

Comparative Survey of Ectoparasites Infestation of Livestock Cohabiting with Humans and Those Sold in Some Markets in Makurdi, Benue State.

OMUDU, E. A., YAJI, A. D. ONAH, E. I. AND OKOH, M. E.
Department of Biological Sciences, Benue State University, Makurdi.

Nig. J. Ent. 32: 85-91 (2016)

ABSTRACT: There is an unprecedented increase in livestock business in Makurdi. This study investigated ectoparasites infestation on livestock reared within residential apartments and those sold in the market from August 2014 to September 2015. Visual inspection of the head, neck, abdomen, trunk, leg, tail, pelvic and wings were performed to search for ectoparasites after which physical handpicking technique using forceps and brushing were employed to remove the ectoparasites. A total of 1,032 animals were examined for ectoparasites over a period of twelve months, 792 (76.7%) of them were reared within residential premises while 240 (23.3%) were those sold in the markets. The overall infestation rates was 596 (57.7%) with those being sold in the market having an infestation rate of 70.0% compared to 54.0% in those reared within residential areas. The infestation of the animals sold in the market was significantly higher than those reared within residential premises ($X^2 = 3.841$, $P < 0.05$). Level of infestation was higher in female animals, this was however not statistically significant ($P < 0.05$). The animals sold in the market also had higher varieties, this was also not statistically significant ($P < 0.05$). *Boophilus* species was the most predominant tick encountered in the study followed by *Amblyomma*, *Rhipicephalus* and *Hyalomma* genera. The predominant species of lice, mites and fleas were *Linognathus*, *Demodex* and *Ctenocephalides* species respectively. The enforcement of already existing prohibition on stray and roaming animals in urban areas will go a long way to preventing spread of infestation in both animals and humans. For the urban livestock farmers, interactive health education, highlighting the zoonotic disease implications of cohabiting with animals will enhance the adoption of more responsible and hygienic animal handling and production.

Key Words: Ectoparasites, Infestation, Livestock, Humans, Markets

INTRODUCTION

Livestock are a major source of animal protein in Benue State and are also known for its high social economic value as insurance against crop failure (Nwoke 2001, Ofukwu *et al.*, 2008,). In an attempt to meet the ever-increasing demand for animal protein and companionship and the need to generate additional income, most families in urban areas of Makurdi, the Benue State capital engage in livestock farming around residential areas and also in keeping companion animals such as dogs. Infestation by ectoparasites could lead to considerable economic losses to farmers due to loss of productivity, mortality, and skin diseases. Ectoparasites including lice, ticks, fleas, and

mange mites are reported to cause a wide range of health problems such as mechanical tissue damage, irritation, inflammation, hypersensitivity, abscesses, weight loss, lameness, anaemia, and in severe cases death of infested animals with the consequent socioeconomic implications (Tongjura *et al.*, 2012). In addition, ectoparasite infestations could induce great economic losses due to reduction of wool quality, meat and milk yield, losses as a result of culling and cost of treatment and prevention of the problem. They are also responsible for great pre-slaughter skin defects, resulting in downgrading and rejection of small ruminant skins [Seyoum *et al.*, 2015].

Dogs are important domestic animals extensively used for purposes such as hunting, security alert and for consumption as meat. They contribute to physical, social and emotional well-being of their owners,

Corresponding author: eddieomudu@yahoo.com

particularly children (Ugbomoiko *et al.*, 2008, Ekanem *et al.*, 2010).

There are well documented report in Nigeria and across the globe of the clinical manifestations resulting from high ectoparasite infestation of livestock (Wilson and Bram, 2003; Yanan *et al.*, 2005). Studies have shown that human-animal contact increase possibility of transmission of parasites and pathogenic organisms naturally harboured by these livestock to humans (Omudu and Amuta, 2007, Nwoke 2001). The lice, *Linognathus caprae* are nuisance irritants among goats and goat traders in parts of Africa and Asia (Tongjura 2012). In rural areas where co-habitation between animals and humans are common, the potential of human infection by some of the ectoparasite - borne pathogens are high.

