



Traditional uses of the remarkable root bark hairs of *Lannea schweinfurthii* var. *stuhlmannii* (Anacardiaceae) by the Vhavenḁa, South Africa

K. Magwede^a, L.I. Ramovha^b, D.E.N. Mabogo^b, A.E. van Wyk^{b,c}, B.-E. van Wyk^{a,*}

^a Department of Botany and Plant Biotechnology, University of Johannesburg, P.O. Box 524, 2006 Auckland Park, Johannesburg, South Africa

^b Department of Plant and Soil Sciences, University of Pretoria, Private Bag X20, 0028 Hatfield, Pretoria, South Africa

^c South African National Biodiversity Institute, Private Bag X101, 0001 Pretoria, South Africa

ARTICLE INFO

Article history:

Received 15 October 2018

Received in revised form 4 February 2019

Accepted 13 February 2019

Available online 12 March 2019

Edited by A Moteete

Keywords:

Ethnobotany

Mulivhadza

Periderm

South Africa

Venḁa

Vhulivhadza

ABSTRACT

Lannea schweinfurthii var. *stuhlmannii*, an African tree ranging from Sudan southwards to South Africa, has its thicker roots covered by an unusual furry layer of hair-like structures originating from the periderm. Wool-like hairs harvested from this layer, known in the vernacular Tshivhenḁa as *vhulivhadza*, is a widely used and traded natural product in Limpopo Province, South Africa. Here we provide a detailed account of the cultural uses of *vhulivhadza* based on original ethnobotanical surveys among the Vhavenḁa, as well as a review of the literature. Our findings indicate that *vhulivhadza* is a “magical medicine,” mostly used to induce several forms of forgetfulness, both in humans and in animals. Various uses reported for *L. schweinfurthii* and *L. alata*, the latter an East African species with similar root bark hairs, suggest that the custom to use these hairs to induce forgetfulness is confined to southern Africa. The practice of taking traditional medicine to “forget something” or “to make people forget” is quite widespread in southern Africa. We discuss *vhulivhadza* and a few other plants used locally for this purpose, notably the mysterious *sho-|ḁā* plant of the now extinct |Xam culture, *Asclepias crispata* (Apocynaceae: Asclepiadoideae) and *Galium tomentosum* (Rubiaceae). The roots of *Lannea schweinfurthii* and other members of the genus are rich in phytochemicals, with at least some screenings for biological activity suggesting the presence of compounds that may affect the neurological system. In the absence of any comprehensive chemical or pharmaceutical analyses of *vhulivhadza* itself, the claimed memory-altering activities of this material can tentatively perhaps best be explained by psychological rather than physical (chemical) effects, but a more definite scientific explanation must await further study.

© 2019 SAAB. Published by Elsevier B.V. All rights reserved.

1. Introduction

Lannea schweinfurthii (Engl.) Engl. var. *stuhlmannii* (Engl.) Kokwaro [= *L. stuhlmannii* (Engl.) Engl.; for a detailed synonymy see Kokwaro, 1986] (Anacardiaceae), a medium-sized deciduous tree, is widely distributed in Africa, from Sudan and Tanzania southwards to KwaZulu-Natal in South Africa (Kokwaro and Gillett, 1980; Coates Palgrave, 2002; Van Wyk et al., 2008, 2011; Van Wyk and Van Wyk, 2013). The taxon is mainly associated with various types of savannah or dry forest (Palmer and Pitman, 1973; Beentje, 1994; Lovett et al., 2006). An unusual feature of the tree is the formation of a furry layer of hair-like structures on the thick roots of the tree, especially where they merge with the trunk. Although for convenience referred to as “hairs” in the present contribution, these hair-like structures are not of epidermal origin and therefore technically not hairs in the true sense of the

word (see below). Known as *vhulivhadza* in Tshivhenḁa, these hairs are a popular and widely used traditional product in the Limpopo Province of South Africa (Mabogo, 1990; Ramovha, 1997), mainly used to induce memory loss or to make people or animals forget. The tree itself is known as *mulivhadza* in Tshivhenḁa and as *ndzivata* in Xitsonga, both meaning “the tree of forgetfulness”. Other vernacular names for the tree include *valsmaroela* (Afrikaans), false-marula (English), *mmpo* (Northern Sotho/Sepedi), *umgabunkhomo* (siSwati) and *umganunkomo* (isiZulu) (Van Wyk et al., 2011).

The anatomical and structural details of the unusual root bark hairs have been described by Kotina et al. (2018). These hairs turned out to be of peridermal origin, thus supporting the findings of an earlier anatomical study of similar root hairs in the East African *Lannea alata* (Engl.) Engl. (McQuade et al., 1970). They develop from dense clusters of phelloid cells that are scattered within a stratified phellem. The cells undergo considerable radial elongation to form hair-like radial files of elongated phelloid cells (Kotina et al., 2018).

