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Full Length Research Paper

Medicinal plants used in the treatment of livestock diseases in Vhembe region, Limpopo province, South Africa

D. Luseba[1]* and M. P. Tshisikhawe[2]

[1]Tshwane University of Technology, Private Bag X 680, Pretoria 0001, South Africa.
[2]Department of Botany, University of Venda, South Africa.

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Traditional medicine (TM) is very important among Venda speaking people but the available literature does not cover the ethnoveterinary medicine (EVM) uses. Open ended questions and group focus discussion were used to investigate the knowledge of EVM in the region. Thirty-seven (37) individuals with an average age of 48.2 years were interviewed of which 24 were males and 13 females. EVM practices involved the use of plants as remedies collected from the wild and prepared mainly as infusions and decoctions for internal use and leave sap for local applications. Cattle, followed by sheep and goats were predominantly owned by old men who treat by themselves their livestock for worm and tick infestations. There were 47 indications in total prepared from leaves, followed by bark of 34 plant species belonging to 22 plant families. The families with more species were Fabaceae (6 species), Asteraceae and Rubiaceae (3 species each) and, Combretaceae and Euphorbiaceae (2 species each). Literatures on laboratory investigations have shown that some of the plants recorded possess multiple biological properties. Further studies on chemical composition and subsequent biological properties are required for validation purpose.

Key words: Venda, ethnoveterinary, Fabaceae, Asteraceae, Rubiaceae, nutraceutical.

INTRODUCTION

The importance of traditional medicine (TM) and its contribution to health care among humans worldwide cannot be underemphasized. It is estimated that more than 80% of people leaving in Africa rely on TM, though it is not fully documented and recognised. Traditional practitioners do not reveal freely their knowledge as it is the source of their livelihood (Luseba and Van der Merwe 2006). Therefore, indigenous knowledge is basically transmitted by word of mouth from generation to generation thus, facing extinction if it is not recorded. Treatment of animal diseases developed in parallel with treatment of human diseases and most of TMs used in animal health care find their usage in humans who transpose the perceived effects of the plants in animal disease treatment. According to Alves et al. (2010) biodiversity is a source of the invaluable information and raw materials that underpin medicinal and health care systems.

The TM is widely available and affordable, even in remote areas, and it is generally accessible to most people. It is indeed an integral part of each ethnic group. In the Venda area, it is estimated that there is one traditional practitioner for every 700 to 1,200 people compared with one physician for every 17,400 people (Helwig, 2001). However, ethnobotanical and ethnopharmocological studies of this region undertaken by Arnold and Gulumaian (1984), Mabogo (1990), Obi et al. (2002), Tshisikhawe (2002) and Samie et al. (2005) to name a few, failed to describe the rich ethnoveterinary practices of Vhavenda people. This is despite a worldwide silent revolution which is bringing back the previously neglected ethnoveterinary medicine (EVM) and knowledge of

*Corresponding author. E-mail: lusebad@tut.ac.za. Telephone: +27123825982. Fax: +27123824224.

Figure 1. Map of Limpopo province with Vhembe district highlighted. Adapted from Wikipedia (2010).

indigenous people in addressing difficult animal health problems especially localised ones as noted by Okoli et al. (2010).

Furthermore, it is suggested that disease control should be based on the geographical area since vegetation zone also influences the kind of disease prevalent in an area. For instance, another study undertaken in South Africa (Mabombo et al., 2003) showed that EVM practices were not sufficiently or completely documented in existing studies since many more other plants were found in the same area already documented by Masika et al. (2000). According to Pfeifer and Butz (2005), ethnobotanical knowledge and practices within any culture vary by geographical origin, residence, ethnicity, religion, age, and gender.

Thus, EVM practices are locality and culture specific making generalisation of results from one area to another a useless option. This has also an implication on plant conservation strategy since policies or determination on threat or overuse might not have considered this undocumented use in EVM. Arnold and Gulumalian (1984) attempt to develop a pharmacopoeia of the Venda area was abandoned because they found that generally plants used grew mainly in the vicinity of the herbalist or healer and, many of useful plants in one area were not found in another. Therefore, this study was conducted in order to explore the biodiversity of the region and fill the gap that might have not been covered due to neglect of EVM documentation.

