

# Medicinal plants used for the treatment of sexually transmitted infections by lay people in northern Maputaland, KwaZulu–Natal Province, South Africa

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Received 12 January 2011; received in revised form 6 April 2011; accepted 8 April 2011

## Abstract

This ethnobotanical study on plants used for the treatment of sexually transmitted infections was undertaken to document the knowledge by lay people in a rural community in northern Maputaland, South Africa. The focus was on the medicinal plants which are growing in and around the immediate vicinity of the homesteads. Thirty three plant species were recorded as being used for the treatment of sexually transmitted infections such as gonorrhoea (*drop* or *ugcusulu*), external and internal sores caused by sexually transmitted infections, genital warts (*cauliflower* or *umhluma*) and syphilis. Nine plants (*Bridelia cathartica* subsp. *cathartica*, *Cladostemon kirkii*, *Erianthemum dregei*, *Euphorbia hypericifolia*, *Ipomoea batatas*, *Krauseola mosambicina*, *Mimusops caffra*, *Opuntia stricta* and *Sarcophyte sanguinea* subsp. *sanguinea*) were recorded for the first time in the literature world wide as a treatment for sexually transmitted infections. Five new vernacular names were documented for *B. cathartica* subsp. *cathartica*, *Bryophyllum pinnatum*, *Clematis brachiata*, *E. hypericifolia* and *Pyrenacantha kaurabassana*. The 33 plant species are used in 23 different combinations of two or more plants per herbal remedy. The three most frequently used plant species in the study area for the treatment of sexually transmitted infections are; *Hypoxis hemerocallidia*, *Senecio serratuloides* and *Ranunculus multifidus*. Roots are mostly prepared, as a decoction which is taken orally or used as an enema. All eighty of the interviewees preferred traditional medicine as the first therapeutic choice for treating sexually transmitted infections. The wide variety of plants that are used to treat sexually transmitted infections in this area emphasises the importance that medicinal plants can have in the primary health care system of the rural people in northern Maputaland (KwaZulu–Natal).

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**Keywords:** Ethnobotany; Maputaland; Medicinal plants; Sexually transmitted infections; South Africa

## 1. Introduction

According to the World Health Organization (2007) more than 340 million new cases of curable sexually transmitted infections occur worldwide every year. Although there are more than 30 bacterial, viral and parasitic pathogens which are sexually transmissible, *Treponema pallidum* (syphilis), *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and *Trichomonas vaginalis* are responsible for most of the sexually transmitted infections (STIs) (World Health Organization, 2007). South and

Southeast Asia have the highest rates of STIs, followed by sub-Saharan Africa, Latin American and the Caribbean (World Health Organization, 2007). Viral sexually transmitted infections most frequently consist of the human immunodeficiency virus (HIV), human herpes viruses, human papilloma and hepatitis B viruses. According to a recent WHO report (2007), a world-wide still-birth rate of approximately 25% occurs as a result of syphilis infections. According to the same report in Africa 4–15% of pregnant women have syphilis. Globally, up to 4000 new-born babies become blind annually, because of untreated maternal gonococcal and chlamydial infections. Genital ulcer disease is mostly caused by the herpes simplex virus type 2, which infect 30–80% of women and 10–50% of men in sub-Saharan Africa.

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This herpes virus infection plays an important role in the transmission of HIV. The human papilloma virus causes approximately 500 000 cases of cervical cancer annually with 240 000 deaths occurring in countries with poor primary health care systems. It is predicted that the above mentioned numbers will increase; given the present social, demographic and migratory trends (World Health Organization, 2007). Most sexually transmissible diseases are curable by appropriate antimicrobial treatment. However, the socio-economic costs of these infections and their complications are amongst the top ten disease categories for which adults seek health-care in developing countries. In South Africa, Johnson et al. (2008) found that 26% of all deaths occurring during the year 2000 were as a result of STIs (including HIV). The study also revealed that in KwaZulu–Natal, a province in South Africa, an estimated 26.4% of the working age population is HIV positive.

The present ethnobotanical study was conducted in a very poor area in KwaZulu–Natal, where approximately 85% of the population had no formal income. As a result most of the men in this region migrate to urban areas in search of employment, which increases the risk of STI infections. A study by Hughes et al. (2006), revealed that male migration has been associated with high-risk sexual behaviour and thus an elevated risk of sexually transmitted infections. Green (1992) reported that the majority of people in sub-Saharan Africa believed that traditional STI cures are more effective than “modern” cures. A number of ethnobotanical surveys conducted in other developing countries such as Bangladesh, India, Central America, Zambia and Zimbabwe confirm the traditional use of plants for the treatment of STIs (Cáceres et al., 1995; Ndubani and Höjer, 1999; Kambizi and Afolayan, 2001; Jain et al., 2004; Hossan et al., 2010). In most of these ethnobotanical studies the information on the plants used for treating STIs came from traditional healers and very few rural dwellers or lay people were consulted for their knowledge. The importance of lay people’s knowledge of medicinal plants was stressed by a study done by Dahlberg and Trygger (2009) in a rural area in South Africa. They found that the medicinal plant knowledge of lay people in this area contributed to their ability to cope with a wide variety of ailments.

