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## COCCIDIA OF WHOOPING CRANES <sup>□</sup>

DONALD J. FORRESTER,<sup>□</sup> JAMES W. CARPENTER<sup>□</sup> and DAVID R. BLANKINSHIP<sup>□</sup>

**Abstract:** Coccidial oocysts were observed in 6 of 19 fecal samples from free-ranging whooping cranes (*Grus americana*) and 4 of 16 samples from captive whooping cranes. *Eimeria gruis* occurred in four free-ranging whooping cranes and *E. reichenowi* in two free-ranging and two captive whooping cranes. Fecal samples from two captive cranes contained oocysts of *Isospora lacazei* which was considered a spurious parasite. Oocysts of both species of *Eimeria* were prevalent in fecal samples collected from three free-ranging Canadian sandhill cranes (*G. canadensis rowani*) from whooping crane wintering grounds in Texas. These coccidia were prevalent also in fecal samples from 14 sandhill cranes (of 4 subspecies) maintained in captivity at the Patuxent Wildlife Research Center in Maryland.

### INTRODUCTION

In 1966 the whooping crane (*Grus americana*) was accorded endangered status by the Bureau of Sport Fisheries and Wildlife.<sup>10</sup> As an adjunct to field studies, habitat preservation, and legal protection, a captive propagation program for this species was initiated at the Patuxent Wildlife Research Center, Laurel, Maryland.<sup>4</sup> Due to international efforts, the whooping crane population has increased from a low of 15 in 1941<sup>11</sup> to greater than 100.

Little is known about the parasites of whooping cranes. In 1965, M. E. McDonald<sup>□</sup> examined 42 fecal samples collected at Aransas National Wildlife Refuge in Texas and found coccidial oocysts in 10. These oocysts were not further identified. In 1969, unidentified oocysts were found in a fecal sample from a captive whooping crane (originally from the wild in

Canada) at the Patuxent Wildlife Research Center.<sup>□</sup>

In 1975 a study was initiated to determine which species of coccidia occur in whooping cranes and the results of that study are reported herein.

### MATERIALS AND METHODS

Fresh fecal samples were collected from 35 different whooping cranes from March, 1975 through March, 1977. Nineteen were free-ranging birds sampled at Aransas National Wildlife Refuge. Sixteen came from captive birds: 13 from Patuxent Wildlife Research Center, 2 from Audubon Park Zoo in New Orleans, Louisiana and 1 from San Antonio Zoo, San Antonio, Texas. For comparative purposes, three samples were collected from free-ranging Canadian sandhill

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<sup>□</sup> McDonald, M.E. 1975. Personal communication. Bear River Research Station, Brigham City, Utah 84302, USA.

<sup>□</sup> Kocan, R.M. 1974. Personal communication. Eastern Fish Disease Laboratory, Kearneysville, West Virginia 25430, USA.

cranes (*G. canadensis rowani*) on the whooping crane wintering grounds at Aransas in March, 1975. Samples also were collected from five Florida sandhill cranes (*G. c. pratensis*), four greater sandhill cranes (*G. c. tabida*), four Mississippi sandhill cranes (*G. c. pulla*), and one lesser sandhill crane (*G. c. canadensis*) which were captives at the Patuxent Wildlife Research Center. Although these sandhill cranes were maintained in separate enclosures, frequently they were in pens adjacent to captive whooping cranes.

The samples were mixed with 2% potassium dichromate solution and mailed to Gainesville, Florida. The oocysts, which had sporulated upon arrival, were concentrated with saturated salt solution and examined with a microscope equipped with a 100X planapochromatic oil immersion objective.

## RESULTS

Coccidia were observed in 6 of 19 (31.5%) fecal samples from free-ranging whooping cranes and 4 of 16 (25.0%) fecals from captive whooping cranes. Four free-ranging birds were infected with *Eimeria gruis* and two with *E. reichenowi*. Samples from two captive birds at Patuxent contained oocysts of *E. reichenowi* and samples from two birds at Audubon Park Zoo contained oocysts of *Isospora lacazei*. No infections of more than one species of coccidia were encountered and positive samples contained very few oocysts.

All three of the samples from free-ranging Canadian sandhill cranes contained oocysts of *E. gruis* and *E. reichenowi*. With one exception, all samples from captive sandhill cranes at Patuxent also contained numerous oocysts of *E. gruis* and *E. reichenowi*. The one exception was a greater sandhill crane which was infected with *E. reichenowi*, but not *E. gruis*.

## DISCUSSION

*Isospora lacazei* is probably a spurious parasite and its occurrence in samples from two whooping cranes in Audubon Park Zoo might have been due to contamination of feed by feces of passeriform birds such as reported by Levine and Mohan<sup>7</sup> for cattle in Illinois. This coccidian is cosmopolitan in distribution, has been reported from some 50 species of passeriforms, and is especially prevalent in house sparrows, *Passer domesticus*<sup>9</sup> which may have been the source of the oocysts in Audubon Park Zoo. Banik and Ray<sup>1</sup> described *Isospora balearicae* from a captive cape-ground crane (South African crowned crane), *Balearica regulorum*, in a zoological garden in Calcutta, India which might have been *I. lacazei*. The measurements of oocysts and sporocysts given by Banik and Ray are similar to those reported for *I. lacazei* from house sparrows.<sup>7</sup>

*Eimeria gruis* and *E. reichenowi* are common parasites of sandhill cranes in North America and have been reported previously from 3 subspecies (Florida, greater, and lesser).<sup>3,5</sup> Both species have been reported also from the demoiselle crane (*Anthropoides virgo*) in the USSR<sup>12</sup> and India.<sup>8</sup> This, however, is the first report of these species from whooping cranes, Canadian sandhill cranes, and Mississippi sandhill cranes. Dual infections of these two eimerians are highly prevalent in free-ranging and captive sandhill cranes, but apparently are not common in captive whooping cranes, suggesting that sandhill cranes may be the primary hosts. However, due to the greater population density and gregariousness of sandhill cranes, a difference in species susceptibility cannot yet be determined with certainty. Although quantitative tests were not conducted in this study, it was observed that oocysts were more numerous in the positive sandhill crane samples than in the positive whooping crane samples.

The pathogenicity of these coccidia is unknown, but there are indications that under certain conditions, coccidiosis may be a significant disease. In 1964, a migrating whooping crane was treated for a coccidial infection in Canada and was released after recovery.<sup>□</sup> The species of coccidium was not determined. Koga<sup>6</sup> stated that coccidiosis (species not given) was the chief cause of mortality in chicks of white-naped cranes (*Grus vipio*) and Japanese cranes (*Grus japonensis*) which were being reared in a zoo in Japan. In a report on diseases encountered at post-mortum examination of 135 captive sandhill cranes at the Patuxent Wildlife Research Center from 1966-1975, Carpenter *et al*<sup>2</sup> recorded coccidiosis as the primary mortality factor in two downy young and a contributing factor in two other downy young. Forrester and Humphrey (unpublished data)

found heavy infections of *E. gruis* and *E. reichenowi* in a free-ranging two-month-old Florida crane found in a weakened condition in north-central Florida.

Although coccidiosis can be a primary mortality factor, the overall importance of this disease is probably related to its role in increasing the susceptibility of the host to other diseases, predation, starvation, and other mortality factors, thereby reducing their chances of survival during times of stress. From the data presented in this report and elsewhere,<sup>2,3,5,6</sup> it is obvious that coccidia should be given consideration in management activities which involve rearing cranes in captivity, establishing new whooping crane populations via the use of foster-sandhill crane parents, and the use of supplemental feeding procedures which attract both sandhill cranes and whooping cranes.

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