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PARASITISM OF CANVASBACK NESTS BY REDHEADS

By Lawson G. Sugden

Redheads (*Aythya americana*) lay eggs parasitically in the nests of several other duck species (Weller 1959, Joyner 1973, 1976). Where Canvasbacks (*A. valisineria*) are sympatric with Redheads, they are the primary host for Redhead nest parasitism because the two species have similar habitat requirements and breeding seasons (Weller 1959). Although several studies (Hochbaum 1944, Weller 1959, Olson 1964) have considered various aspects of Redhead parasitism of Canvasback nests, our understanding of the interspecific relationship is incomplete, particularly for pothole habitat. A study of Canvasbacks in the Saskatchewan parklands from 1971 through 1975 afforded an opportunity to record some host-parasite relationships between the two species.

STUDY AREA AND METHODS

The study area and methods have been described previously (Sugden 1977, 1978). The area (52°N, 106°W), 48 km east of Saskatoon, Saskatchewan, was a 15.5 km² block of farmland in 1971 and 1972 and 31.1 km² in 1973, 1974, and 1975. Pond densities averaged about 18 to 26 per km². Size of ponds ranged from less than 0.04 ha to 8.1 ha.

Breeding pair counts were made in May. Two counts were made in 1971, 10 in 1972 and 1973, and nine in 1974 and 1975. Pairs and lone drakes were used to indicate breeding pairs of Canvasbacks, and total females indicated pairs of Redheads. Two nest searches were made between late May and late July.

RESULTS AND DISCUSSION

Factors Affecting Rate of Parasitism

Weller (1959: 352) concluded that the incidence of Redhead parasitism was "influenced by habitat preferences of the parasite, chronology of laying by host and parasite, and especially by the number of host nests per parasite." My data support the first two conclusions. Using a subjective scale for rating nesting pond quality (Sugden 1978), I concluded that Canvasback nests in preferred Redhead habitat had higher rates of parasitism than those on ponds considered to be inferior ($\chi^2 = 8.08$, df = 2, $P < .02$). Similarly, Canvasback nests initiated in June had a higher rate of parasitism (80%) than those started before June (58%) ($\chi^2 = 6.25$, df = 1, $P < .02$). Because Redheads tended to nest later than Canvasbacks, it is reasonable to expect late nests to receive more parasitic intrusions.

My data on Canvasback nest densities and numbers of female Redheads (Table 1) indicate that the relationship between the two in pothole habitat is complex. Data for 1973 are of particular interest because, despite the lowest host-nest/parasite ratio, the rate of parasitism was also lowest. This, of course, is contrary to the expected relationship (see

TABLE 1.

Breeding pairs, nests, and egg data for Redheads and Canvasbacks.

	Year				
	1971	1972	1973	1974	1975
Size of area (km²)	15.5	15.5	31.1	31.1	31.1
Redhead indicated pairs	14	16	49	26	43
Canvasback indicated pairs	18	27	74	40	54
Redhead nests	2	8	28	9	35
Canvasback nests	17	21	45	51	66
Canvasback nests per ♀ Redhead	1.21	1.31	0.92	1.96	1.53
Percent Canvasback nests[1] parasitized	63	86	54	62	68
Eggs/♀ Redhead in Redhead nests[2]	0.64	3.37	3.65	2.35	5.44
Eggs/♀ Redhead in Canvasback nests[2]	1.07	3.37	1.73	2.85	5.05

[1] Completed nests.
[2] Includes eggs outside nests.

Weller [1959: 351] for discussion). Egg data (Table 1) also indicate that parasitism was comparatively depressed in 1973. The ratio of eggs laid parasitically to those laid in Redhead nests was relatively constant for other years, agreeing with Olson's (1964) report. However, in 1973, the ratio was lower. I suggest that the unexpected low rate of parasitism in 1973 was related to the large number of non-nesting Canvasback pairs that year (Sugden 1978), which gave false information to female Redheads searching for host nests.

On large marshes Redheads locate nests by observing the activities of the host, by searching the cover for host nests, and probably by combinations of the two (Weller 1959). Canvasback nests in the pothole habitat were so widely distributed that cover searching alone would be unproductive. Canvasbacks tended to nest on ponds solitarily (Sugden 1978); during the five years, 200 nests were found on 177 different ponds. On the average, only about 8% of the ponds had one or more Canvasback nests. These included terminated nests, so at any given time the percentage of ponds occupied by active host nests would have been lower. With this kind of nest distribution, the presence of the host (female Canvasback) on a nest pond must have been a major factor in determining the success of a female Redhead in locating a host nest. Seeing a female Canvasback on a pond likely stimulates nest searching on the pond by a Redhead. Thus, in 1973, the presence of non-nesting Canvasback pairs would have thwarted would-be parasitic Redheads.

