



A Survey of the Most Prevalent Tick Parasite on Dogs In Abak Local Government Area of Akwa Ibom State-Nigeria.

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Abstract

This study was designed to ascertain the prevalence of tick parasites on dogs found in five (5) local communities of Abak Local Government Area of Akwa Ibom State, Nigeria. At the end of the research, it was discovered that there is a high prevalence of tick parasitization on dogs in the study area. This therefore calls for a need for further investigation and information on these parasites from other areas so as to enable animal care givers and Veterinarians formulate a master plan that will aid in tackling and managing ticks and their associated diseases.

Keywords: Ticks;Ectoparasites;Dogs;Rhipicephalus;Abak

1.0 INTRODUCTION

Ticks are specialized group of mites and share many features with other mites. They are tiny parasitic insects, wingless, blood sucking in nature [1].

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- There are two sub families of ticks (1) Ixodidae- consisting of the hard ticks
- (2) Argasidae- consisting all the soft ticks.
 - (3) The monotypic family

Ticks being ectoparasites live on the skin or outgrowths of the skin of its host for various periods and may be very detrimental to the latter [2].

Members of the ticks family are known to parasite a wide range of hosts quite unlike other ectoparasites that maybe host specific in nature (e.g. lice) [26,3,4,1].

Ticks as well as other ectoparasites are known to be vectors of pathogens which the parasites typically transmit to the hosts while feeding or defecating. Many species of arthropods are responsible for the transmission of disease to the other animals [5] or are vectors for some diseases that are transmitted to humans. Large numbers of ectoparasites weakens the animal in many ways, through the following disorders as collaborated by many authors; anemia, hypersensitivity, anaphylaxis, irritability, dermatitis, skin necrosis, low weight gains, secondary infections, focal hemorrhages [1,6,7,8,9].

These parasites are generally associated to dermatitis, affects animals to different degrees according to nutrition status of the host. Its immunological conditions and to parasitic intensity and in extreme cases, the parasite can cause exsanguinations which may lead to death [10,11].

According to 1984 report by FAO, it was estimated that 80% of the 1.23 billion cattle were infested worldwide, with ticks [12]. These according to the report was responsible for severe losses due to tick worry, blood loss, damage to hides and udders, infection of toxins or mortality and debility caused by transmitted disease organisms.

Another report in 1989 by Mukhebi, *et al.*, [13] loss from East Coast fever- as cattle disease in Eastern and Southern Africa transmitted *Rhipicephalus appendiculatus* (the brown ear tick) and *R. zambeziensis* to be US\$ 168 million. This figure above was calculated to include the loss of 1.1 million head of cattle.

Byson *et al.*, (2000) [14] cited many authors who have conducted studies on dogs ectoparasites include [15,16,17,18,19,20,21,22,23].

All these authors mentioned above as cited by Bryson *et al.*, 2000; all agreed from their respective Country of study that *R. sanguineus* is extremely widespread and is recognized as a common species of ticks on domestic dogs in Southern region of Africa. The invasion of Ixodid ticks increases the risk of tick bourn-disease, especially canine erlichiosis and babesiosis [5].

Soulsby in [11] indicted *R. sanguineus* as a vector for *Babesia canis*, *Babesia Vogeli*, *Ehrlichia canis* and *Hepatozoon canis*. Just as [25] described *Pulex irritans* as a vector for *Yersinia pestis*, the causative agent of plague Canine tape worm *Dipylidium caninum*.

The role played by ectoparasites in several human diseases and animals therefore calls for a need to study these parasites and their prevalence.

For example, cases of human parasitic (Such as Astrakhan fever) have been reported by *R. sanguineus* from Southern Europe (Bosnia and Greece, specifically) by [26,27]. *Trichodectes canis* acts as an intermediate host for the tape worm *Dipylidium caninum* that may affect humans, especially Children [28].

Both city and local resident keep dogs as pet, for security and for hunting. It appears that only those in the Urban or the city pay attention to the health of those animals in terms of routine visit to the veterinary clinic. Those in the

remote villages have neither access to the Veterinary nor proper information as regard the public health/zoonotic importance of dog ectoparasitism. Therefore, the aim of this study was to determine the most prevalent tick ectoparasitism in 5 rural communities of Abak Local Government Area of Akwa Ibom State-Nigeria.

2.0 MATERIALS AND METHODS

The study was carried out between July 2013 to October, 2013 in five (5) remote villages of Abak local government Area of Akwa Ibom State-Nigeria. Abak is located on the following coordinates 4°59'N 7°47'E and 4.983°N 7.783°E with total area of about 190km² (70Square miles). The major economic activities of the people are palm produce [29].

