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Endoparasitic Worms in Pigs and Cows Butchered at Merila Abattoir and in Pigs Sold in Three Lechon Outlets in Iligan City

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Abstract

Parasitic nematodes, trematodes and cestodes were found in the gastro-intestinal organs and liver of pigs and cows butchered in Merila Abattoir and in the intestines of pigs sold in three lechon outlets in Iligan City. Adult worms and ova of nematodes such ***Ascaris suum; Trichuris*** *suis and an unidentified hookworm were found in the intestines of pigs.* ***Fasciola hepatica*** *was the only fluke detected in cow liver samples while roundworms such as* ***Oesophagostomum, Chabertia*** *and an unidentified juvenile form of an ascarid were found in pig liver samples. Gastro-intestinal organs of cows revealed four kinds of helminths, namely:* ***Haemonchus, Paramphistomum, Taenia saginata*** *and an unidentified nematode. Notes on the pathogenicity of these worms and the possibility of these as causative agents of zoonoses are also included in the study.*

Introduction

Practically all animals harbor at least a few parasites and that a great majority are able to tolerate them. However, harboring of a few worms in the host may cause recognizable disease especially when the host is more or less handicapped by poor nutrition and other debilitating conditions. Parasites harm their host causing mechanical damage such as devouring blood, blocking ducts or vessels, rubbing them of vitamins or other essential subtances, and by toxic effects, either by liberating toxic products or stimulating allergic reactions (Roberts and Janoby, 1996).

Almost every part of the carcasses of pigs and cows is usable and marketable. As

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sources of food, the flesh provides meat rich in protein; intestines are made into casings for processed meat; and blood, together with the intestines are also used for the preparation of a popular delicacy such as 'dinuguan'.

The study aimed at identifying the endoparasitic worms found in the gastro-intestinal tract and liver of cows and pigs slaughtered at Merila Abattoir, Iligan City and in the intestines of pigs butchered as lechon in three outlets in the city. Since microscopic examination is not done on macroparasites found in these visceral organs of these animals the researchers found it necessary to identify these. This survey is significant because many zoonoses are caused by helminth parasites and this is of prime importance to public health. Helminth parasitism may also cause staggering financial loss. Results could provide information to the public consumers as to the quality of meat they consume and to the city health authorities so that control and preventive measures may be strictly imposed.

Collection of samples was done in, at the most, two months time and parasitic worms were collected from organs considered by the City Health Inspector as unfit for public consumption(in the case of liver samples) and from intestines of cows and pigs which were still considered fit for food. In the lechon outlets where services of the inspector were not extended, sampling was done in intestines containing worms.

Materials and Methods

Sources of Samples

Gastro-intestinal organs, i.e. stomach, small and large intestines, and liver of cows as well as intestines of pigs were collected from Merila Abattoir, Iligan City. Intestines of pigs butchered for lechon were collected from three privately-owned lechon outlets in the city such Bayug, Tibanga and Pala-o.

Specimen Collection

Endoparasitic worms were collected from twenty-five cows and twenty-five pigs butchered. From each of the three lechon outlets, twenty pigs were sampled for worms. Parasitic worms seen attaching to the walls of the rumen or reticulum of the stomach and on the mesenteries of the intestine; or swimming on the fluid contents of abomasum or duodenum of cows were collected by gloved hands and using forceps. Cow liver and pig liver samples were sliced to expose the bile ducts and blood vessels. Small intestines of pigs were emptied with contents and worms were transferred into properly labeled containers using 5% or 10% aqueous formol-saline solution as fixative. The same fixative solution was used for the cow samples. The gross charactersitics of the organs from which the worm specimens were taken was also noted. Microscopic examination was done immediately in the Research Laboratory, Department of Biological Sciences, College of Science and Mathematics, MSU-IIT, Iligan City.

Laboratory Examination

Direct smear was done for bigger worms previously-washed with water or saline. Each of the worms was gently compressed on the glass slide by placing another slide on top of it. The slide cover was prevented from lifting or slipping by binding it with masking tape. Wet preparation was done with the intestinal materials which were collected together with the worms. This was examined for ova and parasites not visible to the naked eye.

Identification of the Worms

Identification was done with the aid of a stereomicroscope and compound microscope under LPO and HPO. The worms were named up to the nearest taxa possible based on the their morphological characteristics such as body length and width; suckers, body shape, color and others.