* Corresponding author.

E-mail address: bevanwyk@uj.ac.za (B.-E. van Wyk).

Available information on the use of *vhulivhadza* by the Vhivenḁa (as cited above) is brief and often anecdotal. The aim of this paper is to provide a detailed account of the cultural uses of *vhulivhadza*, specifically as it pertains to forgetfulness, based on literature information and original ethnobotanical surveys. We discuss the use of this and other plant material to induce forgetfulness in South Africa, and noted some of the various uses reported for *Lannea schweinfurthii* and *L. alata* elsewhere in Africa.

2. Materials and methods

Ethnobotanical information was collected in several parts of the Vhembe District, Limpopo Province, the traditional home of the Venḁa people. Ethical approval was obtained from the ethics committee of the Faculty of Science, University of Johannesburg (Protocol of January 13, 2015). We strictly adhered to the ethical guidelines listed in the 2008 version of the [International Society of Ethnobiology \(2006\)](#). Of particular importance is the principle of “educated prior informed consent,” which was part of the consent document, signed by all the participants prior to the interviews. The consent form gives explicit permission that the participant’s name, date of birth and the traditional knowledge that he or she contributed may be used in scientific publications. The interviews were done in Tshivhenḁa, the mother tongue of the first three authors and form part of a comprehensive quantitative ethnobotanical survey and PhD study by one of us (KM) at the University of Johannesburg. A total of 37 randomly selected participants from four municipalities (Makhado, Thulamela, Musina and Mutale) within Vhembe District were interviewed using a flip-file photo album showing color images of the tree (and the product), as shown in [Fig. 2](#) (neither the tree nor the product were named). Of the 37 participants, 10 persons (none of them traditional healers) could provide detailed information about *vhulivhadza* and its uses ([Table 1](#)). Seven traditional medicine (“muti”) shops from the three main towns of the Venḁa area, namely Makhado (one shop), Sibasa (two shops) and Thohoyandou (four shops) were visited to check if *vhulivhadza* was sold there.

3. Results

3.1. Review of magical uses

The Tshivhenḁa name for the tree (*mulivhadza*) and the product (*vhulivhadza*) is derived from *-livhala*, to forget, indicating that the plant is used to make a person forgetful and to make people forget unpleasant events ([Mabogo, 1990](#)). It is also said to induce sleepiness and to make relatives forget. This magical power is ascribed to *vhulivhadza*, which is an important ingredient of traditional medicine ([Mabogo, 1990](#); [Hutchings et al., 1996](#)), and is marketed locally.

Data gathered during recent ethnobotanical surveys show that *Vhulivhadza* is well known and widely used in the Vembe District. Of the seven traditional medicine shops visited, four were found to



Fig. 1. Example of *vhulivhadza* (root bark hairs of *Lannea schweinfurthii* var. *stuhlmannii*) as it is sold on traditional markets in the Limpopo Province of South Africa. Photograph: K. Magwede.

stock the product ([Fig. 1](#)) and the others were temporarily out of stock. This shows that the product is known among local people and that it is still in demand. A 500 ml plastic bag of *vhulivhadza* is sold at an average price of R25.00 (less than two USA dollars). [Kotina et al. \(2018\)](#) reported that in 2016 the prevailing price for a matchbox filled with hairs was about R20.00.

From a total of 37 participants interviewed, 10 were found to know about *vhulivhadza* and its traditional uses ([Table 1](#)). The most knowledgeable participants were elders at an average age of 68 years. Nine main uses of *vhulivhadza* have been recorded.

3.1.1. Forgetting an unpleasant or painful event

Vhulivhadza is used to make people forget all unpleasant events ([Mabogo, 1990](#)). It is used to make a person forget his or her family members who had just passed away (i.e., to aid in the grieving process and to enhance closure after a relative died) ([Mabogo, 1990](#)).



Fig. 2. Flip-file page of images of *Lannea schweinfurthii* var. *stuhlmannii* as presented to participants in an ethnobotanical survey in the Vembe District, Limpopo Province, South Africa. Photographs: K. Magwede.

Table 1

The 10 participants (out of a total of 37 interviewed) who had detailed knowledge about the uses of *vhulivhadza*, including their surnames, full name(s), gender, age, home villages and municipalities.