Ten households were randomly selected each from 5 villages for this study. The breed of dogs that were common in the study includes the local Mongrels, Basenji, Terriers, Alsatian, Mixed breed and very few of the Rhodesian ridgeback and the Rottweiler. On the average, each household had at least two dogs.

Most of these dogs are used for security, companionship and for hunting purposes. Most of the dogs accepted for this study had no history of vaccinations, medications nor treatment with insecticides of any kind.

All dogs from each household were palpated and inspected for ticks. The ticks found were manually removed with care such that the mouth parts of the ticks were not damaged. Areas inspected were the skin, ears, footpads and the inter-digital spaces. Ticks collected were kept in a sample bottle containing 65-70% ethanol to preserve the samples for transportation to the laboratory for counting and identification. The identification of this ticks were done based on their physical characteristic and morphology. For example, the hard ticks are characterized by having a visible scutum with mouth parts originating on the anterior margin while soft ticks lacks a scutum and having mouth parts that originate on the ventral surface.

All dogs examined had a very heavy flea's infestation to the extent that the tables used in examining these dogs were covered with fleas and the end of the examination.

Although the aim of this study had nothing to do with fleas but the authors felt it was worth mentioning.

Data collected at the end of this study were entered into Microsoft Excel worksheet and were later processed into charts for presentation.

3.0 RESULTS AND DISCUSSION

Table 1. Ticks collected during the study and their and point of collection

Villages	No. of Dogs Examined	No. of Hard Ticks collected	No. of Soft Ticks collected	Total	%Prevalence
Ediene	28	58	38	96	1.91
Oku-Abak	25	236	122	358	7.14
Abak-Town	22	301	118	419	8.35
Afaha-Obong	21	405	2015	2410	107.83
Mmanta	19	682	952	1734	34.56
Total	115	1682	3245	5017	

The prevalence of the tick parasite as indicated in the study is as presented in Figure 1 .

