

Medicinal plant use in the Bredasdorp/Elim region of the Southern Overberg in the Western Cape Province of South Africa

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Abstract

There are many individuals in the Bredasdorp/Elim area who still use plants as medicines to treat many conditions. This study aimed to document some of this knowledge and present an inventory of all the plants in use in the area. Over 40 individuals were interviewed from old age homes, community centres for the elderly as well as people who were known for their knowledge in this matter. The information was gathered by means of questionnaires. In total, 36 plant species from 19 families were found to be in general use in the area. Only 58% of these plants are indigenous to South Africa, 33% are introduced species and 9% are naturalized species. The dominant families were Asteraceae, Lamiaceae, Alliaceae and the Solanaceae. Many of the plants in use are commonly used in traditional medicine around South Africa and share many of the same uses. Some uses, which have not been seen in the consulted literature, have also been documented. A more structured questionnaire was used to determine which plants were most popular for particular ailments. It was found that *Artemisia afra* and *Ruta graveolens* were the most popular.

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1. Introduction

In South Africa, many people still use plants as medicines as an alternative or supplement to visiting a western health care practitioner (Van Wyk et al., 1997). This is not surprising due to South Africa's cultural diversity as well as its large floral biodiversity. South Africa is home to over 30,000 species of higher plants and 3000 of these species have been found to be used in traditional medicine across the country (Van Wyk et al., 1997). There are over 27 million users of indigenous medicine (Mander, 1998) and an estimated 200,000 indigenous traditional healers, which up to 60% of the population consult with (Van Wyk et al., 1997). Knowledge of these plants is very important because not only is there the potential to discover new alternatives for the treatments of illnesses, but also from a conservation point of view. If certain plant species are found to be under threat due to a high demand for plant medicines then measures can be implemented to try and ensure sustainability of the plant species. It is also important from a cultural point of view because much

of the knowledge is being lost due to not being passed on from one generation to the next. So, it is important to document this knowledge for future generations who may one day need the information.

Many important sources of information in the literature are available from previous surveys performed in South Africa: Hutchings et al. (1996) performed a survey looking at 1032 plant species (nearly 25% of the flora of KwaZulu-Natal) used in Zulu traditional medicine. This survey was compiled from existing literature as well as from interviews with traditional healers, hospital patients and people who use plants themselves. This shows that performing surveys on indigenous plant use and looking at plants used either by healers or in self-medication can provide information, which may help in the conservation of certain plant species as well as contribute to the South African Pharmacopoeia. Important literature sources detailing medicinal plant use in South Africa include Watt and Breyer-Brandwijk (1962), Watt (1967), Cunningham (1988), Hutchings (1989), Hutchings et al. (1996), Mander (1998), Van Wyk et al. (1997) and Van Wyk and Gericke (2000). This study, in the Bredasdorp/Elim region, aims to capture knowledge from individuals of the "Coloured" population group who use plants in self-care in the hope that it may add to our current knowledge and

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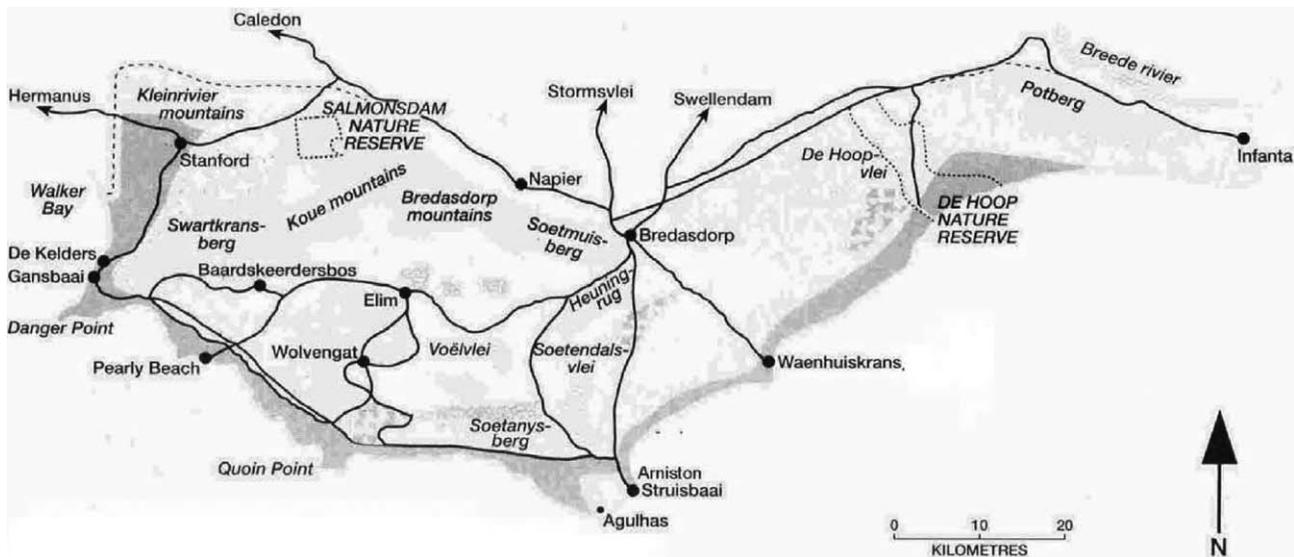


Fig. 1. Southern Overberg region (after Mustart et al., 1997).

may help to substantiate certain plant uses for the illnesses they are reported to treat. Studies similar to this have been performed with success in other parts of the world.

In a study performed by Gedif and Hahn (2003) in rural central Ethiopia, plants are still widely used in traditional medicine, but much of this knowledge has not been recorded. In this instance mothers were interviewed due to them being the healers of the family as is common in many developing countries (Gedif and Hahn, 2003). The interviews aimed at documenting how plants are used and what conditions they are used to treat. Twenty-five species out of 21 plant families were found to be used in self-care in the Butajira community and a third of these species are available in Ethiopian markets and already have recorded uses in cooking (Gedif and Hahn, 2003). In one survey performed in Mexico, 119 people were interviewed to find out about plants specifically used in the treatment of gastrointestinal infections. Out of the 119 interviewed, 88 people stated that they relied on plant-based medicines to treat these stomach conditions. This information was gathered using informal interviews and then semi-structured interviews. A wide range of people were interviewed, such as housewives, farmers and healers (Hernández et al., 2003).

