PREDISPOSING FACTOR OF HYENA BITE TO DOMESTIC ANIMALS IN ADA'A WOREDA, EASTERN SHOA, CENTRAL ETHIOPIA.

Addis Beyene Addis[1] and Yilkal Asfaw[2]

[1]Animal production and Technology, Adigrat University, Adigrat, Ethiopia

[2]School of Veterinary Medicine, Addis Ababa University, Debre-zeit, Ethiopia

ABSTRACT: The low level of development of the road transport network and the rough terrain of the country make the donkey the most valuable; appropriate the affordable pack animal under small holder farming system of Ethiopia. One of the major constraints to working donkeys is hyena bite. The objective of this study was to identify the predisposing factor to hyena bite and to assess the prevention measures taken by the resident communities through community based study in
10 peasant association. The major predisposing factor were; timely Follow up animal(W=0.886,p<0.001), defense mechanism of the animals(W=0.838,p<0.001),feed and water problems(W=0.835,p<0.001),housing problems (W=0.778,p<0.001),hyena habitat(W=0.738,p<0.001) and rainy season(W=0.715,p<0.001) highly significances to donkeys in decreasing order. Also the study revealed that time of attack in midnight (74%), place attack in field (66.6%) and method of attack (63.2%) in pair was observed. Prevention measures perceived by local community put in place to reduce livestock depredation include Make good housing (kraals), Supply feed and water adequately and timely, Keep dog and well managed, wounded animal early treatment.

Keyword: Hyena bite, Ada'a, Domestic animals, predisposing factor, Ethiopia.

1. INTRODUCTION

In a country where there is less developed transport and communication services and road network insufficiently developed, the natural choice rests on the use of human labor and pack animal as a mode of transport, as it has been the case in some part of the world like Ethiopia (Hassen, 2000). The low level of development of the road transport network and the rough terrain of the country make the donkey the most valuable; appropriate the affordable pack animal under small holder farming system of Ethiopia (Gebrewold *et al.,* 2004).

Donkey is still one of the most important drought animals playing a key role in the agricultural economy (Oppong, 1997). Donkeys are considered better than other drought animals because of their inherent tolerance for dehydration, low sweating rate and good thermo-ability (Singh *et al.,* 2005). Recurrent and drought in Ethiopia resulting increase cattle mortality has also contributed to an increase in donkey usage as drought and pack animal both in rural and urban area. They account for over 50% of the animal energy scenario in the country (Feseha, 1997). One of the problems which are a potential threat to the lives of working donkeys in central Ethiopia is hyena bite (Tesfaye, 2005).

Of the three species of hyena in Africa, only the spotted hyena(*Crocuta crocuta*) and the shy and much rarer, striped hyena (*Hyaena hyaena*) are found in East Africa. The smaller and even shyer brown hyena (*Hyaena brunnea*) occurs only in southern Africa. Different from most other animals, female spotted hyenas are dominant over the males and outweigh them by about 3 pounds Hyenas are social animals that communicate with one other through specific calls, postures and signals (Mills, 1999).

The spotted hyena is a skillful hunter but also a scavenger. Truly an opportunistic feeder, it selects the easiest and most attractive food it may ignore fresh carrion and bones if there is, they kill as much as 95% of the feed they eat (Cooper *et al.,*1999). It consumes animals of various types and sizes (including domestic stock and even other hyenas), carrion, bones, vegetable matter and other animals' droppings. The powerful jaws and digestive tract of the hyena allow it to process and obtain nutrients from skin and bones. The only parts of prey not fully digested are hair, horns and hooves; these are regurgitated in the form of pellets (Sillero-Zubiri and Gottelli, 1992).

Hyena can observed in many parts of Ethiopia but prey population appears generally lower. This pattern was also observed in Ada'a district, a region in the central of Ethiopia. One of the most serious human-carnivore conflicts in Ada'a is that of livestock losses. The spotted hyena has a reputation for killing and scavenging domestic stock, mostly donkey, sheep and goats. These predatory activities have actually been observed. Yet little is known about prevalence and predisposing factor of hyena bite in the district. Therefore, the objectives of this study were to identify the predisposing factor those contribute to hyena bite and to assess the protection measures taken by the resident communities.

