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Ndizihiwe Daniel
Department of Agriculture and Agribusiness, Bishop Stuart University, Mbarara, Uganda

Ahishakiye Emmanuel
1. Department of Biomedical Engineering, Mbarara University of Science and Technology, Mbarara-Uganda
2. Department of Computer Science, Faculty of Science, Kyambogo University, Kampala Uganda

Nkuuhe Douglas
Department of Agriculture and Agribusiness, Bishop Stuart University, Mbarara, Uganda

Sunday Benjamin
Department of Agriculture and Agribusiness, Bishop Stuart University, Mbarara, Uganda

Tumwesigye Wycliffe
Department of Economics and Environmental Management, Bishop Stuart University, Mbarara, Uganda

Correspondence
Ndizihiwe Daniel
Department of Agriculture and Agribusiness, Bishop Stuart University, Mbarara, Uganda

Utilization of medicinal plants in treating livestock diseases around Queen Elizabeth national park, western Uganda

Ndizihiwe Daniel, Ahishakiye Emmanuel, Nkuuhe Douglas, Sunday Benjamin and Tumwesigye Wycliffe

Abstract
The study focused on the use of medicinal plants in treating livestock diseases by the communities around queen Elizabeth National Park, specifically in Nyakatonzi and Kichwamba sub-counties in western Uganda. The study identified the available medicinal plant species and their application in treatment of livestock diseases. Plants of families *Euphorbiaceae, Fabaceae* and *Lamiaceae* were the mostly used in treating livestock diseases and most of these plants are harvested from the National Park. A total of nineteen different plant species was found to be used. Diseases treated by herbal plants included; anaemia, bloat, cough, East Coat Fever (ECF) and external parasites with East Coast Fever treated by large number (10) of plant species. There is a need to pay attention on how these plants are being exploited to avoid their extinction as some have become endangered species. Programmes that aim at sustainable use and conservation of the most important plant species in treating these diseases can be thought of, for example the plant domestication projects as some of the species can be found in the National Park only. The distribution, the methods of use and the efficiency of these implicated plant species should be areas of further investigation to give more light on the subject.

Keywords: Nyakatonzi, Kichwamba, sustainable use, plant families, plant domestication

1. Introduction
Much of the ethnobotanical work in disease treatment has been linked much to humans, not paying attention to another side of animal life that is valuable for both food security and income generation for overall all community livelihood. It has been revealed that plants can play a significant role in treating economically important livestock diseases [1], some of which are non-responsive to conventional synthetic drugs. This is because plants contain a variety of alkaloids [2] that react differently, hence performing different functions. In Uganda, residents around Queen Elizabeth National Park, one of the best tourist attraction centres in Africa and the entire world are believed to be the major source of valuable knowledge on the use of traditional plant species in treating both human and animal diseases. This has been the song of the day basically due to the fact that it is difficult to access modern health services with ease both for humans and the livestock in the area. Livestock diseases are responsible for muchlosses incurred [3] and this is mainly due to lack of appropriate measures of dealing with them [4].
Considering the disadvantages of relying on the synthetic drugs [5], trying to find the safe alternative way of dealing with the diseases is paramount. Therefore, there will always be a need to document on the appropriate plant species effective for controlling most of livestock diseases in a given locality.
Thorough understanding and documenting on these plant species may not only be linked to the reduction of the animal fatalities but also be embraced for economic reasons and also environmental and user friendliness. Similar to most parts of the world, indigenous knowledge concerning the utilisation of the available plant species in treating livestock diseases has been ignored which has contributed to the crippling nature of the livestock sector development. Reviving the culture of embarking on the traditional knowledge and using the modern scientific methods to improve it, seem to be the way to go in most agricultural production aspects especially livestock. This study stood up to value the indigenous knowledge locally obtained from the communities around Queen Elizabeth National Park in order to understand the plant species used and on which diseases. The study specifically emphasized the identification of available medicinal plant species and the corresponding diseases treated in Nyakatonzi and Kichwamba subcounties around Queen Elizabeth National Park in western Uganda.

2. Methods

2.1 Study area

The study was conducted in sub-counties of Kichwamba and Nyakatonzi near Queen Elizabeth National Park is located in western Uganda, spanning the districts of Kasese, Kamwenge, Bushenyi and Rukungiri. Its location is approximately 376 kilometres (234 mi), by road, southwest of Kampala, Uganda's capital and largest city. Its coordinates are 00 12S, 30 00E (Latitude: 0.2000; Longitude: 30.0000, at an altitude ranging between 950m and 1300m above sea level. Annual rainfall intensity ranges between 750 mm and 1200 mm, while the temperature ranges between 14ºC and 27ºC. It is now a home to 95 mammalian species, over 500 bird species of and 57 plant species.

