Study On The Prevalenbce Of Sheep And Goats Ectoparasites In Sebeta, Centeral Ethopia

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Abstract: A study on ectoparasites of sheep and goats was carried out in Sebeta, in South Western part of Oromia Regional State, Ethiopia, from November 2010 to March 2011, with the objectives of determining the prevalence of ectoparasites and identifying ectoparasites involved in sheep and goats. Out of 354 sheep and 106 goats examined, 35 % of sheep and 27.4% of goats were infested with one or more ectoparasites. The major ectoparasites identified in sheep were tick infestations (*Rhipicephalus, Boophilus, Hyalomma* and *Ambylomma*), followed by lice (*Linognathus africanus*) and lastly mite (*Demodex*). In goats, only tick infestations (*Rhipicephalus, Boophilus* and *Ambylomma)* were identified. The prevalence of ectoparasites infestations in both sheep and goats were significantly ($p < 0.05$) higher in adult than young animals. The prevalence of ectoparasites was higher in sheep than goats, but it was not statistically significant ($P > 0.05$). Both in sheep and goats, no significant difference between poor body condition and good body condition groups were observed for ectoparasite. There was no significance difference in prevalence of ectoparasite in female and male small ruminants. This study demonstrates that ectoparasites are prevalent in sheep and goats in the study area and require an appropriate control intervention.
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1. Introduction

Ethiopia with its greatest variation in climatic and topography possesses one of the largest small ruminant populations in the world, which is mostly managed by a small holder farmer extensive low input, traditional production system and in adjacent to crop production (ILCA, 1993). Sheep and goat represent an important segment of the Ethiopia livestock system. The national sheep and goat population is estimated about 33 and 30 million respectively, which are raised in different agro-ecological regions of the country (MoA, 2010). The highland support about 75% sheep and 27% of goats, while the lowland inhabited by about 25% of sheep and 73% of goats. In the central highlands of Ethiopia where mixed crop livestock production system is practiced, small ruminants accounted for 40% of cash income and 19% of housed meat consumption (Zelalem and Fletcher, 1993).

Sheep and goats are the first animals to be domesticated and have continued to provide various function to man. Special features of sheep and goat which favor their production includes their greater resistance to drought, short production cycle, low unit costs and easy to handling and husbandry (Charry *et al*., 1992). Both sheep and goat are multipurpose animals producing meat, milk, skin, wool or hair and manure (Peacok, 2005).

Small ruminants and their products are important export commodities in Ethiopia, contributing to the national economy in addition to supporting the livelihood of millions of pastoral people. Owing to their high fertility, short generation interval and adaptation even in harsh environment, sheep and goats are considered as investment and insurances to provide income to purchase food during seasons of crop failure and to meet seasonal purchases such as improved seed and fertilizers for rural households (Gashaw, 1986). Even though small ruminants are important components of Ethiopia farming system, productivity is still low and their contribution to food production are far below the expected potential compared to other countries. This is because small ruminant production in Ethiopia is constrained by the compound effects of diseases, in adequate nutrition and poor management. Direct and indirect losses occur through mortalities, reduced weight gain, poor reproductive performance and condemnation of diseased organs at the abattoir (Tembly, 1997).

Sheep and goat skin and live animals are the second leading export items next to coffee in Ethiopia (Gizaw, 1997). Skin from goats and sheep has been important economic products contributing for the largest share of the total and agricultural export commodities (OIE, 1998). This fact gives the advantage of earning a large foreign currency form the export of hides and skins. About one million hides and nine million skins are processed every year in more than twenty tanneries in different parts of the country. However, about 50% of sheep skins are rejected because of an allergic dermatitis caused by lice and keds, which is characterized by discoloration of the

skin or formation of small nodules on the dermis. These nodules may rapture and leaves scars when they heal. Both these scars and the discolorations formed due to the allergy do not take dyes during tanning, which cause rejection of the leather products (Bayou, 1998).

However, the contribution of sheep and goats to the national income is under the expected potential. This is because external parasites such as mange mites, lice, sheep ked and ticks are the major causes of skin diseases that have resulted in down grading and rejections of skins (Getachew, 1995). Skin diseases are among the major diseases of small ruminants causing serious economic loss to small holder farmers, the tanning industry and the country as a whole. Skin disease causes decreased production and reproduction and down grading and rejection of skins. Currently skin disease caused by lice, keds and mange are affecting the tanning industry very seriously causing enormous down grading and rejection of skin and hides. According to tanneries report, skin disease due to external parasites cause 35% sheep skin and 56% goats skin rejection (Bayou, 1998).

Information about ectoparasite that exists in sheep and goat flock is always necessary to take appropriate control intervention. Because of the presence of different types of ectoparasite in different geographical areas, the study of small ruminant ectoparasite in different geographic areas is required for effective control. This study was, therefore, conducted in the Sebeta, Central Ethiopia to:

- Study the prevalence of small ruminant ectoparasites
- Identify ectoparasites involved in sheep and goats.
- Study risk factors of ectoparasites in sheep and goats.

2. Literature Review

2.1. Arthropod Parasites

Arthropods contain over 80% of all known animal species and occupy almost every known habitat, representing extremely diverse group that exhibit extensive morphological differences. The economically important arthropod belongs to two major groups; class insecta that comprise flies, lice and fleas and class arachnida that comprises tick and mites (Soulsby, 1982). The general life cycle of insects (Flies and fleas) comprised different stages called instarts. After mating, adult female flies lay eggs which hatch to larvae then the maggots of flies of which there may be several stages before formation of pupae from which the adult flies eventually emerge (Hunter, 1994). However, flesh flies lay nearly hatched larvae where as tsetse flies and sheep keds lay larvae almost ready to pupate which larviposited. In the case of lice, the female lays egg on the host, the nymphs hatch from the eggs and moult through 3-5stages, eventually moulting to become asexually mature adult (Wall, and Shearer, 1997). Like insects, adult ticks and mites lay eggs that hatch to larvae which resemble small adults except that they have only three pairs of legs. Larvae moult to nymphs that have four pairs of legs, and these in turn to moult to adults (Hunter, 1994). Arthropod ectoparasite lives on puncture or burrow in to the surface of their host's epidermis to feed or shelter. As a result, there may be direct damage to skin and other sub-cutanous tissues. Moreover, the presence of burrowing ectoparasites and their salivary and faecal antigens can stimulate immune responses, in some individuals leading to hypersensitivity (Berriatum *et al*, 2001).

2.2. Ectoparasites Host Relationship

The presence of ectoparasite on the host is termed as infestation. The association between arthropod ectoparasite and vertebrate hosts may take a variety of forms. In some cases the parasite may be totally dependent on host, in which case the parasitism is described as obligatory. Alternatively, the parasite may feed or live only occasionally on the host, without being dependent on it, in which case the parasitism is described as facultative (Well and Sheare, 1997). The host provides a number of important resources for the parasite, most vitually and the host supplies a source of food, which may be blood, lymph, fear or sweat or the debris of the skin. The host's body also provides the environment on which ectoparasite live, generating warmth, moisture and within the skin or hair a degree of protection from the external environment. The host may also provide transportation from place to place for the parasite, a site at which to mate and, in many cases, the means of transportation from host to host (Wall and Shearer, 1997).