1.1. Intellectual property rights

There is a political and very important consideration when utilizing indigenous knowledge for drug discovery; the question of intellectual property rights and remuneration to the local people. In South Africa, much is being done to encourage researchers to protect indigenous property rights. The National Research Foundation (NRF) has made this topic one of its key focus areas (NRF, 2003). South Africa is also said to have a well-established intellectual property framework in place and is bound under Article 8(j) of the Convention on Biological Diversity to protect, respect and preserve indigenous knowledge (Wolson, 2001). In this study it was decided that the informa-

tion gathered would be compiled into a cost-beneficial booklet, which will benefit the local community.

1.2. The study area

The Bredasdorp/Elim region is situated in the Southern Overberg in the Western Cape Province of South Africa (Fig. 1). The Overberg region has been inhabited by humans for at least half a million years and these early hunter-gatherer inhabitants would have been reliant on the indigenous flora and fauna of the region (Mustart et al., 1997). The Southern Overberg has a rich flora of about 2500 species out of which approximately 300 are endemic (restricted to the area) and 32 are Red Data Book species (Mustart et al., 1997). Since the 1940s a shift has occurred from predominately veld based grazing, i.e. grazing of cattle and sheep in natural vegetation, to cereal crops and introduced pastures. This, along with increasing alien invasive species, has led to the demise of much of the natural renosterveld and poses a threat to existing endemic flora (Mustart et al., 1997). Renosterveld is a vegetation type rich in plant species including a large variety of geophytes and many endemics, which occur nowhere else in the world. The Bredasdorp Formation limestones are associated with an endemic rich vegetation (Mustart et al., 1997; Cowling and Richardson, 1995). The soils are alkaline and organic rich. The plants growing on this terrain are known as limestone proteoid fynbos. Bredasdorp and surrounding areas are made up of three vegetation types: limestone proteoid fynbos, restioid fynbos and neutral sand proteoid fynbos (Mustart et al., 1997). Limestone proteoid fynbos is characterized by the presence of *Protea obtusifolia* and *Leucadendron meridianum*. The ericoid component includes *Diosma guthriei*, *Erica mariae*, *Metalasia calcicola* and *Euryops linifolius*. Restioid fynbos is dominated by members of the Restionaceae while neutral sand proteoid fynbos include *Protea susannae*, *Leucadendron confertum*, *Leucadendron fulgens*, *Erica* species and geophytes like *Lachenalia* and *Bobartia* (Mustart et al., 1997).

2. Methodology

2.1. Interviews and data analysis

Interviews were conducted in places where elderly people generally meet, places such as old age homes and community centres for the elderly. In some cases, individuals were recommended by other members in the community for their knowledge and so these people were interviewed as well. Preliminary interviews took place by appointment and a basic questionnaire was followed where possible to see which plants are in use and how and what they are used for. In follow-up interviews, more specific questionnaires were designed using the information already gathered. These were aimed at finding out more about what had already been mentioned and finding out the preparations and dosages of the various medicines and if there were any alternate species if species *x* was not available. An example of the questionnaires can be seen in [Appendix A](#). In all interviews either a tape recorder was used or notes were written. A new, more specific questionnaire was designed ([Appendix B](#)) which listed all the plants mentioned thus far in the study and asked informants to rank the plants that they used in the order of personal importance. This questionnaire also listed the most common ailments mentioned in the study and asked each individual to specify which plant(s) they thought was most useful to treat that ailment. In the case where there is more than one plant suggested, the person was asked to list the plants in order of importance. From these data, a list could be made to determine the most popular plants in use in the area, termed “preference ranking” (Cotton, 1996; Phillips and Gentry, 1993a,b). For example, if a person used five plants, he or she was asked to rank them in the order of importance. Then the plant termed the most important would be given a ranking of 5 (in the case of five plants) and the fifth most important assigned a value of 1. These values from each informant’s list were summed for each plant to generate a list of the plants in decreasing order of popularity. Also, this data permitted the calculation of each plant’s “use-value”, i.e. the total number of different ethnomedical uses reported for each plant. These values were calculated using a method by Cotton (1996), and Phillips and Gentry (1993a,b).

The use-values were calculated using the following equation:

$$UV_S = \sum \frac{UV_{I_S}}{I_S}$$

where UV_S is the overall use of species *S*, UV_{I_S} the mean number of all uses of a given plant species (*S*) as determined by informant *I* and I_S is the total number of informants interviewed for species *S*.

Of the 44 participants interviewed, 29 were females with ages ranging from 50 to 75 years and 15 were males with ages ranging from 45 to 65 years. Out of these, 15 participants agreed to complete questionnaires to generate the data in [Figs. 2–5](#). Of the 15 individuals, 10 were females and 5 were males.

2.2. Plant identification

Due to some plants having the same or more than one common name there was an initial problem involving the identification of several plants. This problem was overcome by taking illustrated books to the interviews so that the interviewees could page through the books and look at the photographs and recognize certain plants. This helped tremendously in coming to an agreement for each plant in use and also helped in triggering memories of plants that were still used and that were used in the past. Many of the informants also helped in the identification of plants by bringing along samples of plant material to the meetings. This also promoted much discussion and debate amongst the people interviewed. Where possible, the samples were kept and taken to other meetings to use in discussions with different informants, which also helped to verify the names of the plants. The plant specimens were also verified by taxonomist Frans Weitz of the Herbarium in the Department of Biodiversity and Conservation Biology at the University of the Western Cape. Herbarium specimens of the lesser known species were deposited in this herbarium.

3. Results and discussion

Thirty-six species belonging to 19 families were found to be in use in the study area ([Table 1](#)). The families with the largest number of species are the Asteraceae (six species), Lamiaceae (six species), and the Alliaceae and Solanaceae (three species each). Twelve out of the 36 species are introduced species, 3 species are naturalized and 21 species are indigenous to South Africa. [Table 1](#) shows the botanical name, common name, condition treated, preparation and uses recorded in the literature of each plant. [Fig. 2](#) shows a list of the most widely used plants as determined by the questionnaire in [Appendix B](#) where 15 willing informants were asked to rank the plants that they use in order of importance. [Fig. 3](#) shows the results from the questionnaire where the 15 participants were asked to list which plants were best to treat specific conditions. To determine these figures, a plant was assigned a value of one if it was used to treat a condition and a zero if it was not used. The “ones” were summed for each plant and for each condition to give the results in [Fig. 3](#). This graph shows which plants are preferred to treat particular ailments. [Fig. 4](#) shows the number of ethnomedicinal uses (ailments) and the total responses per plant species while [Fig. 5](#) shows the calculated use-values.

