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Prevalence of Ixodid Ticks on Bovine in Soddo Zuria Districts, Wolaita Zone, Ethiopia

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Abstract: The study was conducted from November, 2013 to March, 2014 in Soddo zuria woreda, Wolaita zone, with objective of identifying major ixodidae species and determining their prevalence. Adult ticks were collected from seven main body regions of 638 cattle which were under extensive management system. Out of the total of 638 cattle examined, 418 (65.5%) were found to be infested by one or more tick species. About 3261 adult ticks were collected from the animal body parts and identified to genera and species level. Five tick species of three genera *(Amblyomma, Rhipicephalus* (formerly *Boophilus*) and *Rhipicephalus)* were identified. The relative prevalence of each species was *Rhipicephalus (Boophilus) decolaratus* (41%), *Amblyomma variegatum* (23%), *Rhipicephalus evertsi-evertsi* (16.99%), *A. cohaerence* (14.01%) and *A. lepidium* (5%). The risk factor like age, breed and body condition of cattle showed significant association with the infestation rate but there was no association with sex of the cattle. The prevalence of tick infestation in poor body condition (70.2%), medium body condition (63.6%) and good body condition (51%) was found to be statistically significant ($p < 0.05$) among the three groups of body conditions. The prevalence of tick infestation was found to be statistically significant ($p < 0.05$) among the three breeds, with highest prevalence local breeds (71%) than both cross (55.2%) and exotic breeds (59%). The result indicated that the favorable predilection sites of *Amblyomma* species are more on ventral body and perineum. *R.* (*B.) decolaratus* preferred dewlap, udder/scrotum, belly, leg/tail, head and perineum. *R. eversti-evertsi* had a strong predilection sites for perineum, dewlap, udder/scrotum and ears. The sex ratio of all tick species identified during this study periods was skewed towards male except for *R.* (*B.) decolaratus*).

Key word: Tick Species · Soddo Zuria · Tick Genera

INRTODUCTION

Ethiopia is believed to have the largest livestock population in Africa. Among them the total cattle population for the country is estimated to be about 53.99 million. Out of this total cattle population, the female cattle constitute about 55.48 percent and the remaining 44.52 percent are male cattle [1]. In addition to the products of meat and milk cattle provide draught power for cultivation of the agricultural lands of many peasants. Skins and hides are also important components of the livestock sector in generating foreign export earnings. In most of Africa including Ethiopia, tick and tick borne diseases (TBDs), together with tsetse and Trypanosomosis, are economically very important diseases [2].

Since, studies on tick fauna begun in early the 19th century there are approximately 860 spp. in 22 genera and three families A world checklist of genera, subgenera and species of ticks [3], 30 species are very widespread and important parasites of livestock and causes significant economic losses to livestock industry. The economic losses incurred from downgrading of hides and skins are enormous, export yields foreign earnings of the country, second only to coffee [4]. Although, only relatively few are important only few are important species to man and his domestic animals, these few species must be controlled if livestock production is to meet world needs for animal protein [5].

Ticks belong to the phylum Arthropod, class Arachnid and order Acari. The families of ticks parasitizing livestock are categorized into two, the

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Ixodidae (Hard ticks) and Argasidae (Soft ticks). Though, sharing certain basic properties, they differed in many structures, behavioral, physiological and feeding and reproduction pattern [6]. In Ethiopia, there are 47 species of ticks found on livestock and most of them have importance as vector and disease causing agents and also have damaging effect on skin and hide production [7]. They are most numerous, particularly in tropical and sub-tropical regions and their impact on animal health and production is greatest in these regions. They are obligate, blood feeding ecto-parasites of vertebrates, particularly mammals and birds. It has been estimated that about 80% of the world population of cattle are infested with ticks. The life cycle of ticks (both ixodids and argasids) undergo four stages in their development; eggs, 6-legged larva, 8-legged nymph and adult [8, 9]. Ticks, besides being important vectors for diseases like theilerosis, anaplasmosis, babesiosis and rickettsiosis in domestic animals; they also cause non specific symptoms like anemia, dermatosis, toxicosis and paralysis [10].

According to the numbers of hosts, Ixodids ticks are classified as one-host ticks, two-host ticks, three-host ticks and Argasids classified as multi-host ticks. In one-host ticks, all the parasitic stages (larva, nymph and adult) feed on the same hosts; in two- host ticks, larva attach to one host, feed and moult to nymphal stage and engorged, after which they detach and moult on the ground to adult; and in 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. In multi-host ticks (argasids), a large number of hosts are involved and it is common to have five moults, each completed after engorging and detaching from the hosts [11]. Ticks are usually relatively large and long lived, compared to mites, surviving for up to several years [12]. Ticks are a local and global problem and they cause physical damage and discomfort due to their feeding behavior. They can also act as vector and reservoir of important pathogens of animals as well as humans [13].