Despite a benefit of a close association with the host, there is a considerable variation in the amount of time spend on the host by various types of ectoparasite. Some ectoparasites such as lice live in continues association with their host throughout their life cycle and are therefore, highly dependent on the hosts. The majorities of ectoparasites, have only intermittent contact with their hosts, and are free living for the major portion of their life cycles (Soulsby, 1982). In some cases, ectoparasites, such as mites are highly host specific; only one host species is exploited and in some instances, the parasite can exist only on one defined area of the host other species are able to exploit a wider rage of host. (Wall and Shearer, 1997)

The life cycles of most of the parasites are direct. Their eggs require high humidity and warm temperatures to develop into infective larvae. Animals

become infected when they are feeding or resting, particularly in herds. The fairly common occurrence of these parasites indicates the potential means of clinical infection when conditions such as warmth and adequate moisture combine and in particular, when animals are overcrowded in unhygienic conditions (Soulsby, 1982).

2.3. Occurrence and Mode of Spread of Ectoparasites

The spread of mange, sheep ked and lice is usually by close contact between clean and infested animals. Sarcoptic mange is highly contagious thus single cases are rarely seen in groups of animals kept together. The movement of keds from ewes to lambs is an important rout of infestation (Wall and Shearer, 1997). Infestation with mites and lice may also occur by indirect transfer, since the mites and lice have been shown to be capable of surviving off the host, inert material such as bedding, grooming tool and clothing may act as carriers (Radostitis *et al*., 1994).

Factors that influence the occurrence of the effect of arthropods can be classified in two groups: those controlling the prevalence of arthropods and those determine the susceptibility of the hosts (Soulsby, 1982). The prevalence of parasitic arthropod is largely influenced by season for they are adapted to definite range of temperature and humidity. Flies breed and are active in the warmer and humid month of the year in temperate regions, and the rainy season in tropical and subtropical regions. Local factors such as marshy areas may provide conditions suitable for flies to breed the year round (Hunter, 1994).

In the case of ticks, the relative humidity and air temperature are also main factors that influence tick activity. In temperate climate, tick activity in usually confined to the period between spring and autumn where there is sufficient rainfall and warm temperature. Tropical and subtropical climates, tick activity and reproduction is greatest during the rainy season although different species have different microclimate requirements (Hunter, 1994). Likewise, the levels of infestation of permanent ectoparasites such as mites, lice and sheep keds show seasonal periodicity. However, in contrast to flies and ticks, heavy infestation usually occur in the moist and cool temperature of winter months and decline in the dry and hot conditions of summer. Psoroptic mites take refuge in protected sites such as the axilla, eyes, ears, or even folds in the skin (Radostitis *et al.,* 1994).

In addition to season and climate, those factors affecting the susceptibility of the host play role in determining the effect of arthropod parasites. Sheep and goat that are housed during cold, that are in poor condition, those affected with debilitating diseases, overcrowded and poorly fed, are usually affected with mites, lice and sheep ked. Long fleeced sheep breed are prone to infestation by sheep ked and lice where as shearing reduces their population (Radostitis, 1994, Wall and Shearer, 1997).

2.4. Importance and Damage of Ectoparasites

Arthropods are important because they may serve as mechanical and biological vector for various pathogens such as protozoa, bacteria, viruses, cestodes and nematode that produce disease (Bay and Harris, 1988) and may produce venoms and other substances that are toxic to domesticated or wild animals, or humans (Hindex, 1998). The presence of ectoparasite affect the livestock economy in terms of production, productivity and skin quality and through labor and materials applied to minimize the direct effects (Tembly, 1997).

According to Wall and Shearer (1997), the direct and indirect losses due to ectoparasite includes:-

Blood loss: although each individual ectoparasite only removes small volume of blood from a host, in large numbers the blood removed by feeding may be directly debilitating and anemia is common in heavily infested hosts.

Myiasis: the infestation of the living tissue with larvae causes direct damage to carcass or skin.

Skin inflammation and pruritus: various ectoparasite infestations cause pruritus, often accompanied by hair and wool loss (alopecia) and occasionally by skin thickening (lichenfication). The presence of ectoparasite on or in burrowing in to the skin can also stimulate keratinocytes to release cytokines, which leads to epidermal hyperplasia and cutanous inflammation.

Toxic and allergic responses: caused by antigen and anticoagulant in the saliva of blood feeding arthropod.

Disturbance: the irritation caused, particularly by flies as they attempt to feed or oviposit, commonly result in a variety of behavior such as head shaking, stamping skin twitching and tail switching or scratching. These activities may result in reduced growth and loss of production because the time spent in avoidance behaviors in lost from grazing or resting.

Self-wounding: the activities of particular ectoparasites, such as warble flies, may causes dramatic avoidance responses in the intended host, known as gadding. The animals may cause serious self-injuries following collisions with fence and other objects.

Immuno suppression: due to infestation, the immune response of the animals may be weakened which further leads to increased susceptibility to other diseases.

Social nuisance: large number of flies may breed in animal dung, particularly in and around intense husbandry units. The activity of flies may cause considerable social problem. Adult flies and

their feces may also decrease the esthetic appearance and values of farm facilities.

2.5. Distribution and Prevalence of Ectoparasites of Sheep and Goat in Ethiopia

In Ethiopia, a number of studies have reported on the distribution and prevalence of arthropod parasites of sheep and goats in different areas. In the northern and eastern part of the country, sheep and goats were reported to be seriously affected with ectoparasites. From the tick's genera at species level *Ambylomma varigatum, Ambylomma cohaerans, Boophilus decoloratous, Rhipicephalus pulchellus and Rhipicephalus evertsi evertsi* were reported to be the most aboundant and widely distributed tick species (Teshome, 2002; Numery, 2001, Mekuria, 1987). The prevalence of sheep ked infestation has been reported in North east Ethiopia. It was more prevalent in the high lands of Ethiopia than in low lands. Sarcoptes species, Psoroptes species and Demodex species are common among goats (Asegedech *et al.,* 1999). The studies have indicated that the occurrence and spread of skin diseases have been show to collate with host factors, Poor management, climate factors, feed scarcity and inadequate veterinary services (Gashaw, 1986).

