

Ethno-Veterinary Medicinal Plants of the Lake Victoria Basin: A Bioprospection

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Abstract: The main objective of this study was to identify and document plants traditionally used for treating livestock diseases and conditions in Lake Victoria basin of Kenya, Tanzania and Uganda. In Kenya, the study sites were located in Kendu Bay, Kano Plains, Suri and Yala wetlands; in Tanzania in the districts of Missungu, Magu, Sengerma, Geita, Ukerewe and Ilemela, while in Uganda in the district of Rakai. The study utilised employed participatory rural appraisal tools, mainly focus group discussions and key informant interviews. A wide range of plants with veterinary medicinal uses were identified and documented. The highest number of plants was enlisted in Kenya (81), followed by Tanzania (50) and lastly Uganda (24). Examples of plants mentioned were *Xylopiya aethiopicum* for treating East Coast Fever, *Phragmites mauritianus* for treating retained placenta, *Hoslundia opposita* for treating snake bites and *Cassia occidentalis* for treating internal parasites. Some plants were common in all the three countries, while others were only mentioned in particular countries. Other livestock diseases and conditions traditionally treated included diarrhoea, pneumonia, eye infections, heart water, babesiosis, mastitis, snake bites and wounds. The study points out the need for validating and integrating the use of traditional medicinal plants in community-based animal health care delivery systems in the East African region.

Key words: Veterinary medicinal plants, Lake Victoria basin, livestock diseases, snake bites, diarrhoea, pneumonia

INTRODUCTION

The wetlands of the Lake Victoria basin are a rich source of a variety of medicinal plants, some with veterinary uses. Use of herbal remedies in animal healthcare offers viable alternatives to conventional modern veterinary medicine, especially where the later is unavailable, unaffordable or inappropriate. Worldwide, especially in developing countries, interest in traditional veterinary medicine is growing rapidly (Mathias and Mc Corkle, 1989). Traditional medicines provide low cost health care for many animal health issues such as treatment of internal parasites, internal or external injuries and pregnancy related conditions (Mathias and Perezgrovas, 1997).

Among livestock keeping communities living adjacent the wetlands of the Lake Victoria basin, some traditional medicine practices are common knowledge in the community, whereas other practices are known to only a few privileged people. Because of the informal education methods of passing this traditional knowledge to younger generations, there is a greater possibility of loss or distortion of information over time (Tabuti *et al.*, 2003).

Furthermore, the rapid growth of human population in the Lake Victoria basin puts pressure on habitat of medicinal plants, with a possibility of their extinction over time. Efforts should therefore be made to identify and document such useful plants in order to conserve and sustainably utilise them in line with appropriate land use policies and practices.

The main objective of this study was to identify and document plants in the Lake Victoria basin used for treating livestock diseases and conditions. This would form a basis for further studies to test and validate their pharmacological bioactivity, as well as to characterise and isolate the active principle(s). This will not only add value attached by the communities to these plants, but will also give a reason for them to conserve those plants.

MATERIALS AND METHODS

Study sites: The study was conducted with the livestock keeping communities living adjacent the wetlands of the Lake Victoria basin in Kenya, Tanzania and Uganda. In Kenya, the study sites were located in Kendu Bay, Kano Plains, Suri and Yala wetlands. These areas are inhabited

mainly by the Luo tribal people. In Tanzania, the study sites were in the districts of Missungi, Magu, Sengerma, Geita, Ukerewe and Ilemela, while in Uganda in the district of Rakai. These sites were purposively selected on the basis that the tribal people living in these areas are traditionally livestock keepers and were presumed to utilize wetland plants for treating their livestock.

Study methods: The study utilised participatory rural appraisal tools, mainly focus group discussions and interviewing of key informants. A total of 114 key informants were interviewed; 60 were from Kenya, 30 from Uganda and 24 from Tanzania. The key informants included herbalists, selected heads of households keeping livestock, village chiefs and village elders. The

plants were identified as per the International Code of Botanical Nomenclature (ICBN) rules. Consent to publish the information was obtained from the respondents who participated in the study.

