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Research Article

Prevalence of Ectoparasites on Large Ruminants in Jabitehinan Woreda West Gojjam Zone Amhara Region Northwestern, Ethiopia

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Abstract

This study was done from November 2019 to June 2020 to know and understand the prevalence of ecto-parasites and the potential risk factors in large ruminants in jabitehinan woreda. A total of 384 large ruminants were examined for presence of ecto-parasites. Accordingly, a total of 54.2% (n = 384) were found infested with one or more ecto-parasites. The major ecto-parasites identified in cattle in order of predominance were ticks (35.2%), lice (16.4%), fleas (2.08%) and mite (0.52%) were observed in order of importance. Three genera of ticks were identified such as *Amblyomma, Boophilus* and *Rhipicephalus* and also three genera of lice were identified namely *Linognathus*, *Haematopinus* and *Damalinia* and fleas such as Tunga, Pulex and Ctenocephalides and mite namely Demodex. This study has revealed two important risk factors significantly associated with the occurrence of ecto-parasite prevalence in the study area. It was observed that the prevalence of ecto-parasite infestation was significantly higher in cattle in risk factors of body condition and different age groups. There was significant association ($p < 0.05$) of external parasitic prevalence of infestation with the risk factors such as different age groups and body condition scores but no existed significant ($p > 0.05$) infestation with breed and sex groups.

Keywords: Ecto-parasites; Prevalence; Risk Factors; Large Ruminants

Introduction

Ethiopia has different agro ecological zones that are important to rear huge and different number of livestock species as compared as to other African countries with proximity to the export market and conducive investment policies [1]. The spectacular land formation ranging from mountain chains with the peak of over 4500m to areas below sea level has created diverse climatic condition with variable agro-ecological area and rich in bio-diversity [2].

The large ruminant or cattle population in Ethiopia is above 41million [3]. Ethiopia is the first ranked in amount of large ruminants in Africa [4]. The Ethiopian livestock contribute about 18.8% of the total GDP [5]. Of the livestock population large ruminants are the major part of farming system in the country. Apart from being a source of high-quality protein (meat and milk), they contribute to the economic welfare of the people by providing hides, skin, power for agricultural purposes, fertilizer for increasing the productivity of smallholder farmers [6].

The main objective of agricultural development policy in livestock sector in Ethiopia are improving the quantity and quality export of live animals and its products that increases in rural income, food production through foreign currency and earning of the country. Livestock is the major component in exporting system in Ethiopia that ranked the second in foreign currency [7]. The contribution of large ruminants are too less than the importance of farming system, this is because this ruminant's production in Ethiopia is constrained by the compound effect of the disease, poor management system in general [8].

Ecto-parasites are parasites that found on the body of the host. Parasites spent in part of or in their life on the body of animals [9]. Ecto-parasites commonly ticks, lice and mites are important parasites because of their Voracious blood feeding and extensive skin damage in most of the livestock population [3]. The major drawbacks for livestock productivity in Africa are different diseases, husbandry and management problems [10]. Ectoparasites are the major constraints in skin industry [11].

In Ethiopia ticks found in all agro-ecological zones of the country [12,13]. They are the major cause of production losses in livestock throughout the world [14]. Ectoparasites causes skin diseases in large ruminants that lead economic loss in farmers through downgrading and removal of skin, decrease reproduction, production, growth, and mortality [8].

This study was done to determine the prevalence and type of ecto-parasites of large ruminants and its risk factors in the study area.

Literature Review

Ecto-parasitism

Ecto-parasites are parasitic organisms which line on the skin of the host long period of time [15]. The line or live of Ecto-parasites on the animals body part is called infestation. The arthropod ecto-parasites and vertebrate host interaction may different forms, in some parasite may be totally dependent on the host, alternatively the parasite may feed, or live only occasionally on the host, without being dependent on it [16]. The effect of skin parasites usually depends on the site of invading population, on the manner on which the parasites etch out its existence and the state of nutrition of the host animal when infected [17].

Classifications of arthropod parasites

Arthropods have many morphological differences they contain over 80% of all known animal species and occupy almost every known habitat, representing extremely diverse group [18]. The economic important arthropod classified in to two major groups 'that is class Insect (flies' lice and fleas) and class Arachnida (ticks and mites) [19].

Epidemiology of ecto-parasites

Ecto-parasites occur in the temperate as well as in the tropical region of the world; the occurrence of arthropod is affected by two

Figure 1

factors. These are those controlling the prevalence of arthropods and those determining the susceptibility of the host [20]. Temperature and humidity are the major contributing factor to the prevalence of parasitic arthropods. Flies breed are active in warmer and humid months of the year in temperate regions and the rainy season in tropical and sub-tropical regions, in temperate areas, the overall infestation rates of flies was high in summer, followed by spring than autumn and the least rates of infestation was in winter, local factors such as marshy areas may provide condition suitable for flies to breed the year round [21].