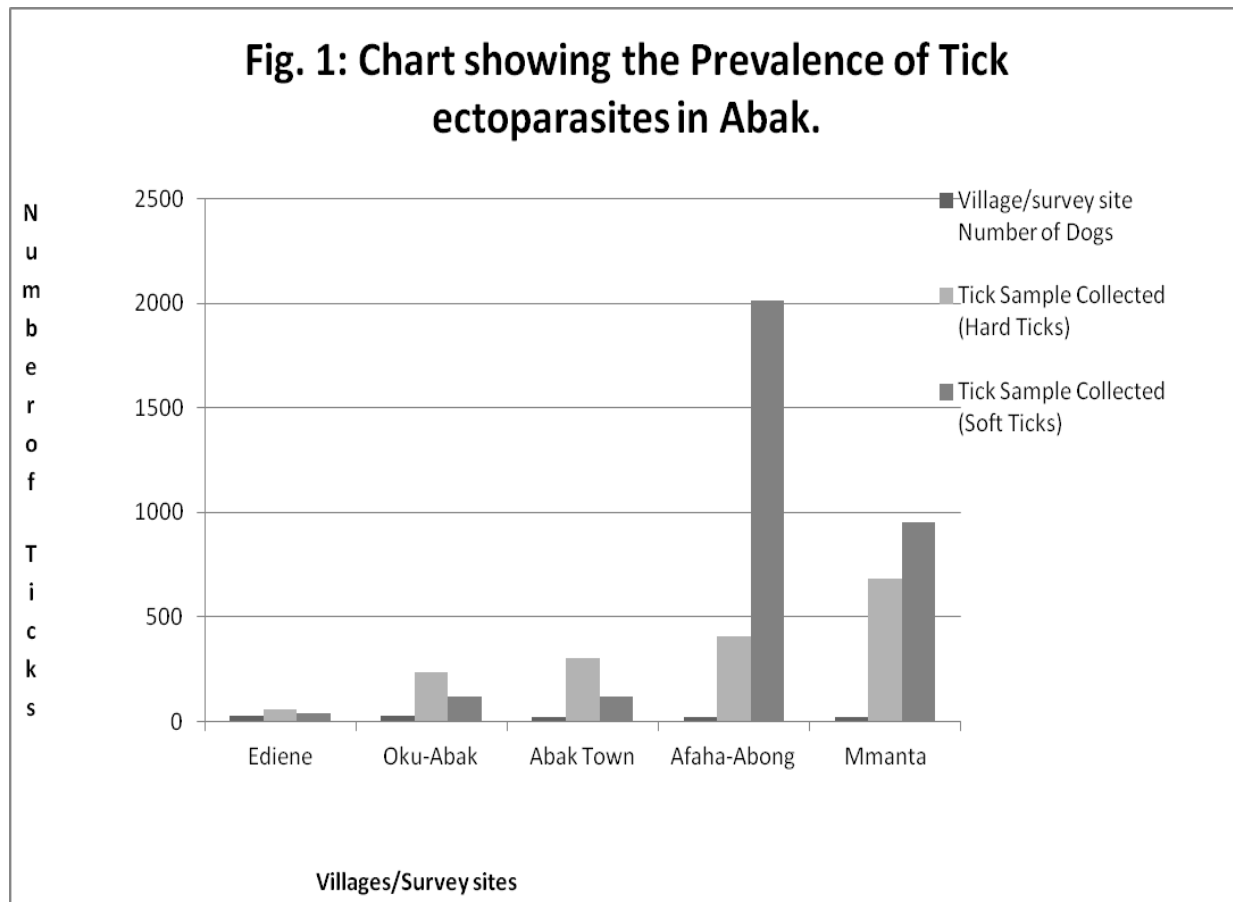


Figure 1

Data collected showed that 115 dogs were examined for ticks and all of them showed very high rates of infestation by these ectoparasites. A sum total of 5017 ticks were collected and counted from the 115 dogs examined, with the soft ticks taking the lead. About 3245 ticks were collected and counted as soft ticks representing 64.68% while the remaining 1682 were counted as hard ticks.

From Ediene Abak about 28 dogs were examined and 96 ticks were collected with 58 and 38 representing hard and soft ticks respectively, showing 1.91% prevalence. At another village known as Oku-Abak, we collected about 358 ticks from 25 dogs with 236 being hard ticks and 122 being soft ticks. This showed 7.14% prevalence rate. Of the 22 dogs examined from Abak-Town, a total number of 419 ticks were collected; the hard ticks prevailed with the number 301 while the soft ticks were 118 indicating 8.35%. Twenty one dogs were examined at Afaha-Obong, 405 were counted for as hard ticks while 2015 were recorded for soft ticks amounting to about 2410 ticks and the highest in the number of ticks collected as compared to the rest of the study locations. This represented 107.83% prevalence. This high rate of prevalence could be associated to the nearness of the community to the local livestock market that is available in the area as there us to be a high rate of animal traffic to the market during the market days. Perhaps this may explain the high rate of the soft ticks over the hard ones as the members of this group *Argasid* are multi host ticks [31].

At Mmanta, 19 dogs were presented for examination, a total of 1734 ticks were collected; 682 were recorded as hard ticks while 952 were recorded as soft ticks. This figure represented 34.56% rate of prevalence of ticks as recorded in the investigation.

However the authors could not ascertain the reason behind the higher number of soft ticks over the hard ticks as one will expect the hard ticks to take the lead over the soft ticks. This assumption is based on the fact that soft ticks feeds and leaves the host while the hard tick attaches itself to the host and feeds for a long time.

The increase in the number of ticks could be attributed to favorable environmental conditions as this plays a very important role in the survival and multiplication of the ectoparasites [5, 30]. Abak local government lying in the warm humid region of Nigeria is favorable enough for the multiplication of these parasites.

4.0 DISCUSSION

To the best of our knowledge, this research is the first of its kind into ectoparasite of dogs in Abak local Government Area of Akwa Ibom State-Nigeria. This investigation has revealed that the rate of infestation of ectoparasites on dogs is very high and therefore calls for action among the stakeholders in the animal health sector.

The study result from Ediene Abak, Oku Abak and Abak town indicated that dogs from these three villages had higher rates of infestation with hard ticks which point us to a major culprit, *Rhipicephalus sanguineus* otherwise called the brown dog tick or kennel tick. This species of ticks is cosmopolitan in distribution. There are about 75 species in the genus *Rhipicephalus* and they attack dogs wherever they are found [2].

According to Le Riche *et al*, 1988, *R. taunanicus* and *R. sanguineus* are the most common tick parasite among the five species of ticks recorded in a study he conducted in Afghanistan, [32] also reported *R. sanguineus* to be most abundant ectoparasites in Ahvaz district, South-West Iran.

Also, [33] reported *R. sanguineus* was the most prevalent tick observed on dogs in Belo Horizonte, Brazil.

In citing [14] as he quoted other authors, *R. sanguineus* was the most prevalent tick on 122 sheep dogs examined in Queensland, Australia; it was found on 68% of stray dogs surveyed in Rabat region of Morocco as he cited Panley *et al.*, 1987. In a similar report from Oklahoma and Arkansas, USA, 870 domestic dogs were examined, with 74865 ticks collected, 62% of this number were *R. sanguineus* [19].