RESULTS

Tables 1-3 show the plants that were enlisted in Tanzania, Kenya and Uganda respectively. A wide variety of plant species with veterinary medicinal uses were recorded. The highest number of plants was recorded in Kenya (81), followed by Tanzania (50) and Uganda (24). In the case of Kenya, the respondents did not consent to publish the names of the diseases treated by the respective plants; hence they are not included this study.

Table 1: Veterinary medicinal plants enlisted in the Lake Victoria basin in Tanzania

Family	Scientific name	Local name (Swahili/Sukuma)	Disease(s)/condition (s) treated
Meliaceae	<i>Azadirachta indica</i>	Mwarobaini	Anaplasmosis and Babesiosis
Euphorbiaceae	<i>Jatropha curcas</i>	Makole	Heartwater
Capparidaceae	<i>Gynandropsis gynandra</i>	Mgagani	Heartwater
Apocynaceae	<i>Strophanthus eminii</i>	Sungululu	Heartwater
Simaroubaceae	<i>Harrisonia abyssinica</i>	Msoma	East Coast Fever
Menispermaceae	<i>Cissampelos pareira</i>	Nkuluwanti	East Coast Fever
Solanaceae	<i>Solanum incanum</i>	Matula	Conjunctivitis
Euphorbiaceae	<i>Euphorbia tirucalli</i>	Minyaa	East Coast Fever
Euphorbiaceae	<i>Euphorbia heterochroma</i>	Lonzwe	East Coast Fever
Aloaceae	<i>Aloe secundiflora</i>	Haruna	Pneumonia
Aloaceae	<i>Aloe microsiphon</i>	Ngaka	Pneumonia
Cucurbitaceae	<i>Cucumis figare i</i>	Salasala	Diarrhoea
Asteraceae	<i>Bidens pilosa</i>	Idasana	Conjunctivitis
Labiatae	<i>Ocimum basillicum</i>	Malumba	Conjunctivitis
Mimosaceae	<i>Albizia anthelmintica</i>	Ng'otabalashi	Internal parasites
Boraginaceae	<i>Ehretia amoena</i>	Nembu	Non-specific ailments ^a
Capparidaceae	<i>Cadaba farinose</i>	Ntwimashigulu	Non-specific ailments
Papilionaceae	<i>Omocarpum trichocarpum</i>	Nkondwamhuli	Non-specific ailments
Vitaceae	<i>Cissus quadrangularis</i>	Magandaja	Pneumonia and arthritis
Salvadoraceae	<i>Salvadora persica</i>	Muche	Non-specific ailments
Bignoniaceae	<i>Kigelia Africana</i>	Mwicha	Unthriftness
Solanaceae	<i>Nicotiana tobaccum</i>	Ugoro	Conjunctivitis
Euphorbiaceae	<i>Synadenium grantii</i>	Ntulasongo	East Coast Fever
Combretaceae	<i>Combretum molle</i>	Mlama	Fractures
Annonaceae	<i>Xylopi aethiopica</i>	Mtwetwe	East Coast Fever
Pedaliaceae	<i>Sesamum calycinum</i>	Makondo	Diarrhoea
Papilionaceae	<i>Dalbergia boehmi</i>	Fifi	Snake bite
Menispermaceae	<i>Chaesmanthera dependens</i>	Nchwela	Bloat
Asteraceae	<i>Vernonia amygdalina</i>	Mbilizi	Internal parasites
Polygalaceae	<i>Securidaca longipechunculata</i>	Ng'watya	Heartwater
Sapindaceae	<i>Zahna africana</i>	Nongonongo	Non-specific ailments
Tiliaceae	<i>Grewia fallax</i>	Nkomankulu	Heartwater
Mimosaceae	<i>Dichrostachys cinerea</i>	Ntundulu	Non-specific ailments
Malvaceae	<i>Hibiscus pycnostemon</i>	Olusinga	Blackquarter
Papilionaceae	<i>Tephrosia vogelii</i>	Muluku	Repelling insects
Scrophulariaceae	<i>Cycnium recurvum</i>	Entangaruhiira	Non-specific ailments
Caesalpiniaceae	<i>Senna didymobotya</i>	Maugabwa	Heartwater
Acanthaceae	<i>Blepharis stuhlmannii</i>	Masombwambeba	Heartwater
Oleaceae	<i>Jasminum flumense</i>	Malimbwa mbuzi	Non-specific ailments
Poaceae	<i>Phragmites mauritianus</i>	Mazuzumbe	Retained placenta
Mimosaceae	<i>Acacia hockii</i>	Nsese	Fever
Asteraceae	<i>Tithonia diversifolia</i>	- ^b	Babesiosis
Labiatae	<i>Hoslundia opposite</i>	Bukokolome	Snake bite
Asteraceae	<i>Sphaeranthus ukambensis</i>	Manung'hi	Diarrhoea
Convolvulaceae	<i>Ipomoea batatas</i>	Marando	Non-specific ailments
Papilionaceae	<i>Vigna unguiculata</i>	Makunde	Fractures
Euphorbiaceae	<i>Euphorbia calendabrum</i>	Nangale	Non-specific ailments
Vitaceae	<i>Cissus rotundifolia</i>	-	Non-specific ailments
Urticaceae	<i>Obetia radula</i>	Ivavaenzunzu	Mastitis