Name	Gender	Age	Village	Municipality
Bohwana, Thinawanga	Female	63	Tshaulu	Thulamela
Bohwana, Salphinah	Female	60	Tshaulu	Thulamela
Mukwevho, Muofhe Nyadzeni	Female	81	Tshaulu	Thulamela
Madoba, Wilson	Male	68	Tshaulu	Thulamela
Lialima, Nkakateni Thomas	Male	60	Matshena	Mutale
Makhushu, Nelson	Male	59	Matshena	Mutale
Netanda, Phalandwa Frans	Male	81	Mafukani-Thengwe	Mutale
Mudumela, Thifhulufheli	Female	52	Vuvha	Makhado
Maitakhole, Rosinah	Female	70	Tshaulu	Thulamela
Vuledzani				
Singo, Masindi	Female	86	Tshaulu	Thulamela

This may be done by making a decoction of the root bark of the tree, to which *vhulivhadza* is added, together with any root that was found to cross the grave site while digging the grave. Family members are given this decoction to drink. It is also said to protect them against a particular type of sleeping sickness known as *vhulungwane* in Tshivenda (Mabogo, 1990). Ash obtained by burning the *vhulivhadza* is added to soft porridge that is eaten by close family members who had just buried a relative so that they can forget the pain of death (participant M.N. Mukwevho).

3.1.2. Getting out of debt

The product is said to induce forgetfulness, e.g., it can be given to someone from whom a loan has been obtained (or cattle bought) but not yet paid for, so that they may forget the transaction or the outstanding debt (Coates Palgrave, 2002). Mixed with a drink or food it is given to someone you owe money or any valuable item in order to make him or her forget about it (participants W. Madoba, N.T. Lialima, T. Mudumela and R.V. Maitakhole).

3.1.3. Protection and safety

Vhulivhadza is mixed with other medicine to discourage enemies from doing harm to a person by making them forget and postpone their plans (Mabogo, 1990).

3.1.4. Enhancing marital relationships

It is an ingredient of medicines used for keeping a married woman at home by making her forget her previous social ties (Mabogo, 1990). *Vhulivhadza* [sometimes mixed with root powder of *Osyris lanceolata* Hochst. & Steud. (Santalaceae) – according to P.F. Netanda] is added to a newly married bride's food (without her knowledge) so that after eating it she should not remember her childhood home and forget her earlier social ties and stay at her husband's home. It was also said that no matter what difficulty she is experiencing with her husband, she should not think of going back home (confirmed by participants T. Bohwana, S. Bohwana, N.T. Lialima, and N. Makhushu). Mixed with food, it is given to a marriage partner (or secret lover) to eat so that he/she forgets about other social ties and only concentrate on the one who had administered the *vhulivhadza* (participant R.V. Maitakhole).

3.1.5. Traditional healing

It is mixed with water or medication that is given to a patient with chronic pain or one suffering from a disease. The aim is to make him or her forget about the pain while they are still under treatment by a traditional healer, in order to facilitate the healing process (participant T. Mudumela).

3.1.6. Adoption of an orphaned child

Vhulivhadza is mixed with cooked seeds of *Arachis hypogaea* L. (*nḡuḡu*, *nḡuhumange*; groundnut), *Vigna subterranea* (L.) Verdc. (*phonḡa*; Bambara groundnut) and *Vigna unguiculata* (L.) Walp. (*muḡawa*; cow pea) and is given to an orphaned child to eat with the person they want him or her to attach to and connect with, i.e., to make the child forget the deceased mother and to adapt to the foster parent (participants M.N. Mukwevho, P.F. Netanda, R.V. Maitakhole and M. Singo).

3.1.7. Weaning an infant

Vhulivhadza is used to wean an infant by applying it to the mother's breast so that when the child suckles he or she will forget about milk and start to concentrate on eating solid food. The same effect can be achieved by adding the ash of burnt *vhulivhadza* into the baby's soft porridge so that the child, after eating the porridge, will forget suckling and concentrate on eating solid food (participants M.N. Mukwevho, R.V. Maitakhole and M. Singo).

3.1.8. Preventing domestic animals from straying

Vhulivhadza mixed with water is given to newly acquired domestic animals to drink to prevent them from straying and to strengthen their relationship with other animals at their new home while forgetting the previous home (Mabogo, 1990; Ramovha, 1997; participants T. Bohwana, S. Bohwana, W. Madoba, N.T. Lialima, N. Makhushu, P.F. Netanda and T. Mudumela). It is also generally mixed with cattle fodder that is browsed by all the animals at the same time to strengthen their relationship and to always remember their home so that they come back without the herder directing them (participant N.T. Lialima).

3.2. Medicinal and other uses recorded in southern and eastern Africa

Vhulivhadza or its uses are not mentioned by Watt and Breyer-Brandwijk (1962) and only a few traditional uses of *Lannea schweinfurthii* var. *stuhlmannii* have been recorded. A summary of medicinal and other uses that have been recorded in southern and East Africa is presented in Table 2.