MATERIALS AND METHODS

Study area

The study was conducted in Vhembe District Municipality, Limpopo province of the Republic of South Africa (22° 56 S, 30° 28E) as shown in Figure 1. Data were collected from villages in Mutale, Thohoyandou, Nzhelele and Pundamaria areas to include different vegetation subtypes. The vegetation is classified as Mopani Bushveld (Low and Rebelo, 1998). This vegetation type is characterised by *Colophospermum mopane* (Mopani) shrubs. The average temperatures range from 28°C in January to 15°C in July. Humidity in the area is ±40%. The majority of its 1.2 million of people are Venda speaking. They are agriculturalists who keep livestock including Nguni cattle, Pedi sheep, goats and chickens of which the Venda chicken is prominently known for its resistance to diseases and prolificacy (Mphaphathi et al., 2008).

Methodology

The field work was done from January, 2003 to March, 2005 and further investigations were pursued through students' participation in form of assignments between 2006 and 2008 in order to elucidate some plants which were not scientifically identified after the workshop. Open ended questions, interviews and field walks were used to collected data including plant samples for further identification where necessary. Interviews were conducted in Venda and Tsonga languages which were understood by the students and informants. Preparations of voucher specimens which have been deposited at the University of Venda herbarium were adapted from Fish (1999) as described by Luseba and Van der Merwe (2006). Mr Tshisikhawe who is a taxonomist identified most of the plants. Results were validated using the veterinary consistency principle of Kansonia and Ansay (1997). There is veterinary consistency when one plant is cited for the same use by more than two respondents. A feedback session attended by 54 people was organised at the end of the data gathering phase to harmonise the information and reach consensus on plant use and other EVM practices (Luseba and Van der Merwe 2006). The data analysis was done using excel programme and summarised using descriptive statistics.

RESULTS

Socio-economic considerations

Thirty-seven (37) individual participants who had some knowledge on EVMs were interviewed of which 24 were males and 13 were females. Twenty-seven (27) participants were older than 40 years, while 10 participants were under 40 years of age. Participants interviewed had a mean age average of 48.2 years. This is alarming because 80% of the population is younger than 40 years in the region (Wikipedia, 2010). This might be a reflection of the culture and a consequence of modernization and its consequence on youth beliefs. Young people do not accept the so-called outdated information (Van der Merwe et al., 2001).

Diviners were usually consulted for protection of livestock and their enclosures but traditional healers were not consulted for treating animals. As noted for Tsonga speaking people in South Africa, traditional healers do not share their knowledge with farmers (Luseba and Van der Merwe, 2006); a list of 10 plants made essentially of information from healers was not identified even during the last workshop. Farmers recognised that the use of TM was decreasing in the area due to the influence of modern medicine. Many (55%) believed that traditional remedies work better than modern medicines for chronic diseases which they only buy when TM do not work or for

acute diseases.

Animal husbandry and diseases

Cattle, followed by sheep, goats and chickens but also pigs, dogs and donkeys are kept in the region. Numerically, chickens and small ruminants were predominant; however, cattle are predominantly treated (90%). This compares with findings among Tswana (Van der Merwe et al., 2001) and Tsonga in South Africa (Luseba and Van der Merwe 2006). Apart from providing beef and milk, cattle are kept as status symbol and cultural medium since they play major role in funeral, marriage, wedding etc. (Cunningham and Zondi, 1991).

Table 1 shows the frequencies of different conditions/ illnesses per habit. Eleven (11) remedies were made from herbs, 15 from shrubs and 21 from trees. Sixteen (16) conditions and 47 indications were associated with the plant species used in Venda EVM. The most prominent condition might be worm infestation (42%) if claims made during the interviews and workshop that worm infestation is highly related to diarrhoea (mutshuluwo) and lack of appetence (tshiutwane) are accepted. To sustain this assertion, some plants are used for both diarrhoea and worm infestation for example, *Combretum molle* and *Vernonia colorata*. It is recognised that parasitic infections remain a constant problem in ruminant production, especially in goat and sheep (Chandrawathani et al., 2004). Similarly, wounds due to tick bites and eye infections were also said to be related and presented the second most important conditions (28%). Tick-borne diseases were not indicated particularly as such though they were known and treated according to the symptoms. Red water (thonda malofha) and heart water (tshimee) were known by farmers.

