RESEARCH NOTES

Coprology of Panthera tigris altaica and Felis bengalensis euptilurus From the Russian Far East

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ABSTRACT: Fecal samples from the Siberian tiger (Panthera tigris altaica) and the Amur cat (Felis bengalensis euptilurus) from Far Eastern Russia, were examined for parasites. A natural sedimentation methodology was used and a complete examination of all the sediment was performed. This fecal investigation allowed us to isolate and identify several developmental stages of gastrointestinal, hepatic, and respiratory parasites. Five parasites were found from P. t. altaica: 11 tetramedate (Platynosomum fastosum) and 4 nematodes (Strongyloides sp., Ance- llostomatidae, Toxocara leonina, and Toxoeca catt). Five parasites were found from F. b. euptilurus: 1 cestode (Diplopylidium sp.) and 4 nematodes (Trichuris sp., Ancylostomatidae, Toxocara leonina, and Aeluromonstrylus abstrusus). In addition, trophozoites of the amoeba Acanthamoeba sp. were detected in tiger feces.

Although there are several postmortem parasitological studies of free-ranging and captive felids in different parts of the world, coprologic investigations are scarce and limited to a few species, such as Panthera leo (Bjork et al., 2000), Panthera pardus (Patton and Rabonowitz, 1994), wild Felis catus (Palumbo et al., 1976), Felis sylvestris (Yamaguchi et al., 1996), and Felis sylvestris and Lynx pardinus (Rodriguez and Carbonell, 1998). Studies on captive tigers have also been done (Garner et al., 1996; Jakob and Wesemeier, 1996); however, little is known about parasites of wild Panthera tigris (Mandal and Choudhury, 1985; Patton and Rabonowitz, 1994; Marathe et al., 2002). In the case of the subspecies, Panthera tigris altaica, an occurrence of toxoplasmosis was described as a result of a single veterinary examination in a zoo (Dorny and Fransen, 1989). References regarding Felis bengalensis are poor (Patton and Rabonowitz, 1994) and those dealing with the subspecies, Felis bengalensis euptilurus, are exclusively from a Czech Republic zoo (Lukesova and Literak, 1998) or postmortem studies on wild specimens (Yasuda et al., 1993, 1994).

The understanding of these pathogens focused on wild animals allows us to increase the knowledge about the ecology of wild felids and to establish correct programs of prophylaxis if necessary.

During September and October 2001, an expedition to Far Eastern Russia was carried out with the aim of studying the Panthera tigris altaica subspecies and its survival perspectives, and to collect data on another under-studied felid: Felis bengalensis euptilurus. Fecal samples were collected by a team of Russian guides and biologists as part of the expedition team only collected samples that were preserved in 2% aqueous (w/v) dichromate potassium. We employed a filtration–sedimentation technique for the diagnosis of the parasites. All samples were incubated at room temperature in order to observe the embryonic development of eggs.

Parasitic forms representing 9 taxa were found in the fecal samples. Each analyzed sample was positive. Table 1 shows the number and distribution of the parasitic forms. Parasites were identified according to size and morphology of the forms present in feces (Hartwick, 1974; Khalil et al., 1994; Bowman, 1995). In P. t. altaica, Toxocara catt shows the higher prevalence, followed by Platynosomum fastosum, whereas in F. b. euptilurus the Anclostomatidae eggs have been the most prevalent, followed by Trichuris sp.

One species of amoeba was found: Acanthamoeba sp. We have only observed trophozoites; cysts have not been seen. Acanthamoeba sp. (family Hartmannellidae Volkonsky, 1931) was observed in one of the tiger samples. The trophozoites measured 10–25 μm, with hyaline projections as spikelike, star-shaped pseudopodia (acanthopodia). This amoeba belongs to a genus of free-living amoebas inhabiting fresh waters, rivers, pools, lagoons, and ponds. Acanthamoeba spp. also has been isolated from vegetation and from animals including fish, amphibians, reptiles, and mammals (Madrigal Sesma, 1988; Dykova et al., 1999). This amoeba occasionally infects man and animals, behaving as a pathogen mainly in immunosuppressed individuals (Bussières and Chermette, 1992). Acanthamoeba sp. are the causative agents of granulomatous amebic encephalitis (GAE), a fatal disease of the central nervous system (CNS), and amebic keratitis (AK), a painful sight-threatening disease of the eyes that can also cause cutaneous lesions and sinusitis (Martinez and Janitschke, 1985; Martinez and Visvesvara, 1997). Acanthamoeba spp. have been isolated from nasal mucosa, throats, brain, lung tissue, skin lesions, corneal tissue, intestinal contents, and feces (Cerva et al., 1973; De Jonckheere, 1991; Visvesvara et al., 1990). The works about isolation of amoebas from intestinal contents and feces are more common in humans than in animals (Velloso, Alves et al., 1984; Velloso, Manzini et al., 1984; Moura et al., 1985; Echandi et al., 1994; Zaman et al., 1999). Because of the predisposition that tigers show for water, the lack of extended behavior in felids, and the very important role that water plays in the amoeba dispersion, it could be surmised that tigers would be exposed to an infection of this type, particularly considering immunodeficiency states and other factors. It is possible that cysts have not been observed because excystation may have occurred before the samples came to the laboratory.