In the case of ticks, the most important situation to be considered in the epidemiology of ticks is categorized in free living development phases host finding phase and parasitic phase, when ticks occur freely in the environment external factors like temperature and humidity are the major determinants of their development and growth [5]. Where there is sufficient rain full and warm temperature in temperate climate, tick activity is usually high between spring and autumn. During the rainy season tick activity and reproduction is increased in tropical and sub-tropical climates and different species have different microclimate requirement [19]. The

level of ecto-parasite infestation such as mites, lice and sheep ked show seasonal periodicity. Flies and ticks, have heavy infestation usually occurs in the moist and cool temperature winter month and it decline in the dry and hot condition of summer [21]. The effect of arthropod parasites can be determined by season, climate, susceptibility of the host body condition, debility disease, overcrowded and poorly management system [16].

Ecto-parasites have specialized physiological and biological mechanism for survival on a host. They feed body fluids and tissues which are complex materials and specific means for ingestion and digestion may be necessary metabolism of the food resources and subsequent growth and development may be similar in many ways to free living arthropods [22]. Ticks are vectors and potential reservoir of infectious diseases. Different species of ticks adapted to certain ranges of temperature and moisture, some species adapted in warm regions with fair degree of humidity and winter ticks are most active in a dry climate [20]. Most suckling and biting lice lead to increase in number during the fall and reach potential population in late winter or early spring and some populations are usually minimum. Animals under stress will have usually large louse population than normal [23].

Ecto-parasites host relationship

The occurrence of ecto parasites on the host is called as infestation. The relation between ecto-parasites and vertebrate host may take on variety of forms. Some parasites may feed, only occasionally the host, without being dependent on the host [16]. The host gives different resources for the parasites, most vitally, the host supplies as a source of food, which may be blood, lymph, tear or sweat debris of the skin, hair of feather and provides transportation from place to place for the parasites, a site at which to mate and in many cases, the means of transmission from host to host [24].

Different types of ectoparasites have different time periodicity to spend on the animal body parts. There is great association between the host and ectoparasite in their life span which is dependent on the host permanently or in short period of time. Ecto-parasites have only short period contact on the host and are free living for the major portion of their life cycles [20]. Mites are highly host specific and one host species is exploited and, in some instance, the parasite can exist only on one defined area of the host, other species are able to exploit a wider range of host [25]. According to [20], most of the parasites are direct life cycles, their eggs require high humidity and warm temperature to develop into infective larvae and animals become infected when they are feeding or resting particularly in a herd.

Mode of spread of ecto parasites

Mange and lice is transmitted from infected animal to healthy animal through direct contact. Single cases of mange are rarely seen in a group of animals because it is highly contagious [16]. Mite and lice are transmitted indirectly due to the surviving of the host, inert materials such as bedding blanket grooming tool and clothing may act as carriers [21].

Economic importance's of ecto-parasites

Parasites act as mechanical and biological vector for various pathogens that produce diseases [18] and may produce venoms which is toxic to different animals and humans [26].

Ecto-parasites have negative effect on the livestock economy in terms of production, productivity, skin quality and through labor and materials applied to minimize the direct effect [24].

Ecto-parasites pose a threat to the rearing animals directly to their pathogenic effect and reported cause severe morbidity. Those influencing production include lower market value due to slaughter house condemnations, reduced drought power, reduced dung output for fuel and fertilizer and reduced efficiency in feed conversion [27]. It has been estimated that 80% of the world's cattle are infested with ticks; approximately one thousand two hundred fourteen million world cattle are at risk from ticks and tick-borne diseases [6].

Ecto-parasites are adapted different types of animals that live on external body surface of the host. They may live permanently on their host or they may occupy the hosts nest and immediate environment and visit the body of the host periodically [22].

Hide and skin account for 12-16% of the total volume of export from Ethiopia and though skins and hides are important sources of export income, its contribution to the national economy may be far below. The quality of hide and skin has deteriorated due to pre and post slaughter defect by lice, ticks and mange mites that cause down grade and rejection of hides and skins [28].

The effect of parasites on wool price and animal productivity will depend on the severity of infestation. Alight infestation in a

small percentage of animals, which has caused little or no rubbing, will have animal effect on over all returns. Medium or heavy infestation will result in some or all of the following:

- Discoloration and yellowing of the fleece
- Decrease in yield of clean wool
- Cutting of the most valuable fleece lines
- Increased susceptibility of fly strike (fleece rot, biting)
- Increased cost of chemical control
- Higher chemical residues in wool due to the need for extra control measures
- Lower price and/or difficulty in selling ecto-parasite infested animals or showing a sign of lice infestation [23].

Ecto-parasites cause a severe economic loss to farmers through animal mortality, decrease production and reproduction and also affect the tanning industries due to skin disease [29].

Ectoparasites have a direct loss in milk production, skin quality, retarded growth rate and reproduction of animals due to their effect on the hosts that produce discomfort and damage by parasites and they also have an indirect loss by transmitting different diseases. Ticks and mites cause direct damage to skins resulting from rubbing and scratching due to pruritus.