Results and Discussion

Helminth parasites were collected from twenty five of each organ samples, namely: cow liver; organs in the gastro-intestinal tract of cows; pig intestines and liver from Merila Abattoir, Iligan City; and, intestines of pigs from each of the three lechon outlets in the city, namely: Bayug, Tibanga and Pala-o. Observation of the gross characteristics of the organs infected such as color change, odor as well as presence or absence of lumps was done and notes on whether or not these worms are causative agents of zoonoses were included in this study. Table 1 depicts the helminth parasites that were found in the different organ samples of pigs and cows butchered and sold as meat or lechon.

Table 1. Parasitic helminths found in gastro-intestinal organs and liver of cows and pigs butchered at Merila Abattoir and in pig intestines from three lechon outlets in Iligan City.

Helminth	Comm name	Source Developmental Animal	Organ	Stage	Average (mm) Length	Width
1. *Fasciola hepatica*	*cow liver fluke*	*cow*	*liver*	*adult*	*29*	*14*
2. *Paramphistomum sp.*	*fluke*	*cow*	*rumen*	*adult*	*8.9*	-
3. *Taenia saginata*	*beef tapeworm*	*cow*	*duodenum*	*adult*	*800*	*2.3*
4. *Haemonchus sp.*	*stomach worm*	*cow*	*abomasum*	*adult*	*29.7*	-
5. *Unidentified nematode*	*roundworm*	*cow*	*mesenteries*	*juvenile*	*58.2*	-
6. *Ascaris suum*	*roundworm*	*pig*	*small intestine*	*adult;ova**	*170*	*30*
7. *Hookworm*	*roundworm*	*pig*	*small intestine*	*ova*	-	-
8. *Trichuris suis*	*whipworm*	*pig*	*small intestine*	*ova*	-	-
9. *Ascarid*	*roundworm*	*pig*	*liver*	*juvenile*	*20*	*0.4*
10. *Oesophagostomum sp.*	*roundworm*	*pig*	*liver*	*adult*	*16.3*	*4.5*
11. *Chabertia sp.*	*roundworm*	*pig*	*liver*	*adult*	*13.5*	*0.3*

* Found in the large intestine contents

Fasciola hepatica (Fig. 1) which causes "liver rot" in domestic animals (Roberts and Janoby,1996) was identified based on the size, the typical leaf shape with characteristic "shoulders" below a cone-shaped projection at the anterior end; and with an acetabulum which is close to the oral sucker. These flukes were usually seen in the bile ducts in the liver, however, curled ones were also seen in big blood vessels. Mature flukes remain in the biliary passages for sometime and these would lay eggs in the tubes (Levine, 1978) which are then carried to the intestine by the bile flow and ultimately excreted through the feces. Some portions of the infected livers, such as bile ducts, were seen enlarged and thickened. The surface of these organs did not show the smooth reddish brown color, instead , lumps could be felt and yellowing of most of the affected parts was apparent. Fascioliasis is potentially a zoonosis wherein humans become infected when aquatic vegetation laden with metacercariae is eaten or when water is drunk. Moreover, ingestion of raw infected liver may result to a respiratory blockage known as halzuon (Roberts and Janoby,1996).

A *Paramphistomum* species (Fig.2a) was easily identified because of its large acetabulum at its posterior end. The life cycle is similar to *F. hepatica.* It was occasionally found in humans (Roberts and Janoby, 1996). Still from the cow's viscera, the beef tapeworm *Taenia saginata* (Fig. 2b) was found with its unarmed scolex equipped with four suckers. Cows become infected when eggs are ingested which later develop into bladder worms, *Cysticercus bovis*. Humans become infected through ingestion of raw of poorly-cooked beef harboring the cysticercus (Neva and Brown, 1994). *Haemonchus* sp. (Fig.2c) and an unidentifed nematode were also detected from the cow's abomasum and mesenteries, respectively. The former has a recognizable finely drawn-out head which contained a small buccal cavity with a single, well developed tooth. Adult females were observed to have a characteristic red and white appearance, an effect produced by twisting of the white genital organs around the blood-filled intestine. These worms, acquired through ingestion of larvae, when present in large numbers cause blood loss (Levine, 1978). The unidentified round-