Plant used, preparation and administration

Famers tended to use the same plants for specific condition/disease in the same area according to their knowledge or recommendations from other farmers or family members, mostly elders. They did not want “to experiment new plants on their animals”.

Table 2 shows the results on plant families, names, parts used and preparation modes and administration. Out of a total of 49 plants cited by the respondents, 38 plant species belonging to 19 plant families and 37 genera were identified and recorded. The families with more species were Fabaceae (6 species), Asteraceae and Rubiaceae (3 species), and Combretaceae and Euphorbiaceae (2 species). Similarly, Alves et al. (2010), in South and Latin America found that Fabaceae, Asteraceae and Euphorbiaceae were prominently used in EVM, whilst Luseba and Van der Merwe (2006) reported similar results in South Africa. Fabaceae is the second largest family of medicinal plants, containing over 490 medicinal plant species, most of which have been used as TMs with 31 species of medicinal plants belonging to the family Fabaceae described in the Chinese Pharmacopoeia as well as numerous species that are included in the Japanese Pharmacopoeia (Gao et al., 2010).

The locality and culture specific concept of EVM could be evidenced from the record of different EVM remedies between Venda and the neighbouring ethnic group of Tsonga people recorded earlier by Luseba and Van der Merwe (2006). Tsonga participants reported 19 EVM remedies from 12 families against 38 plants in this study from 22 families. From these lists, only 4 plants were commonly used between the two ethnic groups that is, *Aloe marlothii, Terminalia sericea, Pterocarpus angolensis* and *Dicerocaryum eriocarpium*. There was also similarity with Tsongas on the mode of preparation and administration based mostly on single plants (only four combinations of two different plants in Venda EVM); this is not the case for other ethnical groups such as Xhosa (Dold and Cocks, 1999; Masika et al., 2000; Mabombo et al., 2003) and Zulus (Cunningham and Zondi, 1991) where multiple plant mixtures are used in treatment of animal diseases.

The habit was made mainly of trees (56%), but also shrubs (24%) and herbs (20%). It is interesting to note that harvesting plants for EVM use is done on an sustainable way since leaves, stem, barks, fruits and other areal parts (shoots, pods, nuts) were predominantly used (76%) compared with roots and root-bark (24%) which are more responsible for plant destruction. This is different from common uses in human TM where considerable amount of roots and bark-roots are used. For instance, in a study on antifungal activities of selected Venda medicinal plants from South African AIDS patients (Samie et al., 2005) in the same study area, 10 out 30 plant materials used were roots and tubes.

DISCUSSION

Socio-economic considerations

Although there are more women (55%) than men in the area (Wikipedia, 2010), few respondents in this study were women. As reported in other areas of South Africa (Cunningham and Zondi, 1991) women do not keep generally large animals among Venda speaking people as they are not allowed traditionally at the animal enclosures (Mabogo, 2006, personal communication). However, during the focus group discussion and the workshop which was organised at the end of data gathering, women and young people constituted the majority (71%) of the participants; this is in accordance with Tsonga speaking people of South Africa (Luseba and Van der Merwe, 2006). Moreover, since a good

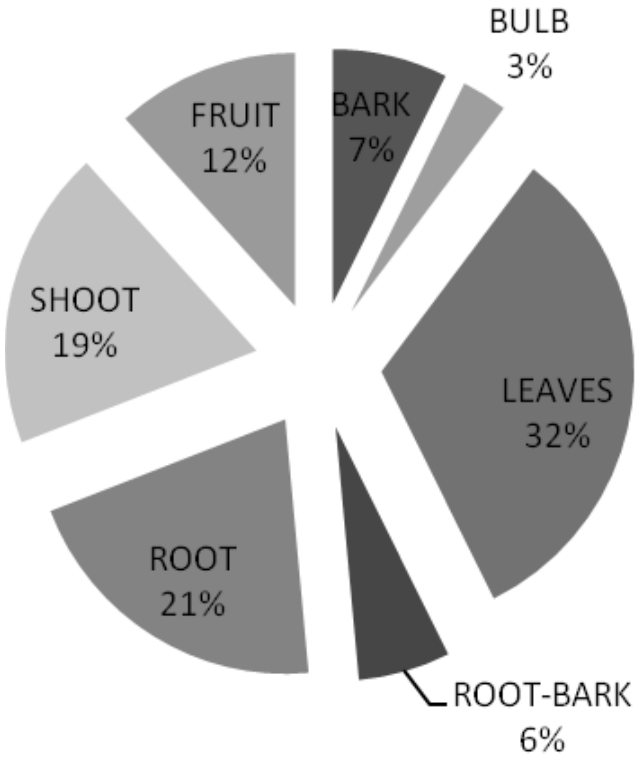

Figure 2. Plant parts used in Venda EVM.