Table 2

Summary of medicinal and other uses recorded for *Lannea schweinfurthii* in southern and eastern Africa.

Plant part(s) used and recorded uses	Reference
"Root powder" (eaten in food): sedative	Arnold and Gulumian (1984) Beentje (1994)
Fruit: edible	
Bark: used for making tea, rope and a red-brown dye; a decoction used against headache and stomach-ache	
Wood: used to make stools, grain pestles, and charcoal. The latter preferred by the Embu for smelting iron	
"Used for medicinal and magical purposes, e.g. snake-bite" (no further details) p. 244	Boon (2010)
Root hairs (pulverized, taken with water or gruel): tuberculosis, female sterility; Root (decoction, taken orally): asthma, dysentery, fever, stomach complaints; also anemia, diarrhea and headache	Chhabra et al. (1987)
"A fungus-like outgrowth from the bark of the roots actually comprises velvety hairs and is very important in traditional medicine. Said to induce forgetfulness, it can be given to someone from whom a loan has been obtained or cattle bought and not paid for. The Swazi name for this tree [umgabunkhomo, according to Van Wyk et al., 2011] means 'the tree of forgetfulness' and could derive from the fact that it features in certain ceremonies which take place when two former enemies meet and agree to forget their past quarrels. The tree is believed to harbor a benevolent spirit which is often invoked by ritual to protect and heal. A paste made from the leaves can be applied as a dressing on sores and abscesses."	Coates Palgrave (2002)
Root (infusion or decoction): diarrhoea	Gelfand et al. (1985)
Bark: yields a deep red or brown dye	Dale and Greenway (1961) Hutchings et al. (1996)
Review of other literature, q.v. (Watt and Breyer-Brandwijk, 1962; Kokwaro, 1976; Gelfand et al., 1985; Mabogo, 1990):	
Root bark (powdered, blown into the nasal cavities of a moribund patient): snakebite (citing Watt and Breyer-Brandwijk, 1962, but not found under <i>Lannea</i>)	Kokwaro (1976, 1983)
Bark (decoction): headache, stomach pains	
Leaves (infusion, as a wash): paralysis or polio	
Leaves (infusion, taken orally): abdominal pains in pregnant women	
Leaves (poultice, applied to the abdomen): to hasten childbirth	
Bark (decoction): used for making tea as a blood tonic, used by the WaPare and WaGogo for diarrhoea, stomach-ache and headache. Roots are used by the WaShambaa as a bath to bring good luck.	Lovett et al. (2006)
Fruits: edible, but not important as a food source	Maundu et al. (1999)
Bark (soft and fleshy parts): used for tea (Maasai, Pokot), medicine for fever (Mbeere); inner bark a source of string (Maasai); fiber from bark used to make grain	

Table 2 (continued)

Plant part(s) used and recorded uses	Reference
containers and baskets (Kamba); yields a brown dye used to decorate baskets.	
Brown root hairs (“wool”) used for stuffing mattresses (Kamba, Tharaka, Mbeere)	
Trunk: carved into stools, beehives, mortars, and drums for storing honey (Kamba, Tharaka)	
Leaf paste (topical): ulcers (citing Bally, 1937, 1938)	Neuwinger (2000)
Leaf pulp (topical): rheumatism, bruises, hematoma (citing Kremnitz et al., 1988)	
(Other information from the same sources cited here)	
“Used for medicinal and magical purposes” (no further details) p. 244	Pooley (1993)
Cited from Arnold and Gulumian (1984) and Van Wyk and Gericke (2000)	Sobiecki (2002)
Fruit: edible, popular with birds and monkeys; seed kernels pounded, boiled with salt and consumed as a relish	Storrs (1995)
Bark (pounded): yields a yellowish brown dye to decorate baskets	
Root hairs: used for cushions, lifebelts and as an insulating material	
Many medicinal uses for bark, roots and leaves (no further details)	
In Zambia “many villages have their own <i>Lannea</i> tree which is used to invoke ancestral spirits, and a cutting is usually planted by the Headman when establishing a new villager. Anyone troubled by spirits or sickness is advised to plant a <i>Lannea</i> outside his house.”	
“Velvety root hairs on the root bark are traditionally believed to have magical powers in making someone forget unpleasant memories”	Van Wyk et al. (2008)
Root hairs (taken as snuff): sedative	Van Wyk and Gericke (2000)
Root (burned, smoke inhaled): sedative (both anecdotes came from Million Matonsi, as personal communication to N. Gericke)	
Root hairs “used as a charm to make people forget.” Other information as in Van Wyk and Gericke, 2000)	Van Wyk and Gericke (2018)
Hairy root periderm: used as a charm (e.g., to induce memory loss)	Van Wyk et al. (2009)
Root (decoction, oral): diarrhea (possibly cholera), gonorrhoea, headache, abdominal pain	Verzar and Petri (1987)
Leaf sap (instilled into the nostrils): mental illness	
Leaves (as dressing): abscesses, furuncles	
Leaves (decoction, as a wash): paralysis	
Leaves (paste, applied topically): abscesses, carbuncles, sores (citing Bally, 1937, 1938)	Watt and Breyer-Brandwijk (1962)
“In the Balovale district of Northern Rhodesia [Zambia] the tree figures a great deal in spirit workshop” (citing Gilges, 1953)	
The tree figured in a case of homicide in Tanzania (not details available)	