Some of the ectoparasites that have veterinary and economic importance in small ruminants are discussed below:

2.5.1. **Ticks**

Ticks are one of the most economically important external parasites of livestock because of the direct and the indirect effects on their host, ticks are considered to be not only a significant threat to successful livestock production, but also seriously interfere with economy of a country. Ticks are belongs to three families, Ixodidea, argasidae and nuttallidae. Ixodidea known as hard ticks contain almost all the species of ticks of veterinary importance. These are *Ambylomma, Boophilus, Rhipicephalus, Dermacenter, Haemaphysalis, Hyalomma* and *Ixodes* (Jongenjan and Uilenberg, 1994). The second family, argasidae known as soft ticks, contains relatively small number of species of veterinary importance (Wall and Shearer, 1997). Ticks are primary parasites of wild animals and only 10%of species feed on domestic animals, primarily sheep and cattle (Wall and Shearer, 1997).

Life Cycle

There are four stages in the life cycle of Ixodid ticks: egg, larva, nymph and adult. After sucking a lot of blood, the female drops off from its vertebrate host and search shelter locally in which it develops and lays a single large batch of eggs. After oviposition she dies while the male usually remains much longer on the host, where they mate repeatedly. Typically, a batch of eggs contains several thousands of brown globular eggs, and oviposition continuous for many days and in some cases, months. There are three types of life cycle that the different species follow namely: one-host, and three host ticks (Arthur, 1961; Jongenjan and Uilenberg, 1994).

One host ticks: the larvae which emerge from the eggs within 3-4weeks, attach themselves to the host animals where they complete their development on the single host, they develop from larvae to nymph and imagoes. Then copulate after maturation period and following engorgement female drops off and deposit eggs on the ground. The entire development cycle takes mostly 19-21days, with a minimum of 15days and a maximum 40days. But depends on the environmental condition (availability and level of humidity and temperature) (Morel, 1980; Seifert, 1996). All three instars engorge on the same animals (Soulsby, 1982). All the species of *Boophilus* are common examples of one host tick (Walker et al., 2003).

Two host ticks: The egg hatches to give larvae, which can attached to a host animal and feed on blood then develop in to nymph stage. After maximum of 14days, it drops off on to the ground where it reaches the image stage in 20-30days time. The adult looks for another host and feeds for 6-11days, then females drop to ground and deposit eggs, which will develop in to larvae (Morel, 1980). Some examples of two host ticks are*; R. evertsi evertsi, Hyalomma deterium* and *Hyalomma marginatum rufipes* (Walker *et al.,* 2003).

Three host ticks: the three host tick looks for a new host during each stage of development in order to feed; the larvae merges from the eggs deposited on the ground, looks for a host, feed on it for 3-4days drops off and molts after 3-4weeks on the ground to nymph. The nymph climb to a second host in order to feed on it for 3-7 days, leave it and molt in to imago on the ground after 2-8weeks. The adult attach to third animals and feed and then female drop off and lay eggs to continue the new cycle which takes about 1-3weeks (Forse, 1999; Latif and Walker, 2004). All species of Ambylomma, dermacenter, Ixodes and most species of Hyalomma are three host ticks (Okello *et al*., 1999). The entire development of one cycle may last up to one year since the different length of time spent in each stage on the ground (Latif and Walker, 2004).

Tick Species

Ambylomma varigatum: it is commonly known as tropical bone tick, and is widely distributed in Ethiopia. The preferred hosts of the adult ticks are cattle, but they also infest sheep and goats. This tick requires moistures and warmth for its survival and is not found in open grass land. Activity of adult tick commences when spring rains begin between March

and June. *A. varigatum* is a potential vector of *Erlichia ruminatum, Theileria mutans* and *Thileria velifera* and the virus Nairobi Sheep Disease. Adult of *A. varigatum* infestation were frequently associated with damages to udder causing teat losses in cow and bulls damaging scrotum leading to sterility (Pergram *et al.,* 1981).

Boophilus decoloratous: it is indigenous to Africa and is the commonest and most wide spread tick in Ethiopia, which is collected in all administrative regions except in the Afar. It was mainly found in wet highlands and sub-highlands receiving more than 800mm rainfall annually. The distribution pattern of this tick is similar to that of *Ambylomma varigatum* (Pegram *et al*., 1981; Walker, 1991). Cattle are the main host of *B. decoloratus*, but it is also found on sheep, goats and equine. In central Ethiopia, *B. decoloratus* was more abundant on cross and exotic cattle breeds. The attachment sites are dewlap, neck, shoulder and the side of the body of an animal. The immature stages are found on the tips and upper edges of the ears and on the legs. A part from down grading the quality of hides and skins, *B. decoloratus* also transmit *Babesia bigmina* and *Anaplasma margina*le to cattle (Walker, 1991).

Rhipicephalus evertsi evertsi: all stages of *R.e. evertsi* are the red legged tick frequently feed on horses, donkey and cattle. Adults are found on the hair loss areas around anus while the immature stages attach on the deeper parts of the inner surface of the ear and in the outer ear canal. *R.e. evertsi* is widely distributed and common in Ethiopia. The tick shows no apparent preference for any altitude, rainfall or season **(**Pegram *et al*., 1981). *R.e. evertsi* transmit *Babesia caballi* and *Theileria equi* to horses, both causing equine Piroplasmosis, and A. marginale causing particularly in lamb, but it may also affect calves and adult sheep (Walker *et al*., 2003).

Rhipicephalus praetexatus: adult of this tick species are most abundant on cattle attaching in the tail brush and around the feet. The immature stage prefers to feed on rodents. The tick is more abundant during the rainy season (Walker et al., 2003). It is found in a wide range of ecological habitats from semiarid areas having 250mm annual rainfall, through tropical and subtropical savanna, to wooden highlands having 1500mm annual rainfall. The presence of this species is recorded in almost all administrative regions. *R. Praetexatus* can transmit the virus of Nairobi sheep disease in sheep and the bacterium *rickettsia conori* to humans causing tick typhus. The feeding of this tick species can cause toxicosis in cattle, resulting in paralysis (Walker et al., 2003). In Ethiopia there was confusing in differentiating morphologically *R. simus* from *R. Praetexatus.* However, recent findings indicated that *R.simus* occurs across central and southern Africa (Walker *et al.,* 2003). This suggests that all ticks previously recorded as *R. Simus* should be replaced by *R. Praetexatus* thus *R. Simus* does not occur in Ethiopia (Pagram *et al*., 1987b).

Hyalomma truncatum, it occurs throughout Ethiopia in different ecological zones from 300 to 3500m altitude and between 250m and 1500mm rainfall (Walker *et al*., 2003). The predilation site of *Hyalomma truncatum* is switches of tail, around anus, on the lower perineum and the legs. These ticks have a toxin in their saliva that causes the skin disease known as waiting sickness in cattle, particularly calves. Due to the long mouth parts, secondary infections may lead to abscess and lameness in lambs (Walker *et al*., 2003).

