects of nest parasitism by Redheads on Mallards that nested in marshes in south-central North Dakota.

Data were collected on the Medina Study Area (93.2 km^2) in western Stutsman County, North Dakota. The study area, located within the Missouri Coteau, is moderately rolling glacial moraine containing 2–14 wetlands per km^2. A detailed description of the study area was presented by Krapu et al. (1979). In 1976 and 1977, wetlands were searched for Mallard nests by systematically wading through emergent vegetation. A colored flag was placed 6 m from each nest; nests were periodically revisited until the eggs hatched or until the nests were abandoned or destroyed.

Of 24 active Mallard nests located in emergent vegetation of semipermanent marshes during 1976, 10 were parasitized by Redheads and two by Ruddy Ducks (*Oxyura jamaicensis*); one nest was parasitized by both species. In 1977, when water levels in semipermanent marshes were low because of a drought, only three nests were located, and we observed no interspecific nest parasitism. Therefore, all calculations were based on our 1976 data. Because nest parasitism by Ruddy Ducks was infrequent, we ignored the nest parasitized solely by a Ruddy Duck and based our calculations on the remaining 23 Mallard nests.

Success rates of parasitized and unparasitized nests (4 of 10 [40%] and 3 of 13 [23%], respectively) were not significantly different ($\chi^2 = 0.77$, df = 1, NS). Unparasitized nests and those parasitized by Redheads were abandoned at similar rates (4 of 13 [30.8%] and 3 of 10 [30%], respectively). Additionally, the percentages of parasitized and unparasitized Mallard nests destroyed (3 of 10 [30%] and 6 of 13 [46.2%], respectively) by predators were not significantly different ($\chi^2 = 0.62$, df = 1, NS).

Redhead nest parasitism resulted in significantly fewer Mallard eggs per nest ($t = 9.71$, df = 21, $P < 0.05$). The mean number of Mallard eggs in nests parasitized by Redheads was 5.6 ± 2.2 compared to 7.2 ± 3.1 eggs in unparasitized marsh nests. Also, in nests that hatched at least one egg, Mallard egg success in parasitized nests was significantly lower than success of eggs in either unparasitized marsh nests ($\chi^2 = 6.83$, df = 1, $P < 0.05$) or unparasitized upland nests ($\chi^2 = 6.40$, df = 1, $P < 0.05$) monitored on the study area (Table 1). Mallard egg success in parasitized marsh nests was only 43%, whereas success in unparasitized marsh nests was 80%. Thus, the primary effects of parasitism were a reduced number of Mallard eggs in nests and lowered egg success.

Egg success at parasitized nests was decreased by a combination of factors; egg displacement was the most important. Thirty-five percent of the Mallard eggs in parasitized successful nests were displaced from nests. Most displaced eggs were under water near the

TABLE 1
COMPARATIVE EGG SUCCESS IN PARASITIZED AND UNPARASITIZED SUCCESSFUL MALLARD NESTS ON THE MEDINA STUDY AREA IN 1976

Habitat	Total eggs		Eggs hatched	
	Host	Parasite	Host	Parasite
Unparasitized				
Upland	50	—	37	—
Marsh	25	—	20	—
Parasitized				
Marsh	23	20	10	8

nests. Infertility and death of embryos, primarily because of cracked eggs, caused most other egg losses.

Egg deposition by Redheads often preceded incubation by Mallards and may have suppressed ovulation in Mallard hens. The comparable hatching success of host and parasite eggs (Table 1) indicated that many parasitic eggs were deposited in Mallard nests before incubation began. On average, 3.8 Redhead eggs were deposited in each parasitized Mallard nest, and 1.5 Redhead ducklings hatched from each successful parasitized nest. This occurred when densities on the study area were about four pairs of Redheads per km^2 and three pairs of Mallards per km^2 (A. D. Kruse, unpubl.).

Our data suggest that Redhead nest parasitism reduces the number of Mallard ducklings hatched at marsh sites in the Prairie Pothole Region. Presumably, the extent of Redhead nest parasitism varies with water conditions, densities of parasite and host, and the relative number of Mallards nesting in marsh habitat. Because Mallards commonly nest in marshes, potential exists for substantial Redhead nest parasitism and attendant reduction in number of Mallard eggs per nest and egg success. However, additional research is needed to evaluate this potential.

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Survival of a demaxillate Red-winged Blackbird.—The literature contains numerous reports of birds with abnormal bills. Surprisingly, in view of the supposed adaptiveness of