4. Discussion

The concept of taking traditional medicine to “forget something” or “to make people forget” is quite widespread in southern Africa. In the Cape region, the roots of two plant species are particularly prominent as “medicine to forget.” These are *witvergeet* or *witvergif*, the dried and powdered root of *Asclepias crispera* P.J.Bergius (Apocynaceae: Asclepiadoideae) and *rooivergeet* or *rooistorm/rooihoutjie*, *Galium tomentosum* Thunb. (Rubiaceae). These Afrikaans names refer to the color of the root – white (*wit*) or red (*rooi*) and the use – to forget (*vergeet*). The medicinal uses of *A. crispera* in the Kamiesberg in Namaqualand have been described by Nortje and Van Wyk (2015). Most participants also agreed that *witvergeet* is a magic medicine without necessarily knowing how it is used. At least five participants confirmed that the root is chewed and spat out to make other people (or yourself) forget. It is also snuffed to “make you think clearly” or to ensure good luck in business. It is sometimes used in combination with *G. tomentosum* (locally called *rooistorm*) as a magic medicine to bring loved ones back (i.e., to ensure their safe return). The main use, however, is as traditional medicine: powdered

root is snuffed to alleviate headache, while decoctions are used against a diversity of stomach ailments (including nausea, flatulence and especially stomach cramps).

Galium tomentosum appears to be the only plant species that can be linked with some certainty to the mysterious *sho-ǀōā* plant, a traditional medicine of the original |Xam people (Southern Bushman, Southern San) who once inhabited the dry Karoo region of the Cape (Hollmann, 2004: 278). The magical uses of the *sho-ǀōā* plant were recorded by Wilhelm Bleek and Lucy Lloyd when interviewing members of the |Xam in the late nineteenth century. It was said to be a men’s medicine, a charm used by hunters to make the springbok “foolishly afraid,” thus making it easier to get close to the animals before shooting off an arrow (Hollmann, 2004; Bleek and Loyd, 2019, <http://lloydbleekcollectie.on.cs.uct.ac.za>). In interviews conducted by one of us (BEVW) with Johannes Willemse, a well-known Griqua expert on medicinal plants (Pienaar and Willemse, 2009), some interesting information came to light. According to Mr. Willemse, an ointment made from *rooivergeet* root was traditionally applied to the bodies of San hunters when they went on springbok hunts. He stated that the ointment brought good luck to the hunter: ‘the antelope will not see you and will forget about you’. This explanation was given with a subtle nuance that suggested not only forgetting but also forgiving. In a further elaboration on the uses of *rooivergeet*, it was stated that bathing in infusions of the root, or keeping the root in your pocket, will bring good luck, especially when you go to court. The explanation was that you will become almost invisible in the courtroom and that the judge will forget (or more likely forgive) you. It is noteworthy that a similar conclusion (of forgiveness) can be reached about *witvergeet*, especially when considering that *witvergif* has also been recorded as a common name for this plant (Nortje and Van Wyk, 2015). The word *vergif* is ambiguous; the direct and obvious translation is “to poison” but it may possibly be a contraction of the Afrikaans word *vergifnis* (forgiveness). Several participants in the Kamiesberg survey agreed that the root is commonly ingested, either as an infusion, or directly chewed or eaten as a dry powder, without the usual warnings that typically accompany anecdotes about poisonous plants. The similarities between the magical uses of these unrelated plants in diverse cultures are striking. However, there are no indications that *vhulivhadza* is used by Venda people for any other purpose than making people and animals forget.

The recorded traditional uses of *Lannea schweinfurthii* are summarized in Table 2. Roots or root bark are used for a diversity of ailments, none of which seem to be related to the recorded uses in the Limpopo Province. There is, to the best of our knowledge, only one report of “root hairs” being used elsewhere in Africa, namely in Tanzania, where it is used to treat tuberculosis and female sterility (Chhabra et al., 1987). All the anecdotes related to sedative and memory effects originate from the Venda region (Table 2). No evidence could be found that *vhulivhadza* and other species used for similar purposes have sedative or mind-altering activities (but see tests for bioactivity further on).

