

CAPILLARIASIS IN THE GYRFALCON

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Among ornithologists and especially falconers an important lethal malady of raptors is called "frounce" (Cade 1960; Michell 1964; Beebe and Webster 1964). This condition, characterized by yellow caseous growths in the mouth and esophagus, usually accompanied by loss of weight, has been commonly reported as a synonym for trichomoniasis (Cade 1960; Stabler 1968).

HISTORY

Recently, formalin-fixed tissue sections of the upper digestive tract from two Gyrfalcons (*Falco rusticolus*) were submitted to this laboratory by Finnur Gudmundsson, Museum of Natural History, Reykjavik, Iceland. Information accompanying these specimens stated that "there is no doubt that our gyrs are dying from a disease commonly called 'frounce' by falconers."

According to Gudmundsson (personal communication), a fatal disease of wild Gyrfalcons has existed in Iceland for at least 10 years, and periodically birds have been found dead or sick and delivered to the Museum of Natural History. Skins were preserved from these birds, and caseous growths in the mouth and throat, typical of the formalin-fixed specimens submitted to this laboratory, were usually found. When such lesions were shown to falconers they replied, "Oh yes, this is frounce, a well-known disease among birds of prey." Birds with this condi-

tion were usually emaciated but otherwise had no other conspicuous lesions.

A taxidermist in Iceland reported that as long ago as 1920 he had received Gyrfalcons with the above lesions. Frounce has been considered a major mortality factor of Gyrfalcons that may well affect population size (Gudmundsson personal communication).

FINDINGS AND DISCUSSION

The formalin-fixed tissues received at this laboratory were examined grossly and microscopically. Histopathological examination revealed heavy infections of parasitic worms and eggs in the epithelium of the tongue and throat, inducing reactive hyperplasia of the stratified squamous epithelium. There were also areas of hemorrhage and necrosis, apparently caused by movements of the worms. Both birds were heavily infected with a *Capillaria* sp. (fig. 1). This was either *Capillaria annulata* (Molin 1858; Cram, 1926) or *Capillaria contorta* (Creplin 1839).

Capillaria annulata has been reported to occur naturally in Bobwhite, pheasants, Hungarian Partridge, Ruffed Grouse, Black Grouse, and other gallinaceous game birds. Signs of disease in wild avian species consist of malnutrition, emaciation, and an associated severe anemia often terminating in death.

Capillaria contorta has been reported to occur naturally in the Goshawk, Red-tailed Hawk, turkey, crow, gull, pheasant, quail, Ruffed Grouse, waterfowl, and some shorebirds. Significant mortality due to infection with this parasite has been reported in wild turkeys and Hungarian Partridges. Other *Capillaria* sp. have been reported from hawks and owls in Europe (Rudoplhi 1819).

A search of the literature did not reveal any reports concerning the presence of *Capillaria* in Gyrfalcons. Since the proper classification of *C. annulata* and *C.*