Ticks are considered most important to domestic animals' health in Africa comprise about seven genera and forty species. Among these tick genera, the main ticks found in Ethiopia are *Ambylomma* (40%), *Boophilus* (21%), *Heamaphysalis* (0.5%), *Haylomma* (1.5%) and *Rhipicephalus* (37%) [9, 14]. Among these, *A. varieegatum* and *R.* (*B*). *decoloratus* are most important and widely distributed [15]. *A. coherence, A. gemma, A. lepidium, Haylomma rufipes, H. truncatum and R. evertsi* are also commonly found in Ethiopia [16, 17]. Therefore the objectives of the present study were therefore to:-

- Identify the common tick species and their prevalence in Soddo zuria Woreda.
- Determine the predilection sites of common tick species.

MATERIALS AND METHODS

Description of study area: Study population: The target animals for study was bovine species that were found in Soddo zuriaWoreda and these animals were categorized based on their sex, age, breed and body conditions.

Study Design: A cross sectional study was conducted from November, 2013 to March, 2014 to identify major ixodid tick species affecting bovine species and to determine their prevalence.

Sampling Method and Sample Size Determination: The examined cattle were selected by simple random sampling method and the sample size was determined by using the formula given in Thrusfield [19]. The expected prevalence of ticks of cattle in Soddo zuria Woreda was assumed as 50%. The parameters that were used were 95% confidence interval and 5% desired level of precision. By substituting these values in the formula, the sample size taken will be, n = 384

$$n=\frac{1.962\ P_{exp}(1 - P_{exp})}{d^2}$$

Where n = sample size; P_{exp} = expected prevalence; d^2 = expected precision which is usually 5% (0.05. But to increase the precision I increased the sample size to 638.

Sampling Design and Sampling Technique: All the animals selected as sampling unit were checked for any tick infestation. Firstly, the selected study animal was properly restrained and ticks were removed carefully and gently in a horizontal pull to the body surface. Ticks were collected from ears, heads, dewlaps, belly/flunk, udder/scrotum, perineum and legs/tails, preserved in universal bottles containing 70% ethanol and labeled with respect to age, sex breed, body condition and date of collection. Then the samples were transported to Wolaita Soddo Regional Veterinary Laboratory for identification. The ticks was counted and subsequently

identified to genus and species level by using stereomicroscope, according to standard identification keys given by Walker *et al*. [20].

Data analysis and interpretation: All data that was recorded in the study period was entered into Microsoft excel and was subsequently analyzed using computer soft ware of SPSS version 16. The overall prevalence of tick infestation was determined by dividing the number of positive animals by total sample size and was expressed as percentage. Chi-square test was used to assess statistically significant association in tick infestation between ages, sex, body condition and breeds.

RESULTS

Prevalence of Ticks on Cattle in Soddo Curia Woreda: In this survey, a total of 638 animals where, local (n = 379, cross (n = 105), exotic (n = 154) breeds of cattle were examined. Then the overall prevalence was calculated by dividing the number of positive samples by the total sample size and multiplied by 100. Out of the 638 animals examined, ticks were found on 418 animals yielding an overall prevalence of 65.5%. The distribution of tick genera were identified and located in Table 1. The statistical analysis was done for the prevalence of tick infestation with hypothesized risk factors

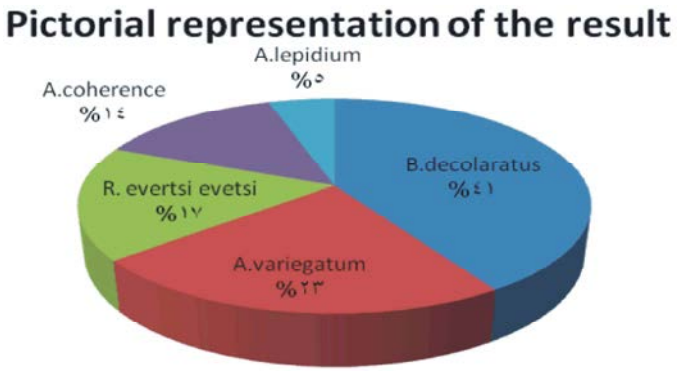

Table 1: Distribution of tick species and favorable predilection site

	Total tick		Sex		Ratio	95% Confidence interval	
Tick species	No	Prevalence (%)	Male	Female	(Male: Female)	Lower limit	Upper limit
R. (B) decolaratus	1337	41	7	1330	0.005:1	0.393	0.427
A. variegatum	750	23	640	110	5.8:1	0.216	0.245
R. evertsi evertsi	559	17.14	503	56	9:1	0.159	0.185
A. coherence	452	13.86	397	55	7.2:1	0.127	0.151
A. lepidium	163	5	134	29	4.6:1	0.043	0.058

