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Detection of some gastrointestinal parasites from four synanthropic flies in Ekpoma, Nigeria

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Synanthropic flies abound in the tropics especially in areas with substandard environmental sanitary conditions. Here, they constitute serious public nuisance. These flies through their filthy breeding habits, feeding mechanisms and indiscriminate travel, between filth and food, make some groups of these synanthropic insects such as non-biting flies as efficient vectors of human enteric protozoan parasites[1]. In other parts of the globe, information on the occurrence of veterinary and medically important parasitic agents, non-biting flies such as *Musca domestica* exists[2–11]. Despite the abundance of filth flies in our locality, there is dearth of information on their role as mechanical transmitters of parasitic infections. This paper, apart from enriching the only existing information on this subject in other parts of Nigeria[12-15], reports for the first time the association of ten parasites and synanthropic flies in Ekpoma, Nigeria.

This investigation was carried out between December 2004 and June 2005 in Ekpoma, Edo State Nigeria that is located on latitude 6°N and longitude 6°E. April to October marks the rainy season while November to March is the dry season with relatively low rainfall. The monthly temperature ranges 34 to 37°C. The pattern of the temperature in combination with high rainfall and relative humidity results in a climate that is warm and humidity in greater period of the year. Further, poor sanitary facilities, poor water management practices, indiscriminate disposal of waste materials, etc are contributory factors for congenial atmosphere for proliferation of synanthropic flies in the study area.

Two hundred and ninety three (293) synanthropic flies were captured by a sweep net method over the surfaces where flies visited. Flies were placed into labeled plastic container and transported immediately to Parasitology Laboratory of Zoology Department for further procession. About 5 ml of formol saline was added into each universal bottle containing flies and shaken vigorously to dislodge the parasites from the exoskeleton (body) especially hair of the flies. The fluid was transferred into a conical tube and centrifuged at 3000 rpm for 5 min. The sediment was examined microscopically for parasites under x40 magnification. The parasites were also quantified. The sediments were stained by using modified Ziehl Nielsen stain for the identification of *C. parvum*[16]. The flies were later dissected and the gut examined for parasites. The data were subjected to statistical analysis using Microsoft Excel.

The abundance of synanthropic flies in 4 different locations namely abattoir, market shops, pit latrines and house environment (kitchen) are presented. Of these sites, the highest fly abundance of 135 was recorded in abattoir while the least (37) occurred in the house environment (kitchen). Of the 4 types of flies collected, *M. domestica* dominated and accounted for 221 (75.4%) of the local fly population and *F. scalaris* 12 (4.1%) had the least abundance rate (Table 1).

Table 2 presents the parasite load of the four fly species investigated. The highest mean load of 54 parasites/ml was observed among the *M. domestica* which harboured eight out of the ten parasites recovered. *C. putoria* had the least parasite load of 8 parasites/ml. The difference was found to be statistically significant ($F = 4.88$, $p < 0.05$) using ANOVA.

The flies caught from the pit latrine had the highest parasite load while it was least in the house environment. Also the highest fly abundance was observed from the abattoir.

The mean parasite load of 81 parasites/ml was recovered from the exoskeleton while the least of 5 parasites/ml occurred in the gut of the flies.

Table 1. Distribution of flies in the four sampling sites in Ekpoma, Nigeria

Synanthropic flies	Sampling sites				
	Abattoir	House environment (Kitchen)	Market shop	Pit latrines	Total no. (%)
M. domestica	104	30	33	54	221 (75.4)
F. scalaris	–	–	–	12	12 (4.1)
C. putoria	22	–	12	–	34 (11.6)
O. leucostoma	9	7	–	10	26 (8.9)

Table 2. The mean parasitic load of ten gastrointestinal parasites isolated from four fly hosts in Ekpoma, Nigeria

Parasites	Fly host and mean parasitic load			
	M. domestica	*F. scalaris*	*C. putoria*	*O. leucostoma*
Chilomastrix mesnili	–	1	–	–
Cryptosporidum parvum	7	1	1	–
Entamoeba histolytica	3	4	3	–
Isospora belli	11	2	2	3
Ascaris lumbricoides	13	1	–	–
Dicrocoelium hospes	–	–	1	12
Enterobius vermicularis	1	–	–	–
Hookworm	4	–	1	–
Strongloides stecoralis	10	–	–	–
Trichuris trichiura	5	–	–	–
Total	54	9	8	15

The present study demonstrated that four synanthropic flies in Ekpoma, Nigeria carried ten different gastrointestinal parasites. This association elucidated the routes of mechanical transmission of some important and predominant tropical diseases such as gastroenteritis/diarrheic diseases and other human helminthiasis which abound in the locality despite the growing/increasing level of personal hygiene. This study collaborates the investigations[2-6] which reported the presence of some pathogens like *C. parvum*, *E. histolytica* and *Isospora* sp among some filth flies such as *M. domestica*.

Graczyk *et al*[2] reported that members of Muscidae were predominant flies recorded among four different families of synanthropic flies studied. This assertion is proved valid by the findings of the present investigation where we reported *M. domestica* accounting for more than 70% of the flies captured. Also the relatively highest parasite load encountered among the flies from pit latrines delineate it as the major site of contamination and subsequent transmission of these parasites in the locality under study.

Some of the parasites reported cause morbidity and often, mortality arising from their infection in man. For instance, *C. parvum* is an anthropozoonotic protozoan parasite that significantly contributes to mortality in human with various immune system impairments[17], and diarrhoea disease is initiated by the oocyst, a microscopic stage of this parasite. It is believed that in those with impaired immune system, a single oocyst can initiate infection[18]. In spite of the flies' immune mechanisms, it is of note, that a lot of similar parasite forms were harvested from the gut and exoskeleton. We suggest that irrespective of some immune modulations of the parasite forms while inside the flies' gut, there was no change in morphology, viability and infectivity of those harvested from the gut and the exoskeleton although, the parasite load may varied. Also, synanthropic flies are reported as major epidemiologic factors responsible for the spread of acute gastroenteritis and trachoma amongst infants and young children in predominantly developing countries[5]. *A. lumbricoidses*, *T. trichuria*, hookworm, etc are causative agents of human helminthiasis. Since this report revealed the presence of these pathogens from the exoskeleton and guts of synanthropic flies in a developing tropical environment, it becomes imperative to urgently institute control measures of these flies through massive education on improving the existing standard of environmental sanitary conditions.

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