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Parasites of village house rats (*Mastomys* species) in sub-rural areas of Maiduguri, Northeastern, Nigeria

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ABSTRACT: All the 188 (100%) village house rats examined harbored one gastro intestinal parasite or the other while 56(29.8%) had ectoparasites. Endoparasitic prevalence of 19.7% was recorded for *Aspicularis* while 15.9%, 15.4%, 11.2%, 9.0%, 6.9%, 5.9%, 4.8%, 4.3%, 3.7% and 3.2% were recorded for *Hymenolepis*, *Syphacia*, *Eimeria*, *Strongyloides*, *Nippostrongylus*, *Angistrongylus*, *Nematospiroides*, *Trichuris*, *Heligmosomoides* and *Giardia* species respectively. 56(29.8%) rats had ectoparasites with 66.1% for lousiness and 33.9% for mites. A prevalence of 89(47.3%) was also recorded for endo-polyparasitism. 47(25.0%) young rats were infested against 141 (75.0%) adults with gastro intestinal parasites while 105 (55.9%) male rats were infested against 83 (44.2%) females. Young rats had 13(23.2%) prevalence of infestation with ectoparasites against 43 (76.8%) in adults while male rats had 30 (5.6%) against 26 (46.4%) females.

Key words: House rats; *Mastomys* species; Prevalence study, Ectoparasites; Gastro-intestinal parasites, Borno State, Nigeria.

Introduction

Diseases due to Ecto and gastro-intestinal parasites are two groups of zoonosis of public health due to recent observations in the ecology of their causal agents (Esuruoso, 1985). The co-existence of the parasites in man and lower vertebrates and the presence of known vectors, reservoir or transport hosts encourages their exchange between man and his livestock (Esuruoso, 1985). Because of their free-living nature, rats are predisposed to infection with these two zoonotic conditions. Dipeolu and Ajayi (1975) and Esuruoso (1985) had reported that the human flea (*Pulex irritans*), tropical rat flea (*Xenopsylla cheopsis*) and the rat tapeworm (*Hymenolepis diminuta*) were found on the giant African rat (*Cricetomys gambianus*) in Ibadan. Georgi *et al.*, (1990); Uhler and Volf (1992); Younis *et al.*, (1995); Bakr *et al.*, (1996); Hendrix (1998); Ceruti *et al.*, (2001) and Soliman *et al.*, (2001) reported the presence of *Capillaria hepatica*, *Nippostrongylus muris*, *Strongyloides ratti*, *Syphacia obvelata*, *Taenia crassicolis* and *Trichuris muris* in free-living rats from other parts of the world. Such data on rats in Maiduguri is lacking, hence this study was undertaken to report on the parasites of village house rats of sub-rural areas of Maiduguri.

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Materials and Methods

One hundred and eighty eight (188) sub rural village house rats killed between October and December 2001 using Zinc phosphide (Phostoxin) rodenticide (Beaver *et al.*, 1984) mixed with groundnut cake were examined for ecto-and endo-parasites in this study. In the Parasitology Laboratory, University of Maiduguri rat hairs were pulled and examined for nits, nymphs and adults while deep skin scrapings were collected from the unfurled areas for mites as described by Hendrix (1998).

For gastro-intestinal parasites each rat was placed on dorsal recumbency on a mounting board and using thumb forceps, scalpel blades and scissors, their abdomens were cut open to expose the gastro intestinal tract. Adult worms were collected after washing the G.I.T. content with water into a tray.

Faecal samples were collected and processed using the formol-ether concentration technique and parasitic eggs identified using the standard parasitological methods described by Hendrix (1998) and Tibor Kassai (1999).

The age of the rats was determined based on the size of the external genitalia and weight of individual rats i.e. adults weigh 40g and above, while young rats weigh less (Kalu and Esuruoso, 1985).

Data obtained were analyzed using the chi square statistics and linear trend analysis for the effect of age and sex of rats calculated using Epi-info version (Dean *et al.*, 1995) with $P=0.05$ as the set level of significance.

Results

The results of this study revealed that all the 188 rats examined had gastro intestinal parasites while 56(29.8%) had ecto parasites.

Table 1 indicated a prevalence of 19.7% for *Aspicularis spp.*, while 15.9%, 15.4%, 11.2%, 9.0%, 6.9%, 5.9%, 4.8%, 4.3%, 3.7% and 3.2% were for *Hymenolepis*, *Syphacia*, *Eimeria*, *Strongyloides*, *Nippostrongylus*, *Angiostrongylus*, *Nematospiroides*, *Trichuris*, *Heligmosomoides* and *Giardia* species respectively. Fifty six (29.8%) rats had ectoparasites with 66.1% for lousiness and 33.9% for mites.

Table 2 shows 89 (47.3%) prevalence endo polyparasitism, the highest by *Aspicularis* + *Hymenolepis* with 13.4% while others were by *Syphacia* + *Nippostrongylus* (12.3%), *Eimeria* + *Aspicularis* (10.1%), *Hymenolepis* + *Nematospiroides* (8.9%), *Syphacia* + *Strongyloides* (7.8%), *Hymenolepis* *Heligmosomoides* (7.8%), *Strongyloides* + *Aspicularis* (6.7%), *Syphacia* + *Aspicularis* (6.7%), *Giardia* + *Eimeria* (5.6%), *Angiostrongylus* + *Eimeria* (4.4%), *Angiostrongylus* + *Syphacia* (2.2%), *Strongyloides* + *Aspicularis* + *Trichuris* (2.2%), *Trichuris* + *Nematospiroides* (1.1%), *Hymenolepis* + *Angiostrongylus* + *Trichuris* (1.1%) and *Angiostrongylus* + *Giardia* (1.1%).

