

Research Note

A Case Report of *Sarcocystis* Infection in a Lesser Flamingo

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Key words: *Sarcocystis*, Flamingo, *Ciconiiformes*

Sarcocystis occurs in many mammals throughout the world. A number of species of wild and domestic birds have also been observed with the infection (Springer, 1978).

Kalyakin and Zasukin (1975) reported that 71–72 species of birds belonging to 14 orders and 28 families, 3 of them are synonyms, were infected with *Sarcocystis* in muscles. Drouin and Mahrt (1979) reported that 40 birds of 23 species in 930 birds of 58 species served as avian hosts. Munday *et al.* (1979) also reported 44 species in 832 Australian birds of 129 species. Kaiser and Markus (1983) examined skeletal muscle from 1511 wild Southern African birds of 279 species (representing 64 families) histologically. Their findings demonstrated 39 individuals of 24 species (representing 19 avian families) infected with *Sarcocystis*.

To date there has not been any report of *Sarcosystis* in Flamingos (Order: *Ciconiiformes*, Family: *Phoenicopteridae*) as an avian host for the parasites listed by the above authors.

This paper is the first recorded incidence of a Flamingo being infected with *Sarcocystis*.

Nine Lesser Flamingos (*Phoeniconaias minor*) were transported to Kobe Oji Zoo in May, 1984. The birds were imported through a local animal trading company. It is assumed the birds were transported directly from their native habitat in Africa. An adult male Fla-

mingo was first observed with clinical signs of arthritis in September, 1984. The bird received treatment with antibiotics and adrenocortical hormone (ACH) but died despite of treatment. At necropsy several whitish and tubular sarcocysts with smooth walls were found within the pectoral muscles. No other pathological lesions associated with *Sarcocystis* were observed macroscopically.

It was observed that tiny rice-grain like sarcosyst (Miescher's tube) elongated with their longitudinal body parallel to the long axis of the skeletal muscle fibers (Fig. 1). The sarcocysts measured 2.70 ± 0.27 mm (range 2.35–3.10 mm) in length and 1.03 ± 0.04 mm (range 1.00–1.10 mm) in width. Microscopically banana shaped bradyzoites (Rainey's corpuscle) were observed measuring 14.2 ± 0.6 μ m (range 13.8–15.0 μ m) in length and 2.5 μ m in width divided from the sarcocysts

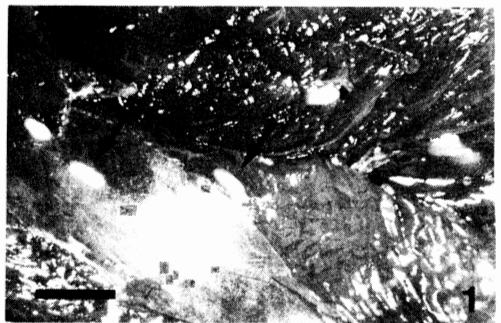


Fig. 1 *Sarcocystis* sp. (arrows) in the breast muscle of a Lesser Flamingo. Bar = 5 mm.

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by squash preparation (Fig. 2).

The skeletal muscles preserved in 10% formalin were examined microscopically. Double layered structures, a spongy inner and dense outer part filled with many bradyzoites were observed in the longitudinal sections of pectoral tissue (Fig. 3). The thickness of the cyst wall measured $7.9 \pm 1.9 \mu\text{m}$ (range $5.0\text{--}10.0 \mu\text{m}$). However, specimens of the skeletal muscles harboring these cysts did not demonstrate any pathological changes due to the presence of the parasite.

