Major Prevalence of liver fluke on Meat Market Oriented of Small Ruminants
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Abstract: An attempt was made to determine the infection prevalence of Ovine and Caprine fasciolosis in Slaughter slabs Assosa Town in three Restaurants and Four Hotels, At three aggro-ecologic zones in the Upper Dabus River Basin from October 20012 to June 20013. In addition, a survey was conducted to determine Liver fluke on Live animal in pellets and on the same animal Carcass especially liver. Furthermore, the effects of a one- and two strategic Triclabendazole (Anthelmintic) treatments on some indicator parameters and associated economic returns were evaluated in relation to live animal body condition and slaughtered animal’s carcass weight. Statistical comparisons, using Chi-square and A statistics, were made to determine the presence of difference in prevalence rates between Young Aged and Older Aged animals in Slaughtering slabs areas, aggro-ecologic zones, seasons and sex. Fecal samples and liver examined of 280(72.90%) Adult and old and 104(27.10%) young were examined and Ante mortem 10 (2.6%) were found positive for fasciolosis and post mortem 14537.8%) were found positive and 5(1.3%) were unknown. The infection prevalence in the Younger (27.1%) was significantly higher (p<0.05) than both adult and old (72.9%) and the 5 unknown resulted (1.3%) at Hotels and Restaurants Slabs.

Keywords: Liver Disease, Meat Market and Small ruminant meat market.

INTRODUCTION

Livestock production is the mean while life of the farmers’ peasant association especially for minor job, plane performance, and stock hold solutions & has a great value with their any day to day motives.

In other word they achieve for their improves of living standards because they sold with simple & easy transportation & higher price demand today, this is the reason for developing countries life is live stock based, they use their animals for Traction power, Transportation, Selling. Eating with their products like Milk, Meat, for Cloth preparation & are raw materials for factories those like skin, hide , feather & etc [1], but Here our attention is one thing those animals that are rare simply & multiply them selves two to three times per year like sheep & goat & Poultry today they get higher price for selling either in Country side or Out of the country side.

In east Africa live stoke production is a vital source for promotion of challenging life & development & prevent poverty. The one that have a great place for changing are small ruminants’ i.e Shoaats, especially around Nomadics of sub Saharan countries beside to Ethiopia. They generate foreign currency around 25-32 % (GDP), for the farmers of view around 35% of in come generation rural

In Ethiopia the population density is estimated around 84 million in national statistics agency with annual growth rate of 2.9%. So the main economic source of the country is Agriculture the sector for live stock based that makes animals are the role player to achieve daily life style of the farmers, & makes live stock basing of the countries [2]. In our countries the animals contribute 30-35% of agricultural importance of (GDP) & for the farmers more than of 85% cash inflows from this 12-16 % is originate from meat & meat products. Sub-sector of total income from live stock is 13-16 % GDP [3].

The Live stock population of Ethiopia is estimated to about 46,124,582 Cattle, 28,721, 633 Sheep, 18, 559,730 Goat, 1,655,383 Equines, 616,396 Camels & 33, 199, 484 poultry [4]. The above mentioned are Huge in number but low in Utility when compared to other African countries averagically. Thus why related to low Productivity due to low genetic potential, lack of sufficient feed, lack of hygeniety, prolonged movement to search feed thus can results of animal exposure to disease with main effect that result mortality, low quality products like of meat, milk, skin & hide, feather & etc in the case of especially
zoonotic disease characters to man or man to animal & Vice version [5].

The area where those shoats can be Originated that prevalence with the diseases mainly liver fluke, leech, Lumpy skin diseases, black leg, foot & mouth diseases, sheep& Goat pox, contagious bovine pleuropneumonia (CBPP), Contagious caprine pleuropneumonia, where as liver fluke & Sheep pox are the main small ruminants problems that results the decreasesments of small ruminant products & by Products, with facing of the peasant income decreasing (Direct Observation, by myself). A number of studies may take place on the high lands of the country related with small ruminants but not common in the law lands especially interconnection with liver fluke study the reason of this is based on the Agro ecological situations of the disease prevention. According to some studies taken place on the high lands of Ethiopia based on the small ruminants (sheep), that respiratory diseases with multifactor etiology are common and constitute the major cause of mortality in sheep. In addition, gastrointestinal parasite, & reproductive wastage, due to infertility & embryonic mortality impose a serious limitation on small ruminant production [6, 7]. This show that as we have less attitude concerning health research.