In a similar report from Nigeria 30% of 820 dogs examined by Veterinarians from four different Veterinary Clinics, had ticks, 160 of these were infested with *R. sanguineus* representing 19.5% prevalence rate [34].

Rhipicephalus sanguineus is a known vector for *Babesia canis*, *Babesia Vogeli* and the only efficient tick vector of *Ehrlichia canis* [5,35].

During the identification process though no attention was given to the species of this tick parasites, there were evidence of infestation of these dogs with other livestock species of the tick parasites such as *Amblyomma* Species, *Boophilus* and *Dermacentor* Species. These may have pointed to the fact that these dogs are in constant contact with livestock such as goats, sheep kept by the local pet owners as well as regular grazing of cattle in the area by free roaming Fulani Herdsmen.

5.0 CONCLUSION

This work was conducted to determine the prevalence and the intensity of the tick infestation on dogs in to communities of Abak Local Government Area of Akwa Ibom State, Nigerian. Dogs examined were found to be infested with ticks of various species (soft and hard). Though consideration was not given to the identification of the species of ticks found in the study, it could be said that there is limited information on the effects and the economic impacts of these ticks on the dogs in these locality, little or no attention to the control of these ticks by the local people as little attention is also given to the study and documentation of the ectoparasite population in these locality.

The availability of information may help in understanding the relationship of these parasites, their potentials and impact on the dog population, livestock and humans.

It will be of benefits, if further studies are conducted in the area and other local government areas of the State and Country to understand the risk of relevant tick borne diseases and also help Veterinarians and animal care givers to formulate program for prevention and control of these parasites and accompanying diseases.

Acknowledgements

These and the Reference headings are in bold. Text below continues as normal.

References

1. Sugden, E. A. *Tick*. Microsoft Encarta (2009). DVD. Redmond, WA: Microsoft corporation, 2008.
2. C.A. Hopta, L A, Durden and J. E. Keirans. *Ectoparasites and Classification*. Rev. Sci. Tech. Off. Int. Epiz., 1994, 13(4), 985-1017.
3. Gross, T. I., P. J. Ihrke, E. J. Walder and V. K. Affolter, 2005. *Skin Disease of Dogs and Cats: clinical and Histopathologic Diagnosis*. Blackwell Publishing Company, Uk, pp: 11-555.
4. Gonzalez, A., D. C. Castro and G. Sandra, 2004. *Ectoparasitic species from Canis familiaria (Linnè) in Buenos Aires Province, Argentina*. Veterinary Parasitology, 120(1-2): 123-129.
5. Sardar, J. Shoorijeh, A. R. Hhasrodashti, A. Tamadon, N. Moghaddar, M. A. Behzadi. "Seasonal frequency of ectoparasites infestation in dogs from Shiraz, Southern Iran". *Turk. J. Vet. Anim. Sci.* 2008; 32(4): 309-313.
6. Hopta, C. E. *Arthropodiasis*. In *CRC handbook series in zoonoses*(1982). (G.V. Hillyer & C. E. Hopta, Eds.). Section C: Parasites zoonoses. Vol. 111. CRC. Pres.; Boca Raton, 215-247.
7. Nelson, W. A. Keirans, J. E., Bell J. F. & Clifford C. M. (1975). "Host-parasite relationships". *J. Med. Entomol.*, 13, 389-428.
8. Nelson, W. A, Bell J. F., Clifford C. M. & Keirans J. E. (1977). "Interaction of Ectoparasite and their Host". *J. Med. Entomol.* 13, 389-428
9. Steelman, C. D. (1976). "Effects of external and internal anthropod parasites on domestic livestock production". *Annu. Rev. Entomol.*, 21, 155-178.
10. Urquhart, G. M. J. Armour, J. L. Durcan, A. M. Dunn and F. W. Jennings, 1996. *Veterinary parasitology*. 2nd edn., Blackwell Science, Uk. Pp:201-23.
11. Souby, E. J. L. 1982. *Helminths, Arthropods and protozoa and Domesticated Animals*. Bailliere. Tindal, London. Pp:136-160.
12. Food and Agriculture Organization of the United Nations (FAO) 1984. "Ticks and ticks-borne disease control". *A practical field Manual (in two Volumes)*. FAO. Rome, PP: 621.
13. Mukhebi, A. W., Perry B. D. & Kruska R. (1989). *Estimated Economic of the Theileriosis Control in Africa*. Pre. Vet. Med. 12, 73-85.
14. Bryson N. R, Horak. I.G. Hohn E.W. Louw J. P (2000). "Ectoparasites of dogs belonging to people in resource-poor communities in North-West province, South Africa". *0038-2809 JI S. Afr. Vet. Ass.* 71(3): 175-179.
15. Cornack K. M, O'Rourke P. K. 1991. "Parasites of sheep dogs in the Charleville district, Queensland". *Australian Veterinary Journal* 68;149.
16. Horak I G. 1982. "Parasites of domestic and wild animals in South Africa". XIV. The seasonal prevalence of *Rhipicephalus sanguineus* and *Ctenocephalides spp.* On Kennelled dogs in Pretoria-North. *Onderstepoort Journal of Veterinary Research* 49; 63-68.
17. Jagger T. Banks, I Walker A. 1996. "Travelling Ticks". *The Veterinary Records* . 139:476.

