

An ethnobotanical survey of the Agter–Hantam, Northern Cape Province, South Africa

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Abstract

The use of a rapid appraisal methodology, followed by a new approach that we refer to as the Matrix Method, has revealed a wealth of traditional knowledge on useful plants amongst people of Khoi–San descent in the Agter–Hantam, Calvinia district, Northern Cape Province of South Africa. The data include 14 new species records of useful plants; 20 new vernacular names and 99 new uses for 46 of the plant species, showing that Khoi–San ethnobotany is still incompletely recorded and that there is an urgent need to document this wealth of traditional knowledge before it is lost forever. This article also introduces two new terms — the Ethnobotanical Knowledge Index (EKI), a quantitative measure of a person's knowledge of local plant use (value between 0 and 1), and the Species Popularity Index (SPI), a quantitative measure of the importance or popularity of each species (value between 0 and 1). In the Agter–Hantam, the EKI varied from 0.20 to 0.93 in older people but even young children had EKI values of 0.27. The best known and most popular indigenous useful plants in the Agter–Hantam are *Aloe microstigma* (a new species record, with a SPI of 0.97), *Hoodia gordonii* (SPI=0.94), *Microlooma sagittatum* (0.94), *Sutherlandia frutescens* (0.92), *Quaqua incarnata* (0.92) and *Galenia africana* (0.85). The new quantitative method will allow for direct comparisons of the preservation of traditional plant knowledge and the importance of various plants species in different communities.

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1. Introduction

The combination of botanical and cultural diversity in southern Africa has resulted in a complex regional mosaic of traditional plant uses that have not yet been systematically documented. Although the ethnobotany of some cultural groups has been fairly accurately recorded [e.g. the Zulu, by Hutchings et al. (1996) and more broadly by e.g. Watt and Breyer-Brandwijk (1962); Van Wyk and Gericke (2000); Van Wyk (2002); Van Wyk et al. (2009)], authors such as Liengme (1983) and Van Wyk (2008) pointed out the paucity of information on Khoi–San plant use. Schapera (1930) gives an excellent anthropological account of the

Khoi–San (Khoisan) people of southern Africa but unfortunately included only very general information on plants and their uses. Cape Dutch medicine has been recorded by Pappe (1847, 1850, 1857, 1868), and early traveler's accounts such as those of Thunberg (1793, 1795) and Burchell (1822–1824), as well as the colonial Floras (Harvey and Sonder, 1860) and later Floras (Marloth, 1913–1932) also provide useful information. The early account of Nama plant uses by Van der Stel (1685) was followed by Laidler (1928) and Archer (1990), but the plant species and vegetation of Namaqualand and the Hantam–Roggeveld region are not very similar, with high levels of endemism in both regions. Since most of the Khoi–San information is contained in an oral-traditional system, a large part of it is undoubtedly already lost forever. From a cultural point of view, this is a tragic loss that can never be corrected.

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This article describes an ethnobotanical survey that was conducted in the Agter–Hantam area near the town of Calvinia in the Northern Cape Province of South Africa. The study aimed to carefully and systematically record whatever fragmentary original plant knowledge that has survived. We also developed a new methodology for quantifying ethnobotanical knowledge amongst 16 members of the local community and for determining the relative importance or popularity of the plants.

2. Materials and methods

2.1. Study area

The survey was conducted in the Agter–Hantam, in the district of Calvinia in the Northern Cape Province of South Africa. The Hantam area (Fig. 1) has been known by this name

at least since the middle of the eighteenth century. It is rather poorly defined but generally refers to the region around the Hantam Mountain, with the Bokkeveld (Nieuwoudtville Plateau) to the west and the Roggeveld to the south. The Agter–Hantam is the northern part of the Hantam area bordered by the Hantam Mountain to the south, Bushmanland to the northwest and the Great Karoo to the north and east. It stretches along the Hantam River and is reached via a circular dirt road (indicated by small arrows in Fig. 1) that passes well-known farms such as Groot Toren, Brandwag, Klipwerf and Welbedag (Fig. 1).

2.2. Participants

The main challenge in any ethnobotanical survey is to find persons who still have original plant knowledge. One of us

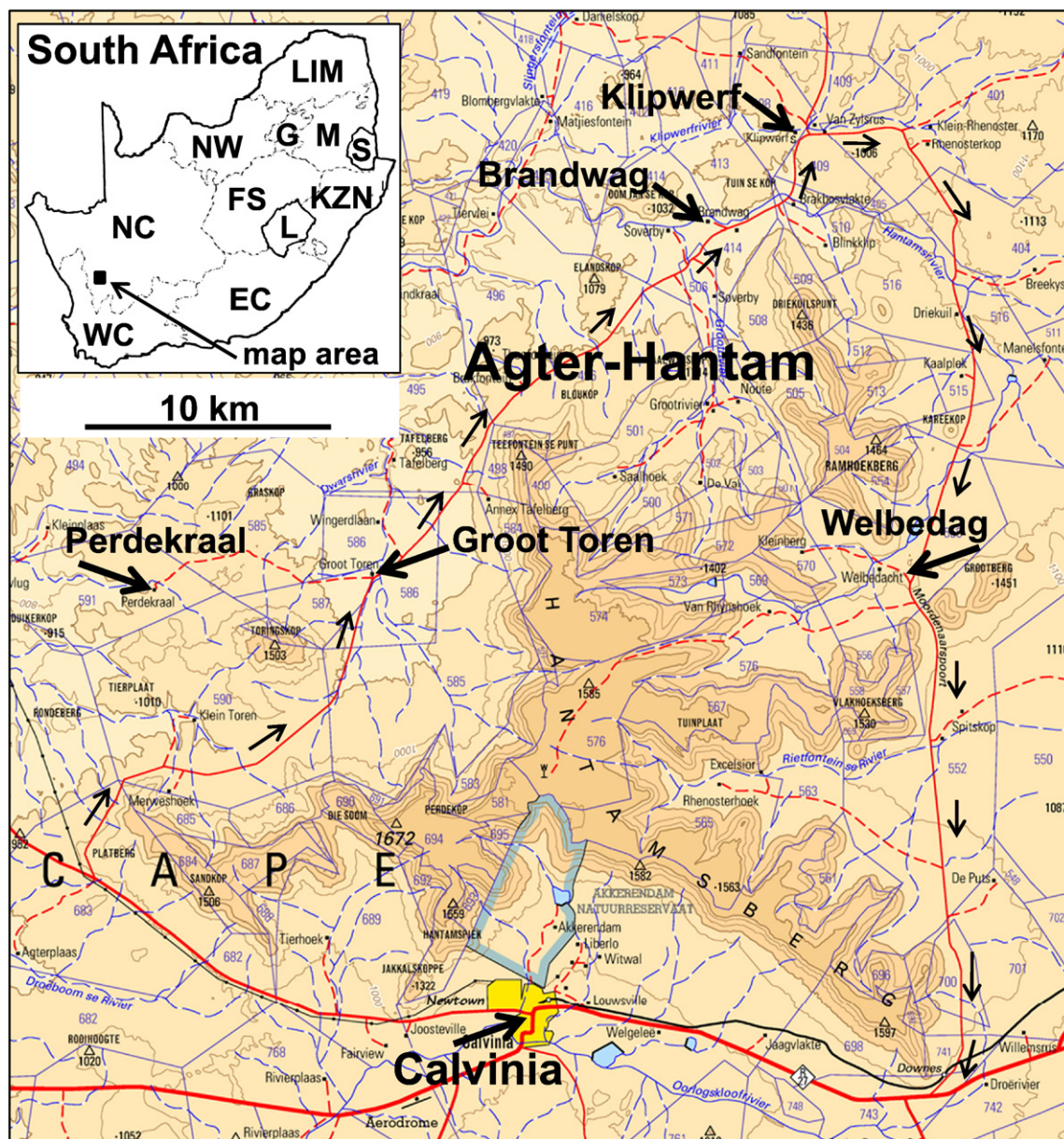


Fig. 1. Map of the Calvinia district in the Northern Cape Province of South Africa, showing the study area (Agter-Hantam).

(BEVW) has cultural ties with the Agter–Hantam (dating back to 1750), which greatly facilitated this research, since access to the area and its people was relatively uncomplicated. We were introduced to Mr Jan Baadjies, a traditional healer (*bossiedokter*), and subsequently to his family and friends, who collectively represent a substantial part of the indigenous community of the Agter–Hantam. The sixteen participants are listed in Table 1.

