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BLOOD PARASITES OF TRUMPETER SWANS, *Olor buccinator* (RICHARDSON), FROM ALBERTA

GORDON F. BENNETT,[□] BRUCE TURNER[□] and GORDON HOLTON[□]

Abstract: A total of 75 trumpeter swans (*Olor buccinator* (Richardson)) from the Grande Prairie region of Alberta was examined for hematozoa; 26 (34.6%) swans were infected with *Haemoproteus nettionis*. A single infection of *Leucocytozoon simondi* and two of *Plasmodium circumflexum* also were recorded. Local, second year (SY) and adult (AHY) female swans had closely similar rates of hematozoan infection; the SY and AHY male swans had substantially higher infection rates than other subgroups.

INTRODUCTION

The trumpeter swans (*Olor buccinator* (Richardson)) are a highly distinctive element of the anseriform fauna of western Canada. The species went into a serious decline in the nineteenth century and approached extinction in the early 1900's.² This decline, presumably induced by over-harvest and habitat loss coincident with man's encroachment on their breeding and overwintering grounds, led to the institution of a series of conservation and management protocols designed to maintain or extend the range of this magnificent bird. These protocols have been successful to the extent that the trumpeter swan is no longer considered to be endangered.¹

In many wildlife management strategies, attention is paid to the role of parasites and pathogens as limiting factors of the population. However, when endangered species are considered, relatively little attention is paid to these aspects, presumably because of the paucity of material. This situation is well exemplified by the trumpeter swan. No known records exist detailing the results

of blood film examinations for hematozoa, although, one species, *Leucocytozoon simondi* of the Anseriformes, is known to have severe effects on waterfowl in various parts of Canada and the northern United States. Furthermore, LePage³ lists only two short papers dealing with the helminth fauna of this species.

A program involving the banding of trumpeter swans by the Canadian Wildlife Service in Alberta during 1978 and 1979 provided the opportunity to obtain blood samples for the diagnosis of blood parasite infections. This report summarizes the results of these examinations.

MATERIALS AND METHODS

Most swans were captured and banded during the first 2 weeks of September 1978 and 1979 in various areas in the general region of Grande Prairie, Alberta. A few individuals were banded in July. At the time of capture, blood films were prepared from blood taken from the femoral artery. The blood films were air-dried, fixed in 100% methanol and subse-

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quently stained with Giemsa's stain prior to examination for hematozoa.

Representative blood smears with avian hematozoa (accession numbers 71114-71188) are deposited in the collection of the International Reference Centre for Avian Haematozoa.

RESULTS AND DISCUSSION

A total of 75 trumpeter swans was examined for hematozoa; 28 (37.3%) were infected with blood parasites, primarily *Haemoproteus nettionis* (Table 1). Only a single bird (a cygnet) was infected with *L. simondi* and two cygnets harbored *Plasmodium circumflexum* (identified by the presence of schizonts), one concurrently with *H. nettionis*. Most infections were of a light intensity, less than one parasite/10,000 red blood cells, an intensity consistent with the late time of year of sampling (September in most cases). *Leucocytozoon* and *Plasmodium* infections were both found in males (Table 1). Prevalence of parasitism was similar in both 1978 (40%) and 1979 (36%).

Prevalence of hematozoa in the second year (SY) and adult (AHY) swans (which had lived in the area for one or more

breeding seasons) was compared with that in swans of the year (HY). The differences (Table 1) were striking. Prevalence rates (essentially the prevalence of *H. nettionis*) were virtually the same in both male and female cygnets, with a slightly higher prevalence in 1979 compared to 1978. The prevalence of *H. nettionis* in SY and AHY females was similar to that observed in the HY birds (Table 1, 1978). However, the prevalence of *H. nettionis* in the SY and AHY males was 72.7%, about twice that noted in the other birds.

Most interesting was the virtual absence of *L. simondi* in these swans. In a sample of 564 *Anas acuta* and *A. platyrhynchos* taken in 1979 from the same areas as the trumpeter swans, 178 ducks (31.3%) harbored blood parasites, 20% with *L. simondi* and 17.7% with *H. nettionis*. On this basis, the trumpeter swans had a higher overall prevalence of parasitism (37.3%), but most of the infections were with *H. nettionis*. The fact that one cygnet had a fairly heavy infection of *L. simondi* indicates that the trumpeter swans can be infected with this parasite. The low prevalence of *L. simondi* in swans relative to ducks from

TABLE 1. Prevalence of blood parasites in cygnets (HY), second year (SY) and adult (AHY) trumpeter swans in the Grande Prairie region, Alberta, during the years 1978 and 1979.

	1978		1979		Total
	male	female	male	female	
Total examined	26	24	12	13	75
Number infected	12	7	4	5	28
Percent infected	46.2	29.2	33.3	38.5	37.3
Number infected with:					
<i>Haemoproteus</i>	10	7	4	5	26
<i>Leucocytozoon</i>	1				1
<i>Plasmodium</i>	2				2
Total HY swans examined	15	14	11	13	53
Number HY swans infected	4	4	4	5	17
Percent HY swans infected	26.7	28.6	36.4	38.4	32.1
Total SY/AHY swans examined	11	10	1		22
Number SY/AHY swans infected	8	3	1		12
Percent SY/AHY swans infected	72.7	30.0			54.5

the same area indicates that some behavioral aspect of the trumpeter swans isolates them from frequent interaction with the simuliid vectors of *L. simondi*, but their contact with the ceratopogonid vectors of *H. nettionis* are greater than those of ducks. The ceratopogonid-SY/AHY male swan interaction must be particularly strong as nearly three-quarters of the sample of these birds harbored *H. nettionis*. Possibly the virtual absence of *L. simondi* is associated with the relatively late nesting season of the swans. The early nesting habits of the mallards and pintails may render them vulnerable to attack by the simuliid vectors of *L. simondi* in late May and early June, a time when black fly-cattle related problems are not unusual in Alberta at the latitude of Grande Prairie, the general collection site, and when *Simulium rugglesi* (a known vector of *L.*

simondi) is known to be present in the region (Semanchuk, pers. comm.). In contrast, trumpeter cygnets do not usually hatch until mid-June — sufficiently late to escape potential early vectors. However, this does not explain the absence of *L. simondi* in the adult birds and some other mechanisms must be in operation to separate the adult swans and the simuliid vectors.

It is probably fortunate for the trumpeter swans that this situation obtains, for *L. simondi* can cause serious mortality among young ducks, whereas no serious pathogenic effects have been attributed to *H. nettionis*. On the basis of this sample it would appear that blood parasites, while present in the Alberta trumpeter swan population, are not likely to be seriously involved as factors limiting the population growth or expansion in this area.

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