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## ETHNO-VETERINARY KNOWLEDGE AND PRACTICES OF ISSA-SOMALI PASTORALISTS AROUND DIRE DAWA, EASTERN ETHIOPIA

### ABSTRACT

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A study was conducted to survey the ethno-veterinary knowledge and practices Issa-Somali pastoralists have and apply in managing their goats around Dire Dawa, eastern Ethiopia. The Issa-Somali community is known for its long history of traditional goat keeping. Pastoral livestock production is the dominant livelihood system in the area where-in disease was prioritized as the major production constraint. Poor accessibility of conventional veterinary services, amid the flock and family mobility characterizing the production system, has left the Issa pastoralists with no choice but uphold the traditional livestock treatment systems passed down through generations. The community employs unique ethno-semantics and ethno-taxonomy approaches to understand, diagnose and treat various goat diseases. Traditional healers within the community practiced rather complex ethno-veterinary practices to treat sick animals. Indigenous knowledge inherited from ancestors and traditional belief/rituals in the community were the main factors shaping the range of ethno-veterinary practices. However, “local experimentations” have enabled the system’s dynamism to respond to emerging diseases. Range of ethno-veterinary practices was uncovered in this study. These findings of knowledge, practices and actors in traditional animal health care could be organized as an input towards implementing feasible and sustainable community-based animal health care scheme to benefit the pastoralist community.

**Key words:** Issa-Somali; Goats; Ethno-semantics, Ethno-veterinary; Disease; Traditional healers

## INTRODUCTION

Series of livestock development programs, with animal health as the main component, have been implemented in Ethiopia for decades mainly targeting the pastoralist areas (IBC, 2004). However, disease still remains to be the major challenge for livestock production. This expensive failure of past interventions largely owes to unsuitability of conventional animal health care systems to the risk averse and highly mobile nature of the pastoral production systems. Lessons from failures of past interventions in Ethiopia and elsewhere in the tropics have led to a paradigm shift in terms of recognizing the role of indigenous knowledge and community-based approaches in livestock health interventions (Grum et al., 2012). Ethno-veterinary knowledge is often “tacit” rather than expressed knowledge and is structured differently from scientific knowledge and takes participatory approaches to make such knowledge visible and channel it towards development projects (LPPS and Koehler, 2005).

The Issa-Somali community is a pastoral community with a long history of goat breeding (Gebreyesus et al., 2013). The mobile nature of goat production system of the community makes it difficult for implementation of conventional veterinary systems. As a result, the Issa-Somali pastoralists show high degree of self-reliance in animal health management and normally treat sick animals themselves. Various studies in pastoral communities have shown that pastoralists have the largest amount of knowledge and experience in this respect (LPPS, 1999). However, level of knowledge and types of ethno-veterinary practice applied are different among different pastoral communities. Studying the indigenous knowledge and practices is the first step towards documentation and designing of intervention schemes tailored to the specific needs of communities. This paper reports the ethno-veterinary knowledge and practices of the Issa-Somali community employed in managing their goat population.

## Materials and Methods

### The study area

This study was carried out in the rural kebeles around Dire Dawa located between 9°27'-9°49' north latitude and 41°38'- 42°19' east longitude in the Eastern part of Ethiopia (DDAC, 2002). The north eastern part of Dire Dawa is relatively sparsely populated lowland exhibiting pastoral and agro-pastoral system and the southeastern part of the administration comprises of the escarpment with mixed farming system (DDAC, 2004). The study sites include Jeldesa, Goladeg and mudianeno kebeles found in the north-eastern and north-western parts of the Dire Dawa Administrative council. Goat and camel are the dominant livestock species in the study sites kept under pastoral and agro-pastoral production systems. In the study sites, the Short-eared Somali goat breed is preferred and predominantly kept by the Issa pastoralists.