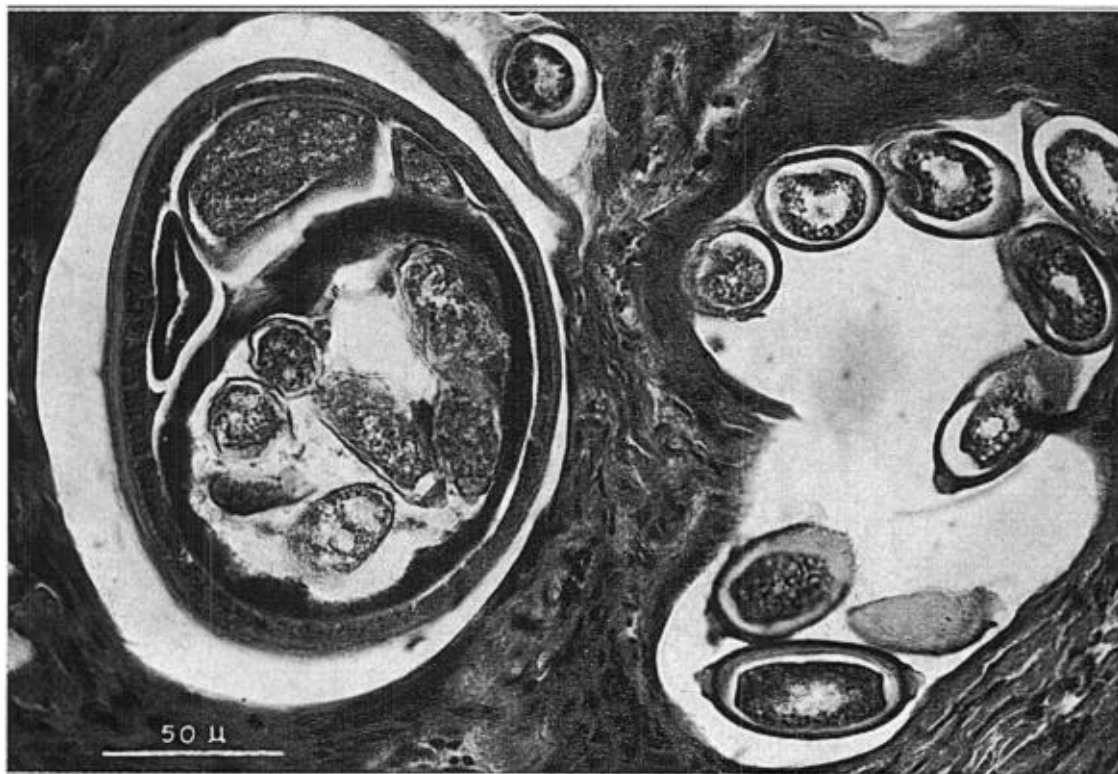


FIGURE 1. *Capillaria* worms and eggs in the tongue epithelium of a Gyrfalcon.

contorta is an academic problem (Madsen 1951), and the fact that only formalin-fixed specimens are available for study, the terminal diagnosis for this case was *Capillaria* sp.

"Frounce" caused by *Trichomonas gallinae* is considered to be a common infection of captive raptors including the Peregrine Falcon, Gyrfalcon, American Kestrel, Pigeon Hawk, Goshawk, Cooper's Hawk, Red-tailed Hawk, Red-shouldered Hawk, and Golden Eagle (Stabler 1968). Information on the occurrence of this disease in wild hawks, however, is limited. Since domestic pigeons and doves are often infected with *T. gallinae* (Stabler 1954) and are a common diet for captive raptors, the source and etiology of frounce in these cases are easily surmised.

In Iceland there are no wild pigeons or doves, although some towns and villages do have domesticated pigeons that occasionally will be taken by gyrs (Gudmundsson personal communication). The staple diet of the Iceland gyr is the Rock Ptarmigan (*Lagopus mutus*). Assuming that in domesticated raptors the common source of the trichomoniasis is the domesticated pigeons and doves, it is easy to see that the wild gyrs of Iceland would not have the same exposure and that a disease, although similar in gross appearance, would not necessarily have the same etiology. As reported, *Capillaria* occurs in a wide

variety of game birds, and Rudolphi (1819) listed *C. longicollis* in *Lagopus*. The ptarmigans could well be the source of infection in Iceland.

This provides another example of the danger in extrapolation concerning the diagnosis of a disease when only gross observations and untrained personnel are involved. Although the caseous lesions in these Gyrfalcons were undoubtedly similar in gross appearance to those resulting from trichomoniasis, the combination of a laboratory examination, a study of the ecology of the bird, and the epizootiology of the disease incriminated *Capillaria*, not trichomoniasis, in the Iceland falcon losses. The importance of a thorough investigation of all mortality as an integrated part of the natural life history of wild populations is evident.

ACKNOWLEDGMENT

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BREEDING OF BOTTERI'S SPARROW (*AIMOPHILA BOTTERII*) IN ARIZONA

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Although the A.O.U. Check-list (1957:603) records southeastern Arizona as part of the Botteri Sparrow's breeding range, there were no known breeding records presented by Phillips *et al.* in The Birds of Arizona (1964:200).

On 22 July 1967, 4 miles N, 1.5 miles W Sonoita, elevation about 4750 ft, Ophir Gulch, Santa Rita Mts., Pima Co., Arizona, I located a nest (Univ. Ariz. Dept. Biol. Sci. no. 8297) that contained four fresh eggs. The nest was constructed of dried grass leaves and lined with animal hair. It was placed on the ground

beneath the leaf canopy of a clump of blue grama (*Bouteloua gracilis*). The area was covered with dense bunches of alkali-sacaton (*Sporobolus cryptandrus*), which ranged in height from three to six feet. Scattered throughout the dense stand of alkali-sacaton were small clearings, and it was in one of the clearings that the nest was located. Annual grasses four to six inches in height covered the area between the nest and the sacaton, which extended 10 to 12 feet in all directions.

The female (Univ. Ariz. Dept. Biol. Sci. no. 8296) was flushed from the nest into a mist net. She had a well-developed brood patch and four postovulatory follicles on the ovary. Three and possibly four other pairs were observed on territories. This area, known more commonly as Gardner Wash or Canyon, has three *Aimophila* species that breed synchronously. They are the Rufous-crowned Sparrow (*A. ruficeps*), Botteri's Sparrow, and Cassin's Sparrow (*A. cassinii*).

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