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REVIEW ARTICLE

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Ixodid Tick Prevalence on Cattle and Its Genera Identification in Ankasha Guagusa Woreda

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ABSTRACT

A cross sectional study was conducted with the objective of determining the prevalence of tick with their genera identification associated with risk factors in Ankasha Guagusa Woreda. The prevalence of bovine tick was studied over a period of 6 months from November 2014-April 2015. Adult ticks were collected from 384 local breed cattle which were kept under extensive management system. The study was conducted using simple random selection that can be used to assess the tick attached during the study period. A total of 1932 adult ticks were collected from half body part of cattle, and were identified to genera level. Three genera, Boophilus, Rhipicephalus and Amblyoma were identified. Of all the total ticks collected, Boophilus, Rhipicephalus, and Amblyomma constituted 41.4 % (800/1932), 34.6 % (668/1932) and 24 % (464/1932) respectively. The total prevalence of tick infestation in the study area during this research was 61.2 %.

The study also found that most infested body part of the cattle was tail base (16.2%) followed by udder (12.5%), dewlap (11.5%) and fore leg (4.4%). In these study females, old aged and poorly conditioned animals had significantly higher prevalence of tick infestation than their contemporaries (p - value < 0.05 for each factor). Appropriate tick control strategy and technique need to be applied in the study area in to account those factors significantly influencing the occurrence of ticks such as sex, age, body condition to which the identified tick genera are sensitive. The study indicated that there was high prevalence of ticks in the area. However, the attentions given to the infestation were not sufficient and the lack of available information on tick genera and the demerits behind tick infestation aggravates the infestation of the livestock population in the area by ticks. Therefore, further studies in the distribution pattern of tick and factors responsible for their distribution are necessary for the continuous understanding of the problem and to use improved control strategies.

Key words: Ankasha Guagusa, Cattle, Ethiopia, Prevalence and Tick genera.

INTRODUCTION

Ethiopian economy is dominated by the agricultural sector. The site and diversity of Ethiopians major agro-ecological zones render it suitable for the support of large number and class of livestock. Ethiopia is known for its livestock population which accounts first in Africa and tenth in the world and has the highest draft animal population in the continent (MEDaC, 1998; FAO, 1999).

The country owns approximately 35 million cattle, 39 million sheep and goats, 8.6 million equine, 1 million camels, and 55.4 million chickens (FAO, 1999). These livestock play a vital role in the farming system of the country. However, in mixing crop livestock farming system of the Ethiopian highlands, livestock mainly uses for drought power, milk production, source of manure, and contribute only 15% (Solomon, 2005; Kidane, 2001).

The limitation to increase livestock development is due to technical and non-technical constraints. The non-technical constraints are related with policy issue, land tenure, institutional, infrastructural and budgetary. The technical constraints are health, feeding, genetic and management (Solomon, 2005). From health constraints livestock are highly affected by ecto parasites mainly ticks, which is a major constraint for the socio economic development of poor farmers (William, 2001). Additionally the absence of well established research regarding socio-economic and public health implication of tick and tick borne diseases in the farm have a negative impact on food security, animal product and by product. As a result, knowledge of tick impact on the animal is very important to have a control measure at farm level. Consequently; this information records can be used by farmers to improve the husbandry system of the animals and probability to avoid some losses related to preventable disease. Ticks are obligate blood feeding ectoparasites of vertebrates particularly mammals, birds and reptiles throughout the world. Approximately 850 species have been described worldwide. There are two well established families of ticks, the Ixodidae (hard tick) and the Argasidae (soft ticks). Both are important vectors for disease causing agents to humans and animals throughout the world. Over 79 different species of ticks are found in eastern Africa but many of these appear to be of little or no economic importance. In Ethiopia, there are 47 species of ticks that are found on livestock and most of them have important as vectors and disease causing agents and also have damaging effect on skin and hide production (Radely, 1980). Among the two families of ticks the most important one is the Ixodidae because of the existence of a rigid chitinous scutum for males,

