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Prevalence of Hard Tick Infestation Load on Cattle in and Around Kore zone, Southern Ethiopia

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ABSTRACT

Across sectional study was conducted in and around Kore zone Sarmale district from December 2022 to May 2023 to study the prevalence of major hard ticks' genera on cattle and identify the prevalence of tick genera level. A total of 384 cattle was selected randomly and examined for hard tick genera level. Out of 384 examined cattle 201(52.33%) of cattle were found to be infested by one or more ticks. About 2379 adult licks were collected from the animal body parts preserved with 70% alcohol and were identified to genera level by using stereo microscope. From the total of ticks collected four genera's manly Ambyelomma, Boophilus, Rhipicephalus and Hyalomma were identified and account for 34.46%, 27.11%, 22.65% and 15.76% respectively from different variation (sex, age, breed and body condition). Body condition was statistical significantly with tick infestation ($P<0.05$) the prevalence of tick infestation was found higher in poor condition animals 23.43%, medium body condition was 18.48% and good body condition animal 10.41% respectively, expressed as percentage. It has also evident that the favorable predilection site of Ambyelomma tick were ventral body parts and perineum region. Boophilus preferred dewlap udder, scrotum, belly leg, head and perineum. Rhipicephalus had a strong affinity for perineum dewlap, udder, scrotum, under tail were its handing sites. Therefore, undertaken to the study of effective tick control program should be formulated and implemented based on the pattern of factors for responsible for their distribution.

Keywords: Cattle; Prevalence; Risk factor; Tick; Kore

Introduction

Ethiopia represent varioin theatic zones and livestock production system in tropical Africa (Solomon, et al. [1]) it has the largest number of livestock in Africa approximately 53.99 million cattle 25.5 million sheep and 24.06 million goats 6.91 million horses 0.92 million camels 6.75 million donkeys, 0.35 million mules 50.38 million poultry and 5.21 million bee hives central statistic authority (CSA, [2]) among livestock population cattle play a significant role in the socio economic aspects of the life of people of Ethiopia. In additional to the product like meat and milk cattle provide drought for cultivation of the agricultural land of many peasants, skin and hides are also important components of the livestock sector in generating foreign export earnings (Tamiru and Abebaw [3]). Even though they are important components of the Ethiopia farming system, their contribution to food production rural income and export earnings are for below the expected potential. This is because cattle promotion in Ethiopia is constrained by the compound effect on animal disease poor feeding and poor management (Getachew [4]). Now a day parasitism represents a major obstacle to development and utilization of animal resources. In Ethiopia ecto parasites in ruminant cause serious economic loss to small holder farmers, the training industry and the country as a whole through morality as animals decreased production down grading and rejection of skin and hide (Tike and Addis [5]) as a result of their activity ecto parasites may have a variety of direct and indirect effects on their hosts.

Ecto parasite commonly tick, mite and the in injection they inflict on the skin (Taylor, et al. [6]) and by their effect on the physiology of the animal as well as through transmission of deferent diseases (Wall and Sherear, 2001) infection by ecto parasites significantly effects the quality of hide they're by effecting the economy on Ethiopia farmers as well as international market (Bekele [7]). Ticks are the most important ecto parasites of livestock in tropical area and sub-tropical

areas and are responsible for secure economic loss in livestock. The major losses however, caused by ticks are due to their ability to transmit protozoan Rickettsia and viral disease of livestock which are great economic importance in worldwide. Tick born protozoan dieses (example Babesiosis and Theileriosis, Anaplasmosis and Cawdrosis and tick associated dermatophilosis are a major healthy and management problem in many developing countries. The economically most important Ixodid ticks of livestock in tropical region belongs to the general of Hyalomma, Boophilus, Rhipicephalus and Ambyelomma (Faris, 2000). In Ethiopia there are 47 species of ticks are found on livestock and most of them have importance as vector for disease causing agents and also have damaging effect on skin and hide production (Bayu [8]).