Table 2: Prevalence of tick within body condition

Body condition	No of positive animals	No of negative animals	No of animal examined	Prevalence (%)
Poor	262	111	373	70.2
Medium	105	60	165	63.6
Good	51	49	100	51

($X^2 = 13.271$, p = 0.001)

Table 3: Animals examined and percentile infestation

Site	Examined	infested	X^2-value	p-value
Waaccigabusha	87	53(60.9%)	7.565	0.372
Waarazalasho	82	59(71.9%)		
Gulgula	86	59(68.6%)		
Delboatwaro	79	51(64.5%)		
Ofagandaba	90	62(68.8%)		
Bugewanche	81	57(70.4)		
Ofasere	57	34(59.6%)		
Bodditti	76	43(56.6%)		

Table 4: Prevalence of tick in relation to sex and age of animals.

	sex		Age	
parameter	Male	Female	young	Adult
No of animals examined	277	361	219	419
Infested animals	186	232	130	288
Prevalence (%)	67.14	64.3	59.4	68.7

Sex: X^2=1.143, P=0.565 Age: X^2=6.028: P=0.043

Table 5: Prevalence of tick within breed.

Body condition	No of positive animals	No of negative animals	No of animal examined	Prevalence (%)
Local	269	110	379	71
Cross	58	47	105	55.2
Exotic	91	63	154	59

(X^2 = 12.725, P = 0.002)

Table 6: Distribution of tick genera in the study area.

	Tick genera							
	Amblyoma		*Boophilus*		*Rhipicephalus*		Total	
Kebele	No	%	No	%	No	%	No	%
Waacciga busha	154	11.2	216	16	61	11	441	13.5
Waaraza lasho	161	11.7	221	16.5	61	11	455	14
Gulgula	192	14	205	15.3	63	11.4	477	14.6
Delbo atwaro	172	12.5	263	19.7	62	11.2	518	15.9
Ofa gandaba	195	14.2	159	11.9	66	12	389	11.9
Buge wanche	182	13.3	212	15.8	68	12.3	433	13.3
Ofasere	132	9.6	113	8.4	34	6	279	8.5
Bodditti	116	8.5	111	8.3	42	7.6	269	8.2
Total	1370	100	1337	100	554	100	3261	100

Table 7: Numbers of tick species identified in different half body regions of cattle.

	Body regions							
Tick	Head	Ear	Dewlap	Udder/scrotum	Leg/tail	Perineum	Belly	species
R. (B.) decolaratus	50	42	365	499	150	60	171	1337
A. variegatum	30	-	268	288	21	120	23	750
R. evertsi evertsi	-	189	120	50	20	140	45	554
A. coherence	-	-	80	127	-	178	72	457
A. lepidium		10	60	50	5	32	6	163
Total	2.45%	7.4%	26.6%,	31.1%	6.01%	16.25%	9.7%	100%

(Age, sex, breed and body condition). There were statistically significant association with breeds (x^2 = 12.725, p = 0.002) and body conditions (x^2 = 13.271, p = 0.001) (Table 2 and 4). Higher tick infestation rate was seen on local breeds than medium and exotic breeds. There were no statistical significances (p > 0.05) associated with sex (Table 3).

Of the total 3261 Ixodid ticks collected from seven body region of 638 cattles, three genera and five different species were indentified. The tick species identified were *R.* (*B*) *decolaratus* (41%), *A. variegatum* (23%), *R. evertsi* subspecies *evertsi* (17.14%), *A. cohaerence* (13.86%) and *A. lepidium* (5%) in descending order of abundance (Table 1). By considering relative abundance of each tick species identified in the study area, *R.* (*B*) *decolaratus* was the most abundant (41%) and *A. lepidium* was the least abundant (5%).

Predilection Site of Identified Ticks: The observed proportion of tick species attachment site during this study was summarized and shown in Table 1. All three species of *Ambylomma* identified during the study preferred udder/scrotum, dewlap/brisket, perineum, belly/back, legs/tail and head regions. The *R.* (*B*)

decolaratus preferred the attachment site such as dewlap/brisket, udder/scrotum, belly/back, legs/tail and perineum, heads and ears regions in decreasing order. The *Rhipicephalus* species were encountered mainly in the perineum, dewlap, udder/scrotum, ears and belly/back and head regions.