Knowing of the type & Extents of the common and/ or major health problems is very important to the live stock owner, veterinary, & researchers which can assist in the selection of possible interventions [8]. Damte [9] has also recommended that an organized research that can elucidate major animal health problem is the central issue for further study of epidemiological study on disease of livestock.

There are many reasons that elevate poor livestock sector performance like underdevelopments & lack of market orientation of products, lack of enough information on livestock resources, prevalence of animal disease, illegal animal and animal product trading , inadequate animal & animal product information , lack of Abattoir for the sake of clean mutton & meat supplying to market, traditional eversion of slaughtered animals , excess production & lack of client are the major.

So to the country to halt trend & achieved poverty alleviation & food security , much greater attention need to give livestock productivity & health; including post harvest processing and marketing [10]. Various projects has been initiated by international institute (ILRI) & the ministry of agricultural & rural development (MOoARD) one entitled: “Improving productivity and market success (IMPS)” of Ethiopian farmers; aims at contributing to reduction in poverty of the rural poor through market oriented agricultural development [11]. Assosa woreda also one of the people of the Ethiopian country that contributes the developments with accounted population of 39,230 male , and 46,135 female totally 85,365 according to the woreda’s [12].

METHODOLOGY

Online electronic PubMed and google scholars were searched to get published literatures in Different features of Meat Market to show appropriate information on its consequence effects.

The parasite

Fasciolosis is a disease of sheep, goat, cattle [13] and occasionally affects humans, thus considered as a zoon tic infection [14, 15]. According to Dunn [16] and Soulsby [17], the taxonomic classification of the organisms that cause fasciolosis is presented as follows: Phylum: - Platyhelminthes, Class: - Trematoda, Sub- class: -Digenea, Super Family: -Fasciolidea, Genus: -Fasciola, Species: - Fasciola hepatica Linnaeus, 1758 and Fasciola gigantica Cobbold, 1885

MORPHOLOGY

The adult parasite F. hepatica has a flat leaf-like body , typical of flukes, and measures 20 to 30 mm long by 8 to 15 mm wide [16]. It has an anterior elongation (a cephalic cone) on which the oral and ventral suckers, which are approximately of equal size, are located. The intestine of the adult parasite is highly branched, with numerous diverticulae extending from the anterior to the posterior of the body. The pair of testes, also highly branched, is located in the posterior half of the body. The relative compact ovary is located just above the testes and is linked to a short convoluted uterus opening to a genital pore above the ventral sucker. The vitellaria are highly diffuse and branched in the lateral and posterior region of the body. F. gigantica is a parasite very similar to F. hepatica, Its length may vary 25 to 75 mm long by 15 mm wide [17].

In addition, the cephalic cone is proportionally shorter than that of F. hepatica, and its body even more leaf like in shape [17].

The egg of F. hepatica measures 150μm by 90μm in size and also very similar in shape to that of F. gigantica [17]. The egg of the latter is larger in size (200μm x 100 μm) [16].

Fasciola eggs should be distinguished from the eggs of other flukes, especially from the large eggs of Paramphistome. Fasciola eggs has a yellowish brown shell with an indistinct operculum and embryonic cells whereas Paramphistome egg has transparent shell, distinct operculum with embryonic clear cells, and possess a small knob at their posterior end [17].

Intermediate hosts

Snails of the genus Lymnaea are the
intermediate hosts for genus *Fasciola*. The epidemiology of fasciolosis is dependent on the ecology of the snail intermediate hosts. *Lymnaea* species, most important in the transmission of *F. hepatica*, include: *Lymnaea truncatula*, widespread in Europe, Asia, Africa and North America; *L. bulimoides* in North America; *L. tomentosa* in Australia. Other species, which have been incriminated in the transmission of *F. hepatica* include *L. viator* and *L. diaphena* (South America), *L. columella* (USA, Australia, Central America and New Zealand) and *L. humilis* (North America) [17, 16].

*L. truncatula* is the most common intermediate host for *F. hepatica* in different part of the world [18] and in Ethiopia [19]. It is an amphibious or mud-dwelling snail which prefers moist temperature conditions (15-22°C) though it appears that variants found in the tropics have adaptation to higher temperature mostly in the lowlands areas and can breed and survive at 26°C with sufficient moister.