2. METHOD AND MATERIALS

2.1. Study area

The study was conducted in ADA'A districts of central Ethiopia. Ada'a: found in Oromia regional state in Eastern shoa zone 45km south east of Addis Ababa, located 90N latitude & 40E longitude of 1880 meter above sea level in the central highlands of Ethiopia (NMSA, 2015). These sites were selected based on their high Equine population; high prevalence hyena bite was reported and poor economic status of the owner.

2.2 Study Animal and sample size

The study animals were domestic animals that susceptible to hyena in ten peasant associations of ada'a district.

2.3. Study design and sampling procedures

participatory appraisal/Communities based methods was applied to generate information on hyena bite such as pair-wise ranking, matrix scoring, proportional piling, and seasonal calendar (Catley *et al.*, 2001; Catley, 2005).first of all the community informed before we come day of work for peasant association leader to selected members of group with at list one female in the discussions to avoid misunderstanding and

discrimination of gender. There may be a range of experiences and opinions among members of the community or there may be sensitivity in divulging information to outsiders or to others within the community. This is where a focus group discussion can be useful. For this study we used three facilitators, one leading the discussion, another making a record and third one to maintain the environment as well as support necessarily materials.

2.3.1 Pair-wise ranking;-

Is structured method for ranking a small list of items in priority order and make- decision in a consensus-oriented manner. This important tools uses for comparable of locally perceived predisposing factor to hyena bite in each selected study area.

2.3.2 Matrix scoring; -

During the participatory appraisal semi-structure interview (SSI) were used to gain an understanding of the local perception of hyena bite. The groups of informants were identified by key informants to prioritize and rank the most important hyena bite Pair wise ranking of the animals was conducted to identify locally perceived indicators. The five animals indicated above were presented using everyday objects and place along the top X-axis of the matrix. Each of five animals in the matrix was scored against a list of indicator. The indicators were illustrated along the Y –axis of the matrix. For each indicator, informants were asked to score each animal by dividing pile of 25 stones against the five animals. Matrix scoring was standardized and repeated within 10 selected site .Group sizes varies from 6-10 individuals. The level of an agreement across the group was determined by the method of Siegel and castellan (1994)

2.3.3 Proportional piling;-

Before performing the proportional piling; first list name of animals and predisposing factor during the past years to estimate the fate of animal, then every informants asked to classified 100 stones for each listed animal then after split 100 stones then ask to informant to list predisposing factor then the informant ask again Mr./Mrs X says this animal high prone due to this. Are you agreed if yes pass to next level among the informants whereas, one them doesn't agree give time to explain his/her idea then we discuss the idea until make decision and pass to next session.

2.3.4 Seasonal calendars; -

Were used to describe the seasonal occurrences of hyena bite the six most important animal identified in the matrix scoring. The methodology for constructing seasonal calendars was similar to matrix scoring. The seasons divided in to three with agreement for easily understanding through local materials for rainy season use green plant, harvesting time use sickle and dry season use dry straw uses were represented by local material on the X-axis and numbers representing season and caused placed along the Y- axis. This type of seasonal calendar was used with groups of informants.

2.4. DATA COLLECTION AND ANALYSIS

The study was analyzed on nonparametric using Kendall coefficient of concordance (W)(Siegel and castellan,1994) Agreement among the scores of informants groups was assessed. Kendall's W ranges from 0 (no agreement) to 1 (complete agreement) to determine the level of agreement using the below formula (Kendall *et al.*, 1939). The other results were analyzed using statistical package for social science (SPSS version 15) respectively. m=judge, n=objects, s=sum

$$W = \frac{12S}{m^2(n^3 - n)}.$$

3. RESULTS

The community of ten peasant association was agreed as major predisposing factor Lack of timely follow up and the least one was rainy season.

