Original Article

Gastrointestinal Helminthic Parasites in Stray Cats (*Felis catus*) from North of Iran

**E Changizi**¹, **I Mobedi**², **MR Salimi-Bejestani**¹, **A Rezaei-Doust**¹

¹School of Veterinary Medicine, Semnan University, Semnan, Iran
²Dept. of Parasitology & Mycology, School of Public Health, Medical Sciences/ University of Tehran Iran

(Received 7 Apr 2007; accepted 14 Oct 2007)

Abstract
Background: Cats play a crucial role in the epidemiology of gastrointestinal helminthic parasites and also play a major role in transmitting of these parasites through faecal contamination of soil, food or water. The aim of this study was to determine the species of gastrointestinal helminthes parasites in stray cats from a rural area of Bandar-e-Anzali, Iran.

Method: Gastrointestinal helminthes were collected from 50 necropsied stray cats (*Felis catus*) after capturing them by trapping from different regions of the city and humanely euthanatized in Bandar-e-Anzali, a port in the Caspian Sea in northern Iran, from March to November 2003.

Results: The prevalence of infection was 90%, with those of individual parasites being *Diplopylidium nolleri* 54%, *Physaloptera praeputialis* 32%, *Ancylostoma tubaeforme* 20%, *Joyeuxiella pasqualei* 10%, *Toxocara cati* 8%, *Pterygodermatites affinis* 6%, *Ancylostoma caninum* 4%, and *Taenia taeniaeformis* 2%. Concurrent infections with two or more parasites were recorded in 34% of the individuals. In relation to the sex, the differences were not significant.

Conclusion: *P. praeputialis, T. cati, D. nolleri* and sometime *J. pasqualei* are the commonest Helminthes in cats. This is the first reported isolation of *P. affinis* and *A. caninum* infections from cats in Iran.

Keywords: Stray cat, Gastrointestinal helminth, Pterygodermatites affinis, Iran

Introduction

Parasites are the most common causes of gastrointestinal disease in domestic cats. Stray cats provide a potential reservoir of helminthic parasites to domestic cats, especially in rural areas (1). Rural cats prowl in urban and rural regions near residential areas. They are reservoir of many zoonotic infestations such as hookworm & ascariasis (2, 3). Excretion of large quantities of faeces by rural cats, presents a health hazard to the human population especially children.

The aim of this study was to determine the species of gastrointestinal helminthes parasites in stray cats from a rural area of Bandar-e-Anzali, Iran.

Materials and Methods

During the period from March to November 2003, a total of 50 (34 males and 16 females) cats were captured by trapping (baited cage-traps) from different regions of the Bandar-e-Anzali, north of Iran. All cats were humanely euthanatized (Confirmation No B-86/955 Iran S.P.C.A). The trapped cats were fixed by two pieces of wood at the corner of the cage and anesthetized by 3 ml ketamine 10% and then killed. The abdominal cavity was opened, the esophagus was detached and the stomach and intestinal tract stripped separately from the mesentery. Then the gastrointestinal tract was...
opened along its entire length and examined for the presence of mature and immature helminthes, both in the contents of the gut and in scraping of the mucosa. They were washed in sieve No. 60 and examined under a magnifying lens providing a six times magnification.

All obtained helminthes parasites were collected and relaxed in water, then fixed in 70% alcohol and 5% glycerin (4) and examined under the microscope. Nematodes were mounted and cleared in lactophenol (4) and tapeworms were mounted and stained in acid alum carmine for identification and counting. The number of individuals of each species was recorded. The number of cestodes was calculated according to the number of scoleces. All parasites were identified using the keys of Yamaguti (5) and Soulsby (6).

