Nigerian J. Anim. Sci. 2020, 22 (1): 156-164

Prevalence of ecto-parasitic infestation of dogs (canine) in Jalingo

Kontan, D.D[1], Patience, I[1]. Josiah, D[1]. Umar, A[1]. Iwan, D.I[2], H.M. Bello[2], Maiwada, A[1]. I.S, Baya[2] and Adams D[2].

[1]*Animal Health Department, College of Agriculture, P.M.B. 1025, Jalingo, Taraba State*
[2]*Animal Production Department, College of Agriculture, P.M.B. 1025, Jalingo, Taraba State.*
E-mail:- dicksondicknwi@gmail.com Phone No: *08066017859*

Target Audience: *Livestock farmers, Animal health practitioners*

Abstract

A study was conducted to investigate the prevalence of ecto-parasites on dogs, data were extracted from veterinary hospital treatment record book Jalingo and was analyzed for five (2014-2018) years respectively. The analyzed results showed that the infestation was highest in the year 2015 with 291(97.0%) followed by that of 2018 with 191(95.0%). In regards to age infestation, 700(90.6%) and 550(91.7%) for adults and young dogs respectively. However, it may suggest that the pet owners might have taken severe measures by treating their animals with acaricidal drugs hence the fluctuation in the infestation rate. It is evidence that the number of dogs examined was 1373 with a prevalence rate of 1250(91.0%) of the dogs affected with the ecto-parasite. Therefore, the dogs in Jalingo Local Government area harbor ecto-parasites on their bodies, all affected canine (dogs) should be isolated, culled and quarantine from the company of other dogs because treated dogs tend to come in contact with the carries of the disease for life and are capable of transmitting the disease to other healthy dogs within the house.

Keywords: *Ecto-parasite, dogs, infestation.*

Description of problem

An ecto-parasite is an organism that lives on the outer surface of another organism (host) and which does not contribute to the survival of the host. Some ecto-parasites such as bed bugs, maintain only periodic contact with their host whereas others such as the crab, louse have a permanent association. [1]

Ecto-parasites are organisms which inhibit the skin or outgrowth of the skin of another organism (the host) for various periods, and may be detrimental to them. Various ecto-parasites cause significant infestations in many kinds of domestic animals including livestock, pets, laboratory animals, poultry, fish and bees [12]. Ecto-parasites are common and important cause of skin diseases in canine and cats. They have a worldwide distribution and are capable of disease transmission. Ecto-parasites cause life threatening anemia and occasionally hypersensitivity disorder in young, some ecto-parasites of pet animals notably fleas can infest humans and may lead to the development of dermatitis and transmit vector-borne disease [21]

In Nigeria, several studies on the ecto-parasites of canine have shown that, infestation by ticks, lice and flea is extremely widespread [23]. Though the prevalence of infestation differs markedly between the studies, the clinical consequences resulting from damage to skin by irritation, invasion of tissue and stimulation of allergic responses are common. The procedure employed to investigate ecto-parasites in canine are the skin scraping, coat brushing, hair pluck, tape trip and serology [16]. The treatments and prevention of ecto-parasites in canine is achieved by spraying, dipping or bathing canine with adequate

insecticides and acaricide, isolation of all affected canine and treat them to avoid continuous exposure of the canine [15].

[13] *Demodex* is not contagious; infection is commonly seen in dogs three months to one year of age. Prognosis is poor if infection occurs in older dogs. Transmission of mites is through trans-mammary gland to the puppies from the bitch during the first days of life. Short-haired breeds and pure breeds are considered predisposed to *demodicosis*. Many breeds such as "Terries", Sharpeis, English bulldogs, Weimaraners, Great Danas, Alaskan malamutes and Afghan hounds, were represented in one study to be at an increased risk for *demodicosis.* Because of genetic susceptibility, breeding of pure-bred is not recommended if diagnosed with *demodex*. Since many dogs naturally harbor *Demodex*, the question as to why some dogs develop infection arises, the immune system is believed to be the issue with *demodex* cases [14]. Mechanism is thought to be a T-cell immunodeficiency of a transient nature in young, growing dogs allows mites to flourish resulting in an immunosuppressive effect by the mites themselves. Stress and poor diet can contribute.

