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## RENAL COCCIDIOSIS IN OLDSQUAWS (*Clangula hyemalis*) FROM ALASKA

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**Abstract:** Renal coccidiosis was found in 4 of 12 oldsquaw ducks (*Clangula hyemalis*) collected from the north slope of Alaska and Prince William Sound. Numerous 1 to 2 mm white foci were observed on the kidney surface of one bird. Microscopically, there was distention of renal tubules with oocysts, flattening of tubular epithelium, and interstitial accumulation of mononuclear cells. Kidneys from several other species of sea ducks from Prince William Sound were not infected.

### INTRODUCTION

Renal coccidiosis was reported from the common eider (*Somateria mollissima*) in Europe in 1952,<sup>1</sup> and from North American ducks in 1956.<sup>1</sup> Renal coccidiosis recently was found in 24.5% of 261 ducks representing 12 species.<sup>2</sup> *Eimeria somateriae* was reported from one oldsquaw (*Clangula hyemalis*) in Sweden,<sup>3</sup> but there have been no subsequent reports and no North American records from oldsquaws. This paper documents the occurrence of renal coccidiosis in oldsquaw ducks from Alaska.

### MATERIALS AND METHODS

On 23 July 1977, an adult male oldsquaw was collected near Teshekpuk Lake on Alaska's north slope. Routine necropsy revealed numerous 1-2 mm white foci on the kidney surface. Kidney tissue was preserved in 10% formalin for routine histologic processing and staining with hematoxylin and eosin (H&E) and periodic acid-Schiff (PAS). Wet mounts for microscopic examination were made by crushing foci from formalin-fixed kidney on glass slides.

During February and March 1978, 11 oldsquaws, 3 harlequin ducks (*Histrionicus histrionicus*), 5 Barrow's goldeneyes

(*Bucephala islandica*), 1 white-winged scoter (*Melanitta deglandi*), and 8 surf scoters (*M. perspicillata*) were collected in Prince William Sound off the coast of southern Alaska. One kidney and ureter from each bird were fixed in 10% formalin. Kidneys and ureters were later minced, washed through a wire screen (23.6 mesh/cm), and filtrates were centrifuged at  $900 \times g$  for 5 min in glass tubes. The supernatant was decanted and the pellet was resuspended in Sheather's solution<sup>7</sup> to float oocysts. After centrifugation at  $900 \times g$  for 5 min a drop of the surface material was transferred to a glass slide and examined microscopically at 100x.

### RESULTS

All birds collected were in good condition, with well developed pectoral muscles and considerable subcutaneous fat. White foci on the kidney surface were noted only in the bird collected near Teshekpuk Lake. No other gross lesions were observed.

Wet mounts from kidney foci of the Teshekpuk Lake oldsquaw contained large numbers of oocysts. The oocysts were elliptical with a smooth, colorless wall and had a short neck encircling the

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micropyle (Fig. 1). Their symmetry was variable, particularly at the micropylar end, with some oocysts showing a curve about the long axis. Oocysts measured



FIGURE 1. Oocysts in wet mount of white foci from formalin-fixed kidney (Unstained,  $\times 860$ ).

$13.6 \pm 0.15 \times 27.3 \pm 0.27 \mu\text{m}$  (mean  $\pm$  SE), and ranged from  $11.8 - 16.1 \times 24.8 - 31.0 \mu\text{m}$  ( $N = 44$ ). Microscopic examination of PAS-stained kidney sections from this bird revealed distension of several tubules with oocysts, flattening of tubular epithelium, and interstitial mononuclear cell infiltration (Fig. 2). Ureteral branches contained a sub-epithelial accumulation of mononuclear cells.

Oocysts resembling those described above in form and size were observed in minced kidney flotations from 3 of 11 Prince William Sound oldsquaws (2 adult males; 1 adult female). A second type of oocyst also was present in kidney flotations from the female. These were shorter,  $14.3 \pm 0.5 \times 20.9 \pm 0.5 \mu\text{m}$  (mean  $\pm$  SE;  $N = 6$ ), more symmetrical, and lacked the short neck seen on the micropylar end of the other oocysts examined. No oocysts were found in kidneys of the other ducks collected.

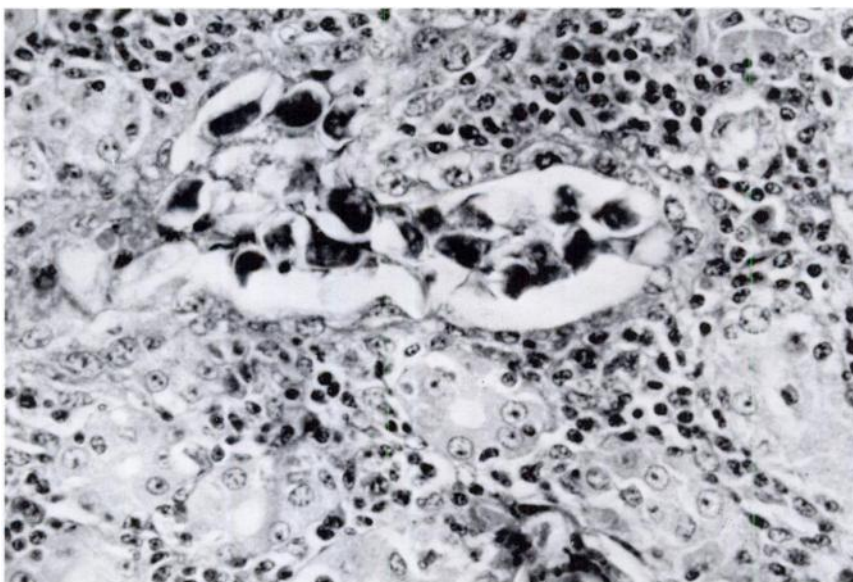


FIGURE 2. Oocysts in distended kidney tubules with flattened tubular epithelium and interstitial mononuclear cell infiltration (PAS,  $\times 430$ ).

## DISCUSSION

The genus of these coccidia was not confirmed because oocysts were not sporulated, but oocysts found in all 4 ducks resembled *E. somateriae*.<sup>1</sup> The smaller oocysts from the female oldsquaw appeared similar to a variant of *E. truncata* described from the common eider.<sup>1</sup>

In domestic geese *E. truncata* has been described as highly pathogenic, causing flock losses as high as 87%.<sup>6</sup> The clinical significance of renal coccidiosis in wild ducks and geese has received little attention, although Persson *et al.*<sup>3</sup> stated that *E. somateriae* seemed to be pathogenic

and was responsible for heavy mortality in eider ducklings. In contrast, Mörner<sup>2</sup> found heavy infections of *E. somateriae* in eider ducklings without signs of illness, and Nation and Wobeser<sup>1</sup> reported that kidney damage to birds appeared insufficient to cause clinical disease.

In the present study all infected oldsquaws were in good condition and showed no overt signs of illness. Microscopic lesions in the Teshekpuk Lake oldsquaw did not appear diffuse enough to result in serious renal impairment, so it is doubtful that renal coccidiosis was causing significant clinical disease.

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