In 1981, about 41.5% school children were observed to be infested with *Tunga penetrans*, a flea that can cause serious inflammation of the feet, leading to ulceration and fibrosis (Ade-Serrano and Ejezie, 1981). This is the public health consequence of close association with livestock Human infestations resulting from mites (*Sarcoptes scabiei*) and ticks from dogs and other livestock occasionally occur as a result of frequent close contact with these animals. Human babesiosis, tick paralysis and intensive pruritic dermatitis sometimes progressing to papular eruption have been reported amongst livestock handlers in parts of Africa (Bryson *et al.*, 2000).

There is an unprecedented increase in livestock business in Makurdi, many of these animals are reared within residential areas and maintain close contact with both owners and traders. This study was designed to compare the rate of infestation livestock reared within residential premises and those sold in some markets in Makurdi.

MATERIALS AND METHODS

Study area

This study was conducted in Makurdi, the Benue State capital of Nigeria from August 2014 to September 2015. It lies between latitude 07°15' – 07°45'N and longitude 08°15-08°40'E. Makurdi town is situated in the guinea savanna vegetation belt and on the bank of the

second-largest river in Nigeria, River Benue. It covers an area of about 16km². The study was conducted in four selected areas of Makurdi namely Wadata, North-bank, Wurukum and Gaadi.

Wadata is located along the bank of the river towards the western end of the town. It is densely populated and has inadequate water supply, sanitary and waste management system. Drainages are blocked with piles of rubbish. It has in addition to residential houses; a market, a prison yard, an abattoir, a rice mill and a thriving burnt-brick production industry along the bank of the river. Residents are mainly Hausas and Jukuns. The Jukuns are active fishermen while a majority of the Hausa residents combine livestock keeping and other forms of petty trade. It is therefore very common for many households to keep goats, sheep and cattle in residential premises and to practice free-range system of husbandry (Omudu and Amuta, 2007).

Wurukum is another densely populated area of Makurdi, known for its poor sanitary conditions, human overcrowding, poor state of housing and lack of clean water. Land mark facilities include a rice mill, an abattoir and vegetable farms along the river bank. The animals kept by the people in this area are predominantly goats and pigs which are reared under a free range system and their dung usually used as manure for the vegetable farms (Omudu and Amuta, 2007).

North bank is located across the River Benue towards the north. The actual place of study was the mission ward. An area prominent with gully erosion sites which most times serves to collect pools of stagnant dirty water and a good play ground for animals such as pigs. These gullies sometimes also serve as human waste disposal channel for people living within the neighborhood. The residents lack clean water supply and the sanitary conditions are poor (Omudu and Amuta, 2007).

Gaadi is a sub-urban settlement in Makurdi. Residents of this area are mostly civil servants many of who engage in farming activities along the bank of the River Benue and are also actively engaged in rearing domestic animals

for several reasons within their residential houses. Landmark facilities include the Benue brewery, a rice mill producing plant, coca-cola bottling company and burnt brick production along the bank of the River Benue. The animals kept by the natives of this area are mostly goats and pigs but other domestic animals like poultry are reared under different systems of animal husbandry but mostly under the free range and extensive system of management.

Sampling Methods for ectoparasites

Ectoparasites were collected from dogs, goats, sheep, pigs, cattle and poultry with the assistance of members of the households and the sellers in the markets. Physical handpicking, use of forceps and brushing method were employed and specific points from where the ectoparasites were removed were noted, (James-Rugu, 2000). The animals were brushed with special attention paid to the ears, the area around the eyes, the axillae and the groin as recommended (Shah-Fischer and Say, 1989). Visual inspection of the head, neck, abdomen, trunk, leg, tail, pelvic and wings were performed to search for ectoparasites. Fleas, mites and lice were collected by combing and brushing the animal's entire body surface onto a white cloth dipped in 70% ethanol to prevent fleas from jumping and lice from creeping away.