DISCUSSION

The distribution and abundance of tick species infesting cattle in Ethiopia vary greatly from one area to another area. In this study *R. (B.) decolaratus* (41%) were found to be the most abundant tick species in Soddo zuria Woreda. This is in agreement with [21] who described that *R.* (*B*) *decolaratus* is the commonest and most wide spread tick in Ethiopia, collected in all administrative regions except in the Afar region. This is also in line with [22]. In Asela and [23] reported the highest prevalence of *R.* (*B*) *decolaratus* (80%) in the study areas. According to Shiferaw [24] *R. (B.) decolaratus* had highest frequency in the observed area during dry seasons (January, February and early March) in Wolaita zone. This result disagreed with the findings of Alekaw [25] at Metekel Ranch, in Ethiopia, showing prevalence of 5.7%. This may be due to the geographical location and altitude factors, 1,500 to 1,600 masl, of Metekel Ranch. This tick species was reported to be widely distributed in central rift valley of Ethiopia [3] It has also been reported as prevalent in many other parts of Ethiopian rift valley [26] Bale [27]. North wollo [28]. and highland areas of Harar and Diredawa districts [29, 30] stated that *R.* (*B*) *decolaratus* often collected in Ethiopia and does not seem really abundant anywhere. According to Bekele [31] relative abundance of *R.* (*B*) *decolaratus* increase from low land towards highland. The females were abundant from September to April and transmitted *Babesia bigemina*to cattle and severe infestation can lead to tick worry, anorexia and anemia [32] the one-host ticks of the genus Boophilusthat parasitize ruminants represent a hindrance to livestock farming in tropical and sub-tropical countries. They transmit the causative agents of anaplasmosis ("Gall sickness") and Babesiosis ("Red water") in cattle [20] *A. variegatum* was the second widespread tick species of the cattle in the current study area (23%). This result disagreed with different reports done by other authors in different parts of Ethiopia such as Tessema and Gashaw [33]. In Assela, Belew and Mekonnen [34] in Holeta, Seyoum [32] and Mehari [35]. In Awassa who described *A. Variegatum* as the first most abundant tick species in their study areas. Naser [36] and G/Michael [37] reported that *A. variegatum* was one of the most abundant tick species in Wolaita zone. In Ethiopia as whole it is the most commonly found tick species [3, 38]. This difference in result in different study area was due to the parameters, such as latitude, altitude and their effects (Sunlight, rainfall and wind patterns) that influence tick distribution and their activity. *A. variegatum* was found in highest number in the highland and area with high rainfall and it is is a widely distributed cattle tick in Ethiopia and is relatively active throughout the year in most part of Ethiopia [10, 30]. This tick species is a potential vector of diseases caused by *Cowdria ruminantium, Theleria mutan, Theleria velifera* ("Benign bovine *theileriosis* ") and viral diseases, Nairob sheep disease and also aggravates the situation of bovine dermatophilosis*(Dermtophilus congolence*) [21]. Among the tick species *A. variegatum* causes the greatest damage to hides and skin because of its long mouth part which renders the commodity valueless on world market if the ticks are in high number [10]. The study conducted in Wolaita zone by Dessie and Getachew [39] Showed that *A. variegatum* was the second abundant tick species at highland and midland and the first abundant in the lowland during wet period. This variation may be due to the change in environmental conditions, with the result of global warming that highly affect the ecology of ticks. Change in temperature and rainfall have been reported to affect the distribution of diseases of vectors and tick borne diseases [11]. *Rhipicephalus evertsi-evertsi* was third abundant (17.14%) tick species in this study. But this tick species was second abundant (22%) and widely distributed tick species in Asellaby Tamru [40]. It was also reported to be prevalent in Awassa by Mehari [35] and in Asella by Behailu [41]. The native 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 Ethiopia and it is a possible vector of *Babesia,Borrelia*, *Theileria* and *Rickettsia conori* [30]. This tick species shows no apparent preference for particular altitude, rainfall zones or seasons and it is present in anger valley in western Ethiopia at 1450 mm annual rainfall and at Asiata in the eastern denakil, below 500m with about 250mm rain fall annually [3, 43]. In Ethiopia its presence has been reported in Tigray by Surafel[43] and Southern wolloby Daniel[44]. Bahirdar by Mesele[45].and Bale by Dejenu[27].and it is known to transmit *Babesia caballi* and *Anaplasma mariginale* (Anaplasmosis) to cattle. The saliva of female ticks contains a toxin that causes paralysis in calves [20].

Amblyomma coherence was the fourth abundant tick species (13.89 %) found in the study area. According to Dessie and Getachew [39].

