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BLOOD PARASITEMIA IN A SOUTH TEXAS WINTERING WATERFOWL POPULATION [1]

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Abstract: Eleven species of wintering waterfowl were trapped on the Welder Wildlife Foundation, San Patricio County, Texas, between October, 1976 and May, 1977. Blood films were made from 580 ducks. *Leucocytozoon simondi, Haemoproteus nettionis, Plasmodium circumflexum,* and a microfilaria were found in three species. These blood parasites occurred in 70 lesser scaups *(Aythya affinis),* 12 blue-winged teals *(Anas discors),* and 3 ring-necked ducks *(Aythya collaris).* There was no difference in the rates of infection between the sexes of the three host species. Adult blue-winged teal and lesser scaup were more heavily infected than juveniles. Juvenile ring-necked ducks had more parasites than adults. Blood parasites were found in 85 of 580 ducks (14.6%) throughout the wintering period.

INTRODUCTION

Biological data concerning wintering waterfowl are meager in comparison to the vast information accumulated for breeding ducks and geese. Factors associated with winter morbidity and mortality are among the least studied population parameters of the continental waterfowl resource. Recent waterfowl mortality on the Texas coast has been linked to environmental contaminants.[7] Extensive losses of waterfowl have been associated with blood protozoans.[5,10] Fallis and Bennett[6] suggested that infected ducks could transmit blood protozoans to virtually every duck in an area if a suitable vector is present. This study was accordingly designed to identify the blood parasites of waterfowl in southern Texas and to monitor the level of blood parasitemia during the overwintering period.

STUDY AREA

Ducks were examined on the Welder Wildlife Foundation refuge in San Patricio County, Texas, between October, 1976 and May, 1977. This is a 3157 ha refuge and includes two semipermanent oxbow lakes that attract hundreds of ducks each winter. One of these, Pollita Lake, is a shallow U-shaped basin lake that is about 2 m at its deepest point and is bordered by mixed communities of grasslands and marsh vegetation.[1] This lake served as our research area and was of approximately 45 surface ha during our study. Rainfall during the winter months of 1976-1977 exceeded the 20-year mean by nearly 10 cm, thus assuring adequate winter habitat for several species of ducks. White and James[11] have described the differential use of these freshwater environments by wintering waterfowl on the Welder refuge.

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METHODS

Migratory ducks were captured using grain-baited funnel traps between October, 1976 and May, 1977. Each captured duck was sexed, aged and banded with standard U.S. Fish and Wildlife Service leg bands. Blood drawn from the brachial vein of birds restrained in a holding sleeve[5] was air dried on glass slides, fixed with methanol, and stained with Giemsa. All birds were released near the trap site, and recaptured birds were bled no more than once weekly.

The blood films were initially examined at 40× magnification, then 10 grids (using a grid micrometer) were examined under oil emersion. The number of hematozoa within the grid and their identity were recorded.

RESULTS AND DISCUSSION

A total of 273 ducks representing 9 species was captured in the fall of 1976 (October-December) and 307 ducks representing 10 species in the spring of 1977 (February-May). Only three species, blue-winged teal *(Anas discors)*, lesser scaup *(Aythya affinis)*, and ring-necked duck *(Aythya collaris)* had detectable blood parasites. Three genera of blood parasites were identified (viz., *Leucocytozoon simondi*, *Haemoproteus nettionis*, and *Plasmodium circumflexum)* and a microfilaria was found in two lesser scaup ducks (Table 1).

The lesser scaup was the most frequently infected species followed by the blue-winged teal and the ring-necked duck, respectively (Table 1). The level of parasitemia in the infected ducks was higher than that reported by Williams *et al.*[12] but no individual duck of any species had more than the 0.06% infected red blood cells we found in one lesser scaup.

The percentage of blue-winged teals infected showed an increase between the fall population (October-December) and those returning north in the spring (Table 2). Teal did not return to the trapping area until March; however, our

TABLE 1. Prevalence of hematozoa in wintering waterfowl in south Texas, 1976-1977.

Species	Number Examined	Blood Parasites				Total Infected
		Leucocytozoon	*Haemoproteus*	*Plasmodium*	Microfilaria	
Lesser Scaup - 1976	96	34	1	-	-[a]	35
1977	84	30	4	1	2[a]	35
Total	180	64	5	1	2	70
Blue-winged Teal - 1976	138	2	-	-	-	2
1977	176	9	1	-	-	10
Total	314	11	1	-	-	12
Ring-necked Duck - 1976	6	1	1	-	-	2
1977	14	1	-	-	-	1
Total	20	2	1	-	-	3

[a]The two birds with a microfilarian are not included in the total because these cases were multiple infections.

TABLE 2. Prevalence of hematozoa in adult and juvenile and male and female anatids of three species, winter 1976-1977.

Species	Number Examined	Percent Infected*		Percent Infected	
		Juveniles	Adults	Males	Females
Lesser Scaup	180	36.4 (96)	41.6 (84)	38.8 (103)	38.9 (77)
Blue-winged Teal	314	1.4 (138)	5.7 (176)	4.7 (149)	3.3 (165)
Ring-necked Duck	20	30.0 (6)	7.1 (14)	18.1 (11)	11.1 (9)

*Sample size in parentheses.

samples for each period were large enough to suggest alternate hypotheses that either (a) their blood parasites are more active in the spring than in the fall or (b) that infection occurred between the time the birds left Texas and their return. The recrudescence of infections, hypothesis (a), seems more likely in view of existing theory although we do not dismiss completely the alternate suggestion as a possibility deserving of further study. Pollita Lake and other water areas, especially the Aransas River that forms the northern border of the Welder study area, may provide suitable habitat for the insect vectors of the hematozoa that parasitize waterfowl. Furthermore, blue-winged teal winter over an extensive range in much of Central and South America[1] where initial infections might occur.

Differences in infection rates between juveniles and adults and between males and females were variable (Table 2). There appeared to be few sex-related differences in rates of parasitemia. Adult lesser scaup were more often parasitized by hematozoa than juveniles; however, juvenile ring-necked ducks were more often carrying hematozoa than adults. The frequencies of infections for male and female blue-winged teal were similar but adults were more often parasitized than juveniles. Blue-winged teal returning north in the spring were necessarily classified as adults (*i.e.*, sexually maturing in their first year) although some of the spring birds were certainly less than 1 year old; plumage and cloacal examinations are no longer fully reliable for determining age in this species during the spring migration. Juveniles, as used here, refer to young of the year still reliably identified by age in the fall when they are about 5-7 months old; the origins of juveniles largely lie in latitudes far to the north of our study area although at least some blue-winged teal are regularly hatched in Texas.

In general, blood parasites were detected in relatively few waterfowl during the winter months. However, these data clearly indicate that hematozoa remain active and viable in wintering waterfowl populations on the Texas coast and infer that the ducks were not acquiring new infections during their wintering period in Texas. Recaptured ducks comprised approximately 25% of the blood samples taken from the lesser scaup and ring-necked ducks, and there was no difference in the infection levels between the initial sample and any subsequent sample from the same bird.[9]

Unlike the previous studies of Bennett *et al.*[2,3] in the Atlantic Flyway, *L. simondi* occurred more frequently than either *H. nettionis* or *P. circumflexum* in our sample of ducks from the Central Flyway. Although the Atlantic Flyway studies sampled some waterfowl species not included in our sample (e.g., black duck, *Anas rubripes),* blue-winged teal were included in both; our results for this species may show differences for *L. simondi* infections between these flyways if the respective sampling procedures are assumed compatible.

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