Economic and Veterinary Importance

Ticks are blood sucking ectoparasites that feed on mammals, birds and reptiles. The medical and economic importance of ticks had long been recognized due to their ability to transmit disease to humans and animals in several ways and parasitize a wide range of vertebrate hosts, and transmit a wide variety of pathogenic agents than any other group of arthropods (Oliver, 1989). They play a major role of vector in spreading different diseases of livestock and humans such as Babesiosis, Thileriosis Anaplasmosis and many Rickettsial and viral diseases. In addition, direct losses due to their being ectoparasites includes blood loss, irritations that result in “tick worry” and interrupt the grazing habits of the host. Damage and loss of udders are also caused by the attachment and feeding activities of ticks, which provide portals of entry for secondary bacterial infections and induce Myiasis and tick paralysis due to the toxins they secrete in to the blood. The secreted toxins may evenly disseminate to the respiratory organs and cause death of the animal (Sere, 1997, Soulsby, 1982). Their attachment and feeding also down grade hides and skins and reduce milk and wool production. Reduce productivity and increase susceptibility to other disease (de Castro, 1997).

The estimated global costs of control and productivity losses to be around USD 7000 million annually and de Castro (1997) estimated that the annual global cost associated with tick and tick borne disease in cattle ranges between USD 13.9 to USD 18.7 billion. Frans (2000) indicated that the economically most important Ixodidea ticks of livestock in tropical regions belong to the genera of Hyalomma, Boophilus and Ambylomma. Species belong to these genera most economically important in Ethiopia are: *A. cohaerans* on cattle, sheep, goat, camel and equine; A. varigatum on cattle, sheep, goat and camel; *A. gemma* on cattle, sheep, goat and camel, *A. lepideum* on cattle, sheep, goat and camel; *B.*

decoloratus on cattle, sheep, goat, camel and equine; *R. pulchellus* on cattle, camel and equine; *Hyalomma truncatum* on sheep and goat, *H. marginatum rufipes* on cattle, sheep, goat and camel and *H. dromedary* on camel (Mekonnen, 1996).

2.5.2. Mites

Mites have a complex taxonomy and according to their location the host, they are grouped as burrowing and non-burrowing mites. The burrowing genera include secretes, Demodex, Notoedres and Knemidocoptes while Psoroptes and Choreoptes are included under non-burrowing mites (Urquhart et al., 1987).

The ectoparasitic mites of mammals and birds inhibit the skin, where they feed on blood, skin debris or sebaceous secretion, which they ingest by puncturing the skin surface. Most ectoparasitic mite spends their entire life in intimate contact with host. Infestation by mite is acariasis and can result sever dermatitis, known as mange. Mage is a wide spread and most important ectoparasites disease of animals, which may cause significant welfare problems and economic losses (Wall and Shearer, 1997).

Manage mites are common in sheep and goats and are reported from several geographic areas (FAO, 1995). The most important mange mites known to cause skin disease in sheep and goats belong to the family Sarcoptidae, Psoroptidae, Choroptidae and Demodicidae (Gashaw, 1986).

Life Cycle

The entire life cycle of mite takes place on the host. Adult female create permanent tunnels, of up to one centimeter in length parallel to the skin surface, in which they feed and lay eggs, female mites produce relatively large eggs, from which a small, six-legged larva hatch. A few species are ovoviviparous, producing live offspring. The larva moult to become eight-legged nymph. There may be between one and three nymphal stages, known as protonymph, duetonymph and triotonymph. At least one of these nymphal stages is usually inactive and development proceeds without feedings. The nymph then moult to become adult (Wall and Shearer, 1997). The number of eggs produced per female is highly variable but life time reproduction output may be allowed as 16eggs per female. Nevertheless, the life cycle of many of parasitic species may be completed in less than four weeks and in some species may be as short as eight days thus having the potential for tremendous increase in their population size (Wall and Shearer, 1997).

Mite Species

There are five genera of mites responsible for mange in sheep and goats. These are Demodectic (follicular mange), Sarcoptic (head scap or mange), Psoroptic (common mange or sheep scab), and Chroptic (foot scapes or mange (Asp, 1988).

Demodex spp. Mites of Demodex species infest hair follicles of domestic animals. Demodex live as commonsals, in sebaceous glands of the skin where they spend their entire lives. For the most part they are non-pathogenic. Species of *Demodex* are unable to survive off the hosts. The disease causes little concern but in cattle it has significant damage in hides and rarely death due to secondary bacterial invasion. The disease may be severe in goats but rare in sheep (Jackson 1991; Urquhart *et al*; 1996).

Sarcoptes spp: it is a species of obligate, burrowing mite host adapted varieties of this species causes Sarcoptic manage in cattle, sheep, goats, dogs and humans, plus a wide range of wild animals. It has been particularly well studied in pigs, but it is a relatively rare in cats or horses. It is usually more common in housed animals or those in poor body condition, usually at the end of winter or early spring (Radostits *et a*l; 1994).

Psoroptes spp: Are obligate ectoparasites of mammals but in this case they are a non- borrowing species. They are generally larger than the borrowing sarcoptid mites but they also infest a wide variety of hosts including sheep, cattle, goats, horses, mules, camels and rabbits (Bates, 1999). The disease caused by *P.ovis* has considerable economic and welfare importance, particularly in sheep, flocks in many areas of the world (O' Brien, 1999). While *P. Ovis* in sheep is prevalent worldwide, the infestation of cattle by their species is less common. It causes a more severe dermatitis, characterized by more extensive lesions and secondary bacterial infestation commonly seen in sheep (Kirkwood, 1986). Psoroptes infested skin will have a grain surface that is total distributed on the area where the parasite has been proliferating on the skin is thicker than normal on that whole area. The central part is rough and in the periphery clearly distributed funnels and pits are seen (Asp, 1988).

Choreoptes Spp: *Choreoptes bovis* is the most widely spread species in sheep, cattle, goats and horses (Heath, 1978; heath *et al*., 1983). It causes an allergic exudative dermatitis and is seen most frequently on the scrotum of rams. When ewes become infested, they transmit the mites to their lambs during sucking (Heath *et al*; 1983). The main concern in rams is that the lesion forming on the scrotum can seriously impair semen quality (Heath, 1978). The extent of the body affected by lesion is categorized into three classifications localized lesion were found only on one part of the body, regional lesion were found in multiple part of the body and generalized lesion were found all over the body. The severity of infection appears to be inversely related to temperature and to lesser extent with total rainfall relative humidity also has a highly significant positive

correlation with the intensity of infestation (Heath *et al*; 1983).

Economic and Veterinary Importance

Mites have chewing rather than blood-sucking mouth parts and appear to feed on skin debris and secretions. Any host reactions are there for likely to be due to mere presence of the mites, their "products" on the skin surface and the secondary bacterial invasion (Soulsby, 1982).

2.5.3. Lice

Lice are small, wingless insects dorso ventrally flattened, with stout legs and claws for attaching tightly to hair and feathers. They spend their entire life on their host. They are generally highly host specific, many species even preferring specific sites on their host's body, only leaving their host to transfer to a new one. They feed on epidermal tissue debris, parts of feather, sebaceous secretions and blood (Wall and Shearer, 1997).

