Helminths of the Tsushima Leopard Cat (Felis bengalensis euputilura)
Authors: Nobuhiro Yasuda, Masao Akuzawa, Hiroyuki Maruyama, Masako Izawa, and Teruo Doi
Source: Journal of Wildlife Diseases, 29(1) : 153-155
Published By: Wildlife Disease Association
URL: https://doi.org/10.7589/0090-3558-29.1.153
Helminths of the Tsushima Leopard Cat (Felis bengalensis euptilura)

Nobuhiro Yasuda,1 Masao Akuzawa,2 Hiroyuki Maruyama,1 Masako Izawa,3 and Teruo Doi4 1 Laboratory of Veterinary Pathology, Faculty of Agriculture, Kagoshima University, Kagoshima 890, Japan; 2 Laboratory of Veterinary Medicine, Faculty of Agriculture, Kagoshima University, Kagoshima 890, Japan; 3 Laboratory of Ecology, Department of Biology, Faculty of Science, University of the Ryukyus, Okinawa 903-01, Japan; 4 Laboratory of Ecology, Department of Biology, Faculty of Science, Kyusyu University, Fukuoka 812, Japan

ABSTRACT: Three Tsushima leopard cats (Felis bengalensis euptilura) in Japan were collected as road kills. Three species of trematodes (Pharyngostomum cordatum, Paragonimus sp. and Dicrocoeliidae gn. sp.), one species of cestode (Spirometra erinacei) and nine species of nematodes (Arthrostoma hunanensis, Uncinaria felidis, Uncinaria sp., Anyclystoma tubaiforme, Molineus springsmithi, Toxocara cati, Capillaria aerophila, Capillaria felis-cati, and Capillaria sp.) were found. Among these helminths, Arthrostoma hunanensis, Uncinaria spp., and Molineus springsmithi have not been previously reported in Japanese domestic cats.

Key words: Tsushima leopard cat, Felis bengalensis euptilura, wild cat, helminth, Arthrostoma hunanensis, Pharyngostomum cordatum.

The Tsushima leopard cat (Felis bengalensis euptilura), a wildcat found on the Tsushima Islands, Japan, is the smallest subspecies of F. bengalensis (Imaizumi, 1960). Yoneda (1990) estimated a population of less than 100 Tsushima leopard cats on the island for this endangered (Izawa and Doi, 1991) subspecies.

Our objective was to gain some insights into the parasitological status of these endangered Japanese wildcats.

The two Tsushima Islands (34°05’ to 34°42’ N, 129°10’ to 129°30’ E) are 120 km from the Japanese mainland and 50 km from the Korean Peninsula, and cover an area of 710 km². Three Tsushima leopard cats were collected as road kills on the Tsushima Island and were transported with cooling by dry ice to the Laboratory of Veterinary Pathology, Faculty of Agriculture, Kagoshima University, in March (Cat 1), July (Cat 2) and October (Cat 3), 1988, respectively. Helminths obtained were all dead and some were decomposed. All worms were fixed in 5% phosphate buffered saline formalin solution and cleared in a lactophenol solution. Cestodes and trematodes were flattened, stained with Grenacher’s ammonium alum-carmine (Lillie, 1948) and examined morphologically. All measurements were in micrometers. All worms measured were mature.

Parasites obtained form the three Tsushima leopard cats were three species of trematodes, one species of cestode and nine species of nematodes (Table 1).

Pharyngostomum cordatum previously was reported in both Tsushima leopard cats (Kifune et al., 1967) and in Irionote cats (Felis iriomotensis) (Hasegawa et al., 1985). This species was believed to be widespread in Tsushima leopard cats based on previous reports (Machida, 1970), and because of the wide distribution of intermediate hosts (Dubey, 1970) such as freshwater snails (Polyplys hemisphaerula), frogs, and snakes on the Tsushima Islands (Inoue, 1972).

A decomposed trematode encysted in the lung of one wildcat was considered to be Paragonimus sp. on account of the location of mouth sucker and acetabulum, the forms of ovary and testes and the size of eggs. While lung flukes occur among carnivores on the Japanese islands, there have been no previous reports in Japanese wildcats.