it covers the entire dosal surface, but in adult female, larva, nymph it extends only for a small area which permits the abdomen to swell after feeding. The following generas have a great veterinary importance among Ixoidae families like Dermacntor, Rhepicephalus, Haemaphysalis, Boophlius, Ambylomma, Hyalomma, and Aponommas (Wall and Sheare, 2001). The second families of ticks are Argasidae (soft tick); having a leathery and unsclerotised body with a texture surface which in unfed ticks which may be characteristically marked with folds or grooves. The integument is inornated; the palps appear somewhat leg like with the third and fourth segments are equal in size. The gnathosoma is located ventrally and is not visible from the dorsal view in nymphs and adults. The soft ticks have a multi - host life cycle, the larval stage feeds once before mounting to become a first stage nymph. Soft ticks un like Ixodae ticks are drought resistant and capable of living for several years and are found predominantly in deserts and dry conditions, but living in close proximity to their hosts. There are three generas which have veterinary importance like *Argas, Otobius,* and *Ornithoderos* (Walker *et al*., 2003).

Ticks transmit the widest variety of pathogens of the blood Sucking arthropods including, bacteria, rickettisia, protozoa, and viruses. The major cattle tick borne diseases in Ethiopia are anaplasmosis, babesoisis, cowdrosis and theileriosis (De Castro, 1984).

In Ethiopia the conservative estimated losses of 1 million USD is attributed to down grading of hides and Skin due to tick infestation, if the loss from reduced production, death and cost of tick control are included economic lost is much greater than this estimation. Massive losses from tick and tick borne disease occur mainly in exotic breeds and the lost is 1% via tick damage on indigenous Bos indicus breeds where as more than 50% on exotic Bos taurus (Pegram *et al.,* 1981).

In general, 80% of world's cattle are infested with ticks and approximately 1214 million world cattle are at risk for tick and tick borne disease (Minjauw and Mcleod, 2003). But there was no any finding about tick prevalence in Ankasha Guagusa Woreda before this study that is why I wanted to do in this title and place.

In order to have the knowledge in the design of more economically efficient tick and tick borne disease control and eradication program, investigating the genera of ticks in the study area are the core points. Accordingly if the prevalent ticks are known to a specific area with their preferred hosts, it is an easy task to have an intervention. Intervention can be controlling tick burden and prevention of their occurrence together with the disease they probably transmit, therefore, the objectives of this study are:

- To determine the prevalence of tick in Ankasha Guagusa Woreda.
- To identify the common cattle tick genera prevalent in the study area.
- To determine the association of potential risk factors with the occurrence of ticks.

LITERATURE REVIEW

Ticks

Classification and general morphology

Ticks are closely related to animals such as insects and spiders, which are all without a spine. They belong to the groups called the phylum Arthropoda, the class Arachnida and order Acari (Hendrix, 1998; Walker *et al*., 2003; and Latif and Walker, 2004).

It is the largest and most conspicuous members of the order acarina; they feed only on the blood of vertebrates, mammals, birds, reptiles and amphibians. Ticks differ from other mites; they are larger and have curved teeth or ridges on the central mouthparts. Ticks do

not have wings and they cannot jump and they cannot run, hop, fly or even move quickly. They also have a sensory pit on each of the first pair of legs. This pit detects stimuli such as heat and carbon dioxide. Ticks also detect light and dark as well as shapes, shadows and vibrations that help them to find their vertebrate hosts. Ticks are noted for crawling under clothing, hiding under fringes of hair and attaching to the skin. Ticks have lost all of the external signs of body segmentation and are divided into two body components (Hendrix, 1998) that is the gnathostoma or capitulum, the mouthparts or a fusion of head and thorax, and the idiosoma (Wall and Shearer, 1997).

Ticks are further divided into two families, hard ticks in the family Ixodidae, and soft ticks in the family Argasidae. Hard ticks have a hard, smooth shield on their backs and are tapered at the front with an apparent head; they are the ticks most readily recognized by most people. Female hard ticks feed once and lay as many as 10,000 eggs or more. Soft ticks lack the shield like plate on their upper surface; have a tough, leathery, pitted skin and no distinguishable head and look like animated pieces of bark or debris. Some soft tick females can feed several times and lay 20 - 50 eggs after each meal. Both groups can swell to considerable size after a blood meal (Wall and Shearer, 2001).

