Short communication

CONTAMINATION OF SOIL WITH PARASITE EGGS AND OOCYSTS IN AND AROUND KUALA LUMPUR, MALAYSIA

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Attempts to isolate parasite eggs from the soil have been made in many countries in the world. The soil samples collected from the surrounding environment in developed countries like Germany, England, Australia, Japan, or America have revealed the presence of *Toxocara* eggs (Schantz, 1989). *Toxocara* that causes the larva migrans in human has attracted considerable attention during recent years as an important public health problem. *Toxocara* infection in humans occurs primarily by ingestion of embryonated eggs in soil contaminated by feces of dogs and cats (Schantz and Stehr-Green, 1988). On the other hand, in many countries located in the tropical areas, little attempt has been made to detect parasite eggs from soil. Uga *et al.* (1995) examined the soil around houses in slum areas of Surabaya, Indonesia, and have found the eggs of *Ascaris lumbricoides* and *Trichuris trichura* including those of *Toxocara* sp. These reports suggest that the soil contamination in developed countries is caused by pet feces, while that in developing countries by both human and pet animal feces.

In recent years, in the capital cities and their suburbs in many developing countries in the tropics, a systematic developmental process is underway to establish an environment wherein the inhabitants can live comfortably in modern facilities. It is not exceptional in and around Kuala Lumpur, the capital city of Malaysia. In Kuala Lumpur, many big modern parks like those seen in America and Europe have been set up. However, at the same time, in rural areas of this country, there is a high infection rate of human parasites and subsequent soil contamination has been suggested (Lai, 1992; Rahman, 1994). Whether soil contamination by the parasite

eggs occurred in the newly developed modern parks has not been reported. In this study, we examined the present situation of soil contamination by parasite eggs in modern parks located in Kuala Lumpur city and its suburb.

Surveys were carried out on two occasions: December, 1994 (rainy season), and July, 1995 (dry season). In this study, the survey was done in three areas, and five parks in each area were examined, i.e., 15 parks in total. Those areas were Kepong area including Parks 1-5 located north-west of the city, Petaling Jaya area including Parks 6-10 in the south-west, and Serdang area including Parks 11-15 located south in the suburb. Soil samples were collected from 4-6 places of each park in the respective areas (89 samples were collected in each season; 178 samples in all). Collected samples were divided into four types (sand, loam, clay, and others) according to their character so as to clarify the relationship between the quality of soil and the contamination rate. The parasite eggs were detected by the centrifugal flotation technique described previously for the recovery of eggs from sand (Uga *et al.*, 1993).

Throughout the study, three species of helminth eggs (*Trichuris vulpis*, *Toxocara canis*, Unidentified nematoda) and four species of protozoan oocysts (*Isospora* sp., *Wenyonella* sp., *Hoarella* sp. *Octosporella* sp.) were detected (Table 1). Prevalence of parasites was 42% in the rainy season, and 24% in the dry season, suggesting parasite infections many occur more in the rainy season than in the dry season. Similar observation has also been made in Indonesia (Uga *et al.*, 1995). The contamination rate of soil with *T. vulpis* eggs was not changed either in the rainy or dry season. Because of

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Table 1 Species of soil-transmitted parasite eggs and oocysts recovered from soil in Kuala Lumpur, Malaysia

Species	No. of sample	Dec. 1994		Jul. 1995	
		No. of positive	(%)	No. of positive	(%)
<i>Trichuris vulpis</i>	89	4	4	4	4
<i>Toxocara canis</i>	89	0	0	1	1
Unidentified nematoda eggs	89	13	15	12	13
<i>Isospora</i> sp.	89	3	3	1	1
<i>Wenyonella</i> sp.	89	13	15	0	0
Oocysts#	89	8	9	7	8
Total	89	37*	42	21*	24

*More than two species of parasite were found in one specimen.

#Either the oocysts of *Hoarella* sp. or *Octosporella* sp.

the close morphological similarity between the eggs of *T. canis* and *T. cati*, little attempt has been made to differentiate between them. Scanning electron microscopic observation, however, has revealed a difference in surface structure of *T. canis* and *T. cati* eggs. They can also be distinguished by light microscopy (Uga *et al.*, 1993). Based on these previous observations, the *Toxocara* eggs detected in this study were identified as *T. canis*. The unidentified nematoda eggs shown in Table 1 were oval, embryonated, and measuring 36×71 μm in size, with a transparent egg shell. We are unable to determine the type of animal discharging these eggs or whether they were infective to human. As to *Wenyonella* sp., it seemed that the oocysts were less resistant to dryness, as its prevalence was 15% in the rainy season and 0% in the dry season, showing a significant difference. The definitive host of *Wenyonella* sp. is ducks. In the parks where such oocysts were detected, a pond was located at the center with ducks being raised, which might have been the source of contamination, but the possibility of other avian species cannot be excluded. The oocysts detected in this study were identified as *Hoarella* sp. or *Octosporella* sp. on the basis of their size, number of sporocysts, and number of sporozoites. Since the *Hoarella* sp. or *Octosporella* sp. are reported only from sauropsids, no further analyses were made.

Of the total soil samples collected, 53% were loam type followed by clay type (22%), sand type (18%), and other types (7%) with a parasite egg detection rate of 28, 25, 19, and 17%, respectively. These findings were not related with the type of soil and their contamination rate by parasite eggs.

Among the parasites recovered through this study, there were two species known to infect human beings, namely, *T. vulpis* and *T. canis*, dogs being the definitive host of both nematodes. No parasite that has human

beings as the definitive host was recovered, indicating no contamination by human feces occurred in these areas. On the contrary, Mohammad *et al.* (1988) reported that soil-transmitted helminths were widely distributed in the urban slums of Kuala Lumpur. Furthermore, recent studies done by Lai (1992) and Rahman (1994) have clarified the existence of many species of human parasites among the people living in the rural areas in Malaysia. Lai (1992) has also found eggs of *A. lumbricoides* and *T. trichura* in 10% of the dirt of the children's nails. With the importance of *T. vulpis* and *T. canis* in the causation of zoonosis, we analyzed the data further in detail (Table 2). Out of 15 parks studied, these two parasites were found in six parks (40%; Parks 1, 7, 9, 11, 12, and 13). Throughout the study, the Serdang area revealed the highest rate of contamination, especially from Park 11 in this area. *T. vulpis* eggs were also detected from adjacent Parks 12 and 13 indicating the higher intensity of contamination in Serdang area compared to other two areas. The reason for the higher contamination rate in this area appears to be due to many dogs kept in the Chinese community. Oikawa (1995) reviewed the study on a survey of dog and cat parasites in Malaysia. Subsequently, 12 species of parasites were reported and many of those were known to be a cause of zoonosis or larva migrans. Since

Table 2 Contamination rate of different parks by *T. vulpis* and *T. canis* eggs

Parsites	1994		1995	
	Park no.	No. of eggs found	Park no.	No. of eggs found
<i>Trichuris vulpis</i>	1	3	9	1
	7	1	11	1
	9	1	12	3
	11	105	13	1
<i>Toxocara canis</i>	—	—	11	2

contamination of soil by pet parasites might increase further, proper control measures in public areas to avoid zoonotic diseases should be taken.

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