2.3. Methodology

The study was done in two phases, with a third phase planned for 2011. During Phase 1 (23–28 September 2009), field survey work was conducted to interview local people of Khoi–San descent. Interviews were conducted in Afrikaans (the researchers and participants were from the same language and cultural group). Ethical conduct and equitable relationships were ensured by following the principles contained in the Code of Ethics of the International Society of Ethnobiology (International Society of Ethnobiology, 2006; see also Crouch et al., 2008). The aims, anticipated outcomes, envisaged publications and benefits of the study were carefully explained to each participant to comply with the principle of educated prior informed consent. A rapid appraisal methodology was followed (Martin, 1995) and practically all of the useful plants of the area were identified during excursions on several farms. Photographs were taken of all the species and plant material was collected (with permission from the landowners) for herbarium voucher specimens. This phase ended with a qualitative assessment, *i.e.* a list of all the species and their uses (Table 2).

During Phase 2 (19–24 November 2009) we used a rigorous and practical method, here referred to for the first time as the Matrix Method. This newly devised quantitative method was used to rapidly quantify the ethnobotanical knowledge of the 16 participants listed in Table 1. The participants, all descendents of the Khoi–San people and of different ages, were shown a collection of 64 “images”, comprising herbarium specimens but

enriched with colour photographs, typically showing the habit, flower colour and other features of each plant that are not visible on specimens. Through a process of engagement (between us, each participant and each “image”), the knowledge of plant names and uses were recorded individually for each of the 16 participants. Since most of the data was already gathered during Phase 1, this process served to ensure the active participation of the community in summarising the data and verifying its accuracy. An uncomplicated instrument (questionnaire) was used to capture answers to the following questions: (1) Does the person know the plant?; (2) Can the person recall a name for the plant?; (3) Can the person recall any uses for the plant (as food, medicinal or for other practical applications)? Biographical details of each participant were also recorded, including the origin/source of his or her information, *e.g.* parents or grandparents. The use of a common language (Afrikaans) allowed us to capture and accurately record subtle nuances that would normally be lost during interpretation and translation. The interviews were digitally recorded and transcribed to ensure accuracy. These formal interviews were complemented with informal discussions while doing fieldwork or sharing meals.

The next step was to enter the data into a matrix of participants against species. Each cell includes four digits, namely (1) species known or not; (2) name known or not; (3) uses known or not, to which numerical values of 1, 2 and 3 were respectively allocated, with 0 indicating no knowledge (Table 3). The last digit represents the sum of the three values (with a maximum value of 6). By adding the scores for each participant, a quantitative measure of his or her knowledge of useful plants is obtained. We express each participant’s ethnobotanical knowledge as a fraction (ratio) of the maximum possible score of 384, obtained by multiplying the total number of plants (64) with the maximum score for each species (6). The value of this “Ethnobotanical Knowledge Index” (EKI) thus varies between 0 and 1. For example, the highest EKI in this study was 0.93 (as expected, for the most knowledgeable participant, Jan Baadjies). The matrix also provides an

Table 1

Participants in the ethnobotanical survey that were interviewed about traditional plant uses in the Agter–Hantam (Calvinia District, Northern Cape Province, South Africa). The abbreviations given in brackets are used in Table 2.

Name of participant	Date of birth	Geographical origin (farm name)	Origin of plant use knowledge
Bertus Baadjies (BB)	1989-03-01	Agter–Hantam (Perdekraal)	Parents; school
Christien Baadjies (CB)	1966-09-07	Agter–Hantam (Brandwag)	Mother
Danster Baadjies (DB)	1946-11-08	Agter–Hantam (Klipwerf)	Father
Elizabeth Baadjies (EB)	1965-11-17	Agter–Hantam (Klipwerf)	Father
Frans Baadjies (FB)	1964-06-20	Agter–Hantam (Groot Toren)	Father
Hendrik Baadjies (HB)	1950-04-22	Agter–Hantam (Klipwerf)	Jan Baadjies
Kato Baadjies (KB)	1966-08-21	Agter–Hantam (Klipwerf)	Parents
Jan Baadjies (JB)	1942-10-30	Agter–Hantam (Klipwerf)	Kaatjie Hoesaar, a legendary <i>bossiedokter</i>
Hendrik Gouws (HG)	1952-11-07	Agter–Hantam (Brandwag)	Adults
Gert Swarts (GS)	2000-03-01	Agter–Hantam (Renosterkop)	School teacher
Abraham Thys (AT)	1968-02-24	Agter–Hantam (Brandwag)	Jan Baadjies
Andreas Thys (AnT)	1996-01-16	Calvinia	Father (Martiens Thys)
Jakob Thys (JT)	1951-01-03	Agter–Hantam (Brandwag)	Adults
Martiens Thys (MT)	1954-08-13	Agter–Hantam (Brandwag)	Parents
Rachel Tromp (RT)	1952-05-24	Agter–Hantam (Klipwerf)	Father
Izak Waterboer (IW)	1954-04-05	Voor–Hantam	Father; workers on farm

Table 2

Useful plants of the Agter–Hantam (Calvinia district, Northern Cape Province, South Africa). Abbreviations for key participants in the Agter–Hantam survey are given in Table 1. Abbreviations for references: A1 = Archer (1990); A2 = Archer (1994); B1 = Batten and Bokelman (1966); C1 = Cunningham (1988); D1 = Dykman (1908); D2 = Dyson (1994); E = Ellis (1989); G1 = Gelfand et al. (1985); G2 = Githens (1948); H1 = Hutchings et al. (1996); H2 = Hobson et al. (1970); H3 = Hulley et al. (2011); K1 = Kling (1923); K2 = Kellerman et al. (1988); L1 = Laidler (1928); M1 = Mabogo (1990); M2 = Marloth (1913–1932); N1 = Neuwinger (1996); P1 = Pappe (1847); P2 = Pappe (1850); P3 = Pappe (1857); P4 = Palmer (1985); P5 = Phillips (1917); P6 = Pooley (1993); R1 = Reynolds (1970); R2 = Roberts (1983); R3 = Roberts (1992); R4 = Rood (1994); S1 = Shearing and Van Heerden (1994); S2 = Smith (1895); S3 = Smith (1966); T1 = Thunberg (1793, 1795); V1 = Van der Stel (1685); V2 = Van Wyk et al. (1997, 2009); V3 = Van Wyk and Gericke (2000); V4 = Van Wyk (2008); V5 = Van Wyk et al. (2008); V6 = Van Koenen (2001); W1 = Watt and Breyer-Brandwijk (1962); W2 = Wilman (1946); Z1 = Zwicky (1914).