Preservation and Identification of Specimen

The collected samples were transported in clean specimen bottles containing 70% ethanol to the Biological Science laboratory, of the Benue State University, Makurdi for identification using keys provided by (Shah-Fischer and Say, 1989).

Data analysis

Data were analysed using simple percentages and chi-square (χ^2) was used to test for significance in infestation levels on the sampled livestock.

RESULTS

A total of 1,032 animals were examined for ectoparasites, 792 (76.7 %) of them were reared within residential premises while 240 (23.3 %) were those sold in the markets. The overall infestation rates was 596 (57.7 %) with those

being sold in the market having an infestation rate of 70.0 % compared to 54.0 % in those reared within residential areas. The infestation of the animals sold in the market was significantly higher than those reared within residential premises ($X^2 = 3.841$, $P < 0.05$). A total of 4,085 ectoparasites were collected from 596 animals giving a general infestation ratio of 1:7. The infestation ratio of animals sold in the market (1:10) was again significantly higher than those being reared in residential premises. Ticks accounted for 71.04% of all ectoparasites while lice, fleas and mites accounted for 15.42 %, 10.11 %, and 3.43 % respectively (Fig. 1). Level of infestation was higher in female animals, this was however not statistically significant ($P < 0.05$) (Fig. 2).

There was rich species diversity of ectoparasites in this study with 5 genera of ticks, 4 species of lice, 2 species of mites and fleas each. In terms of ectoparasites genera, the animals sold in the market also had higher varieties, this was however not statistically significant ($P < 0.05$). *Boophilus* species was the most predominant tick encountered in the study followed by *Amblyomma*, *Rhipicephalus* and *Hyalomma* genera. (Fig. 3). The predominant species of lice, mites and fleas were *Linognathus*, *Demodex* and *Ctenocephalides* species respectively (Fig. 3). Cattle and dogs accounted for 71.4 % of ticks collected while goats and chicken accounted for 67.3 % of the lice encountered in the study. The abdominal region was the most preferred predilection sites for the ticks in cattle, goat, pigs and dogs while under the wings was the most preferred predilection sites for lice (*Linognathus*) in chicken (Fig. 4).