Dogs can be infested with 3 species of lice, *Linognathus setosus* (a bloodsucking louse), *Trichodectes canis* (a biting louse), and *Heterodoxus spiniger* (a biting louse that feeds on blood). Dogs in poor health can become heavily infested. *Heterodoxus spiniger* is rare in North America. *Trichodectes canis* can serve as an intermediate host for intestinal tapeworms. The first signs that your dog may have lice include scratching, biting, and rubbing of infested areas. A dog with lice often has a rough, dry coat. If the lice are abundant, the hair might also be matted. Sucking lice cause small wounds that can become infected. Usually, the diagnosis is made by seeing lice or eggs on the infested pet. Parting the hair often reveals the lice. Chewing lice are active and can be seen moving through the hair. Sucking lice usually move more slowly. They are often found with their mouth-parts embedded in the skin [12]. The aim of the study is to evaluate the prevalence of dog ectoparasites in Jalingo.

Materials and Method

This study was carried out at veterinary hospital Jalingo Taraba state. Jalingo is situated at latitude 8.88^0N, longitude 11.37^0E and 351 meters elevation above the sea level. The climate here is classified as tropical, the average annual temperature is 27.9^0C in a year, and the average rainfall is 958mm.

Study design

A study was carried out to examine ecto-parasitic infestation of one thousand three hundred and seventy-three breeds of dogs (Canine) of different sexes and ages.

Animals (Pets) used for the study

One thousand three hundred and seventy three dogs (Canine) were used for this study. Formal contact was made with the appropriate authority at the veterinary hospital and the record keeping book was made available, information regarding dog infection treated in the hospital and particularly the ones due to ecto-parasite was noted.

Sample collection

Each dog was restrained by the owner or any assistance and examined caraniocaudally, the burden of the parasites on the body of each dog were assessed based on species of the ecto-parasites infestation and recorded.

Table 1. Yearly presentation of Dog`s at the veterinary hospital Jalingo and the ones affected with ecto-parasite in the year review for treatment

Year	Dogs presented	Dogs affected	Percentage (%)
2014	200	151	75.5
2015	300	291	97.0
2016	450	414	92.0
2017	223	203	91.0
2018	200	191	95.0
Total	**1373**	**1250**	**91.0**

Data collection

The data regarding the conditions above for five years was extracted from the record book in veterinary hospital Jalingo. All findings based on the age, sex and species of parasites are presented in Table 2 and 3 respectively.

Results and Discussion

The results of the investigation carried out for five years (2014-2018) revealed that 151(75.5), 291(97.0), 414(92.0), 203(91.0) and 191(97.0) of dogs were infested in the year 2014, 2015, 2016, 2017 and 2018 respectively. The total number of dogs infested with ecto-parasites for the period in review was 1250(91.0).

Based on the result obtained according to age and sex of the dogs, it was revealed that 700(90.6%) of the 773 adults dogs examined were infested with different species of ecto-parasites, 550(91.7%) of the 600 young dogs examined were also infested, it shows that the adults were more infested than the young. While examination of dogs ecto-parasites according to sex revealed that, 650(94.2%) of the 690 male dogs examined were infested with ecto-parasites and 600(87.9%) of the females dogs were also infested with the ecto-parasites, it is evidence that the highest rate of prevalence in male compared to the female is due to their roaming on the street from one place to another in search of bitches.

The results of dogs presented in the veterinary hospital for that period of five years, the infestation was highest in 2015 with 291(97.0) followed by that of 2018 with 191(95.0) of the dogs infested with ecto-parasites followed subsequently with 414(92.0%), 203(91.0%), 151(75.5%) for the year 2016, 2017 and 2014 respectively. The continual yearly variation cannot be fully explained however, it may suggest that the pet's owners might have taken serious measures by treating their animals with acaricidal drugs hence the fluctuation in the infestation rate. Ecto-parasites have contributed greatly to various diseases that affect the external body of dogs by rendering them incapacitated for game activities and show in some countries (13). The intense pruritus caused by some of these external parasites makes these animals restless and loss concentration in feeding, all this assemblage of problems brought about weight loss and decrease market value for those pets.