Major ecto-parasites affecting large ruminants

Ticks

Ticks are obligate blood feeding ecto-parasites of vertebrates particularly mammals and birds. More than 850 species of ticks are recognized ((180 in the family argasidae (soft ticks) and other in the family Ixodidae (hard ticks)) [16]. Most species of *Amblyomma, Boophilus, Rhipicephalus, Hyaloma* and are frequently encountered hard tick (Ixodidae) in Ethiopia [30]. Ticks are parasites of wild animals and only about 10% of the species feed on domestic animals primarily cattle and sheep [25]. The infestation of tick has always represented one of the most important problems affecting livestock in developed and developing countries [31].

Apart their role as a vector and potential reservoir of infestation, tick can cause direct losses of productivity in domestic animals. Tick bite cause debilitating to domestic animals due to mechanical damage, irritation, inflammation, hypersensitivity and when present in large numbers, feeding may cause death from severe anemia [32]. Some species of ticks' cause tick paralysis and it is possible that other will elaborate toxins. High amount of tick can interfere feeding which may lead to loss of production, weight gain; morbidity and mortality during periods of drought [21].

The life cycles of ticks vary. One host tick passes their entire life cycle on host, others pass different stages on the life cycles on successive host and others are parasitizing only at certain stages. Most ticks spend more time off the host, but are totally dependent on the host for sustenance. Ticks are subjected to microenvironment condition when on the ground and thus tend to be more endemic in specific types of area [17]. The pathogenic effects of ticks are depending on the feeding mechanisms, which is both penetrating the skin and transmitting microorganisms. In the feeding process the scissor like action of the digits at the end of chelicerae is followed by a thrusting motion of the hypo's tome through the lacerated skin and the locking effect of its pre-curved teeth on the tissues [33].

Lice

Lice are important skin parasites of many domestic, free ranging mammals and birds. Both biting and suckling lice affect ruminants. The important species in ruminants are found in the genus *Damalinia* and *Linognathus* [34]. Lice usually are tend to remain with a single host animal throughout their life. Most species of lice are highly host specific and many species specialize in resting only one art of their host body and transfer to other hosts by direct contact, particularly during close confinement and the life cycle takes place entirely on the host [21]. To allow their survival as permanent ecto-parasites, lice show the number of adaptations which enable them to maintain a life of intimate contact with their host; they feed on epidermal tissue, debris, part of feathers, sebaceous secretions and blood [16].

Different species of lice favors different sites on the body of their hosts and light infestation are usually tolerated and unnoticed. Heavy infestation may spread all over the body of the host and cause irritation of the ski and stimulate scratching, rubbing and licking leading to restlessness, damage to the fleece, skin and decreasing production. Lice saliva and feces contains substance which causing allergies leads to severe irritation and self- trauma [35]. Infestation occurs more commonly in winter when temperature sis cooler, the wool or hair coat is longer, animals are congregated and the place of nutrition is lower [34].

Mange mites

Mange mites were wide spread and most important ecto-parasites of animals, mites of animals and birds inhabits the skin where they feed on blood, skin debris or sebaceous secretion, which they ingest by puncturing the skins scavenge from the skin surface or immobile from epidermal lesions and the generalized veterinary term for an infestation by mites In animals is called acariasis and can result in severe dermatitis known as mange or scabies [16].

Mange are mainly transmitted by direct contact between hosts and all three stages: -the larvae, nymph and the adult are capable of migrating and survive on inert materials such as bedding and grooming tools can act as a carrier [21]. High temperature, humidity and sunlight favor mange mite's infestation [36]. Mange affects all age groups and more chronic course in adults than younger and poor body conditions animals are most susceptible to mange [17]. Death occurs due to dehydration, feeding of huge number of mites, inability to move and feed due to severe lesion on the face, muzzle and on the joint due to secondary cause such as pneumonia or bacteremia, septicemia introduced through self-inflicted, bite and scratch wounds [33].

Infestation which does not end fatally a marked regression of lesion with healing of the skin and regrowth of the wool or hair occur during dry season exposure of lesion and mite to direct sun light and desiccation may reduce the survival potential of mite population [37].

Fleas

Fleas are wingless ecto-parasites of animals. Fleas are unique in being laterally flattened compared with lice which are dorsoventrally flattened and all fleas have basically the same structure and their identification is matter for the specialist the adult female is 1-6mm long. Females are longer than males of the same species and readily recognized by their mahogany brown color and the habit of jumping when disturbed [38]. They are not an important parasite on animals. This may not be the case in the Mediterranean region, particularly where livestock live in close association with farm cats and dogs. For example, cat fleas, *C. tenocephalides felis* may be amongst the most important ecto-parasites of ruminants. Calves, Lambs and Kids are more affected and infested by fleas than adults [34].

Life cycle

The life cycle of ticks is classified in to three groups according to the number of hosts required. Ticks development has four stages; (egg, larva, nymph and adult). Larva and nymph have to take a blood meal from a host before they are able to molt to the next stage.

Adult ticks require blood for reproduction but they can survive up to two years without feeding. They mate after week when they attach and feed on the host then lays eggs.