2.2 Data collection and analysis

Data was collected using semi-structured interviews and focus group discussions with the aid of questionnaires. Using purposive and simple random sampling methods with the help of Krejcie and Morgan formula for sample size determination, a total of 415 respondents were interviewed of which 331 were livestock owners, 71 traditional healers, 7 vendors of herbal medicine and 6 veterinary officers who are critical in identifying the different livestock diseases. The respondents were asked which plants they use in treating their livestock, where they obtained the plant material and which diseases they commonly treat. The interviews were conducted in native languages (Runyakitara), local Bantu dialects spoken by most of the people in the study area. Data was analysed using descriptive statistics in the excel spread sheet for windows that generated tables histograms and pie charts showing percentages and frequencies.

3. Results

3.1 Plants used in treatment of livestock diseases

Plant species that belong to various families have been found to be used in treating livestock diseases in the study area. Table 1 clearly indicates the plant species commonly used and their respective families. From the table, it can be noted that plants of families *Euphorbiaceae*, *Fabaceae* and *Lamiaceae* are mostly used in treating livestock diseases. There is high diversity of plant species used in treating livestock disease as evidenced by the total of nineteen different plant species used in treating different diseases.

Table 1: Plant species used and their families

Plant species	Plant family
Hibiscsus surattensis	*Malvaceae*
Acacia sieberiana	*Fabaceae*
Carissa edulis	*Apocynaceae*
Curcubita sphaerica	*Curcubitaceae*
Sapium ellipticum	*Euphorbiaceous*
Ocimum suave	*Lamiaceae*
Entada abyssinica	*Mimosaceae*
Rubus steudneri	*Rosaceae*
Clerodendrum myricoides	*Lamiaceae*
Clerodendrum rotundifolium	*Lamiaceae*
Eryrthrina abyssinica	*Fabaceae*
Helinus mystacinus	*Rhamnaceae*
Microglossa pyrifolia	*Asteraceae*
Myrica kandtiana	*Myricaceae*
Phytolacca dodecandra	*Phytolaccaceae*
Solanum aculeastrum	*Solanaceae*
Synadenium grantii	*Euphorbiaceae*
Conyza sumatrensis	*Asteraceae*
Euphorbia candelabrum	*Euphorbiaceae*

3.2 Livestock diseases treated and the respective plant species

The findings of the study revealed the list of the diseases treated and the common plant species used according to the livestock farmers in the area. As indicated in the table 2 below, the diseases treated by herbal plants include; anaemia, bloat, cough, East Coat Fever (ECF) and ecto-parasites. East Coast Fever is treated by many plant species (10 species) compared to other dieseases, however all the diseases can be treated with more than one plant species. Only *Acacia sieberiana* was seen to be used in treating two diseases, that is, anaemia and East Coast Fever.

Table 2: Diseases treated and the respective plant species

Disease	Medicinal plant species used
Anaemia	*Hibiscsus surattensis, Acacia sieberiana,*
Bloat	*Curcubita sphaerica, Carissa edulis,*
Cough	*Sapium ellipticum, Ocimum suave, Entada abyssinica, Rubus steudneri*
East Coast Fever (ECF)	*Acacia sieberiana, Clerodendrum myricoides, Clerodendrum rotund folium, Eryrthrina abyssinica, Helinus mystacinus, Microglossa pyrifolia, Myrica kandtiana, Phytolacca dodecandra, Solanum aculeastrum, Synadenium grantii.*
Ecto-parasites	*Conyza sumatrensis, Euphorbia candelabrum*

3.3 The provenance of the plants used

The sudy considered the specific locations of the area where these plant sepecies are found. It was revealed that most of the plants are harvested from the National Park. 140 respondents said that they obtain these plants from the National Park, 139 from the communal land and 136 said that they get the plants from both communal land and the National Park as shown by the figure 1.