Species	Common names	Uses in the Agter-Hantam	Literature references and notes on known uses
*indigenous but not the Hantam area — cultivated or bought in shop; **exotic species; voucher specimen numbers (VW) refer to Van Wyk, De Beer and Tilney in JRAU; numbers starting with P indicate photographic vouchers; new species records in bold	Hantam names underlined; newly recorded common names in bold (*known vernacular names that have been applied to other species)	New uses are indicated in bold; Abbreviations (JB, DB, etc.) refer to the key participants as listed in Table 1)	
1. <i>Acacia karroo</i> Hayne (Fabaceae) P91	<u>witdoring</u> , <u>witpendoring</u> ; <u>doringboom</u> ; <u>soetdoring</u>	The bark is used to treat aching legs (JB); used as fire-wood (DB, confirmed by EB, JT, HG, IW).	L1; A1; B1; D1; G1; G2; H1; K1; M1; N1; P1-3; P4; R3; R4; S3; V2, V3. Bark and leaves are remedies for diarrhoea and dysentery. Gum is used as food.
2. <i>*Agathosma betulina</i> (P.J. Bergius) Pillans (Rutaceae); P92	<u>boegoe</u> ; buchu: letuling; bookoo	The leaves (sometimes dried) used to treat colds (JB), and stomach aches (JB); used for sores (<i>rou sere</i>) in which case the leaves are often mixed with fat (JB); an infusion of the leaves also drunk for treating ulcers (JB).	D1; E; G2; K1; L1; P1-3; P4; R2; R3; R4; S3; V2, V3; W1. Were used by the Khoi–San to anoint the body; used to treat stomach problems.
3. <i>Aloe dichotoma</i> Masson (Asphodelaceae); VW4468	<u>kokerboom</u>	The stem is used as medicine — mainly to treat cancer and asthma . Put stem in water for 2–3 days. Cut in blocks and leave in refrigerator. Pieces can be made into a tea when needed (JB). An infusion is used for backache (drink as a tea). (FB, confirmed by CB). Leaves are placed in the drinking water of chickens to control fleas and diseases (BB).	A2; S3; V2, V3. Stems used in the construction of houses and to make quivers.
4. <i>*Aloe ferox</i> Mill.(Asphodelaceae); P93	<u>aalwyn</u> , <u>bitteraalwyn</u> ; <u>Kaapse aalwyn</u>	Drink an infusion of the leaves for kidneys and bladder (JB); stomach problems (JT, confirmed by HG); used for back pain (RT); put leaves in the drinking water of chicken for lice and chicken diseases (<i>piep</i>) (DB, confirmed by EB, HG, BB).	B1; C2; E; G2; H1; ; K1; L1; M2; N1; P1-3; P4; P5; P6; R3; R4; S2; S3; V2, V3; W1. An important and widely used laxative medicine; leaves and roots also used to treat arthritis, eczema and hypertension.
5. <i>Aloe microstigma</i> Salm-Dyck (Asphodelaceae); VW4396	<u>veldaalwyn</u>	The leaves are dried and eaten as an energy booster (CB); leaves eaten to clean the stomach (BB); used to treat back pain (JB, confirmed by IW); treating lice in chickens , by putting leaves in drink water (JB, confirmed by CB, FB, GS, AT, KB, JT, HG, MT, AnT); bake the leaves, and use as a wound dressing (RT, confirmed by HB, DB, MT); energy boost (general tonic) (CB).	No references to medicinal uses in literature
6. <i>Aloe variegata</i> L. (Asphodelaceae); VW4441	<u>kanniedood</u>	Leaf is cut open, and used as a warm compress for wounds (CB, confirmed by FB, KB, DB, EB, JT, HG); cleanse the body (JB); used in spells (JB); flower colour used for forecasting the weather — bright red indicates rain, dull pink indicates drought (JB); rub legs with leaf pulp to treat pains (RT).	D1; R1; S3; V5; W1. Applied to the skin to treat callosities, bunions, boils and burn wounds.
7. <i>Anisodonteia triloba</i> (Thunb.) Bates (Malvaceae); VW4439	<u>*wildesalie</u>	A leaf infusion is used to treat colds and asthma; headaches . Drink as a tea; mixed with other herbs (JB); used to treat stomach ailments (JB).	No references to medicinal use in literature
8. <i>Apium decumbens</i> Eckl. & Zeyh. (= <i>A. prostratum</i> Vent.) (Apiaceae); VW4465	<u>*seldery</u>	Edible — used in soups (JB, confirmed by FB, CB, AT, HB).	A new record of an indigenous edible plant. <i>Apium graveolens</i> (celery) is well known
9. <i>Aptosimum indivisum</i> Burch. ex Benth. (Scrophulariaceae); VW4449	<u>kinkhoesbos</u> , <u>kannie</u>	An infusion of the whole plant is used to treat stomach ache/upset stomach (JB, confirmed by CB, FB); toothache and headache (JB).	S3; W1. Uses poorly recorded in literature

10. <i>Aptosimum spinescens</i> Thunb. (Scrophulariaceae); VW4454	<i>sandboega</i>	Leaves dried and used as a snuff for headache (JB); stomach-ache (JB, confirmed by RT); backache (JB, confirmed by RT).	R4; S1; S3; V6. Uses poorly recorded in literature
11. <i>*Artemisia afra</i> Jacq. ex Willd. (Asteraceae); P96	<i>wildeals; wilde-als; als; alsem; African wormwood</i>	Leaves used to treat colds and a tight chest (<i>toegetrekte bors</i>) (used with <i>wynruit</i> — CB) (JB, confirmed by FB, RT); treating pains, especially backache (RT, confirmed by KB, EB, MT); stomach pain (BB); kidneys (JT, confirmed by HG).	C1; D1; D2; E; G1; G2; H14; K1; P1-3; P4; R2; R3; R4; S2; V2, V3; W1; W2. Widely used in Africa for many ailments, including coughs, colds, influenza, fever, colic, headache, malaria and intestinal worms.
12. <i>Ballota africana</i> L. (Lamiaceae); VW4420	<i>kattekrui; kattekruid</i>	Leaf infusions are used by women, who gave birth (afterbirth), and to stimulate milk production in pregnant women (JB, confirmed by CB, FB); put leaves in hot water, to make a tea, to treat fever (JB); wash aching legs with it (HB, confirmed by RT, HB).	A2; C2; D1; D2; E; G2; K1; L1; P2-3; P4; R3; R4; V2, V3; W1. Was used by the Khoi to treat fevers and measles. Infusions are used to treat asthma, heart trouble, hysteria, headaches and liver problems.
13. <i>Boophone haemanthifolia</i> F. M.Leight. (Amaryllidaceae); VW4443	<i>gijbol</i>	The papery bulb scales are used to treat asthma — use them to stuff a pillow — put pillow on chest or sleep on it (JB, confirmed by FB, CB, RT, AT, HB, DB, EB, BB, MT); also used as a compress on paining knees . (JB, confirmed by FB, CB).	The closely related <i>B. disticha</i> (L.f.) Herb. is well known and widely used, e.g. B1; C1; G1; G2; H1; K1; N1; P4; R3; R4; S2; S3; S4; V2, V3; W1; W2.
14. <i>*Carpobrotus edulis</i> L.Bolus (Mesembryanthemaceae); P102	<i>rankvy; suurv; ghaukum; vyerank; nautsi amma; sour fig</i>	Fruit is edible (JB, confirmed by JT, HG, CB, FB, DB, EB, MT); the leaf juice is used to treat oral thrush (<i>tandesproei</i>) (JB, confirmed by CB, FB, AT, DB, EB, IW, MT); used for sores and wounds (rub skin with plant) (RT).	A1; C1; D1; H1; K1; L1; P1-3; P4; R1; R2; R4; S3; T1; V2, V3; W1. Leaf juice gargled to treat infections of the mouth and throat; taken orally for dysentery. Applied externally to treat eczema, wounds and burns.
15. <i>Chamarea longipedicellata</i> (Apiaceae); VW4467	<i>*vinkel</i>	Root is edible (JB, confirmed by FB, CB, DB, EB, JT, HG, MT); help for headache (RT).	<i>Chamarea capensis</i> (<i>chamare</i>) first recorded by V1.
16. <i>Chrysocoma ciliata</i> L. (Asteraceae); VW4388	<i>beesbos</i>	A leaf decoction is used for colds (boil with <i>Tulbaghia</i> sp.) (JT); medicine for the stomach (JB); pain (especially aching legs) (HB).	B1; H2; R4; S1; S3; W1. Uses poorly recorded in literature
17. <i>Conyza scabrida</i> DC. (Asteraceae); VW4436	<i>*meidebos, perskebos; oondbos; oondbesembos</i>	Leaf infusions used for cramps after labour and pain (<i>trek plant vir nageboorte krampe en pyn</i>) (JB, confirmed by RT); used for pain and bladder infections (RT, confirmed by KB, HB, EB); used to treat colds (steam under a blanket) (AT, confirmed by HG, MT); for swollen feet and hands (CB, confirmed by FB).	G2; H1; R4; S1; S2; S3; V3; V4; V5; W1. Infusions taken for stomach, chest, heart, influenza and for women's ailments.
18. <i>Cotyledon orbiculata</i> L. (Crassulaceae); P108	<i>beesore; plakkie; varkoor</i>	The fleshy leaves are used as an ointment or dressing for wounds (CB, confirmed by FB).	A2; D2; E; G2; H1; K1; P1-3; P4; P5; R3; R4; S1; S2; S3; V2; V3; V6; W1 Used to treat warts; leaf juice used as drops for earache and toothache.
19. <i>Crassula muscosa</i> L. (Crassulaceae); VW4447	<i>*skilpadbos; klein koorsbos</i>	Leafy stems use to treat backache (JB); oral thrush (<i>tandesproei</i>) (JB, confirmed by FB, CB, JT, HG).	A2; G2; L1; S3; V6; W1. Decoction taken for fever.
20. <i>Dicoma capensis</i> Less. (Asteraceae); VW4463	<i>*hen-en-kuikens; karmedik; wilde karmedik; dermbos; teringbos; koorsbossie</i>	A decoction is used as a tea for colds and influenza (both leaves and roots are used) (JB, confirmed by RT, AT, EB); used to treat high blood pressure (JB); stomach pains (CB, confirmed by FB, HG); tonic for the liver (FB); back pains (FB, confirmed by KB, HB).	A2; K1; S1; V2; V3; V5; W1. Widely used to treat fever (as diuretic); also for upset stomach and numerous other ailments, including influenza, diarrhoea and cancer.
21. <i>Dodonaea viscosa</i> Jacq. var. <i>angustifolia</i> L.f. (Benth.) (Sapindaceae); VW4437	<i>basterolien; ysterhout(toppe); sandolien; t'koubi</i>	A decoction of leaves is made to treat colds and influenza, and a variety of other ailments (JB, confirmed by CB, FB, RT, AT, HB, MT). [Used in conjunction with <i>vaalsalie</i> and <i>wynruit</i> (confirmed by MT)]; bladder and kidney problems (JB, confirmed by DB, EB); use powder as a snuff; helps with headache and fatigue ; slimy chests in children (JB); to treat pain (RT, confirmed by JT, HG).	A1; D1; G2; K1; L1; P1-3; P6; R4; S3; V2; V3; W1. Decoction of leaves a remedy for fever; stomach trouble, measles, arthritis and sore throat.
22. <i>Elytropappus rhinocerotis</i> (L.f.) Less. (Asteraceae); P110	<i>renosterbos; anosterbos</i>	Used as firewood (DB).	D1; K1; P1-3; P4; R3; R4; S1; S3; V2; V3; W1. Infusions of branches in brandy a medicine for ulcers, indigestion and stomach cancer.
23. <i>Euchlora hirsuta</i> (Thunb.) Druce (Fabaceae); VW4435	<i>noorsbol</i>	Leaves used to treat hangovers (JB); dry tubers used as firewood (FB, confirmed by CB).	No uses recorded in the literature.