Table 1: This shows the relationship of predisposing factor to domestic animals

Predisposing factor	cattle	Dog	Donkey	Sheep	Goat
1.Feeding and watering problem					
W=0.835; p<0.001	4(0,5)	0(0,2)	11(0,15)	6.5(0,10)	4.5(0,7)
2.Housing system problem					
W=0.778; p<0.001	2(0,4)	0.5(0,5)	7(0,17)	7.5(0,15)	5.5(0,7)
3.Ability of animal defense Mechanism					
W=0.838; p<0.001	1(0,4)	2.5(0,4)	9(0,14)	8.5(0,11)	4(0,6)
4.Rainy season					
W=0.715; p<0.001	2(0,4)	2.5(0,5)	8(0,11)	6(0,14)	5(0,6)
5. Destruction of hyena habitat					
W=0.738; p<0.001	2(0,13)	0.5(0,3)	10(0,10)	5.5(0,15)	5(0,8)
6.Lack of timely follow up					
W=0.886; p<0.001	2(0,6)	0(0,2)	10(0,15)	7(0,9)	5(0,6)

The spotted hyena mostly attack the domestic animals in the field (66.6%) whereas, least one was in the Stoll.

Table 2. Where hyena attack the domestic animals

PA	Field	Barn	Stoll
Giche	57	28	15
Gerbicha	86	10	4
Dalota	55	34	11
Filitino	52	35	13
Hiddy	82	11	7
Yerer	77	23	0
Bekejo	60	35	5
Dire	56	36	8
Koftu	74	22	4
Kality	67	23	10
Over all percentage	66.6%	25.7%	7.7%

Hyena attacks the domestic animals mostly as pair (63.2%), Herd (20.6%) and Solitary (16.2%) respectively.

Table 3: way of hyena attack

PA	Solitary	Pair	Herd
Giche	30	52	18
Gerbicha	24	54	22
Dalota	14	67	19
Filitino	15	69	16
Hiddy	13	51	36
Yerer	5	73	22
Bekejo	11	64	25
Dire	9	72	19
Koftu	19	69	12
Kality	22	61	17
Over all percentage	16.2%	63.2%	20.6%

4. DISCUSSION

Wild prey species have been greatly reduced in the past decades mainly due to intensive agriculture, habitat loss, human settlements and other factors associated with human population growth. As habitat gets fragmented, the length of 'edge' for the interface between humans and wildlife increases, while the animal populations become compressed in insular refuges. Consequently, it leads to greater contact and conflict with humans as wild animals seek to fulfill their nutritional, ecological and behavioral needs (Sukumar, 1990).

Spotted hyenas are efficient predators in their own right; they kill as much as 95% of the feed they eat. Also spotted hyenas scavenge opportunistically (Cooper *et al.*, 1999). Spotted hyena preyed mainly on domestic animals as was expected considering the whole extirpation of medium-sized natural prey in the study area. Major predisposing factor for hyena bite perceived by the community in study area as follow; lack of timely follow up, ability of defense mechanism of the animals, supply feed and water problems, housing problems, destruction of hyena habitat and season in descending order (Table 1).

Animals should be handled quietly, with care and patience to respect the animal's welfare also checking the animals were housed before dusk and even earlier during the rainy season was mandatory to maintain the animal welfares. The main predisposing factor to hyena bite of the domestic's animals was lack of timely follow up. Within this predisposing factor susceptibility of domestic animal to hyena bite was different with type animals Donkeys, Sheep, Goat, Cattle and Dog were more susceptible to hyena bite related to lack of timely follow up in ascending order In this studies donkeys due to lack of timely follow up highly significance to hyena bite(W=0.883,P<0.001). a lot of reasons rise by the community such as lack of awareness about animal welfare, Doesn't understand feeding behaviors' of donkey, backyard aptitude like donkey feeds a lot than other animals and in donkeys don't considered ration formulation domestic animals(doesn't given supplementary feed after daily work for this animals).

