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An Ethnobotanical Study of Plants Used for the Treatment of Livestock Diseases in the Eastern Cape Province, South Africa

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Abstract

Information on medicinal plants used by the people of the Eastern Cape for the treatment of animal diseases was collected by rapid rural appraisal techniques, including ranking, stories, transect walking, seasonal calendars and semi-structured interviews. A total of 38 species belonging to 31 families was found to be commonly used in herbal remedies against various diseases of farm animals. Out of these, 21 plant species from 17 families are used to treat gallsickness, while 13 species from 13 families are used to treat redwater disease. In the majority of preparations, 78% of the remedies are decoctions: 13% as infusions, 5% by just squeezing the plant parts, and 4% of the preparations are either prepared as infusions, or as decoctions. Leaves are the most frequently used plant part. A total of nine livestock disease conditions, namely gallsickness, redwater, heartwater, eye inflammation, retained placenta, foot rot, hastening of estrus, three-day-stiff sickness and internal parasites (helminthiasis) were reported to be treated using the plants recorded during the investigation. Generally, more than one plant species are combined for the treatment of livestock by the rural farmers of the Eastern Cape province. In most cases, the plants used are reported, in literature, to possess some pharmacological activity.

Keywords: Ethnobotany, herbal remedies, livestock diseases, medicinal plants.

Introduction

The use of plants in herbal medicine is an age old practice and is still prevalent all over the world, while the dependence on plants as the source of medicine is still very common

in developing countries, where traditional medicine plays a major role in health care delivery (Adhikarla, 1984; Farnsworth, 1984). Traditional medicine is an integral part of the South African cultural life, a position that is unlikely to change to any significant degree in the coming years. For instance, it is estimated that between 12 and 15 million South Africans still depend on traditional herbal medicines from as many as 700 indigenous plant species (Brandt et al., 1995; Meyer et al., 1996). In this part of the world, people do not only use traditional medicine for their own welfare, but also for that of their animals. A previous study has shown that almost 75% of resource-limited livestock owners use traditional medicine to treat animal ailments (Masika et al., 2000), and it is believed that most of these plants possess pharmacologically active compounds (Coetzee, 2000).

Problems facing resource-limited livestock farmers in the Eastern Cape include, among others, low income and lack of access to proper veterinary services. There is also a high incidence of diseases, especially tick-borne diseases which, in most cases, bring about the high livestock mortalities experienced in this area during summer (Masika et al., 1997). In the majority of cases, farmers prepare herbal remedies on their own or consult herbalists who use plant materials to treat the animals. Despite the wide use of herbal medicine for the treatment of animal diseases in this part of the world, there is a lack of sufficient scientific documentation of the practice.

Information on herbal medicine, like any other cultural practices in Africa, has been dominated by the oral tradition. The older generation, who often know which plants to use to cure or prevent disease in stock animals, pass on such information to the apprentices (Hutchings, 1989; Van Wyk et al., 1997). Unfortunately, some of the knowledge is distorted or

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lost completely during transfer, which leads to loss of information with time. Therefore, it is necessary to make an effort to avoid the erosion of this knowledge in South Africa, not only to preserve a part of the cultural heritage, but also to conserve the information on useful plants.

In this article, we report on the information gathered from herbalists and resource-limited farmers on the plants used for the treatment of livestock ailments in the Eastern Cape province of South Africa.

Methodology

The study area falls within latitudes 30°00′–34°15′S and longitudes 22°45′–30°15′E. It is bounded by the sea in the east and the drier Karroo (semi-desert vegetation) in the west. The elevation ranges from sea-level to approximately 2200m in the north, and the vegetation is veld type number 7, known as the Eastern Cape thorn veld (Acocks, 1975). The study was conducted in two phases. In a preliminary investigation, rapid rural appraisal (RRA) techniques of analytical ranking, story telling, diagrams of transect walking and seasonal calendars were used to generate information. Most appraisal meetings were organized to coincide with livestock inspection or dipping days. During the second phase of the study, information obtained in RRA meetings was expanded by conducting semi-structured interviews. Some of the plants used were collected (if available) and voucher specimens deposited at the University Herbarium.

Results and discussion

The results of this study showed that 38 plant species belonging to 31 families are frequently used for the treatment of livestock ailments by the people of the Eastern Cape (Table 1). Out of these, 21 of the plants from 17 families are used for the treatment of gallsickness (anaplasmosis), which is an arthropod-borne disease of cattle, sheep, goats and some wild ruminant species. It is caused by obligate intra-erythrocytic rickettsial organisms of the genus *Anaplasma*. Generally, the disease is characterized by fever, progressive anemia and icterus (Potgieter & Stoltz, 1994). Plants used to treat gallsickness possess various pharmacologically active substances. For example, *Tulbaghia alliacea* is reported to have similar antibiotic and antifungal activities as in garlic, due to its alliin content (van Wyk et al., 1997). Two antimicrobial compounds, faltarindiol and asaricin, have been isolated from *Heteromorpha arborescen*.

