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Identification of Bovine Tick Species in Chiro Wereda, Oromia Region, Ethiopia

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ABSTRACT

Identification of bovine tick species was conducted in Chiro wereda, western oromia, Ethiopia over a period of 6 months from October 2011 to Marche 2012. From 384 local and cross breed cattle a total of 5498 adult ticks were collected from full body part of cattle, and were identified to genera and species level in Hirna regional veterinary laboratory. From this study seven species of four genera were identified. The genera recorded were *Amblyomma*, *Rhipicephalus*, *Boophilus* and *Hyalomma* while the identified seven tick species from the four genera were *Amblyomma variegatum*, *Rhipicephalus evertsi-evertsi, Boophilus decolaratus, Amblyomma cohaerence*, *Amblyomma gemma*, *Rhipicephalus pulchellus*, and *Hyalomma truncatum* with relative infestation rate of 50.9%, 38.5%, 29.9%, 9.4%, 7.5%, 6.3%, and 2.6% respectively. In this study the average tick male to female sex ratio in species level were *Amblyomma variegatum* 2:1, *Amblyomma cohaerence* 3:1, *Amblyomma gemma* 2:1, *Rhipicephalus evertsi-evertsi* 3:1, *Rhipicephalus pulchellus* 4:1, *Boophilus decolaratus* 1:4 and *Hyalomma truncatum* 4:1 and the average tick genera male to female sex ratio was 1.7:1, which could be explained by the reproductive behavior of the female tick. In general this study suggests as the study area is favorable for the successive perpetuation of the identified tick species and as the cattle are at a higher risk of tick infestation, mainly with *Amblyomma variegatum* species, the study contributes its part in the development of best control strategies of tick and tick borne diseases in the study area.

Key words: Identification, *Amblyomma variegatum,* tick borne diseases

1. INTRODUCTION

The main stay of livelihood for 85.90% of the people of Ethiopia is agriculture. The agricultural sector is characterized to a large extent by mixed farming system. Livestock and livestock products play a vital role in the farming system of the country. There is a growing demand for meat, milk and eggs to improve the nutritional status of the population. Hides and skins are important components of the agricultural sector in generating foreign export earnings. Moreover, livestock help as a source of security and supplementary cash income for rural agricultural households. The country is endowed with the largest livestock, population in Africa, which is estimated to be 35 million head (CSA, 2002). The majorities of these cattle are indigenous, Bos indicus breeds and are a vital component of the mixed farming system (CACC, 2003). However, the contribution of this huge natural resource to human nutrition and export earnings is dis-proportionally low. The counters livestock sector contributes only 15% to the GDP (Kettle,1995). Recently the Ethiopian government has been changed to give more encouragement to commercial farming. Local breeds are being upgraded through the introduction of pure breed Bos *taurus* cattle and their crosses (EASE, 2003). Unfortunately all of the cattle's, the introduced and the indigenous one are at risk from the effects of ticks and tick-borne diseases. In most parts of Africa, including Ethiopia, ticks and tick borne diseases together with tse tse and trypanosomes are economically important disease. (Solomon, 2001). Losses attributable to ticks are caused either directly, through tick worry, blood loss, damage to hides and udders and the injection of toxins, or indirectly through mortality or debility caused by the diseases transmitted by or associated with the ticks. In 1984, the United Nations food and agricultural organization (FAO) estimated the global cost of ixodidae tick infestations to be $ US 7.0 billion annually.