3.1. Outcomes from the interviews

From [Table 1](#) it can be seen that the majority of the plants used in this survey are plants that are commonly used around South Africa in Zulu, Xhosa and Sotho traditional medicine, for example, *Artemisia afra*, *Mentha longifolia* and *Leonotis leonurus*. These popular plants share many of the same uses, for example, *Artemisia afra* was found to be used to treat gastrointestinal trouble and as a general tonic (Hutchings, 1989; Hutchings et al., 1996). In the same survey (Hutchings, 1989), *Mentha longifolia* is used to treat respiratory ailments, headaches and fevers,

Table 1
Current uses and preparations of medicinal plants used in the Bredasdorp/Elim region and previously recorded uses in literature

Family plant species (Common name)	Use/condition treated	Method of preparation and use	Uses in the literature	Other information
Alliaceae <i>Allium cepa</i> L. (Ui, Onion) (I)	Liver problems	Administered in cooking or eaten raw	Internally for bronchial and gastric infections and externally for acne and boils ^a	
<i>Allium sativum</i> L. (knoffel, garlic) (I)	Arthritis, backache, fever, rheumatism and worms	Cloves are eaten raw. Taken on a daily basis for arthritis and pains	Febrifuge, tuberculosis (TB), stimulant, carminative, antiseptic, anthelmintic, diaphoretic, expectorant, diuretic, hypotensive, whooping cough ^b	It has been suggested that on the first day take one clove and on the second two and on the third three, then two then one on the following days and repeat for arthritis
<i>Tulbaghia violacea</i> Harv. (wilde knoffel, wild garlic) (Ind.)	Earache, fever and high blood pressure	Clove pieces are placed in castor oil to make eardrops. For fever and high blood pressure a tea is made from bulbs and a small cup taken three times daily	Fever, colds, asthma, Stomach complaints ^{c,d} , TB and anthelmintic ^{b,d}	
Amaryllidaceae <i>Gethyllis</i> spp. (koekmakranka) (Ind. Possibly endemic)	Convulsions, heart and stomach problems, sleeplessness	Seed pods are soaked in brandy and a small amount (± 25 ml) taken at night for sleeplessness and heart condition or symptomatically to relieve stomach pain or treat convulsions	Colic, indigestion ^{b,e,d} , flatulence, teething trouble, boils, bruises and insect bites ^b	
Apiaceae <i>Foeniculum vulgare</i> Mill. (vinkel, fennel) (I)	Arthritis, fever, milk stimulant in pregnant women, diuretic for weight loss	An infusion made from the leaves is drunk, to treat arthritis and fever and to stimulate milk production, green fruit is chewed to reduce fat	Flatulence, cough, diuretic, digestive problems ^d , diarrhea, stomachache and cramps ^b	The infusion can also be used as a wash in which arthritic joints can be soaked in
<i>Petroselinum crispum</i> (Mill.) A.W. Hill (pietersielie, parsley) (I)	Arthritis, bladder and kidneys, liver problems, cough, diabetes, rheumatism	Taken as a tea made from a handful of leaves taken when needed	Diuretic and emmenagogue ^b	Also used in cooking to help with the listed ailments
Asphodelaceae <i>Aloe ferox</i> Mill. (alwyn, aloe) (I)	Skin problems	Leaf juice is applied to affected area	Laxative ^{b,d,f} , arthritis, eczema, conjunctivitis, hypertension and stress, other species leaf sap used to treat irritations, burns, bruises ^d , ophthalmia, purgative, syphilis and venereal sores ^{b,c}	
<i>Bulbine lagopus</i> (Thunb.) N.E.Br. (geel katstert) Herbarium specimen no. (TSAT 011) (E)	Wounds, sores, skin conditions	leaf is broken and exudate applied to affected area	Leaf sap of <i>Bulbine</i> species used to treat burns, wounds, skin conditions ^{b,d} (such as acne, eczema and rashes ^c), cracked lips, herpes ^d and stomach upsets ^c	

Asteraceae <i>Artemisia afra</i> Jacq. Ex Willd. (Wilde als, wormwood) (I)	Bladder and kidney disorders, coughs, colds, influenza, convulsions, diabetes, fever, headache, heart, inflammation, rheumatism, stomach disorders and worms	A tea made from a handful of the leaves can be taken daily to treat bladder and kidney trouble, coughs, colds, influenza, heart, headache. A syrup can also be made by boiling the leaves with sugar for coughs. For inflammation and fever leaves are made into a poultice with brandy or vinegar and wrapped around affected area (inflammation) or around the stomach (fever). For diabetes a small amount of the tea is taken twice daily continuously.	This popular plant has many uses in the literature including uses as a tonic, anthelmintic ^{e,c} , eyewash ^e , coughs, colds and influenza, fever, loss of appetite, colic, headache, earache, malaria, worms ^{b,c,d} , constipation, diabetes and as blood purifiers for acne and boils ^c	Was used as a remedy during an influenza epidemic in 1918 ^e
<i>Elytropappus rhinocerotis</i> (L.f.) Less. (renosterbos) (Ind.)	Bladder and kidney disorders, convulsions, diabetes, fever, headache, stomach disorders, worms and wounds/ sores (tea has also been mentioned to be good for heart and cancer)	Place leaves in brandy or vinegar for stomach ailments and take small amount; tea made from leaves drunk for bladder and kidneys, convulsions, diabetes, fever, headache, and worms; tea used to wash wounds and sores ³	Stomach problems, dyspepsia, indigestion, ulcers, cancer, stomachic and appetite stimulant ^{b,e,d,f}	Was used as a remedy during an influenza epidemic in 1918 ^e
<i>Conyza scabrada</i> DC. (paddabossie) Previously named <i>C. ivaefolia</i> Less also known as “bakbos” or “oondbos” because plant was used as a brush to sweep out ovens ^{b,a} Herbarium specimen no. (TSAT 013) (N)	Chest, heart, fever, diabetes, rheumatism, colds and flu, inflammation	Leaf infusions drunk as a tea, take 25 ml morning and evening for fever, rheumatism, heart, stomach ailments coughs, colds and flu, leaves (fresh or dried) are placed on a cloth with vinegar/brandy and wrapped around sore area (headaches, stomach ache) as a poultice to relieve pain. Can also be used as an eyewash	Influenza, chest, stomach, heart afflictions ^e , convulsions in children ^{b,g} , fever, to hasten the birth of the placenta and pleuritic pain in children ^b , sprains and fractures ^{a,c}	Showed evidence as a remedy for influenza during the 1918 influenza epidemic. Dried leaves keep a long time and no reported difference between the dried and fresh herb has been mentioned. “groenamara” has been said to be an alternative if <i>Conyza</i> not available
<i>Helichrysum crispum</i> (L.) D. Don (kooigoed) (Ind.)	Arthritis, bladder and kidneys, colds and flu, cough, fever, headache, heart, sleeplessness and rheumatism	Dried leaf infusions drunk as tea, approx 25 ml taken 2–3 times per day until symptoms disappear. For sleeplessness place small amount of leaves under pillow at bedtime	Colds, headache ^{e,c,d} , Coughs, fever, infections, menstrual pain ^{e,d} , heart, backache, kidneys ^b , stomachache and used as a circumcision wound dressing, and as a blood purifier for boils ^c	Has been claimed to be able to treat heart disease and heart failure ^d Also used in cooking
<i>Eriocephalus paniculatus</i> (Cass.) (wilde roosmaryn, wild rosemary) (Ind.)	Heart	A leaf infusion is made and drunk as a tea	Diaphoretic, diuretic ^{b,d} <i>E. umbellatus</i> was used by early Cape settlers and the Khoi to treat dropsy, stomachache and heart trouble ^b	Has been claimed to be able to treat heart disease and heart failure ^d Also used in cooking
<i>Vernonia spp.</i> (groenamara) (Ind))	Stomach ailments, diabetes, and worms	A tea is made using a small handful of leaves infused in boiling water for these complaints	<i>V. oligocephala</i> used to treat stomach disorders ^{b,a,c,d} , rheumatism, dysentery, diabetes ^{b,d} and ulcerative colitis ^d Other <i>Vernonia</i> species used to treat fevers, urinary tract diseases, backbone pain and chronic coughs and to get rid of head lice ^c	Can act as a substitute for <i>A. afra</i> in cases where it is used to treat the same ailment