Ticks may be:

- **One host tick:** All three instars (stages) engorge on the same animals, such as *B. decooratus* and *B. annulatus.*
- **Two host ticks:** The larvae engorge and molts on the host and nymph drops of after engorged and it molts in the ground and needs a new host. E.g. *R. evertsi*.
- **Three host ticks:** Require a different host for every instar. They drop of each time after engorged and its molts on the ground. E.g. *R. appendiculatus* [20].

Louse completes its entire life cycle on the body of animals, mature; female louse lays eggs called nits and attaches them to the hair with glue like substance. Single female will lay about 300 eggs in her life time. The nits remain attached to the hair until hatching in 4-7 days [39].

Fleas lay tiny white eggs loosely on the hairs, in the feathers or in the habitat of the host. The eggs readily fall of the host on to the ground, floors, bedding or furniture's. Some fleas can lay 500 eggs over a period of several months by laying batches of 3-8 eggs at a time. The tiny eggs hatch in 1-20 days after being deposited. The white worm like larvae feeds particles of dead animal or vegetable matter. Generally present in cracks and crevices. Within 7-14 days, unless food has been scarce the third larval stage is completed and the larva spins a tiny cocoon and pupates. Usually after a week the adult flea emerges and begins its search for blood [22].

Clinical findings and pathogenesis

Ticks are vectors and potential reservoir of infectious diseases, tick bite causes directly debilitating to domestic animals, irritation, inflammation and hypersensitivity and when present in large number feeding may cause anemia and loss of production [16,21].

Some species cause tick paralysis and will elaborate toxins other than those causing paralysis. High amount of tick can interfere feeding which may lead to loss of production and weight gain. Tick cause morbidity and mortality during periods of drought and delays in fattening [21].

Ticks cause damage to hide and skin. Damage on sheep skin is primarily found along the belly area or where the flea is thinner. Lamb skins are particularly susceptible to skin damage. Secondary bacterial infection of flea bite increases the severity of the damage. Skin injuries can attract flow flies and screw flies that deposit eggs on the wound and produce fatal cutaneous myositis. Ticks produce marks that look like hole or scars that mostly occur in the belly [20].

Diagnosis

Many tests are used in the diagnosis of ecto-parasites like skin scraping, hair brushing, biopsy, visual examination and observation whilst feeding are involved [40]. One of the most common diagnostic method in evaluating animal ectoparasites and dermal infections is skin scraping. The blade is dipped in mineral oil in the slide and the skin scraping is done. Tunnels are areas that mite lives in and skin scraped until the capillary oozes occur. Inspection of large ruminants is the major method of detecting lice primarily and collecting them from different body parts of animals which examined under microscope [41].

Treatment, prevention and control

Insecticidal compounds are important in control of ectoparasites. Ivermectin and synthetic pyrethroids are a routine parasite control programs. Several studied suggests that insecticides controls are less effective in autumn [42].

Very few insecticides are registered for control of ecto-parasites of large ruminants with precautions carefully to ensure proper usage such as permethrin [23]. Until the end of 19thcentury where it was attempted pests and parasites control depend almost entirely on relatively inefficient but low-cost management practice such as pasture rotation and the use of natural plant derived insecticides, sulfur, dusts oils and highly toxic heavy metals [43].

The treatments applied to control or prevent infestation are being targeted by the animal right and environmental lobbies. No more chemicals or insecticides are available to control and remove ectoparasite due the impact on the environment. There are also increasing restriction on timing treatment available. Dipping, setting, dusting, spray race back line application and localized dressing have all been used to control or eradicate ecto-parasites. Treatment may be failed due to insecticide resistance of ectoparasites but most common reason has been poor application of insecticides. Systemic insecticides such as macro cyclic lactones are effective against scab, ked and itching mites. The longer acting macro cyclic and macro cyclic lactones capsules will control for longer than 15-21 days [44].

Materials and Methods

Study area

The study was conducted from October, 2019 to June, 2020 in jabitehinan district which is located in west Gojjam zone of Amhara region northwestern Ethiopia on the paved highway 376km from Adiss Abeba. This woreda has a longitude of 37^{0}14′60″ E and latitude of 11◦09′60″ N with an elevation of 1917mean above sea level (m.a.s.l). The area is known by having three agro-climatic zones, Woyina Dega, Dega and kola. The annual rainfall ranges in 1453mm.

Study animals

The study animals that were used for this study were 384 large ruminants (cattle) that were found in jabitehinan woreda as well as cattle brought to jabitehinan veterinary clinic. Among the study population there were 165 males and 219 females. Animal of all age, sex groups and animals with different body condition were included. The age determination is made according to [45]. Large ruminants are divided in to three groups according to their age, namely calve (less than or equal to one year old), young between one and three years old and adult animals (above three-year-old).

Study type

A cross-sectional study was conducted on local and cross breed cattle found in jabitehinan woreda from October, 2019 to June, 2020 to know the prevalence of ecto-parasites in different age groups, body condition, sex and breeds.

Sample size determination

The sample size for study was determined using the formula that is stated by (46) by taking the expected prevalence of 50% in the study area, absolute desired precision of 5% at confidence level of 95%.

$$n = \frac{1.96^2 \times p_{exp}\,(1-p_{exp})}{d^2}$$

Where

n = required sample size

P_{exp}= expected prevalence

d= desired absolute precision.