Ticks (subphylum chelicerata; Class Arachnida; subclass Acar; Super order parasitiformes, order Ixodida) are obligate blood feeding ecto parasites of global medical and veterinary importance (Jongejan and uilenberg.,2004). There are two well defined families of ticks, the Ixodidae or hard ticks and the Argasidae or soft ticks, and the two groups differ from each other markedly in appearance habits and life histories. The family *Argasidae* includes the common fowl ticks; *Argaspericus*. Members of the family they distinguished by the fact that they have a tough leathery outer coat which is more or less uniform in appearance all over the body. The mouth parts are centrally placed and more or less invisible from above (Kassa, 2001). According to their habits *Ixodid* ticks can be divided into three

groups. One-host tick remain on the same animal from the time they attach themselves to it as larvae until they drop off as fully-fed adults, e.g. *Rhipicephalus (Boophilus) deceolaratus*, the blue ticks. Two host ticks attach themselves to an animal as larvae, feed and then stay on the same animal while developing into nymphae. The nymphae reattach, feed and then drop to the ground to continue their development. When the adults emerge they have to find a second animal on which to feed, e.g. *Rhipicephalus evertsi- evertsi*, the red-legged tick (Sonenshine., 2005). Three hos ticks require 3 animals to enable from them to complete their life cycle because each stage drops off the host after feeding to moult. Most ixodid ticks belong to this group. E.g. *Amblyomma hebraeum* (Stafford. 2007). Ticks live on all continents of the world. There are approximately 899 species of ticks; the majority are ectoparasites of wildlife and approximately 10% at these are recognize as disease vectrors or for their ability to cause direct damage through blood feeding (Jongeian and Uilenberg, 2004).

In Ethiopia, tick occupy the first place amongst the external parasites by the economic loss it incurred when they infest livestock particularly cattle (Abebayehu and Kibrom,2010). Ticks transmit a greater-variety of viruses, bacteria and protozoa than any other blood feeding arthropod and are second only to mosquitoes in terms of the ir medical and veterinary impact (Sonenshine et al., 2006). Worldwide there is growing concern because tick-borne infectious disease are emerging and resurging (Kaaya ., 2003).

The success of ticks as vectors of disease causing agents can be attributed to wide host range, feeding on multiple hosts as well as the mechanism and length of time required to blood feed. Within each area of distribution of a vector, the pathogen is considered as present from the point of view of epidemiological risks (Randolph and Rogers,2007). The long life span (1-2 years) of most hard ticks also enhances vector capability because it provides sufficient time for ticks to become a reservoir host. Both transtadial and trans ovarial mechanisms of pathogen transmission are documented in the Ixodida. Thus, in certain species, both immature states and adult ticks are competent vectors (Gray,2002)

The identification of tick species has always been used on morphological key characters of the mouth parts and adjacent structures. Separate keys must be used for larvae, nymphs and adults (Stafford.,2007). Furthermore, relevant data on the type of ticks' species is essential for the development of effective control strategies of tick and tick born disease. Therefore, this study was

formulated with the objectives of identifying tick species using morphological key marks based on presence /absence of eyes; the presence of anal plates; ornamentation on the legs and scutum; shape size and the patterns of the scutum, and other unique characteristics in Chiro wereda, Western Oromia part of Ethiopia.

The objectives of this study were, therefore:

- Identification of Bovine tick species in Chiro Wereda
- Development of best control strategies of tick and tick borne diseases in the study area.

2. MATERIALS AND METHODS

2.1 Study Area

The study was conducted at Chiro Wereda of Western Oromia region, Ethiopia from October 2017 to March 2018. Chiro is located west of Addis Ababa along to the way to Dira Dewa from Addis. Geographically, it is located at 263to 1524 m.a.s.l.altitude. The altitude ranges from 1524 to 263 meter above sea level. The annual mean temperature ranges form 17 to 29 and the area receives annual rainfall greater than 3200ml. The total livestock populations of the district were estimated to be 300,024. The farming system of the area is mixed framing system to which the majority of the total population engaged. In the area livestock population occupies a significant place.

2.2 Study animals

Study animals in the area were cattle of both sexes. Three hundred and eighty four local and cross breed cattle, infested with ticks, were purposively selected and examined for the identification of tick species. The sample was taken by using purposive sampling. Cattle were categorized based on age, breed and sex. Most of sample was taken from animals that were presented to Chiro veterinary clinic for various reasons. The rest were through field activity from different kebeles of Chiro wereda.

2.3 Study design

The study was cross-sectional observation study conducted to determine the species of ticks found in the study area.