Both are important vectors of disease causing agents to humans and animals throughout the world (Anne and Conboy, 2004). Among the two families of ticks the most important one is the Ixodidae because of the existence of a rigid chitinous scutum which covers the entire dorsal surface of the adult male, but in adult females, larvae and nymph, it extends only for a small area, which permits the abdomen to swell after feeding (Wall and Sheaker, 2001).

Family Argasidae are soft ticks, it has one important genus that infest cattle i.e *Ornithodorus* (Latif and Walker, 2004*).* This family of tick is wandering ticks, which only remain on their host while feeding. In contrast, Ixodidae (hard ticks) can have more genera that can infest domestic animals and are disease causing vectors for animals in tropics. Accordingly Boophilus, Ambylomma, Hyalomma, Rhipicephalus, Haempaphysalis, Dermacentor and Ixodes are genera that belong to this family Ixodidae *(*Kettle, 1995). In order to locate the host, both families of ticks possess a number of chemoreceptor, Haller's organ, which is located on the tarsus of the first pair of legs (Kettle, 1995 and Walker *etal.,* 2003).

Biology and life cycle

An important feature of the biology of ticks is their high potential of reproductive rate. They possess separate sex, have tremendous reproductive capacity and reproduce sexually. Since Ixodidae contains almost all the species of ticks that can have veterinary importance in cattle (Wall and Shearer, 1997) its life cycle is described as follows.

There are four stages in the life cycle of Ixodidae ticks; the egg, the six legged larva eight, legged nymph and adult (Katherine, 1976). The adult Ixodidae female tick on the host sucks up considerable amount of blood and copulates with the male while feeding. The mating activity of hard ticks' takes place on the host except for Ixodes where it may also occurs when the ticks are still on vegetation. After attachment to the host the female is inseminated once, before it is ready to fully engorged with blood, and subsequently completes its single large blood meal, but the males feed intermittently and mate with females repeated1y (Latif and Walker *et al*., 2004). During mating the male crawls under the female and after manipulating the female genital opening with its mouth parts, transfers the spermatheca, a sac containing the spermatozoa, into the opening, presumably with the aid of his front legs (Walker *et al.,* 2003). The developmental stages can be mentioned as follows.

***Seed tick (larvae*)**

A fully engorged female tick can deposit (100 - 18,000) eggs on the ground. Normally, thousands of tiny six legged larvae are hatched from the batch of eggs and crawl randomly up grasses, weeds, low vegetation or walking over the ground to await or search for a host in the surrounding area; fortunate ones attach to a small mammal, bird or lizard. These ticks, called seed ticks, suck blood. Being small, their feeding (or engorgement) time lasts only hours or a day. While feeding, the host wanders and seed ticks are distributed away from the site of the initial encounter. When the engorged seed ticks drop off, they are still usually in or near an animal run. After eating its blood meal the larva or seed tick molts and becomes an eight legged nymph (Wall and Shearer, 2001).

Nymph

They are small and very hard to see. After molting the engorged nymph climbs grass leaves or a plant stem. Ticks climb progressively higher as they develop; different stages reach different layers of vegetation. Because of this, developing ticks usually find a larger host than they had during the previous stage. After several days feeding, the engorged nymph drops off its host and molts again (Wall and Shearer, 2001).

Adult

The adult slowly climbs vegetation, stretches its front pair of legs and waits for vibrations or a shadow announcing a nearby host. Ticks sometimes wait for months or more than a year for a suitable host to pass by. Copulation usually takes place on the host while the female is feeding (Oliver, 1989).

Another life cycle classification method is based on the number of hosts required to complete the developmental stage during their life cycle. So it can be classified as one host, two hosts and three host tick (Walker *et al.,* 2003).

One host tick

Eggs are laid on soil and hatched to larva after several weeks of development and crawl on to vegetation to quest for a host when they have completed feeding within three weeks, they remain attached to the host and molting occurs there. The nymphs then feed on the same host and remains attached. After another molt the adult hatched and then feed on the same host. The adult will change position on the same host for mating (Walker *et al.,* 2007).

