

THE OCCURRENCE OF HEMATOZOA IN ROBINS OF CENTRAL WASHINGTON

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day after inoculation. The eighth suckling mouse died on the fourth day. Of the six adult mice, one died on the first, two died on the second, and one each on the third and fourth day. *Escherichia coli* was recovered from the brains and blood of all the dead mice. The remaining adult mouse was sacrificed in good health after surviving the inoculation 28 days.

The early observation that the organism was non-motile in the birds and mice and motile in culture was reexamined. When *E. coli* suspensions from culture were inoculated intraperitoneally into mice, the organism became non-motile, both before and after death of the mice. Two cycles of alternate passage between mice and culture always resulted in the organism being non-motile in mice and motile in culture. The high degree of pathogenicity for mice initially demonstrated by the organism in the brain suspension was also substantiated. The mice, which were intraperitoneally inoculated with culture suspension, all died or were moribund and were sacrificed in two days. Overwhelming numbers of *Escherichia coli* were demonstrated microscopically and culturally in the heart blood of these intraperitoneally inoculated mice.

After oxytetracycline was added to the feed of the pheasants, no additional deaths occurred and a marked improvement was noted in the flock. No other disease problems were observed in this group of birds. The source of the infection was not determined.

Summary

Signs of colibacillosis were observed in a flock of captive pheasants. A diagnosis of *Escherichia coli* septicemia was made on two moribund pheasants after large numbers of this bacterium were observed microscopically in their blood and the organisms were recovered on culture of the blood. The serotype of the organism was O1:ab:K1:H7. Marked improvement of the sick birds was

noted after they were given oxytetracycline in the feed.

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THE OCCURRENCE OF HEMATOZOA IN ROBINS OF CENTRAL WASHINGTON

Despite the wide distribution and abundance of robins, their parasitology has received very little study (Manwell, 1955, J. Protozool., 2: 85-88). Work on avian blood parasites in Washington is limited apparently to a study in magpies and english sparrows of eastern Washington (Wagner, 1946, Birdbanding, 17(2): 53-55). Blood and tissue smears were taken from nestlings, juveniles and adult robins (*Turdus migratorius*) collected in central Washington from fall 1965 to fall 1966. The term "juvenile", in this study, was applied to those robins that were capable of flying and still retained spots on their breasts. Nestlings were those birds still remaining in the nest proper. Juveniles and adult birds were shot and as soon as possible after death, thin blood films were made from large thoracic vessels or directly from the heart. Tissue smears were made from small sections of lung and kidney. Prior to making the smear, each piece of tissue was wiped clean of blood with cheese cloth, macerated on the slide and then all but a thin smear was removed. Portions of spleen, heart, small intestine, brain, kidney, lungs and liver were

Table 1. Incidence of blood parasites in 124 robins

Age Distribution	No. of Birds Examined	No. and Per cent Infected	H	L	P	T	M	Mx
Nestlings	11	1 (9.1%)	0	1	0	0	0	0
Juveniles	25	25 (100.0%)	1	22	3	0	1	3
Adults	88	65 (73.9%)	8	66	0	8	21	25
Totals	124	91 (73.4%)	9	89	3	8	22	28*

Legend: H - *Haemoproteus*; L - *Leucocytozoon*; P - *Plasmodium*; T - *Trypanosoma*; M - microfilariae; Mx - mixed infections.

* Organisms occurring in mixed infections were as follows: L-M (11); L-H (3); L-) (3); L-P (2); H-P (1); M-T (1); L-M-T (4); L-H-M (3).

also taken from each juvenile and nestling for histological examination. All smears were examined for at least 10 minutes with low power (200X), medium power (430X) and with oil immersion lens (970X).

Results and Discussion

Examination of blood and tissue smears from 124 robins revealed 91 (73.4%) infected with *Haemoproteus*, *Leucocytozoon*, *Plasmodium*, *Trypanosoma* and microfilariae. Table 1 shows the incidences and percentages for the organisms found in the various groups. Multiple infections involving two or more blood parasites were quite common. Of a total of 91 infected birds, 61 carried a single parasite, 21 carried 2 species, and 7 harbored 3. *Leucocytozoon*-microfilariae combination occurred most often in the mixed infections.

Significant differences were noted among the various age groups. The most interesting was the 100% incident found

in the juveniles and the nearly complete absence of parasites in the nestlings. The nestlings were all less than 12 days old, therefore, the absence of parasites does not necessarily mean that these birds were free of infections. It may simply mean that prepatent period had not elapsed.