In cases of lice infestation (5), you may see light tan, brown or reddish color "dots" on the dog`s skin or presence of silvery colored nits attached to hair shafts. The clear clinical signs to be observed on dogs is, they make dogs restless by biting and always jumping on their bodies causing allergic pruritus (11). Lice are small, flightless insects that live in the hair or feathers of animals and people. There are 2 basic types of lice. Biting or chewing lice

(order Mallophaga) infest both birds and mammals. They feed mostly on skin debris and the secretions of their hosts. Blood-sucking lice (order Anoplura) are skin parasites of mammals only. Typically, lice are species specific; that is, they do not readily transfer from one animal species to another. Female lice glue their eggs, called nits, to the hairs of the host near the skin. Ordinary shampooing and washing will not dislodge the nits. Nits are pale, translucent, and almost oval in shape. Once the nits hatch, the lice undergo nymphal stages before reaching adulthood. The immature nymphs look very much like adult lice, only smaller. It takes about 3 to 4 weeks for most lice to go from nit to reproductively capable adult, although this period varies with the species.[10]. [9] Lice dropped or pulled from the host die in a few days, but eggs may continue to hatch over 2 to 3 weeks. Thus, lice control treatments should be repeated 7 to 10 days after the first treatment. Careful inspection of your pet's coat should be continued daily for at least 2 weeks after you see the last louse. Be sure to carefully collect any lice (dead or alive) removed from your pet and dispose of them promptly in a sealed container (such as a zip-closure plastic bag). Other dogs that have contact with an infested dog should be treated to prevent spread of the lice. In addition to killing the lice on your pet, you will want to be sure that lice are not infesting your dog's bedding, collar, grooming tools (including bushes or combs), and other similar objects in your dog's environment. Bedding should be washed frequently in hot, soapy water or treated with an appropriate spray until the infestation is controlled. Careful cleaning and inspection of these objects can help provide your pet with continued relief from the irritation caused by lice [14]

[1] Skin scrapping is the method used to diagnose *demodecosis*, hair is clipped from suspicious lesion and skin is squeezed between thumb and forefingers and scraped with a dull blade until blood oozes from site. Scrapping are mounted on to a slide containing approximately two drops of mineral oil to suspense tissue and examined it. A positive skin scraping can consist of adult mites, larvae "3pairs of legs" nymphs and reddish spindle shape eggs may be found. Prognosis worsens if the ratio of adult to immature form is 50:50 or less [15].

[13] Diagnosis can be made by light skin scrapping or gross examination of the skin by a hand lens. Another option is potassium hydroxide (KOH) digestion sugar flotation of skin debris and hair can reveal characteristics mites with strong mandibulate mouth parts. Used of magnifying lens helps identify any of the ecto-parasite on dogs. [18] Diagnosis is based on clinical observation, mites live in "psuedotunels" in hyperkeratinized skin where they periodically pierce the skin to suck lymph. Sometimes leading to pustule formation. Skin scraping for possible parasites can be done, however, parasites may still be present even though the scraping are negative.

[19] Quarantine of newly purchased mammals, isolation and identification of affected dog`s and vaccination of healthy ones with Ivermectin should be done. [8] Control of ecto-parasites involves not only treating the animals but also its environment, fumigation or spray of the dog house, doggy articles and other things with insecticides (Amitraz, Cypermethrin) has to be undertaken. If dogs spends time in the lawn or the yard, that also has to be sprayed. [4] Regular application of anti-parasitic powder will certainly help in preventing the flea, commonly employed pesticides for control of fleas is carbonyl which belongs to carbonate compound. Cerberyl is least toxic and has a wide margin of safety with 307-850 mg/kg oral LD50 value. This implies that cerberyl preparation are quite safe in pets for elimination of existing fleas, insecticides like amitraz, cypermethrin,

dettamethrin, commophos can be used with proper dilution since they are toxic to the pets.

Ticks are the most dangerous of all the blood sucking parasites of dogs. These eight-legged pets are hardiest and transmit several diseases, they are most common in warm, moist environment [2]. Ticks has lare abdomen and as it sucks blood, its abdomen distends to 1/3rd of an inch. Mating takes place on the body of the host and the gravid female drops off and lay hundreds of eggs in concealed places like under the carpet, furniture or behind the drapes [15].