Thirteen plants from 13 families are used to treat redwater (babesiosis), a tick-borne disease caused by the intra-erythrocytic protozoa *Babesia bovis* and *Babesia bigemina* (De Vos & Potgieter, 1994). As the name implies, redwater is characterized by intravascular haemolysis, haemoglobinemia and the development of haemoglobinuria, which is responsible for the red colored urine, and icterus (De Vos et al., 1994). However, seven of the plants used in the treatment

of redwater are also used for the treatment of gallsickness (Table 1). This is an indication of the possible broad-spectrum nature of the plants against the causative agents of the diseases. For example, *Salix capensis* possesses anti-inflammatory properties that are effective in the alleviating symptoms of gallsickness, redwater and for retained placenta. *Combretum caffrum* used in the treatment of redwater possesses both antimicrobial and anti-inflammatory activity. This property is mainly ascribed to stilbenoids (combretastatins), triterpenoids and saponins. *Aloe ferox*, which is used in the treatment of gallsickness, redwater and helminthiasis, is reported to have a laxative effect, due to its anthrone C-glucoside aloin content (van Wyk et al., 1997). Polyhydroxystilbenes have been isolated from *Schotia brachypetala*; stilbenes have been reported to possess antibiotic properties (van Wyk et al., 1997).

Three plants from this study are used for the treatment of heartwater (cowdriosis), a tick-borne disease of domestic and wild ruminants, caused by a rickettsia, *Cowdria ruminantium*. The disease is typically characterized by high fever, nervous signs, hydropericardium, hydrothorax and edema of the lungs and brain (Bezuidenhout et al., 1994). Despite heartwater being a tick-borne disease, the plants used in its treatment are not similar to the ones used for gallsickness and redwater. This could be due to the fact that small-scale farmers in the Eastern Cape province perceive gallsickness and redwater to be caused by the eating of green grass (Masika et al., 1997). In the case of heartwater, the plants used possess different activity; for example, *Rhoicissus* species has anti-inflammatory properties, whereas the root of *Rumex lanceolatus* contain glycosides of chrysophanol, which have a laxative effect (van Wyk et al., 1997).

Four plants are used in the treatment of pink eye (infectious bovine keratoconjunctivitis), a condition characterized by lachrymation, conjunctivitis, and keratitis, and caused by the bacteria *Moraxella bovis* (Van Halderen & Henton, 1994). *Combretum caffrum*, which is one of the plants used, contains triterpenoids and saponins which are well-known for their antimicrobial and anti-inflammatory activity (van Wyk et al., 1997). Antibiotic activity has been reported in *Pentanisia* species. According to Hutchings (1989), *Pentanisia prunelloides* is locally known as Icimamlilo, meaning “putting out the fire”, an indication of the plant’s ability to relieve pain and/or inflammation.

Two of the five plants are used against retained placenta; *Salix capensis*, that possesses anti-inflammatory activity due to its salicylic acid (van Wyk et al., 1997), and *Plectranthus laxiflorus* which has been reported to possess antimicrobial activity.

Helichrysum appendiculatum is one of the two plants recorded in this study as being used for the treatment of foot rot, a highly contagious, painful and debilitating disease. It is primarily caused by a synergistic infection of two bacteria, *Dichelobacter (Bacteroides) nodosus* and *Fusobacterium necrophorum* (Venter & Van Amstel, 1994). *Helichrysum appendiculatum* contains flavonoids, sesquiterpenoids and

Table 1. Plants used for the treatment of livestock diseases in the Eastern Cape, South Africa.