Therefore, using the above formula, the sample size was calculated to be 384.

Study methodology

Live animal examination

Examination of animals that were found in jabitehinan woreda was made animals with the case of skin lesions, history of itching and in contact animals was examined closely by visual inspection, palpation of skin for parasites and\or gross skin lesion across all parts of animals including ears, digits and each side as described by [47].

Laboratory examination

Ecto-parasites such as lice, ticks and fleas were collected from the attachment sites manually and kept in 70% alcohol until subsequent examination. Identification of the parasite was carried out according to [16]. Samples were collected from suspected cases using scalpel blade by deep skin scrapping until capillary oozing was examined under light microscope. Ecto-parasitic species are identified based on morphological characteristics described by [20]. Mites can be examined from crusts and scabs of skin on the host by adding 10% KOH on the specimens

Data analysis

The data was entered in to Microsoft excel data base system and analyzed using STATA (version 9) statistical software. The interaction between different risk factors were assessed by Chi-square (x^2) test. Descriptive statistics such as percentage is used to summarize the prevalence of different kinds of ecto-parasite from animals. Level of rejection was set at $p > 0.05$.

Results

Prevalence of ecto-parasites in cattle

The study shows that that out of 384 examined for external parasites 208 (54.2%) were infested with at least one or more parasites. Overall, ten genera of external parasites which belong to ticks, lice, fleas and mites were found infesting in the study area (Table 1). The most abundant parasites identified were ticks of genus *Amblyomma, Boophilus, Rhipicephalus* and lice of genus *Linognathus, Haematopinus, Damalinia* and fleas of genus Tenocephalides, Pulex, Tunga and mites of Demodex in decreasing order except Tunga which is less than Demodex.

Ecto-parasites	No. infested	Prevalence %
Ticks	135	35.2
Lice	63	16.4
Fleas	8	2.08
Mange	2	.52
Total	208	54.2

Table 1: Overall prevalence of ecto-parasites in cattle (n = 384).

Prevalence of ecto-parasites in cattle by sex

Overall prevalence of ecto-parasite infestation in male and female animals is 48.49% and 58.90% respectively (Table 2). This result revealed that the infestation was more prevalent in females than males. No statistical difference or association with sex groups.

Ecto-parasite	Male (n = 165)	Prevalence (%)	Female (n = 219)	Prevalence (%)	X^2	P value
Ticks	53	32.12	82	37.44	1.1690	0.280
Lice	26	15.76	37	16.89	0.0888	0.766
Fleas	1	0.61	8	3.65	3.8168	0.051
Mange	0	0.00	2	0.91	1.5147	0.218
Total	80	48.49	129	58.90	6.5893	1.315

Table 2: Prevalence of ecto-parasites in cattle by sex.

Prevalence of ecto-parasites in cattle by breed

Overall prevalence of external parasite infestation in local and cross breed is 57.89% and 33.33% respectively (Table 3). This result revealed that the infestation is more prevalent in local breed than in cross breed. There was statistical association of lice infestation with breed difference ($p \leq 0.05$).

Prevalence of ecto-parasites in cattle by age

The overall prevalence of external parasite infestations in animals of different age groups such as calves, young, and adults had 5.8%, 45.67% and 78.20 respectively (Table 4). There were significant differences observed in prevalence of ticks and lice in all age groups ($p \leq 0.05$)

Ectoparasites	Local (n = 330)	%	Cross (n = 54)	%	X^2	P value
Ticks	121	36.67	14	25.93	2.3484	0.125
Lice	60	18.18	3	5.56	5.3944	0.020
Fleas	9	2.73	0	0.00	1.5081	0.219
Mange	1	0.30	1	1.85	2.1486	0.143
Total	191	57.89	18	33.33	11.3995	0.507

Table 3: Prevalence of ecto-parasites in cattle by breed.

Ecto-parasite	Calve n = 69	(%)	Young n = 127	(%)	Adult n = 188	(%)	X^2	P value
Ticks	1	1.45	29	22.83	105	55.85	78.1660	0.000
Lice	2	2.90	23	18.11	38	20.21	11.4348	0.003
Fleas	1	1.45	5	3.94	3	1.6	2.1093	0.348
Mange	0	0.00	1	0.79	1	0.53	0.5359	0.765
Total	4	5.80	58	45.67	147	78.20	92.246	1.116

Table 4: Prevalence of ecto-parasite in cattle by age.

The overall prevalence of external parasites in animals having poor, medium and good condition was 95.68%, 41.00% and 11.90% respectively (Table 5). There were significant association tick and lice infestation with body condition ($p \leq 0.05$). But there were no association with other ecto-parasites.

Ecto-parasites	Poor n = 139	%	Medium n = 161	%	Good n = 84	%	X^2	P value
Ticks	80	57.55	48	29.81	7	8.33	59.1145	0.000
Lice	51	36.69	12	7.45	0	0.00	67.5973	0.000
Fleas	1	0.72	5	3.11	3	3.57	2.5637	0.278
Mange	1	0.72	1	0.62	0	0.00	0.5768	0.749
Total	133	95.68	66	41.00	10	11.90	129.5423	1.027

Table 5: Prevalence of body condition.