It was not possible to determine chance and source of the infection in the present case. It is assumed that the bird was infected with *Sarcocystis* in Africa prior to importation into Japan. No infection from these parasites has been observed in the other Flamingos and bird species at necropsy in the zoo prior to this

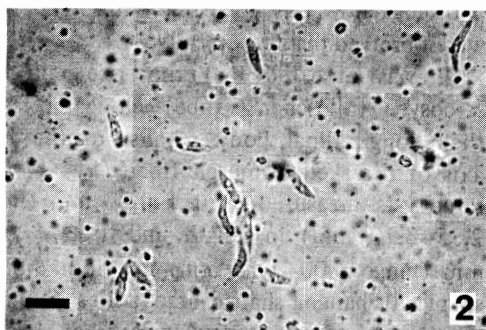


Fig. 2 Bradyzoites divided from Cyst. Bar = $15 \mu\text{m}$.

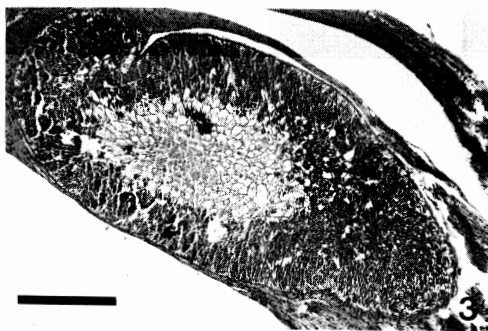


Fig. 3 Cyst in the breast muscle of a Lesser Flamingo. H.E.-stained section. Bar = 5 mm.

report.

It is known that *Sarcocystis* spp. are obligatory two-host parasites, generally alternating between a herbivorous intermediate host and a carnivorous final host (Dubey and Fayer, 1983). But in this case it could not be concluded what kind of wild animals would be the final host of the parasite under natural conditions, because experimental infections of *Sarcocystis* from the bird to carnivorous animals were not attempted.

With the captive conditions at our zoo, there may be no possibility for the parasites in remaining eight exposed birds to continue their life cycle further more. Because the suspected birds will not be consumed by any carnivorous animal, there is no possibility of the *Sarcocystis* infection being transmitted to its other obligatory host from the Lesser Flamingos. Even if a carnivorous host is the final host of the life cycle of the *Sarcocystis*, the zoo management conditions insure that the *Sarcocystis* infections, if present in the remaining Flamingos, will terminate within the suspected birds.

The identification of *Sarcocystis* sp. found in the Lesser Flamingo could not be done by macro- and microscopical observation in the present report. A literature indicates that approximately six different species of *Sarcocystis* in wild South African birds can be distinguished on the basis of the fine structure of the cyst wall with electron microscopy (Kaiser and Markus, 1983). It was also reported that similar type of cysts can be found in unrelated birds and provided that the species of avian *Sarcocystis* can have a loose host specificity (Box and Smith, 1982). Accordingly, it would be possible to examine by electron microscope the type of cyst wall of the *Sarcocystis* found in the Lesser Flamingo to determine the species specificity, if any.

Acknowledgments

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短 報

レッサーフラミンゴにおける住肉胞子虫寄生例

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アフリカから動物商により直接輸入されたと思われるレッサーフラミンゴ (*Phoeniconaias minor*) が関節炎で死亡した。剖検を行ったところ胸筋内に住肉胞子虫の多数寄生を認めた。肉眼的には 2.70 ± 0.27 mm (長さ) の表面滑達な白色米粒様の胞囊が観察され、圧片標本では $14.2 \pm 0.6 \mu\text{m}$ (長さ) の三日月型の胞子が鏡検された。

病理組織学的検査では、内層が海綿状で外層が胞子により稠密となった2層構造が認められた。

野鳥における住肉胞子虫寄生の報告は多くあるが、

未だにフラミンゴ目の寄生例報告はなく貴重と思われるので報告した。

形態学的観察だけでは種の同定は難しいものの、電顕的壁構造の観察から南アフリカ産の野鳥寄生の住肉胞子虫にはおよそ6種のもが存在するといわれる一方、種の特異性が失なわれていると推定される報告もあり、当該例がどのような組織構造(電顕的)を有しているかを調べることは今後の興味ある課題となった。