Table 1 (Continued)

Family plant species (Common name)	Use/condition treated	Method of preparation and use	Uses in the literature	Other information
Crassulaceae <i>Cotyledon orbiculata</i> L. (kouterie, plakkie) (Ind)	Corns and sores	The leaf sap is smeared on corns or the fleshy inside of the leaf bound to the corn to soften it so it can be removed. Sap is applied to sores Leaves are bound to affected area	Corns, warts ^e , earache ^{b,e,d} , toothache, vermifuge ^{e,d} , boils and epilepsy ^{b,g} venereal disease ^{b,a,c} , sprains and fractures ^a	
Euphorbiaceae <i>Ricinus communis</i> L. (olieblare, kastorolie boom) (I)	Inflammation and rheumatism		Stomach ache, wounds, sores, boils ^{b,a,c,d} , epilepsy ^g , headache ^b	Leaves not taken internally
Fabaceae <i>Sutherlandia frutescens</i> (L.) R. Br. (keurtjies, kankerbossie) (Ind.)	Back pain, bladder and kidneys, cancer, colds, influenza, liver, diabetes, fever and stomach complaints	A tea from 3 teaspoons/small handful of fresh or dried leaves and stems infused in 1 L boiling water is made and ±25 ml taken morning and evening for all listed complaints	Cough ^b , washing wounds, fevers ^{e,f} , chicken pox, cancer, eye trouble ^e , Old Cape remedy for stomach trouble and internal cancers ^{b,d} , poor appetite, indigestion, peptic ulcer, colds, urinary tract infections are among the many uses for this widely used plant ^{e,d,f}	Not recommended for pregnant women, need to wait overnight at least for the tea to take effect. Too strong an infusion will cause vomiting
Gentianaceae <i>Chironia baccifera</i> L. (aambeibossie) Herbarium specimen no. (TSAT 012) (Ind.)	Stiff muscles	An infusion of the leaves and stems is made and applied to the affected area symptomatically	Boils, hemorrhoids ^{b,e,d} , blood purifier, acne, sores, diarrhea ^{b,d} and leprosy ^d	
Geraniaceae <i>Pelargonium species</i> (malva) (I)	Earache, toothache and pain	Leaves are scrunched up and placed in ear to treat earache or rubbed against sore tooth. Leaves placed on sore area on skin and held in place to alleviate pain	Diarrhea, dysentery ^{b,e,d} , bronchitis ^{a,d} , fevers ^a coughs ^d , <i>P. betulinum</i> used to heal wounds and treat stomachache	
Hyacinthaceae <i>Drimia species</i> (gifbol) (Ind.)	Wounds and sores	Peel off the bulb scales and place on sores to draw out infection	<i>Drimia</i> species used to treat stabbing chest pains, stomach ailments, high blood pressure (<i>D. elata</i>) ^c and feverish colds (<i>D. robusta</i>) ^c	Good for slow healing sores
Lamiaceae <i>Mentha longifolia</i> L. (kruisement) (N)	Arthritis, backache, bladder and kidneys, liver, colds, influenza, coughs, fever, headache and stomach trouble	A handful of fresh leaves made into a tea and drunk as needed for adjacent complaints	Diaphoretic, antispasmodic ^{b,e,d} , flatulent colic, hysteria ^{e,d} , coughs, colds, respiratory problems ^{b,a,d} and wounds ^d	Boiling the leaves with sugar in water makes an excellent syrup for whooping cough
<i>Leonotis leonurus</i> (L.) R. Br. (klipdagga, wilde dagga) (Ind.)	Arthritis, backache, bladder and kidney disorders, cancer, colds, influenza, diabetes, headache, heart, rheumatism, high blood pressure and stomach	A tea is made from a handful or a stems worth of leaves and flowers steeped in boiling water and left to draw in a glass bottle. ±25 ml is drunk morning and night for the adjacent complaints	Coughs, colds, chest problems, piles, boils ^{e,d} , high blood pressure ^d , headache ^{a,c,d} , asthma snakebite ^{b,a,d} , epilepsy, emmenagogue, purgative, TB and insect bites ^b include some of the many uses of this plant	Not recommended for pregnant women. Tea should made daily and not be kept. Can use the leaves fresh or dried
<i>Ballota africana</i> (L.) Benth. (kattekruid) (Ind.)	Stomach trouble, colds and liver complaints	A tea is made using 1 teaspoon of herbs in a cup of water for stomach trouble and for the liver. A syrup can be made with boiling water and sugar for colds	Measles ^d , colds, influenza, asthma, bronchitis, heart, hysteria, fever, insomnia, typhoid fever ^{b,d} , headaches, liver problems and arthritis ^f and snakebite ^b	
<i>Salvia africana-lutea</i> (L.) (wilde salie) (Ind.)	Cough, sinuses and chest complaints	A tea is made from a small handful of leaves to relieve complaints	Coughs, colds, diaphoretic and female ailments ^b	Often substituted with household sage