There are two kinds of lice, represented by the suborder anoplura, or blood sucking lice and mallophaga, or chewing lice (Soulsby, 1982). The anoplura have piercing parts constituting of three stylets that are usually concealed within the relatively narrow head (Urquhart, 1987), which enables, the lice to reach body fluids such as blood and drive nutrients they require. These processes may also involve the injection of anti-coagulant secretions which cause local irritation. The anoplura are exclusive to mammals on the other hand, mallophaga have mouth parts adopted specifically for chewing the epithelial debris of the skin, epidermal scales, feathers, and sebaceous secretions of birds and mammals. The mallophaga are found in greatest variety on birds and are often called "bird lice" but some of them are very common on livestock such as sheep and cattle (Urquhart, 1987).

Life Cycle

Mature adult female lice generally deposit one to two eggs per day, cementing them firmly to individual's hairs or feathers. Nymphs hatch from the eggs and then feed and moult through three to five stages, eventually moulting to become asexually mature adult. The entire eggs to adult life cycle can be completed in as little as 4-6 weeks. In suitable conditions, lice survive 30 to 60 days on sheep, and possibly some survive up to 5months (Urquhart, 1987).

There are five species of lice which infest sheep and goats:

Linognathus africanus: this is 2.5cm long, blue-gray louse that sucks blood. It is mainly found on the face, head and neck, but in heavily infested sheep it can be seen all over the body. In summer the population decreases, and during the winter months there is an increase, with a population peak in the early spring (Asp, 1988).

Linognathus pedalis: the "foot louse" inhibits the lower regions of the hind limbs from the feet to below the hooves, and where there is a great fluctuation in temperature and away from the host's body for more than a day or two and is available on pasture for about a week (Urquhart, 1987).

Linognathus ovillus: the "face louse" it occurs on the face and ears spreading from there to checks, neck and body (Soulsby, 1982).

Linognathus stenopsis: the "sucking louse" which is common in goats, is more pathogenic than the biting lice *Bovicola caprie* (Maming and scott, 1985).

Bovicola ovis: *Bovicola ovis* was previously named *Damalina ovis* (the biting louse; body-louse; common louse, trichodectes spherocephallus). This is a white yellow louse 1.2cm long. It is a biting louse which feeds on exfoliated epithelium of sheep. Like the others, *B.ovis* is susceptible to high temperature, but it is also intolerant to moisture (Urquhart, 1987).

Economic and Veterinary Importance

The effect of lice is usually a function of their density. Lice numbers build up relatively slowly on newly infested sheep and the pattern of population increase depends on the time of year the introduction occurs. A small number of lice may present no problem and may become a normal part of fauna. However, they have a potential of massive increases (Wall and Shearer, 1997). Solar radiation, temperature and rainfall all have a profound effect on lice numbers. The chief effect of lice on their host is due to irritation they cause. All species cause irritation of the skin and stimulate scratching, rubbing and licking leading to restlessness, damage to the fleece and skin. Moreover, the saliva and feces of the lice contains substances which are capable of causing allergies, giving rise to severe irritations followed by the skin thickening (Peter, 1995). Sever infestation with sucking lice may cause "Pediculosis" which is infestation with lice and cause anemia. The foot louse of sheep is found most frequently around the dew-claws, sever infestation of which produces lamness (Soulsby, 1982). According to kettle (1985), lice might also be expected to affect fleece weights and quality could reduce the percentage yield of clean wool after shearing.

2.5.4. Mellophagus ovinus (Sheep ked)

The Mellophagus ovinus, sheep ked, is a member of the parasitic dipteria, family Hippobosidae. It is wingless and hairy, measure 4-6mm long. The head is short, broad and not freely moveable; the thorax is brown and the broad abdomen is grayish-brown. The largest are strong and armed with stout claws (Soulsby, 1982). Adult keds are

permanent ectoparasites and feed on the blood of sheep which also parasite goats (Maming and Scott, 1985).

Sheep ked was a wide spread ectoparasites of sheep that has veterinary importance until the introduction of effective pesticides. Then, it become less concern and become relatively uncommon species through much of it former range. Changes in agricultural practice, both greater intensification and development of more extensive system (including organic farming and conservation grazing) may allow resurgence and a review of existing knowledge of Mellophagus ovinus (Heath *et al*; 1995).

The spread of sheep ked is mainly through contact and movement of keds from ewes to lamb is an important route of infestation (Wall and Shearer, 1997). The predilection sites of infestation are the neck, around the tail, should back and ventral part of the body (White, 1998). M. ovinus has strong legs provided with claws and is permanent ectoparasites. The irritation caused by sheep ked result in biting and rubbing that can damage the skin. The parasite lives in the wool of the sheep and suck blood. Heavy infestation can reduce the condition of the host considerably and even cause anemia. They produce intense irritation, causing the sheep to bite, rub and scratch itself, thus damaging the wool. The feces of the keds produce stains in the wool which do not wash out rapidly (Urquhart *et al*., 1996).

Mellophagus ovinus is the most important ectoparasites observed in sheep (Assegedech *et al*., 1999). The prevalence of sheep ked infestation has been reported to be 12.5% in North east Ethiopia (Tefera and Abebe, 2006a). It was more prevalent in the high lands of Ethiopia than in midlands and no cases has been recorded in low lands (Assegedech *et al*., 1999). From fresh sheep pelt examined Sabeta tannery showed that 32.7% had M.ovinus (Ermias, 2000).

Life Cycle

The female hatches its larva to the wool of the sheep by means of sticky substance parturition lasts a few minutes. It is ovoid in shape with broad ends and 3-4mm long. The pupal stage lasts 19-23 days in summery to 36 days in winter, or even longer if the sheep are exposed to very cold conditions. The keds live 4-5 months on sheep. Copulation occurs 3-4 days after emergence of the adult and each gestation lasts about 10-12 days. A female may produce ten to fifteen larvae engorged females can live up to 8 days on the host. Pupae removed from the sheep for example at shearing can if conditions are favorable (Evans, 1950). The entire life is spent amongst the wool of their hosts during direct contact between sheep. Such transfer is more likely during periods of higher ambient temperature when adult keds move to the fleece surface. They usually spread from sheep to sheep by contact and are most numerous in the autumn and winter (Radositis, *et al.,* 1994).

Economic and Veterinary Importance

The feeding of keds cause a wide spread priorities exacerbated by the rubbing, scratching and biting of the host in response to the irritation in young lambs, loss of blood to keds may be sufficient to cause a patent anemia, with consequent reduction of growth rate and production (Bowman, 1995).