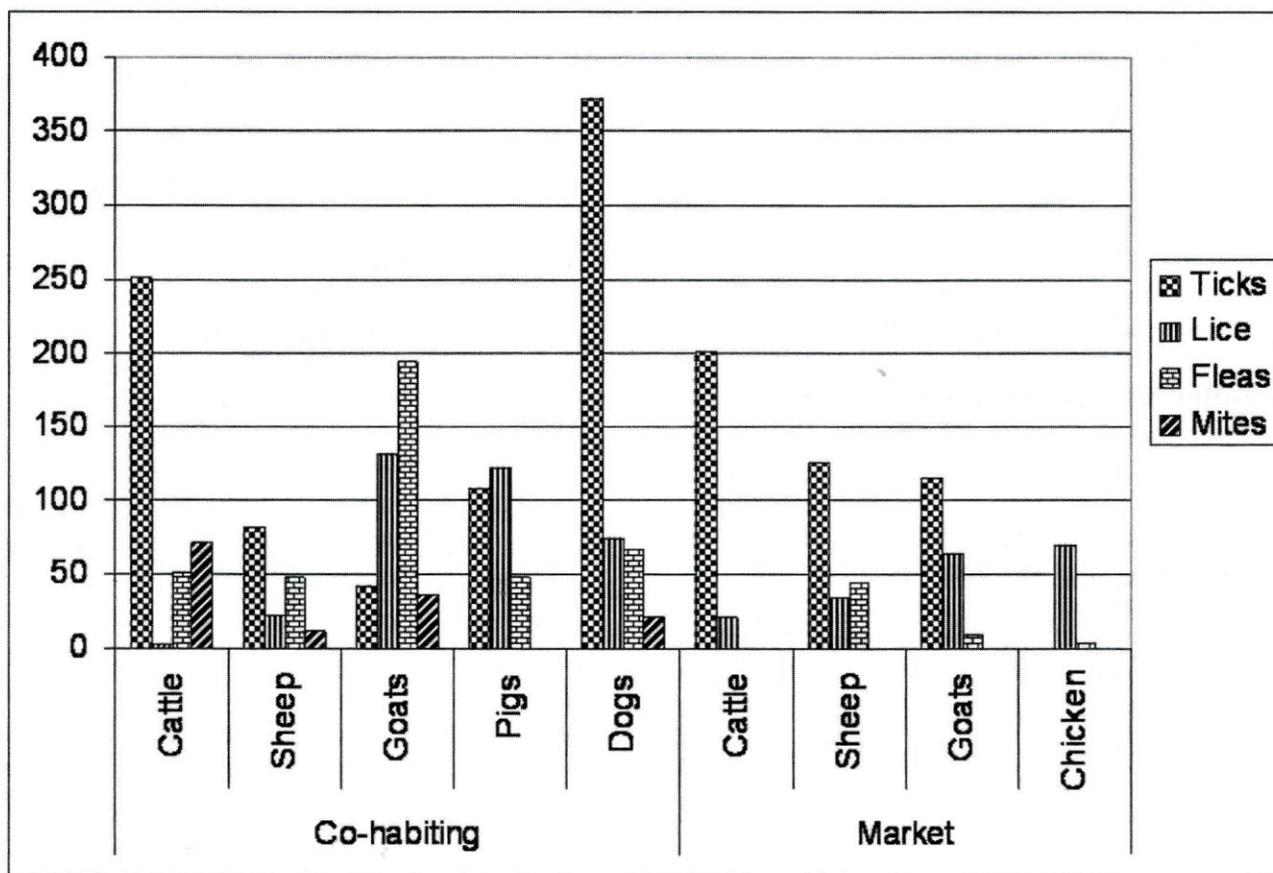


Fig. 1: Relative abundance of ectoparasites found on livestock cohabiting with humans and those sold in some markets in Makurdi.