The few trematodes found in the pancreatic duct had characteristics of members of the family Dicrocoeliidae, based on their body size, location of two suckers, and egg sizes. They were not identified because of their advanced state of decomposition. Concinnum okinawanum is the only known fluke in Japan belonging to family Dicrocoeliidae; it occurs in domes-
Table 1. Helminths from three Tsushima leopard cats on the Tsushima Islands, Japan.

<table>
<thead>
<tr>
<th>Helminths</th>
<th>Infected tissues</th>
<th>Number of helminths</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Cat 1</td>
</tr>
<tr>
<td>Trematodes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pharyngostomum cordatum</td>
<td>Small intestine</td>
<td>0</td>
</tr>
<tr>
<td>Paragonimus sp.</td>
<td>Lung</td>
<td>1</td>
</tr>
<tr>
<td>Dicrocoeliidae gn.</td>
<td>Pancreas</td>
<td>+*</td>
</tr>
<tr>
<td>Cestodes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spirometra erinacei</td>
<td>Small intestine</td>
<td>0</td>
</tr>
<tr>
<td>Nematodes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arthrostoma hunanensis</td>
<td>Bile duct</td>
<td>6</td>
</tr>
<tr>
<td>Uncinaria felidis</td>
<td>Colon</td>
<td>3</td>
</tr>
<tr>
<td>Uncinaria sp.</td>
<td>Small intestine</td>
<td>0</td>
</tr>
<tr>
<td>Ancylostoma tubaeforme</td>
<td>Small intestine</td>
<td>0</td>
</tr>
<tr>
<td>Molineus springsmithi</td>
<td>Small intestine</td>
<td>0</td>
</tr>
<tr>
<td>Toxocara cati</td>
<td>Stomach</td>
<td>0</td>
</tr>
<tr>
<td>Capillaria aerophila</td>
<td>Trachea</td>
<td>0</td>
</tr>
<tr>
<td>Capillaria felis-cat</td>
<td>Bladder</td>
<td>0</td>
</tr>
<tr>
<td>Capillaria sp.</td>
<td>Stomach</td>
<td>0</td>
</tr>
</tbody>
</table>

* An approximation.
+ Numbers not determined.

Tic cats on the Japanese island of Okinawa (Hasegawa and Asato, 1983, 1984). Eggs of flukes belonging family Dicrocoeliidae are found also in the feces of Iniomote cats (Akuzawa et al., 1987). Other possible pancreatic flukes are C. procyonis (Burrows and Lillis, 1960) and Platynosomum fastosum (Leam and Walker, 1963), which have not been reported in Japan.

Spirometra erinacei was the only cestode found. This is a very common tapeworm in Japanese domestic cats and has previously been reported from both Tsushima leopard cats (Machida, 1970) and Iniomote cats (Hasegawa et al., 1985).

There are no reports of hookworms belonging to the family Ancylostomatidae, except Ancylostoma tubaeforme in Japanese domestic cats (Uga et al., 1983). However, Ancylostoma caninum is morphologically quite similar to A. tubaeforme. These two species are differentiated by the form of mouth and tail, and the arrangement of lateral bursal rays (Burrows, 1962).

The worm found in the bile duct was consistent with the description of Arthrostoma hunanensis that was once reported from Felis bengalensis in China (Cheng and Shen, 1982). This was the only arthrostomatid hookworm found in the bile duct. To our knowledge there is no previous report on this worm in Japanese wildcats. All three wildcats examined had many such worms in the bile duct.

Uncinaria felidis was identified by the body size and the shape of bursa copulatrix and prevulvar flap. There were no previous reports of Uncinaria sp. in Japan except U. maya from Iniomote cats (Hasegawa, 1989).

Another Uncinaria sp. found in the ileum in one wildcat was similar to U. felidis but differed in the size and the form of head and prevulvar flap. It also resembled U. maya in shape but was different in the measurement of parts. No male worms for this Uncinaria sp. were available for species identification.

The Molineus sp. was similar to Molineus springsmithi from wildcats in Nepal (Inglis and Ogden, 1965) and M. s. yayeyamanus from Iniomote cats (Hasegawa, 1989). There have been no reports of Molineus sp. from Japanese domestic cats.
We are grateful to Professor Yuiti Ono and Mr. Masaya Tatara, Kyusyu University, and the Government office of Tsushima Islands for allowing us to study this precious animal, and Professor Doris Wurster-Hill, Dartmouth Medical School, for advice.

**LITERATURE CITED**


Received for publication 8 January 1992.