In the animal world, they live by the laws of survival. The strong once can survive for long time. Based on this idea; Animals have many different defense mechanisms that can protect them against predators such as horn, voice, teeth, the feet, tongue, tail, release putrid odor and change their coat color. In this study, Donkey highest affect by hyena bite in relation to defense mechanism (W=8.38;p<0.001,9(0,5)) than other domestic animals due to no feed and water supply adequately this leads during dusk donkeys out from Stoll to search feed and water, donkey keeps in the barn with cattle that easily to penetrates hyena to the barn and bite it, deep sleep donkey due to lethargy, donkey start run immediately and make sound when seen hyenas this leads easily to bite ventral parts of the donkeys and to called group of hyena, donkey free to graze without keeper.

The second one affect was sheep due to no horn, during attack of hyena no noise for help, light body weight to carry, drawn their head to ground this leads shortsighted, during rainy settle circular manner and relatively run forward when sees hyena. Third one goat due to light body weight to carry, feed habited nature, high urine smile to attract hyena but positive she run fast to mountainous nature, make loud sound, most time keep shoat with shepherded. Fourth one dog due to occurred first line stof defender for other domestic animals , during rainy season no hear sound or deep sleep dog due to no supply feed adequately but positive she lives in and around home, make loud sound, high ability smile long

distance to detect predator. Cattle and horse have high ability to defend via their horn(cattle), front leg (horse), doesn't afraid when sees of hyena, respectively. Whereas, either due to age (young or elder) or poor body condition (diseased or malnutrition) may attacked by hyena.

Livestock population depends primarily on naturals grazing, the quality and quantity of grazing is variable depending on season. During dry season the quality grazing is very poor and result domestic animals (except dog) evolved to spend 14–16 hours per day browsing and foraging for feed. Also, any inclement weather, such as wind and rain will reduce the ability of the hair coat to insulate, and further will increase energy need (Nengomasha, 2005). This study point out that donkeys the highest median in relation to feed and water problems encountered (W=8.35;p<0.001,11(0,15) due to no supplementing feed given after work(Table 1). This is mainly because of the generally low status perception of donkeys when compare with other domestic animals. But the reality was totally different for example; donkeys are more efficient at digesting feed than horses may due to have a different microbial population in the large intestine than do horses. Another possibility is increased gut retention time compared to ponies.

Also donkeys need to eat about 1.5% of their body weight about 90% of dry matter, compared with 2.5% for horses to maintain their weight and normal activity (maintenance requirements) in dry matter(Gebrewold *et al*., 2005). The second one affect by hyena was sheep due to feeding behavior. The least one susceptibility to hyena bite related to feed and water problem was dog due to dog search their feed within and around homes.

In this study, third one predisposing factor to hyena bite was housing problem (W= W=0.778; p<0.001). In all types of housing systems animals should be free to stand up or lie down comfortably at all times. Housing facilities should provide for enough height to permit domestic animals to have a full range of head and neck motion without touching the ceiling when standing with four feet on the floor. Flooring should be properly designed, constructed and maintained to provide good traction, proper drainage, and comfort and prevent injury. Effective shelter will afford protection against cold winds, sunburn, and driving rain. Very young and very old animals will be more susceptible to climatic extremes and require extra consideration. The lack of adequate shelter can result cold stress, loss of body conditions and increased susceptibility to disease (FAWAC, 2005).

Sheep was highest susceptible to hyena bite in relation to housing problem (W=0.778;p<0.001,7.5(0,15)) than other domestic animals due to sheep kept in separate kraal with poor constructed door because no give attention or poor economic status, sheep when hyena enter their kraal no make sound but circling within the kraals. The second one animals was donkey due to in most in Ada'a district donkey's kept at center of barn with cattle this helps hyena couldn't the donkey attack because the cattle defense to the donkeys(Table 1). The least one that susceptible to hyena bite was dog (W=0.778;p<0.001,0.5(0,5).