Meliaceae <i>Melanthus comosus</i> Vahl. (kruidjie roer my nie) (Ind.)	Wounds and sores	A large handful or bunch of the plant leaves is placed in a bucket of boiling water to draw. This is then used to wash wounds and sores	2 species <i>M. comosus</i> and <i>M. major</i> used to treat wounds, sores ^{b,e,a,c,d} , bruises, backache and rheumatism ^{b,e,d} snakebite ^{b,a,c,d} , sprains and fractures ^a . Other uses include root infusions for cancer and leaf decoctions for ringworm ^d	Useful for sores on livestock as well as people. Plant is toxic and should not be taken internally
Mesembryanthemaceae <i>Carpobrotus spp.</i> (suurvy, vygies) 3 species found in the area: <i>C. edulis</i> (L.) L. Bolus <i>C. acinaciformis</i> (L.) L. Bol. <i>C. murii</i> (L. Bol.) L. Bol. (endemic) (Ind.)	Stomach trouble, sunburn, mouth ulcers, sore throat, tuberculosis and thrush	Juice squeezed from leaves can be taken either alone or with milk to ease stomach trouble. Sap applied directly to sunburn thrush and mouth ulcers. Used to treat sore throats and TB by chewing the leaves and swallowing the juice but spitting out the skin and residual tissue	Mouth and throat infections using juice as a gargle ^{b,e,d} , Juice swallowed to treat dysentery ^{b,e,d} ; digestive trouble ^{b,a,d} ; TB and as a diuretic ^{b,d} . Used externally for skin complaints and burns and wounds ^{b,e,f} . <i>C. edulis</i> has also been said to be effective in treating toothache, earache, oral and vaginal thrush ^d	
Myrtaceae <i>Eucalyptus spp.</i> (outydse bloukombossie) (I)	Chest complaints and cough	Leaves are scrunched up into a bowl and covered in boiling water and the fumes inhaled	Leaves and oil used as decongestants in cases of chest colds and influenza ^{b,f} . Also used to treat fevers ^a , dysentery and as a wash for pimples or acne ^e	Insect repellent ^b
Rutaceae <i>Agathosma betulina</i> (Berg.) Pillans (buchu) (Ind.)	Sprains, pain, arthritis, bladder and kidney ailments, backpain, stomach pain, fever and prevention of cancer	For sprains and pains (including arthritic pain) place dried leaves on a cloth and sprinkle with brandy or vinegar and wrap cloth around affected area to relieve the pain. A tea made from 1 handful of fresh leaves (from veld if possible) in boiling water (±1 L) and left to stand is used to treat bladder and kidney trouble, and stomach pain. A small cup should be drunk 3 times daily.	A very popular plant used since 17th and 18th centuries in the Cape to treat numerous complaints such as stomach, kidney and bladder ailments, urinary tract infections, diuretic, rheumatism, wounds, bruises ^{b,e,d,f}	
<i>Ruta graveolens</i> L. (wynruit, rue) (I)	Bladder and kidneys, convulsions, diabetes, fever, headache, stomach complaints, worms and sinus	A tea is made from the leaves (1 teaspoon in a cup of boiling water) to treat adjacent complaints	Used to treat fever, convulsions ^{b,g,d} , fits (epilepsy and hysteria ^g), respiratory and heart problems ^{b,d} , toothache, earache and to ease childbirth ^{b,g,d}	
Sapindaceae <i>Dodonaea angustifolia</i> L.f. (ysterhoutoppe) Herbarium specimen no. (TSAT 014) (Ind.)	Arthritis, bladder and kidney ailments, colds, influenza, convulsions, fever, inflammation, rheumatism, stomach complaints	The leaf tops (±3 teaspoons in 1L boiling water) are made into a tea and small amount taken 3 times daily to treat listed problems	Fever, colds, influenza, stomach ailments, sore throat ^{b,d} , pneumonia, arthritis, measles, TB and skin rashes ^d	Leaves can be used dried or fresh but if the dried leaves are a grey colour then should not be used. Fresh leaves are preferable

Table 1 (Continued)

Family plant species (Common name)	Use/condition treated	Method of preparation and use	Uses in the literature	Other information
Solanaceae <i>Datura stramonium</i> L. (stinkblaar) (I)	Sores	Place leaf on sore or affected area to draw out the poison	Has many uses in traditional medicine including pain ^b , rheumatism, gout, boils, abscesses and wounds by using a poultice ^{c,d} . Fruit has been reported to be used for toothache, tonsillitis, and sore throat ^{e,d} . To treat asthma, bronchitis ^{e,d} and headaches ^{d,e} the leaves are smoked	
Viscaceae <i>Viscum capense</i> L.f. (voelënt) (Ind.)	Fever and colds	Whole pieces are placed in brandy and taken to relieve fever and cold symptoms	Used to treat asthma, bronchitis ^{b,a,d} , menstrual problems, fruits used to reduce bleeding and get rid of warts ^{b,d} , diarrhea ^{a,d}	Is quite difficult to find and is often mixed

I, introduced species; Ind., indigenous species; N, naturalized species; E, endemic species.

^a Hutchings (1989).

^b Watt and Breyer-Brandwijk (1962).

^c Hutchings et al. (1996).

^d Van Wyk et al. (1997).

^e Smith (1966).

^f Van Wyk and Gericke (2000).

^g Watt (1967).

and this is in agreement with the uses for this popular plant in the Bredasdorp/Elim area where these uses are also recorded for this plant. *Leonotis leonurus* is a plant that features frequently in the literature and many uses have been recorded. In Zulu, Xhosa and Sotho medicine it was found to be used to treat gastrointestinal and respiratory disorders, headaches, fevers and snakebite (Hutchings, 1989). Common uses for this plant in this study are headaches, respiratory problems and stomach ailments. So, there are common threads between this survey and those results in the literature, which suggests that studies like this are important when it comes to choosing a plant species to test in a particular bioassay. If a plant has been reported in many surveys around the country and even in other countries to be used for the treatment of a common ailment then this plant may be a new source of medication for this ailment in the future. Some uses have been recorded in this study that have not been found in the literature reviewed such as for *Conyza scabrada*. Although not indigenous to South Africa, it is an African plant, which has become naturalized in South Africa. It has a wide distribution and it is surprising that *Conyza scabrada* is not more widely used. In this survey, uses, such as for fever, diabetes, rheumatism and inflammation, have been recorded as well as those mentioned in the literature: influenza, heart afflictions (Watt and Breyer-Brandwijk, 1962) and respiratory or chest problems (Watt and Breyer-Brandwijk, 1962; Smith, 1966; Hutchings, 1989; Hutchings et al., 1996). Perhaps this plant is one that should be investigated further. However, many bitter tasting herbs appear to be good for treating diabetes. Placing leaves and alcohol in a poultice on the affected area often cures inflammation and Watt and Breyer-Brandwijk (1962) suggests that any plant might have the same effect on inflammation so the relief may not be due to the plant but just due to the poultice process. *Conyza scabrada* has also been reported to be good for convulsions, stomach and pleuritic pains, to hasten the placenta during childbirth (Watt and Breyer-Brandwijk, 1962) and for sprains and fractures (Hutchings, 1989) but none of these uses were mentioned in the study by any of the informants.