(continued on next page)

Table 2 (continued)

Species	Common names	Uses in the Agter-Hantam	Literature references and notes on known uses
*indigenous but not the Hantam area — cultivated or bought in shop; **exotic species; voucher specimen numbers (VW) refer to Van Wyk, De Beer and Tilney in JRAU; numbers starting with P indicate photographic vouchers; new species records in bold	Hantam names underlined; newly recorded common names in bold (*known vernacular names that have been applied to other species)	New uses are indicated in bold; Abbreviations (JB, DB, etc.) refer to the key participants as listed in Table 1)	
24. <i>Fockea</i> sp. (Apocynaceae); P129	<u>kambro</u> ; <u>camarebi</u> ; <u>camao</u>	Fleshy tuber is edible; make jam from it (CB, confirmed by AnT, AT); can be used to treat headache (cut in small pieces, and use as compress on head) (JB).	L1; V1; V3; V5. Tuber used as food; diuretic; fresh, sliced tuber applied to snake bites and stings.
25. <i>Galenia africana</i> L. (Aizoaceae); VW4422	<u>geelbos</u> ; <u>kraalbos</u> ; <u>t'kooi dabee</u>	Make a leaf infusion, and wash head to treat pimples, rashes on head (kopsere) (JB, confirmed by CB, RT, AT, DB, EB, BB); used to treat dandruff and lice (JB, confirmed by JT); treatment of dry skull (KB); leg pains and swollen legs (KB, confirmed by IW); used to clean wooden floors (CB); used as lye when drying fruits, e.g. prunes (<i>loog van pruime</i>) (Anna Visagie, confirmed by CB).	A1; K1; K2; L1; S3; V3; V5; V6; W1. Small amount of leaves chewed for toothache.
26. <i>Galium tomentosum</i> Thunb. (Rubiaceae); VW4424	<u>rooistorm</u> , <u>kleefa</u> ; <u>rooihoutjie</u> ; <u>rooivergeet</u> ; <u>nooit vergeet</u>	Make a root infusion, and use as a general tonic (DB, confirmed by JT) (root can also be chewed raw); used against witchcraft spells (paljas) (JB, confirmed by AT); wash body (with salt solution) to assist in relieving pains (JB).	A1; A2; S1. Uses are poorly recorded.
27. <i>Gomphocarpus fruticosus</i> (L.) W.T. Aiton (Apocynaceae); P113	<u>melkbos</u> , <u>tontelbos</u>	Wash painful legs with a decoction of leaves (JB).	A2; C1; G1; H1; K2; M1; P4; P5; R3; R4; S1; V2; V3; V6; W1.
28. <i>Grielum humifusum</i> Thunb. (Neuradaceae); VW4455	<u>snotwortel</u>	Edible veld food (JB, confirmed by FB, CB, GS, AT, KB, HB, DB, EB, JT, HG, MT) (root eaten raw, or can be made into a porridge).	Edible; poorly recorded.
29. <i>Hermannia cuneifolia</i> Jacq. var. <i>cuneifolia</i> (Sterculiaceae); VW4442	<u>wilde heuning</u> ; <u>kwaaiman</u> ; <u>geneessossie</u> ; <u>pleisterbossie</u>	Use an infusion of the leaves to treat diabetes (JB); used to treat cancer (JB); and as a remedy for colds (JB).	H2; R4; S3; V5; W1. The traditional uses of <i>Hermannia</i> species are poorly recorded.
30. <i>Hermannia johanssenii</i> N.E. Br. (Sterculiaceae); VW4429	<u>*heuningbos</u>	Make a tea (infusion) of the leaves and use for piles (aambeie) (JB).	No uses recorded in the literature.
31. <i>Hoodia gordonii</i> (Masson) Sweet ex Decne. (Apocynaceae); VW4452	<u>ghôba</u> , <u>ghôwa</u> ; <u>ghaap</u>	Fleshy stems are a popular (bitter!) veld food — “ to clean the blood ”. Use to suppress appetite (JB, confirmed by CB, FB, RT, GS, AT, KB, DB, EB, IW, BB, MT, AnT); also various medicinal uses, namely for oral thrush (tandesproei) (JB); to treat slimy chests (JB); for measles (JB) and to treat heartburn (JB). Also used to treat stomach pains (JB, confirmed by CB, FB, MT).	K1; L1; M2; P2-3; R4. Popular veld food and thirst quencher; use of <i>Hoodia</i> as appetite suppressant first explicitly recorded by M2.
32. <i>Hydnora africana</i> Thunb. (Hydnoraceae); VW4453	<u>kannikan</u> ; <u>kanni</u> ; <u>jakkalskos</u>	Over-ripe fruit (mealy/floury) used as veld food (JB, confirmed by CB, FB, JT, HG, RT, AT, KB, HB, DB, EB, BB, MT); used for oral thrush (CB).	A2; C1; H1; R4; T1; V3; W1. Known as an edible plant, first discovered in the Agter-Hantam by Thunberg (T1) in 1774.
33. <i>Jamesbrittenia atropurpurea</i> (Benth.) Hilliard subsp. <i>atropurpurea</i> (Scrophulariaceae); VW4444	<u>*tandpynbos</u> ; <u>geelblommetjie</u> ; <u>saffraanbossie</u>	Leaves used for toothache (JB); used as chewing tobacco (FB, confirmed by DB, JT, MT); for general pains (HB).	K1; P1-3; S3; V6; W1. Antispasmodic, stimulant, used for convulsions, cough, bronchitis.
34. <i>Massonia depressa</i> Houtt. (Hyacinthaceae); VW4459	<u>*soetprop</u>	Drink the nectar (JB, confirmed by FB, CB, KB, DB, EB, JT, HG).	No references in literature.
35. <i>Melianthus comosus</i> Vahl (Melianthaceae); VW4421	<u>kriekiebos</u> ; (<u>truitjie</u> -) <u>kruidjie-roer-my-nie</u> ; <u>koffiebos</u>	A leaf decoction is used for swollen feet and leg pains. Bathe feet with it, and cover in blankets to keep warm; poisonous, not for internal use (JB, confirmed by RT, HB).	G2; H1; K2; P4; R3; R4; S1; S2; S3; V2; V3; V5; W1; W2. Leaf decoctions used to treat septic wounds, sores, backache and rheumatic joints.