A. cohaerence (14.14%) was the fourth abundant tick species in Soddo zuria Woreda. This finding is similar with the reports of Belew and Mekonnen [34]. In Holeta and Tessema and Gashaw [33] in Assella. However, in western Ethiopia, where the climate is humid much of the year, *A. cohaerence* is the most prevalent and abundant tick on cattle [3]. In tick survey conducted in western Ethiopia, *A. cohaerence* was founded to be the most prevalent in Mezanteferiby Seid [46]. and Jimma by Yitbarek [47]. with a prevalence rate of 50.5% and 83.1%, respectively. It is hardly abundant at lower altitude and rainfall. It also seems to subsist normally on cattle where the initial host disappeared [30, 14]. The prevalence of *A. cohaerence* is alarmingly important as this tick has been reported as a vector for *C. rumination* which is the causative agent of Cowdriosis ("Heart water") [21]. In this study *A.lepidium* was least abundant tick species (5%). This finding was in line with result reported where this tick species was least abundant 1.7%. Its prevalence is limited by semi-deserted conditions [30]. It is also known as the east African native ticks and is common in many of the semi- arid regions of east Africa [20]. This tick was irregularly dispersed through most of the country and was collected from Tigray, Afar, Amhara, Oromiya, Somali, SNNP and Harare regional states. In south west parts of Ethiopia including Gambella region and western zones of Oromia, this tick was reported with less abundance by several researchers [3, 49 and 50] that agrees with the current result..In this study, different animal related risk factors were studied to determine whether there is a significant variation in tick infestation between and among different groups of animals with suspected risk factors. In this study the difference on tick prevalence (Table: 3) was found to be statistically significant ($p<0.05$) which was higher in age groups higher than 3 (68.7%) and is less in age groups less than 3 (59.4%). Young's are less infected than higher age groups. Higher proportion in adults may be due to outdoor management and long distant movement of adult animals to search for food and water compared to younger animals, so the chance of exposure is higher. The calves were maintained apart from adult animals at less population densities due to exposure to lower parasite burdens on the pasture. This is because calves graze on pasture around home which is less infested by ticks, no more animals graze around it and most of the time they practice zero grazing. Calves are generally more resistant to infection of tick than adult [51, 52]. These present study agree with idea of the above authors, but disagrees with the study of Tamru [22] in Assela which shows insignificant difference in any age group. There was no statistically significant association of tick infestation between different kebeles. This is because all those kebeles have the same agro-ecology. But the percentage of tick infestation is highest in waarazalasho (70.9%) and is lowest in Bodditti (56.6%). This difference in percentage is may be due to difference in management, society's awareness to treat tick infested animal and access to veterinary service. There was also statistically non-significant association ($p > 0.05$) in the infestation rate among different sex groups, where higher infestation was recorded in male animals compared to their counter parts. This variation may be associated with female animals which were kept properly in the house with good management system for dairy purpose whereas male animals grazing on field all day may be exposed to tick infestation. This result also agreed with the previous work done by other authors [53] in Bako. The proportion of tick infestation was higher in poor body conditioned (85%) as compared to medium body conditioned (49%) and good body conditioned animals (10.6%). This was due to poor body 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 result s in poor body condition due to consumption of high amount of blood and fluid by those ticks [54, 55] who reported that the British cattle breeds having the lowest body condition score under tropical conditions had the highest infestation of ticks. [54, 56, 57] It is reported that tick load on animal is affected by breed and nutritional stress. Ultimately, this factor affect general body condition, which in turn affects blood composition, respiration rate, appetite and eventually leades to poorer body condition scores. This present study is agreed with previous studies above mentioned. The result of current study shows that the presence of tick infestation in Local breeds (Table:2) were very high with a prevalence of 81% while in Cross breeds and Jersey the prevalence were 49% and 10.6%, respectively. The significant variation in tick infestation of cattle of different breeds in the current research might be attributed to differences in management systems, lack of supplementary feeding to local cattle breeds, or lack of control measures against tick on local cattle breeds. Furthermore, it can be assumed that it might be due to lack of interest of farmers about local cattle as well as taking more care to Cross breed than Local cattle. The similar result was reported by Belew and Mekonen [34].

In this study the most infested region of the animal were udder-scrotum (31.1%), Dewlap (26.6%), perineum (16.25), belly (9.7%) ear (7%), leg-tail (6.01), Head (2.45%). The predilection site mentioned in the result of this study was also reported by other researchers such as Pawlos and Derese [57]. In humbo district and Hussen [53]. In Bako town reported that ano-vulva was the first site of attachement which is in contradiction with this findings, but this result is in agreement with the result of Gezali [58]. In Mezanteferi who reported udder- scrotum (33.95%) is preferred site for tick attachment. A variety of factors such as density [60] and season of the year [32]. inaccessibility for grooming Chandler and Read [61] has also been reported to determine the attachment site of ticks. Information on predilection site of ticks is helpful in spraying individual animal since it gives a clue to which part of the body requires more attention [62].

In this short period of study, it was possible to indicate the trend seasonality of tick population by comparing the number of tick collected every month. From November to march, the number of tick population has been shown variation in decreasing manner. This is probably is due to changes in climatic condition from slightly weather change from wet month (November) to the drier month (march). Similarly the comparable report has been conducted by Solomon *et al.* [10], Alekaw [25], Feseha [51] Hussen [53] and Seid [56] and a similar survey has also been reported by Gezali [58] that infestation by ticks during the dry months reaches very low level and during the rainy season the activity of adult tick become high. The male to female rations of *R. (B.) decolaratus, R. evertsi-evertsi, A. varigatum, A. cohaerence*and *A. lepidium*were similar to previous reports of Solomon [10] and Seyoum [62]. Except *R. (B.) decolaratus*, all other species male ticks outnumbered females because males normally remain on the host longer than females. Fully engorged female tick drops off to the ground to lay eggs while male tend to remain on the host up to several months to continue feeding and mating with other females on the host before dropping off [10]. The females of *R. (B.) decolaratus* outnumbered males in this may be due to small size of male which may not be seen during collection [33].

