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Authors: LEWIS, JAMES C., CARPENTER, JAMES W., and MORRISON, JOHN A.

Source: Journal of Wildlife Diseases, 11(4) : 537-539

Published By: Wildlife Disease Association

URL: https://doi.org/10.7589/0090-3558-11.4.537

HEMOPROTOZOA IN MOURNING DOVES AND OTHER SMALL BIRDS OF WESTERN OKLAHOMA

JAMES C. LEWIS, JAMES W. CARPENTER and JOHN A. MORRISON,
Oklahoma Cooperative Wildlife Research Unit, Stillwater, Oklahoma 74074, USA

Abstract: Blood smears obtained from 370 birds live-trapped in western Oklahoma were examined for hemoprotozoa. *Haemoproteus* spp. were found in 189 (90.4%) mourning doves (*Zenaida macroura*), one oriole (*Icterus galbula*), two mockingbirds (*Mimus polyglottos*), and three brown thrashers (*Toxostoma rufum*). *Plasmodium* sp. was present in one brown thrasher. *Haemoproteus* spp. in the mourning dove were identified as *H. sacharovi* and *H. maccallumi*, with the latter species predominating. The average parasitemia for doves infected only with *H. sacharovi* was 0.1% of the erythrocytes, for doves infected only with *H. maccallumi* it was 0.9%, and in doves with dual infections 1.8% of the erythrocytes were infected.

INTRODUCTION

As part of an extensive study of the ecology of mourning doves in Oklahoma, including their parasites and diseases, the authors conducted a survey for hemoparasites during July and August, 1971. Student assistants working on a mourning dove banding project near Fairview, Major County, Oklahoma, prepared the blood smears. Blood smears obtained from other trapped birds were also examined.

The study area is characterized by large fields of wheat and mesquite-grassland used for pasture. Streambeds frequently become dry. The annual rainfall of 71 cm is evenly distributed throughout the year and the evaporation rate is high. The only relatively permanent surface water is found in small stock ponds.

MATERIALS AND METHODS

Two smears from the first four doves captured each day and from the first two birds of each other species captured each day were made with blood from the brachial vein following the technique described by Bennett.[1] Each slide was labelled with the date, species, and a collection number. Similar records were placed on field data sheets that also included the bird's age,[7] sex, the trap location, and band number. Each slide was later stained with Giemsa and examined for 5 min at X430 and for 10 min with oil immersion at X970. Hemoprotozoa were identified and their frequency determined.

RESULTS AND DISCUSSION

Slides were examined from 370 individual birds including 209 mourning doves, 84 brown-headed cowbirds (*Molothus ater*), 32 bobwhite quail (*Colinus virginianus*), 3 loggerhead shrikes (*Lanius ludovicianus*), 10 lark sparrows (*Chondestes grammacus*), 20 western meadowlarks (*Sturnella neglecta*), one oriole, six mockingbirds, three brown thrashers, one roadrunner (*Geococcyx californianus*), and one flicker (*Colaptes auratus*). Age composition of the doves examined included 173 immatures, 33 adults, and three of undetermined age.

Haemoproteus maccallumi and/or *H. sacharovi* were found in 189 doves (90.4%). Three brown thrashers were infected with *H. beckeri*. A Baltimore oriole was infected with *H. quiscalus*. Two mockingbirds were infected with an

undetermined species of *Haemoproteus*. A brown thrasher was infected with *Plasmodium* sp., probably *P. relictum* (personal communication E. C. Greiner). Schizonts were not present in this bird but the RBC nucleus of the infected cells were turned 90° and displaced towards the cell pole and the gametocytes were round. No known species of *Haemoproteus* has these characteristics.

Sixty percent of the mourning doves were infected with *H. sacharovi,* and 74% were infected with *H. maccallumi*. Forty-five percent of the doves were infected with only a single species of parasite; 65% of these were infections of *H. maccallumi* and another 45% of the doves had mixed infections. Parasitemia varied between 0.1% and 22% of the red blood cells (RBCs). The average number of cells infected with *H. sacharovi* only, *H. maccallumi* only or both species of *Haemoproteus* was 0.1%, 0.9% and 1.8%, respectively. In the mixed infections, between 10 and 500 times more RBCs were infected with *H. maccallumi* than with *H. sacharovi*.

No weekly trends were detected in the number of *Haemoproteus* infected cells per 1,000 RBCs during the 8 weeks of sampling. However, the prevalence of infection was greater in the older age categories. In the age categories 0 to 30 ± 4 days (n=43), 37 ± 5 to 54 ± 8 days (n=68), and 66 ± 10 to 96 ± 16 days (n=44) of age, 79%, 94%, and 100% respectively, of the birds were infected. These data suggest that the chance of exposure to the vector of this disease increases with age.

The only other survey of hemoprotozoa in wild birds in Oklahoma was conducted by Janovy[6] who examined 277 individuals of 36 species. His samples were collected principally in Love and Cleveland Counties, in southcentral and central Oklahoma, respectively. *Plasmodium* spp. were found in one of two red-shouldered hawks (*Buteo lineatus*), two of 19 meadowlarks, and three of 47 red-winged blackbirds (*Agelaius phoeniceus*). *H. maccallumi* and *H. sacharovi* were found in over one-half of 35 mourning doves and *Haemoproteus* sp. were found in one of two crows (*Corvus brachyrhynchos*). No doves were reported to be simultaneously infected with both species of *Haemoproteus*.

Although prevalence of *Haemoproteus* in mourning doves examined in this study is higher than that reported by Janovy,[6] it is similar to the results reported in other surveys conducted in the western United States.[2,3,4,5,7,9] None of the *Haemoproteus* infections in other species that we examined represents a new host record. The failure to find *Leucocytozoon*, microfilariae and haemogregarines in the doves is probably a consequence of the habitat of the study area and of the sample size. These parasites have been found in a small percentage of the doves surveyed in other studies in the western United States.

Acknowledgements

The authors acknowledge P. Keasling, V. Heller, and S. Tobler for collection of the blood smears and the editorial assistance of R. E. Corstvet and H. E. Jordan. E. C. Greiner checked the identification of some of the *Haemoproteus* spp. and the *Plasmodium* sp.

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Received for publication 2 July 1974