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Observation on fleas of common domestic mammals in Benin City, Nigeria

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ABSTRACT: A Study was conducted on fleas of common domestic mammals in Benin City from April 2001 to April 2002, using handpicking and combing methods. Two species were recorded, *Ctenocephalides canis* (dog flea) and *Ctenocephalides felis* (cat flea) amounting to 2,662 specimens; 50.5% (1345) from dogs, 24.9% (662) from cats and 24.6 (655) from goats. 75.4% (2006) of the total flea collected from goats, cats and dogs were *Ctenocephalides canis* while 24.6% (656) *Ctenocephalides felis* occurred on cats only. They were more abundant from March – May, being found more around residence of Man and domestic animals.

Key words: Fleas; Common domestic mammals; Benin City

Introduction

Fleas are a group of wingless laterally compressed blood Sucking ectoparasitic insects with a shape suited for creeping through hairs, fur and feathers (chandler and Read 1981; Crooks *et al*, 2004). An obligatory blood feeder, fleas parasitize warm-blooded vertebrates (Harrison *et al*, 2003); more than 94% of known species are parasites of mammals, only 6% occurring on birds (Gordon 1996). The subtropical climate present the most favourable condition for fleas (Medvedev, 1998).

Interest in fleas heightens upon the idea that fleas can transmit bubonic plagues (Jarrett *et al* 2004). While fleas constitute a biting nuisance to man and his livestock, other diseases they can transmit include Endemic or Murine typhus, Tularaemia, myxomatosis and they serve as intermediate host of certain tape worm (Hoogland *et al*, 2004; Lledo *et al*, 2003;Goldsmith and Heyneman 1989; chandler and read 1981).

This is the first report on fleas in Benin City. Flea Control can be best achieved when they are ecologically understood. Thus this work was aimed at determining flea host preference, Seasonal abundance, predilection sites and spatial distribution.

Materials and Methods

Study area

This study was conducted in Uniben Junior Staff Quarters, Ring Road, and Benin GRA residential areas, Aduwawa Market and a free range farm in Ugbowo, Benin City.

Benin City is the capital of Edo State and lies between Latitude $6^{o}17'$ and $6^{o}26'$N and Longitude $5^{o}35'$ and $5^{o}41'$E. The Rain forest which is characterized by an Annual rainfall of between 1850 – 2445mm and temperature range between 30 – 36^{o}c. The soil is a compact laterite which become flooded after heavy rainfall.

Trapping technique

Fleas were collected by hand picking and combing. Handpicking was done by brushing to the left the hairs to expose trapped fleas trying to creep through hair, which are picked up with the right fingers. Fleas were subsequently transferred using artist brush dipped in 70% alcohol or dropped directly into the alcohol, when fleas were many. Hand gloves were always used. Combing was carried out by applying 2mm spaced hair comb through animal fur. This was done over a non-absorbent glycerin coated white surface, so fleas were easily seen (Ehmanan and Storey 1982).

Collection procedure

Fleas were collected from each of the four sampling areas (Ring Road and G.R.A., Benin Metropolis, Uniben Junior Staff Quarters, Aduwawa and free range farm ground in Ugbowo area), between 12.30hr – 15.30hr from April 2001 to April 2002.

Specimens collected were placed in bottles containing 70% alcohol with an artist hand brush, bottles being labelled according to predilection sites. They were then identified using the keys provided by Chandler and Read (196); Smart *et al* (1965).

Data analysis

Data were presented in density of occurrence per individuals and percentages, then analysed with Kolmogorov – Smirmov one sample test and ratio for deviation from 1:1. (Siegel 1956; Campbell 1989; Lewis and Taylor 1976).

Results

The host preferences of fleas in Benin City is shown in (Table 1). Of the 2662 fleas (density 38.3) collected, 44.9%, 22.2% and 32.9% occurred on dogs, cats and goats respectively. There was no significant different ($P>0.05$) in these proportions. Cat haboured exclusively *Ctenocephalides felis* while Dog and Goat accounted for the bulk of *C. canis* on domestic animals. Only 0.4% of *C. canis* was found on Cats.

The abundance of fleas varied from Month to Month; the peak was recorded in March, April and May in each case, the least being in August/January in *C. canis* and August/September in *C. felis* (Table 2). Generally flea preferred the dorsal and ventral part of the trunk of animals (Table 3). This pattern reoccurred at individual level (Table 4).

Human residence (35.6%) and Markets (45.4%) accounted for the variation in spatial distribution of fleas while farm animals produced the least number of fleas. This pattern was reflected by *C. felis* although this species did not feature at all in farm. *C. canis* maintained equal numbers from locality to locality (Table 5).