Two previous ethnobotanical studies were conducted in the same geographical area as the present study. De Wet et al. (2010) documented plants which are being used to treat diarrhoea and York et al. (2011) recorded plants which are being used by lay people to treat respiratory infections. This paper is part of a larger study to document the ethnobotanical knowledge in a rural community in northern Maputaland and is the first to gain information, mostly from lay people, on plants grown in and around their homesteads used for treating sexually transmitted diseases.

## 2. Methodology

The study area is situated between 32° 22′ and 32° 52′ latitudes and 27° 15′ and 27° 30′ longitudes in northern Maputaland, KwaZulu–Natal, South Africa (De Wet et al., 2010; York et al., 2011). The four regions selected for the study

are dominated by different vegetation types, namely; the Tembe Sandy Bushveld type (Tshongwe), the Maputaland Coastal Belt type (Mseleni), the Northern Coastal Forest type (Mabibi) and the Maputaland Wooded Grass Land type (Mbazwana) (Mucina et al., 2005). These regions are all situated in the Umkhanyakude District Municipality (3619 km<sup>2</sup>), at Umhlabuyalingana Local Municipality with an estimated population of 140 951. It is a very poor region with 85% of the inhabitants not having any formal income (Municipal Demarcation Board South Africa, 2001).

The study was conducted during February–April 2009. Ethics clearance was obtained from the University of Zululand before the onset of the study. A total of eighty homesteads (Muzis) were visited, 20 per region. Household residents were approached and the objective of the study was explained in IsiZulu. Households in each of the four regions were selected purposively, based on the resident’s medicinal plant knowledge and attitudes towards sharing their knowledge (Tongco, 2007). A consent form was signed prior to interviewing. The following data was obtained using a structured questionnaire; locality, sociodemographic details (age, gender and educational background), vernacular plant names, plant parts used, method of preparation, dosage forms and method of administration. The focus of the study was to determine which plants growing in and around their homesteads are being used to treat STIs or symptoms closely related to infections of the urogenital tract. Plant species documented in the survey were collected during February and April 2009 and the voucher specimens have been deposited in the herbarium of the Department of Botany, University of Zululand, South Africa. Identity of plant samples were authenticated by Mkhiphene Ngwenya from the South African National Biodiversity Institute KwaZulu–Natal Herbarium.

## 3. Results

The present study recorded 33 plant species (25 families) (Table 1) which were used by the interviewees for the treatment of various sexually transmitted or related infections. These infections include gonorrhoea, syphilis, genital warts, internal and external sores caused by STIs and symptoms related to HIV/AIDS infections. Table 1 gives the list of plant species recorded as being used to treat STIs along with the names of their families, the vernacular name used by the interviewees, the plant part(s) used, the number of times the plant was quoted for its STI uses, the methods of preparation and administration and some of its reported STI uses. To the best of our knowledge the following nine plants are recorded for the first time globally as medicinal plants in the treatment of STIs; *Bridelia cathartica* subsp. *cathartica*, *Cladostemon kirkii*, *Erianthemum dregei*, *Euphorbia hypericifolia*, *Ipomoea batatas*, *Krauseola mosambicina*, *Mimusops caffra*, *Opuntia stricta* and *Sarcophyte sanguinea* subsp. *sanguinea*. Three of the above mentioned plants are naturalised exotics in South Africa, namely: *E. hypericifolia*, *I. batatas* and *O. stricta*. Although there are no recorded STI uses for *Syzygium cordatum*, Van Vuuren and Naidoo (2010) included *S. cordatum* in their antimicrobial investigation of plants used to treat STIs. The 33 plant species are used in 23 different combinations of two or more plants per herbal remedy for the treatment of STIs (Table 1). The three most

Table 1  
Medicinal plants used for the treatment of sexual transmitted infections.

