Blood Parasite Survey of Inca Doves from a South Texas Urban Environment

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ABSTRACT

Inca doves (*Columbina inca*) are a native species of southern and central Texas, which are locally abundant in urban areas. Unfortunately, little is known about the factors that may impact their populations such as predation, disease, and parasites. To learn more about factors that may influence the health of this species, we initiated a survey to determine if Inca doves in south Texas have blood parasites. Inca doves were live trapped on the Texas A&M University-Kingsville campus and surrounding City of Kingsville, aged and sexed, banded, sampled via leg vein puncture, and released. Two blood smears from each bird were made on microscope slides, preserved, stained, and examined under 1000x magnification. Forty-one Inca doves were captured from 5 July to 10 October, 2000. No blood parasites were observed on the smears. Our findings suggest that Inca doves were not infected or at least they were not demonstrating active infections in peripheral blood during late summer and early fall 2000.

KEYWORDS: Blood parasites, *Columbina inca*, Inca dove, South Texas

Blood parasites have been known to cause morbidity and mortality in various avifauna (Herman et al., 1975; Atkinson, 1991; Forrester, 1991). Much of the focus has been on game species due to the emphasis on evaluating factors that influence population densities. Information about less high profile species has often been lacking.

One such species, the Inca dove (*Columbina inca*), is a resident of southern and central Texas and is locally abundant in urban habitats. Currently, none of the published studies that examined Inca doves for blood parasites have sampled more than one individual each and were birds sampled from populations occurring outside of the U.S. (Beltran, 1942; Beltran and Pardinas, 1953; Saunders, 1959; Winchell, 1978). Such lack of sampling for this species precludes health assessments at the host population level and points to a need for surveying Inca dove populations in Texas and across their geographic range. To learn more about factors that may influence the health of Inca doves, a survey was initiated to determine if Inca doves in a south Texas urban environment have blood parasites and, if they do, determine prevalence and density of infection.

METHODS

Inca doves were live trapped using wire cages baited with grain at six different sites in the City of Kingsville and Texas A&M University-Kingsville campus in Kleberg County, Texas (27° 31'N, 97° 51'W). Sites were baited for three days and traps were put near the bait for two days before traps were set. Trapping began on 5 July 2000 and continued until 10 October 2000. At the time of capture, Inca doves were aged and sexed according to descriptions of Baptista et al. (1997) and Goodwin (1977), banded and Wildlife Service aluminum leg bands to avoid resampling previously captured birds, and sampled via leg vein puncture. After the blood sample was taken, a Kimwipe® or clean paper towel was

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compressed on the leg until blood flow ceased, after which the bird was released. Two blood smears from each bird were made on glass microscope slides. Smears were preserved in 100% methanol and stained using Diff-Quik®. Each smear was examined for 15 minutes (30 minutes per bird) at 1000x magnification using a microscope. Standard observation times have not been established for examining blood smears at particular magnifications; however, recent studies have examined individual smears for a short as 10 minutes (DeJong and Muzzall, 2000) up to 20-30 minutes (Fedynich et al., 1998) at 1000x magnification.

Inca doves were trapped and handled according to the protocols of the U.S. Department of the Interior, U.S. Geological Survey, Bird Banding Laboratory Permit No. 23051 and Texas Parks and Wildlife Department Scientific Permit No. SPR-0498-949. This study was approved by the Texas A&M University-Kingsville Animal Care and Use Committee, authorization No. Y2K-6-2.

RESULTS AND DISCUSSION

Forty-one Inca doves (three adult males, three adult females, 23 juvenile females, and 12 juvenile males) were captured and sampled. No blood parasites were observed in each of the blood smears. Early stages of either Haemoproteus sp. or Plasmodium sp. were suspected in four birds. In each case, a more advanced-stage specimen needed to determine that a parasite was actually present could not be found after additional examination of the two smears of the bird in question. Consequently, these birds were considered negative.

Findings of this study are surprising, given that up to three blood parasite species (*Haemoproteus columbae*, *Haemoproteus sacharovi*, *Leucocytozoon* sp.) have been found in other columbid species in Texas (Stabler, 1961; Godfrey et al., 1990; McClinton, 1998) including south Texas (Glass, 1999). Absence of infections in a localized host population and presence in another population of the same host species have been reported in mourning doves (*Zenaida macroura*) and pigeons (*Columbia livia*) (Knisley and Herman, 1967), which suggests that lack of infection is the result of a breakdown of the host-vector-parasite transmission cycle rather than some intrinsic host factor such as immunity or resistance.

A dysfunctional host-vector-parasite transmission cycle may be the result of a lack of vectors or insufficient vector density. Although it was beyond the scope of this study to trap and identify possible vectors, we did observe several hippoboscid flies on Inca doves, which are known vectors for *H. columbae* and *H. sacharovi* (Atkinson, 1991). Fedynich and Small (1996-1998, unpublished data) found fledged juvenile and adult eastern white-winged doves (*Zenaida asiatica asiatica*) from Kingsville, Texas were infected with *H. columbae* during October-November 1996 (n = 12), July 1997 (n = 6), and May 1998 (n = 5), which indicates that at least this host species is infected within the locality where we sampled Inca doves. It is possible that the population dynamics of vectors during our particular sampling period was such that there was insufficient densities to sustain infections in Inca doves.

We sampled a high proportion of fledged hatch-year birds, possibly reducing our chances of observing blood protozoa. It takes 12-16 days for Inca dove nestlings to fledge (Baptista et al., 1997) and the prepatent phase (time from actual infection of host to observation of gametocytes in blood) of H. columbae ranges from 14-28 days (Garnham, 1966). Knisley and Herman (1967) summarized several studies in which no blood parasites were observed in nestling mourning doves (fledge in 11-15 days) and white-winged doves (fledge in 13-16 days). However, Farmer (1960) found mourning dove nestlings infected with *H. sacharov*i and *Leucocytozoon* sp., which suggests that gametocytes for these parasite species are capable of being observed in host blood prior to fledging. Relatively high prevalences of *H. columbae* have been found in 62 of 78 (79%) fledged hatch-year mourning doves sampled in early September on the Rolling Plains and Southern High Plains of Texas (Godfrey et al., 1990) and in 10 of 16 (62%) fledged hatch-year white-winged

doves sampled June-September in south Texas (Glass, 1999), which suggests that fledged hatch-year Inca doves have sufficient time to acquire and demonstrate infections in blood.

In this study, 41 Inca doves were not infected or at least did not have active infections in the peripheral blood during summer-fall 2000. Although these findings do not unequivocally indicate that Inca doves were free of infection (certain stages of blood protozoa occur in host tissue), it does suggest that the host-vector-parasite transmission cycle was not operating during summer 2000.

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