The most important intermediate hosts of *F. gigantica* are *L. natalensis* and *L. auricularia* [20, 16, 17]. *L. natalensis* is the recognized intermediate host for *F. gigantica* (Yilmia and Malone, 1998) Other species serving as secondarily hosts to this species are *L. rufescens* and *L. acuminata* (Indo-Pakistan) and *L. rubiginosa* (Malaysia).

*L. natalensis* is a strictly aquatic snail often found in Africa. It serves as the intermediate host for *F. gigantica* [20] and requires well-oxygenated non-polluted water bodies and can aestivate during dry periods. Optimal temperature requirement for the completion of parasite developmental stages within the snails is 22-26°C. However, in irrigated areas snail breeding is less circumscribed and will continue all year around, except for periods extreme temperature levels.

**Life cycle**

The life cycle of *Fasciola spp.* is a typical of Digenean trematodes. Eggs laid by the adult parasite in the bile ducts of their hosts pass into the duodenum with the bile. The eggs then leave the host through the faeces. At this stage, eggs are still not embryonated, further development to maturation taking approximately two weeks. The eggs then hatch to release the motile miracidium, which will then locates and penetrates the intermediate snail host. The need to find a suitable host to penetrate is an urgent one, for those miracidia failing to do so generally die within 24 hours.

After penetrating the snail, the miracidium loses its cilia and becomes a sporocyst. The sporocyst dividing and forming redia (forum with sucker and primitive gut), and a fully mature redia showing redia and cercaria stages. The cercaria of *Fasciola spp.* have a rounded body measuring between 0.25 and 0.35mm long, with a long thin unbranched tail measuring approximately 0.5mm long. The mobile cercaria snail generally leaves the snail 4-7 weeks after infection by migrating through the tissues of snails. This is during moist conditions when a critical temperature of 10°C is exceeded.

On emerging from the snail the cercaria attaches to submerged blades of grass or other vegetation like watercress; the tail falls away and the cercarial body secretes a four-layered cyst covering from cystogenous glands located on the lateral regions of the body. The formation of the cyst wall may take up to two days. The metacercaria (encysted, resistant cercariae) is the infective form to the definitive host. Generally, metacercaria are infective to ruminants such as cattle and sheep, but also to other mammals including human beings. One miracidium hatching from a fluke egg can produce up to 4,000 infective cysts (metacercariae) due to the vegetative multiplication at the sporocyst and redai stages. The metacercarial cyst is only moderately resistant, not being able to survive dry conditions. If however they are maintained in conditions of high humidity and cool temperatures, they may survive for up to a year [13, 17, 16], infection through hay as a vehicle of infection in non-endemic areas.

The metacercarial cysts, when ingested along with the contaminated vegetation by the definitive host enter into the small intestine, releasing the young parasite which penetrates the gut wall, entering the peritoneal cavity. From there, it migrates directly to the liver over a period of approximately seven days, directly to the liver. The juvenile fluke (also referred to as adeloscaria) then penetrates the liver tissues, through which it migrates, feeding mainly on blood, for about six weeks. After this period, the fluke enters the bile ducts, maturing in to a fully adult parasite after about 3 months from initial infection. Egg production then commences and completing the life cycle Adult flukes can survive for many years in the livers of infected hosts and lay between 20,000 and 50,000 eggs/day.

The rate of egg production is responsible for the degree of pasture contamination and thus greatly influences the epidemiology of the disease. The epidemiology of the disease is also influenced by the grazing habits of the animals. Animals grazing in wet marshy areas, favored by the intermediate host, are more likely to become infected. Typically, long and wet seasons are associated with a higher rate of infection. However, sheep are more likely to ingest large numbers of cysts during dry periods following a wet season. This is due to a reduction in available pasture, forcing the animals to graze in swampy areas or in areas where the water has receded, thus exposing them to vegetation heavily infected with metacercariae [21].

In the past, human fasciolosis was limited to populations within well-defined watershed boundaries.
however, recent environmental changes and modifications in human behavior are defining new geographical limits and increasing the populations at risk [22].