Results

Five species of nematodes, *Ancylostoma tubaeforme*, *A. caninum*, *Toxocara cati*, *Pterygodermatites affinis* & *Physaloptera praeputialis* & three species of cestodes, *Joyeuxiella pasqualei*, *Diplopylidium nolleri* and *Taenia taeniaeformis* were found in this study. Of the 50 examined cats, 45 (90%) were infected with at least one species of helminths. Twenty seven cats were parasitized by one species, 11 by two and 7 by three species. Among the species found, the two most common and numerous were *D. nolleri* (54% with a total of 181 worms, 6.7± 3.09) and *P. praeputialis* (32% with a total of 74 worms, 4.56± 2.33). The number of infected cats, and the prevalence and intensity of infection are listed in Table 1. As no significant difference in the prevalence of parasitic infection was found between male and female cats the results for both sexes have been combined.

<table>
<thead>
<tr>
<th>Parasite</th>
<th>Number of infected cats</th>
<th>Prevalence (%)</th>
<th>Intensity (mean ± SD)</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>T. cati</em></td>
<td>4</td>
<td>8</td>
<td>3 ± 0.81</td>
<td>2 – 4</td>
</tr>
<tr>
<td><em>P. praeputialis</em></td>
<td>16</td>
<td>32</td>
<td>4.56 ± 2.33</td>
<td>2 – 9</td>
</tr>
<tr>
<td><em>A. tubaeforme</em></td>
<td>9</td>
<td>18</td>
<td>3.11 ± 0.62</td>
<td>2 – 5</td>
</tr>
<tr>
<td><em>A. caninum</em></td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><em>P. affinis</em></td>
<td>3</td>
<td>6</td>
<td>1.66 ± 0.57</td>
<td>1 – 3</td>
</tr>
<tr>
<td><em>D. nolleri</em></td>
<td>27</td>
<td>54</td>
<td>6.7 ± 3.09</td>
<td>3 – 18</td>
</tr>
<tr>
<td><em>J. pasqualei</em></td>
<td>5</td>
<td>10</td>
<td>1.4 ± 0.54</td>
<td>1 - 2</td>
</tr>
<tr>
<td><em>T. taeniaeformis</em></td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Discussion

The parasitic infection rate (number of cats infected by at least one species of helminths) in this study of 90% was similar to that reported in earlier studies, i.e. 98.5% in Isfahan(7), Iran, 89.7% in Spain (1) and 89.6% in Brazil (3). Several studies on the prevalence of endoparasites, as determined at autopsy, in stray cats in Iran have been reported (7-12). The results of these studies are summarized in Table 2. The *Toxocara cati* prevalence of 8% found in the current study was similar to that of other studies in Iran at around the same time - 8.3% in Ahvaz (11); 16% in Tehran, (8); and 13% in Isfahan, (7). Nevertheless the prevalence rate in this study was lower than that found in the earlier studies in Iran by Mirzayans (13) and Sadighian.
(12), with parasitism rates of 42.31% and 67.5%, respectively. However the prevalence encountered in this study was very similar to that of Iraq (15%) (14), but far lower than Spain (55.2%) (1), England (53.3%) (15), Greece (66.7%) (16) and Denmark (79%) (17).

Table 2: Previous studies of helminthes parasites in the gastrointestinal of stray cats (Felis catus) in various regions of Iran