18. Koch H.G 1982. "Seasonal Incidence and attachment sites of ticks (*Acari ixodidae*) on domestic dogs in Southern Eastern Oklahoma and North Western Arkansas, USA". *Journal of Medical Entomology* 19:293-298.
19. Le riche P. D., Soe, A K, Alemzada, Q. Sharifi I. 1988. "Parasite of dogs in Kabul, Afghanistan". *British Veterinary Journal* 144;370-373.
20. Panley V. S., Dakkak A, Elmamoune M 1987. Parasites of Stray dogs in the Rabat region Morocco. *Annals of Tropical Medicine and Parasitology*, 81: 53-55.
21. Rautenbach G. H 1991. "A cross-sectional, descriptive study of the health status of a canine population in a rural town in Southern Africa". *Journal of the South African Veterinary Association* 62:158-162.
22. Ribeiro V. L. S., Webber, M A., Fetzer L. O. De. Vargas CRB. 1997. "Species and prevalence of ticks infestation of stray dogs in Porto Alegre City, R. S. Brazil". *Gencia Rural* 27:285-289.
23. Uilenberg, G. Franssen F.F. J. Perie, N.N. Spanjer AAM 1989. "Three groups of *Babesia Canis* distinguished and a Proposed nomenclature". *The veterinary Quarterly* 11; 33-40.
24. Soulsby, E. J.L. *Helminthes. Arthropods and protozoa of domesticated animals*. 7th edn. Bailliere Tindall. London 1982
25. Patrick, M J., Harrison, R.L. 1995. "Fleas on grey foxes in New Mexico". *J. Med. Entomol.* :32 201-204.
26. Fournier P E, Durand J P, Rolain J M, Camicas J L, Tolou H, Raoult D (2003). *Detection of Astrakhan fever rickettsia from ticks in Kosovo*. *Ann New York Acad. Sci.* 990:158-161.
27. Chaligiannis, I. Sotiraki, S. Xanthopoulou k Papa A. 2009. Ticks parasitising humans in North-East Greece. 7th Ann. Meet. Eur. Vet. Parastol Coll and 10th Bienn Symp. Ectoparasites in pets (ISEP). Toulouse, France, Proc. P. 76.
28. Scott. D. W, Miller W H, Griffin C E. 2001. *Miller and Kirk's Small Animal Dermatology*. 6th ed. WB Saunders, Philadelphia, USA.
29. Abak-Wikipedia. The free Encyclopedia. [<http://en.wiki-pedia.org/w/index.php?title=Abak>] [Nov. 11-2013].
30. Dryden, M W. Rust. M.K. *The Cat flea: Biology, Ecology and Control*. Vet. Parasitic, 1994; 52:1-19.
31. DPD-X-Tick Image Library. [http://dpd.cdc.gov/dpdx/HTML/image_library/Ticks-u.htm][11-11-2013].
32. Mosallanejad, B., Aborzi, A.R. Katvand N. "A survey of Ectoparasites infestation in Companion Dogs of Ahvaz District, South-West of Iran". *Journal Arthropod-Borne Dis.*, 2012, 6(1):70-78.
33. Linardi, P. M., Nagem, R. L. 1973. "*Pulicidae* and other ectoparasities on dogs of Belo Horizonte and neighbouring Municipalities". *Rev. Bras. Biol.*,33: 529-537.
34. Ugochukwu E. I, Nnadozie C.C.1985. "Ectoparasitic Infestation of dogs in Bendel State, Nigeria". *Int. J. Zoonoses*. 12(4):308-312.
35. Green, C. E., Harvey J. W 1984. *Canine Ehrlichiosis* In Green C. E (ed.). *Clinical Microbiology and Infectious diseases of the dogs and Cats*. WB Sanders, Philadelphia 545-561.