Ticks besides being important vectors for diseases of ecto parasites are organisms that spend all or part of their life cycle on the external of another organism the host and in the process extract nutriment from it for survival. They could live on puncture, burrow or attach on the surface of their host causing discomfort, weight loss, loss of body condition, reduction in milk production and irritation of the skin, which subsequently leads to ulceration and secondary infection these result negative effect on animal welfare, animal husbandry and generally quality of production (Colebrook and Wall [9]).The pathogens transmitted by major ticks' genera can cause high morbidity and mortality in livestock. These diseases generally affect the blood and lymphatic system and cause fever, anemia, jaundice, anorexia, weight loss, milk drop, swelling of lymph node, dyspnea, nervous disorder and even death these factors also contribute to losses in milk production calving interval and weaning performance (Jonson 2006).The distribution of ticks is determined by a complex interaction of factors such as climate, host density, host susceptibility and grazing habits (Minijauw and Decastro, 2000) one of Ethiopia belongs a tropical country. Tick belong to the phylum arthropod class Arachind and order Acari the families of ticks parasiting livestock are categorized in to two the first one is Ixodidae (hard tick) and the second Argasidae/soft ticks/ these are shearing certain basic properties they differed in many structures' behavior, physiological, feeding and reproduction pattern (Kassa [10]) According to the number of hosts Ixodidae ticks are classified as one host ticks two host ticks and three host ticks in one host ticks all the parasitic stages (larva, nymph and adult) feed on the same hosts. In two host tick's larvae attach to one host feed and mount on the ground to adult and three host ticks the larva, nymph and adult attach to different hosts and all detach from the host after engorging and moult on the ground (Kettle [11]).

Although species of ticks and ticks born disease offer among ecological regions their impact on animal production in important wherever they occur. Ticks are wide spread in Ethiopia (Pegram, et al. [12]) ticks apart from transmitting protozoal rickettsia and viral disease.A complex of problem related to ticks and tick born disease of cattle created a demand for methods to control ticks and losses of cattle production and productivity (George, et al. [13]). Control of tick infestation and transmission of tick-borne diseases remain a challenge for the cattle industry in tropical and sub-tropical area of the world. Tick control is a priority for many countries in tropical and sub- tropical regions (Faris, 2000). In the study area there is no enough information that determine the prevalence of hard tick infestation on cattle even though, tick infestation in cattle was prevalent in selected zonal administrative. Therefore, objective of this study was to determine the prevalence and associated risk factors of hard tick genera on cattle in and around Kore zone Sarmale district, Southwestern Ethiopia.

Material and Methods

The study was conducted in and around Kore zone, Sarmale district in selective kebeles such as, Derba, Buniti, Abulo and Alefacho. Kore zone is one of the zonal administrations of Southern Ethiopian region with a total land coverage area 179980 hectare of land. The altitude of the zone 1200-3601m above sea level with annual temperature of 12-25oc. The rain fall distribution various from year to years and rainy periods June to November. The population of zone is 183056. Of whom 89095 are females and the rest 93961 are males and about 76% of their livelihood depend on traditional pastoralist and 24% depend on agro pastoral (AWAO, 2016). Kore zone is located of the bordered with to the North lake Abaya North East Oromia region, South Burji zone South-West Konso zone and to the West lake Chamo. The land scape of Kore zone is characterized by steeply sloping maintains 30% hills 20% undulating 25% and gently to plan land features 25% and the population of livestock Bovine 242211, Caprine 259032, Equine 23705 (AWLFDO, [14]).

Study Design

A cross-sectional study was conducted from December 2022 to May 2023 in selective area of Kore zone. Active data was generated from randomly selected cattle. In this study simple random sampling method was employed. Then the collected ticks were carefully examined to different groups them in to the genera using the guide indicated in (Walker et al., 2003).

Study Animal

The study animal was cattle of different breed, origin, age, sex and body condition around Kore zone. A total of 384 cattle was randomly selected from total number of cattle selected by numbering and examined which are managed under extensive farming system. The age, origin, sex, breeds and body condition score of each cattle was recorded.

Sample Size Determination and Sampling Technique

The sample size was determined by assuming the expected prevalence of 50%, 95% confidence interval and 5% absolute

precision according to (Thrusfield, 2005). The desired sample for the study was calculated by the formula of by substituting this formula the sample size was taken 384.

$$n = \frac{1.96^2\, pex(1\_ pex)}{d^2}$$

where n= required sample size

pexp= minimum expected prevalence 50%

d= desired accuracy level at 0.05 %

Data Collection Procedures

Before tick collection animals were casting by using physical restraining. The body surfaces of animals were inspected for tick infestations alternative one sides were made by using damage to the tick. Adult ticks were collected from different parts of body regions from the ear, neck, dewlap, abdomen, anus, vulva, hip, udder, scrotum, base of tail prepuce, hind leg, flank, belly, and data of collected, address, site of attachment, breed, age, sex and body condition scores of animals were labeled. The collected ticks were put in to universal bottle, which are labeled according to the site of collection in to the 70% alcohol. Before the transport of all tick collected from different animals' body were separately examined under stereo microscope.