^aRespondents mentioned that this plant is used for treatment of various diseases and conditions which they did not divulge ^bRespondents could not give the local name of this plant

Table 2: Veterinary medicinal plants enlisted in Lake Victoria basin in Kenya

Family	Scientific name	Local name (Luo)	Place where mentioned	Nature of plant
Asteraceae	<i>Vernonia amygdalina</i>	Olulusia	Yala	Shrub
Asteraceae	<i>Vernonia hildebrandtii</i>	Osadhi	Yala	Herb/Shrub
Mimosaceae	<i>Albizia coriaria</i>	Ober	All study sites	Tree
Labiatae	<i>Plectranthus barbatus</i>	Okita Lango	Yala and Kendu Bay	Herb/shrub
Araceae	<i>Colocasia spp</i>	Nduma	Yala	Shrub
Musaceae	<i>Musa spp</i>	Odhigo/Sothi)	Yala	Herb
Euphorbiaceae	<i>Euphorbia tirucalli</i>	Ojuog chola	Yala	Shrub
Rhamnaceae	<i>Ziziphus mucronata</i>	Ojuog Lango	Yala	Shrub/Tree
Euphorbiaceae	<i>Ricinus communis</i>	Odagwa	Yala	Herb
Moraceae	<i>Ficus sycomorus</i>	Ngou	All study sites	Tree
Simaroubacaa	<i>Harrisonia abyssinica</i>	Pedo	Sori	Shrub/Tree
Labiatae	<i>Leonotis nepetifolia</i>	Nyanyodhi	Sori, Yala	Herb/Shrub
Celastraceae	<i>Mcytenus senegalensis</i>	Nyandemera	All study sites	Tree/Shrub
Mimosaceae	<i>Acacia drepanolobium</i>	Aduogo	Sori, Kano plains	Shrub/Tree
Tiliaceae	<i>Grewia bicolor</i>	Pou/Powo	Sori	Shrub/Tree
Euphorbiaceae	<i>Croton dichogamus</i>	Rachier	All study sites	Shrub/Tree
Anacardiaceae	<i>Lannea schweinfurthii</i>	Kuogo	Sori	Tree
Rutaceae	<i>Zanthoxylum chalybeum</i>	Rogo/Roko	Yala, Sori, Kendu Bay	Shrub/Tree
Rubiaceae	<i>Gardenia ternifolia</i>	Rayudhi	Sori	Shrub/Tree
Anacardiaceae	<i>Ozoroa insignis</i>	Madhari	Sori	Shrub/Tree
Apocynaceae	<i>Carrisa edulis</i>	Ochuoga	All study sites	- ^a
Mimosaceae	<i>Acacia drepanolobium</i>	Adugo	Sori, Yala	Shrub/Tree
Canellaceae	<i>Warburgia ugandensis</i>	Soko	Sori	Tree
Meliaceae	<i>Ekebergia capensis</i>	Tido	Sori	Tree
Balanitaceae	<i>Balanites aegyptica</i>	Othoo	Suri, Yala, Kano	Tree
Sapindaceae	<i>Pappea capensis</i>	Okuro/Okuworo	Sori	Shrub/Tree
Boraginaceae	<i>Cordia ovalis</i>	Oseno	Sori	Shrub/Tree
Cupressaceae	<i>Cupressus lucitanica</i>	Obudo	Sori	Tree
Poaceae	<i>Cassia dactylon</i>	Modhuo	Sori	Grass
Caesalpiniaaceae	<i>Senna didymobotrya</i>	Owino	Sori	Shrub/Tree
