



**Parasites of the marabou stork (*Leptoptilos crumeniferus* (Lesson)) in Queen Elizabeth National Park\*, Uganda**

As part of a more extensive research project undertaken by one of us (D. E. P.), several marabou storks were shot in the vicinity of Mweya, Queen Elizabeth National Park, in western Uganda, in March 1970. One of the investigations carried out on these birds was to examine four of them for endo- and ectoparasites and for possible infection with *Salmonella* or *Shigella* species of bacteria.

Marabous feed mainly by scavenging (Kahl, 1966). Until recent times the species was probably rather rare, but today marabous are a common sight at abattoirs, urban refuse tips, and around fishing villages. Leavings from the fish-processing plants in the vicinity of Lakes George and Edward† probably constituted most of the food of the birds examined here. However, marabous appear to travel considerable distances at certain times, and these birds may well have had a much more varied diet during the few months prior to collection.

*Procedures*

Feathers and skin of the birds were examined for ectoparasites. The birds were dissected and the various organ systems and body cavities were examined in detail for endoparasites. A total of at least 60 cm of intestine, half from the proximal and half from the distal end of the gut, was opened lengthwise. Contents were removed and examined macroscopically; in addition, a direct smear preparation was examined microscopically. Gizzard, proventriculus and oesophagus were also opened and searched. Similarly, trachea, lung, liver and gall bladder were searched.

A sample (approximately one gram) of faeces was preserved in MIF solution and later examined by acid ether concentration of the entire sample. In the case of bird No. 2, the intestinal mucosa was noted to be edematous with petechial haemorrhages throughout and with a heavy mucous exudate. Mucosal scraping showed *Giardia* species; for examination of the MIF preserved sample from this bird, formalin ether rather than acid ether concentration was used. The entire concentrated sediment from all specimens was examined microscopically; findings were measured with an ocular micrometer and tracings transferred to paper using a camera lucida attachment on the microscope.

For bacteriological examination, Stuarts transport medium slopes and DCA agar plates were inoculated in the field. Non-lactose-fermenting isolates from the DCA plates were placed on nutrient agar slopes in the field. In the laboratory, routine procedures for identification of enteric bacteria were used to identify isolates; media included DCA and McConkey medium plates, thioglycolate broth, urease and indol

\* Since going to press Queen Elizabeth National Park has been renamed Ruwenzori National Park.

† Since going to press Lake Edward has been renamed Lake Amin.

test media, sugar utilization media (lactose, glucose, mannitol, sucrose, and dulcitol) and *Salmonella* and *Shigella* typing sera for confirmation of identification when necessary.

Additional faecal samples and samples of fresh blood were taken for virological tests. No further examination of blood was made.

### Results

Table 1 below lists the parasites, and their locations in the host, of the four birds examined in detail. A nematode species found in a fifth bird (examined later) and another tick, from a sixth bird, are also included. The original four birds are those designated 1, 2, 3 and 4 in the table. All the birds were adults; 1, 2 and 3 were males; 4 was a female. The most commonly encountered endoparasite was the echinostome *Balfouria monogama* (Leiper, 1908), numerous specimens of which were found in three of the birds.

Table 1. Parasites found in six marabou storks

Species	Location in the host	Found in bird No.
Arthropoda		
(A) Ticks (Acarina)		
(i) <i>Amblyomma lepidum</i> (Dönitz, 1909)	Skin of neck: one adult	6
(ii) <i>Amblyomma</i> sp.	Skin of head and neck: three nymphs, eight larvae	1, 4
(iii) <i>Argas (Persicargas) ? arboreus</i> Kaiser, Hoogstraal & Kohls, 1964	Skin (inguinal region): twenty-seven larvae	3
(B) Bird lice (Mallophaga)		
(i) <i>Ardeicola fissomaculatus</i> (Beibel, 1874)	Feathers	1, 2
(ii) <i>Ciconiphilus africanus</i> (Bedford, 1939)	Feathers	2, 3
(iii) <i>Colpocephalum longissimum</i> (Rudow, 1869)	Feathers	2, 3
(iv) <i>Laemobothrion</i> sp.	Feathers	4
Protozoa		
<i>Giardia</i> sp.	Lumen of upper intestine	2
Trematoda		
(i) <i>Balfouria monogama</i> (Leipera, 1908)	Encysted throughout gut wall	1, 3, 4
(ii) <i>Cathemasia spectabilis</i> (Odhner, 1926)	On mucosal lining of oesophagus	2, 3
Nematoda		
(i) <i>Eustrongylides africanus</i> (Jagerskiold, 1909)	Encysted in proventriculus	2
(ii) <i>Dujardinascaris</i> sp.*	Unattached in proventriculus	2
(iii) <i>Paronchocerca ? ciconarium</i> (Peters, 1936)	Pulmonary artery	5