36. <i>Melolobium candicans</i> (E.Mey.) Eckl. & Zeyh. (Fabaceae); VW4438	<u>wilde dagga; naeltjedorring</u>	A decoction of the stem and leaves is drunk to treat asthma (JB); tuberculosis (JB); sometimes smoked and confuses the person (JB, confirmed by MT); used to treat colds (RT) and stomach problems (JT). Infusion of leaves drunk as a tea; warm leaves used as a compress (JB); to treat headaches (put a leaf compress under hat on head) (JB, confirmed by CB, FB, AT, DB, EB, IW, BB); to treat stomach pains (JB); used for paljas , against witchcraft spells (JB); wash aching legs (HB); used for kidneys (DB); influenza and colds (JT). Often used with other herbs (JB). Young fruits are edible (JB, confirmed by FB, CB, GS, RT, AT, KB, HB, DB, EB, JT, HG, BB, MT, AnT).	No uses recorded in the literature.
37. <i>Mentha longifolia</i> (L.) Huds. (Lamiaceae); VW4423	<u>ballerja; balderjan; baldrian; t'kamma</u>	Leaves and flowers are used for sweaty and smelly feet (“nat voete”); dry the flowers, and put in shoes (JB, confirmed by FB, CB, AT, MT); use to clean oily and dirty hands (MT); used to treat stomach problems (RT, confirmed by JT, HG); for backache (HB).	A2; L1; P1-3; P4; P5; R3; R4; S3; W1. Main use for coughs, colds and asthma; also headaches, fevers, indigestion, flatulence, hysteria, painful menstruation and urinary tract infections. G2; W1. Popular veld food.
38. <i>Microloma sagittatum</i> (L.) R. Br. (Apocynaceae); VW4434	<u>bokhorinkie, peulebos</u>	Leafy twigs used to treat cancer (make a tea) (JB); for treating backache (JB) and headache (HB).	D1; K1; L1; P1-3; P4; R4; S2; S3; V2; V3; V6; W1. Smith (1966) refers to the fact that the Khoi-San made a mixture that included <i>stinkkruid</i> to cure infantile convulsions. No uses recorded in the literature.
39. <i>Oncosiphon suffruticosum</i> (L.) Källersjö (Asteraceae); VW4430	<u>stinkkruid; wurmkruid; wurmbos; miskruid</u>	This lichen is used as a female medicine, for “cleaning the womb” (<i>maak baarmoeder skoon</i>) (CB); treating general pains, especially back and kidneys (JB, confirmed by RT, HB, DB, JT); grind, and use as an ointment for burns and wounds (HB); treating colds (IW); bladder diseases (MT).	K1; L1; V2; V3; V4. Infusions for back pain; mouth wash for oral thrush; lichen used for anointing the body. Matsiliza and Barker (2001) recorded the oral and topical use of rock lichens against gonorrhoea. P4. Uses poorly recorded in the literature.
40. <i>Otholobium arborescens</i> C.H. Stirt. (Fabaceae); VW4433	<u>*wildegranaat</u>	Leaf infusion used for chest problems (JB), and for treating colds and influenza (CB, confirmed by FB, AT, BB, MT).	A2; G2; K1; L1; P1-3; P4; R3; R4; S3; V2; W1. Decoctions in milk for dysentery
41. <i>Parmelia</i> sp.; VW4389	<u>klipblom; klipmos; klipbuchu</u>	Used for treating wounds (RT).	No uses recorded in the literature. The only original record of the Griqua name <i>aree</i> (for <i>Pelargonium</i> species) is that of V1 in 1685. R4; S1; S3; W1. The plant was used to induce abortions and to treat amenorrhoea (S3). G2; R4; S2; S3; W1. Infusion or tincture, for colds, tuberculosis, as nerve tonic.
42. <i>Pelargonium abrotanifolium</i> (L.f.) Jacq. (Geraniaceae); VW4451	<u>*bergsalie</u>	A popular veld food — the stem is roasted in ash, and eaten; fresh leaves are also edible , with a sweet-sour taste (JB, confirmed by CB, AT, MT, DB, EB, HB, KB, GS, JT, RT).	H2; P4; S1; V5; V6; W1. Stomach problems and diarrhoea; colds.
43. <i>Pelargonium antidysentericum</i> (Eckl. & Zeyh.) Kostel. (Geraniaceae); P127	<u>*wilde aree; t'namie; t'kamie; nanievortel</u>	Decoction of the whole plant used to treat asthma and a tight chest (<i>toe bors</i>) (JB).	S3, V3; V5. The use of <i>Psilocaulon</i> species for making lye is well documented in the literature.
44. <i>Pelargonium carnosum</i> L. L. Herit (Geraniaceae); VW4460	<u>aree; oupa-aree, oupa arrie</u>	Infusions of leafy stems used to treat backache (JB, confirmed by RT, JT, HG); for asthma ; used as a mixed herb (JB); for colds and influenza; coughs (JB, confirmed by FB, CB, RT, AT, HB, BB); treating headaches (JB, confirmed by DB, EB); for kidneys and bladder (KB); stomach problems (BB).	
45. <i>Pelargonium grossularioides</i> (L.) L'Her. (Geraniaceae); P128	<u>rooirabas</u>	Leaves are chewed to treat stomach cramps (JB, confirmed by CB, FB, AT, HB, JT, MT, AnT); leaves also used to treat general pain (GS confirmed by RT — especially kidney pains , KB).	
46. <i>Pelargonium ramosissimum</i> (Cav.) Willd. (Geraniaceae); VW4445	<u>dassieboegoe; dassiebos</u>	Stems are used for lye (<i>loog</i>) when drying fruits (JB, confirmed by AT, MT); treating dandruff — plant material burned, ash added to water and left overnight — people wash their hair with this water (JB); ash used as lye for making soap (CB, confirmed by DB, EB); used to build shelters (<i>skerms</i>) (AT, confirmed by KB, AnT).	
47. <i>Pentzia incana</i> (Thunb.) Kuntze (Asteraceae); VW4428	<u>skaapbos; ankerkaroo; karoobos; skaapkaroo</u>	Make an infusion (tea) of the leaves for influenza (AT).	
48. <i>Psilocaulon</i> sp. cf. <i>coriarius</i> (Burch. ex N.E.Br.) N.E.Br. (Mesembryanthemaceae); VW4461	<u>asbos</u>	The fleshy seeds are edible; the dried and powdered fruit pericarp (<i>skil</i>) is used for oral thrush (JB, confirmed by CB, FB, JT, HG, RT, AT, KB, HB, DB, EB, IW, BB, MT).	
49. <i>Pteronia divaricata</i> (P.J.Bergius) Less. (Asteraceae); VW4401	<u>boegabos; flip-se-bos</u>		H3. An important medicinal plant in the Cedarberg area. D1; K1; P3; R2; S2; V2; W1. The dried fruit rind is a remedy for diarrhoea and stomach ache. The root bark is used to treat tapeworm.
50. <i>Punica granatum</i> L. (Punicaceae); P121	<u>granaat (skille); granaatbas</u>		

(continued on next page)

Table 2 (continued)