Data Management and Data Analysis

The collected data was entered into Microsoft excel and was transferred to statistical package for social science (spss version20). The prevalence of ticks was determined by dividing the number of positive samples by total sample size and expressed as percentage. Chi square test was used to assess statistical significance tick infestation rate with different origins, sex, breed, age groups as well as body condition scores. In this study a total of 384 animals were examined and overall 52.33% prevalence for hard tick infestation was recorded in the study area. The prevalence of tick in study area 55(14.32%), 39(10.15%), 55(14.32%) and 52(13.54%) across the selected kebele Abulo, Derba, Bunit, Alfacho respectively below (Table 1). Out of 384 cattle Variation in breed also occurs in that local breeds were affected as compared with cross breeds 38.28% and 14.06% respectively (Table 2). Based on sex 16.66% female and 35.67% male animals were found to had more than one genus of tick and statistically significant association was recorded indicated below (Table 3). Based on body condition scoring poor 23.43% medium 18.48% and good 10.41% poor body condition animals were found severely affect with ticks than medium and good body condition animals respectively. Body condition was significant associated with tick infestation at which engorging the diseases in poor body condition were higher than cattle that have good body condition (Table 4). From total of 384 cattle the prevalence of hard tick infestation was found 11.45% in young, 20.57% in adult and 20.31% in old animals (Table 5).

Table 1: Prevalence of hard tick infestation based on origin at Sarmale district.

Origin	No of Examined Animals	No of Infected Animals	Prevalence
Abulo	92	55	14.32%
Derba	104	39	10.15%
Bunit	100	55	14.32%
Alfacho	88	52	13.54%
Total	384	201	52.33%

Table 2: Prevalence of hard tick infestation based on breed.

Breed	No of Examined Animals	No of Infected Animals	Prevalence
Local	296	147	38.28%
Cross	88	54	14.06%
Total	384	201	52.33%

Table 3: Prevalence of hard tick infestation based on sex.

Sex Group	No of Examined Animals	No of Infected Animals	Prevalence
Female	129	64	16.66%
Male	255	137	35.67%
Total	384	201	52.33%

Table 4: Prevalence of hard tick infestation based on body condition scores.

Body Condition Score	No of Examined Animals	No of Infected Animals	Prevalence
Poor	142	90	23.43%
Medium	155	71	18.48%
Good	87	40	10.41%
Total	384	201	52.33%

Table 5: Prevalence of hard tick infestation based on age.

Age Group	No Examined Animals	No of Infected Animals	Prevalence
Young	87	44	11.45%
Adult	159	79	20.57%
Old	138	78	20.31%
Total	384	201	52.33%

Discussion

Different tick genera are widely distributed in Ethiopia and number of researchers reported the distribution and abundance of sticks in different parts of the country (Solomon, et al. [1]). In the

present study the total tick infestation prevalence was found 52.33% this found were greater than the reports of (Kassa and Talew, 2012) with a prevalence of 33.21% in Haramaya district and (Tesfahewet and Simeon [15]) a prevalence of 16% Benchi Maji Zone of the South Western Ethiopia those study contrast to the presence study (Nigatu and Teshome [16]) were reported a higher prevalence of ticks (89.4%) from Western Amhara region. The presence study had high result of tick infestation recorded due to poor management system of pasture, in adequate control of tick and care of his cattle.Risk factor (sex, origins, breed and body condition score) were also involved in the variation of the prevalence of ticks in the study area. The prevalence of tick was 23.43%, 18.48% and10.41% in poor, medium and good body condition score respectively. These was lower than indicated in (Bossena and Andu [17]) were poor body condition 62.9%, medium body condition 59.4% and good body condition scoring 41.2%. In this less than one year it was 66.91% while in one three years and greater than three years were 101% and 49.45% respectively. In general, the prevalence of ticks in all the researchers' indicated that very young animals are affected less than adult animals. This could be due to the less exposure to field grazing with other animal in the field and adults are exposed due to the communal grazing habit (Gedilu et al., 2014) local breed 38.28% was affected higher than that of cross breed 14.06%. This result was agreed with the finding of Kassa and yalew, [18] who reported the prevalence of tick infestation was significantly higher in local cattle (58.18%) than cross breed (10.55%).

Conclusion and Recommendations

The important and abundant tick genera investigated in this study were Boophilus, Ambyelomma, Hyalomma and lastly Rhipicephalus. The study indicated that was high prevalence of ticks in the study area. However, the attention given to controlling the infestation had not been sufficient the control methods necessary were selection of tick resistance cattle, acaricide treatment, appropriate livestock management evaluation and incorporation of traditional practices. Generally, the distribution of ticks is not fixed but determined by a complex interaction of factors such as climate, host density, host susceptibility, grazing habit and pasture herd management. Therefore, an effective tick control program should be formulated and implemented based on the distribution pattern of ticks and factors responsible for their distribution. Based on the above conclusion the following recommendations are forwarded:

- Awareness creation on regular deworming and topical acaricide application should be implemented.
- •A proper posture management through rotational grazing
- Further detailed epidemiological study should be conducted at the study area.

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