### Engagement of the community

It was attempted to acquire a prior informed consent before entering the community for actual data collection. The quality of data to be collected in a participatory manner, centering such traditional communities, largely depends on a genuine cooperation of the very community. This genuine cooperation in turn stipulates clarification and sensitization of the community on the objectives, intentions and use of possible outcomes of the study. Accordingly, a community meeting was organized at each PA, in the respective central villages, before the commencement of actual field work. The local

chiefs in each PA were prior contacted and briefed on the rationale for conducting the meetings. The meetings were then called by and conducted in the presence of the local chiefs.

### **Sampling framework and data collection procedures**

Three Kebeles were selected for the study following purposive sampling approach considering livestock production systems and location. The first kebele, Jeldesa, is located 40 kilometers east of Dire Dawa and is characterized by agro-pastoral production system while Mudianeno is 10 kilometers east of Dire Dawa and is characterized by a transhumant pastoralist production system. The third kebele, Goladeg, is located 42 kilometers west of Dire Dawa and was characterized with a predominantly nomadic system.

Focal group discussions were made with a focal-group established at each kebele. Members included individuals communally known as “traditional healers”, women, and local elders believed to be knowledgeable about traditional treatment practices. The focal group discussions were facilitated by a multidisciplinary team composed of the researchers, two veterinarians from the regional agricultural bureau and local agricultural development agents at each kebele. In the discussions, local participants were asked to exhaustively mention list of goat diseases in the area, their local name, symptoms as well as methods of diagnosis.

Informal enquiries were made with randomly accessed local informants as a method of triangulation in order to cross check reports on similar issues. Participatory observation, staying within the community, was also made to identify important goat diseases, disease ethno-taxonomy and traditional treatment methods.

Semi-structured questionnaires were distributed to a total of 120 respondents, randomly selected from the three kebeles, to rank the major goat diseases according to prevalence.

### **Data Analysis**

Statistical Procedure for Social Sciences (SPSS for window, release 15.0, 2006) was used to analyze the qualitative data from the questionnaire. Qualitative data on disease ethno-semantics, ethno-taxonomy and ethno-veterinary practices were subject to triangulation in order to cross check and validate reports from several sources on similar issues.

Indexes were calculated for all ranking data according to a formula: Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons.

## Results and Discussion

### Goat production systems in the area

Pastoral and agro-pastoral production systems were dominant in the area. The main feed sources for goats in the study area were communal natural pasture, shrub and woodlands. Boreholes, hand-dug wells and springs were the major sources of water both for human and livestock in the area. Natural depressions were also reported important during the wet season in harvesting and retaining water from the light rains.

Almost all pastoralists provided thorny enclosures for night shelter. Thorny enclosures were reported as dominant forms of night shelter to livestock in general among several pastoralist communities in the county (ex. Farm Africa, 1996; Workneh, 1992; Fikrte, 2007). Kids were generally housed in separate pens within or side to the thorny enclosure provided for the main flock. These pens were well roofed with wooden materials and walled usually with stone. Goats were also seen housed together with sheep either within the same enclosure or the main enclosure separated only with thorny barriers. The thorny enclosures are thoroughly cleaned each morning once the flock leaves for grazing.



**Picture 1. The family house, a thorny enclose for the main flock and a separate pen for kids**

Purposes of keeping goats ranged from the more tangible benefits including milk, income, meat, skin and manure to socio-cultural benefits like tradition, social status, saving, social payments and medium of ritual performances (Gebreyesus et al., 2012).

### Flock size and structure

The average goat flock size per household was found to be  $32.8 \pm 21.6$ . The figure is higher than the case reported by Farm Africa (1996) which suggested a mean flock size of 23 for the Small-eared goat population in general in Ogaden and around Dire Dawa. On the other hand, the mean flock

size reported in this study was lower compared to the figure reported by Workneh (1992) for the goat dominated pastoral systems in southern Ethiopia. Females more than one year old constituted 42.4% of the whole population while males of the same age made up only 8.9% of the population. The ratio between male of more than one year of age and their female counterparts was accordingly 1:5. This is close to the inference of Wilson (1991) who reported that for small ruminants in traditional livestock production systems of Africa ratios of between 1:4 and 1:6 have been widely observed. But there were on average more bucks to does in the results of this study as compared to the report of Nigatu (1994) who mentioned buck to doe ratios of 1:19 for Ethiopian and Eritrean goats in pastoral flocks.