Elsewhere in Africa, various biocultural uses have been recorded for the superficially very similar-looking root hairs of *Lannea alata*, a species from Somalia, Kenya and Tanzania (Royal Botanic Gardens, Kew, 1999). However, none of these uses seem to involve the induction of forgetfulness. The wool-like hairs of this species has, for example, been used by the Somali, Tharaka, Kamba and Mbeere to stuff pillows and mattresses, but no mention is made in the literature of such stuffings holding any other benefits over and above that of providing comfort (Maundu et al., 1999; Royal Botanic Gardens, Kew, 1999). These hairs (similar to *vhulivhadza*), are buoyant and float in water – a property reminiscent of the seed floss or “kapok” obtained from some members of the Malvaceae, e.g., *Ceiba pentandra* (L.) Gaertn. In this regard, it is said that a British military unit once used these hairs, at the time known under the commercial name “Floatite,” as a flotation agent in lifejackets to cross rivers (Dale and Greenway, 1961).

The Anacardiaceae are known to contain skin irritants such as urushiol, the active compound in poison ivy (*Rhus toxicodendron* L.).

Other members of the family produce similar cytotoxic and skin-irritating alkyl- and alkenylphenols but they are not known to be sedative (Wink and Van Wyk, 2008). Members of the genus *Lannea* are mainly used in the management of mental disorders, gastrointestinal disorders, bacterial infections, viral, infections, fungal infections and fever (for a concise review, see Okoth, 2014). In her study, Okoth (2014) isolated various secondary compounds (including novel ones) from the root and stem bark of *Lannea schweinfurthii*. The biological activity of these phytochemicals still needs to be explored. It is, however, noteworthy that acetylcholinesterase inhibition activity has been reported in ethyl acetate extracts from the root of *L. schweinfurthii* (Adewusi and Steenkamp, 2011). Similar positive acetylcholinesterase inhibitory activity was also demonstrated in methanol and dichloromethane extracts of the stem bark and root, notably the latter, of the West African *Lannea barteri* (Oliv.) Engl. (Koné et al., 2011). Since the cholinergic system plays an important role in the regulation of learning and memory processes, the roots of at least these two species contain compounds that may not only be effective in the treatment of neurological disorders, such as Alzheimer's disease (e.g., Anand and Singh, 2013), but may well have other memory-related effects.

Hitherto no detailed chemical analyses or screenings for bioactivity have been conducted on *vhulivhadza*, at least not in isolation from the rest of the root. Anatomically the *vhulivhadza* hairs were found to be tangentially extended clusters of thin-walled phellem cells with non-suberized but lignified walls; technically they comply with the definition of phelloid cells (Kotina et al., 2018). Observations on the root hairs of *L. alata* under the transmission electron microscope, supplemented by histochemical tests, indicated a heavy lipid core surrounded by a cellulose sheath. Paper chromatography of a methanol–chloroform extract of the cork and its associated wooly covering of hairs in the latter species showed the presence of abundant sterol and carotenoid compounds (McQuade et al., 1970). However, a lipid core has not been reported in *vhulivhadza* (Kotina et al., 2018), although it could have been overlooked.

Several southern African members of the Anacardiaceae, Apocynaceae and Rubiaceae have been recorded as having psychoactive uses (Sobiecki, 2002) but there appear to be no psychoactive compounds (such as alkaloids) known from these plants. In Europe, *Galium odoratum* L. is used in traditional medicine and is known to have sedative effects, which are associated with coumarins (Van Wyk and Wink, 2017). The Apocynaceae are known to contain heart glycosides and chemically related pregnane glycosides with analgesic and appetite-suppressant effects (Van Wyk et al., 2009) but the main chemical compounds of *Asclepias crista* have apparently not yet been studied. Except for the acetylcholinesterase inhibitory activity found in some *Lannea* root extracts mentioned above, no obvious links seem to exist between the chemistry of these magic medicines and their supposed sedative or memory-altering activities, suggesting that their use can perhaps be best explained by psychiatric and psychological principles. It should be noted, however, that lemons and limes were once also “magic medicines,” until their activity against scurvy could be rationally explained by the discovery of Vitamin C, more than 200 years later (Van Wyk and Wink, 2017). At this stage treatment with *vhulivhadza* appears to have psychological rather than physical (chemical) effects but it is perhaps prudent to keep an open mind. Further research is needed to explore a possible scientific rationale behind the unusual and interesting uses of *vhulivhadza*.