2.4 Sample size and sampling methods

A simple purposive sampling method was used to select sample animals from those brought and searched in Chiro wereda within the different kebeles of Chiro. In this study 384 cattle are examined.

2.5 Tick collection techniques

Removal of ticks from full body is searched fully after the animal is cast in a crush.

To remove ticks from host skin whilst retaining their good condition we use good quality steel forceps. The forceps are of medium size with blunt points and serrated inner surfaces. Then after the tube is labeled and kept in a sealed plastic bag containing wet cotton wool to maintain high humidity. The ticks are kept cool over ice with a good care not to freezes them fatally. To preserve the ticks at the collection site we place them directly into 5% formalin with 3% glycerin.

For the collection purpose 25ml capacity glass tubes were used, which are known as universal tubes as their tick glass walls make them more durable than plastic tubes. These universal bottles were properly labled with date, site collector, sex of the host and species of animals.

2.6 Tick identification technique

The ticks were identified to species level under a stereomicroscope according to the standard identification keys developed by Hoogstraal (1956) and Keirans *et al.,* (1999) ,which is based on presence/absence of eyes; the presence of anal plates; ornamentation on the legs and scutum, shape, size and the patterns of the scutum, and other unique
characteristics.

Table 1. Keys for classification the genera hard ticks (*Ixodidae*) Hoogstraal (1956)

	The genera of ticks						
Structures	*Ixodes*	*Hyalomma*	*Amblyomma*	*Dermacentor*	*Haemaphysalis*	*Rhipicephalus*	*Boophilus*
Gnathosoma	Long			Short			
Basis capituli	Rectangular dorsally					Hexagonal dorsally	
Eyes	Absent	Present			Absent	Present	
Anal grooves	Anterior	Posterior					
Coxae I	not forked	bifed	With two spurs	bifed	Not forked	With two spurs	bifed
Festoons	absent	Pre/abs	Present				Absent
Scutum color	Inornate or ornate		Ornate		Inornate		
Males ventral shields	Cover all the surface	three pairs of shield					Two pairs of shields
Caudal proces	*no*					*Present in some species*	*Yes on some*
Sub-anal plates	*No*	*yes*	*No*				

Table2.Identificafication of *Amblyomma cohaerence* and *Boophilus decolaratus (*Hoogstraal*.,* 1956*).*

	Adult *Amblyomma cohaerence*	Adult of *Boophilus decolaratus*
Scutum color	Ornate	Inornate
Gnathosoma	Long	Short
Basis capituli	Rectangular	Hexagonal
Festoons	Present	Absent
No of legs	Eight	Eight

2.7 Data Analysis

Simple descriptive statistics such as count, proportion and ratio were used for analysis of data generated from this study.

3. Results

A total of 5498 ticks were collected from which four genera and seven species were identified. *Amblyomma* (66.53%) was the most abundant and widely distributed genus from all and *Hyalomma* (0.56%) was the least prevalent tick genus identified in the study area. Among the seven tick species idenfitide three species (*A. variegatum*, *A. gemma* and *A. cohaerence*) were from the genus *Amblyomma*, two species (*R. evertsi-evertsi* and *R.pulchallus*) from the genus *Rhipicephalus*, one species (*Rh. (B.) decolaratus*) from the genus/sub genus *Boophilus* and one species (*H. truncatum*) from genus *Hyalomma*.