### Major production constraints

The major production constraints in the area were reported to be feed and water shortage, diseases and predators (Table 1). The locals employ range of techniques to mitigate these constraints. Movement was reported to be an integral part of the livestock production system in the area to mitigate shortages of feed and water as well as outbreaks of diseases.

Constraints	Jeldesa*				Mudianeno*				Goladeg*			
	R1	R2	R3	I	R1	R2	R3	I	R1	R2	R3	I
Feed shortage	70.3	16.2	8.1	0.42	93.8	6.3	0	0.49	82.5	15	2.6	0.47
Water shortage	13.5	43.2	40.5	0.28	0	52.1	17.8	0.2	5	15	34.2	0.13
Disease	13.5	37.8	40.5	0.26	6.3	35.4	53.3	0.26	7.5	45	28.9	0.24
Predator	0	2.7	10.8	0.03	0	6.3	17.8	0.05	5	25	31.6	0.16
Market	0	0	0	0	0	0	0	0	0	0	2.6	0.008

**Table 1. Household ranking on major production constraints in the area**

\* R1, R2 and R3 = rank 1, 2 and 3 respectively. I= index : Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons

### Mortality

Mortality rates for different sexes and age groups of goats according to kebele respondents are summarized in Table 2. Overall mortality rate of 25.4% was reported for the last twelve months. This was comparable with the report of ILCA (1990), which stated that annual mortality rates of 25 to 35 were common in small ruminants. 58.7% of the overall mortality was reported for female goats. Meanwhile, mortality of male goats contributed 41.3% of the whole mortality. It can be observed that the mortality rate was higher for females compared to their male counterparts. Higher mortality rate was also computed for the kids less than one year of age than the adults in both sexes. Disease (57.6%) and predators (37.3%) were ranked as first and second most important reasons of mortality. FGD members also mentioned that drought and heat stress may add up to the fatality of diseases which, under good conditions, could have been tolerated.

Category	Jeldesa		Mudianeno		Goladeg		Overall %
	% of total mortality	% of total flock	% of total mortality	% of total flock	% of total mortality	% of total flock	
Male< one year	16.25	3.5	31.8	8.7	26.8	7.2	26
Female<one year	24.4	5.2	46.6	12.7	28.5	7.6	37.2
Male> one year	17.6	3.8	6.8	1.8	18.1	4.9	15.3
Female>one year	41.7	9	14.8	4	26,5	7.1	21.5
Total	100	21.6	100	27.2	100	26.8	25.4

**Table 2. Reported mortality in different sex and age categories**

### Major goat diseases in the area

Respiratory, skin and external parasitic diseases were prevalent in the area (Table 3). Respiratory diseases such as CCPP have been reported as major goat diseases in other pastoral goat producing regions of Ethiopia as well (Workneh, 1992). Tick infestation has been ranked as the most significant health problem in the area with rank indexes of 0.30, 0.4 and 0.28 in Jeldesa, Mudianeno and Goladeg kebeles, respectively. The locals are aware that apart from the direct effect of Ticks in reducing the condition and productivity of animals, they predispose the goats to tick-borne diseases and reduce their level of tolerance to other diseases. Some poisonous plants were also reported to cause ill-health and even death when consumed by animals. Invasive weed species, notably Prosopis, were also reported to cause diseases.