Two host ticks

The eggs are laid on the soil or ground and merges to the larval stage, then molt to the nymphal stage occurs on the host, but the engorged nymph leaves the host, to molt in the environment and then finds a new host (Zajac and Conboy, 2006).

Three host ticks

The larvae merges from the egg deposited on the ground, look for a host, feed on it for 3-7 days, drop off and molts after 3-4 weeks on the ground. Then nymph climbs to a second host in order to feed on it for 3-7 days, leave it and mount in to adult on the ground after 2-8 weeks. Then the adult ticks look for a third host to feed on, and for copulation with male, which takes 1-3 weeks. Finally it drops off and completes that cycle with oviposition on the ground to continue another cycle (Latif and Walker, 2004).

Epidemiology

Ticks occur in the temperate and tropical region of the world. There are 840 described species of ticks found in the world parasitizing domestic and wild animals as well as human (Walker*et al,* 2003). When ticks occur freely in the environment external factors like temperature and humidity are the major determinants of their development and growth

(FAO, 1984). Its habitat is composed of a variety of living and non living things in the space in which it lives. They are adapted to two extremely contrasting components of their habitat; the physical environment and their host. When they are mounting and then questing in the physical environment they are in danger of drying out, starvation and freezing, as well as exposed to predators (Walker*et al.,* 2003).

Host relation ship

The survival of a population of ticks depends on the presence of maintenance hosts suitable for perpetuation. Whenever ticks couldn't get host they will die of starvation. They find their hosts in several ways. Some ticks live in open environment and crawls on to vegetation to wait for their hosts to pass by. This is a stage of ambush and the behavior of waiting on vegetation is known as questing (Walker *et al.,* 2003).

Attachment Site

Site specificity is one of the populations limiting system that operate through the restriction of tick species to certain parts of the host body. The ticks grab on to the hosts using their front legs and then crawl over the skin to find a suitable place to attach and feed (Walker *et al*., 2003). They seek out places on the hosts where they are protected and have favorable conditions for their development and prefer to bit in to thin parts of the skin (Okello Onen *et al.,* 1999). Ticks location on the host is linked to the possibility of penetration by the hypostome. Species with a short hypostome for example, *Rhipicephalus species, Dermacenter species*, and *Haemaphysalis specie*s usually attach to the head (within the ear, eye canthus, around neck), margin of the anus and under the tail. Long hypostome species attached to the lower part of the body where the skin is thicker (like dewlap, axilla, udder/scrotum, teats, perineum and margin of the anus (Hoogstraal, 1996**)**.

Major tick borne diseases of cattle in Ethiopia

Both the argasid and the ixodid ticks are vectors of over 30 diseases to people, pets, cattle, sheep, goats and other livestock. Many domestic and wild animals are died by tick borne diseases (Sileshi *et al*., 2007).

Babesiosis

Is mainly a disease of cattle and is caused by *Babesia. bigemina* (Vector *Boophilus decoloratus*) and *Babesia bovis* (vector *Boophilus.anulatus*). Infection with *Babesia bigemina* is wide spreaded in the country and *Babesia bovis* is of recent origin in the livestock disease scenario of the country and has so far only been detected in Gambella, south west Ethiopia (Lawrence, and De Vos, 1990).

Cowdrosis (heart water)

It is caused by *Cowdria ruminantium* considered to be the most important tick borne disease of exotic and cross breeds of cattle. The most important tick vector is *Ambylomma varigatum*, which is wide spread in the country. As a recent history of this disease in 1992 a devastating outbreak occurred at Abernosa ranch where Borena x Friesian crosses are kept (Morel, 1986).

Dermatophilosis

Was reported as being an emerging concern in dairy farms where crosses and exotic cattle breeds are kept. It is a skin disease of cattle and other domestic livestock caused by the bacteria known as *Dermatophilus congolensis*. The disease is clinically characterized by superficial, pustular, crusting and /or ulcerative dermatitis (Morel, 1986).