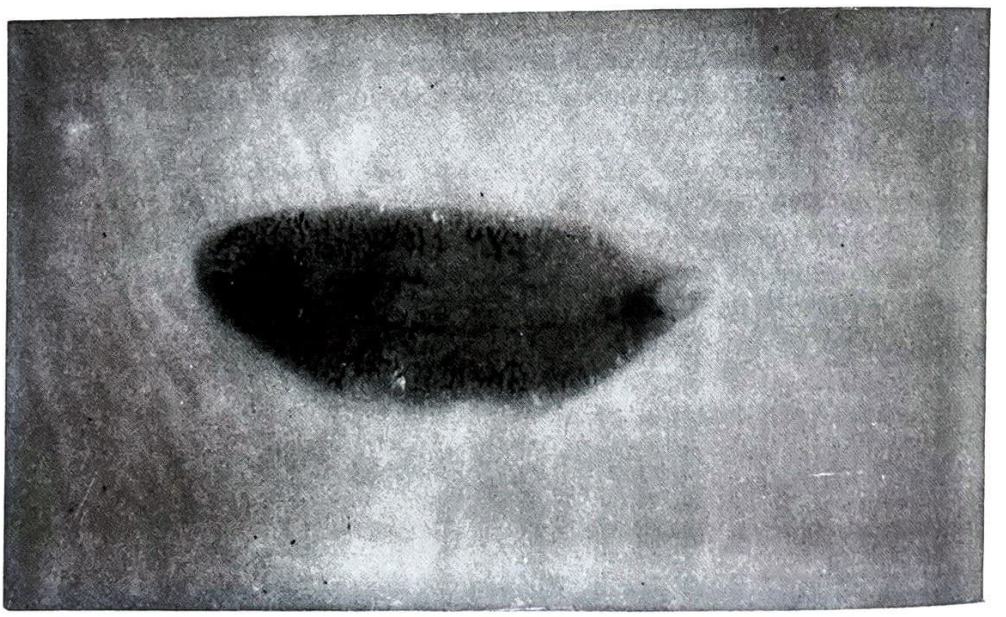

Figure 1. A photograph of adult **F.hepatica** obtained from livers of cows butchered at Merila Abattoir, Iligan City.

worm, a juvenile, was identified based on the elongated body, possessing lips anteriorly and with spicules at the pointed posterior end. Juveniles of many intestinal nematodes pass through the mesenteries in their life cycle as noted by Chandler (1961).There was no account on these worms as agents of zoonoses

The large nematode, *Ascaris suum* (Fig. 3a) was consistently present in the intestines of pigs in both slaughtering venues. These were identified by their great size; the three lips and the spicules at the posterior end. Males, which were usually smaller than females were seen having ventrally-curled posterior end. Fertilized eggs (Fig. 3b) were recognized as having a thick and lumpy outer shell and outer covering had an albuminoid coat. Washings in the small intestines of pigs revealed ova of *Trichuris suis.* (Fig. 4a). No adult worms were seen. As revealed by Joklik et. al (1997), these worms are rarely seen because of the firmness with which they fastened to the intestinal wall and can be seen, however, in heavy infections when the rectum has prolapsed. Hookworm ova (Fig. 4c) were also seen and noted to have thin membrane. According to Chandler (1961) species of hookworms cannot be identified reliably by eggs. Two species are common to humans and swine namely: *Ancylostoma duodenale* and *Necator americanus*. These are acquired when the third stage of juveniles found in the soil burrow through the skin while *Trichuris* can be acquired through ingestion of eggs (Roberts and Janoby, 1996).