Scientific name	Local name	Part used	Preparation	Uses
Alliaceae <i>Tulbaghia alliacea</i> L.f.	isivumba mpunzi	Leaves	Crush and leave to stand in cold water to make an infusion	Gallsickness
Amaryllidaceae <i>Boophone disticha</i> (L.f.) Herb.	inCwadi	Inner bulb	Crush and boil in water	Redwater
Apiaceae <i>Heteromorpha arborescens</i> var. <i>abyssinica</i> (Hochst. Ex A. Rich.) H Wolff	uMbangandlela	Roots	Crush both in cold to make an infusion	Gallsickness Redwater
Araceae <i>Zantedeschia aethiopica</i> (L.) Spreng.	Inyibiba	Rhizome	Boil in water	Redwater
Araliaceae <i>Cussonia spicata</i> Thunb.	umSenge	Bark and leaves	Crush and boil in water	Gallsickness Redwater
Asphodelaceae (Aloaceae) <i>Aloe ferox</i> Mill.	iKhala	Leaves	Crush and leave to stand in cold water to make an infusion	Gallsickness Redwater Helminthiasis
Asteraceae <i>Helichrysum Appendiculatum</i> (L.f.) Less.	iMpepho	Leaves	Boil in water	Foot rot
<i>Chrysocoma tenuifolia</i> Berg.	uBosisi	Roots	Boil in water and strain	Redwater
Combretaceae <i>Combretum caffrum</i> (Eckl. & Zeyh.) Kuntze	umDubi	Leaves and bark Leaves	Crush and boil in water Squeeze leaf juice on to affected eye	Redwater Conjunctivitis
Cucurbitaceae <i>Kedrostis africana</i> (L) Cogn.	uTuvana	Bark and leaves	Crush and boil in water	Gallsickness
Euphorbiaceae <i>Clutia pulchella</i> L. var. <i>obtusata</i> Sonder	uBuhlungu-bedila	Leaves and stalk	Crush and boil with leaves of <i>Leonotis leonurus</i> in water	Gallsickness
Fabaceae <i>Schotia latifolia</i> Jacq.	umGxam	Bark and Leaves	Crush and boil in water	Redwater
<i>Acacia mearnsii</i> De Wild	indywabasi	Bark	Stump and boil in water	Hasten estrus
Fagaceae <i>Quercus rober</i> L.	umOkhi	Bark	Crush with bark of <i>Schotia latifolia</i> and boil in water	Gallsickness
Geraniaceae <i>Pelargonium reniforme</i> Curtis.	iVendle Kubalo	Roots	Crush and boil in water and add salt to the decoction	Gallsickness
Hyacinthaceae <i>Eucomis punctata</i> L'Hér.	Ubuhlungu	Leaves	Crush and boil, add potassium permanganate	Gallsickness
<i>Ledebouria revoluta</i> (L.f.) Jessop	Inqwebebane	Leaves	Crush and boil in water	Gallsickness

Table 1. Continued

Scientific name	Local name	Part used	Preparation	Uses
Hypoxidaceae <i>Hypoxis colchicifolia</i> Baker	iNongwe iLabatheki	Corms and leaves	Stump and boil with bark of <i>Salix capense</i>	Gallsickness Redwater
Lamiaceae <i>Leonotis leonurus</i> (L.) R. Br.	umFincafinane	Leaves	Squeeze leaf juice on to affected eye	Conjunctivitis
<i>Plectranthus laxiflorus</i> Benth.	uHlololwane	Roots	Crush and boil with leaves of <i>Eucomis punctata</i> and bark of <i>Kedrostis africana</i> in water	Gallsickness
		Roots and bark	Crush, boil, and salt added to the decoction	Redwater
		Bark	Crush with leaves of <i>Teucrium capense</i> then boil in water	Retained-placenta
<i>Teucrium trifidum</i> Retz	ubuhlungu be Bhokwe	Leaves	Crush and boil in water	Gallsickness
Malvaceae <i>Hibiscus diversifolius</i> Jacq.	umSongelwa	Roots	Crush and boil in water	Heartwater Helminthiasis Retained-placenta
Meliaceae <i>Melia azedarach</i> L.	umSeringa	Leaves	Boil in water	Gallsickness
Melanthaceae <i>Bersama tysoniana</i> Oliv.	Isindiya	Bark	Crush and boil in water	Gallsickness
Moraceae <i>Ficus sur</i> Forssk.	umKhiwane	Leaves	Crush and boil in water	Redwater-placenta
Oleaceae <i>Olea europaea</i> L. subsp. <i>cuspidata</i> (Wall. ex G. Don) Cif.	mNquma	Bark	Crush and boil in water	Gallsickness
Pittosporaceae <i>Pittosporum viridiflorum</i> Sims	umKwenkwe	Bark	Either an infusion or a decoction	Gallsickness
Podocarpaceae <i>Podocarpus latifolius</i> (Thunb.) R. Br. ex. Mirb.	umKoba	Bark	Crush and boil in water	Gallsickness
Polygonaceae <i>Rumex lanceolatus</i> Thunb.	iDololenkonyana	Rhizome	Crush and boil in water	Heartwater Helminthiasis
Rubiaceae <i>Pavetta revoluta</i> Hochst.	uSkolpati	Leaves	Crush and leave to stand in cold water to make an infusion	Gallsickness
<i>Pentanisia prunelloides</i> (Eckl. & Zeyh.) Walp.	Icimamlilo	Leaves	Boil with leaves of <i>Cannabis sativa</i> and add glycerine	Conjunctivitis Retained-placenta
Rutaceae <i>Clausena anisata</i> (Willd.) Hook.f. ex Benth.	isiFutho umNukambiba	Leaves	Squeeze the leaves and place between hooves in cattle	Foot rot
		Roots	Boil in water	Helminthiasis
Salicaceae <i>Salix capensis</i> Thunb.	umNgcunube	Bark and leaves	Crush and boil in water	Gallsickness Redwater Retained-placenta