Economic significance of ticks

Ticks are one of the harmful parasites for any livestock species, the impact of ticks on animal health can be two fold. These are effect of the tick burden as ectoparasites and disease

transmission by tick serving as vectors.Ticks as the ectoparasite can have an effect of blood loss (De Castro, 1994). Losses from tick damage to hides and skin were claimed in 1979 to be in the region of one million Ethiopian birr per annum but are likely to be much higher. Another financial loss is treatment cost; likewise an estimate of the yearly cost of acaricides in 1989 was three million Ethiopian birr. When other losses such as death, reduced growth rate, and reduced milk production are added, economic losses due to ticks and tick borne disease are highly significant (Radley, 1980).

Review of tick distribution in Ethiopia

Amblyomma

Of the genus Amblyomma four species that commonly infest cattle, which includes *Amblyomma variegatum, Amblyomma gemma, Amblyomma lepidum and Amblyomma cohaerens* are known to exist in Ethiopia (Morel, 1980; De Castro, 1994 and Walker *et al*., 2003).

Boophilus

Two species of this genus are known to exist in Ethiopia, which include *Boophilus decoloratus* and *Boophilus annulatus*. (Wellcome, 1976). They are more prevalent in Gambiella region (Pegram *et al*., 1981; and De Castro, 1994).

Hyalomma

Up to now about eight species of Hyalomma that affect cattle are identified, which includes *Hyalomma marginatum rufipes, Hyalomma dromedarii, Hyalomma tuncatum, Hyalomma marginatum marginatum, Hyalomma impelatum, Hyalomma anatolicum excavatum, Hyalomma anatolicum anatolicum* and *Hyalomma albiparmatum. Hyalomma dromedarii* and they are most adapted to conditions of drought (Wellcome, 1976).

Rhipicephalus

The most commonly encountered species on cattle are *Rhipicephalus evertsi evertsi, Rhipicephalus bergeoni, Rhipicephalus praetextatus, Rhipicephalus simus, Rhipicephalus pravus* and *Rhipicephalus pulchellus* (Pegram *et al*., 1981 and De Castro, 1994).

Tick control strategies

Cultivation of the land

Most ticks can slowly climb to the top of grass, medium height vegetation and/or low brush to await a passing host**.** So cultivation of the land or at least keeping the grass and brush cut low especially around walks, paths, fences, sheds, trees, shrubs, play areas and other potentially dangerous locations. Simply cleaning up leaf litter and putting down wood chip barriers at the lawn perimeters can reduce nymphal abundance. Keeping the grass short in tick infested areas increases tick desiccation during hot weather (Walker *et al.,* 2003).

Biological Control

Ticks have many natural predators in the environment. Several species of ants are known to feed on ticks. Many species of spiders eat ticks if they can find them. Additionally, there are a variety of fungi and nematodes that also feed on and kill ticks while they are molting in the soil. Birds eat ticks that they encounter during foraging (Sileshi *et al*., 2007).

Mechanical Control

Increase areas of open lawn and sunlight penetration. Keep the lawn mowed to a height of 3 inches or less, this lowers the humidity at ground level, making it difficult for ticks to survive. Get rid of bush, weeds, leaf litter, and other debris (Mekonnen, 1998).

Acaricide application

Acaricide application is still the main tick control method. A wide range of chemical acarisides including arsenical, chlorinated hydrocarbons, organophosphates, carbamates,

synthetic pyrethroides and parentral preparation of ivermectins are being used for controlling tick. The majority of tick infestations on cattle is solved by spraying a localized part of the animal such as axilla, ventrum, abdomen, udder/scrotum, and tail which are common sites for ticks (Lawrence and De Vos, 1990).

MATERIALS AND METHODS

Study area

The study was conducted from November 2014 - April 2015 at Ankasha Guagusa Woreda which is located in the north western part of Ethiopia, approximately 480 km North West of Addis Ababa, the capital city and 120 km south west of Bahir Dar, capital of the region. Geographically its absolute location extends between the coordinates of 10°31'46'' and 10°41'32'' north latitude and 36°36'18'' and 36°59'33'' east longitude. Ankesha is bordered on the south by Mirab Gojjam, on the west by Guangua, on the north by Banja shekudad and on the east by Guagusa Shekudad. The district has an elevation varying from 1800 to 2800 m. asl. The major relief features of the district include mountains, undulating plains, hilly and gullies and valleys. The resulting weather pattern provides the highlands with most of its rainfall during a period that generally lasts from mid June to mid September. Here, animal husbandry is mainly extensive (AGWRDD, 2014).