3.2. Outcomes from the semi-structured questionnaires

The 16 most popular plants can be seen in Fig. 2. This graph shows that *Artemisia afra* and *Ruta graveolens* are the two most popular plants used by the people who participated in this questionnaire. However, these are the two plants that were mentioned by every person interviewed in the study, and the remaining plants (Fig. 2) also had a higher mention of use than any of the other plants in Table 1. Here, 15 individuals agreed to participate by completing the questionnaire but these were people that were deemed the most knowledgeable on this matter by their peers and so the information acquired is from reliable sources. All the plants in this graph are widely available with the exception of *Gethyllis*, which perhaps explains why these are the most popular, and most often used plants.

In Fig. 3, *Artemisia afra* and *Ruta graveolens* are seen to treat a wide variety of conditions. It shows which plants are recommended to treat the specific conditions. The most widely treated conditions are arthritis, bladder and kidney trouble, diabetes,

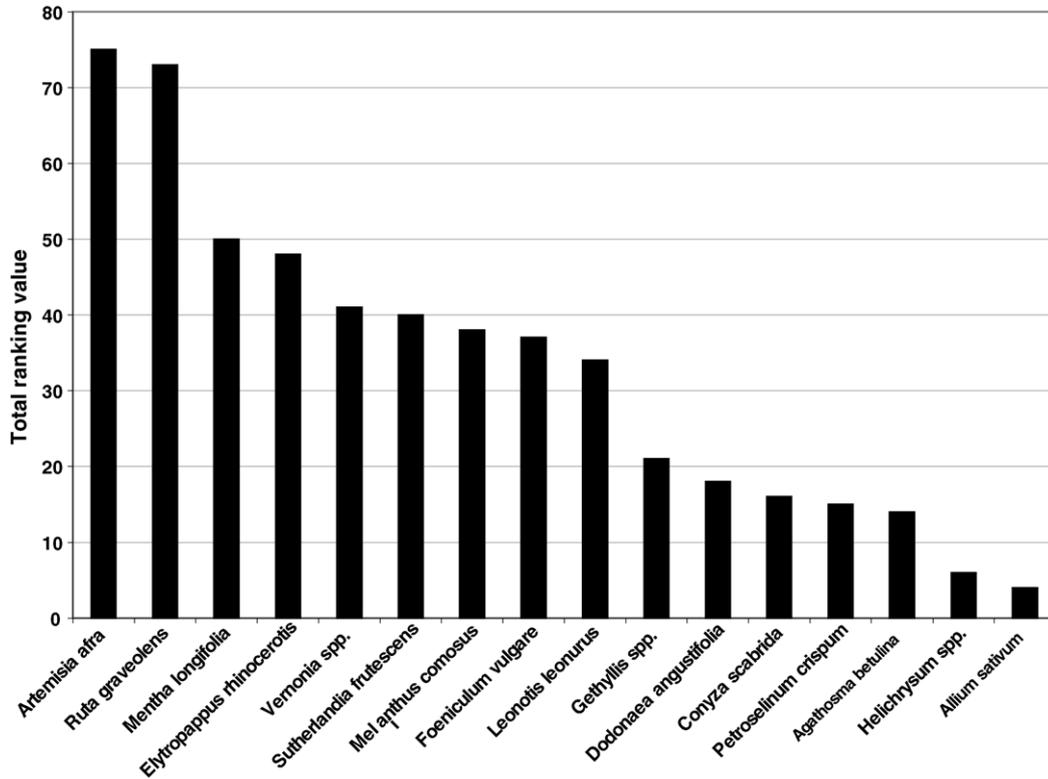


Fig. 2. Total ranking value for each plant as ranked by order of importance by each informant.

fever, and stomach trouble. These conditions would therefore have a wide variety of plants to treat them with. The relationship between the total number of conditions/uses (arthritis, backpain, bladder and kidneys, etc.) and total number of responses vary in the 16 most widely used species (Fig. 4). Fig. 5 shows the calculated use-values generated from the data in Figs. 3 and 4, and shows which plants have the widest range of uses in the study. The two plants with the highest use-values are *Artemisia afra* and *Ruta graveolens*, corresponding to the two most popular plants in Figs. 3 and 4. However, the ranking values and the use-values often do not correlate with each other such as in the case of *Melianthus comosus* (ranking value of 7th place, Fig. 2,

and use-value 0.6, Fig. 5), and *Leonotis leonurus* (ranked 9th, Fig. 2 with use-value 1.5, Fig. 5). This is because *Melianthus comosus* is only used externally, and therefore only in the treatment of wounds and sores, whereas *Leonotis leonurus* is used for many ailments and so will have a higher use-value because it can be taken internally. A plant, such as *Melianthus comosus* was recommended by most people interviewed to treat wounds and sores, whereas not everyone necessarily recommended plants, such as *Elytropappus rhinocerotis*, *Petroselinum crispum* and *Foeniculum vulgare* to treat the same things, and therefore this will affect the use-value. The use-value is therefore dependent not only on how many uses a particular

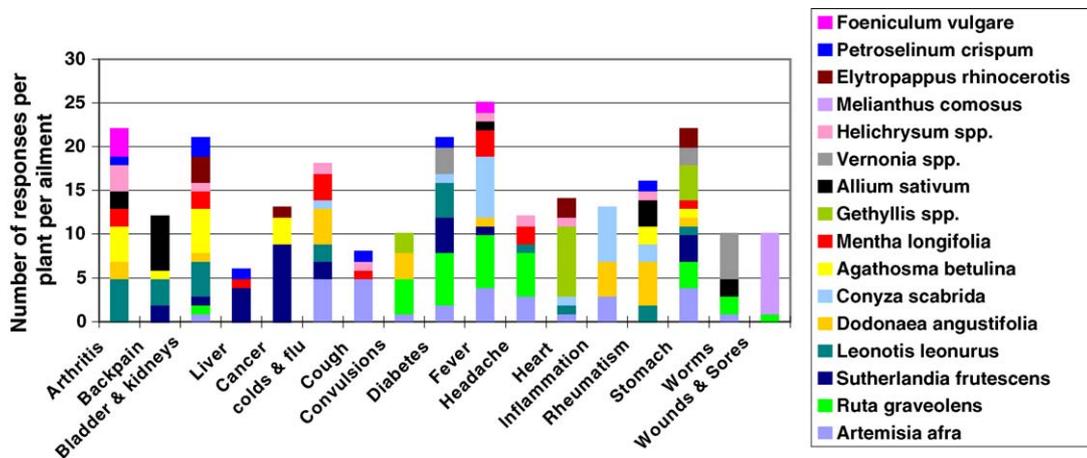


Fig. 3. Plants which are best used for specific ailments.

