

Assessment of Poisonous Plants to Livestock in and around Dale Sadi Woreda, Kellem Wollega Zone, Western Ethiopia

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Abstract

The study was conducted from November 2015 to May 2016 in and around Dale Sadi woreda, Kellem Wollega Zone of Oromia regional state, Western Ethiopia to assess and identify the potential toxic plants to livestock. Structured questionnaires in two forms were applied and 142 individuals: 124 livestock owners and traditional healers, and 18 animal health practitioners were interviewed. The result of this assessment indicated that more than 135 (95%) respondents have disclosed the presence of plant poisoning to livestock in the study area. In this study, 35 toxic plant species were identified and documented. The major problems that expose the livestock to toxic plants as explained by study participants were a shortage of feed (54.8%) and nutritional deficiency that causes abnormal feeding habits (25.9%). The animals are usually poisoned at the end of the rainy season and during the dry season. The most common plant parts that cause toxicosis to the livestock were the whole (all parts of the plant) and leaf. Among the toxic plants: Parthenium hysterophorus (18.51%), Marga Cita (NA) (15.55%), Medica goburu wed (14.81%), Sorghum bicolor (8.2%), and Euphorbia spp. (4.44%) were the most frequently complained toxic plants in the study areas. The majority of the plants that cause toxicosis to the animal were by ingestion with a single exposure (single consumption) or and among species, bovines were found to be susceptible animals. Generally, the study indicates the existence of many toxic plants in the area that needs public awareness to reduce livestock exposure and further research should be carried out to determine the toxicogenic ingredients of the plants.

Keywords: Kellem Wollega, Livestock, Toxicosis, Toxic Plant.

Introduction

Plants comprise the third-largest category of poisons known around the world. In countries with higher plant biodiversity, the number of problematic toxic plants may be greater (Radostits *et al.*, 2007). Plant biodiversity in Ethiopia is very high, as there are about 7,000 species of vascular plants native and naturalized. No country in Africa enjoys as great diversification of geology, landforms, soils, and climate as Ethiopia (Dereje *et al.*, 2015).

Numerous factors that influence the action of poisonous substances include the route of absorption, the dose, the chemical nature of the poison, whether exposure to the poison is single or repeated, the management system, the species, sex, and general health state of the animal and chemical factors (Panter *et al.*, 2011). Under normal conditions, only a few toxic plants can be considered sufficiently palatable but during a shortage of pasture and forage, they may be forced to browse these toxic plants (Dixit, 2007).

A toxic or poisonous plant causes biochemical or physiologic changes when consumed by livestock (Larry *et al.*, 2011). Diagnosis of plant poisoning of livestock depends on the history, clinical syndrome observed, post-mortem lesions, evidence that plants have been grazed, and remains of toxic plants in the gastrointestinal tract (Birgit *et al.*, 2006).

A first approach to avoid the negative impact of toxicosis on livestock is the identification of plant species that can affect animals, using ethnobotany as a source of information (Botha and Penrith, 2008) and identifying the plant (toxic principles and parts, clinic effects, target species, systems and organs, antidote or special treatment) is also significant in terms of management of cases (Dixit, 2007).

Further, it is not customary among local veterinarians to write case reports and there is no well documentation on the poisonous plant in Ethiopia (Dereje *et al.*, 2015). Hence, it is imperative to bring to the attention of all professionals the effects of poisonous plants on animal health and productivity. Therefore, this study was designed to identify and document potential toxic plants to livestock and to create awareness among livestock owners in and around Dale Sadi woreda of Kellem Wollega zone, Western Ethiopia.

Materials and Methods

Study Area

The study was conducted from November 2015 to May 2016 in and around Dale Sadi Woreda, Kellem Wollega Zone of Oromia regional state, Western Ethiopia. Dale Sadi Woreda is about 512km far from Addis Ababa. The average temperature in the area is 34^oc with an average rainfall of 1200mm. According to Dale Sadi Woreda District Agricultural Office (DSDAO, 2013), the altitude of the study area is about 1150 m above sea level and the district has various topographic features. Xerophytic plants dominated the vegetation of the area. A mixed crop and livestock farming system is the mode of agriculture in the districts.

Study Population

The target populations for this study were livestock owners (farmers and traditional healers) and animal health practitioners.

Sampling Methods

Purposive sampling methods were used to select the Kebeles and interview the individuals. The questionnaire survey was carried out on the selected individuals by interviewing voluntary animal owners, traditional animal healers, and animal health practitioners. All volunteer traditional healers were selected based on a recommendation from elders of the study area.

Material and Methods

The structured questionnaire was used to collect data related to toxic plants to livestock and their associated risk factors. The plants were collected from surrounding forests and other sites of the study areas with the people who

know the local name of the plants. To identify the scientific names of the complained and collected poisonous plants the Biology Department of Natural Science Faculty, Wollega University was consulted and named accordingly.