Asteraceae	<i>Solanecio mammii</i>	Maroo/Marowo	Sori	Shrub/Tree
Papilionaceae	<i>Erythrina abyssinica</i>	Orembe	All study sites	Tree
Papilionaceae	<i>Mucuna gigantea</i>	Ombasa	Sori, Yala	Shrub/climber
Olacaceae	<i>Ximenia americana</i>	Olemo	Kendu Bay	Tree /shrub
Euphorbiaceae	<i>Euphorbia candelabrum</i>	Bondo	Kendu Bay	Shrub
Aloeaceae	<i>Aloe dawei</i>	Okaka	Kendu Bay	Shrub
Agavaceae	<i>Agave sisalana</i>	Tuoro	Kendu Bay	Shrub
Capparaceae	<i>Boscia angustifolia</i>	Ayer gwueng	Kendu Bay	Shrub/Tree
Meliaceae	<i>Melia azedarach</i>	Dwele	All study sites	Tree
Asteraceae	<i>Bidens pilosa</i>	Anyego/Onyego	Kendu Bay, Yala	Herb
Meliaceae	<i>Azadiracta indica</i>	Mwarubaine	All study sites	Tree
Rubiaceae	<i>Mussaenda arcuata</i>	Achak	Yala, Sori, Kendu Bay	Shrub/Tree
Combretaceae	<i>Terminalia brownii</i>	Onera	Sori	Tree
Papilionaceae	<i>Vigna unguiculata</i>	Alayo	Sori	Climber Herb
Caesalpiniceae	<i>Tamarindus indica</i>	Chwa	Sori	Tree
Asteraceae	<i>Tithonia diversifolia</i>	Mafua/Akado	Kano, Yala, Sori	Shrub
Papilionaceae	<i>Phaseolus vulgaris</i>	Oganda	Yala	Herb/climber
Verbenaceae	<i>Lantana trifolia</i>	Nyabende winyo	Yala	Herb
Myrtaceae	<i>Psidium guajava</i>	Mapera	Yala	Tree
Myrtaceae	<i>Eucalyptus saligna</i>	Bao	Yala	Tree
Mimosaceae	<i>Entada abyssinica</i>	Osembe	All study sites	Tree
Caesalpiniaaceae	<i>Cassia siamea</i>	Ndek obino/Oyieko	All study sites	Tree
Mimosaceae	<i>Acacia hockii</i>	Oriang	All study sites	Tree/Shrub
Mimosaceae	<i>Acacia lahai</i>	Alaktar	Yala	Tree/Shrub
Verbanaceae	<i>Clerodendrum myriocoides</i>	Okurgweno	Yala	Herb
Araceae	<i>Pistia stratiotes</i>	Anyuongi	Yala	Herb
Poaceae	<i>Zea mays</i>	Wino Mar Oduma	Yala	Herb
Bignoniaceae	<i>Kigelia africana</i>	Muratina	Kendu Bay	Tree
Anacardiaceae	<i>Mangifera indica</i>	Maembe	All	Tree
Solanaceae	<i>Datura stramonium</i>	Kwekwe	All study sites	Herb
Solanaceae	<i>Nicotiana tabacum</i>	- ^b	Sori	-
Poaceae	<i>Pennisetum purpureum</i>	-	Yala	Grass
Celastraceae	<i>Myroxylon aethiopicum</i>	Ochol Rateng	Sori	Tree/Shrub
Amaranthaceae	<i>Amaranthus sp.</i>	Nyatigotigo	Sori	-
Caesalpiniaaceae	<i>Cassia bicapsularis</i>	Angor	Sori	Shrub
Asteraceae	<i>Acanthospermum hispidum</i>	Onduongo	Kano, Kendu Bay	Shrub