Table 3: Distribution of sex ratio of adult tick genera of cattle in Chiro wereda, Ethiopia

Tick genera	Male	Female	M:F	Total	Percentage distribution
Amblyomma	2485	1173	2:1	3658	66.53
Rhipicephalus	832	315	3:1	1147	20.86
Rh.(Boophilus)	122	540	1:4	662	12.04
Hyalomma	25	6	4:1	31	0.56
Total	3464	2034	1.7:1	5498	100

In this study *A. variegatum* was the most abundant tick species and it represented 48 of the total ticks collected. *R. evertsi-evertsi* was the second most abundant species. This species represented by 19% of the total collection of ticks. *B. decolaratus* was the third widely distributed tick species. *It* represented 12% of the total collection of ticks. *A. cohaerence* was the fourth most common tick species. It was the fourth abundant tick species that is represented by 10% of the total collection of ticks. The fifth abundant tick species *was A. gemma*. It is represented by 8% of the total collection of tick species. Next to *A. gemma, R. pulchallus* was the sixth abundant tick species represented by 2% of the total collection of ticks. Finally *H. truncatum* was the least abundant tick species and it represented 1% of the total ticks collected from the study area. When we look to the genus level, the ratio of male to female, it is putted as; *Amblyomma* 2:1, *Rhipicephalus* 3:1, *Boophilus* 1:4 and *Hyalomma* 4:1. In species level the male to female ratio was *A. variegatum* 2:1. *A. gemma* 2:1, A. coherence 3:1, *R. evertsi-evertsi* 3:1, *R. pulchallus* 4:1, *B. decolaratus* 1:4 and *H. truncatum* 4:1.

Table 4: Distribution and sex ratio of adult tick species of cattle in Chiro wereda, Ethiopia

Tick species	Total tick	% out of total	Sex ration (male: female)	Percentage distribution
A.variegatum	2650	48	2:1	48
A.cohaerence	545	10	3:1	10
A. gemma	463	8	2:1	8
R. evertsi- evertsi	1043	19	3:1	19
R. pulchallus	99	2	4:1	2
B. decolaratus	`662	12	1:4	12
Hyalomma truncatum	31	1	4:1	1

In this study, the relative infestation rate of tick species on cattle sampled showed that *A. variegatum* was the most abundant tick species with a relative abundance of 50.78% and *R.evertsi-evertsi* was the second most abundant tick species found with a relative abundance of 38.5%. Next *B. decolaratus* was the third abundant tick species found with a relative abundance of 27.9% and then the fourth abundant tick species found was *A. coherence* with a relative abundance of 9.4%. *A. gemma* was the fifth abundant tick species found with a relative abundance of 7.5% and *R. pulchellus* was the six abundant tick species found with a relative abundance of 6.3%. *H. truncatum* was the least abundant tick species found with a relative abundance of 2.6% in the study.

Table 5: Relative infestation rate of tick species on cattle sampled in Chiro wereda, Ethiopia.

	A. variegatum	*A. coherence*	*A. gemma*	*R. evertsi-evertsi*	*R. pulchellus*	*B. decolaratus*	*H. truncatum*
Positive animals	195	36	29	148	24	107	10
Negative animals	189	348	355	236	360	277	374
Prevalence	50.9%	9.4%	7.5%	38.5%	6.3%	27.9	2.6%

Table 6: tick burden within age, sex and breed of cattle in chiro wereda, Ethiopia

	Age			Sex		Breed	
	<1 year	1-3 years	>3 years	Male	female	Local	Cross
No. of animals examined	97	168	119	252	132	149	235
Total tick	1302	2414	1782	2956	2542	2753	2745
Mean tick burden							

4. Discussion

Amblyomma (66.53%) was the most abundant and widely distributed genus in the study sites. There are 129 species of *Amblyomma* ticks. They are characterized by long mouth parts and, usually, beautifully colored. "Ornamented" scuta. Eyes are present, in most species not housed in sockets. These three host ticks are wide spread in tropical and subtropical zones where they parasitize a wide variety of mammalian hosts and also reptiles and amphibians. Immature stages of some species infest birds and these can play an important role in dispersing the ticks (Walker.,2003). From identified species *A. variegatum* were found to be the most abundant tick in Chiroo wereda (48%).It is the most widely distributed cattle tick in Ethiopia (Pegram ., 1981) and has a great economic importance because it is an efficient vector of cowdriosis of ruminants, vector of thogoto virus(2), African tick bite fever (*Rickettsia africae*) in man and severe local reactions in cattle (abscesses due to secondary bacterial infections leading to lameness and loss of udder quarters) (Fabricuius, 1794). *A. variegatum* also causes the greatest damage to hides and skins because of its long mouth part which renders the community valueless on world market if the infestation is high (Solomon ., 2001). Furthermore, ulcer caused by this tick species becomes favorable site for secondary bacterial infection like *Dermatophilus congolensis*. Dermatophylosis is one of the most serious disease constraints on livestock production in Ethiopia. Whatever the influence of breed and season, it has long been noted that outbreaks of dermatophylosis are associated with the presence of tick *Amblyomma* species (Mekonnen., 2007).