Acknowledgements

Financial support from the University of Johannesburg and the National Research Foundation of South Africa is gratefully acknowledged.

References

- Adewusi, E.A., Steenkamp, V., 2011. *In vitro* screening for acetylcholinesterase inhibition and antioxidant activity of medicinal plants from southern Africa. *Asian Pacific Journal of Tropical Medicine* 4, 829–835.
- Anand, P., Singh, B., 2013. A review on cholinesterase inhibitors for Alzheimer's disease. *Archives of Pharmaceutical Research* 36, 375–399.
- Arnold, H.-J., Gulumian, M., 1984. Pharmacopoeia of traditional medicine in Venda. *Journal of Ethnopharmacology* 12, 35–75.
- Bally, P.R.O., 1937. Native medicinal and poisonous plants of East Africa. *Bulletin of Miscellaneous Information (Royal Botanic Gardens, Kew)* 1937 (1), 10–26.
- Bally, P.R.O., 1938. Heil- und Giftpflanzen der Eingeborenen von Tanganyika. In: F. Fedde (Ed.) *Repertorium specierum novarum regni vegetabilis*. Im Selbstverlage, Dahlem.
- Beentje, H., 1994. Kenya Trees, Shrubs and Lianas. National Museums of Kenya, Nairobi, p. 722.
- Bleek and Loyd, 2019. The Digital Bleek and Loyd. lloydbleekcollection.cs.uct.ac.za/.
- Boon, R., 2010. *Pooley's Trees of Eastern South Africa. A Complete Guide. Flora and Fauna Publications Trust, Durban*, p. 262.
- Chhabra, S.C., Mahunnah, R.L.A., Mshui, E.N., 1987. Plants used in traditional medicine in eastern Tanzania. I. Pteridophytes and angiosperms (Acanthaceae to Canellaceae). *Journal of Ethnopharmacology* 21, 253–277.
- Coates Palgrave, M., 2002. *Keith Coates-Palgrave Trees of Southern Africa*. 3rd ed. Random House Struik, Cape Town, pp. 543–544.
- Dale, I.R., Greenway, P.J., 1961. *Kenya Trees and Shrubs*. Buchanan's Kenya Estates Ltd., Nairobi, p. 23.
- Gelfand, M., Mavi, S., Drummond, R.B., Ndemera, B., 1985. *The Traditional Medical Practitioner in Zimbabwe. His Principles of Practice and Pharmacopoeia*. Mambo Press, Gweru, Zimbabwe, p. 263.
- Gilges, S.W., 1953. *Trees in South Africa* 5, 17. The Occasional Papers of the Rhodes Livingstone Museum Number 11.
- Hollmann, J.C. (Ed.), 2004. *Customs and Beliefs of the |Xam Bushmen*. Wits University Press, Johannesburg, p. 439.
- Hutchings, A., Scott, A.H., Lewis, G., Cunningham, A.B., 1996. *Zulu Medicinal Plants*. University of Natal Press, Pietermaritzburg, p. 178.
- International Society of Ethnobiology, 2006. ISE Code of Ethics (With 2008 Additions). Online. www.ethnobiology.net/global_coalition/ethics.php.
- Kokwaro, J.O., 1976. *Medicinal Plants of East Africa*. East African Literature Bureau, Nairobi, p. 21.
- Kokwaro, J.O., 1983. *Medicinal Plants of East Africa*. second ed. East African Literature Bureau, Nairobi, p. 31.
- Kokwaro, J.O., 1986. Anacardiaceae. In: Polhill, R.M. (Ed.), *Flora of Tropical East Africa*. Balkema, Rotterdam, pp. 1–59.
- Kokwaro, J.O., Gillett, J.B., 1980. Notes on the Anacardiaceae of Eastern Africa. *Kew Bulletin* 34, 748–753.
- Koné, W.M., Soro, D., Dro, B., Yao, K., Kamanzi, K., 2011. Chemical composition, antioxidant, antimicrobial and acetylcholinesterase inhibitory properties of *Lannea barteri* (Anacardiaceae). *Australian Journal of Basic and Applied Sciences* 5, 1516–1523.
- Kotina, E.L., Tilney, P.M., Van Wyk, A.E., Oskolski, A.A., Van Wyk, B.-E., 2018. “hairy” bark in *Lannea schweinfurthii* (Anacardiaceae): hyperhydric-like tissue formed under arid conditions. *IAWA Journal* 39, 221–233.
- Kremnitz, W.A., Knies, M., Kremnitz, M., 1988. Kalahari: aus dem Pflanzenreich: floristische und ethnobotanische Betrachtungen. *Ambro Lacus, Frieding (Aunde)*.
- Lovett, J.C., Ruffo, C.K., Gereau, R.E., Taplin, J.R.D., 2006. *Field guide to the moist forest trees of Tanzania*. The Society for Environmental Exploration, UK & the University of Dar es Salaam, Tanzania, pp. 11–12.
- Mabogo, D.E.N., 1990. *The Ethnobotany of the Vhavenda*. M.Sc. thesis. University of Pretoria, Pretoria, p. 260.
- Maundu, P.M., Ngugi, G.W., Kabuye, C.H.S., 1999. *Traditional food plants of Kenya*. Kenya Resource Centre for Indigenous Knowledge (KENRIK). Nairobi, National Museums of Kenya.
- McQuade, H.A., Cumbie, B.G., Sheldrick, D.L.W., 1970. The wool-like covering of the roots of *Lannea alata*. 1. The origin and morphology of the wooly coat. *American Journal of Botany* 57, 1240–1244.
- Neuinger, H.D., 2000. *African Traditional Medicine: A Dictionary of Plant Use and Applications*. Medpharm Scientific Publishers, Stuttgart.
- Nortje, J., Van Wyk, B.-E., 2015. Medicinal plants of the Kamiesberg, Namaqualand, South Africa. *Journal of Ethnopharmacology* 171, 205–222.
- Okoth, A.D., 2014. *Phytochemistry and bioactive natural products from Lannea alata, Lannea rivae, Lannea schimperii and Lannea schweinfurthii* (Anacardiaceae). Ph.D. thesis. University of KwaZulu-Natal, Durban.
- Palmer, E., Pitman, N., 1973. *Trees of southern Africa*. 2. Balkema, Cape Town, pp. 705–1497 [iv] + pp.
- Pienaar, A., Willemsse, J., 2009. *The Griqua's Apprentice*. Umuzi Books (an Imprint of Penguin Random House), Cape Town and Johannesburg, South Africa.
- Pooley, E., 1993. *The Complete Field Guide to Trees of Natal, Zululand and Transkei*. Natal Flora Trust, Durban, p. 244.
- Ramovha, L.I., 1997. *The Taxonomic Significance of Bark Structure in Southern African Anacardiaceae*. M.Sc. thesis. University of Pretoria, Pretoria, p. 181.
- Royal Botanic Gardens, Kew, 1999. *Survey of Economic Plants for Arid and Semi-Arid Lands (SEPASAL) Database*. Published on the Internet. <http://apps.kew.org/sepasalweb/sepaweb>, Accessed date: 10 October 2018.
- Sobiecki, J.F., 2002. A preliminary inventory of plants used for psychoactive purposes in southern African healing traditions. *Proceedings of the Royal Society of South Africa* 57, 1–24.
- Storrs, A.E.G., 1995. *Know Your Trees: Some of the Common Trees Found in Zambia*. Regional Soil Conservation Unit (RSCU), Nairobi, pp. 169–170.