Table 2: Continued

Family	Scientific name	Local name (Luo)	Place where mentioned	Nature of plant
Labiatae	<i>Orthosiphon parvifolius</i>	Oluo chiel	Sori, Kendu Bay	Herb
Papilionaceae	<i>Ormocarpum trichocarpum</i>	Det	Sori, Kendu Bay	Shrub Tree
Mimosaceae	<i>Albizia zygia</i>	Otur Bam	Sori, Kendu Bay	Tree
Tiliaceae	<i>Triumfetta tomentosa</i>	Ong'ono	All study sites	Shrub
Lauraceae	<i>Persea Americana</i>	Akado	Yala	Tree
Graminaceae	<i>Eleusine corana</i>	-	Sori/Yala/Kendu Bay	Grass
Anacardiaceae	<i>Schinus molle</i>	Pilipili	Sori/ Yala	Herb/shrub
Apocynaceae	<i>Cassia edulis</i>	Ochuoga	Kano plains, Sori	Shrub
Caesalpinaceae	<i>Cassia sp.</i>	Kagno	Yala	Shrub
Papilionaceae	<i>Tephrosia vogelii</i>	-	All study sites	Shrub
Cucurbitaceae	<i>Trichosanthes sp.</i>	Otangi	All study sites	Climber
Poaceae	<i>Hyperrhenia filipendula</i>	Osinde	All study sites	Grass

^a Respondents did not disclose the nature of this plant, ^b Respondents did not disclose the local name of this plant

Table 3: Veterinary medicinal plants enlisted in Lake Victoria basin in Uganda

Family	Scientific name	Local name (Luganda/Kinyankore)	Parts(s) used	Method of preparation	Disease(s)/ condition treated
Euphorbiaceae	<i>Euphorbia candelabrum</i>	Nkukulu	Sap	Maceration	Ectoparasites
Phytolaccaceae	<i>Phytolacca dodecandra</i>	Oluwoko	Leaves	Maceration	East Coast Fever
Canabaceae	<i>Cannabis sativa</i>	Njagga	Leaves	Maceration	New Castle Disease
Asparagaceae	<i>Asparagus africana</i>	Kadaali	Leaves	Decoction	Eye infections
Caesalpinaceae	<i>Cassia didymobotrya</i>	Gasia	Leaves and flowers	Maceration	Mange
Caesalpinaceae	<i>Cassia occidentalis</i>	Mutanjoka	Roots	Decoction	Internal parasites
Asteraceae	<i>Microglossa pyrifolia</i>	Olufugankande	Roots	Concoction	East Coast Fever
Cucurbitaceae	<i>Cucurbita sphaerica</i>	Butanga	Fruit	Decoction	Bloat
Verbanaceae	<i>Clerodendrum myricoides</i>	Kikonge	Roots	Decoction	East Coast Fever
Apocynaceae	<i>Carrisa edulis</i>	Muyonnza	Roots	Concoction	Internal parasites
Asteraceae	<i>Vernonia amygdalina</i>	Mululuza	Roots	Decoction	Internal parasites
Mimosaceae	<i>Entada abyssinica</i>	Omwolala	Stem bark	Decoction	Cough
Leguminosae	<i>Erythrina abyssinica</i>	Muyirigiti	Roots	Decoction	Internal parasites
Solanaceae	<i>Solanum incanum</i>	Ntegotogo	Fruit	Maceration	Eye infections
Malvaceae	<i>Sida cuneifolia</i>	Akeyoyo	Shoot	Concoction	Retained placenta
Asteraceae	<i>Bidens pilosa</i>	Ssere	Leaves	Maceration	Wounds
Lamiaceae	<i>Ocimum suave</i>	Mujaja	Leaves	Maceration	Wounds
Asteraceae	<i>Conyza sp.</i>	Kafumbe	Leaves	Maceration	Wounds
Ebenaceae	<i>Euclea divinorum</i>	Omukikimbo	Leaves, roots	Concoction	Retained placenta
Leguminosae	<i>Indigofera arrecta</i>	Akeyoyo	Leaves	Maceration	Sprains
Labiatae	<i>Leonitis nepetifolia</i>	Kifumufumu	Leaves	Concoction	Mastitis
Mimosaceae	<i>Acacia sieberiana</i>	Mweramanyo	Roots	Decoction	Retained placenta
Solanaceae	<i>Nicotiana tobaccum</i>	Taaba	Leaves	Decoction	Eye infections