Next to *A. variegatum* from genera of *Amblyomma*, *A. coherence* (10%) and *A. gemma* (8%) are the fourth and fifth abundant tick species in Chiro Wereda respectively in this study. The different types of *A. cohaerence* have been observed in Ethiopia. A larger type believed to be associated to wild hosts, particularly African buffalo and a smaller one from cattle. The second type has adapted from buffalo to cattle and most common in Ethiopia (Pegram ., 1981). Both are efficient vector of cowdriosis and Benign African theileriosis of cattle (*Theileria mutans*) (Donitz, 1909 and Koch 1944).

The second abundant (20.86%) in genus level in the study area is *Rhipicephalus*. The resulted ticks from the genus *Rhipicephalus* comprises two species. These are small to medium-sized ticks with short, broad palps that are usually inornate and have eyes and festoons. They are usually three host ticks, although some have a two host cycle (e.g. *R. evertsi-evertsi*) (Walker et al., 2000).

Rhipicephalus evertsi- evertsi was second abundant (19%) tick in this study area in species level. This tick species shows no apparent preference for particular altitude, rainfall zones or seasons (Pegram, 1981). Morel (1980) affirmed that the major distribution of *R.evertsi-evertsi* in Ethiopia seems to be connected with middle height dry savannas and steppes in association with zebra and ruminant and it is widely distributed throughout the country.

It is efficient vector of equine piroplasmosis (*Babesia caballi*; *Theileria equi*) and bovine anaplasmois (*Anaplasma marginale*) and also cause tick paralysis in animals (Toxin) (Neumann, 1887).

Next to R. evertsi-evertsi from the genera of *Rhipicephalus* ,*R. pulchellus* (2%) was the sixth abundant tick species in the study area. This tick species transmits the protozoan *Theileria taurotragi* which causes benign bovine theileriosis. It also transmits Nairobi sheep disease of the same name on sheep. It can be a risk to humans because of its transmission of the bacterium *Rickettsia conorii*, causing tick tiphus, and transmission of the virus of Crimean-congo haemorrhagic fever. It may occur on some hosts in sufficient numbers to cause direct parasiteic harm (Walker et al., 2000).

The third abundant (12.04%) tick in the genus level is *Boophilus* in this study area. *Boophilu*s is one host tick about three weeks to complete their cycles on the host from unfed larvae to engorged female, preferably on cattle (except for *B. kohlsi*, a near/ middle Eastern spices with a predilection for small ruminant). Boophilus has recently become a subgenus of the genus Rhipicephalus. *Boophilus* ticks have a hexagonal basis capitulu, the spiracular plate is rounded or oval and the palps are very short, compressed, and ridged dorsally and laterally. Males have adanal shields and accessory shilds. The anal groove is absent or indistinct in females and fiat in males. There are no festoons or ornamentation (Walker et al., 2000).

Rh. (Boophilus) decolaratus was the third abundant (12%) tick species in this study. It is also known as the blue tick because of color of engorged females. It is the commonest, most wide spread and frequent of the one host cattle ticks in Africa. It transmits the protozoa *Babesia bigemina*, causing bovine babesiaosis (red water) in cattle. In addition this tick transmits the bacteria *Anaplasma marginale*, the cause of bovine anaplasmosis (gall sickness) and *Borrelia theileri*, the cause of sirochaetosis in cattle, sheep, goats and horses. Although *Rh. (Boophilus) decolaratus* tick has short mouth part, are likely to cause leather potential and reduce the rate of growth of cattle in heavy infestations. As *Boophilus spp.*

are one host ticks, they may become very numerous on cattle herds particularly these with a low degree of resistance, and cause considerable direct damage (Kahun and line.,2003).