**Life cycle of Fasciola**

**Epidemiology**

Fasciolosis is considered an important limiting factor for ovine, caprine and bovine production. In general, infection of domestic ruminants with *F. hepatica* and *F. gigantica* causes significant economic loss estimated at over US$ 200 million per annum to the agricultural sector worldwide, with over 600 million animals infected [23]. In developed countries, the incidence of *F. hepatica* ranges up to 77% [24]. Evidence suggests that sheep and cattle may be considered the main reservoir host species, pigs and donkeys being secondary [25]. In tropical regions, fasciolosis is considered the single most important helminth infection of cattle with prevalence rates of 30-90% in Africa, 25-100% in India and 25-90% in Indonesia [26].

*F. hepatica* is a temperate species and it is found in Southern America, Northern Europe and Australia and Africa, but found in the highlands of Ethiopia and Kenya [27]. It is the major cause of liver fluke disease in Ethiopia. Its tropical counterpart, *F. gigantica*, on the other hand is widely distributed in tropical countries, in Africa and Asia, parasitizing domestic ruminants and other herbivores in almost every continent. In Ethiopia, *F. gigantica* is found at altitudes below 1800 m.a.s.l. while *F. hepatica* is found at altitude between 1200-2560 m.a.s.l. [27]. Mixed infections by the two species can be encountered at 1200-1800 m.a.s.l.

The annual loss due to endo-parasite in Ethiopia is estimated at 700 million Ethiopian birr/annum [28]. Particularly financial loss due to ovine fasciolosis alone is estimated at 48.8 million Ethiopian birr/annum of which 46.5%, 48.8% and 4.7% were due to mortality productivity (weight loss) and liver condemnation, respectively [29].

The epidemiology of fasciolosis depends on the grazing habitat preference of the animal. Njau and Scholtens [30] reported that metacercaria can survive up to 3 months after harvesting in hay from endemic highland areas that are consumed by the ruminants in arid and lowland areas, particularly during the dry season when suitable grazing pastures are scarce; local crowding of animals along the banks of streams and ponds during the dry season. When nutritional conditions are generally compromised also provides an important dynamics for infection transmission. Irrigation would have major effects on transmission [27].

**Clinical signs**

The clinical features of fasciolosis can have acute, sub-acute and chronic forms.

*Acute* fasciolosis occurs as disease outbreak following a massive, but relatively short-term, intake of metacercariae [31]. The high fluke intake is often the result of certain seasonal and climatic conditions combined with a lack of appropriate fluke control measures. It typically occurs when stocks are forced to graze in heavily contaminated wet areas as a result of overstocking and/or drought. Animals suffering from acute fasciolosis especially sheep and goat, may display no clinical signs prior to death; while some may display abdominal pain and discomfort and may develop jaundice [17, 31]. In some cases, the liver capsule may rupture and fluid may lick into the peritoneal cavity causing death due to peritonitis. More commonly, on ingestion of fewer metacercaria, fever and eosinophilia is seen [17].

Death usually results from blood loss due to hemorrhage and tissue destruction caused by the migratory juvenile flukes in the liver resulting in traumatic hepatitis. This is more commonly seen in sheep than in other hosts.

*Sub-acute* fasciolosis is caused by ingestion of a moderate number of metacercaria and is characterized by anemia, jaundice and ill-thrift. The migrating fluke causes extensive tissue damage, hemorrhage and in particular liver damage. The result is severe anemia, liver failure and death in 8-10 weeks [31].

*Chronic* fasciolosis is the most common clinical syndrome in sheep and cattle. It occurs when the parasite reaches the hepatic bile duct. The principal effects are bile duct obstruction, destruction of liver tissue, hepatic fibrosis and anemia. The onset of clinical signs is slow. Animals become gradually anemic and anorectic, as the adult fluke becomes active within the bile duct and many may include dependent oedema or swelling under the jaw (‘bottle jaw’). Affected animals are reluctant to travel. Death eventually occurs when anemia becomes severe. Additional stress upon anemic animals, such as droving, may lead to collapse and death. Cattle typically present with signs of weight loss, anemia and chronic diarrhea [32].

In addition to these, a condition known as 'black disease' is a complication, which usually is fatal.