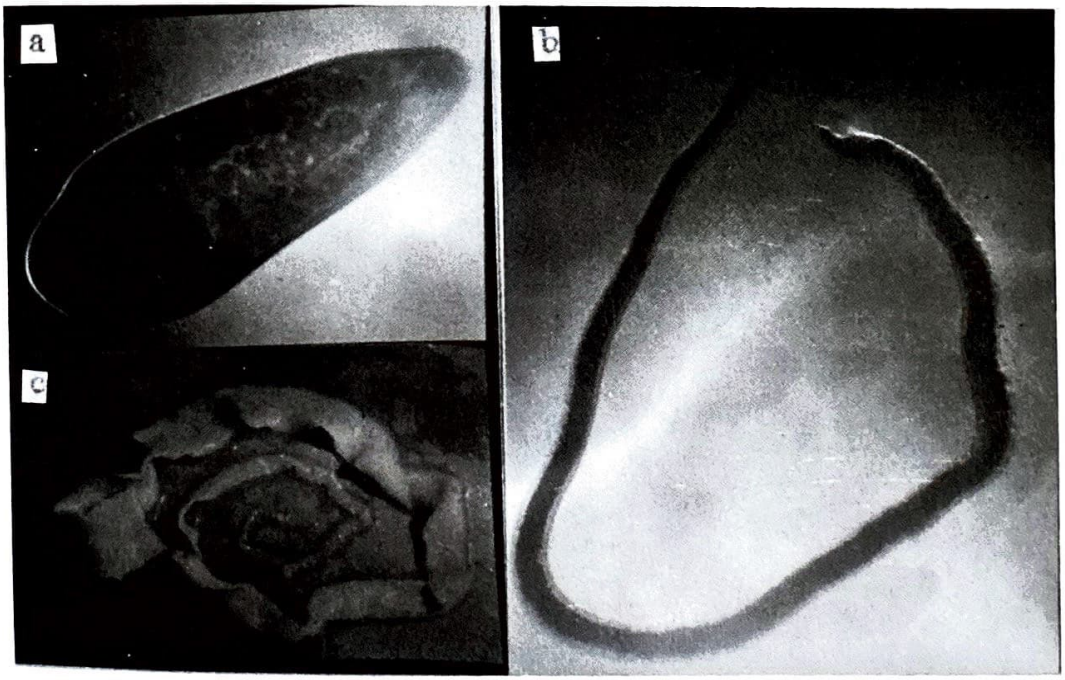

Figure 2. Photomicrograph of parasitic helminths, namely: a) **Paramphistomum** sp. (10X); b) **Haemonchus** (40X) and photograph of c) **Taenia saginata** found in the stomach and intestines of cows butchered at Merila Abattoir, Iligan City.

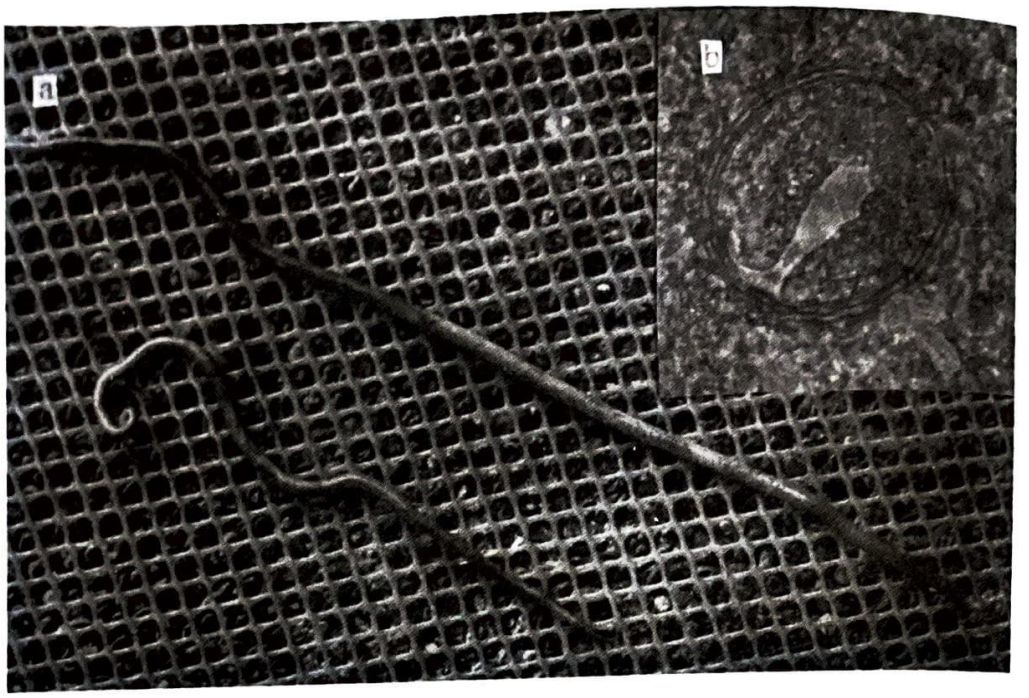

Figure 3. Photograph of male (bottom) and female (top) of a) adult **Ascaris suum**, and photomicrograph of b) fertilized ovum found in intestines of pigs butchered at Merila Abattoir and lechon outlets in Iligan City.