Data Analysis

The data that was gathered through a questionnaire survey about toxic plants to livestock were coded and entered into Microsoft Excel 2007 spreadsheet. The data was imported from the Excel program and analyzed by SPSS version, 20. Descriptive statistics were also used to calculate the frequency of the data.

Results

A total of 35 toxic plant species were identified and documented during the study period. From 142 people interviewed, 135(95%) individuals complained presence of plant poisoning on livestock in the study area.

Table 1: Summary of respondents who participated in the interview about poisonous plants to livestock in the study area.

Group of participants	Kebeles from the Dale Sadi district used for the study					
	Idoo warra walee		Gonsii Darabaa,		Ganda Magaalaa	
	Asked	Respondents	Asked	Respondents	Asked	Respondents
Livestock owners	40	38(95%)	41	39(95.1%)	43	40(93%)
Animal Health practitioners	4	4(100%)	6	6(100%)	8	8(100%)
Total	44	42(95.5%)	47	45(95.7%)	51	48(94.1%)

Among the major complained poisoning plants, *Parthenium hysterophorus* (18.51%) Marga cita (NA) (15.55%) *Medicago buruwed* (14.81%), *Sorghum bicolar* (8.2%), and *Euphorbia spp* (4.44%) were the most frequently complained toxic plants.

Table 2: Summary of identified poisonous plants in the study area with their local and scientific names, toxic parts, manifested signs, and affected species with types of exposure.

Scientific Name	Afaan oromo /Local Name	Frequency	Toxicosis	Species Affected	Toxic Parts	Exposure
<i>Parthenium Hysterphorus</i>	Faramsisa	25	Anorexia Allergic reactions	All Species	Leaf	Repeat
NA	Marga cita	21	Bloat Death	All Species	Whole Parts	Single
<i>Medicago burweed</i> (Eng)	Siddisa	20	Bloating colic	Bovine Ovine	Whole Parts	Single
<i>Sorghum bicolar</i>	Guboo Bishingaa	8	Bloating dyspnea	All Species	Leaf	Single
<i>Euphorbia Spp</i>	Baala Diimtuu	6	Skin burn Blindness	All species	Other Parts	Single
<i>Brackenfern</i> (Eng)	Dheertuu	3	Blood urine nervous sign	Bovine Equine	Leaf	Repeat
<i>Stinging Nettle</i>	Gurgubbee	2	Skin burn	All Species	Whole Part	Single
NA	Qamaxxee	2	Mucosal damage to Oral cavity	Bovine Equine Caprine	Whole Parts	Single
<i>Giradinia Bullossa</i>	Doobbii	2	Restlessness Irritation	All Animal	Whole Parts	Single
<i>Amaranthus Spp.</i>	Raafuu	3	Bloating, Anorexia	Bovine Caprine Ovine	Leaf	Single

<i>Castor Bean (Ricinus cumunus)</i>	Qobboo	3	Diarrhea Colic Collapse	Bovine Equine Caprine	Seed, Fruit	Single
<i>Glottidium Vasicaria</i>	Tasfaaniyaa	1	Gastroenteritis Diarrhea Death	Caprine Poultry	Seed Fruit	Single
<i>Allium Cepa</i>	Qullubbi Waraabessa	1	Diarrhea Inappetance	Caprine Equine Bovine	Root	Single
<i>Prunus Africana</i>	Hoomii	2	Bloating salivation Colic	Caprine Bovine	Leaf	Repeat
<i>Xanthium Spinosum</i>	Darbattee	2	Restlessness Death	Equine	Other Part	Single
<i>Opuntia Microdasys</i>	Babattoo	2	Skin discomfort Itching	Ovine Caprine Bovine	Leaf	Single
<i>Solanium Incanum</i>	Hiddii Gurraacha	2	Diarrhea Inappetance Depression	Ovine Caprine Bovine	Seed, Fruit	Repeat
<i>Elephant Ear(Eng)</i>	Baala Go'adarree	2	Excess salivation	Caprine Ovine	Whole Parts	Single
<i>Hyparrhenia Rufa</i>	Jajjaba	3	Edema Weight Loss	Bovine	Leaf	Single
<i>Agave Lecheguilla</i>	Qaaca	3	Pain sensation depression	All Animals	Other Part	Single
<i>Hibiscus Ludwigi</i>	Hincinnii	2	Bloating	Caprine Ovine	Leaf	Repeat
<i>Algae Species</i>	Saphaphuu bishaanii	1	Diarrhea	Bovine	Whole Parts	Repeat
<i>Hordium Vulgar</i>	Garbuu	1	Irritation, Abscesses	All Species	Seed, Fruit	Single
<i>Acacia Absynica</i>	Laaftoo	1	Bloating	Bovine Caprine	Leaf	Single
<i>Snowdina, Polystarchia</i>	Muujjaa	2	Bloating diarrhea	Bovine Caprine	Whole Parts	Single
<i>Lantana Camara</i>	Akayii Simbirroo	1	Photosensitization	Bovine	Whole Parts	Single
<i>Glossypium Spp</i>	Jirbii	1	Vomition, Diarrhea	Bovine Equine	Seed, Fruit	Single
<i>Plantago lanceolata</i>	Qorxobbii	2	Bloating	Bovine Caprine Ovine	Leaf	Repeat
<i>Datura Stramonium</i>	Hashangira	2	Bloating Dyspnea	Bovine Caprine	Leaf	Single
<i>Phytolacea- Dodecandra</i>	Handoode	1	Bloating	Bovine Ovine Caprine	Leaf	Single
<i>Olea Europaea</i>	Ejersa	1	Bloating	Bovine	Leaf	Single
<i>Nicotiana Tabacum</i>	Tambo	1	Bloating	Bovine Caprine	Leaf	Single
<i>Nerium Oleander</i>	Baredaa	2	Diarrhea Salivation Anorexia	Bovine Equine	Whole Parts	Single
<i>Ponderosa Pine</i>	Xidii	1	Abortion	Bovine	Leaf	Repeat
<i>Datura Proporia</i>	Hashangira qorattii	3	Bloating	Caprine Bovine Ovine	Leaf	Single