Species *indigenous but not the Hantam area — cultivated or bought in shop; **exotic species; voucher specimen numbers (VW) refer to Van Wyk, De Beer and Tilney in JRAU; numbers starting with P indicate photographic vouchers; new species records in bold	Common names Hantam names underlined; newly recorded common names in bold (*known vernacular names that have been applied to other species)	Uses in the Agter-Hantam New uses are indicated in bold; Abbreviations (JB, DB, etc.) refer to the key participants as listed in Table 1)	Literature references and notes on known uses
51. <i>Quaqua incarnata</i> (L.f.) Bruyns (Apocynaceae); VW4469	<u>karoena</u> ; aroena	Fleshy stems are eaten raw as veld food (JB, confirmed by FB, CB, GS, RT, KB, HB, DB, EB, JT, HG, IW, MT).	A2; S3; V3. This species is relatively well known as a veld food.
52. ** <i>Ricinus communis</i> L. (Euphorbiaceae); P122	<u>kasterolie</u> (boom)	Used to treat painful knees/joints (heat leaves, and put on affected area) (JB, confirmed by FB, CB, RT, AT, IW, HB, BB, MT).	A2; C1; D1; G1; G2; H1; K2; M1; N1; P1-3; P4; P6; R2; R3; R4; S2; S3; V2; V3; V6; W1. A well-known purgative medicine; leaf infusions used for stomach ache.
53. ** <i>Ruta graveolens</i> L. (Rutaceae); P123	<u>wynruit</u> , <u>wynruik</u>	Leaf infusions are taken for colds and influenza (JB, confirmed by JT — add aspirin; AT — add <i>bergsalie</i> ; DB, EB, BB); treatment of headache (JB); put under mattress to chase lice away (<i>verdryf weeluisse</i>) (CB); for pain (KB, confirmed by HB, EB); stomach problems (BB, confirmed by AnT).	D1; G2; K1; P4; R2; R4; S3; V2; V3; W1. Leaf infusions taken for fever, and fits in children. Alcoholic tinctures popular for respiratory problems and heart diseases. Bruised leaves used to treat toothache and earache.
54. <i>Salix mucronata</i> Thunb. (Salicaceae); P124	<u>wilger</u> ; <u>rivierwilger</u>	Leaves are used to treat pain (HB).	A2; B1; D1; M1; R3; S2; V2; V3; W1. Willow tips are used to treat rheumatism and fever.
55. <i>Salvia dentata</i> Aiton (Lamiaceae); VW4440	<u>bergsalie</u>	Leaf decoctions used for various ailments; often mixed with other herbs; general tonic, <i>e.g.</i> for fatigue (JB, confirmed by DB, EB); colds; (CB, confirmed by JT and HG; together with <i>dassiebos</i> , BB, AT); backache (AT); kidney diseases (JT, confirmed by HG).	A1; A2; V2. Uses poorly recorded in the literature.
56. <i>Salvia disermas</i> L. (Lamiaceae); VW4419	<u>terpentynbos</u> ; <u>muishondbos</u>	Leaf decoctions used to treat swollen feet (make water blisters, if feet are kept too long in it) (JB); For treating fungal infections on the head (wash skull with plant infusion) (CB, confirmed by FB); wash tired feet and painful legs (DB, confirmed by EB).	P4; R3; S1; W1. Uses poorly recorded in the literature.

57. <i>Sceletium emarcidum</i> (Thunb.) L. Bolus ex H. Jacobsen (Mesembryanthemaceae); P116	<u>kougoed</u> ; <i>kanna</i> (wortel); (“ <i>channa, canna</i> ”)	Whole plant is baked in the fire, and used as intoxicant (JB, confirmed by AT, MT); people chew the plant (<i>kougom/kougoed</i>) (CB, JT — like chewing tobacco) (confirmed by DB, EB, MT); used for washing aching legs (RT); toothache (EB).	R4; S3; W1. The closely related <i>Sceletium tortuosum</i> is a well-known Nama masticatory: A2; G2; L1; P1-3; R4; S3; V1; V2; V3; W1; Z1.
58. <i>Searsia lancea</i> (L.f.) F.A. Barkley (Anacardiaceae); VW4426	<u>kruboom</u> ; <i>karee</i>	The small dry fruits are edible (JB, confirmed by CB, FB, RT, AT, KB, HB, DB, EB, JT, HG, BB, MT).	G1; M1; V3. Ripe fruits are edible and are traditionally used as ferment in mead/honey beer (= <i>karri</i> , hence the name <i>karee</i> for the tree).
59. <i>Septulina glauca</i> (Thunb.) Tiegh. (Loranthaceae); VW4456	<u>voëlent</u>	Berries are edible (KB, confirmed by DB, BB, AnT); used as a mouthwash for babies (CB).	No uses are recorded in the literature.
60. <i>Solanum tomentosum</i> L. (Solanaceae); VW4462	<u>slangbessiebos</u> ; <i>gifappel</i> ; <i>vuilsiekbossie</i> ; <i>doringappeltjie</i> ; <i>!nuheis</i> ; <i>bitterboelabos</i>	Numerous medicinal uses, <i>e.g.</i> to treat open wounds (<i>rou sere</i>) (JB); breathing problems (tight chest) (JB); backache and stomach-ache (JB); kidney problems (JB); toothache (put a leaf in the mouth, on aching tooth) (CB, confirmed by FB, JT, HG, MT — grind leaf, and put ointment on tooth); wash body with it — a general medicine (DB).	A2; B1; H1; P5; R4; S3; W1. Archer (1994) refers to the use of the root, which is placed in milk to sour it, and to give it a good taste.
61. <i>Sutherlandia frutescens</i> (L.) R. Br. (Fabaceae); VW4431	<i>kalkoenbos</i> ; <i>kankerbos(sie)</i> ; <i>kalkoenblom</i>	Leaf infusions taken for numerous ailments, <i>e.g.</i> nausea (JB); diabetes/ “treating sugar” (JB, confirmed by CB, FB); high blood pressure (JB); kidney stones; gall; cleanse the bladder (JB, confirmed by AT, KB, HB, DB, EB); if chewed in mouth and placed on tooth, it helps with toothache (JB, confirmed by CB, FB); rashes on skin (JB); backache (JB, confirmed by CB, FB, HG, MT); stomach problems (EB, confirmed by BB, AnT); for treating colds and influenza (JT).	A1; A2; B1; D1; D2; E; G2; L1; P1-3; P4; P5; R3; R4; S1; S2; S3; V2; V3; W1; W2. A wide diversity of uses have been recorded.
62. <i>Thesium lineatum</i> L.f. (Santalaceae); VW4458	<u>*koringbos</u>	Fruits are edible (but the stems and leaves are poisonous to livestock) (JB, confirmed by DB, EB, HG).	No uses have been recorded in the literature
63. <i>Veronica anagallis-aquatica</i> L. (Plantaginaceae); VW4427	<u>waterboege</u>	Make a tea from the leaves, to treat cancer (JB); mix with hyraceum (<i>dassiepis</i>) to treat backache (JB); wash painful legs and feet (RT, confirmed by EB).	No uses have been recorded in the literature.
64. <i>Viscum capense</i> L.f. (Viscaceae); VW4425	<u>voëlent</u> , <u>voëlink</u> ; <i>litjies tee</i>	Stem infusions used as tea or tea substitute (JB, confirmed by KB, DB, EB, JT, HG); used to treat diabetes (<i>bloedsuiker</i>), stomach cramps and chest diseases in children (JB); only those growing on a <i>kruboom</i> (<i>Searsia lancea</i>) considerable suitable for use; oral thrush (<i>tandesproei</i>) (CB, confirmed by FB, AT).	D1; H1; K1; P1-3; R2; R4; S3; V2; V3; W1. Used for diarrhoea, asthma, and irregular menstruation. Antispasmodic; epilepsy in children.

Table 3

Matrix of 64 useful species of the Agter-Hantam, with scores reflecting the knowledge of 16 participants of each plant, its name and use(s). Participants: Senior citizens — JB = Jan Baadjies; DB = Danster Baadjies; HB = Hendrik Baadjies; HG = Hendrik Gouws; IW = Izak Waterboer; JT = Jakob Thys; MT = Martiens Thys; RT = Rachel Tromp. Adult participants — AT = Abraham Thys; CB = Christien Baadjies; EB = Elizabeth Baadjies; FB = Frans Baadjies; KB = Kato Baadjies. Young people — AnT = Andreas Thys; BB = Bertus Baadjies; GS = Gert Swarts. Explanation of the four digits in each cell: (1) does the participant know the plant? — score 1 or 0; (2) does the participant have a name for the plant? — score 2 or 0; (3) can the participant name any use for the plant? — score 3 or 0; (4) total score (out of 6; in bold); SPI = Species Popularity Index = ratio of total species score divided by maximum possible score (96); EKI = Ethnobotanical Knowledge Index = ratio of total personal score divided by maximum possible score (384).