CONCLUSION

The important and abundant tick species investigated in this research ranking first and second were *Boophilusdecoloratus and Amblyommavariegatum*, followed by *Rhipicephalus evertsi-evertsi* and *Amblyommacohaerence and* lastly *Amblyommalepidium.* The study indicated that there was high tick infestation in the area. However, the attention given to the infestation had not been sufficient. The control methods necessary for tick and TBDs were selection of tick resistance cattle, acaricides treatment, appropriate livestock management, evaluation and incorporation of traditional practices or remedies that appear to be of value. In general, the distribution of ticks are not fixed but are determined by a complex interaction of factors such as climate, host density, host susceptibility, grazing habits and pasture-herd management. Therefore, effective tick control program should be formulated and implemented based on the distribution pattern of ticks and factors responsible for their distribution. In light of the above conclusion the following recommendations are forwarded:

- Community should be well informed about the proper control and care of their livestock from ecto-parasite point of view in general and about tick in particular
- More attention should be given to integrated control options through the use of one or more methods like selection of resistance cattle breeds, appropriate pasture management in communal grazing area, using predator animals, Vaccination and increase of good nutrition plane to get good performance of productive breeds in the area.
- Tick control program (Application of acaricides) should be continued with an increasing frequency of application in wet months and acaricide resistance tick species should be detected since this is economically important because limited types of acaricide were used in the area.
- Concerned government officials, non government organizations and professionals should work together in developing and application of strict policy on cattle management and proper control of ecto-parasite in general and tick in particular.

REFERENCES

1. Central Statistics Authority CSA, 2013. Ethiopia agricultural sample enumeration result for SNNPR. Statistical report on livestock and farm implements.
2. Belew, T. and A. Mekonnen, 2011. Distribution of Ixodidae ticks on cattle in and around Holeta Town, Ethiopia. Global veterinarian, 7(6): 527-531.
3. Keirans, J.E. and Robbins R.G., 1999. A world checklist of genera, subgenera and species of ticks (Acari: Ixodida) published from 1973-1997. J. Vector Ecol., 24:115-129.Sileshi, M., 2001. Ticks, tick-borne disease and their control in Western Ethiopia. Insect Science Applications, 13: 661-664.