The fourth abundant (0.56%) in the genus level is *Hyalomma*. The genus is characterized by ticks of large size, long mouth parts pale to dark scutum and pale rings on their legs. All species have convex eyes, festoons and the male have anal plates (Apanaskevich And Horak.,2009). *Hyalomma* species parasitize domestic and wild mammals and birds, and are abundant in semi arid zones. The genus *Hyalomma* comprises 30 species, most of which follow a three host life cycle. However, some species undergo either a two host or three host cycles, depending on the host species. While *H. scupense* is a one host tick (Apanaskevich and Horak .,2005,2006, 2007).

Hyalomma truncatum was the least abundant tick species and represented 1% of the total counts collected. It is also known as the shiny Hyalomma because of the smooth surface of the male. This speces of tick is notorious for casusing a variety of types of direct dagmage to its hosts. It is a distinctive speices which is easily identified, but in a few parts of Africa it needs to be differentiated from Hyalomma albiparmatum (Norval and Horak.,2004).Certain stains of H. truncatum have a toxin in their saliva that causes the skin disease known as sweating sikness in cattle, particularly calves. The long mouth parts cause tissue damage in cattle and sheep and secondary bacterial infections may lead to infected abscess. The injuries caused by the long mouth parts are attractive to the blow fly chrysomya bezziana and this leads to infection of the flesh with maggots (myiasis). The attachment of adult ticks to the inter digital clefts on the feets and fetlocks of lambs almost always results in lameness (Walker et al.,2003).

4.1 Host age

It seems from the results presented in (table 4) animals in age groups below 1 years had more tick compared to animals between 1 to 3 years and older. This indicates that as the animals increase in age, there is a decrease in tick infestation.

Riek (1962), Bennet (1969) and George (1985) reported that host grooming activity was an important factor in the reduction of ticks burden and animals restricted presented increased numbers of engorged ticks. Cutaneous immune reactivity directed toward the attached tick could serve as a source of irritation, which could stimulate host grooming. Lehmann (1993) hypothesized that young hosts are often more affected by ectoparasites because they possess a higher ratio of accessible surface to body volume, and because their grooming behavior and other defense capabilities are often inefficient.

Sutherst ., (1983) reported that steers suffers a much greater loss in live weight due to the difference in age, weight and tick resistant status. Doube and Wharton (1980) and Rechav (1992) indicated that age, nutrition, hormone levels of the host, pregnancy and lactation can also influence natural or acquired immunity to ticks. The results optained in this study supported those of Lehmann (1993) who studied the effects of ectoparasites on various hosts of different ages and found that young hosts are more affected by ectoparasites. Rieck (1956) observed that the susceptibility or resistance of hosts to tick infestation is based on grooming behavior that is poorly developed in young animals. It seems that host resistance to ticks may increase with increased incidences of exposure to ticks. Sutherst ., (1983) reported major differences in live weight and tick resistance status between steers of different ages due to tick infestation. The older groups of steers suffer less than the younger steer that lost more weight due to tick infestation. The literature pertaining to the effect of age has on tick burden in cattle is generally scarce, but a study conducted by Brown (1984) on guinea pigs showed that age was a significant factor contributing to tick resistance.