Diseases	Jeldesa				Mudianeno				Goladeg			
	R1	R2	R3	I	R1	R2	R3	I	R1	R2	R3	I
Babesiosis	2.6	2.8	3.7	0.03	4.8	16.7	-	0.09	12.5	7.7	27.8	0.13
CCPP	10.5	11.1	11.1	0.1	4.8	8.3	-	0.06	5	10.3	5.6	0.07
FMD	-	22.2	18.5	0.1	4.8	20.8	-	0.1	-	2.6	-	0.009
Coenuruses	15.8	30.6	40.7	0.24	-	-	-	-	-	-	5.6	0.009
Menge	2.6	2.8	3.7	0.03	-	-	-	-	20	23.1	22.2	0.2
Tick infestation	52.6	22.2	11.1	0.36	61.9	25	66.7	0.4	32.5	30.8	11.1	0.28
CSN	-	-	-	-	-	8.3	-	0.03	-	-	-	-
LSD	-	-	-	-	7.1	8.3	22.2	0.12	-	-	-	-
PPR	1.3	-	11.1	0.02	2.4	4.2	11.1	0.05	-	2.6	10.8	0.026
Plant toxicity	4	2.8	-	0.02	4.8	-	-	0.02	20	23.1	17	0.2
Foot rot	-	5.6	-	0.01	-	-	-	-	-	-	-	-
Orff	-	-	-	-	2.4	4.2	-	0.03	-	-	-	-
Pasturellosis	-	-	-	-	2.4	4.2	-	0.03	-	-	-	-
Tick paralysis	10.5	-	-	0.05	4.8	-	-	0.02	10	-	-	0.05

**Table 3. List of major goat diseases according to prevalence rank (%)**

CCPP= Contagious Caprine Pluero-Pneumonia; FMD=Foot and Mouth Disease, CSN=Complex Skin Necrosis, LSD= Lumpy Skin Disease, PPR; Pest de Petit Ruminants

\* R1, R2 and R3 = rank 1, 2 and 3 respectively. I= index : Index = sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) given for an individual reason (attribute) divided by the sum of (3 for rank 1 + 2 for rank 2 + 1 for rank 3) for overall reasons

### Disease ethno-taxonomy and ethno-semantic

Ethno-semantic and ethno-taxonomy refers to a local perception of a disease and its nomenclature, aetiology, pathogenesis, diagnosis and epidemiology (Ellen, 2001). According to LPPS and Koehler (2005), studying local terminology and ethno-taxonomy of livestock diseases promotes an understanding of their concepts, and facilitates communication and helps to overcome an often faced difficulty in “translation” of local disease names to western equivalents.

Table 5 shows list of local names and scientific equivalents of the reported diseases. Many of the respondents were able to distinguish between the different diseases, they know the symptoms associated with the diseases and whether diseases are contagious or not. Naming of diseases was observed to refer to symptoms, affected areas and in rare cases the causative agents. Naming diseases according to symptoms was different from the conventional (western) system. For instance, different stages of the same disease had different names as each stage may show different symptoms; although majority of them understand that the stages are related. Giving different names could be because of the fact that their system of disease diagnosis is limited to symptom analysis and not based on the causative agents, especially at the micro organism level, which obviously need sophisticated equipments and skills. The same disease also had different local names even within neighboring villages.

Local names	Scientific equivalents
1. Sogudud, Gedh ass, Jonis, Shimbir, Sobudob	Babesiosis
2. Sombob, Sulgar, Newrsi, Hargeb	CCPP
3. Abeb	FMD
4. Amedelo	Coenuruses
5. Andho	Mange
6. Shilinta	Tick infestation
7. Dhela'e, Kurukuri	CSN
8. Gedh anole, Erq	LSD
9. Colere	PPR
10. Harka, Shuben	Diarrhea (plant toxicity)
11. Lugo dhela'e, Dhuti	Foot rot

12. Ay delow, Achero, Maoni,	Orff
13. Bogta	Pasturellosis
14. Hulumbu	Tick paralysis
15. Gestury, Andhubul	Horn degenerating disease

**Table 4. Local names and scientific equivalents of reported major diseases in the area**

### **Ethno-veterinary practices**

The inconsistency and sometimes complete absence of conventional veterinary services by the government and private sector has led the pastoralists to stick and rely on the traditional treatment systems followed by their ancestors DDAC (2002). The traditional treatment systems in the study area could roughly be described as mix of rational and belief-based practices where in some cases the locals can explicate how the treatment applied is to cure the disease and in some other circumstances they just believe the treatment will heal the animals but fail to explain how. The reported concepts and practices regarding traditional treatments varied from respondents to respondents both in terms of variety and content. Females and elders were found to have rich knowledge with regard to goat diseases, their diagnosis and treatment.