Table 1. Indications of plants used in Venda EVM per habit.

Condition	Herb	Shrub	Tree	Total
Agalactiae	0	1	1	2
Blackquarter	1	0	1	2
Constipation	1	2	2	5
Diarrhoea	2	2	0	4
Dystocia	1	1	4	6
Eating problems	1	3	4	8
Eye problems	0	0	1	1
Gallsickness	0	1	0	1
General ailments	0	1	0	1
LSD	1	1	1	3
ND	0	1	2	3
Tick	3	1	1	5
Tonic	0	1	3	4
Worms	0	0	1	1
Wounds	1	0	0	1
Total	11	15	21	47

LSD, Lumpy skin disease; ND, Newcastle disease.

number of young people and farmers (40%) learnt about EVM remedies during formal gathering and from other farmers, it was confirmed that a workshop at the end of the information gathering phase was an important mean of information consolidation.

Animal husbandry and diseases

Local farmers and livestock keepers employ different methods to prepare remedies. Water-based preparations are predominant (79%) that is, infusions (62%) and decoctions (17%) of single plants as seen elsewhere (Van der Merwe et al., 2001; Luseba and Van der Merwe, 2006). Leaves or aerial parts are also squeezed or crushed to produce juice (9%) and poultice (2%) for use as topical for wounds, lumpy skin diseases (LSD) and other skin disorders.

Plant parts used, preparation and administration

Plant parts used are shown in figure 2. Plants were exclusively collected from the wild and used when fresh. Wild plants are thought to be more potent than cultivated ones (Luseba and Van der Merwe, 2006). This can be partially justified; Luseba et al. (2011) demonstrated that dried medicinal plants harvested from the wild had better antibacterial activities than fresh and grown plant materials. The predominance of fresh materials in EVM contrary to human TM is explained by the fact that farmers only recourse to EVM when remedies are needed for their own animals, therefore, they do not see the importance of storage. This is a matter of concern since collections done in precipitation could be indiscriminate and might jeopardise the biodiversity.

There is a tendency to suggest that water-based medicinal plant preparations might not be effective *in vivo* due to lack of biological activities of these preparations in the laboratory. In general, farmers do not sieve the preparations before administering them; therefore, small plant particles constitute the core of these preparations. Such small particles are easily digested and many cell contents are made available when absorbed in the ruminant forestomach or after further digestion in the intestine (mainly duodenum). Among mammals, ruminants are able to digest the polysaccharides constituting the plant cell wall (Frandson et al., 2009). It is therefore suggested that substances are made available to the animal after ruminal digestion. Furthermore, in human TM, salts or ashes (rich in organic matter) are often added to preparation to enhance the taste and obvious uptake. What is not known is the chelation level of these added salts. Chelation is the use of a chemical substance to bind molecules, such as metals or minerals, and hold them tightly so they can be removed from the body (Wong, 2005). According to Das et al. (2010) *in vitro* evaluation of antimicrobial activity of plants is influenced by several factors, that is, environment and climatic conditions during plant growth, choice of plant extracts, choice of extraction methods, antimicrobial tests employed, and on test microorganisms. Therefore, bioavailability of orally administered medicines and their absorption and metabolism are major factors that will influence biological activities (McGaw and Eloff, 2010).

Table 2. Plant species used to treat livestock, their habit, disease treated, plant part used, preparation and administration.