Key: Eng-English NA-Not identified

Among assessed predisposing factors, shortages of feed (54.8%) and the nutritional deficiency (25.9%) were the major problems (Table 3).

Table 3: Priority ranking of factors that predispose livestock to plant poisoning

Associated risk factors for poisoning livestock	Frequency
Feed shortage	74(54.8%)
Nutritional deficiency	35(25.9%)
Water shortage	6(4.4%)
Other factors	2(1.48%)
Total	135(100%)

Discussion

During the present study, 35 plants having toxic effects on livestock were identified. Among these *Parthenium hysterophorus* (18.51%), *Marga cita* (NA) (15.55%), *Medicago buruwed* (14.81%), *Sorghum bicolar* (8.2%), and *Euphorbia spp.* (4.44%) were the most frequently complained plants. However, this was different from the report of Adeniran and co-investigators (2014) in Abuja, Nigeria, and Dereje and others (2014) in central Ethiopia, in which *Erythrophleum guineense* and *Rhizophoraceae* were the most, complained toxic plants, respectively.

Medicago spp and *Sorghum bicolar* was also reported to have caused the poisoning of livestock in many countries as in the study area. Similarly, the importance of *Medicago buruwed* and *Sorghum bicolar* were reported as causes of livestock poisoning. *Sorghum bicolar*, *Ricinus communalis* and *Lantana camara* are also reported to have caused the poisoning of livestock in Sokoto state, Nigeria (Ebbo *et al.*, 2013).

The study also revealed that *Nerrium oleander*, *Datura propria*, and *Agave lecheguilla* complained of having toxicity to livestock. The plant *Nerrium oleander* is known to contain cardiac glycosides that can cause rapid death in humans and animals (Bandara *et al.*, 2010), and their presence was reported in Colombia (Diaz, 2011).

In this study, the respondents responded that leaf (45.7%), whole part (28.58%), seed and fruit (14.2%), root 3(8.57%), and others 1(2.85%) were suspected poisonous plants. However, this is different from the report of Dereje and others (2014) who revealed that parts of poisonous plants were leaves (58%) and whole part (19.4%) in Adama area, and Fred-Jaiyesimi and Ajibesin, (2012) reported that toxic parts were leaf (43.9%), roots (13.2%) and fruits (6.6%). In this context, Agaie and co-workers (2007) described that 70% of toxic parts were leaves and bark in Nigeria.

Conclusion

The results of the present study show that plant toxicities are among the important causes of health problems in and around Dale Sadi Woreda. Shortages of feed and nutritional deficiency were the major problems that expose the livestock to toxic plants. *Parthenium hysterophorus* (18.51%) grass species (15.55%) *Medicago buruwed* (14.81%), *Sorghum bicolar* (8.2%), and *Euphorbia spp* (4.44%) were the highest botanical frequent toxic plants recorded in the study area. The majority of the toxic plants that cause toxicosis to the livestock were by ingestion with a single exposure and bovine species were found to be susceptible to poisoned animals. Thus, awareness creation should be given to livestock owners on the impact of toxic plants on their livestock and an adequate amount of feed supplements should be provided. Moreover, further research should be conducted to investigate the toxic principles and to know the active ingredients of the poisonous plants.

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Contribution by Authors

Equal contribution

Conflict of Interests

There is no conflict of interest.

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