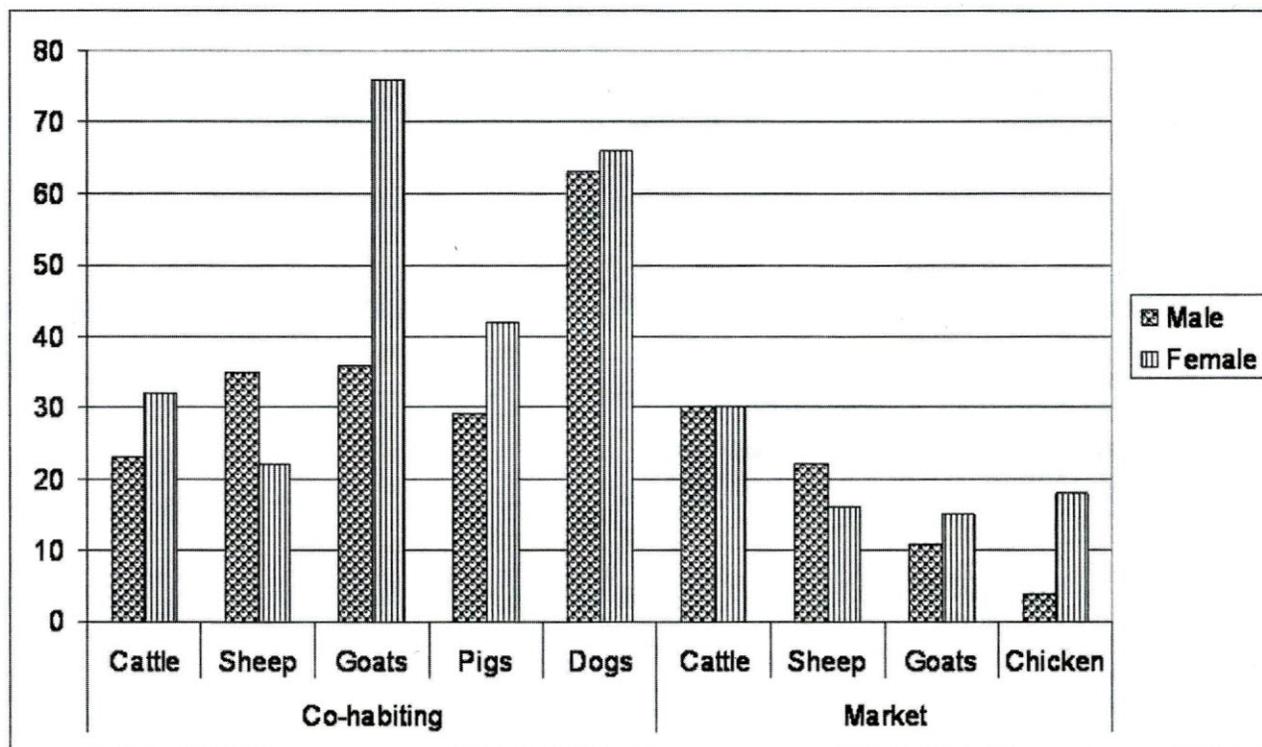


Fig. 2: Ectoparasites infestation in relation to sex of animal.