The fourth one predisposing factor of domestic animals to hyena bite was destruction of hyena habitat. Spotted hyenas are found in grasslands, woodlands, savannas, sub-deserts, forest edges and mountains. Spotted hyenas are organized into territorial clans of related individuals that defend their home ranges against intruding clans. Destruction of hyena habitat least significance in relation to hyena bite as predisposing factor in most domestic animals in the study area. But for donkey highly significance (W=0.738; p<0.001**,** 10(0.13)) due to in the study area donkey doesn't given supplementary feed this leads to donkeys to search other alternative feeds to fulfilled nutritional requirement far from villages then faced with hyena and bitted. Whereas, dog was least one (W=0.738;p<0.001,0.5(0,5)the reason behind this was dog live in and around house.

The last predisposing factor was rainy season and highest hyena bite encountered due to the sky cloudy cover, difficult to heard sound that produced by the animal, farmers become lethargic, dog deep sleep due to coldness, couldn't see long range due to cloudness, hyena doesn't go far due to full river/mud, hyena doesn't scavenge on ground due to scavenge material washed with water and be came early to villages, the predator animals doesn't see/hear/run their will be hunt easily by hyena, supplementary animal feed was decrease during this season(fulfilled nutritional requirement only by grazing/browsing), disappear animal to find difficult, during rain the animal separate in different direction. Plant covers wide area difficult to see. Whereas, during dry season also incident of hyena bite occurred due to the animal free to graze without keeper, shortage supplementary feed, hyena can scavenge easily and accessibly, donkey relatively minimized work load had energy to kick the hyena, start green grass growth to search. However, harvesting season lowest case of hyena bite encountered due to most animals keep with keeper to prevent cereals, the animal doesn't go far from surrounding due to efficient access feed, need for work/transport the animals, relatively supplement to animal.

Informants were asked the way of attack, place and time of livestock predation. This study point out that most of time hyena attack the animal through the best tactic one hyena run forwarded with dog barking then the hidden one come hanged the dog then become suitable environment to attack other animals in pair (63.2%) the most common one. Whereas hyena attacks domestic animals as solitary (16.2%) was rear observed only during comeback to their habitat accidental. The study indicated that the animals attack in their field (66.6%) during the animal disappear for the reason search feed and water, mismanagement like doesn't care about the animal where rest, from Barn (25.2%) due to doesn't construct with hard materials and have hole that favors to hyena easily penetrate and 7.7% in Stoll (localy Gurono) due to the wall wells construct and have door. In contrast 20% of the respondent's indicted that the livestock has been killed in fields (Gidy *et al.,* 2010). In our study no human attack. Exclusively attacks were at night (3-9AM due to human deep sleep time (no hear).

Prevention measures perceived by local community put in place to reduce livestock depredation include Help of GOD, Make good housing (kraals) that construct by stonewalls high in length so that the hyena could not jump over it and should be strong enough and sited near to home for assisting during attacks. Understand of animal behaviors, Supply feed and water adequately and timely, Keep dog and well managed, Wounded animal early treatment, Health statuses of animal follow up and educated the people regularly with action, Good fencing, Keep animal by shepherd or intensively manage, early evening manage the animal, Give free time for the animal to graze. This preventive measure agrees with Gidy *et al* (2010). Killing, firing and poisoning were not proposed and practiced as preventive measures in this study as the community suggest if the hyena disappear viability because ecosystem imbalance this leads increase of water and soil borne disease that harmonious with(Sillero-Zubiri and Laurenson, 2001; Fritts *et al*., 2003).

5. CONCLUSION AND RECOMMENDATIONS

Domestic animals had huge contribution to social and economic development of communities but the role of domestic animals especially; equine power has not been fully realized because of a number of interrelated technical, economic, social, managemental, health and welfare issues. This could be effective only if joint efforts are taken by the government and the various developmental organizations to address these issues. To alleviate the major constraints that rise the community through strong apply extension program and conduct research in order that

sustainable impacts on the domestic animals and livelihoods of the users and the development of the country can be achieved. Based on the above information the following recommendations were forwarded: first create awareness among the domestic animals owners and society about the seasonality and reason of occurrence should be addressed. Secondly, Communities and wildlife conservation authorities should work together for environmental conservation and numbers of hyena population in a given locality does not exceed a threshold that threatens livelihood systems via conservation of their habitat.

6. ACKNOWLEDGMENTS

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