### **Branding (Cauterization)**

Cauterization involves burning of the animals' skin tissue with hot iron materials. Although no research has so far been made to scientifically validate or disprove the use of cauterization for treatment, Köhler Rollefson (1997) describes it as a highly complex system with possible parallels to acupuncture. The locals in the study area practice branding on the animal body with red hot metal utensils in an attempt to treat a disease or problem. It was reported to be applied on goats with Coenurus, coughing, babesiosis, sheep and goat pox, tick paralysis and different skin diseases. Although in many cases location of the cauterization point may be associated with the location of the disease, there are some exceptions. Coenurus is treated by branding on the head while coughing is treated by branding on the chest. Different skin diseases are treated by branding on the spot of the problem with different patterns and number of branding points according to the type of the disease and size of affected area. Sheep and goat pox is treated by branding at the muzzle. Goats with Babesiosis and tick paralysis are treated by branding at two points below the neck despite the systemic nature of both problems.

The locals also reported a culture of forcing goats with FMD to walk on smoking hot charcoals left after deliberately burnt woods on the ground. The rationale for this is to heat up the affected areas of the feet and can be considered as the traditional version of "hot-pressure treatment" of lesions.

### **Treating with smoke (fumigation)**

Smoke from eucalyptus tree leaves, tobacco, coffee bean shells, cattle dung and birds' nest is used to fumigate the animal in treating for circling disease. Scientifically, smoke is used for preservation of food items such as meat due to its antimicrobial and antioxidant nature. According to Harold (2004),



Phenol and other phenolic compounds in wood smoke, for example, are antimicrobials which slow bacterial growth. Other antimicrobials in smoke include formaldehyde, acetic acid, and other organic acids, which give wood smoke a low pH—about 2.5.

### **Use of medicinal plants and other chemicals (Ethno-pharmacology)**

Use of different herbal plants believed to have medicinal values was reported in traditional treatment of diseases. Several scientific investigations have validated the use of some herbal plants and recommended that Herbal remedies used for hundreds of years by livestock herders can be put to commercial use provided that the safety and efficacy is verified.

Other plants used for treatment purposes in the study area include *Azadirachta indica* (locally known as gedh kinin), eucalyptus, tobacco leaves (tumbo), coffee bean shells (hashara), *Prosopis* (Gerewewa) and chili powder (Bisbas). Many of these plants are used in fresh state except tobacco leaves, coffee bean shells and chili powders. Both dry and wet leaves and/or shells are grinded, usually mixed with water and used either through external application or drenching according to the disease to treat.

It was also observed that the jus from grinded wet leaves of Neem tree (*Azadirachta indica*) is commonly used in treatment against gastro-intestinal parasites and diarrhea. A study by Samson (2011) has found a significant drop in fecal egg count, larvae count and adult parasite counts in experimental group of goats from eastern Ethiopia fed with Neem tree (*Azadirachta indica*) leaves for ninety days. Neem tree leaves are also popular traditional medicine for humans even by the town population.

Water boiled with table salt is applied on lesions and open wounds in cases of FMD, predator bites and other mechanical injuries as an antiseptic treatment of the lesions. This is similar to the common conventional to FMD which involves local antiseptic treatment of the lesions together with antibiotic treatment to help stop the blisters getting infected by bacteria. In case of bleeding wounds after predator attack or injuries, application was followed by branding the wound space. Gasoline, purchased from the city, is applied on the whole body against ticks. A sulfur ointment (dign) mixed with cooking oil is applied externally to treat Menge.

