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Hematozoa in the Endangered Wood Stork from Georgia

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ABSTRACT: Thin blood smears of 75 wood storks (*Mycteria americana*) from Georgia (USA) were made during the summers of 1994–96 and examined for blood parasites. *Haemoproteus crumenium* was found in one of 71 juveniles and in two adults from a sample of two subadults and two adults. Intensity of infection in the juvenile and in each of the two adults was 11, 3, and 2 parasites/5,000 erythrocytes, respectively. This is the first record of *H. crumenium* in the wood stork from Georgia and the second published record of *H. crumenium* infecting this host in North America. Additionally, one juvenile was infected with a microfilarid.

Key words: Endangered species, *Haemoproteus crumenium*, haemoproteid, hematozoa, *Mycteria americana*, survey, wood stork.

The wood stork (*Mycteria americana*) is a threatened or endangered species in several states in North America. As such, the biology of the wood stork has been the focus of much research, particularly those factors associated with morbidity and mortality. Pathological responses of blood parasites have been reported in various avifauna (Forrester et al., 1980; Atkinson, 1991). Consequently, we undertook this study to determine species composition, prevalence, and intensity of hematozoans circulating in the peripheral blood of the endangered wood stork from Georgia (USA).

Sixty-eight prefledged (ages 4- to 6-wk-old) wood storks were captured in their nests during May and June 1994–96 at five rookeries in Brooks (30°40′N, 83°37′W; n = 7), Camden (31°02′N, 81°30′W; n = 13), Glynn (31°16′N, 81°21′W; n = 15), Jenkins (32°51′N, 82°02′W; n = 17), and Thomas (30°53′N, 83°54′W; n = 16) counties, Georgia. Additionally, blood smears were made from three wood storks (two from the Brooks and one from the Thomas county rookeries) that were approximately 8- to 10-wk-old. On 27–29 August 1996, two sub-adult (1- to 3-yr-old) and two adult (≥4-yr-old) wood storks were captured by rocket net at Harris Neck National Refuge (McIntosh County, Georgia, USA; 31°38′N, 81°16′W) and sampled. Wood storks were captured, handled, and blood samples collected in accordance with established guidelines and protocols of U.S. Fish and Wildlife Service Endangered/Threatened Species Permit No. PRT-697819/SA 93-21 (Atlanta, Georgia, USA) and Georgia Department of Natural Resources Permit No. 0030313 (Social Circle, Georgia, USA).

Two thin smears from each of 66 birds and one smear from each of nine birds were made from blood obtained via brachial vein puncture. Smears were fixed in 100% methanol and stained with Diff-Quick® (Dade Diagnostics, Inc., Aguada, Puerto Rico). To determine prevalence of haemoproteids, each blood smear was examined for 20 to 30 min at 1,000× magnification. These examination parameters are considered sufficient to detect low intensity infections (Fedynich et al., 1993). Blood smears made at the colony in Camden County were heavily contaminated with bacteria precluding thorough examination; these smears were examined for 5 to 10 min even though blood cells could not be adequately viewed. Parasite intensity was quantified following the recommendations of Godfrey et al. (1987); 5,000 erythrocytes were counted and examined in 50 replicates of 100 erythrocytes each. A representative specimen was deposited in the Queensland Museum—International Reference Center for Avian Hematozoa Collection (South Brisbane, Queensland, Australia; No. G462444).

From 75 wood storks examined, *Haemoproteus crumenium* (synonym *Haemo-*

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proteus brodkorbi; Peirce, 1987) was found in one juvenile nestling from the Camden County colony and in two free-ranging adults captured in McIntosh County. Intensity of infection in the one juvenile and in each of the two adult birds was 11, 3, and 2 parasites/5,000 erythrocytes, respectively. Additionally, one juvenile from the Brooks County colony had an unknown microfilarid.

Forrester et al. (1977) first reported *H. crumenium* (= *H. brodkorbi*) from wood storks in North America from birds sampled in Florida (USA). However, subsequent surveys of wood storks have not demonstrated the presence of this haemoproteid species in 60 nestlings (L. A. Tilmant and D. J. Forrester, pers. commun.) or in one nestling and one juvenile (Telford et al., 1992) sampled from Florida, until the present study. This may, in part, reflect the lack of sampling, particularly of the subadult and adult subpopulations. Restrictions on the capture of fledged wood storks due to their threatened or endangered species status have prevented intensive sampling. Our limited sample of adults (n = 2) did suggest they were acquiring infections of *H. crumenium*. However, it is uncertain where these birds obtained infections; adults sampled in this study also were radiomarked and demonstrated migratory behavior. These birds were found in central and/or southern Florida approximately 3 mo post-capture (A. L. Bryan, unpublished data).

Since the single infected juvenile came from the colony where most of the blood smears were contaminated with bacteria, we can not be certain whether other birds from this site were infected. However, juvenile wood storks collected at the other colonies did not have haemoproteids circulating in the peripheral blood at the time blood samples were collected. Possibly, these birds were essentially free of haemoproteid infection or infected birds were prepatent. The latter case could result from sampling young birds in which there was insufficient time for haemoproteids to become patent. However, Forrester (1980) found *Haemoproteus plataleae* in four of 40 white ibis (*Eudocimus albus*) nestlings, which indicated patent stages in this haemoproteid were occurring before the young left the nest. Forrester et al. (1977) found that *H. crumenium* (their *H. brodkorbi*) was morphologically and morphometrically similar to *H. plataleae* and suggested that they may be the same species. If true, then there appeared to be sufficient time (4 to 10 wk) for infections to become patent in prefledged wood storks.

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