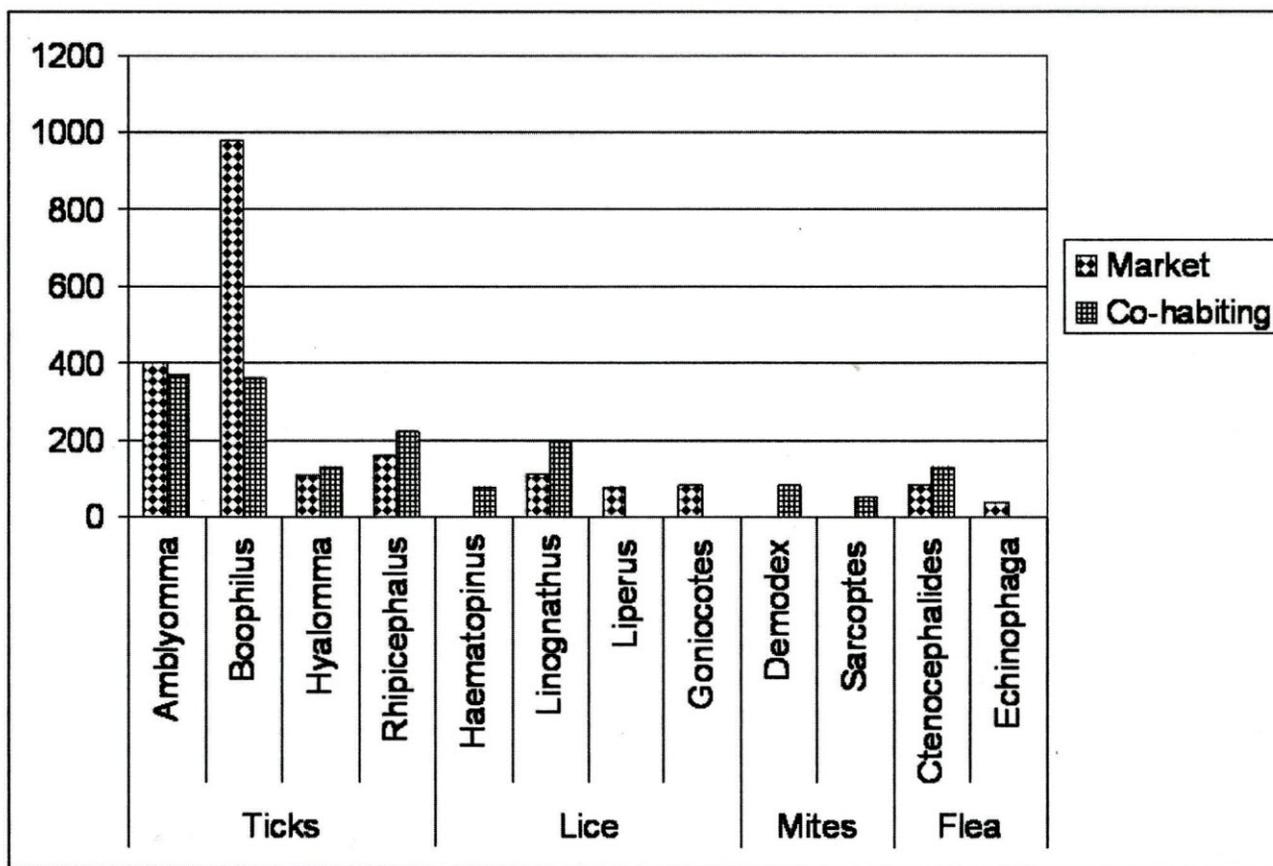


Fig. 3: species of ectoparasites collected from infested livestock in homes and Markets in Makurdi.

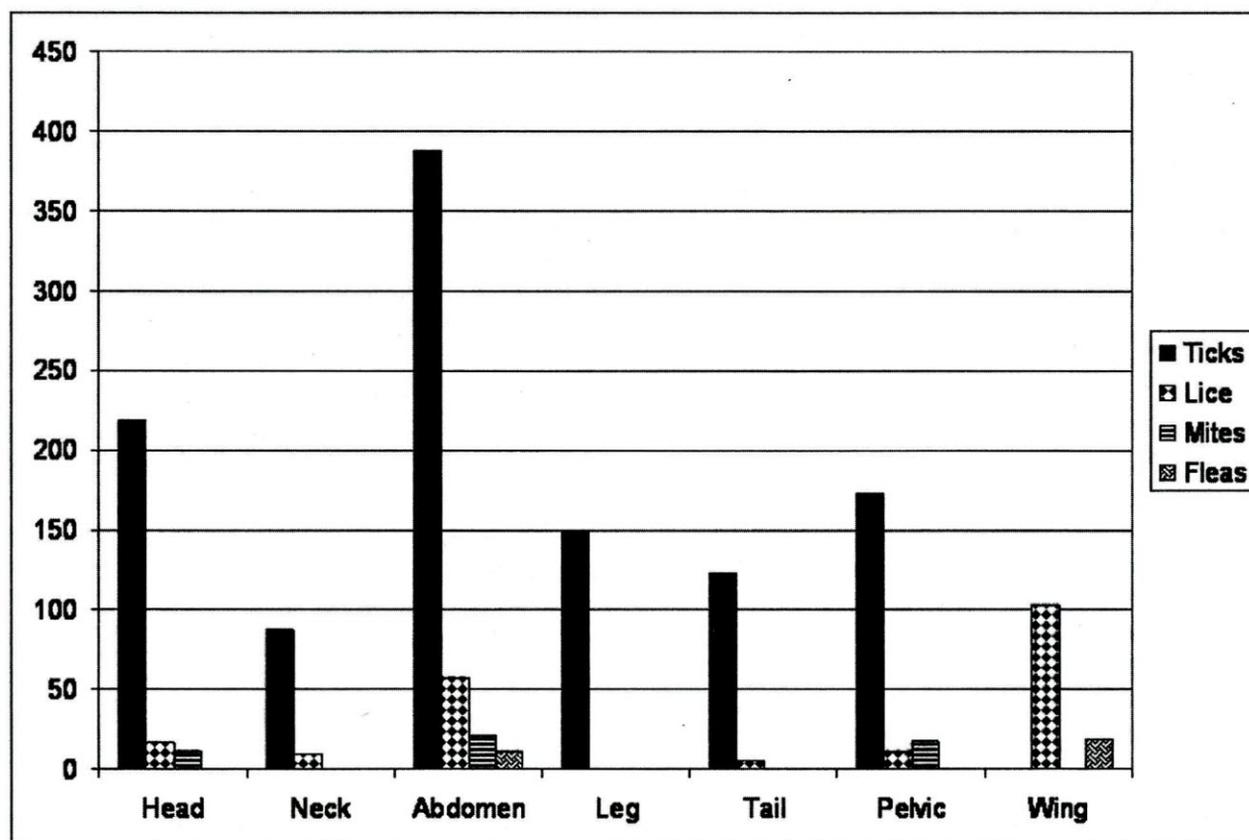


Fig. 4: Predilection sites of ectoparasites on infested livestock in homes and Markets in Makurdi.