Species	Senior citizens (age 55+)								Adults (age 30–54)					Children (age 10–18)			SPI
	JB	DB	HB	HG	IW	JT	MT	RT	AT	CB	EB	FB	KB	AnT	BB	GS	
1. <i>Acacia karroo</i>	1236	1236	1001	1236	1236	1203	1203	0000	1203	1203	1236	1203	0000	0000	0000	1203	0.54
2. <i>Agathosma betulina</i>	1236	0000	0000	1001	0000	1001	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0.08
3. <i>Aloe dichotoma</i>	1236	1203	1203	1203	1203	1203	1203	1203	1236	1236	1203	1236	1203	1203	1236	1203	0.66
4. <i>Aloe ferox</i>	1236	1034	1001	1236	1203	1034	0000	1236	1203	1203	1034	1203	1203	1203	1236	1203	0.60
5. <i>Aloe microstigma</i>	1236	1236	1203	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	0.97
6. <i>Aloe variegata</i>	1236	1236	1203	1236	0000	1236	1203	1236	1203	1236	1203	1236	1236	1203	1203	1203	0.38
7. <i>Anisodonte triloba</i>	1236	1001	0000	1203	0000	1001	0000	0000	0000	1236	1034	1236	1034	0000	0000	0000	0.31
8. <i>Apium prostratum</i>	1236	1001	1236	1203	0000	1236	0000	1001	1236	1236	1203	1236	1001	0000	0000	0000	0.46
9. <i>Aptosimum indivisum</i>	1236	1236	0000	1001	0000	1001	0000	0000	0000	1001	1203	1236	0000	0000	0000	0000	0.25
10. <i>A. spinescens</i>	1236	0000	1001	1203	0000	1001	0000	1236	1203	1203	1001	1203	0000	0000	0000	0000	0.28
11. <i>Artemisia afra</i>	1236	1203	0000	1236	0000	1203	1236	1236	1236	1236	1236	1236	1236	0000	1236	0000	0.69
12. <i>Ballota africana</i>	1236	1203	1034	1203	0000	1203	1236	0000	1236	1203	1236	1236	0000	0000	0000	1001	0.47
13. <i>Boophone haemanthifolia</i>	1236	1236	1236	0000	1203	0000	1236	1236	1236	1236	1236	1236	0000	0000	1236	0000	0.66
14. <i>Carpobrotus edulis</i>	1236	1236	0000	1236	1236	1236	1236	1236	1236	1236	1236	1236	1203	0000	0000	1203	0.75
15. <i>Chamarea longipedicellata</i>	1236	1236	0000	1236	0000	1236	1236	1236	1203	1236	1236	1236	0000	0000	0000	0000	0.59
16. <i>Chrysocoma ciliata</i>	1236	1203	1236	1001	0000	1034	1001	1001	1203	1203	1203	1203	1001	1203	0000	0000	0.40
17. <i>Conyza scabrida</i>	1236	1236	1236	1236	0000	1236	1236	1236	1236	1236	1236	1236	1236	0000	0000	0000	0.75
18. <i>Cotyledon orbiculata</i>	1203	0000	1001	1203	0000	1001	0000	1001	1203	1236	1001	1236	0000	0000	1203	0000	0.29
19. <i>Crassula muscosa</i>	1236	1203	1203	1236	0000	1236	1203	1203	1203	1236	1203	1236	1203	0000	0000	0000	0.53
20. <i>Dicoma capensis</i>	1236	1236	1236	1236	0000	1203	1203	1236	1236	1236	1236	1236	1236	0000	0000	0000	0.69
21. <i>Dodonaea viscosa</i>	1236	1236	1236	1236	0000	1236	1236	1236	1236	1236	1236	1236	0000	1001	0000	0000	0.70
22. <i>Elytropappus rhinocerotis</i>	1203	1236	1203	1203	0000	1001	0000	0000	0000	0000	0000	0000	0000	0000	0000	1203	0.21
23. <i>Euchlora hirsuta</i>	1236	0000	0000	0000	0000	0000	0000	0000	0000	1236	0000	1034	0000	0000	0000	0000	0.17
24. <i>Fockea edulis</i>	1236	1203	1203	1236	1203	1203	1236	1236	1236	1236	1203	1236	1203	1236	1236	1236	0.78
25. <i>Galenia africana</i>	1236	1236	1203	1203	1034	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	0000	0.85
26. <i>Galium tomentosum</i>	1236	1236	1203	1203	1203	1236	0000	0000	1236	1203	1203	1203	0000	0000	0000	1203	0.47
27. <i>Gomphocarpus fruticosus</i>	1236	1203	1203	1203	1203	1203	1203	1203	1203	1203	1203	1203	1203	1203	1203	1203	0.53
28. <i>Grielum humifusum</i>	1236	1236	1236	1236	0000	1236	1236	1001	1236	1236	1236	1236	1236	0000	0000	1236	0.76
29. <i>Hermannia cuneifolia</i>	1236	1203	0000	1001	0000	1001	0000	0000	0000	1203	1001	1203	0000	0000	0000	0000	0.19
30. <i>H. johanssenii</i>	1236	1203	1001	1001	0000	0000	1001	0000	0000	1203	0000	0000	0000	0000	0000	0000	0.16
31. <i>Hoodia gordonii</i>	1236	1236	1236	0000	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	0.94
32. <i>Hydnora africana</i>	1236	1236	1236	1236	0000	1236	1236	1236	1236	1236	1236	1236	1236	1001	1236	1001	0.83
33. <i>Jamesbrittenia atropurpurea</i>	1236	1236	1236	1001	0000	1236	1236	1203	1001	1236	0000	1236	1001	1001	0000	0000	0.51
34. <i>Massonia depressa</i>	1236	1236	1034	1236	0000	1236	0000	1001	1203	1236	1236	1236	0000	0000	0000	0000	0.52
35. <i>Melanthus comosus</i>	1236	0000	1236	0000	0000	0000	1203	1236	1203	1203	0000	1203	1203	0000	0000	0000	0.34
36. <i>Melolobium candicans</i>	1236	0000	0000	1203	0000	1236	1236	1236	0000	1203	0000	1203	0000	0000	0000	0000	0.34
37. <i>Mentha longifolia</i>	1236	1236	1236	1236	1236	1236	0000	1001	1236	1236	1236	1236	1001	0000	1236	0000	0.71
38. <i>Microloma sagittatum</i>	1236	1236	1236	1236	0000	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	0.94
39. <i>Oncosiphon suffruticosum</i>	1236	1203	1236	1236	1203	1236	1236	1236	1236	1236	1236	1236	1203	0000	1203	1203	0.78
40. <i>Otholobium arborescens</i>	1236	0000	1236	0000	0000	0000	1203	0000	1203	1203	1001	1203	0000	0000	0000	0000	0.26
41. <i>Parmelia</i> sp.	1236	1236	1236	1203	1236	1236	1236	1236	1203	1236	1203	1236	1203	1203	0000	1001	0.73
42. <i>Pelargonium abrotanifolium</i>	1236	0000	1203	0000	0000	0000	1236	0000	1236	1236	1001	1236	0000	0000	1236	0000	0.41
43. <i>P. antidysentericum</i>	1203	1001	0000	0000	0000	1001	1001	1236	0000	1203	0000	1001	0000	0000	0000	0000	0.17
44. <i>P. carnosum</i>	1236	1236	1236	1203	0000	1236	1236	1236	1236	1236	1236	1236	1236	0000	0000	1236	0.78
45. <i>P. grossularioides</i>	1236	1203	1001	1001	0000	1203	1001	1203	0000	1203	0000	1001	0000	0000	0000	0000	0.23
46. <i>P. ramosissimum</i>	1236	1236	1236	1236	0000	1236	1236	1236	1236	1236	1236	1236	1236	0000	1236	0000	0.81
47. <i>Pentzia incana</i>	1236	1203	1236	1203	0000	1236	1236	1236	1236	1236	1203	1236	1236	1236	0000	1236	0.78
48. <i>Psilocaulon</i> sp.	1236	1236	0000	0000	0000	0000	1236	1203	1236	1236	1236	1236	1236	1034	1203	1203	0.64
49. <i>Pteronia divaricata</i>	0000	1001	1001	1001	0000	0000	0000	0000	1236	0000	0000	0000	0000	0000	0000	0000	0.08
50. <i>*Punica granatum</i>	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1.00
51. <i>Quaqua incarnata</i>	1236	1236	1236	1236	1034	1236	1236	1236	1236	1236	1236	1236	1236	1203	1203	1236	0.92
52. <i>Ricinus communis</i>	1236	1203	1236	1203	1236	1203	1236	1236	1236	1236	1203	1236	1203	1203	1236	0000	0.75
53. <i>*Ruta graveolens</i>	1236	1236	1236	1236	0000	1236	1203	0000	1236	1236	1236	1236	1236	1236	1236	0000	0.78
54. <i>Salix mucronata</i>	1001	1203	1236	1203	0000	1203	1203	1203	1203	1203	1203	1203	0000	0000	0000	0000	0.35
55. <i>Salvia dentata</i>	1236	1236	1203	1236	0000	1236	0000	0000	1236	1236	1236	1236	0000	0000	1236	0000	0.59
56. <i>Salvia dissermas</i>	1236	1236	1203	1203	0000	1203	1001	1203	1203	1236	1236	1236	1203	1203	1001	0000	0.55