Keds serve as the mechanical vector of Anaplasma ovis and orbivirus, responsible for the Blue Tongue Disease, a serious condition that cause 70% mortality in sheep and weight and wool loss, abortion and congenital abnormalities in survivors. They are also biological vectors of Trypanosoma melophagium which is a harmless blood parasite of the sheep (Mathieson, 1991).

2.6. Diagnosis Of Parasitic Skin Diseases

In making a diagnosis of ectoparasitic infestation or an ectoparasite associated dermatosis it is important to have an idea of the parasite involved and its life cycle. Some parasites live in intimate relationship with the hosts' skin, however, visiting parasites may be on the skin only for a short period of time and a diagnosis is often made by implication. Hence a working knowledge of the clinical sign of skin disease is usually also required (Wall and Shearer, 1997). The ideal approach to diagnosis of skin disease is a logical progression from history to an overall clinical examination to a detailed examination of the skin and finally to confirmatory testing or diagnosis by response to treat (Jackson, 1991; Smith and Sherman, 1994).

2.6.1. History

According to Jackson (1991), the main points to be noted during history taking includes: date when symptoms first appeared, symptom observed by owner, contact with other flock, spread with in the flock, previous health history of affected animals other disease problems within the flock past and present, response to treatment (including home remedies) so far and detailed management.

2.6.2. Clinical Examination

Simple observation allows identification of most external parasite infestation and clinical sign of skin disease, thus many conditions can be diagnosed with reasonable certainty (Smith and Sherman, 1994). The entire skin surface of the patient should be examined for parasite and lesions and the elasticity of the skin, its temperature, thickness, color and consistency should be noted and response of animal to palpation of affected area should be observed (Jackson, 1991). The appearance and location of lesions are the basis for diagnosis. The primary lesion includes papules, vesicles, pustules and nodules, secondary lesions such

as scales, crusts and alopecia are the result of self-trauma or superimposed bacterial infections (Smith and Sherman, 1994).

During clinical examination unidentified external parasites or their eggs are collected, fixed and stored in 70% alcohol or 10% formalin and identification can be made with the help of an identification key (Soulsby, 1982). Ticks may be collected directly of the host using appropriately sized forceps. Small specimens may be picked up with the end of moistened paint brush. Unattached mites and ticks can be removed by combing or brushing of the host animal, over a white enamel tray or sheet or paper. Brushing over moistened white blotting paper or paper towel may help to identify flea infestation (Wall and Shearer, 1997).

To insure that the mouth parts are not left behind, embedded living ticks may be removed most effectively by dabbing the ticks and the surrounding skin with alcohol. This relaxes the tick, allowing it to be pulled out in fact. Alternatively, the tick can be covered with a layer of petroleum jelly, which prevent respiration and after about 30 minutes, the tick will drop off (Wall and Shearer, 1997).

2.6.3. Skin Scraping Examinations

Examination of skin scrapping is essential in the diagnosis of mange in longstanding cases mites are often very few in number and extremely difficult to find and their absence from the skin scraping doesn't negate a diagnosis multiple sites should be scrapped to increase the likelihood of ectoparasite detection. Superficial skin scraping (epidermal surface examination) after removing coat hair by gentle-clipping can be used to identify surface mites and deep skin scraping (deep epidermal examination) until capillary ooze occurs is useful in the diagnosis of burrowing and follicular mites such as *Sarcoptes scabic*i and *Demodex spp*, (Wall and Shearer, 1997).

A few drop of 10% potassium hydroxide solution or liquid paraffin due added to the sample a cover slip applied and cleaning of debris allowed to process for 15-30minutes before microscopic examination. Large samples may be processed by boiling 10 minute in 10% KOH solution, centrifuging and performing sugar floatation on the sediment (Smith and Sherman, 1994).

2.6.4. Collection of Free Living Ectoparasites

Mobile free-living mites can be extracted from bedding and nets by careful search or by sharking the material through a tier or siever of decreasing mesh size. They may be swept from vegetation using a hand net; most commonly used for collecting ticks, however is a blanket drap (Wall and Shearer, 1997).

2.6.5. Biopsy and Histopathology

Although these indirect techniques are not as useful as direct identification for the diagnosis of ectoparasite dermatitis, they may be valuable in some circumstances. Such as insect and arthropod bite lesions (Wall and Shearer 1997. small whole thickness strips of skin 25mm by 5mm are taken from normal and abnormal area and the skin strip should be fixed in formal saline (Jackson, 1991).

3. Materials And Methods

3.1. Study Area

The study was conducted in Sebeta in different areas. Sebeta is found in Oromia Region, in special Zone surrounding Addis Ababa. Sebeta is found South West of Addis Ababa at latitude of about $8^{o}55'N38^{o}37'E$ and longitude of about $8.917^{0}N38.617^{O}E$ and an elevation of 2,356 meters above sea level. The area gets annual rainfall of about 866-1200 millimeters. The annual mean minimum and maximum temperature is $18^{o}C$ to $25^{o}C$ respectively (CSA, 2008). The farming system in the area is mixed type (crop-livestock production). The crop type in the area is teff, barly, guaya, and bean.

3.2. Study Animals

The study was conducted on small ruminants (sheep and goats) that were coming to Sebeta Awas Woreda veterinary clinic from October 2010 to March 2011. The animals were all local breeds and both sexes. The animals were also from different age groups and classified as young and adult. The age determination was made based on owner's information and according to Aiello and Mays (1998). Lambs and kids that were less than 6 month old were considered as 'young' where as those more than 6 month old were included in the 'adult' group.

3.3. Study Design, Sampling and Sample Size Determination

The study was cross-sectional study in which each animal was examined once during the study period. Animals were selected for the study by handling animals that were presented to Sabeta Awas Woreda veterinary clinic for different reasons (treatments and vaccination). A total of 460 animals (354 sheep and 106 goats) were used for the study. This sample size was greater than the maximum samples size needed for prevalence study from theoretically infinite population at 5% desired absolute precision and 95% confidence interval (Thrusfield, 2005) and is expected to produce a better precision.

3.4. Parasitological Examination

Before clinical examination, the age, sex and body condition of each selected animal was recorded. Body condition score was made by modifying the scoring system described in Gatenby (1991) and Steele (1996) sited in Tefera (2006) for sheep and goats respectively. The clinical examination was performed by multiple fleeces parting in the direction

opposite to that in which hair or wool normally rests and visual inspection and palpation of the skin for parasites and/or lesions on all parts of the animal including the ears and the digits was conducted.

Collection and identification of ectoparasites

During clinical examination of external parasites including immature stages were collected and kept in 70%, alcohol and identification was made with the help of an identification key according to Soulsby (1982). To observe the predilection sites of the parasites and to facilitate the parasite collection, the body of animal was divided into ear, head, shoulder, back ventral sites, hoof, anus-vulva area and tail.

