

A SURVEY OF GASTROINTESTINAL NEMATODES IN SOIL SAMPLES IN IBADAN, NIGERIA

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SUMMARY

A survey was conducted to determine the level of soil contamination by gastrointestinal nematodes in high and low density areas of Ibadan Nigeria. This was to determine the comparative level of soil contamination by these helminthes. Out of the 60 top and deep soil samples collected from high-density areas, 12(20%) were positive for various pathogenic gastrointestinal nematodes. They include *Ascaris sp.*, *Toxocara canis*, *Trichuris trichiura*, *Strongyloides stercoralis*, *Ancylostoma sp.* and *Trichostrongylus colubriformis*. Of the 60 soil samples collected from low density areas 9(15%) were positive for *Ascaris sp.*, *Dictyocaulus filaria* and *T. trichiura*. However, their infection rates were not significantly different in the two study areas ($P > 0.05$ Chi square test). It is concluded that soil may play an important role in the epidemiology of these infections in man and animals.

INTRODUCTION

Gastrointestinal helminths of man and animals are ubiquitous in many parts of the tropics where environmental factors provide suitable conditions for their survival and development (Hanson & Perry, 1990). As a result of the unsanitary disposal of wastes and sewage in many urban centers in Nigeria and the free roaming of animals, the environment may play a significant role in the maintenance of the organisms in the man and animals. Pathogenic nematodes cause mild to serious ill health in the definite and

sometimes the intermediate hosts which may manifest in unthriftiness, weight loss, enteritis and diarrhea.

Urban areas in Nigeria harbor many stray animals, which may defecate near human dwellings (Dada and Belino, 1979). Some of these animals may be infected with zoonotic helminthes thereby contributing to the prevalence of the infection in man and animals (Webb and Archer, 1994). This may compromise environmental hygiene and constitute public health hazards.

This work was carried out to determine the various gastrointestinal nematodes in soil samples from various parts of Ibadan.

MATERIALS AND METHODS

Sources of soil samples

A total of 120 soil samples were collected from various parts of Ibadan between March and May 1997. Sixty samples each were randomly collected from low density and high-density areas respectively. Samples were collected from Beere, Oje, Molete, Adeoyo, New Bodija and Old Bodija all located within the Ibadan metropolis. Two samples were collected from each site, one from the topsoil and the other from the sub soil. The soil samples were collected with clean spoons into universal bottles and labeled as they were collected. Samples were analyzed within two hours of collection.

Laboratory Analysis

Five grams of each sample was mixed with water and sieved through a wire mesh to remove coarse sand/stones. The mixture was centrifuged at 1000xg for 10 minutes. The sediment was then mixed with saturated salt (NaCl) solution in a centrifuge tube and allowed to stand for 15 minutes. A cover slip was placed on top of the meniscus formed by the fluid and placed on a microscope slide and examined at x100 of the light Microscope (Soulsby, 1982). Pathogenic gastrointestinal nematode eggs or larva of man and animals were identified using morphometric and morphological parameters. The results were compared using the Chi-square test (Hayslett, 1974).

RESULTS

Out of the 60 soil samples collected from high-density areas 12(20.0%) were positive for gastrointestinal helminth eggs.

Of these, 5 (41.7%) and 7(58.3%) were recovered from the topsoil and subsoil respectively. Among the helminthes recovered are: *Ascaris spp*, *Ancylostoma duodenale*, *Toxocara canis*, *Trichostrongylus colubriformis*, *Trichuris trichiura*, *Strongyloides stercoralis*. *T canis*, *Tri. trichiura* *Strongyloides stercoralis* and *Ascaris spp* were recovered from top soil samples (See Table I).

From the 60 soil samples collected from low-density areas. 9(15.0%) were positive for nematodes. Out of these 6 (66.7%) and 3 (33.3%) were recovered from topsoil and subsoil respectively. Among the helminthes eggs seen are *Ascaris sp.*, *Ascaridia sp.*, *Dictyocaulus filaria*, *Trichuris trichiura*. From the topsoil in this area, *Dictyocaulus filaria* larva was seen from four samples while *Ascaris sp.* was seen in two (Table I).

DISCUSSION

From our results, the prevalence of gastrointestinal nematodes in soil samples in high constituting 17.5% of the total sampled. This result is however lower than the 27.2% recovery rate reported by Du-sai and Vakuru (1991) in Zaria for *Toxocara canis* alone. In our work there was no significant difference in recovery rate from low and high-density areas. This is probably because all areas are freely accessible to man and animals thereby

giving rise to the free deposition of pathogenic gastrointestinal nematode eggs in the various areas. Galadima *et al* (1989) reported higher recovery rates from quarters of educationally low individuals.

In this work, several of the nematodes recovered are of zoonotic importance. *Ascaris spp* and *Trichuris* has been reported to be the most common helminth parasites seen in a survey of human population (Onadeko and Ladipo, 1989). *Ascaris* eggs are known to survive in the soil for varying periods (Soulsby, 1982). *Ascaris sum* egg, which is similar to *A. lumbricoides*, is capable of causing viscera larva migrans in man although it is primarily a parasite of pigs.

The risk of environmental contamination by gastrointestinal nematodes is real. There is need for public enlightenment and surveillance for the infection in man and animals. Regular deworming of animals are necessary to reduce the worm burden in infected animal and human wastes will further improve the qualities of our environmental hygiene.

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TABLE I: Distribution of pathogenic gastrointestinal helminths in high and low density areas of Ibadan

Class of area	Street/area	Total collected	No. positive			Helminths
			Top soil	Subsoil	Total (%)	
High density areas	Beere	18	0	1	1 (5.6)	<i>Ascaris spp*</i> (SS)
	Oje	14	0	1	1 (7.1)	<i>Trichuris trichiura</i> (TS, SS)
	Adeoyo	14	4	2	6 (42.9)	<i>Strongyloides stercoralis</i> (TS, SS), <i>Trichostrongylus columbriformis</i> (SS)
	Molete	14	1	3	4 (28.6)	<i>T. canis</i> (TS), <i>Tri. Trichiura</i> (SS), <i>T. columbriformis</i> (SS), <i>Ancylostoma spp</i> (SS)
Subtotal		60	5	7	12 (20.0)	
Low density areas	New Bodija	30	4	1	5 (16.7)	<i>Ascaris spp</i> (TS), <i>Ascaridia spp</i> (TS), <i>D. filaria</i> (SS)
	Old Bodija	30	2	2	4 (13.3)	<i>Ascaris spp</i> (TS, SS), <i>D. filaria</i> (TS), <i>Tri. Trichiuria</i> (SS)
	Subtotal	60	6	3	9 (15.0)	
Grand Total		120	11	10	21 (17.5)	

TS- Top soil, SS- Subsoil