

Research Note

**Prevalence of Intestinal Parasites with Fecal Examination in
Stray Cats Collected in the Western Area of Japan from 1983 to 1990**

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Stray cats are well known to harbor a number of protozoan and helminthic parasites. Many species of the parasites of cats are infective to humans as final and/or paratenic host, and they are called zoonotic parasites. As they are of free living in the urban and rural areas, feral and stray cats can freely contact with domestic or domiciled cats and also humans. From the medical and veterinary points of view, stray cats are regarded as potent reservoirs of various parasites. They voided eggs, oocysts and infective larvae in soils and other environmental circumstances (Uga *et al.*, 1989).

We have surveyed the prevalence of intestinal parasites in stray adult cats by fecal examination over 8 year period from 1983 to 1990. Totally 1064 stray cats including 1014 males and 50 females weighing from 2.0 to 5.0 kg were collected through animal dealers from the western areas of Japan including 15 prefectures in Kinki, Chugoku and Shikoku areas.

The cats were taken to the experimental animal room of Aburahi Laboratories and housed individually in aluminum cages in the isolated boxes to prevent air borne or contagious

diseases. The animals were fed daily with commercial dry cat food and canned fish meat. Water was available *ad libitum*.

Examination of cat feces for parasite eggs and oocysts was done with the following two methods, flotation and formol-ether concentration. In the flotation method, about 1 g of feces suspended in 10 ml of a 33% zinc sulfate solution (S.G. 1.18) were filtered through a sheet of gauze, and centrifuged at 2000 rpm for 5 min. The flots were examined with a microscope. In the ether-formol concentration, 1 g of feces suspended in 10 ml of a 10% formol solution were filtered and ethyl-ether (1/3 vol.) was added to it. They were shaken vigorously and centrifuged at 2000 rpm for 5 min. The sediments were observed with a microscope. The examination was done two or more times in each cat. Sometimes young or adult *Toxocara cati* and mature proglottids of cestoda were discharged spontaneously with the feces.

The results are shown in Table 1. The number of parasite positive cats were 439 (41.3%) of 1064 tested. Prevalences of each species are shown as follows in order of the detection rates: *Toxocara cati* (18.2%), *Spirometra erinacei* (15.6%), *Anchylostoma* sp. (10.9%), *Pharyngostomum cordatum* (9.3%), *Isoospora felis* (3.0%), *Isoospora rivolta* (2.1%), *Dipyridium caninum* (1.6%), *Trichuris* sp. (1.2%) and others. The annual detection rate tended a gradual increase during the years of the survey as shown in Fig. 1. The

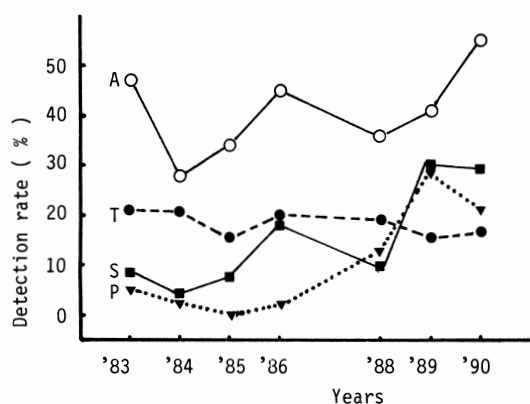
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annual detection rate of *T. cati* was almost at the same level through the whole period, while that



A: Annual detection rate of total positive cases
 T: *Toxocara cati*
 S: *Spirometra erinacei*
 P: *Pharyngostomum cordatum*

Fig. 1 Changes in annual detection rate of total positive case and three dominant species of intestinal parasites with fecal examination of stray cats in the western area of Japan.

of *S. erinacei* and *P. cordatum* turned to a high level in 1989 and 1990. *Toxoplasma* oocysts were detected in one cat from the same population restricted in 1988 and 1989, as reported elsewhere (Oikawa *et al.*, 1990).

Many surveys have been done on parasitic infection of cats in Japan (Asato *et al.*, 1986; Tanaka *et al.*, 1985; Uchida *et al.*, 1982) and in other countries (Nichols *et al.*, 1981a, 1981b; Heipe *et al.*, 1988).

The detection rates of parasites may be varied mostly depending on the difference of examination method such as coproscopy (fecal examination) or autopsy (dissection), and the difference of cats sources such as fecal, stray or domestic (or domiciled) cats living in the urban or rural areas under various sanitary circumstances. It may be also varied by ages of cats and by sexual differences with or without castration. Other factors to be considered are (1) years and seasons of examination, (2) examination duration, (3) areas of cat collection, and (4) metrological situation.