Botanical name (voucher no.)	Family	Vernacular name	Plant part(s) used	Number of times quoted	<sup>a</sup> Method of preparation and administration	Reported uses for STIs
<i>Adenia gummifera</i> (Harv.) Harms var. <i>gummifera</i> (NZ-8)	Passifloraceae	Impindamshaya	Root	1	Boil a handful of chopped root with a handful of chopped <i>Erianthemum dregei</i> leaves and a handful of <i>Sarcophyte sanguinea</i> stem in 10 L of water for 5 h. Take half a cupful twice daily to cure any HIV/AIDS related infections and gonorrhoea.	Gonorrhoea (Hedberg et al., 1983)
<i>Albizia adianthifolia</i> (Schumach.) W. Wight var. <i>adianthifolia</i> (NZ-3)	Fabaceae	Igowane	Leaves	1	Boil a handful of chopped bark with a handful of chopped <i>Trichilia dregeana</i> bark in 2 L of water. Half a cup of the decoction is taken as an enema once a day to treat syphilis.	Gonorrhoea (Van Puyvelde et al., 1983)
<i>Aloe marlothii</i> A. Berger subsp. <i>marlothii</i> (NZ-16)	Asphodelaceae	Inhlaba	Leaves	5	(a) Crush three quarters of a hands length of leaf and boil in 2 L of water for 1 h with one handful of chopped corm of <i>Hypoxis hemerocallidea</i> and a handful of <i>Senecio serratuloides</i> leaves. Take half a cupful thrice daily to cure internal and external sores caused by STIs. Half a cup can be taken as an enema once daily. (b) Place a piece of leaf (approximately 1 cm × 2 cm) in two cups of water and add a handful of chopped <i>Hypoxis hemerocallidea</i> corm. Sieve and take half a cup four times daily or one cup once a day as an enema to treat sores. (c) Crush a piece of leaf (approximately 1 cm × 3 cm) and boil in two cups water. Half a cupful is taken orally four times a day or one cup once a day as an enema to treat sores.	Unspecified sexual transmitted infections (Turner, 2001)
<sup>b</sup> <i>Bidens pilosa</i> L. (NZ-14)	Asteraceae	Uqandolo	Whole plant	1	Chop a handful of the stem and leaves and combine with a handful of chopped <i>Clematis brachiata</i> (stem and leaves), <i>Ranunculus multifidus</i> (stem and leaves) and <i>Sarcophyte sanguinea</i> stem and boil in water. It is taken orally to treat genital sores and warts. The dosage depends on the seriousness of the infection.	Syphilis (Hutchings et al., 1996)
<i>Bridelia cathartica</i> Bertol.f. subsp. <i>cathartica</i> (NZ-1)	Euphorbiaceae	<sup>c</sup> Umkhawulangazi	Leaves or root	3	Boil a handful of leaves in 2 L of water until the water changes colour. One cup of the decoction is taken orally twice daily to treat internal sores, particularly in the womb.	None found
<sup>b</sup> <i>Bryophyllum pinnatum</i> (Lam.) Oken (NZ-33)	Crassulaceae	<sup>c</sup> Umvuthuzi	Leaves	1	Boil a handful of chopped leaves with a handful of chopped <i>Opuntia stricta</i> stem and a handful of chopped <i>Euphorbia hypericifolia</i> (whole plant) in 2 L of water. Use one cup of the concoction once daily as an enema. According to the interviewee the gonorrhoea infection “drop” will disappear within 4 days.	Gonorrhoea (Halberstein, 2005)
<sup>b</sup> <i>Carica papaya</i> L. (NZ-21)	Caricaceae	Upopo	Leaves or root	3	(a) Crush a handful of leaves and boil in 4 L of water with a handful of crushed <i>Senecio serratuloides</i> leaves and a handful of chopped <i>Hypoxis hemerocallidea</i> corm. Take half a cup twice a day to treat gonorrhoea infection. (b) Boil half a handful of chopped roots in 2.5 L of water for 10–15 min together with half a handful of chopped <i>Hypoxis hemerocallidea</i> corm and one handful of crushed <i>Senecio serratuloides</i> leaves. Take three quarters of a cup twice daily to treat internal sores. (c) Crush a handful of leaves and boil in 1 L of water for 20 min with a handful of <i>Senecio serratuloides</i> leaves. Take 1 tb (25 mL) three times a day to treat gonorrhoea and shingles.	Gonorrhoea (Abbiw, 1990); Venereal infections (Arnold and Gulumiam, 1984; Mabogo, 1990); sexual transmitted infections (Ndubani and Höjer, 1999)
<i>Cladostemon kirkii</i> (Oliv.) Pax & Gilg (NZ-13)	Capparaceae	Isidumbu	Root	1	Boil a handful of chopped roots in 1 L of water. Take half a cup of the decoction twice daily to treat internal sores.	None found
<i>Clematis brachiata</i> Thunb. (NZ-7)	Ranunculaceae	<sup>c</sup> Ufufuno	Whole plant	1	Used in combination with <i>Bidens pilosa</i> , <i>Ranunculus multifidus</i> and <i>Sarcophyte sanguinea</i> as previously mentioned to treat genital sores and warts.	Syphilis (Chhabra et al., 1991)
<i>Combretum molle</i> R.Br. ex G. Don (NZ-2)	Combretaceae	Umbondo	Leaves or root	1	Boil a handful of chopped roots or leaves in 5 L of water with a handful of chopped <i>Hypoxis hemerocallidea</i> corm and a handful of crushed <i>Senecio serratuloides</i> and <i>Kigelia africana</i> leaves. Take half a cup three times a day to treat sores.	Gonorrhoea (Abbiw, 1990; Fyhrquist et al., 2002); syphilis (Fyhrquist et al., 2002)
<i>Erianthemum dregei</i> (Eckl. & Zeyh.) Tiegh. (NZ-9)	Loranthaceae	Iphakama	Leaves and stem	1	It is used in combination with <i>Adenia gummifera</i> and <i>Sarcophyte sanguinea</i> as previously mentioned to treat HIV/AIDS related infections and gonorrhoea.	None found
<i>Erythrina caffra</i> Thunb.	Fabaceae	Umsinsi	Root	2	(a) Boil a handful of chopped roots in 1 L of water and take half a cup three times a day to treat genital warts (cauliflower).	Venereal diseases (Hutchings et al., 1996)