[10] Ticks can be controlled by regular spraying of insecticide in the kennel for elimination of existing ticks, bath the dogs with proper and effective insecticide at regular intervals. Ticks have to be pulled out by tweezers or by hand, it is important to extract their heads otherwise abscess may be found. A suitable method is to soak them with alcohol (methylated spirit) then pull them, regular application of anti-parasitic powder will protect from tick infestations, spray with insecticide should be adopted to prevent re-occurrence.

[19] Squamos form of *demodicosis* can be treated with local topical insecticide (1%) ointment or (5%) benzoyl peroxide gel once or twice daily is recommended but have questionable effectiveness. [14] Treat dogs each 7-10 days with various insecticidal preparations to break the three weeks life cycle. All dogs in or around premise must be treated. Ivermectin at 300ug/kg repeated in 3-5 weeks is effective. Insecticide treatment does not affect the eggs stage. Regular spray of anti-parasitic powder prevents infestation of mites. Therapy include clipped of hair crust and dirt removed by soaking with a good antiseborrheic shampoo and acaricidal dip applied. [2] Mites are small arthropods belonging to the class Arachnida and the subclass Acari (also known as Acarina). The term "mite" refers to the members of several groups in Acari but it is not a clade as it spans two different groups of arachnids; it also excludes the ticks, order Ixodida. Mites and ticks are characterized by the body being divided into two regions, the cephalothorax or prosoma (there is no separate head), and an opisthosoma. The scientific discipline devoted to the study of ticks and mites is called acarology.

Most mites are tiny, less than 1 mm (0.04 in) in length, and have a simple, unsegmented body plan. Their small size makes them easily overlooked; some species live in water, many live in soil as decomposers, others live on plants, sometimes creating galls, while others again are predators or parasites (7). This last group includes the commercially important *Varroa* parasite of honey bees, as well as the scabies mite of humans. Most species are harmless to humans but a few are associated with allergies or may transmit diseases. Ear mite can be treated wither with ear drop injection or a combination of the two, where the ear had become very dirty thorough ear cleaning may also be required, if necessary under sedative and if there is also bacterial infection, antibiotics may also be necessary [12]. Some dogs develop quite severe allergy to fleas and this will need to be treated separately from getting rid of the fleas.

Table 2. Canine ectoparasitic infestation based on age and sex

Age	No of dogs presented	No of dogs positive	Percentage
Adults (> 1 year) 773		700	90.6
Young (< 1 year) 600		550	91.7
Total	**1373**	**1250**	**91.0**
Sex	**No of dogs presented**	**No of dogs positive**	**Percentage**
Male	690	650	94.2
Female	683	600	87.9
Total	**1373**	**1250**	**91.0**

The result obtained for ecto-parasites based on age revealed 700(90.6%) and 550(91.7%) for adults and young dogs examined respectively, these findings is corroborated by the report of Ugbomoiko (2008) who recorded 42% and 31.8% for adults and young dogs respectively. The difference in infestation based on age may suggest that adult dogs are kept for longer period when compared to the young ones, more so, adult dogs seems to roam the streets more than the younger ones.

Based on gender, in this article revealed that 650(94.2%) and 600(87.9%) for male and female dogs examined respectively, while Ugbomoiko (2008) recorded 47.4% and 52.6% for male and female dogs respectively. This explained that male dogs are more susceptible to ecto-parasitic infestation than their female counterpart. Kamani *et al.*,2011 have contrary opinion that gender cannot affect the infestation rate as a result of some management processes of both sexes.

Fleas are by far the most common external parasites of pets and they affect all species. While more often a problem in the warmer months of the year, they can occur at any time particularly where pets have access to warm houses. Fleas also suck blood (leading to anemia) and transmit infective organisms into the body of the host [17].

Fleas serve as intermediate host for tapeworms, so it is mandatory to deworm the dogs in case of fleas infestation. They are hardy; these can survive for several months without food. The female lays hundreds of eggs affecting the beddings, carpet, cracks and furniture. It is said that for every single flea on the body of the dog, there might be hundred fleas lurking nearby [19]. By virtue of their long legs, fleas jump from one dog to the other in proximity; thus if one dog is showing signs of infestation other dogs in the house may also be harboring fleas [14]. These small wingless pets are very annoying, the claws of legs are used to cling to the hair.