Table 1 Prevalence of intestinal parasites with fecal examination of stray cats in the western area of Japan

Items and Species	1983	1984	1985	1986	* 1988	1989	1990	Total
Number of cats tested	192	122	173	240	70	176	91	1064
Number of cats positive	92(47.2)	34(27.9)	58(33.5)	107(44.6)	25(35.7)	72(40.9)	50(55.0)	439(41.0)
<i>Isospora felis</i>	7(3.6)	2(1.6)	3(1.7)	9(3.8)	1(1.4)	10(5.7)	0	32(3.0)
<i>Isospora rivolta</i>	7(3.6)	4(3.3)	3(1.7)	3(1.3)	1(1.4)	1(0.6)	3(3.3)	22(2.1)
<i>Giardia</i> sp.	0	1(0.8)	1(0.6)	0	0	1(0.6)	0	3(0.3)
<i>Clonorchis sinensis</i>	2(1.0)	0	0	0	0	2(1.1)	0	4(0.4)
<i>Pharyngostomum cordatum</i>	10(5.2)	4(3.3)	0	5(2.1)	9(12.9)	52(29.5)	19(20.9)	99(9.3)
<i>Spirometra erinacei</i>	17(8.9)	5(4.1)	13(7.5)	46(19.2)	7(10.0)	52(29.5)	26(28.6)	166(15.6)
<i>Dipyridium caninum</i>	8(4.2)	3(2.5)	3(1.7)	3(1.3)	0	0	0	17(1.6)
<i>Taenia taeniaformis</i>	2(1.0)	0	0	0	0	0	0	2(0.2)
<i>Toxocara cati</i>	40(20.8)	25(20.5)	27(15.6)	46(19.2)	13(18.6)	28(15.9)	15(16.5)	194(18.2)
<i>Anchylostoma</i> sp.	28(14.6)	7(5.7)	16(9.2)	20(8.3)	3(4.3)	29(16.4)	13(14.3)	116(10.9)
<i>Trichuris</i> sp.	2(1.0)	0	4(2.3)	3(1.3)	0	4(2.3)	0	13(1.2)
Others	T2		C1(0.6)		Tg1(1.4)			
<i>P. cordatum</i> + <i>S. erinacei</i>	5(2.6)	1(0.8)	0	3(1.3)	5(7.1)	30(17.1)	10(11.0)	54(5.1)

*: Not done in 1987

T: Trematoda (species is not identified) C: *Capillaria felis-cati* Tg: *Toxoplasma gondii*

A comparison of helminthic infection rates examined in two methods (autopsy and coproscopy) of feral cats was reported on each parasitic species by Nichols *et al.* (1981a); *T.cati* 52.2% in autopsy and 36.2% in coproscopy, *D.cninum* 30.4% and 7.3%, *T.taeniaformis* 15.9% and 2.9%, and *Toxascaris leonina* 1.5% and 0%, respectively.

As is generally known, the detection rate by coproscopy was lower than that by autopsy. But autopsy can not be always applied to pet cats and laboratory cats. Fecal samples for coproscopy can be obtained repeatedly without any harmful effects to the cat.

It was concluded that the most dominant parasite species in stray adult cats was *T.cati* in this survey examined with coproscopy as well as in surveys with autopsy so far reported.

S.erinacei was detected at 21% in 1971 and 16% in 1985 in Kanto area in Japan, while *P.cordatium* was found at 1.3% in 1985 according to a survey tested with autopsy (Tanaka *et al.*, 1985). It might be interesting that a sharp increase in prevalence of *S.erinacei* and *P.cordatium* in 1989 and 1990 was observed in this survey.

Only a few reports were found on those two helminth species in England and in Germany, and *T.leonina* reported in those countries was not detected in the present survey.

Heipe *et al.* (1988) reported that the incidence of *D.caninum* was higher in urban cats than rural ones, while that of *T.taeniaformis* was higher in rural than urban, and that of *T.cati* was equally at a high level both in urban and rural. The exact incidence of cestodes in stray cats could not be certified in the present survey, because only the coproscopy was applied.

As shown in Fig. 1, the annual detection rate of total positive cases tended toward increase by years. This probably was caused by increase in

the rate of either single or mixed infection with *P.cordatium* and *S.erinacei*. It is not known whether *P.cordatium* is infective to human or not. On the other hand, *S.erinacei* is well known to infective to human, and larval (or plerocercoid) infection of the parasite known as sparganosis mansoni is especially important in Japan.

High prevalence of intestinal zoonotic parasites is to be seriously considered for soil contamination with their eggs or oocysts as is suggested by Uga *et al.* (1989).

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