Family and botanical names, voucher number	Common names	Habit[a]	Disease[b]	Part used[c]	Preparation, administration
Anacardiaceae, *R. lancea* L.f. (EV0030LT)	Karre (Eng.), Mushakaladza (V)	T	LSD in cattle	L.	Leaves are boiled, 1 litre to adults and ½ litre to calves;
Apocynaceae, *Carissa bispinosa* (L.) Desf. *ex* Brenan subsp. *bispinosa* (EV0040LT)	Num-num (Eng.), Tshirungulu (V)	S	Calving difficulties in cattle	R and B.	Take bulb, grind them and give 1 litre to cows
Asparagaceae, *Asparagus falcatus* L. (EV0025LT)	Sickle thorn (Eng.), Lufhaladzamakole (V)	H	Constipation in cattle	W and P.	Cut the whole plant including roots, immerse for 24 h, 1 litre once a day for 3 days
Asteraceae, *Tagetes minuta* L. (EV0022LT)	Khaki weed (Eng.), Mushushathuri (V)	H	Tick control in cattle	L.	Take the leaves, mix with peri-peri (*Capsicum frutescence*), grind and apply the mixture on the ticks
Asteraceae, *V. colorata* (Wild.) Drake subsp*. colorata* (EV0002LT)	Phathane (V)	H	Diarrhoea Worms	R	Take the roots, boil, give 1 litre to cow, and ½ litre to young ones Take the roots and soak until the color change to dark brown (like coke), give the animal in 1 L.
Asteraceae, *Vernonia corymbosa* Less. (EV0034LT)	Phathaphathane (V)	H	Worms in cattle	R.	Take the roots, grind them, and mix it with water. Litre to cows and half a litre to young calves
Boraginaceae, *Ehretia rigida* (Thunb.) Druce (EV0012LT)	Puzzle bush (Eng.), Mutepe/Murovherovhe (V)	T	Eating problems (tshiuthwane) in cattle	R.	Boil the roots; give the cow in 1 litre and ½ a litre to young animals.
Capparaceae, *Maerua angolensis* DC. (EV0033LT)	Bead-bean tree (Eng.), Mutambanamme (V)	T	Eating problem drought tonic/	L.	Take leaves, grind them, mix with water, and give to cows in 1 litre and calves in ½ litre
Celastraceae, *Elaeodendron transvaalensis* (Burt Davy) RH Archer (EV0031LT)	Bushveld Saffron (Eng.), Mulumanama (V)	T	Worms in cattle	F.	Take the fruits, grind them, mix with water and give 1 L to cows and ½ litre to calves
Clusiaceae, *Garcinia livingstonei* T. Anders. (EV0029LT)	Lowveld mangosteen (Eng.), Mupimbi (V)	T	Eye problems in cattle	L.	Take the fresh leaves and squeeze the juice into the eye of the animal
Combretaceae, *T. sericea* Burch. *ex* DC. (EV0005LT)	Silver cluster-leaf (Eng.), Mususu (V)	T	Diarrhoea (u tshuluwa) in cattle Ticks and wounds	R.	Take the roots, boil, and give the animal in 1 litre, ½ a litre to young ones (mix with milk). Grind the roots, mix with water, apply on the ticks and wounds
Combretaceae, *C. molle* R. Br. *ex* G. Don (EV0007LT)	Velvet bushwillow (Eng.), Mugwiti (V)	T	Gut conditions – diarrhoea Worm infestation Breeding problems for example, difficult calving	L	An infusion is administered: 1 L to cows and ½ litre to calves
Ebenaceae, *Diospyros lycioides* Desf. subsp. *lyciodes* (EV0017LT)	Karoo bluebush (Eng.), Muthala (V)	S	Ticks in cattle	l.	Grind leaves, mix with water and apply on the affected area.

Table 2. Contd.