In cases where infestation is present (3), you may see any of the following signs, intense itching with intermittent or persistent scratching, loss of hair, ulcerated skin, abrasion or scabs that can be seen more commonly on the neck and back of shoulders, presence of droppings of digested blood on the dog skin which may appear as particles of dirt.

Table 3. Parasitic infestation based on species of parasites collected

Species	No of parasites	percentage
Ticks		
Rhipicephalus Sanguineus	85	40.7
Haemaphysalis Lichi	79	37.8
Amblyomma Variegatum	45	21.5
Total	**209**	**100**
Fleas		
Ctenocephalides canis	98	100
Total	**98**	**100**
Lice		
Manecanthus Stramineus	65	25.4
Heterodoxus Spiniger	34	13.3
Linognathus Setosus	80	31.3
Trichodectes canis	77	30.0
Total	**256**	**100**
Mite		
Demodex canis	50	42.7
Mix infestation	67	57.3
Total	**117**	**100**

This findings present different ectoparasitic infestation based on species of parasites with *Demodex canis* 42.7%, *Rhipicephalus sanguineus* 40.7%, *Haemaphysalis lichi* 37.8%, *Linognathus setosus* 31.3%, while report of Omonijo and Sowemimo (2017) recorded 30.9% and 28.2% for *Rhipicepalus sanguineus* and *Haemaphysalis* respectively in a work carried out in Ekiti state Nigeria. The variation in infestation remained unexplained; however, it could suggest that difference in species infestation could be attributed to locality, management and feeding habits of the dogs.

Conclusion and applications

1. In this study, the number of dogs examined was 1373 with a prevalence rate of 1250 (91.0%) of the dogs affected by ecto-parasites. Therefore, the need for dog owners to treat and control parasites with acaricidal drugs cannot be over emphasized.
2. To achieve the control and treatment of these parasites, more extension workers needs to be trained, procurement of drugs and all affected dogs should be isolated, culled and quarantine from the company of other dogs because treated dogs tends to become carriers of the disease for life and are capable of transmitting disease to other healthy dogs within the vicinity.
3. In an area where there is outbreak of ecto-parasites, the dogs should be restricted from movement, deticking of affected dogs is very important especially the ones affected with ticks. Various acaricidal drugs, insecticides like lidane, comaplis, cypermethrin can be used to treat affected pets and their environment and this will check mate any disease outbreak to a bearable level.

References

1. Adams, R.H (2001), veterinary pharmacology and therapeutics.

Pp.970-971. Iowa state university press.