Here, a secondary infection due to the bacterium *Clostridium novyi* Type B, proliferating in necrotic lesions produced by the young larvae migrating in the liver is responsible for the fatal outcome [33]. Chronic fasciolosis provides the right environment in the liver for the germination of the spores of the bacterium. This form of the disease is much more common particularly in man. In humans the presence of the flukes causes a number of non-specific symptoms including malaise, an intermittent fever, mild jaundice,
anemia, eosinophilia and frequently pain under the right costal margin. Furthermore, *Fasciola spp.* do not appear to be fully adapted to using man as a definitive host, as the flukes may often give rise to ectopic infections, particularly in the lungs and subcutaneous tissues, where they may be found encysted.

**PATHOLOGY AND PATHOPHYSIOLOGY**

Pathogenesis of fasciolosis varies according to the parasitic development phases: parenchymal and biliary phases. The parenchymal phase occurs during migration of flukes through the liver parenchyma and is associated with liver damage and hemorrhage. The biliary phase coincides with parasite residence in the bile ducts and results from the haematophagic activity of the adult flukes and from the damage to the bile duct mucosa by their cuticular spines [31]. In the bile ducts of some permissive hosts, such as the sheep, rabbit, rat and mouse, the biliary stage of the disease is common. In others, such as cattle and humans, few flukes survive beyond the migratory phase and biliary disease is relatively rare [34].

Light infections due to *Fasciola hepatica* may be asymptomatic. However, they may produce hepatic, colic with coughing and vomiting; generalized abdominal rigidity, headache and sweating, irregular fever, diarrhea and anemia [34]. In domestic ruminants, an adverse effect of acute or chronic fasciolosis includes decreased weight gain and milk production, decreased female fertility, work power and mortality. Hepatic pathology, even when only limited areas of the liver are damaged, results in significant disturbances in mitochondrial bioenergetic metabolism of carbohydrates, proteins, lipids and steroids, as well as bile flow and bile composition [35].

Sheep and goat are very susceptible to acute fasciolosis and the damage results from the immature flukes tunneling through the liver parenchyma with extensive tissue damage and hemorrhage that culminate in severe clinical disease and high mortality in the grazing sheep in Africa [14]. During the movement of the immature stages of *Fasciola hepatica*, which may continue for months, symptoms may include abdominal pain, an enlarged live, fever, and diarrhea. Mitchell [32] indicated that the pathology associated with diseases are caused by the inflammation of the bile ducts which causes thickening of the lining and eventually leads to fibrosis that results in reduced flow of the bile and back pressure builds leading to atrophy of the liver parenchyma and cirrhosis.

Occasionally the worms penetrate the bile duct wall into the liver parenchyma causing liver abscesses. The complexity arises from several sources. Maturation of flukes involves development and growth for over 12-16 weeks during which time the fluke travels between and within organs.

Because an individual fluke may pass the same part of the liver twice (or more) during these peregrinations, fresh and resolving lesions caused by the sequential insults may be found in the same section of tissue; as the migratory fluke grows the size of its track through the liver increases as does the damage and the inflammatory response. Calves are susceptible to fasciolosis but in excess of 1000 metacercariae are usually required to cause clinical fasciolosis [34].

The disease is characterized in calves by weight loss, anemia, and hypoprotenemia after infection with 10,000 metacercaria [34]. Resistance develops with age so that adult cattle are quiet resistant to infection.

Even though, the rate of development of human fasciolosis is similar to that in sheep, as an unnatural host, only few flukes develop sufficiently to reach the bile duct. Fasciolosis has a major effect on blood components (plasma proteins).

Hypoalbuminemia and Hyperglobulinemia commonly occur in liver fluke infections in all host species. During the parenchymal stage of the infection, liver damage caused by the migrating flukes compromise liver function, which in sheep and calves is reflected in a decline in plasma albumin concentrations, attributed partly to reduced rate of synthesis and partly to an expansion of the plasma volume [34, 31]. Nevertheless, during biliary stage of the infection loss of blood from haematophagia and into the intestines is so extensive, causing severe anaemia, that synthetic capacity of the liver is insufficient to replace the lost albumin (smallmolecular size) that oozes through the hyperplastic bileducts (Chollengitis). Thus, a progressive loss of plasma albumin occurs in all infected host species, starting from around the time the fluke commences blood feeding. This results in disturbance in intravascular and extravascular oncotic pressure leading to the development of oedema, often markedly visible at sumundibular region of ruminants (‘bottle jaw’).