4. Drummond, R.O., 2007. Tick borne livestock diseases and their vector. World Animal Review. htm Ethiopia. FAO Consultancy report 9 June-24 July 1979 FAO, Rome (Italy).
5. Urquhart, G.M., J. Armour, J.I. Dunean, A.M. Dunn and F.W. Jennings, 1996. Veterinary parasitology. 2nd Ed. Black Well Science. The University of Glaskow, Scotland, UK, pp: 181-188.
6. Kassa, B., 2005. Standard veterinary laboratory diagnostic manual. Vol. III. MOA Addis Ababa, Ethiopia.
7. Lefebvre, P.C., J. Blancou, R. Chermette and G. Uilenberg, 2010. Infectious and Parasitic diseases of livestock, 1: 93-128.
8. Minjauw, B. and A. McLeod, 2003. Tick borne diseases and poverty. The impact of ticks and tick borne diseases on livestock owners in India and Eastern health program center for tropical veterinary medicine, University of Edinburgh, UK, pp: 24-57.
9. Solomon, G., M. Night and G.P. Kaaya, 2001. Seasonal variation of ticks on calves at Sabetha, Western Shewa zone. Ethiopia Vet. J., 7(1&2): 17-30.
10. Taylor, M.A., R.H. Coop and R.L. Wall, 2007. Veterinary Parasitology.3rd Ed. Black Well Publishing, London, pp: 679-712.
11. Kettle, D.S., 1995. Medical and Veterinary Entomology. 2nd Ed. UK: CAB international, pp: 420-460.
12. Lord, C.C., 2008. Brown dog tick, Rhipicephalus sanguineus Latreille (Arachnida: Acari: Ixodidae). Featured Creatures from Entomology and Nematology Department.
13. De Castro, J.J., 1997. Sustainable tick borne diseases control in Western Ethiopia. J. S. Afr. Vet. Assoc., 71(4): 240-243.
14. Abebaw, G., 2004. Seasonal dynamics and host preference of Boophilusdecolaratus on naturally infested cattle in Jimma zone, South Western Ethiopia. Ethiopia Vet. J., 18(1): 19-28.
15. Pegram, P.G., R.J. Tatchell, J.J. De Castro, M.J. Chizyuka, P.G. McCosker, M.C. Moran and G. Nigarura, 2004. Tick control: New concepts, www.fao.org/AGA/ AGAP/FRG/Feedback.htm.
16. Solomon, G. and G.P. Kaaya, 1996. Studies on the developmental and survival of Rhipicephalus pulchelu and Amblyomma gemma under field condition. Ethiopia Vet. Assoc.
17. WSDADO: WolaitaSoddo district agricultural development office.
18. Thrusfield, M., 1995. Survey in veterinary Epidemilogy, 2 ed., Black well science limited, Cambridge, USA, pp: 178-198.
19. Walker, AA., A. Bouatour, J.L. Camicas, A.A. Estadapena, I.G. Harok, A.A. Hatif, R.G. Pegram and P.M. Preton, 2003. Ticks of domestic animals in Africa: A guide to identification species. The University of Edinburgh, UK, pp: 67-80.
20. Sileshi, M., R.G. Pegram, G. Solomon, M. Abebe, J. Yilma and Z. Sileshi, 2007. A synthesis of review of Ixodids (Acari: Ixodidae) and Argas (Acari: Argasidae) ticks in Ethiopia and their possible role in diseases transmission. Ethiopia Vet. J., 2: 1-22.
21. Tamru, T., 2008. Survey of Bovine tick species in and around Asela Town, DVM Thesis, School of Veterinary Medicine, Jimma University, Jimma, Ethiopia.
22. Teshome, Y., G. Feseha, A. Wakjira and T. Tsega, 1995. Preliminary observation on ticks: Seasonal dynamics and resistance of three indigenous and three cross breed cattle in Ethiopia. Bull. Anim. Health. Prod. Afr., 43: 105-114.
23. Shiferaw, D., 2005. Cattle tick dynamics in different agro-ecological zones of Wolaita, Southern Ethiopia. Master degree thesis. Faculty of Veterinary Medicine, Addis Ababa University, DebreZeite, Ethiopia, pp: 1-137.
24. Alekaw, S., 1998. Distribution of tick and tick borne diseases at Metekel Ranch. Ethiopia Vet. J. 4(1): 30.
25. Solomon, G. and G.P. Kaaya, 1998. Development, reproductive capacity and survival of Amblyomma variegatum and Boophilus decoloratus in relation to host resistance and climatic factors under field conditions. Veterinary Parasitology, 75(2/3): 241-253.
26. Dejenu, G., 1988. A preliminary survey of ticks on domestic animals in Bale. FVM, AAU, Debrezeit, Ethiopia.
27. Seyoum, Z., 2001. Study of tick and TBDs on cattle at Girran valley in the North Wollo Zone. Proceeding of the Ethiopian Vet. Assoc., pp: 15.
28. Mannueri, K. and J. Tilahun, 1991. A survey of Ectoparasites of cattle in Harer and around Dire Dama. DVM Thesis, Faculty of Veterinary Medicine, Debra Zeit, Ethiopia.
29. Morel, P., 1980. Study on Ethiopian ticks (Acaridae: Ixodidae). 1st.Ed. Republic of France, Ministry of Foreign affairs, French Vet. Mission, Addis Ababa, Ethiopia, pp: 15-183.