Ecto-parasite group	Frequencies	Prevalence (%)
Amblyomma	61	15.9
Boophilus	46	12.0
Rhipicephalus	28	7.3
Linognathus	27	7.0
Haematopinus	22	5.7
Damalinia	14	3.6
Demodex	2	0.5
Tunga	1	0.3
Pulex	2	0.5
Ctenocephalides	6	1.6

Table 6: Frequencies and percentages of ecto-parasites in cattle (n = 384) identified.

Discussion

The main objective of present study was to determine the prevalence of ecto-parasites affecting large ruminants and to compare the magnitude of ecto-parasites infestation between different risk factors. The effects and problems of ecto-parasites in large ruminants of the study areas are highly found in all agro-ecological zones affecting all age groups. From the total 384 large ruminants examined 54.2% of them were infected by ectoparasites. Multiple infestations were common among the examined positive animals. The relatively high prevalence of ecto-parasites may be associated to nutritional and climatic as a result of repeated drought. In additions different herd of animals at study area come in close contact at available communal watering and grazing sites because of feed scarcity. Due to this condition the prevalence of ecto-parasites infestations was favored.

Tick infestations were the most prevalent parasites recorded with a prevalence of 35.2% in cattle in the study area and lice was the second prevalent. From the three genus of ticks recorded, the percentage was *Amblyomma* (15.9%) followed by *Boophilus* (12.0%) and *Rhipicephalus* (7.3%) in prevalence respectively. In the present study cattle were highly infested by ticks when compared to 14.5% in cattle at Bench Maji Zone southern regional state (48). This variation was resulted due to environmental factors, management and agro-ecological difference. Unfavorable climatic condition, good access to veterinary service, long dry season impaired tick development leads low prevalence. However, the tick prevalence observed in the present study was in agreement with report of [49] from North West shewa zone of Oromia region. The major ticks identified in the study areas were *Amblyomma*, *Boophilus*, and *Rhipicephalus*. There was statistically significant difference ($p < 0.05$) in the prevalence of ticks between different age groups and body condition score categories but was no existed statistical significance ($p > 0.05$) in the prevalence of ticks between different breed and sex groups. It may be the management and farming system of animals.

From the total prevalence of lice recorded was 16.4%. My finding disagrees with the result of [50] who reported a prevalence of 9.5% and also disparities with the finding of [51] with the prevalence of 63.5%. The variations could be due to differences in risk factors of for the prevalence of ectoparasites. Out of the three lice recorded in cattle *Linognathus* (7.0%), *Haematopinus* (5.7%), and *Damalinia* (3.6%) were the major lice parasites identified in the study area. In the present study there was statically significant difference ($p < 0.05$) in the prevalence of cattle lice infestation between different age groups and body condition score categories but no significant difference ($p > 0.05$) in breed and sex groups.

From the total prevalence of mite in large ruminants was 0.52% and demodex was the only mite identified in the area. My study agreed with the result of [50] (0.4%) [52] (0.43%) in Nekemte.

On the contrary prevalence of mites was high 5.5% [51] was reported from Western Ethiopia. The macro and micro environment (high temperature, humidity and sun light) favors the breeding and multiplication of mites [53]. My findings indicates lower in prevalence than the result of [54] (1.63%) in wolaytasodo and report from [29] with the prevalence of 2.93% and also lower than with the report of [55] 9.58%.There was no significant dispersion ($p > 0.05$) in the infestation of animals by mites with regard to sex, breed, age and body condition categories.

The total infestation of fleas in cattle was 2.08% and the major fleas identified in the study areas were Ctenocephalides (1.6%), Pulex (0.5%) and Tunga (0.3%) but no infestation of fleas was observed in cattle in the report of [42] (0%) and [46] (0%). There was no significant variation ($p > 0.05$) in the sex, breed, age and body condition of cattle.

Conclusion and Recommendation

The current study showed very prevalence of ecto-parasites in cattle of all age, breed, sex and body condition scores in the study

areas. Ecto-parasites were observed to be major problems of large ruminants in all agro-ecologies of the study areas. The presence of these external parasites leads to down grading of skin and decrease the quality of wool and skin, thereby decreasing the supply of skin for leather industry for export as well as for domestic consumption.

The overall finding regarding ecto-parasitism suggests the importance of the diseases in the study area in reducing the production and productivity of large ruminants. Considering the skin and hides as a means source of foreign currency to Ethiopia, the high prevalence of ecto-parasites recorded in cattle of the study districts in west gojjam zone north western of Ethiopia needs much more emphasis of all measurements in order to reduce the dissemination of infestation and enhancing the way of life of small holder farmers since they are dependent on their livestock. There are many types of ectoparasites that infest large ruminants in jabitehinan district in north western Ethiopia and they have a negative impact on productivity, reproduction of animal's. Strict management system and by providing veterinary services reduces the epidemiology and control of ectoparasites. Management systems such as feeding, grazing and different agro ecological zones have a significant role in epidemiology and control of external parasites.