Euphorbiaceae, *Pseudolachnostylis maprouneifoloia* Pax (EV0021LT)	Kudu berry (Eng.), Mutondowe (V)	S	Drought tonic	B.	Grind the bark, mix with water, sieve the liquid and give 1 litre to cows and ½ litre to calves
Euphorbiaceae, *Synadenium cupulare* (Boiss.) L.C. Wheeler [EV0001LT)	Dead-man's tree (Eng.), Muswoswo (V)	S	Eye problems (infections) Black quarter LSD	Stems	Apply latex on the side of the eyelid after applying pig or cattle fat. Strike with latex branch on the affected area Cut the branch, apply the oozing latex on the limb
Fabaceae, *B. speciosus* (Bolus) Harms (EV0048LT]	Nkohlwane	T	Retained placenta in cattle	R	Pounded roots are immersed for 12 hours, 2 litres for 3 days
Fabaceae, *Elephantorrhiza burkei* Benth. (EV0024LT)	Sumach bean (Eng.), Gumululo (V)	S	Diarrhoea in cattle	R and B.	Take the bulb, grind it, mix with water, and give to animal
Fabaceae, *P. angolensis* DC. (EV0009LT)	Transvaal teak (Eng.), Mutondo (V)	T	"Mali" and not eating in cattle	B.	Soak the bark in water; give to the cows in 1 litre and ½ a litre to calves.
Fabaceae, *Senna petersiana* (Bolle) Lock (EV0019LT)	Monkey pod (Eng.), Munembenembe (V)	S	General illnesses in goats	L.	Leaves are soaked and given to goat. Half a litter to goat
Fabaceae, *Xanthocersis zambesiaca* (EV0006LT)	Nyala tree (Eng.), Mushato (V)	T	Diarrhoea in cattle Eating problem	B and L.	Take the bark, grind it, mix with salt and give to cattle or Leaves are soaked for 12 hours; 2 litres given to animal. Take the bark, grind it, boil it, and give it in 1 litre for cows and ½ litres for calves.
Iridaceae, *Gladiolus dalenii* Van Geel (EV0035LT)	Wild gladiolus (Eng.), Phende-phende (V)	H	Eye problems in goats, sheep and cattle	R and B.	Grind fresh bulb and put it in a sac, squeeze the juice on the infected eye
Lauraceae, *Cassytha filiformis* L. (EV0010LT)	Love vine (Eng.), Luangalala (V)	H	Eating problems (tshiutwane) in cattle, goats, and sheep. Calving difficulties	Stem	Take the stem and mix with leaves of *D. eriocarpum*, crush the mixture, boil, give in 1 litre bottle Take the stem and mix with leaves of *D. eriocarpum*, crush the mixture, boil, give in 1 L.
Liliaceae, *A. marlothii* Berger Asphodelaceae *Aloe marlothii* Berger (EV0020LT)	Mountain aloe (Eng.), Tshikhopha (V)	H	Liver problems in chickens/Newcastle disease	L.	Take the broad leaves, grind them, squeeze the juice in water, and let the chickens drink.
Meliaceae *Turrae obtusifolia* Hochst (EV0042LT)	Mbhovane	S	Wounds in goats, sheep and cattle	L.	Crush leaves, apply directly on the wounds
Ochnaceae, *Ochna holstii* Engl. (EV0026LT)	Red ironwood (Eng.), Tshipfure (V)	S	Not eating (tshiuthwane) in cattle	Shoots	Mix Shoots with water let the animal drink with 1 litre.
Olacaceae, *Ximenia americana* L. var. *microphylla* Welw. *ex* Oliv. (EV0032LT)	Blue sourplum (Eng.), Muthanzwa (V)	T	Wounds in goats, sheep and cattle	L	Boil leaves and branches for 2hours, 1 litre once a day for 3days.

Table 2. Contd.

Pedaliaceae, *D. eriocarpium* (Decne) Abels (EV0003LT)	Devil's thorn (Eng.), Museto (V)	H	Calving difficulties in cattle Worms in cattle	Stem and L.	Grind aerial parts, mix with water, and give 1 litre to cows Grind aerial part, mix it with water and give it to animals (1 litre bottle)
Rosaceae *Prunus persica* (L.) Batsch (EV0011LT)	Peach tree (E) Muberegisi (V);	T	Wounds in cattle Eye problems in cattle	L	Take the leaves, grind them, squeeze the juice and apply to the wound/eye.
Rubiaceae, *Cephalanthus natalensis* Oliv. (EV0014LT)	Strawberry bush (Eng.), Murondo (V)	S	Eye problem in cattle	L.	Take leaves, grind them and give the animal in 1 litre bottle
Rubiaceae, *Hyperacanthus amoena* (Sims) Bridson (EV0016LT)	Thorny gardenia (Eng.), Murombe (V)	T	Eye problems	R.	Take the fresh roots, crush them, and squeeze the juice in the eye.
Rubiaceae, *Rothmania capensis* Thunb (EV0023LT)	Wild gardenia (Eng.), Murathamapfene/Murathambila (V)	T	Eating problem in cattle	R	Decoction is administered in 2 litre bottle
Solanaceae, *Solanum incanum* L. (EV0028LT)	Bitter apple (Eng.), Mututulwa muhulwane (V)	S	Eye problems in goats, sheep, and cattle	F.	Take the fruits (thuthulwa khulwane), grind them and apply to the eyes.
Ulmaceae, *Trema orientalis* (L.) Blume (EV0013LT)	Pigeonwood (Eng.), Mukurukuru (V)	T	Eye problems in goats, sheep and cattle Gallsickness	L.	Grind leaves, mix with water, and give to an animal Take leaves, grind them, mix them with water and give them to animals