Liver trauma is the abrasion caused by cuticular spines and the prehensile action of the suckers and appears to account for the majority of the damage caused in the liver. Death of the host is a consequence of the hemorrhage induced by this damage. The oral sucker is the route by which liver flukes obtain most of their nutrition. It appears to cause considerable damage to liver tissue and macerated hepatic cells have been observed inside the sucker and pharynx. The oral sucker extends during migration and feeding from the earliest stages is capable of disrupting cells. The muscular pharynx assists in this process and oral sucker is a major organ involved in tissue disrupting [34].

Although the inflammatory process has an important role in protecting the host against severe consequences of liver damage by the flukes, perhaps by

retarding the growth of the parasite and contributing to hepatic healing process, there is accumulated evidence, in rats, that the response also contributes to hepatic dysfunction. There is evidence also that the infected rat liver is under oxidative stress during the parenchymal stage of the infection.

The liver plays a central role in the physiology of the body, being responsible for a large proportion of the body’s amino acid metabolism, for carbohydrate and lipid balance, urea synthesis, detoxification metabolism, ketogenesis, albumin and glutathione synthesis as well as aspects of homeostasis. Therefore, it is to be expecting that many systemic changes will be induced by liver fluke infections that ultimately cause reduced productivity in livestock. Both anorexia (inappetance) and the quality of the diet of infected sheep contribute to hypoalbuminaemia during the infection [34].

Diagnosis

Diagnosis of fasciolosis may consist of tentative and confirmatory procedures. A tentative diagnosis of fasciolosis may be established based on prior knowledge of the epidemiology of the disease in a given environment; observations of clinical signs, information on grazing history and seasonal occurrence. Confirmatory diagnosis, however, is based on demonstration of Fasciola eggs through standard examination of feces in the laboratory; postmortem examination of infected animals and demonstration of immature and mature flukes in the liver. The latter is helpful in deciding the intensity of infection. There are other laboratory tests (enzymatic and/or serological) procedures used to qualify the infection mainly for research purposes.

Serological assays are often used to detect infections due to immature forms where feecal egg output is often nil. Such tests allow the detection of substance like cathepsin L proteases, excretory-secretory products, detection of Ag in milk, and ELISA detection of antibodies against the flukes plasma concentration of Gamma-glutamyltransferase (GGT), which are increased with in the bile duct damage [36, 17, 31] for example, Oxidative stress would be one of the consequences of the activity of inflammatory cells such as neutrophils, macrophages and eosinophils in producing oxygen-derived free radicals, nitric oxide and their products. A useful indicator of oxidative stress is the concentration of reduced glutathione (GSH) in cells. For chronic fasciolosis, confirmatory diagnosis could easily carried out by coproscopic examination employing sedimentation technique. Fasciola eggs have high specific gravity and sedimentation is preferred to flotation. When the latter is employed, floating medium such as ZnSO4 should be used. As Fasciola eggs may be confused with Paramphistomum eggs, addition of methylene blue in the faecal suspension will facilitate ease identification by providing a blue and contrasting microscopic field.

Control and prevention

Several control methods against ruminant fasciolosis are available and can either be used independently and as a combination of two or more of them. These methods involve reduction in the number of intermediate snail hosts by chemical or biological means, strategic application of anthelmintics, reduction in the number of snails by drainage, fencing and other management practices and reduction in the risk of infection by planned grazing management.

Economic

According to Ethiopian life point of view their animal populations are the great roll in relation to the cultivation of crops, transportation, selling and with getting cash, food and food productions and what ever of our daily life can be tied to the existence of animals all species of animals even if beside to pet animals those can sever with guarding of our areas.

When we see the problem that arised with liver flukes it results some what economical crisis by condemnation of the needed and that have high price even while selling of liver.

According to Daniel. F [37] Economic importance of organs condemnation due to Fasciolosis and hydatidosis in cattle and sheep slaughtered at Dire Dawa Abattoir.

With relation to much organ condemnation higher amount of income will be destroyed and the profitability of the abattoirs that they contribute to income generation will be deducted and those persons who have been may get profit and serve the country in come generation and defense of poverty may not ended with positive situations, those type of works may be lead to cheat or theft to pass the infected organs & exposes the users with infection.

So this problem not to be controlled in Assosas town due to the weakness of municipal and much of the users be expose to infection as of Dires abattoirial indication too.

FAO [38] estimated that Africa has 241 million Sheep and 209 million goats representing approximately 23% and 29% the world total population, respectively.