Generally, the listed below should be understood and recommended:

- Integrated control of external parasites needs to be launched.
- Awareness creation has to be done in farmers about economic impact on their animals.
- The animal health services delivery systems should be strengthened in this district to control losses due to diseases.
- Further investigations on economic impacts of ecto-parasites on large ruminants should be conducted
- Coordinated research should be conducted on ecto-parasites and associated skin lesions in large ruminants to generate base line data that can be used to control the ecto-parasitic diseases all over the country.

Bibliography

1. Belachew H. "Livestock marketing and animal health in Ethiopia". Paper presented at the 18th annual conference of Ethiopian Veterinary Association, Addis Ababa, Ethiopia (2004): 36.
2. Agaze T., *et al.* "Ethiopian journal of animal production. ESAP 1.1 (2013): 3-4.
3. CSA, Central Statistical Authority. Prevalence of ecto-parasites fauna of ruminants in Ethiopia, Addis Ababa (2004).
4. Leach I. "Economic importance of hides, skins and leathersin Ethiopia". Control of Sheep and Goat skin diseases for improved quality of skins and hides MOA/FAO: 21(1998).
5. FAO: Livestock sector brief, Ethiopia (2003).
6. Minjauw B and Mcleod A. "Tick borne diseases and poverty-The impact of ticks and tick-borne diseases on the livelihood of small scale and marginal livestock owners in India and eastern and southern Africa. Research report". DFID Animal health programme, Centre, for Tropical Veterinary Medicine University of Edinburghuk (2003): 1-116.
7. FAO. "The causes of parasitic skin diseases in sheep". Ethiopian Veterinary researchers and FAO technical cooperation project (TCP). Rome, Italy (1995): 45.
8. MOARD Mange. lice and sheep ked control project in Amhara, Tigray and Afar regions, MOARD animal health department, Addis Ababa (2005).
9. Ball Werber LR. Veterinary parasitology, British, Butter work, Heinemann (2001): 5.
10. Mekonnen S., *et al.* "Ticks, tick borne diseases and their control in western Ethiopia". *Insect Science Applications* 13 (1992): 661-64.
11. Solomon G., *et al.* "Seasonal variation of ticks on calves at Sebeta in western zone of Ethiopia". National animal health and research institute". *Ethiopian Veterinary Journal* 7.1-2 (2003).
12. Zeleke D. "Major cattle ticks and their distribution in Ethiopia". *Veterinary Bulletin* 4.2 (1980).
13. Decastro JJ. "Tick survey: - A survey of the tick species in western Ethiopia includes previous findings and recommendations for further tick survey in Ethiopia". *Food and Agriculture Organization Rom*e (1994).
14. Kahn BA and Cynthia M. "Merck veterinary manual 9th edition". U.S.A, and CO, INC (2005): 21.
15. Hoopla CE., *et al.* "Ecto-parasites and classification". *Limited Company* (1994): 200-201.

16. Wall R and Shearer D. "Veterinary Entomology". 1st edition, Champan and Hall. UK (1997): 431-439.

17. Peter G. "Parasite and skin diseases". J.A. Allen and Company limited. London (1995): 212-256.

18. Bay DE and Harris RL. Introduction to Veterinary Entomology (A guide to Livestock Insects), stone fly Publishing: Texas (1988): 111.

19. Hunter A. "Animal health specific disease". Macmivan Education. Ltd; USA (1994): 104-142.

20. Soulsby ESL. "Helmenths, Arthropods and Protozoa of domesticated animals". 7th edition. Bailiere. Tindal, UK (1982): 356-497.

21. Radiostitis OM., *et al.* "Veterinary Medicine text book of the diseases of Cattle, Sheep, Pig, Goats and Horses". 8th ed. Bailliere. Tindal. UK (1994): 234-250.

22. Kennedy TB. "Arthropod ecto-parasites of vertebrates in Canada". *Veterinary Parasitology* 1 (2006): 645-658.

23. Kaufman PE., *et al.* "External parasites of sheep and goat". *Veterinary Parasitology*. 8th edition (2008): 148-158.

24. Tembly S. "Small ruminant production in Ethiopia: Prospects for improving productivity". In proceedings of the 5th national conference of *Ethiopia Society of Animal Production* (ESPA) held in Addis Ababa, Ethiopia (1997): 82-89.

25. Walker AR., *et al.* "Ticks of domestic animals in Africa guide to identification of species". *Integrated Control of Ticks and Tick-borne Diseases* (2003): 211-219.

26. Hindex CM. "Diagnostic Veterinary Medicine.2ndedition". MOS by publication. Ltd (1998): 200-201.

27. Fthenakis GC., *et al*. "Efficacy of moxidectin against sarcoptic mange and effects on milk yield of ewes and growth of lambs". *Veterinary Parasitology* 87 (2000): 207.