In Uganda, additional information on the part(s) of plant used and method of preparation is recorded. Though some plants were mentioned to be used for treating livestock diseases and conditions, they could not be scientifically identified either because the key informants declined to show them to the botanist or the key informant could not find them at the time of the study. Such plants are not reported here.

The medicinal plants identified belonged to 36 different families. The most common families were Euphorbiaceae, Combretaceae, Labiatea, Asteraceae, Caesalpinaceae, Vitaceae, Polygalaceae and Aloeceae. In some cases, the same plant was known by more than one local name in the same ethnic community. Some plants were common in all the three countries, while others were mentioned only in particular countries. Examples of plants that were listed in all the three countries included *Vernonia amygdalina*, *Euphorbia candelabrum*, those listed in only Kenya and Tanzania were *Euphorbia triculi*, *Ocimum basilicum* and *Cissus quadrangularis*, while

those mentioned in only Uganda were *Microglossa pyrifolia*, *Asparagus africana* and *Leonitis nepetifolia*.

Some of the plants mentioned like *Lantana camara*, *Phytolacca dodecandra*, *Datura stromonium* are also known to be poisonous to livestock. For example, *Phytolacca dodecandra*, though is poisonous, respondents affirmed that it should only be given in small amounts and only experienced persons should administer it. Some of the plant like *Warbugia ugandensis* and *Azadirachta indica* are also used for medicinal purposes in humans. Interestingly, some medicinal plants listed for treating livestock bear fruits for human consumption. For example, *Mangifera indica* (the mango tree) and *Psidium guajava* (guava plant) were reported to have medicinal properties for livestock diseases.

Examples of livestock diseases and conditions traditionally treated with herbal remedies were East Coast Fever, helminthosis, retained placenta, diarrhoea, pneumonia, eye infections, heart water, babesiosis, mastitis, snake bites and wounds.

DISCUSSION

This study is the first report of ethno-veterinary medicinal plants of the Lake Victoria basin in Uganda, Kenya and Tanzania. Previous efforts to document medicinal plants traditionally used for treating animals have largely been centred in the pastoral and agro-pastoral communities in the arid and semi-arid areas of East Africa (Ejobi *et al.*, 2004; Wanyama, 1997). The variation in the number and species of plants listed in the different East African countries could be due to the differences in the ethnic groups studied and willingness of the study respondents to divulge the information enquired. In most African communities, individuals with immense knowledge in traditional medicine are respected. Consequently, information regarding this valuable science is always kept secret and disclosure is limited only to trusted people. As such, it was difficult getting some people to disclose the medicinal plants used in treating some diseases affecting livestock. Most of the people interviewed were suspicious and were initially unwilling to disclose their ethno-veterinary knowledge. Knowledge of this nature is usually transmitted carefully and selectively.

Many of the plants mentioned in this study have also been reported in other areas by a number of researchers. For instance, Tuwangye and Olila (2006) also reported the use of *Vernonia amygladina* among the Banyankole herdsmen of the south-western Uganda. In Kenya, the ITDG and IIRR (1996) compiled a field manual of ethno-veterinary medicine of the Turkana, Samburu and Masai ethnic. Some of the plants listed in that manual were reported to be used in the Lake Victoria basin.

Some of the plants mentioned in this study are also used for traditional human medicine. This is due to the fact that livestock keepers also consult traditional human healers. Mathias-Mundy and McCorkle (1992) reported that where ethno-veterinary practices are found in most cultures, disease concepts apply more or less equally to animals and people. Given this congruency, healers of people often treat livestock and vice versa (Tuwangye and Olila, 2006).

We conclude that there is a potential for integration of indigenous medicinal plants in animal healthcare delivery systems in East Africa. However, there is a need to scientifically validate the efficacy of herbal remedies before they can be widely promoted for use in livestock.

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