Table 3 shows that young rats had a prevalence of 47 (25.0%) while 141 (75.0%) adults were infested by G.I.T. parasites ($P>0.05$). 105 (55.9%) of the infested rats were males and 83 (44.2%) were females ($P>0.05$). The Table also shows the prevalence of ectoparasites based on age and sex. Young rats had 13 (23.2%) prevalence while adults had 43 (76.8%). Male rats had 30 (53.6%) and females had 26 (46.4%) ($P>0.05$).

Discussion

There is a dearth of data on the parasites of rats in Nigeria. However, Esuruos (1985) reported in Ibadan the presence of *Hymenolepis diminuta* in the African dwarf rats (*Cricetomys gambianus*) which are in close contact with man. The finding of lice, mites, *Hymenolepis*, *Syphacia*, *Eimeria*, *Strongyloides*, *Nippostrongylus*, *Angiostrongylus*, *Nematospiroides*, *Trichuris*, *Heligmosomoides* and *Giardia* species respectively in this study is also consistent with studies done outside Nigeria by Linardi *et al.*, (1985); Younis *et al.*, (1985); El-kady *et al.*, (1985), Bakr *et al.*, (1996), Fedorko (1999) and Soliman *et al.*, (2001) who recovered similar parasites and suggested that a significant wild life i.e. free-living reservoirs of parasitic infection exist (Chalmers *et al.*, 1997), especially *Musca domestica* which are known hosts of a large number of different micro-organisms (Ceruti, *et al.*, 2001).

Table 1: Prevalence of parasites of village house rats of sub rural areasw of Maiduguri, Nigeria.

Parasites	No. (%) of rats infested
ENDO:	
<i>Syphacia</i>	29(15.4)
<i>Aspiculuris</i>	37(19.7)
<i>Hymenolepis</i>	30(15.9)
<i>Angiostrongylus</i>	11(5.9)
<i>Trichuris</i>	8(4.3)
<i>Strongyloides</i>	17(9.0)
<i>Nematospiroides</i>	9(4.8)
<i>Nippostrongylus</i>	136.9)
<i>Heligmosomoides</i>	7(3.7)
<i>Eimeria</i>	21(11.2)
<i>Giardia</i>	6(3.2)
ECTO:	
Lice	37(66.1)
Mites	19(33.9)

Table 2: Prevalence of polyparasitism in village house rats examined.

Endoparasites	No(%) of rats infected
<i>Angiostrongylus</i> + <i>Giardia</i>	1(1.1)
<i>Trichuris</i> + <i>Nematospiroides</i>	1(1.1)
<i>Hymenolepis</i> + <i>Stronhyloides</i>	2(2.2)
<i>Angiostrongylus</i> + <i>Eimeria</i>	4(4.4)
<i>Giardia</i> + <i>Eimeria</i>	5(5.6)
<i>Syphacia</i> + <i>Aspiculuris</i>	6(6.7)
<i>Strongyloides</i> + <i>Aspiculuris</i>	6(6.7)
<i>Hymenolepis</i> + <i>Heligmosomoides</i>	7(7.8)
<i>Syphacia</i> + <i>Strongyloides</i>	7(7.8)
<i>Hymenolepis</i> + <i>Nematospiroides</i>	8(8.9)
<i>Eimeria</i> + <i>Aspiculuris</i>	9(10.1)
<i>Syphacia</i> + <i>Nippostrongylus</i>	11(12.3)
<i>Aspiculuris</i> + <i>Hymenolepis</i>	12(13.4)
<i>Hymenolepis</i> + <i>Angiostrongylus</i> + <i>Trichuris</i>	1(1.1)
<i>Strongyloides</i> + <i>Aspiculuris</i> + <i>Trichuris</i>	2(2.2)
<i>Trichuris</i> + <i>Aspiculuris</i> + <i>Angiostrongylus</i>	2(2.2)
<i>Trichuris</i> + <i>Nippostrongylus</i> + <i>Syphacia</i>	2(2.2)
<i>Angiostrongylus</i> + <i>Syphacia</i> + <i>Eimeria</i>	3(3.3)

NB: Total No. of rats with polyparasitism = 89

Table 3: Prevalence of ecto and endoparasites village house rats based on their age and sex.

Parasites	No. examined	% (of total) rats infested
Endo parasites		
Young rats	47	25.0
Adult rats	141	75.0
Male rats	105	55.9
Female rats	83	44.2
Ectoparasites		
Young rats	13	23.2
Adult rats	43	76.8
Male rats	30	53.6
Female rats	26	46.4

Epizootics such as endo- and parasitic diseases due to rodents are of great interest to public health due to recent observations on the ecology of their causal agents, the existence of the parasites with man and lower vertebrate animals and the presence of vectors, reservoirs or transport hosts which could create circumstances where constant exchanges readily occur between man and his animals. These rats and house mouse are of particular concern because of their close association with humans as their faeces and urine may contaminate his food with parasitic forms such as oocysts (Iseki, 1986) and helminthes ova or larvae such as those of *Hymenolepis nana* (Khalil, 1991; Hendrix, 1998).

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