DISCUSSION

The heavy infestation of animals cohabiting with humans by ectoparasites of veterinary and medical importance has severe consequences for arthropod-borne zoonotic diseases. Species encountered in this study and infestation rates observed agree with findings reported in some parts of Nigeria (James-Rugu, 2000, Omudu and Amuta, 2007, Ofukwu *et al.*, 2008, Ofukwu and Akwuobu, 2010, Tongjura *et al.*, 2012) and elsewhere (Rony *et al.*, 2010, Seyoum *et al.*, 2015). The predominance of ticks, especially species incriminated in the transmission of babesiosis and other livestock diseases, has serious economic consequences for livestock farmers and the industry. Anaemia may also result in heavy infestation, thereby weakening the animals and even killing younger ones. The ability of these traditional animal ectoparasites to bite humans and suck human blood and sometimes transmit zoonotic diseases is the main concern in this study.

Dog and cat fleas on the other hand have been reported to occasionally transmit *Dipylidium caninum* in children who accidentally swallow infected fleas while playing with pets (Ade-Serrano and Ejezie, 1981). The nostril tick of the genus *Amblyomma* has been reported to feed on apes, chimpanzees and humans in Uganda (Hamer *et al.*, 2013). Ticks that feed upon apes and humans could facilitate cross-species transmission of pathogens, and the risk of exposure is likely elevated for persons who frequent ape habitats.

The availability of wide range of hosts within an enclosed environment could be the reason for the high infestation reported in this study. Of epidemiological importance also is the infestation of goats and sheep with traditional dog ectoparasites. Prevalence of dog flea, *Ctenocephalides canis* on goats in the present study indicates the cohabitation or close contact of animals with infested dogs or cats and also the same host. Rony *et al.* (2010) also reported similar infestation in Bangladesh. Favorable climatic conditions, backward level of management, poor level of consciousness and awareness of farmers, and weak animal health extension services are believed to have contributed for widespread distribution and occurrences of ectoparasites.

The ectoparasites encountered in this study have been identified as the major causes of livestock production constraints and quality deteriorations of skin in Nigeria and other African countries (Ohaeri and Ugwu, 2013, Seyoum *et al.*, 2015). This growing threat from ectoparasites on livestock productivity and tanning industry warrants urgent control intervention to manage the effects of ectoparasites. The need to enforce the restriction of animal movement within residential areas requires full cooperation of farmers and responsible bodies in the area.

The large concentrations of roaming animals as well as those restricted within residential homes reduces hygienic standards and increase the risk of acquiring arthropod-borne zoonotic infections. Though human infestation with ticks and other ectoparasites is not widespread in Nigeria, the dismantling of the biological barriers between livestock and man has resulted in the emergence and re-emergence of new zoonotic infections (Nwoke 2001). Urban livestock farming will no doubt exacerbate the environmental and public health problems being experienced in many urban areas in the developing world. It is a common experience these days to see livestock roaming in and around houses in search of food. While feeding, they defecate indiscriminately, seeding residential and recreational areas with excreta-borne pathogenic organism (Omudu and Amuta, 2007).

The large concentration of these livestock scavengers in search of food in cities reduces the hygienic standards and increases the risk of their acquiring and disseminating zoonotic diseases to the human population. The benefits of urban livestock farming, especially in meeting the demand for essential animal protein notwithstanding, it is important to note that helminthes zoonoses are becoming a major health problem in developing countries with domestic and peri-domestic cycles and reservoirs in pigs or cattle²⁴. The enforcement of already existing prohibition on stray and roaming animals in urban areas will go a long way to preventing environmental pollution. For the urban livestock farmers, interactive health education, highlighting the zoonotic disease implications of cohabiting with animals will enhance the adoption of more responsible and hygienic animal handling and production.