Table 7. Economically important tick species in Ethiopia (Mekonnen, 1996)

Tick species	Host
Amblyomma cohaerence	Cattle, sheep, goat, camel, equine
Amblyomma gemma	Cattle, sheep, goat, camel
Amblyomma lepidium	Cattle, sheep, goat, camel
Boophilus decolaratus	Cattle, sheep, goat, camel
Rhipicephalus bergeoni	Cattle, sheep, goat, camel, equine
Rhipicephalus everts-everts	Cattle, sheep, goat, equine
Rhipicephalus pulchellus	Cattle, sheep, equine
Hyalomma truncatum	Cattle, sheep, goat
Hyalomma marginatum rufipes	Cattle, sheep, goat, camel
Hyaloma dromedary	Cattle, sheep, goat, camel

4.2 Breed

Comparison between local and cross breed show that local cattle carried less one host and multi-host ticks than the cross in this study. Likewise the study carried out in Sudan by Latiff (1984) indicated that cross breed cattle carried four and half times as many ticks as pure breed zebu cattle. Bourne et al.,

(1988) reported that large difference in tick's numbers could arise from differences in cattle breed, due to their location and type of pasture. Cattle with low resistance allow more ticks to survive. They also contaminate the pasture with many more engorged ticks, leading to a cumulative build-up of tick population (Bourne et al ., 1988). The ability of many cattle breeds in the world to acquire resistance to ticks after repeated contact has been known for a long time (Brossard, 1998). Zebus and some taurine breeds indigenous to Africa have evolved a relatively stable relationship (tolerance) with ticks and except in unusual circumstances are not greatly affected by continuous exposure to ticks. In addition many of these cattle breeds are farmed by small scale in Africa and are not treated for ticks, thus allowing continuous natural selection to occur (Frisch, 1999).

Without acting as vectors of disease, ticks can be harmful to livestock and of great economic importance simply because of their direct effects. Much depends on the circumstances, on the tick species involved, on the local climatic condition (favorable or un-favorable to the ticks) and, to a large extent, on susceptibility to tick infestation of the livestock in the region. Resistance to tick infestation, or as least the capability of developing an effective immunological response to infestation, is genetically determined (Estrada.,2009). However, highly favorable climatic condition throughout the year and a large population of susceptible cattle breeds have made it necessary to develop intensive acaricidal treatment programs, which have led to an enormous problem of wide spread multi acaricide resistance, with resistance having successively developed to the various groups of chemicals used (Bianchi et al., 2003).

The damage caused by tick bites also diminish the value of skins and hides for the manufacture of leather; even ticks with short hypostome such as Rh. (Boophilus) may be important in this respect when present in large numbers on susceptible cattle. Ticks with long and massive hypostomes, such as *Amblyomma* and to some extent *Hyalomma* species, may induce abscess because of secondary bacterial infections. In this way *Amblyomma* species may cause loss of teats or lameness, depending on the sites of attachment. In turn loss of teat lead to increased calf mortality (Aydin and Bakirci,2007).

The saliva of certain tick species contains paralyzing toxins that induces a severe form of paralysis. Another form of tick toxicosis is sweating sickness, a generalized eczemative condition of calves and other species of livestock in Africa, induced by the saliva of certain lines of *Hyalomma truncatum* (Gothe, 1999).

There is also at least one example of tick associated disease which is not transmitted by ticks. This is bovine dermatophilosis induced by the presence of adult *Amblyomma* variegatum which, in certain regions of the tropics, may prevent upgrading of local cattle with highly susceptible imported breeds (Ambrose et al., 1999).

Table 8.Disribution of tick born disease agents in Ethiopia (Mekonnen, 1998)

TBD agents	Princioal Vector	Distribution
Anaplasma marginale	*B.decolaratus*	Country wide
Babesia bigemina	*B.decolaratus*	Country wide
Babesia bovis	*B.annulatus*	Southwest Ethiopia(Gambella)
Cowdria ruminantum	*A.variegatum*	Country wide
Theileria mutans	*A.variegatum*	Country wide
Theileria orientalis	*A.cohaerens*	Southwest Ethiopia
Dermatophilus congolensis	*A.variegatum*	Country wide
	A.cohaerens	