Eggs of Platynosomum fastosum Kossack, 1910, a hepatopancreatic fluke of the family Dicrocoeliidae Odhner, 1911 that occurs in the liver, bile and pancreatic ducts of numerous domestic and wild felids, were isolated from 2 tiger samples. These eggs, 44–60 × 24–38 μm (n = 15), were operculated, brownish, and oval, and contained a fully de-
TABLE I. Number and distribution of each species of parasite. S. = sample; x/x = number of eggs found in the sample/number of larvae found in the sample.

<table>
<thead>
<tr>
<th>Parasite name</th>
<th>S.1</th>
<th>S.2</th>
<th>S.3</th>
<th>S.1</th>
<th>S.2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acanthocephala sp.</td>
<td>1/0</td>
<td>2/0</td>
<td></td>
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<tr>
<td>Platystrongylus fastosum</td>
<td>1/0</td>
<td>2/0</td>
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<tr>
<td>Diplopylum sp.</td>
<td>1/0</td>
<td>2/0</td>
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<tr>
<td>Trichuris sp.</td>
<td>1/0</td>
<td>2/0</td>
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<tr>
<td>Strongyloides spp.</td>
<td>1/0</td>
<td>2/0</td>
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<tr>
<td>Ancylostomastida sp.</td>
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<td>2/0</td>
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<tr>
<td>Diplopylum abstrusus</td>
<td>1/0</td>
<td>2/0</td>
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<tr>
<td>Toxocara cati</td>
<td>1/0</td>
<td>2/0</td>
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<tr>
<td>Toxocara leonina</td>
<td>1/0</td>
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* Presence of amoeba trophozoites.

in felids are Diplopylum acanthotetrum and Diplopylum nölleri. Diplopylum acanthotetrum has been found in wild felids of Europe and the Middle East, having amphibians and reptiles as paratenic hosts. Diplopylum nölleri is a canid and felid parasite found in Asia, Europe, and North Africa. We cannot disregard the possibility that these eggs belong to another dilepid tapeworm, Joyeuxiella sp. Fuhrmann, 1935, in which the uterine capsule also contains only a single egg. To distinguish Diplopylum from Joyeuxiella we would need to have the adult forms (Schmidt, 1986). Species described in wild and domestic felids are Joyeuxiella chyzeri (Ratz, 1897) syn Joyeuxiella pasquali (Diamare, 1893) and occur in Europe, Asia, and Palestine (Schmidt, 1986; Khalil et al., 1994), and Joyeuxiella riccius (Skrijabin, 1923) in Russia. First intermediate hosts known in both dilepidids are coprophagous arthropods, adult or larvae or related to animals (fleas and lice). Reptiles, amphibians, and small mammals are also known as paratenic hosts (Rysavy, 1973; Roca et al., 1987).

The eggs of Capillaria sp. (family Trichuridae) (Ransom, 1911) appeared in the cat samples and measured 62–66 × 30–32 μm (n = 10). The eggs differ from those of Trichuris only in detail. They are ovoid, lemon-shaped, slightly irregular in symmetry, with a transparent plug at either pole and display a yellowish or orange-brown coloration with a lemon-shaped, slightly irregular in symmetry, with a transparent plug. These eggs contained 1 or 2 spherical cells, which can be observed every phase of the embryonic development until the formation of an embryo, the different segmentation stages until the formation of an embryo, the differentiation of the first and second-stage larvae, and the hatch of this last stage, which took place in 40% of the observed eggs. Bowman (1995) mentions that second-stage larvae of Toxocara cati hatch when eggs come in contact with gastrointestinal and bile fluids of the host. We have detected that a considerable number of larval have hatched under laboratory conditions. No explanation has found for this behavior. The low intensity of this parasite seems to indicate that tigers have acquired the parasite by ingestion of L. larvae in paratenic hosts.

Toxocara leonina (v. Linstow, 1902) is also a member of the family Ancylostidae. It occurs in the small intestine and sometimes in the bile ducts of wild and domestic canids and felids in most parts of the world. Eggs were found in 1 sample of each host. These eggs measured 60–75 × 75–85 μm (n = 20), were colorless and slightly oval with a smooth shell surface. The outer layer was about 2 μm, without striations or albuminous coat. These eggs contained 1 or 2 spherical cells, which did not occupy the entire interior of the egg. In this case, we were able to observe every phase of the embryonic development until the second-stage larvae, which developed in 4–6 days. However, hatching of these second-stage larvae was never observed. The egg of Toxocara leonina containing a second-stage larva is also the infective stage.

All parasites are cited for the first time on these hosts with the exception of Toxocara cati which has been described on P. t. altaica.

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LITERATURE CITED