Effect on Canvasback Clutches

The mean number of Canvasback eggs in 74 completed nests that were not parasitized by Redheads was 8.1 compared with 5.4 in 168 parasitized nests. The difference of 2.7 eggs per nest was significant ($t = 7.34$, $P < .001$). Bellrose (1976) summarized data from other studies

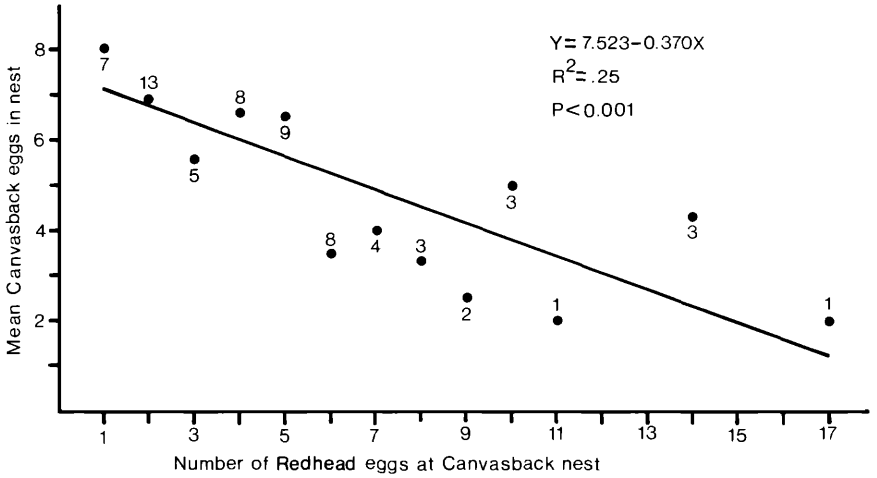

FIGURE 1. Relationship between number of Canvasback eggs in the nest and total Redhead eggs present. Numbers indicate number of nests in sample.

reporting similar clutch reductions, and Weller (1959) stated that reduced clutches resulted from suppressed ovulation in the host and loss of eggs from the nest. During the last three years, systematic searches were made for eggs outside all nests so I could compare total eggs laid in parasitized and unparasitized nests. The mean number of Canvasback

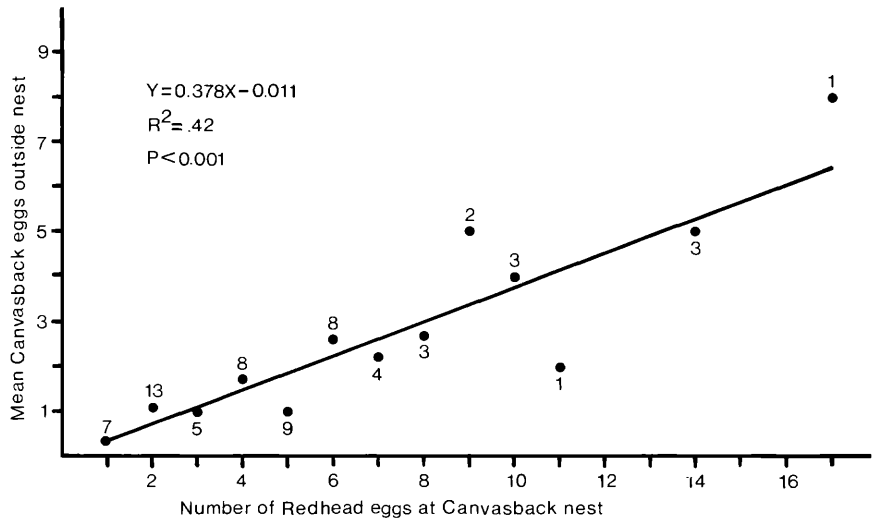

FIGURE 2. Relationship between number of Canvasback eggs outside the nest and total Redhead eggs present. Numbers indicate number of nests in sample.

eggs in and around 40 completed unparasitized nests was 8.7 compared with 7.6 for 67 parasitized nests ($t = 2.38$, $P < .02$), indicating that suppressed ovulation through parasitism resulted in about one less Canvasback egg per clutch. In the same sample, eggs outside parasitized nests averaged 1.84 compared with 0.23 outside unparasitized nests. Thus, Redhead parasitism resulted in a total reduction of about 2.7 eggs per nest—1.1 due to suppressed ovulation and 1.6 due to eggs lost outside the nest.

The number of Canvasback eggs found inside parasitized nests was inversely related to the total number of Redhead eggs found at the nest (Fig. 1). A similar relationship has been shown for Cinnamon Teal (*Anas cyanoptera*) nests parasitized by Ruddy Ducks (*Oxyura jamaicensis*) and Redheads (Joyner 1976). Conversely, the number of Canvasback eggs outside parasitized nests was directly related to the number of Redhead eggs (Fig. 2). Total Canvasback eggs was unrelated to the number of Redhead eggs ($P > 0.7$), indicating that egg reduction due to suppressed ovulation was unrelated to the number of parasitic intrusions.

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