Ticks and Lice

Hard ticks and lice were collected from different predilection sites of the examined animals. Each type of ectoparasites was placed in separate universal bottles containing 70% ethanol that had been pre labeled with date, region, zone, Woreda, locality and animal species, sex and body condition. Each bottle was tightly closed and transported for further examination in the laboratory at National Animal Health Diagnostic and Investigation Center Sebeta. Identification of ectoparasites was done by using light stereomicroscope according to the standard taxonomic keys described by Wall and Shearer (1997), Soulsby (1982), for lice and Morel (1980) for ticks. During collection, care was taken to ensure that the mouth parts of tick were not left behind during traction with thumb forceps.

Skin Scarping Examination

Examination of skin scarping in the diagnosis of mange was made in a site where lesion was visible on animal and approximately 1cm^2 area were scraped for superficial skin scraping. Superficial scraping (After removing hair by gentle clipping) was used to identify surface mites while deep skin scarping (until capillary blood oozes) was used in the diagnosis of borrowing and follicular mites (Wall and Shearer, 1997). Skin scarping was transferred in to a petridish and examined within 6hrs of collection. After adding 10% KOH, the sample was heated until hair and epithelial scales were dissolved. Mites were then removed from the top of the solution and examined under light microscope at 40x magnification and the species were determined according to the method described by Bowman (1995) and Urquhart *et al.,* (1996).

3.5. Data Entry and Analysis

The raw data collected from the study area were recorded in the format developed for these purpose and were entered into Microsoft excel. Intercooled STATA 7 software (Stata corporation 1984-2001) was used for summarizing and analyzing the data. Chi-square (x^2) test was used to determine the variation in ectoparasites infestation between species, sex, body condition and age groups. A statistical significant association between variable is considered to exist if the computed P-value was less than 0.05.

4. Results

4.1. Prevalence of Ectoparasites in Sheep and Goats

The overall prevalence of ectoparasites in small ruminant was 33.3%. Out of 354 sheep and 106 goats examined for ectoparasites 124 (35%) sheep and 29(27.4%) goats were infested with one or more ectoparasites. The major ectoparasites identified in sheep were *R. e. evertsi*, immature *Ambylomma* species, *Linognathus africanu*s, *R. praetexatus, B. decoloratus* and *A.varigatum*. In goats, *R.e. evertsi* and immature *Ambylomma* species were the most dominant (Table 1).

Table-1: Prevalence of different ectoparasites in small ruminants

Ectoparasites	Sheep (n=354)		Goats (n=106)		Overall (n= 460)	
	Infested	Prevalence (%)	Infested	Prevalence %)	Infested	Prevalence (%)
R. e. evertsi	89	25.1	21	19.8	110	23.9
R.praetexatus	2	0.56	3	2.8	5	1.1
A.varigatum	8	2.3	-	-	8	1.7
H. truncatum	2	0.56	-	-	2	0.4
H.marginatum rufipes	1	0.28	-	-	1	0.2
B.decoloratus	4	1.12	1	0.94	5	1.1
Ambylomma spp (immature)	12	3.4	4	3.7	16	3.5
L. africanus	6	1.7	-	-	6	1.3
Demodex	1	0.28	-	-	1	0.2
Total	124	35	29	27.4	153	33.3

4.2. Prevalence of Ectoparasites in Relation to Different Factors

The prevalence of ectoparasites in sheep and goats were 35% and 27.4%) respectively. Prevalence of ectoparasites in the study area was higher in sheep compared to goats but it was not statistically significant (P>0.05).

In female and male sheep the prevalence was 36.9% and 31.5 respectively; likewise the prevalence in female and male goats was 28.5% and 25%

respectively (Table 2). But these observed differences were not statistically significant (P> 0.05).

Table-2: Prevalence of ectoparasite in different sexes of sheep and goats

Ectoparasites	Sheep				Goats			
	Male =124	Prevalence (%)	Female =230	Prevalence (%)	Male =36	Prevalence (%)	Female=70	Prevalence (%)
Ticks	34	27.4	82	35.6	9	25	20	28.5
Lice	3	2.4	3	1.3	-	-	-	-
Mite	1	0.8	-	-	-	-	-	-
Total	38	31.5	85	36.9	9	25	20	28.5

The prevalence of ectoparasites in adult and young were 42.5% and 11.4% in sheep and the prevalence of ectoparasites in adult and young goats were 35.8% and 3.5% respectively. The prevalence of ectoparasite was statistically higher in adult animal than young animals (P<0.05).

Table-3: Prevalence of different ectoparasites in different age groups

Ectoparasites	Sheep				Goats			
	Adult =266	Prevalence (%)	Young =88	Prevalence (%)	Adult =78	Prevalence (%)	Young =28	Prevalence (%)
Ticks	106	39.8	10	11.4	28	35.8	1	3.5
Lice	6	2.2	-	-	-	-	-	-
Mite	1	0.8	-	-	-	-	-	-
Total	113	42.5	10	11.4	28	35.8	1	3.5

The prevalence of ectoparasites in good body condition and poor body condition were 34.6% and 35.2% in sheep and the prevalence of ectoparasites in good body condition and poor body condition were 20% and 33.9% in goat respectively. Both in sheep and goats the prevalence of ectoparasites was higher in poor body conditioned animal than good body conditioned animals, but it was not statistically significant (P> 0.05).

Table-4: Prevalence of different ectoparasites in different body condition.

Ectoparasites	Sheep				Goats			
	Good body condition =104	Prevalence (%)	Poor body condition =250	Prevalence (%)	Good body condition =50	Prevalence (%)	Poor body condition=56	Prevalence (%)
Ticks	35	33.6	82	32.8	10	20	19	33.9
Lice	1		5		-	-	-	-
Mite	-		1	0.4	-	-	-	-
Total	36		88	35.6	10	20	19	33.9

5. Discussion

From a total of 354 sheep and 106 goats examined for ectoparasites, 124 (35%) sheep and 106 (27.4%) goats were infested with one or more types of ectoparasite. Ticks, lice and mange mites were the major ectoparasites affecting sheep and goats in the study area. Previous study have indicated a wide spread nature of these ectoparasites in many areas of Amhara region (Tefera and Abebe, 2006a; Mersha, 2007).

A relatively low prevalence of tick infestation (35.0% in sheep and 27.4% in goats) was observed in the present study area. Higher prevalence (65.6% in sheep and 33.0% in goats) were reported in the Dire Dawa region, Eastern Ethiopia (Zelalem, 1994) and similarly Teshome (2002) observed low tick prevalence (23.8% in sheep and 16% in goats) from Sidama zone in Southern Ethiopia. Differences in the environmental condition (study season) could have contributed for this variation and also low tick prevalence may be related to impaired tick development due to unfavorable climatic conditions (intermittent and weak rainfall in study area during the study period combine to relative high temperature). The most important tick species identified from sheep in the study area includes, *Rhipicephalus evertsi evertsi, Rhipicephalus praetexatus, Boophilus decoloratus, Ambylomma varigatum, Hyalomma*

truncatum, Hyalomma marginatum rufipes and immature Ambylomma species and tick species identified from goat includes, *Rhipicephalus evertsi evertsi Ambylomma varigatum, Rhipicephalus praetexatus* and *Boophilus decoloratus*, showing the presence of economically important ticks in the study area. Similarly, *R.evertsi evertsi, B.decoloratus, A.varigatum* and immature *Ambylomma* species were reported to exist in sheep and goats in different areas of Ethiopia (Morel, 1980).