B, Barks; Eng, English common names; EV, ethnoveterinary; H, herb; L, leaves; R, roots; S, shrub; T, tree; V, Venda common names.

Plant use validation

Biological validation based on *in vitro* and *in vivo* studies might not be the ultimate goal of all ethnoveterinary studies. However, in order to join the mainstream of health care including veterinary primary health care, the so-called anecdotes need to be evaluated if not validated. Moreover, plants administered have more than one biological property making a single evaluation quite limitative. Such property which is ignored is the nutraceutical properties since animals are often seen eating these plants. According to Kalra (2003), when a functional food aids in the prevention and/or treatment of disease(s) and/or disorder(s), it is called a nutraceutical. For instance, *Bolusanthus speciosus* contains many flavonoids that were shown to have antimicrobial activity and moderate to strong radical scavenging properties (Erasto et al., 2004). Flavonoids are also recognised as nutraceutical (Kharb and Singh, 2004). *Rhus lancea* is indicated against diarrhoea and in treatment of gallsickness (Van der Merwe et al., 2001). Roots and bark of *R. lancea* showed some antibacterial and anthelmintic activities (McGaw et al., 2008). *Rhus* species are also a rich source of condensed tannins (Min et al., 2008). Tannins are known to control bloat and improve protein utilization in ruminants (Makkar et al., 1995). Thus, the plant can also be classified as nutraceutical.

Some studies on major ailments in the study area such as tick and tick-borne diseases have been undertaken. The use of Aloes was evaluated for anti-babesial (Naidoo et al., 2005), anti-rickettsial (Naidoo et al., 2006) and for antibacterial, anti-inflammatory and mutagenic activities (Luseba et al., 2007). In all of these studies, certain positive activities were found but further investigations are still needed. This is in any case common to any process of drug discovery and development. For instance, Luseba et al. (2007) studied the antibacterial, anti-inflammatory and mutagenic activities of plants used for treatment of wounds, the researchers validated the use of different plants including *A. marlothii, D. eriocaryuim and P. angolensis. P. angolensis was* one the most plant used against tick and tick-borne diseases in the study area. Dichloromethane (DCM) extracts of *P. angolensis* exhibited the highest antibacterial activity and high inhibitory activity against cyclo-oxygenase enzyme 1 (COX-1) (> 60%). Similarly, methanol extracts of *P.*

angolensis showed high inhibitory activity against COX-2 (> 70%). In another study (Luseba, unpublished) the acetone extracts of leave and bark of *P. angolensis* were tested against *Ehrlichia ruminantium*; the leave extract cleared signs of *E. ruminantium* in the endothelial cells though lower concentrations of the leave extract reduced cytotoxicity.

Conclusions

This study has shown clearly that there is still more to describe in ethnobotany. In the light of global warming and degeneration of the natural habitats, a full picture on the use of plants should not exclude EVM practices as they are fundamentally based on nature. Indigenous knowledge and subsequent technology should be considered as part of our modern existence considering the mutual impact. Young people do not accept the old ways of living including EVM. It is therefore a matter of restoring not only the ecology which has been destroyed but also address the acculturation that characterise our modern society. EVM is ethnic and locality specific; flora on its own does not determine the type of plants used by a specific ethnic group. It is also necessary to validate the claims and permit a sound understanding of the mechanisms of action of the plant secondary metabolites and to better characterise the bioactive compounds associate with the therapeutic properties. As stated by Toledo et al. (2009) “The possibility to better understand the relationships within the men, the nature and their culture has extreme importance because it allows the characterisation of social systems through their particular environmental perception, and provides useful tools for the development of conservation policies”. A systematic recording of the uses of the biodiversity by different ethnic groups is therefore required.

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