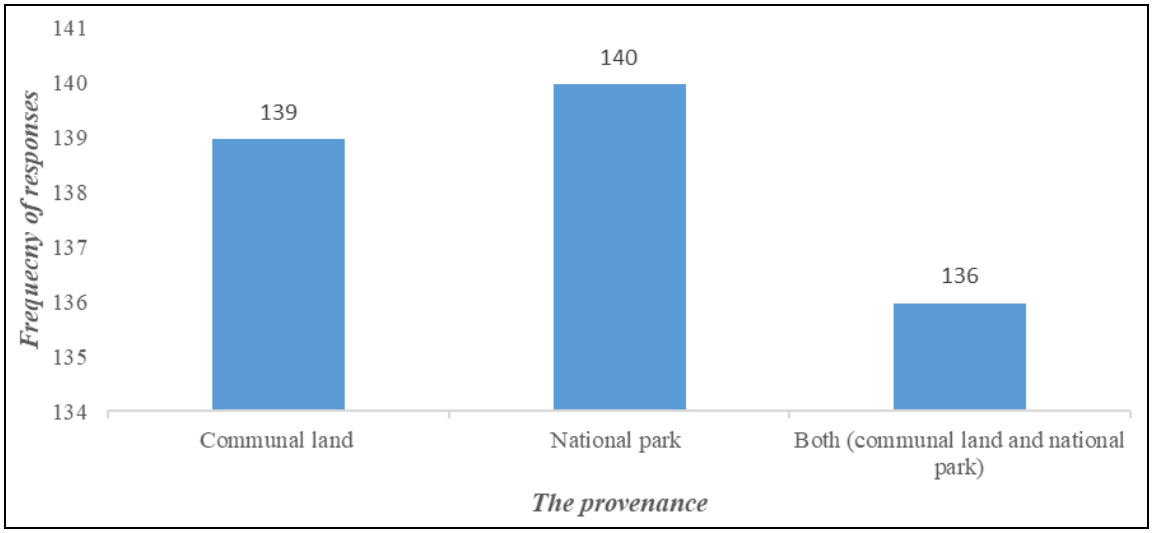

Fig 1: The provenance of the herbal plants

3. Discussion

The use of plants in treating livestock diseases has proven to be of high potential in sustaining livestock productivity [6] irrespective of the growing resistance of the pathogens and parasites to synthetic drugs that are common on the market [7]. Plants exhibit natural broad-spectrum effect in tackling animal diseases in addition to being environmental and user friendly. Families of *Euphorbiaceae, Fabaceae* and *Lamiaceae* showed high potential in treating the diseases in the area. The findings revealed high diversity of the plant species that can be used in treating livestock diseases which is a big asset to livestock farmers provided they are informed of how to use them effectively. Most of the plant species such as *Acacia sieberiana* [8], *Eryrthrina abyssinica* and *Phytolacca dodecandra* are readily available and can grow in most areas of the tropics. This enhances accessibility by the farmers to these plants and they can effectively be used in case of a need. Livestock diseases that were indicated to be treated by the implicated plant species included; anaemia, bloat, cough, East Coat Fever (ECF) and ecto-parasites. This implies that most of the common diseases affecting livestock diseases are treated using available herbal plants. The most serious livestock disease affecting goats and cattle in the tropics is East Coast Fever (ECF) [9] many thanks to innovative livestock farmers who have at least ten identified plant species that can treat this disease. Most of the synthetic medicine have not been effective on this disease [10] like others posing threats on livestock productivity without forgetting the increased expenses buying the drug and the drug residual effect. Much of the fortune comes true when farmers have as well identified plants that can fight against the external parasites considering their current resistance to the available drugs. *Conyza sumatrensis* and *Euphorbia candelabrum* have been found to be effective on common external parasites such as brown ear tick that is the major threat in transmitting *Theirelia parva* that causes theileriosis (East Coast Fever).

The findings indicated that the plants used in treating diseases are obtained from both National Park and the surrounding communal areas. Indeed, communities surrounding protected areas benefit getting useful plant species that are very rare in disturbed areas due to human population pressure [11, 12]. Some other plants can be obtained from the privately or communally owned land when they are conserved after understanding their role in treating livestock diseases.

4. Conclusion

The understanding of the use of traditional herbal plants in solving the challenge of common livestock diseases is a key in sustaining increased livestock productivity of any livestock community. This not only minimizes the costs involved in treatment but also reduces the reliance on the synthetic drugs whose efficiency continue to drop as animals and parasites and/or pathogens change to any direction due to environment or other factors. The communities of Kichwamba and Nyakatonzi near Queen Elizabeth National Park have gone a step ahead in fighting common diseases affecting their livestock, however there is a need to pay attention on how these plants are being exploited to avoid some of them disappearing completely.

Also, it can be observed that most of the medicinal plants are gotten from Queen Elizabeth national park. Getting access to national parks and game reserves in Uganda is restricted from the public access and therefore limited access to the medicinal plants by the livestock farmers.

More so, some of the medicinal plants are very rare (in national parks and communal land) and there's fear that they might soon become endangered and therefore a need to conserve them. Therefore, programmes that aim at sustainable use and conservation of the most important plant species in treating the diseases can be put in place, for example the plant domestication projects in case some appear in the national park only.

The distribution, the methods of use and the efficiency of these implicated plant species should be areas of further investigationto give more light on the subject.

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