Several tick genera are widely distributed in Ethiopia such as *Ambylomma, Boophilus* and *Rhipicephalus* that are the main parasite of livestock, the remaining species occurring in limited number and having little practical significance to livestock production (Mekonnen, 1996). *Ambylomma varigatum* is widely distributed in Ethiopia, and the preferred hosts of adult tick are cattle, but they also infest sheep and goats. This tick requires moisture and warmth for its survival and is not in found in open grass land (Pegram *et al*; 1981). The species of ectoparasite identified from sheep and goats were the same as for cattle, however prevalence and density of infestation is differed, probably due to pasture differences (Encinas, 1986).

Although not statistically significant, the rate of infestation by ectoparasite in general was higher in sheep than goats. This is probably because of self grooming, licking, scratching, rubbing and grazing behaviors of goats which contribute to rapid ectoparasite elimination (Pegram *et al*; 2004). This result is in agreement with Zelalem, (1994).

Within sheep and goat population, it was also noticed that females were more frequently affected than males (36.9% and 31.5%), this result could be due to the weakness of pregnant and lactating females which could not efficiently get rid of ectoparasites especially that of ticks. These were comparable with previous studies conducted in and around Wolaita Soddo in Southern Ethiopia (Yacob *et al*; 2007).

Lehman (1993) reported as a greater susceptibility of young animals to ectoparasites and attributed it a high ratio of accessible surface to body volume and a poor grooming behavior. But in the present study area significantly higher tick infestation in adult animals than young animals was observed in small ruminants. This result was in disagreement with most previous studies on the topic, this may be due to most of the animals that come to clinic were adult animals compared to young animals as indicated in the result, so further study should be run in the difference of prevalence of ectoparasite between adult and young animals. Although not statistically significant, relatively higher prevalence of tick infestation was observed in animals with poor body condition (35.2% in sheep and 33.9% in goats) than with good body condition (34.6% in sheep and 20% in goats). This result is similar to previous study reported by Yallew (2007). This may be due to debilitated animals do not groom themselves and the tick live undisturbed on host's body (Urquhart *et al*;1996).

It has been reported that ectoparasites are the major constraints in the production of good quality skins from sheep and goats (Asegedech et al, 1999; Ermias, 2000; Numary; 2001; Bayou, 2005). In the present study, the skin scraping test was done for the presence of mange mites, it show only one positive result (Demodectic mange) in sheep which gives the prevalence of 0.28%. Despite the difference in study area environment, 0% prevalence of Demodectic mange in sheep was reported from Sidama Zone in Southern Ethiopia (Teshome, 2002). The current result was also comparable with the report from Wolaita Soddo (0.98%) (Yallew, 2007). There was absence of mange mite in goats in study area; this is probably because of the particular goat behavior that would reduce ectoparasite infestation rate. Similar study was reported by Chalachew (2001) in North Shoa Zone of Oromia region. By contrast, Kedir (2002) obtained higher prevalence of mange mite infestation in small ruminants (26.1% in goats and 30% in sheep) from Tigray region in Northern Ethiopia and Wondwossen *et al*., (2010) 29.4 % in goats in the Northeast Ethiopia. In the same way a very high mange mite infestation prevalence (52.2%) was reported in goats from Dire Dawa region where as sheep were not affected (Zelalem, 1994). Environmental factors might have contributed to this great variation. High temperature, humidity and sunlight favor mange mite infestation. Mites have been shown to be capable of surviving off the host for short periods, but the length of time is different in various species depends on environmental conditions but may be two to three weeks (Steele, 1996).

According to present study, only one genus of louse was identified in sheep (*Linognathus africanus*) with a prevalence rate of 1.7%. The prevalence of lice infestation obtained in current study was relatively lower than observations made in and around Kombolcha (Numery, 2001) with the prevalence of 14.2% and in Wolaita Soddo (Yallew, 2007) with the prevalence of 26.64% in sheep. On the other hand, the present prevalence of lice infestation was relatively higher than 0% (in sheep) prevalence in Southern range land (Molu, 2002). In the study area absence of lice infestation in goat was observed. By contrast Sertse and Wossene (2006) obtained higher prevalence of lice infestation in goats (29.2%) in Amhara Regional State. Such difference in prevalence may raise from difference agro-climate, in season during which the study was conducted, management and health care of small ruminants in the study areas.

Lice infestation may indicate some other underlying problems such as malnutrition and chronic diseases, lice infestation also associated with damage to the skin, loss in production and irritation (Wall and Shearer,1997). The irritation caused by large population of lice leads to scratching and rubbing, damage to the skin and sever infestation with Linognathus may cause anemia (Foreyt,2001).

6. Conclusionsandrecommendations

Generally, the study was conducted to determine the prevalence and to identify ectoparasites involved in small ruminants. Ectoparasites are among the major causes of sheep and goat production constraints and quality deteriorations of exported skin in the country. This study demonstrated an overall prevalence 33.3% ectoparasite infestation in small ruminants in study area. The most important and abundant ectoparasites identified in the study area were ticks (*Rhipicephalus, Ambylomma, Boophilus* and *Hyalomma*) followed by lice (*Linognathus africanus*) and lastly Mange mite (*Demodex*). Among tick species *R. e. evertsi* were the most dominant in the study area followed by immature Ambylomma species, but *Hyalomma truncatum* and *Hyalomma marginatum rufipes* were less commonly occurred relative to other tick species. *Linognathus africanus* was the only lice species found in sheep, but not lice were observed in goats. Among mite species only *Demodex* was observed in single case of sheep. In the this study the prevalence of ectoparasite was relatively low compared to the previous studies that were conducted in different parts of Ethiopia, this may be due to difference agro-climate, in season during which the study was conducted, management and health care of small ruminants in the study areas. The presence of these ectoparasites in small ruminants has a great economic impact through decreased production and productivity, deaths and down grading the quality of skins of sheep and goats, hence reduces the foreign currency earnings of the country.

Based on the result of this study and the above conclusions the following recommendations are forwarded:-

- Control of ectoparasites using effective insecticide and acaricides should be practiced to minimize the impact of parasitism on health and productivity of animals in study area.
- Education of farmers and livestock producers with regard to parasitic disease and appropriate husbandry practices will help to reduce ectoparastie infestation rate.

Control program run in some regions of the country by the Ethiopian government should be expanded to study sites as well as to other regions of the country so that the effect of ectoparasites in the national economy will be minimized.

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