					(b) Mix a handful of crushed <i>Ozoroa engleri</i> leaves and a handful of chopped <i>Erythrina caffra</i> root and boil in 2 L of water. Sieve and take a quarter of a cup once a day to treat internal sores in the womb and genitals.	
<sup>b</sup> <i>Euphorbia hypericifolia</i> L. (NZ-37)	Euphorbiaceae	<sup>c</sup> Umaphipa	Whole plant	1	Used in combination with <i>Bryophyllum pinnatum</i> and <i>Opuntia stricta</i> as previously mentioned to treat gonorrhoea.	None found
<sup>b</sup> <i>Euphorbia tirucalli</i> L. (NZ-24)	Euphorbiaceae	Umnduze	Stem	1	Crush a handful of leaves and boil in 10 L of water for 1 h together with a handful of crushed <i>Tabernaemontana elegans</i> and <i>Ozoroa engleri</i> leaves and a handful of chopped <i>Hypoxis hemerocallidea</i> corm. <i>Ozoroa engleri</i> roots are reportedly more effective than its leaves. Take two sips (25 mL) of the decoction twice a day to treat gonorrhoea.	Gonorrhoea (Hutchings et al., 1996)
<i>Hypoxis hemerocallidea</i> L. (NZ-38)	Hypoxidaceae	Inkomfe	Corm	20	(a) Boil two handful of chopped <i>Hypoxis hemerocallidea</i> corm and one handful of crushed <i>Senecio serratuloides</i> in 2 L of water for 30 min. Take half a cup of the decoction three times a day to treat internal and external sores (b) Boil one chopped corm and one handful of crushed <i>Senecio serratuloides</i> leaves in 2 L of water for 20 min (or boil until water changes colour). Take half a cup of the concoction three times a day to treat gonorrhoea. (c) Boil one chopped corm, one handful of leaves of <i>Senecio serratuloides</i> and <i>Ranunculus multifidus</i> in 1.5 L of water for 10 min. Take 1 tb of the decoction three times a day to treat internal sores. (d) Crush a handful of leaves and boil in 2 L of water together with a handful of crushed <i>Tabernaemontana elegans</i> leaves. Take one cup of this decoction three times a day to treat gonorrhoea. (e) Used in combination with <i>Aloe marlothii</i> or in combination with <i>A. marlothii</i> and <i>Senecio serratuloides</i> as described previously for the treatment of internal and external sores (e) Used in combination with <i>Carica papaya</i> alone or in combination with <i>Carica papaya</i> and <i>Senecio serratuloides</i> as previously mentioned to treat gonorrhoea and internal sores. (f) Used in combination with <i>Combretum molle</i> , <i>Senecio serratuloides</i> and <i>Kigelia africana</i> as previously mentioned to treat sores. (g) Used in combination with <i>Euphorbia tirucalli</i> , <i>Tabernaemontana elegans</i> and <i>Ozoroa engleri</i> as previously mentioned to treat gonorrhoea. (h) Used in combination with <i>Musa acuminata</i> and <i>Senecio serratuloides</i> as described under <i>M. acuminata</i> to treat HIV/AIDS related infections, especially internal and external sores. (h) Mix one handful of chopped <i>Pyenacantha kaurabassan</i> roots with one handful of chopped <i>Hypoxis hemerocallidea</i> corm and boil in 2 L of water. Take half a cup three times a day to treat genital warts.	Anti-HIV (Pooley, 2005); related urinary tract infections (Van Wyk et al., 2009)
<sup>b</sup> <i>Ipomoea batatas</i> (L.) Lam. (NZ-40)	Convolvulaceae	Ubhatata	Leaves	1	Boil a handful of <i>Ipomoea batatas</i> leaves together with a handful of <i>Tabernaemontana elegans</i> leaves in 2 L of water. Take one cup of the decoction three times a day to treat gonorrhoea.	None found
<i>Kigelia africana</i> (Lam.) Benth. (NZ-11)	Bignoniaceae	Umvongothi	Leaves	2	(a) Chop one mature fruit and mix with one handful of chopped corm of <i>Hypoxis hemerocallidea</i> , add 2 L water and bring to boil. Take half a cup of this decoction three times a day to cure STI sores. (b) Used in combination with <i>Senecio serratuloides</i> , <i>Combretum molle</i> and <i>Hypoxis hemerocallidea</i> as previously mentioned to treat STI sores.	Syphilis and sores (Abbiw, 1990; Van Wyk et al., 2009).
<i>Krauseola mosambicina</i> (Moss) Pax & K. Hoffm. (NZ-28)	Caryophyllaceae	Isihlaza	Whole plant	1	Crush a handful of the whole plant and add to 1 L of warm water. Take a quarter of a cup twice daily or use as an enema once daily. Apparently this is a strong concoction to treat internal sores cause by STI's.	None found
<i>Mimusops caffra</i> E. Mey. ex A. DC. (NZ-39)	Sapotaceae	Amasethola	Root	1	Boil one handful of chopped roots in 1 L of water for 45 min, strain and take half a cup three times a day to cure gonorrhoea.	None found
<sup>b</sup> <i>Musa acuminata</i> Colla (NZ-25)	Musaceae	Ubhanana	Root	1	Mix one handful of chopped <i>Musa acuminata</i> roots with one handful of crushed <i>Senecio serratuloides</i> leaves and one handful of chopped <i>Hypoxis hemerocallidea</i> corm. Add 2	Sores on genital parts (Ndubani and Höjer,