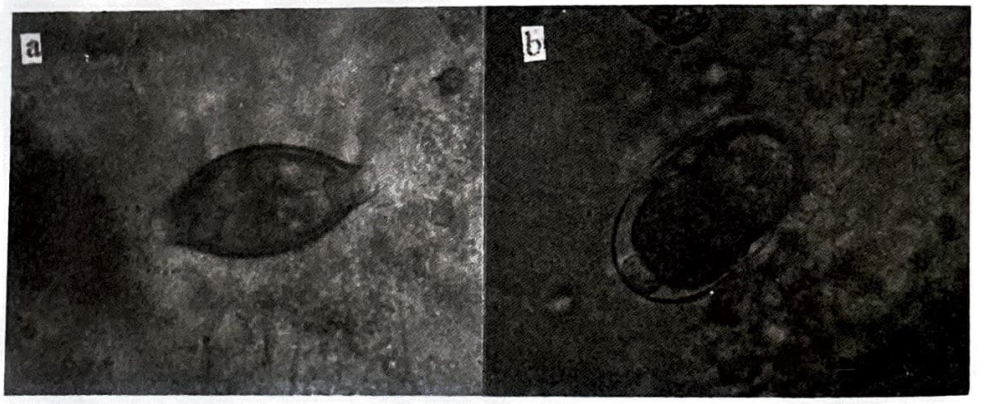

Figure 4. Stereomicrograph of ***Trichuris suis*** ovuum (a) and a hookworm ovum (b) found in the lumen materials of intestines of pigs butchered at Merila Abattoir and lechon outlets in Iligan City.

Pig livers condemned unfit for public consumption were characterized as having brownish to yellowish color and also forming lumps and bulges on the surface oftentimes bearing white spots. Mostly seen were juvenile forms of nematodes, probably ascarids (Fig.5a and 5b) which were having tapered ends,with developing lips at the anterior end. Juvenile forms of many nematodes migrate, after hatching in the intestine,to many locations such as spleen, liver, and lymph nodes often eliciting an inflammatory response that cause vague symptoms (Roberts and Janoby, 1996).

Two roundworms,namely: *Oesophagostomum* sp.(Fig.6a)and *Chabertia* sp.(Fig.6b) were found in pig liver. These are generally classified as Strongyles with relatively thick bodies and large mouths with or without teeth and a well developed bursa. The former are nodular worms of livestock. The mouth is directed forward and is surrounded by a mouth collar which bears head papillae. The posterior end was characterized as having spread bursa. Infections of these nodular worms have been reported in humans (Roberts and Janoby, 1996). *Chabertia* , on the other hand, was described as having a mouth directed anteriorly-ventrally, and lancets or teeth were seen in the esophageal funnel. The buccal capsule is relatively large. There is no report that these worms cause zoonosis.