Study design and sampling method

A cross sectional study was conducted in the study area. Three kebeles were selected from the woreda purposively for their convenience for transportation and ability of the society to communicate with Amharic language since most kebele's people mother tounge language is Awgna.

Simple random sampling was carried out to include the study animals for collection of ticks from the cattle's at the field where extensive livestock management system has been performed. Tick sample were collected from local breed cattle.

Sample size

The total number of cattle required for the study was calculated based on the formula given by Thrustfield (2005). By rule of thumb where there is no information for an area, it is possible to take 50% prevalence. In this study 50% prevalence with 5% desired level of precision and 95% of confidence interval are used to calculate the sample size using the following formula.

$$N=\frac{1.96^2 (p) (1-p)}{d^2}$$

Where N= sample size

P= Expected prevalence

d= Desired level of precision (5%)

$$N= \frac{1.96^2 (0.5) (1-0.5)}{(0.05)^2}$$

$$= \frac{3.8416 \times (0.5) (0.5)}{0.0025}$$

$$= \frac{3.8416 \text{ X } 0.25}{0.0025}$$

$$= \frac{0.9604}{0.0025}$$

$$= 384.16$$

$$\approx \underline{\underline{384 \text{ cattle}}}$$

Study methodology

Tick collection and preservation

Ticks were collected successfully from cattle after being restrained using strong crushes, by physical handling to identify for tick genera and for total tick burden counting. Ticks were manually collected by searching on different regions of the animal's body. The skin of each study cattle was inspected for the presence of ticks. All adults were collected by using universal bottles; collected ticks were preserved in 70% ethyl alcohol and transported to Bahir Dar Regional Veterinary Laboratory.

Laboratory techniques for tick examination

First ticks were seen grossly and classified to different genera levels depending up on their morphology and identification structures they have, such as shape of scutum, leg color, body, coxae one and ventral plates. During tick identification in the laboratory the sample was put on petridish and examined under stereomicroscope then identifying the ticks. The additional material used in the laboratory was forceps, identification key and color print picture of different tick genera.

Data analysis

Data collected from field were entered into Microsoft excel spread sheet (Microsoft Corporation). The data were analyzed by SPSS version 16 statistical package for window7. Descriptive statistics and chi square were used to describe the prevalence of different tick genera and association of risk factors with tick infestation respectively. When P-value is less than 0.05 it is considered as significant.

RESULT

Overall Prevalence

Out of a total of 384 cattles examined 235 (61.2%) animals were found to be infested with different genera of ticks. Among the tick genera identified *Boophilus* (18.8%), *Rhipicephalus*(15.9%), *amblyoma*(9.9%), both amblyoma and boophilus (9.4%), both amblyoma and rhepicephalus (2%), both rhepicephalus and boophilus (1%), and the mixed of boophilus, amblyoma and rhepicepicephalus (4.2%) were encountered(Table 1).

Table 1. Percentage infestation of cattle with different tick genera.

Tick genera	No. of positive animals	Prevalence
Boophilus	72	18.8%
Rhepicephalus	61	15.9%
Amblyomma	38	9.9%
Amblyomma and Boophilus	36	9.4%
Amblyomma and Rhepicephalus	8	2%
Rhepicephalus and Boophilus	4	1%
Boophilus, Amblyomma and Rhepicephalus	16	4.2%
Total	**235**	**61.2 %**

Percentage of tick genera

A total of 1932 adult Ixodidae ticks were collected from half body region of 235cattles population that were positive for tick infestation. Three Ixodidae tick genera (Boophilus, Rhipicephalus and Rhipicephalus) were identified from the study area. From identified generaBoophilus was the most abundant and widely distributed genus, 41.4 % (800) followed by genus Rhipicephalus, 34.6 % (668). However, Amblyoma was found to be the least abundant genus, 24 %(464) (Fig.1).