(continued on next page)

Table 1 (continued)

Botanical name (voucher no.)	Family	Vernacular name	Plant part(s) used	Number of times quoted	<sup>a</sup> Method of preparation and administration	Reported uses for STIs
					L of water and boil. Take one cup of this concoction three times a day to cure HIV/AIDS related infections, especially internal and external sores.	1999); sexual transmitted infections (Kambizi and Afolayan, 2001)
<sup>b</sup> <i>Opuntia stricta</i> Haw. (NZ41)	Cactaceae	Umdolofiya	Stem	1	The leaves of <i>Opuntia stricta</i> are used in combination with <i>Bryophyllum pinnatum</i> leaves and <i>Euphorbia hypericifolia</i> plant as previously mentioned to treat internal and external sores.	None found
<i>Ozoroa engleri</i> R. Fern. & A. Fern. (NZ-34)	Anacardiaceae	Isifice	Leaves or root	3	(a) Mix one handful of crush <i>Ozoroa engleri</i> leaves with one handful of chopped <i>Erythrina caffra</i> root. Add 2 L of water and boil. Take a quarter of a cup once a day to treat internal sores. Concoction is reportedly very strong. (b) Mix one handful of crushed <i>Ozoroa engleri</i> leaves together with one handful of crushed <i>Euphorbia tirucalli</i> stem and one handful of <i>Tabernaemontana elegans</i> leaves and one handful of chopped <i>Hypoxis hemerocallidea</i> corm. Add 10 L of water and boil for 1 h. Take two sips (25 mL) of this concoction twice a day to treat gonorrhoea. Roots of <i>Ozoroa engleri</i> can be use instead of leaves to make concoction stronger.	Venereal diseases (Hutchings et al., 1996; Prozesky et al., 2001)
<i>Peltophorum africanum</i> Sond. (NZ-17)	Fabaceae	Isikhabamkhombe	Root	1	Boil one handful of chopped <i>Peltophorum africanum</i> roots in 2 L of water. Take one cup of this concoction three times a day to treat sores or used half a cup once a day as an enema.	Venereal diseases (Arnold and Gulumiam, 1984; Mabogo, 1990)
<i>Pyrenacantha kaurabassana</i> Baill. (NZ-4)	Icacinaceae	<sup>c</sup> Inzema	Root	1	Mix one handful of chopped <i>Pyenacantha kaurabassana</i> roots with one handful of chopped <i>Hypoxis hemerocallidea</i> corm and boil in 2 L of water. Drink half a cup three times daily to treat genital warts.	Herpes (Long, 2005)
<i>Ranunculus multifidus</i> Forssk. (NZ-36)	Ranunculaceae	Uxhaphozi	Whole plant	12	(a) Boil one handful of <i>Ranunculus multifidus</i> (whole plant) in 1 L of water for 30 min and sieve. Take half a cup three or four times a day or used half a cup as an enema to treat genital warts and gonorrhoea. (b) Used in combination with <i>Bidens pilosa</i> , <i>Clematis brachiata</i> and <i>Sarcophyte sanguinea</i> as previously mentioned to treat genital sores and warts. (c) Used in combination with <i>Hypoxis hemerocallidea</i> and <i>Senecio seratuloides</i> as previously mentioned to treat internal sores.	Syphilis (Hutchings 1989).
<i>Sarcophyte sanguinea</i> Sparrm. subsp. <i>sanguinea</i> (NZ-29)	Balanophoraceae	Umavumbuka	Stem	2	Used in combination with <i>Adenia gummifera</i> and <i>Erianthemum dregei</i> as previously mentioned to treat any HIV/AIDS related infections and gonorrhoea.	None found
<i>Sclerocarya birrea</i> (A. Rich.) Hochst. subsp. <i>caffra</i> (Sond.) Kokwaro (NZ-22)	Anacardiaceae	Unganu	Leaves or bark	2	Boil a handful of chopped bark of <i>Sclerocarya birrea</i> and <i>Syzygium cordatum</i> in 2 L of water for 15 min (if very strong, dilute 1 L of the above concoction with 1 L of water). Take 2 tb once or twice a day to treat gonorrhoea.	<i>Candida</i> infections (Runyoro et al., 2006)
<i>Senecio serratuloides</i> DC. (NZ-10)	Asteraceae	Unsukumbili	Whole plant	19	(a) Boil one handful of <i>Senecio serratuloides</i> leaves in 1 L of water. Take half a cup three times a day to treat sores caused by STIs.	Syphilis (Githens, 1949)