The latest animal population census [4] shows that Ethiopia has 23.62 million sheep and 23.33 million goats. Despite the huge population size productivity of small ruminants in Ethiopia is very low because of prevalent diseases, sub-optimal nutrition, and poor management [39]. Animal diseases are widely distributed and one of the major causes of livestock mortality, ill thrift and sub-optimal productivity in all

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agro-ecological zones of the country [40] is diminishing the benefit of their high reproductive performance.

Mulugeta et al., [28] and Goll and Scott [41] showed that productivity losses attributed to helminth parasite in Ethiopian highland sheep are considerable, and fasciolosis is a major factor in this respect. Direct losses due to fasciolosis are host mortality and liver condemnations whereas losses indirect losses may occur in a form of losses in body weight and decreased weight of lambs from infected ewes and decrease wool production [42, 39, 34].

Public health

Fasciolosis has recently been shown to be an important public health problem with human cases reported from countries in five continents, the level of endemicity ranging from hypo- to hyperendemic [43]. Human fasciolosis has also been reported in Europe, including Belgium, France, United Kingdom, Ireland, Switzerland and Spain [23].

The perception of human fasciolosis, caused by Fasciola hepatica or Fasciola gigantica, as an sporadic disease of low economic importance, is no longer tenable as the estimate of global prevalence is between 2.4 and 17 million human infections worldwide [44] and a further 180 million at risk of infection [23]. As a result, WHO [15] has recognized fasciolosis as an emerging disease of humans. The distribution of the disease is predominantly rural, being associated with cattle and sheep breeding, although high prevalence in humans are not necessarily associated with areas where fasciolosis is a significant veterinary problem. A few studies showed that the incidence appears to be concentrated within families, as they are all likely to consume the same contaminated product.

The most common transmission route is the ingestion of watercress contaminated with encysted metacercariae, although, depending upon the geographical location, and a variety of edible aquatic plants can be vehicles of transmission. Water containing floating metacercariae has also been implicated in disease transmission, as have salads contaminated with metacercaria-contaminated irrigated water. Among the risk factors are included the use of animal manure as fertilizers and wastewater effluent for irrigating aquatic or semi-aquatic vegetables [44]. High prevalence of human fasciolosis is recorded from Peru and Bolivia. Very few human fasciolosis reports exist in Ethiopia [45], personal communication). The anticipated common means of transmission is the habitual use of grass as a toothpick in this environment

CONCLUSIONS

The inferences drawn from the present study are summarized as follows:

- Significantly higher prevalence of ovine and caprine fasciolosis was obtained in the young, irrespective of the adult and older inspected status, than both the species and original areas. This shows that, as compared with age and areas, the in region and out region in the Upper Dabus River Basin are more favorable for the propagation and activity of the snail vectors and progression of the Fasciola life cycle for most months of the year.
- One of the remarkable findings of the present study is that fasciolosis prevalence significant increased at irrigated sites in young grazers at lowland dry (dry season only) and lowland wet areas, (both during wet and dry seasons) when compared with the parallel scenario in non-irrigated younger grazers study sites (slabs). This finding warrants that special schemes for fasciolosis must be instituted while undertaking development efforts such as expansion of irrigated agriculture with widening prevalenced.
- From the study meant to assess the effects of strategic anthelmintic trial (Triclabendazole 300mg/kg BW), the following core results were obtained:

  - A significant decrease (p< 0.05) in mean faecal egg output was seen in both shooats
  - a one time treatment and received twice treatment as compared with untreated slaughtered

In addition, similar significant trends were depicted in improvements of those comes to the slabs from in region with good housing and those comes out of the region with their manging system was not better unkown.

The difference between species and origin, however, was not statistically significant (p>0.05). Accordingly, a considerable net return of birr 17.4ml./animal/year was lost this is per animal/year while negative return (a net loss of 17. 4 birr) was recorded from Fasciola-infected and untreated sheep and goat slaughtered in per Hotels and Restaurants due to infected liver. In addition, farmers have expressed some valuations on non-monetary benefits from strategic treatments such as avoidance of repeated journeys to markets because of the ease of selling and ability to bargain on prices of wellconditioned animals while in comparison with attempts to sell poor condition and untreated animals. This is paramount in terms of getting quick money to be able to solve urgent household needs, effective planning and in view of maximizing time utilization at farm levels.

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