Table 1: Host preferences of flea species in Benin City

	% (Density)		
Host	*Ctenocephalides canis*	*Ctenocephalides felis*	Total
DOG	57.5 [17.2]	0	44.9 [17.2]
CAT	0.4 [0.1]	100 [8.4]	22.2 [8.5]
GOAT	42.1 [12.6]	0	32.9 [12.6]
TOTAL	78.1 [29.9]	21.9 [8.4]	[38.3]

*Total number of fleas divided by total number of host in all cases.

Table 2: Monthly variation of fleas on common domestic mammals in Benin City, April 2001 – April 2002.

	Density (No.)	
Month	*C. canis*	*C. felis*
April 01	22.4 (224)	12.8 (77)
May 01	32.4 (324)	17.7 (107)
June 01	7.3 (73)	4.2 (25)
July 01	9.9 (99)	5.5 (33)
August 01	2.9 (29)	2.7 (16)
September 01	8.1 (81)	3.5 (21)
October 01	20.4 (204)	9.5 (57)
November 01	20.8 (208)	11.2 (67)
December 01	5.7 (57)	7.0 (42)
January 02	2.7 (27)	1.5 (9)
February 02	7.1 (71)	4.0 (24)
March 02	24.2 (244)	13.2 (79)
April 02	26.5 (265)	16.5 (99)
TOTAL	(2006)	(656)

Discussion

Since the fourteenth century epidemic in Europe, it is established that one – forth of the entire population of Europe died and superstition and unreasonable terror led to horrible persecution and torture. From then till now less is known of the vector of these disease called plague. In this study two species of fleas, *Ctenocephalides canis* and *C. felis* were found to infest common domestic mammals in Benin City. *Ctenocephalides canis* are more abundant in dogs, (Chandler and Read 1981) but are also much in goats (Joseph 1981) probably due to their close association with dogs *C. felis*, even though can be found in dogs are more in Cats as also reported by Gordon, (1996).

Table 3: Predilection sites of fleas on dogs, cats and goats in Benin City.

Host	Density						
	Dorsal Part	Ventral Part	Lateral	Anal	Head	Leg	Total
DOG (n=78)	5.0	3.4	6.4	0.8	2.3	1.3	17.2
CAT (n=78)	2.5	1.7	3.2	0.2	0.5	0.4	8.4
GOAT (n=52)	4.4	1.4	5.1	0.9	0.9	0.7	12.6

n = sample size.

Table 4: Predilection sites of *C. canis* and *C. felis* on common domestic mammals in Benin City.

Host	Density						
	Dorsal Part	Ventral Part	Lateral	Anal	Head	Leg	Total
C. canis (n=2006)	9.4	4.7	11.6	1.7	0.4	2.0	29.9
C. felis (n=656)	2.5	1.7	3.1	0.2	0.5	0.4	8.4

n = sample size.

Table 5: Spatial distribution of fleas in Benin City from April 2001 – April 2002.

Locality	Density		
	C. canis	*C. felis*	Total
Residence	33.2 (16.1)	42.4 (7.5)	35.6 (23.6)
Market	40.8 (19.8)	57.6 (10.2)	45.4 (30.1)
Farm	26.0 (12.6)	0	19.0 (12.6)
Total	48.5	17.7	66.3

Krasnov *et al*, (2004) has shown that the index of host body infestation by fleas can be used reliably as an indication of the entire population size. *C. canis* and *C. felis* are more abundant in residence and markets where there is abundance of dogs and cats. The low number of fleas in farms could be attributed to constant treatment of farm animals.

According to Medvedev (1998) fleas are abundant when temperature is between 20 – 32^{o}C and relative humidity 70 – 75%. In the nests and holes where fleas breed, however, the microclimate may be favourable even when conditions in the open are highly unfavourable (Chandler and Read 1981). The result in this study revealed that the month of March, April and May have this suitable conditions. During this period which is the beginning of the rainy season; rainfall increases the relative humidity, and drops the temperature to 30 – 31^{o}C. During the moist hot summars, *C. canis* and *C. felis* become exceedingly abundant (Medvedev, 1998; Chandler and Read 1981). In the

Benin area, the season may be called the flea season. In August and January, flea count was reduced to lowest level. This is probably due to reduced or lack of rainfall in these months.
Fleas are more abundant in the dorsal and lateral trunk of the body probably because it is hairy (Chandler and Read 1981); this serves for insulation against environmental conditions. In the ventral part they are also numerous probably due to the presence of sex hormone and other hormone which aid their fecundity (Yeruham *et al*, 1982).
Some host look healthy even with heavy infestation and infestation sometimes can be indicated by restlessness, stamping of the feet scratching and weight loss (Faghemi, 1982). The aspects of the bionomics of fleas recorded in this investigation could add to the baseline information needed during control programme.

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