(b) Used in combination with *Aoe marlothii* and *Hypoxis hemeracallidia* as previously mentioned to treat internal and external sores.  
 (c) Used in combination with *Carica papaya* and *Hypoxis hemeracallidia* as previously mentioned to treat gonorrhoea and internal sores.  
 (d) Used in combination with *Combretum molle*, *Hypoxis hemeracallidea* and *Kigelia africana* as previously mentioned to treat STI sores.  
 (e) Used in combination with *Musa acuminata* and *Hypoxis hemeracallidea* as previously mentioned to treat HIV/AIDS related infections and internal and external sores.  
 (f) Used in combination with *Ranunculus multifidus* and *Hypoxis hemeracallidea* as previously mentioned to treat internal sores.  
 Used in combination with *Sclerocarya birrea* as previously mentioned to treat gonorrhoea.

<i>Syzygium cordatum</i> Hochst. ex C. Krauss. (NZ-12)	Myrtaceae	Umdoni	Leaves or bark	2		No traditional uses for STIs, but were screened for antimicrobial activity against STIs (Van Vuuren and Naidoo, 2010)
<i>Tabernaemontana elegans</i> Stapf (NZ-35)	Apocynaceae	Umkhadlu	Leaves or root	3	(a) Used in combination with <i>Euphorbia tirucalli</i> leaves, <i>Ozoroa engleri</i> leaves and <i>Hypoxis hemeracallidea</i> corm as previously mentioned to treat gonorrhoea. (b) It is also used in combination with <i>Ipomoea batatas</i> leaves as previously mentioned to treat gonorrhoea.	Venereal diseases (Arnold and Gulumiam, 1984; Mabogo, 1990)
<i>Terminalia sericea</i> Burch. ex DC. (NZ-19)	Combretaceae	Imkhonono	Root or bark	2	Bring to boil one handful of chopped <i>Terminalia sericea</i> root or bark in 4 L of water. Take one cup three times a day to cure internal and external sores. The concoction can also be used as a purgative, by taking 0.75–1 L of it once a day and immediately putting a hand in throat to induce vomiting.	Venereal diseases (Arnold and Gulumiam, 1984; Mabogo, 1990)
<i>Trichilia dregeana</i> Sond. (NZ-23)	Meliaceae	Umkhuflu	Leaves	1	Used in combination with <i>Albizia adianthifolia</i> as previously mentioned to treat syphilis.	Gonorrhoea and syphilis (Arnold and Gulumiam, 1984; Mabogo, 1990)
<i>Ximenia caffra</i> Sond. var. <i>caffra</i> (NZ-6)	Olacaceae	Umthunduluka	Root	1	Mix half a handful of chopped <i>Ximenia caffra</i> roots with half a handful of chopped <i>Tabernaemontana elegans</i> roots and boil in 1 L of water for 1 hr. Take 1 tb (25 mL) of the concoction three times a day to cure gonorrhoea. If the concoction is too strong, diarrhoea may occur.	Venereal diseases (Arnold and Gulumiam, 1984; Mabogo, 1990); sexual transmitted infections (Ndubani and Höjer, 1999; Kambizi and Afolayan, 2001)

<sup>a</sup> One cup is approximately 250 mL.  
<sup>b</sup> Naturalised exotics in South Africa.  
<sup>c</sup> Undocumented vernacular name.

regularly used plant species in the study area for STI treatment are: *Hypoxis hemerocallidia* (25%), *Senecio serratuloides* (24%) and *Ranunculus multifidus* (15%). Roots (25%), followed by leaves or whole plant (18%) and then the combination of root and leaf (15%), were the plant parts mostly used in the preparation of the herbal remedies (Fig. 1). Plant materials are mostly used in the fresh state and are available in and around the homesteads throughout the year. None of the informants considered time of year and/or day as an important factor for plant collection. Only the amount of plant material needed for treatment is collected, therefore sustainable harvesting is readily practised. Boiling of plant material in water is the foremost method of preparation of the herbal remedies for STIs. The concoctions are either taken orally and/or used as an enema (Table 1). The interviewees knew the symptoms caused by STIs, without specifically knowing what infections they are treating. The most frequently mentioned infection treated by the interviewees was gonorrhoea (urethral discharge), which is known by them as “drop” or “*ugcusulu*”. Second was internal and external sores caused by STIs and third were genital warts, which are known as “cauliflower” or “*umhluma*”. The treatment of syphilis was mentioned as well as the treatment of symptoms related to HIV/AIDS, which they associated with (symptoms) such as loss of weight, pneumonia, TB, sores and shingles (*ibhande*). The inhabitants of the homesteads were mostly women, where 93% of the people interviewed were female, with an average age of 53 years. Men were working elsewhere (migrant workers), in order to obtain better incomes. All the interviewees preferred traditional medicine as a first choice for treating STIs, despite the accessibility to 13 clinics and two hospitals in this district.