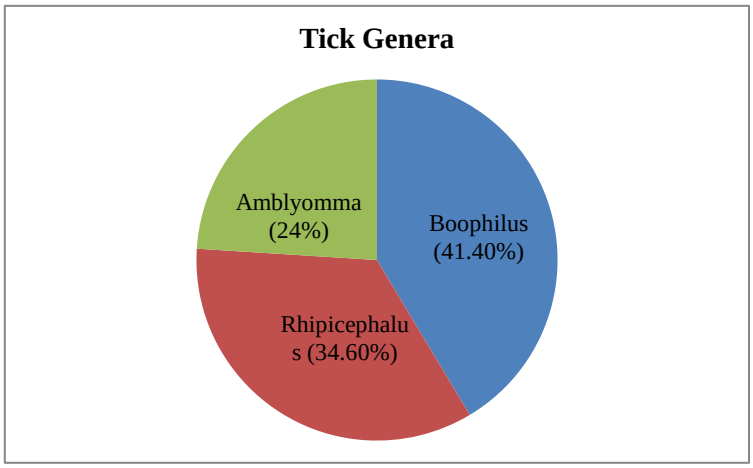

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Fig: 1. Proportion of tick genera of cattle in the study area.

Attachment sites

The distribution of tick genera on different body sites was determined. Accordingly, the most infested region of the animal was tail base (38.2 %), followed by udder (32.3 %) and other body parts were the least infested site (Table 2).

Table 2: Percentage infestation of body parts of animal with different tick genera.

Site of attachment	No. of positive animals	Relative prevalence
Tail base	90	38.2 %
Dewlap	60	25.5%
Udder	76	32.3%
Brisket	29	12.3%
Scrotum	20	8.5%
Others	16	6.8%

Preferred sites for specific genera

The results of the study indicated that the most favorable predilection sites for Boophilus were dew lap and udder (23.8% and 23.9% respectively); for Amblyomma were tail base and udder (11.1% and 13.7% respectively); and for Rhepicephalus was the tail base (32.8%) (Table 3).

Table 3. Percentage of specific site of attachment for specific tick genus in tick infested animal.

Site of attachment	Genus		
	Boophilus	Amblyomma	Rhipicephalus
Dew lap	23.8%	10.2%	1.7%
Brisket	8.5%	8.5%	3.4%
Udder	23.9%	13.7%	5.2%
Scrotum	3.4%	8.5%	1.7%
Tail base	8.5%	11.1%	32.8%
Others	3.4%	5.1%	3.4%

Risk Factors

Analysis of association of risk factors for the occurrence of tick infestation has revealed that there was a significant association (P< 0.05) between sex, body condition and age of animals and tick infestation. Accordingly, female (69.4%), poor body condition (91.4%) and old age (70.5%) cattle were highly infested by different tick genera. However, male (48.7%), good body condition (43.7%) and adult (55.2%) animals were affected less likely by tick infestation (Table 4).

Table 4. The co relation between infestation of cattle by different tick genera and risk factors.

Risk factors		Result				
		Total animals examined	No. of positive animals	%	X^2	p-value
Sex	Male	152	74	48.7	16.59	.000
	Female	232	161	69.4		
BCS	Poor	93	85	91.4	58.4	.000
	Medium	117	74	63.2		
	Good	174	76	43.7		
Age	Young	106	67	63.2	6.442	.040
	Adult	183	101	55.2		
	Old aged	95	67	70.5		

DISCUSSION

The study was limited to adult ticks for the reason that they are more visible, easier to collect and believed to be the most important ectoparasite stage that causes reduced productivity in cattle. In the present study, the overall prevalence of tick infestation in Ankasha Guagusa woreda was 61.2 %. This finding is in agreement with the report of Wasihun and Doda (2013) (61.0%) at Southern Nations Nationalities and Peoples Region of Ethiopia. However, it is higher than the finding of Tiki and Addis (2011) at Holetta, Central Ethiopia and that of Haile and Zeryehun (2013) from Bench Maji zone, southwest Ethiopia

with overall prevalence of 25.6% and 27.3% respectively.This difference might be due to environmental and ecological variations, management system and the season of research conducted.