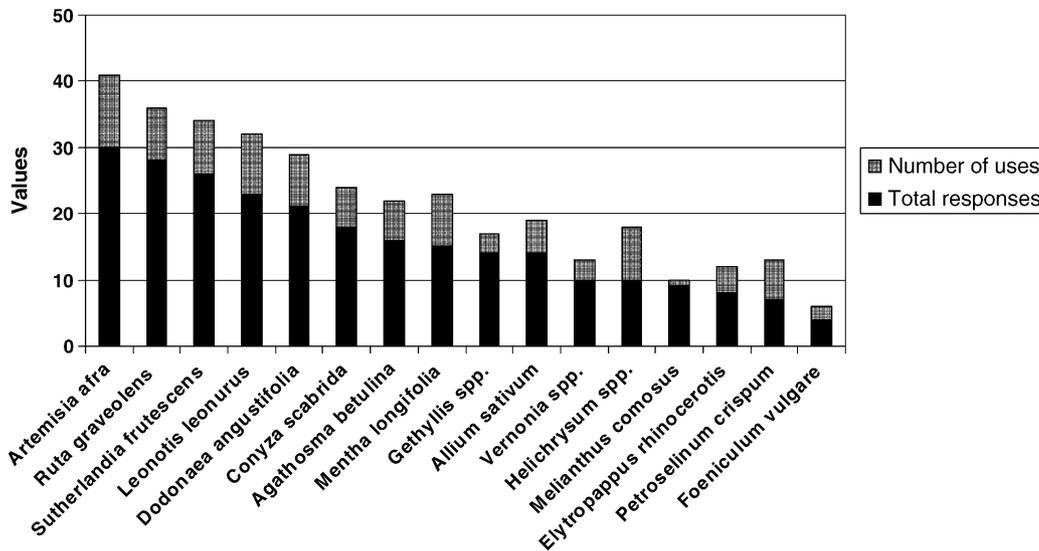


Fig. 4. Number of ethnomedical uses and responses per plant.

plant has, but also on how many people use it for that particular complaint.

Many of the same genera around the world are also used in traditional medicine: *Artemisia absinthium* is widely used in Europe as an appetite stimulant and to treat dyspepsia and gastritis (Van Wyk and Wink, 2004). *Artemisia annua* is used in Chinese medicine for a wide variety of ailments, such as an anti-malarial, a tonic, febrifuge and antibiotic (Van Wyk and Wink, 2004). *Conyza sumatrensis* is used in Uganda to treat boils, amoebiasis, fungal infections and insanity (Tabuti et al., 2003). A different *Conyza* species (*Conyza floribunda*) in Ecuador has been found to have significant anti-inflammatory activity, which justified its use in traditional medicine (de las Heras et al., 1998). Perhaps this means that *Conyza scabrida* used in the Bredasdorp/Elim area also contains the same anti-inflammatory compounds, which would justify the relevant uses of this plant by the people. Common household plants like potato garlic,

thyme and onions are widely used due to the accessibility of the plants. These are also popular plants used in medicines in places such as England (Brown, 2002). Onions are also used in Uganda, but to treat diphtheria and snakebite (Tabuti et al., 2003). Onions have antibiotic and cholesterol lowering activity and are used to treat a wide range of ailments, such as prevention of arteriosclerosis, coughs, colds and dysentery (Van Wyk and Wink, 2004), and therefore can present a cheaper alternative to a visit to a doctor. Thyme (*Thymus vulgaris*) has antibiotic, expectorant and spasmolytic properties (Brown, 2002; Van Wyk and Wink, 2004), which justify its use in treating colds and coughs.

3.3. Other outcomes of the survey

Eighty percent (35 participants) feel that knowledge has been lost because they remember their grandparents and parents using

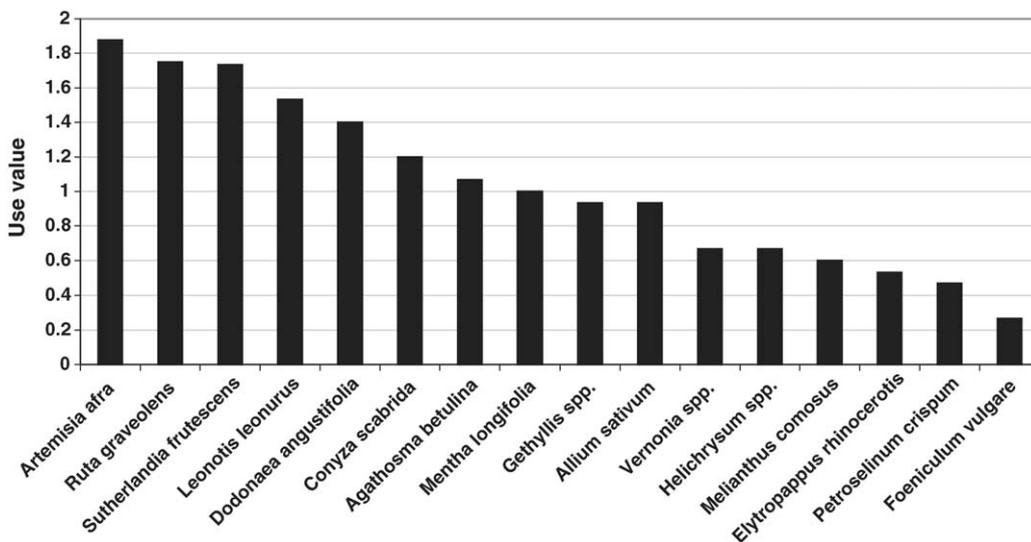


Fig. 5. Use-values for each plant.

certain plants but cannot remember either the plant name or its use and now wish it had been recorded. This is one of the reasons these individuals wanted to help this study; they felt that their knowledge is important and should be remembered. Seventy percent (31 participants) get their plant material from plants in their own gardens or along the verges of the main roads. Some plants are difficult to obtain, such as *Agathosma betulina*, which does not grow in the area. This plant is bought in the supermarket (if available) when it is needed or obtained from acquaintances living in areas where the plant grows naturally. *Gethyllis* spp. are very difficult to find and are very rare. Many of the people interviewed know a farmer who grows these plants on his farm and obtain his permission to collect the material when they need it. The seed pods are usually placed in brandy and can be kept for a long time. The informants generally dry the plant material and store it in brown paper bags or in glass bottles, or place the material in alcohol. Plants should be collected around August and September after the rains and before flowering; this is when they are said to be at their best. All the people interviewed learned their knowledge of self-care using plants from their parents and/or grandparents and say they would not use the plants if they did not feel relief for the symptoms treated. Most of the information gathered was from women as has been found in similar studies looking at self-care using plant medicines (Gedif and Hahn, 2003; Hernández et al., 2003) and all the informants were elderly people as was also found by Malamas and Marselos (1992).