#### 4. Discussion

Similar studies conducted in South and Southeast Asia revealed that a high percentage of people rely primarily on

traditional healers and medicinal plants for the treatment of various STIs. In Bangladesh 10 plant species were recorded to be used to treat syphilis and gonorrhoea (Hossan et al., 2010) and in the state of Rajasthan, India, 11 plants species are used for the cure of sexual diseases (Jain et al., 2004). Ethnobotanical studies done on STIs in sub Sahara Africa revealed that the Rwandese people are using 25 different plant species for the treatment of gonorrhoea (Van Puyvelde et al., 1983) and in Zambia and Zimbabwe 19 and 15 plant species respectively are being used against various STIs (Ndubani and Höjer, 1999; Kambizi and Afolayan, 2001). From these studies, five plants species (*Albizia adianthifolia*, *Carica papaya*, *Kigelia africana*, *Musa* sp., *Ximenia caffra*) correspond with our findings. Previous studies reported in the literature focused mostly on the interviewing of traditional healers.

Despite the numerous references to plant use for STI therapy (Watt and Breyer-Brandwijk, 1962; Hutchings et al., 1996; Neuwinger, 2000; Von Koenen, 2001; Van Wyk et al., 2009), there is still a wealth of unrecorded indigenous knowledge existing within the Zulu tribe. Only six plant species discovered in this study correspond with the 46 plant species mentioned by Hutchings et al. (1996). Another comprehensive ethnobotanical study done on traditional plant medicines in South Africa was done in Venda in the early 1980's (Arnold and Gulumiam, 1984). The Venda is one of the remote tribes in South Africa. The Venda area is presently part of the Limpopo Province and borders Zimbabwe and Botswana. This survey only recorded information obtained from traditional healers, who mentioned 151 medicinal plant species of which 25 species were used to treat venereal diseases. Five of these species correlated with those found in our study, namely: *C. papaya*, *Peltophorum africanum*, *Tabernaemontana elegans*, *Terminalia sericea* and *X. caffra*. An interesting fact from this Venda study is that *Psidium guajava* (a naturalised exotic species) is used in this

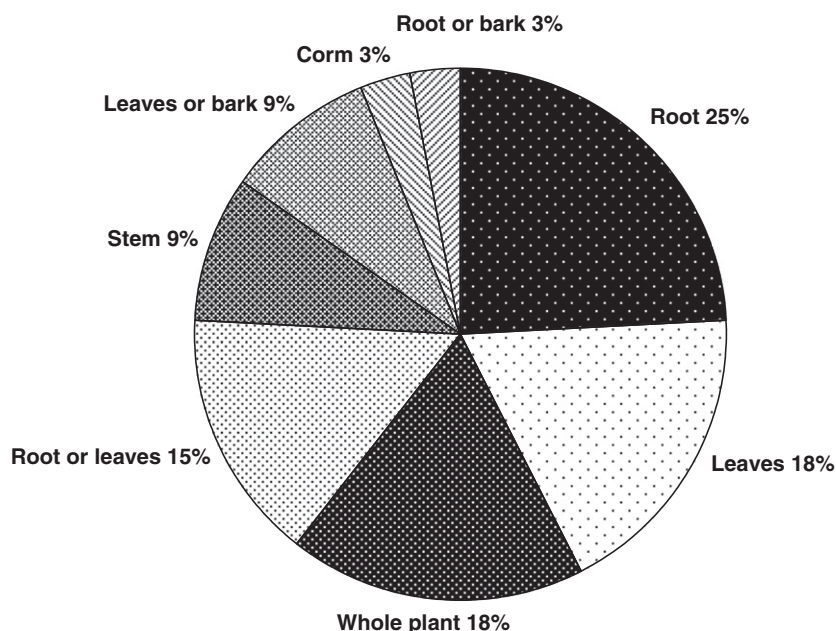


Fig. 1. Percentage of different plant parts use to treat STIs by the rural people in northern Maputaland.