The most common tick borne diseases in Ethiopia are: Anaplasmosis, Babesiosis, Theileriosis, Cowderiosis and tick associated Dermatophilosis (Solomon, 2007; Radostits et al., 2000). Recovered animals retain the infection and remain immune for long periods, some times for life. In general where such diseases are endemic, the local livestock has been exposed to a long process of natural selection and has, to various degrees become tolerant, but not refractory to the infection. Furthermore, young animals are generally more tolerant than adults. The combination of natural tolerance and age associated tolerance may result in an endemically stable situation which, at best, means that the prevalence of infection may be 100% but that the disease is not clinically apparent. In other cases, endemic stability may be less perfect and there may be some mortality following primo-infections in young animals, but older stock that have survived the infection are immune. Obviously tick numbers are important as endemic stability can only be attend where adequate numbers of infected ticks are present to infect all animals while they still possess their age associated tolerance. Climatic

conditions are among the main factors influencing tick numbers and endemic stability is thus not attained in areas which are climatically marginal for the vector of tick species (Gray,2002).

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Exotic livestock, introduced from disease-free regions in which they have not been exposed to natural selection, are far more susceptible to most tick-borne diseases and even though mortality in young stock of such breeds is less than in adults, endemic stability can often not be achieved (Gothe, 1999). This is certainly true for cattle and *Theilerioses* (at least tropical theilerioses, *Thieleriua anulata*, and east coast fever caused by *Theileria parva*), *Babesiioses* caused by *Babesia bovis* and *caudriosis (Ehlichia/Caudria ruminantium*). However, there may be little difference in susceptibility to Aanaplasmoses (*Anaplasma marginale*) and babesia caused by *Babesia bigemina* between local and exotic cattle. Particularly *Theilerioses* and *Cowdrioses* may make it impossible, or at least uneconomical, to keep exotic ruminant breeds unless management and veterinary infrastructures are adequate. The same considerations apply to indigenous breeds of animals that have never been exposed to particular pathogens (Bekker, 2001).

Anyone involved with livestock in tropical and subtropical areas of the worled recognizes that ticks and tick- borne diseases are important, but there are few if any reliable global figures of the costs involved. Young, Groocock and Kariuki (1988) considered the control of ticks and tick borne diseases as the most important health and management problem in Africa, presenting a problem of equal or greater magnitude than tsetse fly and trypanosomosis. Various estimates of effects are tentative, sometimes rather disserent and moreover depend on variables, including annual climatic variations, fluctuating exchange rates and inflation (McCosker, 1979).

5. CONCLUSSIONS AND RECOMMENDATIONS

The present study revealed that cattle in the study area were highly infested with different species of ticks namely, *A. varigatum, R. everts everts*, *A. gemma*, *A. coherence*, *Rh. (Boophilus) decoloratus*, *R.pulchellus* and *Hyalomma truncatum*. These all indicates that the bionomic situation of the study area is favorable for the successive perpetuations of the pathogens transmitted by ticks and for their subsequent transmission to susceptible e host that necessitate regular parasitological investigation and application of effective prophylactic and control measures. The problem of ticks in cattle of the study area seems to be very important as they were widely distributed in all village considering the

importance of skin and hide as a main source of foreign currency to Ethiopia, the existing tick species recorded in cattle of the study area deserves serious attention at all levels in order to minimize the spread of infestation and improve the living standard of farmers which are dependent on their animals. Tick should be managed at an economically acceptable level by a combination of techniques. Because there is no single method that would guarantee complete control of ticks and tick-borne diseases, combination of available methods of tick control is necessary. This encompasses the selection of tick resistant cattle, acariside treatment, appropriate livestock management, evaluation and incorporation of traditional practices or remedies that appear to be of value.

In general, the distribution limits of ticks are not fixed but are determined by complex interactions of factors such as climate, host density, host susceptibility, grazing habits and pasture–herd management.
Based on the above conclusion the following recommendations are recommended:

- Public education is very important on the impact of ticks on animal health and production and the role of hides in the economy of the country
- To implement planned, safe, effective and economically sound immunization of animals at risk from tick-borne diseases, based on epidemiological findings
- Encourage community to practice safe and economical traditional control methods as part of integrated tick *management*.

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