Five adult robins were shot which were associated with known sets of offspring in an attempt to find the relationship of parasite incidence between parents and their respective offsprings. The parasites of 4 such parents (or parent) and their respective young are shown in Table 2. The number of family units observed here is not large enough to make any definite correlations between the parasite population of the young bird and that of the respective parents. However, the data does indicate that in most instances a ready source of hematozoa is available to the vector for transmission to the offsprings.

Organisms of the genus *Leucocyto*

Table 2. Relationship of parasite incidence in parents to that of their offspring

Parents							Offspring						
No. Per. Family Unit	No. Positive	H	L	P	T	M	No. Per. Family Unit	No. Positive	H	L	P	T	M
2	2	+	+	0	0	0	1	1	0	1	0	0	0
1	1	0	+	0	+	0	2	1	0	1	0	0	0
1	1	0	+	0	0	+	3	3	1	2	1	0	0
1	0	0	0	0	0	0	1	1	0	0	0	0	0

Legend: 0, Parent negative; + Parent positive; H - *Haemoproteus*; L - *Leucocytozoon*; P - *Plasmodium*; T - *Trypanosoma*; M - *Microfilariae*.

zoon, were the most common parasites observed among robins in this area (71.8%). This concurs with data reported elsewhere by Manwell in 1955 (J. Protozool., 2: 85-88) Bennett and Fallis in 1960 (Can. J. Zool. 38: 261-273) and Clark and Swinehart in 1966 (Bull. of Wildlife Disease Ass., 2(3): 53-54). Only generalizations can be made here since the various investigators differ on age classifications. An interesting observation was an acute case in a 9 day old nestling. Upon examining the smear from this bird, a 10-minute search period revealed 230 gametocytes in various stages of development.

Microfilariae were the next most common parasite (17.7%) found in blood and tissue smears of robins. The incidence was greater in lung smears than in blood preparations, 16.1% to 8.9% respectively. The intensity of the infections was also significantly higher in the lung smears.

Organisms of the genus *Haemoproteus* were present in only 7.3% of the birds examined. This corresponds to data reported by Bennett and Fallis (1960, Can. J. Zool. 38: 261-273), but is significantly less than the incidence of this organism reported by Manwell (1955, J. Protozool., 2: 85-88.).

Organisms of the genus *Trypanosoma* were found in 6.5% of the birds. This was determined only by examination of dried smears and probably not indicative of the true incidence. Manwell's data in 1955 (J. Protozool., 2: 85-88) also revealed a low parasitemia with this organism in robins of the high Rockies and of central New York.

Malaria was observed in only 3 juveniles (2.4%) and this was due to *Plasmodium vaughani*. This data is in general concurrence with the above mentioned researchers, with the exception of the robins of central New York (Manwell, 1955, J. Protozool., 2: 85-88), in which the incidence was relatively high (46.4%).

Upon histological examination of tissue sections taken from infected nestlings and juveniles, the author was unable to find hepatic and megaloschizonts of members of the genus *Leucocytozoon*. No reproductive stages of other hematozoa were observed in tissue sections during this study.

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REDESCRIPTION AND INCIDENCE OF *Eimeria antilocaprae* HUIZINGA, 1942 IN THE PRONGHORN ANTELOPE, *Antilocapra americana* (Ord, 1815)

Huizinga (1942, J. Parasit. 28: 167-168) briefly described *Eimeria antilocaprae*, with measurements of 200 oocysts from 3 fecal samples collected from antelopes, *Antilocapra americana* (Ord, 1815), near Laramie, Wyoming. Sporulated oocysts were inadequately described and illustrated. Honess and Winter (1956, Wyoming Game and Fish Comm. Bull. No. 9) reported the occurrence of oocysts of this species in antelopes in Carbon County, Wyoming. No other information is known concerning the prevalence of coccidia in the Pronghorn Antelope.

Fecal samples from 63 antelopes were examined during the period from 11 August, 1965, to 21 April, 1966. Of these, 48 (38 females and 10 males) were collected in Yellowstone National Park, Wyoming, the remaining 15, all females, were collected in the National Bison Range, Moiese, Montana. Animals were aged by the method of Dow and Wright (1962, J. Wildl. Mgmt. 26: 1-18). The ages were confirmed by Wright. Fecal pellets were obtained from the colon of animals which had been shot. The pellets were stored in 2.5% potassium dichromate solution; samples were prepared for examination for oocysts with the aid of flotation using