### **Traditional vaccine**

The locals also reported a practice by which the body of a CCPP victim goat is dissected and its lung taken out and sliced into pieces and each piece tied on the head close to the nasal opening of every healthy goat. This was reported to be commonly practiced during severe outbreak of the disease as a sort of “vaccination” and the locals believe that goats treated so will be immune to CCPP. Some of the ethno-veterinary practices of the Issa-Somali pastoralist may not be scientifically backed. However, as Martin et al (2001) puts it, the issue is not whether indigenous beliefs and practices are “right” or “wrong”. Rather, what is important is the extent to which they promote productive animal management given the resources realistically available to farmers.

**Administration of conventional veterinary drugs**

Shortage or lack of veterinary personnel and easy access to illegal drugs at chip prices has encouraged the pastoralists to buy and administer these drugs by themselves. The most frequently reported administration of such was an injection with oxy-tetracycline for a range of diseases including tick infestations. Apart from the quality issue associated with illegal drugs, unprofessional administration of such drugs for range of diseases may have negative consequences including development of pathogenic strains resistant to the respective drugs.

**Preventive measures**

One of the most commonly practiced preventive measures against tick infestation was deliberate reduction of watering frequency especially during the rainy seasons when there was more free water access and the vegetations saturate with high water content. Their justification was associated with the perceived varying levels of blood movement according to levels of hydration of the animal. According to the locals, as the animals are optimally hydrated, their blood will be “thinned”, the volume of blood moving through the veins will be high and ticks find it easy to stay parasite on the skin of such animals. The locals’ observation that tick infestation gets exacerbated during the wet season was supported by DDAC (2004) which, based on data collected between the years 1992 to 2000, reported a significant increase in infestation during the rainy seasons. However, further research needs to be done to validate or disprove the locals’ concept that level of hydration of the animals exposes them to tick infestation.

The locals also employ burning and rotational use of grazing lands to prevent infestation. These measures are very effective in wiping out the larvae and eggs of internal and external parasites dropped out onto the ground. Regular cleaning of night shelters and fumigating the special roofed enclosures of kid goats by smoking manure were also reported as preventive measures against tick infestation. They also employ separate-species housing system and prepare different compartments for sheep and goat within the open coral. The pastoralists have the concept of species difference in the level of tolerance to specific diseases.

Movement is also taken as the last resort in mitigating disease and infestation pandemics. It was reported that instead of split-herd migration, as in the case of the search for feed and water, the entire herd is taken onboard and the route of migration will not be as such far.

**Household labor division in treatment and care of sick animal**

Women primarily perform wide range of activities starting from herding to construction of the mobile family houses. Some activities in goat husbandry were gender segregated. Milking goats, processing and selling the dairy products are, for example, exclusive tasks of females specially the house wife due to a taboo against such practices by all age males. Taking care of sick animals is primarily undertaken by adult females in 34.4% of respondents’ households. In 27.2% of the households, both male and female adult members of the household were reported to be responsible for taking care of sick animals.

### Traditional healers

There are individuals locally recognized for their skill in treating sick animals, the majority of whom also treat humans. Livestock owners themselves are active in ethno-veterinary practices. They treat their own animals for common diseases and minor injuries in consultation with the local traditional healers. However, in cases of treatments which need special skills like cauterization and traditional vaccine preparations, locally known traditional healers within the village or neighboring villages are called up on to provide their services for free. Nevertheless, the traditional healers are not classified in any form of special profession caste; they have no unique terminology or titles and have no specializations.

### CONCLUSION

The study has shown that disease is one of the major production constraints in the area. It was also found that the locals have complex knowledge in identifying, diagnosing and treating diseases. Indigenous knowledge inherited from ancestors and traditional belief/rituals in the community were the main factors shaping the range of ethno-veterinary practices. However, "local experimentations" have enabled the system's dynamism to respond to emerging diseases. Their methods of diagnosis and naming of diseases was found to be different from the conventional approach. Traditional healers were found to be the main actors in animal health care. Implementing community-based animal health management is highly recommended to mitigate the threats from diseases. Local traditional healers identified in this study may be used as focal points to put some technical trainings and facilities at their disposal to support pastoralist communities in the area.

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