Many of the people interviewed do visit the local clinic for medication as sometimes they feel the medicine is more effective and that it works faster than some of the plant medicines. None of these people know of any nasty side effects by using the various infusions and treatments except that sometimes if too much is taken then the stomach may be affected. Children are given half the adult dosage (all dosages in the table are adult dosages), but children generally do not like the bitter tasting plants and so are taken to the doctor. The plants are not really recommended for pregnant women, not only because they may prove harmful, but also mostly because the bitter tastes of the medicines can make the woman feel nauseous. The most widely used method of administration of these plant medicines is in the form of a tea. The tea is generally made with a handful of fresh or whole dried material or 1–2 teaspoons of powdered material infused in boiling water (Van Wyk and Gericke, 2000).

It was interesting that only 21 out of the 36 plant species used are indigenous to South Africa. This is surprising because of the large floral diversity in the study area and one would perhaps expect more fynbos species to be in use. Out of the indigenous plants, *Bulbine lagopus* and *Carpobrotus murii* are endemic to the area, but do not appear to be under any collec-

tion pressure since they may be substituted with other species of their respective genera. The species of *Gethyllis* and *Drimia* used may also be endemic to the area; however, as mentioned, they are hard to find and the former can be kept for a long time in brandy. The latter is not the only plant that can be used for sores and boils and so these plants are not under any collection pressure from the people interviewed. Twelve out of the 36 species in use (33%) are species that have been introduced into South Africa. This perhaps has its advantages from a conservation point of view because although the indigenous flora is under threat from increasing agriculture and habitat destruction, it is at least not under threat from being over-collected as well. It is a concern that past knowledge of local plant species has been forgotten in favour of the uses of the introduced plants.

These results show that many plants are still in use by mainly elderly women for medicinal purposes, although much of this knowledge has already been lost. Only 58% of the plants in use are indigenous to South Africa, 8.3% are naturalized African species and 33% are introduced species. It is surprising that no more of the indigenous flora is used for medicinal purposes considering the large floral diversity in the area. It is possible that more indigenous species were used earlier, but through selection, fewer species including introduced species have come into use due to their efficacy and easy accessibility. The main families represented were the Asteraceae, Lamiaceae, Alliaceae and Solanaceae. Families such as the Asteraceae, Lamiaceae and Solanaceae are often well represented in terms of species numbers in other surveys (Leporatti and Ivancheva, 2003; Tabuti et al., 2003). The popular South African medicinal plant *Agathosma betulina* was found to share uses reported in the literature, but was also said to be good for the prevention of cancer by several people in the study area. *Artemisia afra*, the most widely used plant, has been found to contain decongestant and antibacterial volatile oils as well as possessing analgesic and antihistamine properties (Van Wyk et al., 1997). This justifies the use of the plant for treating many of the conditions listed by the informants, such as colds, influenza and headache. This suggests that ethnobotanical surveys can be a reliable source of discovering (and perhaps even re-discovering) plants, as well as new uses of these plants, which deserve further investigation. Ethnobotanical studies can also be useful in preserving this type of knowledge for future generations.

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We would like to thank the kind people of the study area for all of their time, kindness and for imparting their valuable information, which of course, made this study possible.

Appendix A*A.1. Preliminary questionnaire***Interviewee:** **Date:**/...../.....

1. What are your most widely used herbs?
2. What conditions are these plants used to treat?
3. Are these herbs easy to find? If not why?
4. Where do you find these herbs? (grow, buy, collect?)
5. How long have you been using plants as medicine?
..... yrs..... months
6. How or from whom has your knowledge of these herbs been obtained?
7. Which parts of the plants do you use?
8. Specify method/s or recipe of preparation e.g. extraction methods (burnt, boiled, alcohol, tea) and how much of the plant is used?
9. What is the dosage of the plant drug? And how should it be taken (inhaled, orally etc)
10. When should the medicine be taken and for how long should its use be continued?
11. Is there any side effects? (dizziness, headache, vomiting?)
12. Can any of these herbs be combined?
13. Can these plant drugs be taken by pregnant women?
14. Can these plants be stored? If so for how long and in what condition are they stored (dried, extractions in alcohol...) if not why?
15. How do you tell if the plant is still potent and capable of treating the conditions it is meant to treat? (smell, leaf colour?)
16. Can any other plant(s) be substituted when the above plants are not available?

Appendix B*B.1. Semi-structured questionnaire***Name:** _____**Date:** _____

1. Plants which have been mentioned by all informants

Wilde Als	Buchu
Paddabossie	Klipdagga / Wilde Dagga
Suurvy, Vygie	Keurtjie
Ysterhouttoppe	Renosterbos
Kruitjie-roer-my-nie	Malva
Kattekruid	Kruisement
Kooigoedbos	Wynruit
Koekmakranka	Voelent
Plakkie / Kouterie	Groenamara
Gifbol / Maerman	Wilde roosmaryn
Vinkel	Stinkblaar
Wilde salie	Olieblare

Other plants not on this list

Please could you put your top 10 most used plants in the space below? Number one being the most used plant by you and number 10 the least used. If you do not use 10 plants, please write down the names of the ones you do use starting with the one you use the most.

- 1. _____
- 2. _____
- 3. _____
- 4. _____
- 5. _____
- 6. _____
- 7. _____
- 8. _____
- 9. _____
- 10. _____

2. Please give your personal recommendations for the best plant(s) to treat the following conditions:

Arthritis _____

Backache _____

Bladder and Kidneys _____

Liver _____

Cancer _____

Colds and flu _____

Coughs _____

Convulsions _____

Diabetes _____

Fever _____

Headache _____

Heart _____

Inflammation _____

Rheumatism _____

Stomach _____

Worms _____

Wounds _____

Thank you very much for your contribution

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