\* Immature—identification on basis of gut morphology only.

Table 2 lists findings from microscopic examination of preserved faecal specimens. No object identified as a protozoal cyst or coccidial oocyst was seen. Identification of *Balfouria monogama* eggs was possible since several gravid worms were crushed and examined microscopically. The identity of other eggs was not determined.

No bacterium identified as *Salmonella* or *Shigella* strains was found among the bacterial isolates from these birds. Strains identified as *Achromobacter* and *Pseudomonas* species were isolated but were not further identified.

Faecal and blood samples were tested for presence of viruses by the E. A. Virus

Table 2. Eggs in marabou stork faecal specimens

Bird No.	Description of egg	Size of eggs (no. measured)	No. of eggs found
1.	Non-embryonated, operculated	51 × 97 μm (4)	4
2.	Non-embryonated, operculated	Not measured	4
3.	Non-embryonated, operculated	49 × 93 μm (6)	8
	<i>B. monogama</i> , embryonated, eyespot	57 × 97 μm (6)	66
4.	Non-embryonated, operculated	49 × 93 μm (3)	3
	<i>B. monogama</i>	58 × 94 μm (13)	177
	Small with coiled larva	18 × 29 μm (1)	1

Research Institute, Entebbe, who have kindly provided the following information. Blood specimens were inoculated into new-born mice, and the faecal specimens were tested in a culture of monkey kidney tissue. In both cases the results were negative.

#### Discussion

The birds carried only a small number of species of parasite and these did not appear to be present in excessive numbers, despite the fact that marabous are exposed to a wide variety of vertebrate food (particularly fish, and to a lesser extent frogs, reptiles and mammalian carcasses). Marabous are often in close contact with man, especially at fish landing-places and abattoirs. The results presented here, whilst based on a small sample, do not indicate the presence of pathogens of primary importance to man. The *Achromobacter*, *Pseudomonas*, or even the *Giardia* species might conceivably be of importance as incidental or opportunistic pathogens, but the likelihood of this would seem to be small.

The presence of an adult tick, *A. lepidum*, is of interest because this species normally breeds much further to the north. The bird concerned, an immature, was caught in Kampala in January, a time when a considerable migration of marabous occurs.

Lice of the genus *Laemobothrion* are normally associated with birds of the order Falconiiformes; possibly the single specimen found on a marabou was a straggler. Marabous share roosting-sites in Queen Elizabeth Park with various birds of prey, notably the hooded vulture, *Necrosyrtes monachus* (Temminck) and the African fish eagle, *Circus vocifer* (Daudin).

#### Acknowledgments

We wish to express our appreciation to the Nuffield Unit of Tropical Animal Ecology, whose co-operation in making available their facilities at Queen Elizabeth National Park made this study possible.

We also wish to thank the following for their help in identification of the parasite species: Drs H. Hoogstraal and M. Kaiser, United States Naval Medical Research Unit, No. 3 Cairo, Egypt, for identifying the tick specimens; Dr T. Clay, British

Museum, for identifying the bird lice specimens; and Mr T. Panesar, Vector Control Division, Uganda Ministry of Health, for identification of the *Dujardinascaris* sp. and for confirmation of identification of the other helminth species.

*Reference*

KAHL, M.P. (1966) A contribution to the ecology and reproductive biology of the marabou stork (*Leptoptilos crumeniferus*) in East Africa. *J. Zool. Lond.* **148**, 289-311.

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*(Manuscript received 15 May 1972)*