region for the treatment of venereal diseases, but not in northern Maputaland (our study area) where it is recorded to be the most frequently used plant species to treat diarrhoea (De Wet et al., 2010) and to a minor extent for treating respiratory infections (York et al., 2011). Another example is *A. adianthifolia* (in the present study found to be used to treat STIs) but used by the Venda tribe only as nutritional fodder for cattle. The Venda's prefer *Alibizia anthelmintica* and *Alibizia versicolor* as a treatment for venereal diseases (Arnold and Gulumiam, 1984). These examples confirm yet again the difference in indigenous medicinal plant knowledge between cultures. One commonality between the cultures as well as the traditional healers and lay people is that more than one plant is used in combinations to treat various STIs (Table 1). These plant concoctions are quite often used as an enema (present study), which is not a common practise with traditional healers in the other studies mentioned. The interviewees believe that taken anally, the preparation works faster, which is probably true as the active compounds are more effectively re-absorbed by the mucus membranes of the rectum (Van Wyk and Wink, 2004). Some of the decoctions are taken simultaneously orally which they trust will cleanse the body more thoroughly. Five new vernacular names were recorded for *B. cathartica* subsp. *cathartica*, *B. pinnatum*, *C. brachiata*, *E. hypericifolia* and *P. kaurabassana* (Table 1). These vernacular plant names were compared with the names recorded in Hutchings et al. (1996), Pooley (2003), Pooley (2005) and Von Ahlefeldt et al. (2003).

The present study is one of three surveys done in the same geographical area to document plants used by ordinary rural dwellers for treating different infections. The first survey revealed 23 plant species which are used to treat diarrhoea (De Wet et al., 2010) and the second study documented 33 plants species which are used to treat respiratory infections (York et al., 2011). Four plant species (*K. mosambicina*, *Sclerocarya birrea* subsp. *caffra*, *S. cordatum*, *T. sericea*) are used by the rural dwellers to treat all (STI, diarrhoea and respiratory) symptoms (Table 2). Eight plant species are used to treat exclusively both STIs and respiratory infections whereas three plant species are used for both diarrhoea and respiratory infections (Table 2). It is interesting to note the higher incidence of co-usage of the same plant species to treat respiratory and STI conditions. One would have expected that the common symptoms (abdominal discomfort etc.) related to STI and diarrhoea conditions may have impacted on greater incidences of common plant selection.

## 5. Conclusion

Nine of the 33 plant species used by lay people in a rural community in northern Maputaland to treat STIs have not been previously documented. They are: *B. cathartica* subsp. *cathartica*, *C. kirkii*, *E. dregei*, *E. hypericifolia*, *I. batatas*, *K. mosambicina*, *M. caffra*, *O. stricta* and *S. sanguinea* subsp. *sanguinea*. Also recorded for the first time are five new vernacular names (*Umkhawulangazi*, *Umvuthuzi*, *Ufufuno*, *Umaphipha* and *Inzema*). This new information provides valuable contributions to the ethnobotanical records of South

Table 2

Comparison of medicinal plants used in the same geographical region to treat three different infections.

Plant species used for the treatment of STIs	Plant species used for the treatment of diarrhoea	Plant species used for the treatment of respiratory infections
<i>Aloe marlothii</i> subsp. <i>marlothii</i>	No	Yes
<i>Bridelia cathartica</i> subsp. <i>cathartica</i>	No	Yes
<i>Clematis brachiata</i>	No	Yes
<i>Combretum molle</i>	No	Yes
<i>Erythrina caffra</i>	No	Yes
<i>Euphorbia tirucalli</i>	No	Yes
<i>Hypoxis hemerocallidea</i>	No	Yes
<i>Krauseola mosambicina</i>	Yes	Yes
No	<i>Lippia javanica</i> (Burm.f.) Spreng.	Yes
No	<i>Psidium guajava</i> L.	Yes
<i>Sclerocarya birrea</i> subsp. <i>caffra</i>	Yes	Yes
<i>Senecio serratuloides</i>	No	Yes
<i>Syzygium cordatum</i>	Yes	Yes
<i>Terminalia sericea</i>	Yes	Yes
No	<i>Trichilia emetica</i> Vahl	Yes

Africa and indicates that the ethnobotanical knowledge of the Zulu ethnic group is incompletely documented. The rural inhabitants in this area, which is mostly women, prefer to use traditional medicine over allopathic medicine for the treatment of STIs. The reasons were similar to those previously documented by De Wet et al. (2010) and York et al. (2011) (cheap, easily accessible, more effective, no side effects, cultural aspects etc.). The wide variety of plants used for STIs in this area supports the value that medicinal plants can have in the primary health care system of the rural people in northern KwaZulu-Natal. This strengthens previous results documented by Dahlberg and Trygger (2009), De Wet et al. (2010) and York et al. (2011). Further studies are underway to establish the antimicrobial efficacies of these plant species and their combinations against pathogens prevalent in sexually transmitted infections.

## Acknowledgements

Financial support was provided by the Research Committee of the University of Zululand and The National Research Foundation. Mr. S. Khumalo is thanked for acting as an interpreter. The authors would like to express their sincere gratitude to all the interviewees, for their hospitality and their willingness to share their traditional knowledge with us.

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