28. Bayou K. "Control of shoat skin diseases". In: Iran, B.C.FAO, and Addis Ababa (1998).

29. Yacob HT., *et al.* "Prevalence of major skin diseases in cattle, sheep and goats at Adama vet. Clinic, Oromia regional state". *The Revue de Médecine Vétérinaire* 159.8-9 (2008): 455-461.

30. Sinshaw S. "Distribution of ticks and tick-borne diseases at Metekel ranch". *Ethiopian Veterinary Journal* 1.4 (2000): 40-59.

31. Okello-Onen J., *et al.* "Taxonomy of African ticks' identification manual". *International Centre of Insect Physiology and Ecology* (1999): 124-125.

32. Kaufman J. "Parasitic infection of Domestic animals, a Diagnostic Manual". 2th edition. Birkhauser, Germany (1996): 188-201.

33. Urquhart GM., *et al.* "Black well science". Veterinary Parasitology, 2nd edition Ltd. UK (1996): 141-142.

34. Carlton WW and Mc Gavin MD. "Special veterinary pathology". 2nd edition. Mosby year book Inc. St. Louis. Missouri. USA (1995).

35. Foreyet WJ. "Black well publishing". Reference manual 5thedition, Iowa state university press *Veterinary Parasitology* USA (2001): 69-71.

36. Pangui J. "Mange in domestic animals and control method". *Science and Technology* 13 (1994): 5227-12497.

37. Blood DC., *et al.* "Veterinary Medicine, a text book of the diseases of Cattle, Sheep, Pigs, Goats and Horses". sixth edition. Baillerie Tindall. London (1983): 963-968.

38. Yeruham I., *et al.* "Mortality in calves lambs and kids caused by severe infestation with the cat flea Ctenocephalide felisfelis (Bouchae, 1835) in Israel". *Veterinary Parasitology* 30 (1989): 351-356.

39. Koechler PG and Butter JF. "Pests of humans and domestic animals". UK. University of Florida. Fas extension (2003).

40. Richard W and David S. "Blackwell science". Veterinary Ecto-Parasite Biology and Control, 2nd edition. UK (1997): 179.

41. Yakchali M and L Hosseine A. "Prevalence of ecto-parasites fauna of shoats' flock in uremia suburb, Iran". *The Journal Veterinarski Arhiv* 76 (2006): 431-442.

42. Richard WS. "A review of Melophagus ovinus, the sheep ked". Veterinary Parasitology 2nd edition (2005): 141-155.

43. Richard WS. "Ecto-parasites future challenges in a changing word". *Veterinary Parasitology* 148 (2007): 62-74.

44. Plant JW. "Sheep ecto-parasite control and welfare". *Small Ruminant's Research* 6 (2006): 109-112.

45. Alello SE and Mays A. "The merck veterinary manual". 8th edition. Merck and CO, INC, White house station, NJ, USA (1998): 131-133.

46. Thrusfield M. "Black well science". *Veterinary Epidemiology* 2nd edition, UK: Ltd (1995): 182-198.

47. Health ACG., *et al*. "Evidence for the role of sheep biting lice in producing cockle, a sheep pelt defect". *Veterinary Parasitology* (1995): 53-59.

48. Simeon H and Tesfaheywet. "Prevalence of ecto-parasite infestations of cattle in Bench Maji Zone, Southwest Ethiopia". *Veterinary World* 6.6 (2011):291-294.

49. Nigist M. "A study on comparative prevalence of ecto-parasites in small ruminants in thee selected agro-ecological area of north west shewa zone of Oromia regional state, Ethiopia". MSc thesis. A. A.U, F.V.M. Debre Zeit (2008).

50. Tadesse A., *et al.* "Study on the prevalence of ecto-parasite infestation of ruminants in and around Kombolcha and damage to fresh goat pelts and wet blue (pickled) skin at Kombolcha Tannary, Northeastern Ethiopia". *Ethiopian Veterinary Journal* 15 (2011): 87-101.

51. Nigatu K and Teshome F. "Population dynamics of cattle ecto-parasite in Western Amhara Natonal regional state, Ethiopia". *Journal of. Veterinary Medicine and Animal Health* 4 (2012): 22-26.

52. Regassa C. "Preliminary study on major skin diseases of cattle coming to Nekemte Veterinary Clinic, western Ethiopia". DVM thesis, F.V.M, A.A.U, Debre Zeit, Ethiopia (2003).

53. Radiostitis OM., *et al.* "Veterinary Medicine a text book of diseases of cattle, horses, sheep, pigs and goat". 10th edition. Edinburgh, Saunders Elsevie (2008): 1585-1612.

54. Chalachew N. "Study on the ski diseases in cattle, sheep and goats in and around wolaytasodo, Southern Ethiopia". DVM thesis, A.A.U, F.V.M, Debre Zeit. Ethiopia (2001).

55. Endris F., *et al.* "Study on the prevalence of ectoparasite infestation of ruminants in and around Kombucha and damage to fresh goat pelts and wet blue (pickled) skin at Kombolcha Tannary, North-eastern Ethiopia. *The Ethiopian Veterinary Journal* 15.2 (2011): 87-101.