2. Araujo, F.R., Silva, M.P., Lopes, A.A., Ribeiro, P.P., Pires, C.M., Carvalho, C.M., Balbuena, C.B., Villas, A.A. and Ramos, J.K (19998), severe cat flea infestation of dairy calves in Brazil. *Veterinary Parasitology, 80:83-86.*
3. Bond, R (1998) Diagnosis and treatment of canine scabies. In practice, 20,308-315.
4. Boy, M.G., Six, R.H., Thomas, C.A., Novotny, M.J., Smothers, C.D., Rowan, T.G. and Jernigan, A.D (2000) Efficacy and safety of salemectin against fleas and heartworms in dogs and cats presented as veterinary patients in North America. V*eterinary Parasitology, 91:233-250.*
5. Beesly, W.N (1998) Scabies and other mite infestations. In:Zoonozes, S. Palmer, Lord Soulsby and D. Simpson, edts.pp859-872 Oxford Medical publication 1998.
6. Bishop, B.F., Bruce, C.I., Evans, H.A., Goudie, A.C., Gration, K.A.F., Gibson, S.P., Pacey, M.S., Perry, D.A., Walshe, N.D.A. and Witty, M.J, (2000), Selamectin: a novel broad-spectrum endectocide for dogs and cats. *Veterinary Parasitology, 91:163-176.*
7. Cadiergues, M.C., Caubet, C. and Franc, M. (2001), comparison of the activity of selamectin, imidacloprid and fipronil for the treatment of dogs infested experimentally with *Ctenocephalides canis and Ctenocephalides felis felis. Veterinary Record, 149:704-706.*
8. Clemence, R.G., Sarasola, P., Genchi, C., Smith, D.G., Shanks, D.J., Jernigan, A.D. and Rowan, T.G (2000), Efficacy of selamectin in the prevention of adult heartworm *(Dirofilaria immitis)* infection in dogs in northern Italy. *Veterinary Parasitology, 91:251-258.*
9. Dryden, M.W. and Rust, M.K. (1994), the cat flea, biology, ecology and control. *Veterinary Parasitology, 52:1-19.*
10. Endris, R., Cooke, D., Amodie, D., Sweeney, D. and Katz, T (2002), Reppellency and efficacy of 65% permethrin and selamectin spot-on formulations against Ixodes ricinus ticks on dogs. *Veterinary Therapeutics, 3:64-71.*
11. Ferreira, B.R and Silva, J.S (1998), Saliva of *Rhipicephalus sanguineus* tick impairs T cell proliferation and IFN-gamma-induced macrophage microbicidal activity. *Veterinary Immunology and Immunopathology, 64:279-293.*
12. Flynn R.J. (1973). Parasites of laboratory animals. Iowa State University press, Ames, Iowa, Pp. 884.
13. Genchi, C. (1992), Artropoda as zoonoses and their implications. *Vet. Parasitol. 44:21-33.*
14. Gross, T.L and Halliwell, A.E (1985), Lesions of experimental flea bite hypersensitivity in the dog. *Veterinary Pathology, 22:78-81.*
15. Lavan, R.P., Armstrong, R., Normile, D., Zhang, D., Tunceli, K. (2017). Results from a U.S Dog owner survey on the treatment satisfaction and preference for fluralaner against flea and ticks infestations. *Journal of Veterinary Science Technology,* 8: 439.
16. Mark, C. (2010). Diagnostic testing for ectoparasitic infestation in canine and cats Pp. 1-2.
17. McTier, T.L., Shanks,D.J., Jernigan, A.D. Rowan, T.G., Jones, R.L., Murphy, M.G., Wang, C., Smith,

Holbert, M.S. and D.G., Blagburn, B.L (2000), Evaluation of the effects of selamectin against adult and immature stages of fleas *(Ctenocephalides felis felis)* on dogs and cats. *Veterinary Parasitology, 91:201-212.*

18. McTier, T.L., Siedek, E.M., Clemence, R.G., Wren, J.A., Bowman, D.D., Hellman, K., Shanks,D.J., Young, D.R., Cruthers, L.R., Smith, D.G., Holbert, M.S., Rowan, T.G. and Jernigan, A.D. (2000), Efficacy of selamectin against experimentally induced and naturally acquired ascarid *(Toxocara canis and Toxascaris leonine)* infection in dogs. *Veterinary Parasitology, 91:333-345.*
19. Pulliam, J.D., Seward, R.L., Henry, R.T. and Steinberg, S.A (1985), Investigating ivermectin toxicity in Collies. *Veterinary Medicine, 80:33-40.*
20. Shanks, D.J., McTier, T.L., Rowan, T.G., Watson, P., Thomas, C.A., Bowman, D.D., Pengo, G., Genchi, C., Smothers, C.D., Smith, D.G. and Jernigan, A.D, (2000), the efficacy of selamectin the treatment of naturally acquired infestations of *Sarcoptes scabiei* on dogs. *Veterinary Parasitology, 91:269-282.*
21. Scott, D.W., Miller, W.H, and Griffin, C.E. (2001). Muller and Kirk`s small animal Der-matology. 6th edition WB Saunders, Philadelphia, USA.P.203.
22. Thomas, C.A (1999), revolution: A unique endectocide providing comprehensive, convenient protection. Suppl. Compend.Contin.Educ.Pract.21:2-25.
23. Ugochukwu, E.I and Nnadozie, C.C. (1985). Ectoparasitic infestation of canine in Bendel State, Nigeria. *International Journal of Zoonoses,* 12(4):308-312.
24. Yeruham, I., Rosen, S. and Hadani, A, (1989), Mortality in calves, lambs and kids caused by severe infestation with the cat flea, *Ctenocephalides felis felis* (Bouche, 1835) in Israel. *Veterinary Parasitology., 30:351-356.*