Out of 1932 ticks collected from the study animals Boophilus was the most widespread and dominant tick genera from the total count and, constituted 800 (41.4 %). This finding disagrees with the work of Belew and Mekonnen (2011) in and around Holetta and Tamiru and Abebaw (2010) in and around Asella reported 18.1% and 15.4% tick infestation prevalence respectively. This variation was considered due to altitude and temperature difference because this tick was presented at high mountains and moderate temperature (Hoogstraal, 1996). Rhipicephalus was also the second most abundant tick genera in the study area that accounts for 34.6 % (668/1932). The result of the current research was in line with those authors Belew and Mekonnen (2011) (29.29%). Slight variation is due to agro ecological and sample size difference during the study time. Amblyoma was the third abundant tick genera 24 % (464/1932), in the study area. The result of this study incomparable with tick survey conducted in Western Shoa at Bako district by Husen (2009) that indicated the distribution of this tick as the first most abundant in that area with a prevalence of 54.3%.

In this study the most infested region of the animal was tail base (38.2 %) and followed by udder (32.3 %). The attachment site mentioned in the result of this study was disagree with those reported by Okello Onen in 1999 most infested region of the animal were udder**/**scrotum (32.4%). Several factors such as density (Kettle et al., 1995), time and season (Seyoum, 2005), in accessibility for grooming (Chandler and Read, 1994) have also been reported to determine the attachment site of ticks.

The prevalence of tick infestation in this study is significantly associated ($P< 0.05$) with sex of the cattle in which the prevalence of tick infestation in female (69.4%) is higher than that of male (48.7 %) cattle. This result also disagreed with the previous work done by other authors (Hussen, 2009: and Morel, 1989) in Bako. Although, the exact cause of higher prevalence of tick infestation in female cattle cannot be explained but it can be hypothesized that some hormonal influences may be associated with this phenomenon. Lloyd (1983) reported that higher level of prolactin and progesterone hormones make the individual more susceptible to any infection. Moreover, stresses of production such as pregnancy and lactation make the female animals more susceptible to any infection.

Prevalence of tick was slightly associated ($P< 0.05$) with the age of the animals in which older animals had higher prevalence (70.5%) than young animals (63.2%) and adults (55.2%). This finding is also in line with the findings of Feseha (1997) where the higher prevalence was found in older animals than in younger animals. The higher proportion may be due to associated with decreases in immunity as the animals get older.

The study also showed that the effect of tick on different body condition were statistically significant ($P< 0.05$). The infestation level of ticks was higher in the poor body condition (91.4%) than the medium (63.2%) and good body condition animals (43.7%). The present study concurs with previous authors like Bossena and Abdu (2012) in Assosa town. The higher prevalence in poorly conditioned animals is most likely due to poor management system and low immunity associated with inadequate nutrition. The observation indicates that poor conditioned animals are less resistant to tick infestation and lack enough body potential to build resistance with age advancement. Several authors have reported high infestation of tick results poor body condition due to consumption of high amount of blood and fluid by those ticks (Southerest, 1983).

CONCLUSIONS AND RECOMMENDATIONS

To control tick infestation at economically acceptable level by a combination of techniques require knowledge of the tick prevalence, an understanding of their epidemiology and identification. The study indicated that there was high prevalence (61.2%) of ticks in the area. However, the attentions given to the infestation were not sufficient and the lack of available information on tick genera and the demerits behind tick infestation aggravates the infestation of the livestock population in the area by ticks. Among the tick genera identified in the study areas Boophilus (41.4%) was the most abundant, and distributed tick. From this study result it is possible to conclude that sex, body condition and age of animals are principally determinant of distribution and abundance of tick. In general there is no a complete and combined control method of ticks and tick borne diseases in the study area and it makes the productivity of cattle low. Based on the above conclusion the following recommendations are forwarded:

- Selected tick resistant and comparatively productive indigenous cattle should be reared.
- Strategic and Integrated tick control methods should be performed. .
- Highly venerable groups (females, poor body conditioned, and old aged cattle) should be given a great attention and follow up.
- All facilities and extension programmers should be reached to the bottom of the animal breeders and stack holders to create knowledge and improve the management system.
- Further studies in the distribution pattern of ticks and factors responsible for their distribution and tick borne diseases assessment and surveillances in the study area should also be done.

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