30. Bekele, T., 2002. Studies on seasonal dynamics of ticks of Ogaden cattle and individual variation in resistance to ticks in eastern Ethiopia. Journal of veterinary medicine series B, 49(6): 285-288.
31. Seyoum, Z., 2005. Distribution and host parasite relationship of Ixodids ticks in Eastern Amhra, Kombolcha Regional Veterinary Laboratory, Kombolcha, Ethiopia, pp: 34-47.
32. Tessema, T. and A. Gashaw, 2010. Prevalence of ticks on local and crossbreed cattle in and around Asela Town, South East, Ethiopia, Amber Animal Health Department, East Gojam, Ethiopia Vet. J., 14(2): 79-89.
33. Belew, T. and A. Mekonnen, 2011. Distribution of Ixodidae ticks on cattle in and around Holeta Town, Ethiopia. Global veterinarian, 7(6): 527-531.
34. Mehari, B., 2004. Distribution of livestock tick species in Awassa Area. DVM Thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debre Zeite, Ethiopia.
35. Naser, M., 1985. Common tick species in WolaitaAwraja, DVM, thesis, Addis Ababa university, Faculity of veterinary medicine, Debrezeit, Pp 1-38.Netherlands.
36. G/Michael, T., 1993. Ticks and tick born disease of cattle in North omo zone, DVM thesis, Addis Ababa university, Faculity of veterinary medicine, Debrezeit, pp: 150.
37. Mekonnen, S., I. Hussein and B. Bedane, 2001. The distribution of Ixodidae ticks in central Ethiopia. Onderstepoort Journal of veterinary research, 68(4): 243-251.
38. Dessie, S. and A. Getachew, 2006. Cattle tick dynamics in different agro-ecological zones of Wolaita, Southern Ethiopia. Ethiopia Vet. J., 10(2): 85-9.
39. Tamru, T., 2008. Survey of Bovine tick species in and around Asela Town, DVM Thesis,School of Veterinary Medicine, Jimma University, Jimma, Ethiopia.
40. Behailu, A., 2004. A survey of ticks borne blood protistia in cattle at Assela Arsi Zone. DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University Debrezeit, Ethiopia.
41. Hoogstraal, H., 1956. African Ixodoidea Ticks of Sudan. Bureau of medicine and Survey, Department of the navy, Washington D.C.
42. Surafel, M., 1996. Survey of tick species of four domestic animals in Tigray region. DVM thesis, FVM, AAU and Debrezeit, Ethiopia.
43. Daniel, W., 1994. Survey on ticks species of cattle,came, sheep and goats in south wollo region Ethiopia. DVM thesis, FVM, AUU, Debrezeit.
44. Mesele, A., 1989. Bovine tick survey in Bahirdar Awraja. DVM thesis, FVM, AAU, Debrezeit, pp: 1-40.
45. Seid, B., 2004. Survey of cattle tick species in and Around MizenTaferi, Bench Maji zone of SNNPS, DVM Thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debreziet, Ethiopia.
46. Yitbarek, G., 2004. Tick species infesting live stock in Jimma area, South West Ethiopia. DVM thesis, Faculty of Veterinary Medicine, Addis Ababa University, Debrezeit, Ethiopia.
47. Mekonnen, S., I. Hussein and B. Bedane, 2001. The distribution of ixodid ticks in central Ethiopia. Onderstepoort journal of veterinary Research, 68(4): 243-251.
48. Castro, J.J., 1994. A survey of the tick species in western Ethiopia including previous finding and recommendations, for further tick surveys in Ethiopia. UNDP, Addis Ababa, Ethiopia, FAO, Rome (Italy), pp: 83.
49. Feseha, G., 1983. Notes on tick species and tick born diseases of domestic animals in Ethiopia. DVM Thesis, Faculty of Veterinary Medicine, Debrezeit, Ethiopia.
50. Morel, P., 1989. Study on Ethiopian ticks (Acarida, Ixodida). Republic of France, Ministry of Foreign Affairs, French Vet. Mission, Addis, C. J. E. M. V.T., pp: 7-332.
51. Hussen, Y., 2009. Preliminary survey of cattle tick species and burden in and around Bako Town. DVM Thesis, school of Veterinary Medicine Jimma University, Jimma, Ethiopia.
52. Southerest, R.W., 1983. Management of Artropods and Parsitezim in Livestock. In: Tropical Parasitosis and Parasitic Zoonoses, Dunsmare, J.P. (Ed.). Murdon University, Perth, Australia, pp: 41-56.
53. Aerts, J.M. and O.N. Neshem, 1999. Florida beef cattle external pest control survey. UF Pesticide Information Office: Report in Production. http://Edis. Ifas.ufl.edu/pdf files/PI/P104300.pdf.
54. Bianchi, M.W., V. Barre and S. Messd, 2003. Factors related to cattle infestation level and resistance to acaricides in Boophilusmicroplus tick populations in New Calender. Vet. Parasitol, 112: 75-89.

55. Pawloswasihun and Derese Doba, 2013. Study on prevalence and identification of ticks in Humbo district, Southern Nations, Nationalities and People's Region (SNNPR), Ethiopia. Journal of Veterinary Medicine and Animal Health, 5(3): 73-80.
56. Gezali, A., 2010. Survey of cattle tick species and tick burden in and around MizanTefari town, DVM thesis, College of Agricalture and Veterinary medicine, Jimma university, Jimma, Ethiopia, pp: 18.
57. Kettle, D.S., 1995. Medical and Veterinary Entomology. 2nd Ed. UK: CAB international., pp: 420-460.
58. Pegram, R.G., J.E. Keirans, C.M. Clifford and J.B. Walker, 1987. Acari, Ixodoidae. Systematic Parasitology, 10: 3-44.
59. Seyoum, Z., 2001. Study of tick and TBDs on cattle at Girran valley in the North Wollo Zone. Proceeding of the Ethiopian Vet. Assoc., pp: 15.
60. Keirans, J.E. and R.G. Robbins, 1999. A world checklist of genera, subgenera and species of ticks (Acari: Ixodida) published from 1973-1997. J. Vector Ecol., 24: 115-129.
61. Chandler, C. and P. Read, 1994. Introduction to parasitology,Jhon Weakly and Sons Inc.UK, 10: 882.
62. Pegram, R.G., J.E. Keirans, C.M. Clifford and J.B. Walker, 1987. Acari, Ixodoidae. Systematic Parasitology, 10: 3-44.