- Van Wyk, B.-E., Gericke, N., 2000. People's Plants: A Guide to Useful Plants of Southern Africa. Briza Publications, Pretoria, p. 168.
- Van Wyk, B.-E., Gericke, N., 2018. People's Plants: A Guide to Useful Plants of Southern Africa. Revised and Expanded Edition. Briza Publications, Pretoria, pp. 200–201.
- Van Wyk, A.E., Van Wyk, P., 2013. Field Guide to the Trees of Southern Africa. Ed. 2. Struik Nature, Cape Town, p. 732.
- Van Wyk, B.-E., Wink, M., 2017. Medicinal Plants of the World. CABI, London, p. 6.
- Van Wyk, A.E., Van Wyk, P., Van Wyk, B.-E., 2008. Photographic Guide to Trees of Southern Africa. Briza Publications, Pretoria, p. 190.
- Van Wyk, B.-E., Van Oudtshoorn, B., Gericke, N., 2009. Medicinal Plants of South Africa. 2nd ed. Briza Publications, Pretoria, p. 186.
- Van Wyk, A.E., Van den Berg, E., Coates Palgrave, M., Jordaan, M., 2011. Dictionary of Names for Southern African Trees. Briza Academic Books, Pretoria, p. 411.
- Verzar, R., Petri, G., 1987. Medicinal plants in Mozambique and their popular use. *Journal of Ethnopharmacology* 19, 67–80.
- Watt, J.M., Breyer-Brandwijk, M.G., 1962. The Medicinal and Poisonous Plants of Southern and Eastern Africa. 2nd ed. Livingstone, London, p. 47.
- Wink, M., Van Wyk, B.-E., 2008. Mind-Altering and Poisonous Plants of the World. Timber Press, Portland and London, p. 205.