REFERENCES

- Ade-Serrano, M.A. and Ejezie, G.C. (1981).** Prevalence of tungiasis in Oto-Ijanikin village, Badagry, Lagos State, Nigeria. *Annals of Tropical Medicine and Parasitology*, 75:471-472.
- Bryson, N.R., Horak, I.G., Hohn, E.W. and Louw, J.P. (2000).** Ectoparasites of dogs belonging to people in resource poor communities in North West Province, South Africa. *Journal of South African Veterinary Association*, 71:175-179.
- Ekanem, M.S., Mbagwu, H.O.C., Okpara, K.N. and Agbata, Q.C. (2010).** Ticks infestation of domestic dogs (*Canis familiaris lupus*) in Uyo, Akwa Ibom State, Nigeria. *World Journal of Applied Science and Technology*. 2: pp191-196.
- Hamer, S. A., Bernard, A. B., Ronan M. D., Hartel, J. A., Wrangham, R. W., Tony, E. and Goldberg, L. (2013).** Coincident tick infestations in the nostrils of wild chimpanzees and a human in Uganda. *American Journal of Tropical Medicine and Hygiene*, 89(5): 924-927.
- James-Rugu, N.N. (2000).** A survey of ticks and tick borne parasites of sheep and goats from Bassa Local Government Area of Plateau State, Nigeria. *Journal of Pure and Applied Sciences*, 1:35-43.
- Nwoke B. E. B. (2001).** Urbanization and livestock handling and farming: the public health and parasitological implications. *Nigerian Journal of Parasitology* 22(1&2): 121-128
- Ofukwu, R.A., Ogbaje, C.I. and Akwuobu, C.A. (2008).** Preliminary study of the epidemiology of ectoparasites infestation of goats and sheep in Makurdi, North central Nigeria. *Sokoto Journal of Veterinary Sciences*. 7(2): Pp. 22-26.
- Ofukwu, R. A. and Akwuobu, C. A. (2010).** Aspects of Epidemiology of Ectoparasitism Sheep and Goats in Makurdi North Central Nigeria. *Tanzania Veterinary Journal*, 27(1): 36-42.
- Ohaeri, C.C. and Ugwu, A.U (2013).** Survey of Ectoparasites of Farm Animals. *Journal of Agriculture and Veterinary Sciences*. 5:22-26.
- Omudu, E.A. and Amuta, E.U. (2007).** Parasitology and urban livestock farming in Nigeria: prevalence of ova in faecal and soil samples and animal ectoparasites in Makurdi. *Journal of South Africa veterinary Association*, 78(1): 40-45.
- Rony, S. A., Mondal, M. M. H., Islam, M. A. and Begum, N. (2010).** Prevalence of ectoparasites in goat at Gazipur in Bangladesh. *International Journal of Biological Research*, 2(9): 19-24.
- Shah-Fischer, M. and Say, R. (1989).** Manual of tropical veterinary parasitology. Technical Centre for Agriculture and Rural Cooperation, CAB International, Wallingford.
- Seyoum, Z., Tadesse, T. and Adisu, A. (2015).** Ectoparasites prevalence in small ruminants in and around Sekela, Amhara Regional State, Northwest Ethiopia. *Journal of Veterinary Medicine*, 10: 6-12.
- Tongjura, J. O., Amuga, G. A., Ombugadu, R. J., Azamu, Y. and Mafuiya, H. B. (2012).** Ectoparasites infesting livestock in three Local Government Areas of Nasarawa State, Nigeria. *Science World Journal*, 7(1): 23-29.
- Ugbomoiko, U.S., Ariza, L. and Heukelbach, J. (2008).** Parasites of importance for human health in Nigerian dogs: high prevalence and limited knowledge of pet owners. *BMC Veterinary Research* 2008, 4:49.