<table>
<thead>
<tr>
<th>Place</th>
<th>Reference</th>
<th>Collected parasites</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tehran</td>
<td>10</td>
<td>Physaloptera praepatialis, Toxocara cati, Toxascaris leonina, Taenia taeniaeformis, Mesocestoides lineatus, Dipylidium caninum</td>
</tr>
<tr>
<td>Tehran</td>
<td>8</td>
<td>Toxocara cati, Physaloptera praepatialis, Dipylidium nolleri, Toxascaris leonina</td>
</tr>
<tr>
<td>Northern parts of</td>
<td>9</td>
<td>Toxocara cati, Physaloptera praepatialis, Ancylostoma tubaeforme, Mesocestoides lineatus, Spirometra mansoides, Taenia taeniaeformis, Metrochis albidus, Opisthochris felineus, Corinosa sp.</td>
</tr>
<tr>
<td>Iran</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Isfahan</td>
<td>7</td>
<td>Toxocara cati, Physaloptera praepatialis, Taenia taeniaeformis, Dipylidium nolleri, Mesocestoides lineatus, Joyeuxiella pasqualeti, Joyeuxiella echinorhincoides, Taenia taeniaeformis, Dipylidium caninum, Dipylidium noller, Dipylidium acanthotetra, Joyeuxiella pasqualeti, Toxocara cati Physaloptera praepatialis, Rectalaria sp, Toxoplasma gondii, Sarcocystis sp.</td>
</tr>
</tbody>
</table>
| Ahwaz              | 11        | Pterygodermatites affinis (Rictolaria cahirensis) was a wide spread parasite of the intestine of carnivores (such as e.g. Canidae, Felidae) (19). Quentin et al. (20) found larvae encapsulated in the insect. Larvae, which were in the wall of the ileum behind its junction with the malpighian tubules, were given to a young cat, which passed eggs 38 days later. In this study we report the first isolation of P. affinis from cats in Iran where a prevalence of 6% has been found. P. affinis has been isolated from foxes and jackals in northern parts of Iran (9, 21). This nematode has also been found in a cat in Iraq (22). In the present survey, Dipylidium nolleti had the highest prevalence (54%) of the cestodes that were isolated from gastrointestinal tract of Felis catus. This prevalence rate was higher than previously recorded rates in Iran, with moderate rates having been being found as 37.75% (23) and 15% (11). In some areas very low rates have been found. Bahadori et al. (8) found a prevalence of 1% in Tehran and Jamsizidi et al. (7) reported a rate of 0.7% in Isfahan. It seems that in the Northern part of Iran (Bandar-e-Anzali) with a humid climate, conditions for transmission of the parasite are good, but the dry urban areas, of Tehran and Isfahan, to be unsuitable for the survival of the
insect intermediate hosts. This results in failure of the parasite of *D. nolleri* to complete its life cycle leading to an absence of very low numbers of the parasite. In studies elsewhere the prevalence of *D. nolleri* was 36.4% in Egypt (24) and 57.7% in Greece (25).

The *Joyeuxiella pasqualei* prevalence (10%) was lower than that found earlier as 75.6% (7) and similar to Dalimi *et al.* finding as 3.92% (23). Mirzayans did not find *J. pasqualei* in her study (10). In other parts of the world (1, 22) *J. pasqualei* has also been reported in *Felis catus*. Little is known about the biological cycle of this species. Lopez Neyra (26) reported a reptile as the single intermediate host, while other authors have reported rodents as paratenic hosts, or arthropods and reptiles as first and second intermediate hosts, respectively (27, 28). *D. nolleri* and *J. pasqualei* transmission depends on coprophagous beetles. Cysticercoid of *D. nolleri* develops in beetles and reptiles. Small mammals serve as second intermediate hosts (6).

The *Taenia taeniaeformis* prevalence (2%) was similar to that found by Mirzayans (10) in Tehran as 0.95% and Nihad *et al.* (14) in Iraq as 4% and was lower than a previous study in Isfahan as 9.2% (7). In wild cats, foxes and jackals the prevalence of this cestode was found as 50%, 27% and 10%, respectively (9).

In conclusion, *P. praeputialis, T. cati, D. nolleri* and sometimes *J. pasqualei* are the commonest helminthes in cats together with *A. tubaeformis, Mesocestoides lineatus* and *T. taeniaeformis* which are the helminthes species more frequently encountered in Iran.

**Acknowledgements**

The present investigation was funded by the Islamic Open University, Garmsar section. The authors are grateful to the Bandar-e-Anzali Veterinary Organisation’s staff for their collaboration and to Dr. Ben Makepeace for his kind support. We are also grateful to those staff of municipally council of Bandar-e-Anzali who were helped us.

The authors declare that they have no Conflict of Interests.

**References**

11. Navidpour Sh. A study of gastrointestinal parasites of stray cats in Ahwaz, Iran.