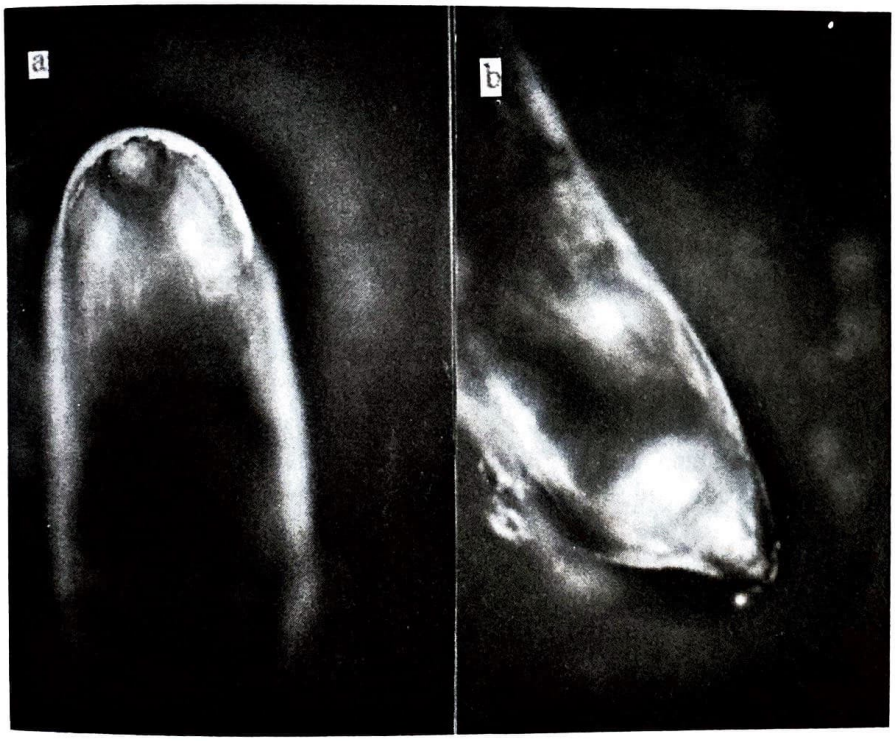

Figure 5. Stereomicrograph of a nematode; anterior end (a) and posterior end (b) found in the liver of pigs butchered at Merila Abattoir.

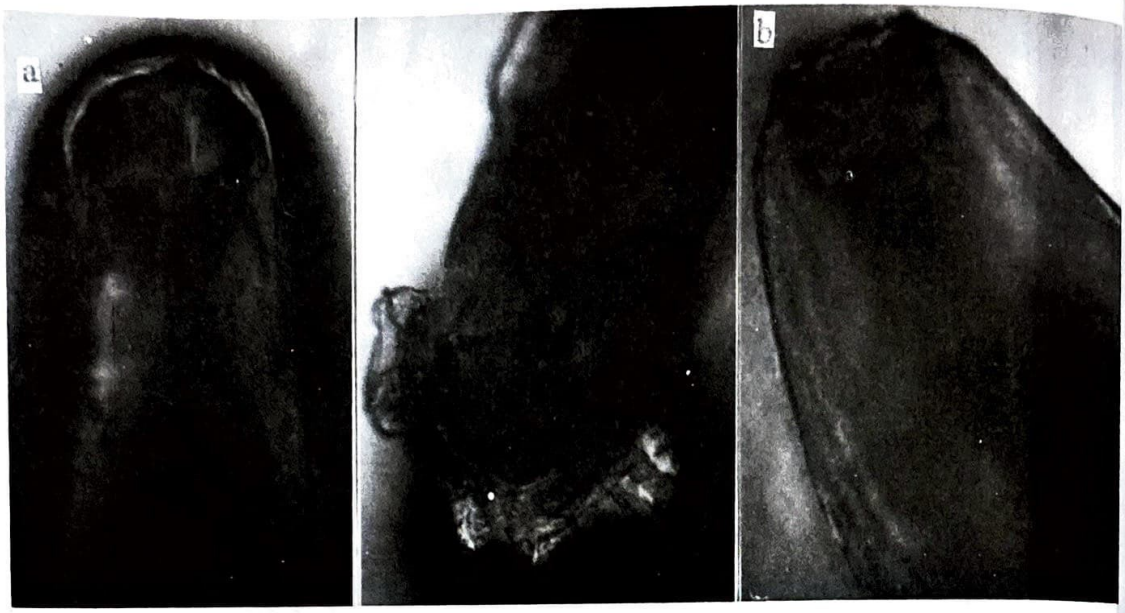

Figure. 6. Stereomicrograph of the anterior end (left) and posterior end (right) of a) **Oesophagustomum** sp. and b) **Chabertia** sp. found in the liver of pigs slaughtered at Merila Abattoir.

Summary, Conclusion and Recommendations

Detected from the gastro-intestinal organs and liver of cows and intestines and liver of pigs butchered at Merila Abattoir and in three lechon outlets in Iligan City were two species of digenetic flukes, eight types of nematodes and a beef tapeworm. Some of these worms are common agents of zoonoses and therefore of prime importance to public health. Humans become infected when they enter any cycle, such as eating undercooked liver or meat; ingestion of contaminated aquatic vegetation, or ingestion of fertilized eggs. The identification of the helminth parasites in the animal sources indicates that there is a need to reconsider control and preventive measures before these would bring annoyance to the piggery proprietors, cow raisers and the meat-eating public.

It is important to study the occurrence of these worms in animals butchered in all slaughter houses in the city so that one will know the degree of infection. Deworming programs and snail control are recommended. Modern methods of studying parasitic worms should be made available for direct and less tedious manner of studying macroparasites.

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