Table 1. Continued

Scientific name	Local name	Part used	Preparation	Uses
Sapindaceae <i>Hippobromus pauciflorus</i> (L.f.) Radlk.	uLathile	Leaves	Boil in water	Conjunctivitis
Solanaceae <i>Solanum anguivi</i> Lam.	Umthuma	Leaves	Boil in water	Retained-placenta
Verbenaceae <i>Lippia javanica</i> (Burm. f.) Spreng.	inZinziniba	Leaves	Crush and boil with leaves of <i>Escomis heterophylla</i>	Gallsickness Redwater
Vitaceae <i>Rhoicissus tomentosa</i> (Lam.) Wild & R.B. Drumm.	iSaqoni Sakoone	Bark	Crush and boil in water	Heartwater
		Bark	Crush with bark of <i>Kedrostis africana</i> then boil in water	3-day stiff sickness
		Root	Crush and boil in milk for young calves	Helminthiasis

acylated phloroglucinols, which are reported to induce pain-relief, anti-infective and anti-inflammatory activity (van Wyk et al., 1997).

Three-day stiff sickness (bovine ephemeral fever) is an arthropod-borne viral disease of cattle and water buffalo. It is characterized by short durations of fever, stiffness and disinclination to move (St. George, 1994). In most cases, it is self-limiting within a few days duration, thus the name three-day stiff sickness. The local farmers in this province use *Rhoicissus tomentosa* in combination with *Kedrostis africana* for the treatment of three-day stiff sickness. These plants are reported to possess anti-inflammatory and purgative properties, respectively (Brander & Pugh, 1977).

In this study, five plants were recorded as those used for the treatment of worm infestation (helminthiasis), the most prevalent in the area being liverflukes, tapeworms and roundworms (Monnig & Veldman, 1989). *Aloe ferox* and *Rumex lanceolatus* are known to have laxative action due to anthrone C-glucoside aloin and glycosides of chrysophanol, respectively (van Wyk et al., 1997).

In all, nine different livestock disease conditions were recorded, among which gallsickness was the most common, especially in summer. However, farmers in the rural areas use the term “gallsickness” for a range of ailments associated with either jaundice (icterus), distension of the gallbladder with bile, or lesions of the liver. At times, diseases such as redwater, heartwater, or mixed infections of these diseases are all referred to as “gallsickness” (Henning 1932; Masika et al., 1997).

Different methods are used for the preparation of the remedies. Boiling in water to make decoctions constitutes the majority (78%) of the cases, while steeping in water at room temperature for varied length of time forms 13% of the methods. Other methods include squeezing out of juice directly from the plant materials (5%) and in 4% of cases, a combination of the first two above methods are employed.

Generally, different plant parts are used in the formulation of the remedies. Leaves constitute 51% of the materials and the bark makes up 30%, while roots are used in 16% of the remedies. Corms, rhizomes and bulbs are used only in about 1.5% of the preparations. In 20% of the formulations, combinations of leaves, roots, corms and bark are used.

There is the tendency by the farmers to combine more than one plant in the preparation of remedies to treat their livestock. In ten of the preparations, plant combinations were used for the formulation of livestock medicines. For instance, a decoction of *Plectranthus laxiflorus* (Lamiaceae), *Eucomis punctata* (Hyacinthaceae) and *Kedrostis africana* (Cucurbitaceae) is used to treat gallsickness. In three preparations, non-plant materials are added to the herbal remedies; these were potassium permanganate, salt and glycerine. Potassium permanganate is added to a decoction of *Eucomis punctata* leaves, which is used in the treatment of gallsickness, while glycerine is added to a decoction of *Pentania prunelloides* (Rubiaceae) and *Cannabis sativa* (Cannabaceae), used in the treatment of eye inflammation. Salt is added to root decoctions of *Pelargonium reniforme* (Geraniaceae), and *Plectranthus laxiflorus* for the treatment of gallsickness and redwater, respectively.

In most cases, plants used in the preparation of remedies for specific ailments had documented activities that were similar to those of remedies used in the conventional treatment of these ailments. The results provide the basis for the use of the plants in the treatment of livestock diseases and would constitute a platform for the improvement of efficacy, the safety and the quality of the herbal remedies.

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