Table 3 (continued)

Species	Senior citizens (age 55+)								Adults (age 30–54)					Children (age 10–18)			SPI
	JB	DB	HB	HG	IW	JT	MT	RT	AT	CB	EB	FB	KB	AnT	BB	GS	
57. <i>Sceletium emarcidum</i>	1236	1236	1203	1236	1001	1236	1236	1236	1236	1236	1236	1236	1001	1001	0000	1203	0.72
58. <i>Searsia lancea</i>	1236	1236	1236	1236	0000	1236	1236	1236	1236	1236	1236	1236	1236	1001	1236	0000	0.82
59. <i>Septulina glauca</i>	1001	1001	0000	1203	0000	1001	0000	0000	1203	1236	1001	1236	1034	1034	1236	1236	0.44
60. <i>Solanum tomentosum</i>	1236	1236	1001	1236	0000	1236	1236	0000	0000	1236	1236	1236	0000	1203	0000	1203	0.57
61. <i>Sutherlandia frutescens</i>	1236	1236	1236	1236	1001	1236	1236	1236	1236	1236	1236	1236	1236	1236	1236	1203	0.92
62. <i>Thesium lineatum</i>	1236	1236	0000	1236	0000	1236	1203	0000	1203	1203	1236	1203	0000	1203	0000	0000	0.47
63. <i>Veronica anagallis-aquatica</i>	1236	1236	1001	0000	0000	0000	1001	1236	1202	1203	1236	1203	1203	1203	1203	0000	0.43
64. <i>Viscum capense</i>	1236	1236	1236	1236	0000	1236	1203	1203	1236	1236	1236	1236	1034	0000	1001	0000	0.67
EKI	0.93	0.68	0.56	0.61	0.20	0.65	0.56	0.58	0.64	0.82	0.64	0.81	0.43	0.27	0.37	0.27	
Average EKI	0.60								0.67					0.30			

indication of the importance or popularity of each species, as measured by the number of participants who knows the plant and its uses. We express this “Species Popularity Index” (SPI) as a fraction (ratio) of the maximum possible score of 96, obtained by multiplying the number of participants (16) with the maximum score for each species (6). For example, the highest SPI in this study was 1.00 for *Punica granatum* L. (a popular, non-indigenous, cultivated fruit tree that also has traditional medicinal uses), followed by 0.97 for *Aloe microstigma* Salm-Dyck and 0.94 for the popular veld food, *Hoodia gordonii* (Masson) Sweet ex Decne.

Phase 3 is planned for 2011, with the aim of providing further feedback to the community and sharing with them the final publication(s) resulting from this study (including journal article(s) and copies of poster presentations for permanent display at the local school and community centre).

2.4. Literature

No published ethnobotanical information exists for the study area except for one species, *Hydnora africana* Thunb., discovered in the Agter–Hantam by Thunberg in 1774 (see later discussion). To evaluate the data in Table 2, the most important and relevant ethnobotanical publications were consulted, as listed in the caption of Table 2. A careful literature study was necessary to determine which of the species or uses have not yet been recorded.

3. Results and discussion

3.1. Diversity of useful plants in the Agter–Hantam

The only published ethnobotanical information from the Agter–Hantam was recorded by the well-known Swedish botanical explorer, C. P. Thunberg, who visited Abraham van Wyk (the direct ancestor of BEVW) on the farm Uitvlugt on the 12th of October 1774. Near this farm, Thunberg (1795) discovered an extraordinary parasitic plant which he later described and named as *H. africana* (Hydnoraceae). He wrote that the plant always grows under euphorbia bushes and that the fruit is eaten by the local people.

Information on 64 species of useful plants encountered during this survey is recorded and briefly discussed in Table 2.

Names are given alphabetically by scientific name, together with family names and local vernacular name(s). For each species, the various uses as given by the key participants are listed. In most cases, all participants were in agreement about the use(s) of the plant, as indicated in Table 2. Author citations for scientific names are given in the table and are therefore omitted from here on.

A wide diversity of plants in the Agter–Hantam is still a source of food and medicine or is used for various other purposes. There are some interesting new records of plants that are locally important and widely used in the study area, but which have not been documented before. Several new vernacular names and new uses were also recorded. These new records are indicated in bold in Table 2. Of special interest are two new food plants — *Apium prostratum* [used in the same way as *Apium graveolens* (celery)] and *Thesium lineatum* (the fleshy drupes are eaten as a snack).

The following 14 species are here reported for the first time as having ethnobotanical relevance: *A. microstigma*, *Anisodonteia triloba*, *Apium decumbens*, *Aptosimum spinescens*, *Boophone haemanthifolia*, *Chamarea longipedicellata*, *Euchlora hirsuta*, *Hermannia johanssenii*, *Melolobium candicans*, *Otholobium arborescens*, *Pelargonium carnosum*, *Septulina glauca*, *T. lineatum* and *Veronica anagallis-aquatica*. In addition, 99 new uses of often well-known medicinal plants and food plants have been documented. For example, new medicinal uses were recorded for *Aloe dichotoma*, namely to treat cancer and asthma. Literature references to the use of *A. dichotoma* (the well-known quiver tree or *kokerboom*) include using hollowed stems for quivers, timber for the construction of wagons and farming implements (Pappe, 1850; Smith, 1966), nectar from the flowers as a food source (Archer, 1994) and root infusions for treating unspecified ailments (Archer, 1994). The exotic fruit tree *P. granatum* was known to all participants, not only for its edible fruits but also for the medicinal value of the fruit rind. Amongst the indigenous species, *A. microstigma* was known to practically all the participants and several new uses were recorded. The leaves are dried and eaten as an energy booster or they are eaten to clean the stomach. Decoctions are used to treat back pain and baked leaves are applied to wounds as a dressing. Several new uses for well-known medicinal plants were recorded, for example the use of *Ballota africana* to stimulate milk production in pregnant women and the use of *H. gordonii* to

“clean the blood” and to treat oral thrush. Similarly, a new use was recorded for *Sutherlandia frutescens*, namely that the leaves are placed on a cavity in a tooth (or bitten into it) to alleviate toothache. *Galenia africana* is one of the dominant plants in the Hantam area and is also well known locally for a variety of uses that have not been recorded before, including the use of an infusion with which the head is washed to treat pimples, rashes, dandruff and lice. We recorded an interesting use of *Dodonaea viscosa*, namely that the powdered leaves are used as snuff to treat headache and fatigue. Amongst the more unusual plant uses that we recorded are the value of *Aloe variegata* in forecasting changes in the weather.

Table 2 also includes at least 20 vernacular names that are not listed in Marloth (1917), Smith (1966) and Powrie (2004) and which are therefore presumed to be recorded for the first time. An additional 11 common names (indicated by an asterisk in Table 2) are well known but have previously been applied to other (often unrelated) species. Of special interest are the names *aree* (for *P. carnosum*) and *wilde aree* (for *Pelargonium antidysentericum*). The only original record of this vernacular name is in the “Dagh Register” of Simon van der Stel’s Namaqualand expedition (Van der Stel, 1685), where it is listed as the Griqua name for two species of *Pelargonium* (the Nama equivalent is given as *Heyntame*). We therefore suggest that the name “Hantam” is derived from the Nama generic name for *Pelargonium*, a genus which is well represented (and commonly used) in the region around the Hantam Mountain.

The quantification of the Agter–Hantam data is presented as a matrix in Table 3. All 64 species are listed with their Species Popularity Indices (SPI) and all 16 participants with their Ethnobotanical Knowledge Indices (see Materials and methods for details of the score values and how the indices were calculated).

The most popular and widely known indigenous food plants in the Hantam (arranged by their SPI values) are *H. gordonii* (0.94), *Microlooma sagittatum* (0.94), *Quaqua incarnata* (0.92), *H. africana* (0.83), *Searsia lancea* (0.82), *Fockea* sp. (0.78) and *Grielum humifusum* (0.76). The two new food plants that were recorded had relatively low SPI values, namely *T. lineatum* (0.47) and *A. decumbens* (0.46).

The best known and most popular indigenous medicinal plants include *A. microstigma* (0.97), *S. frutescens* (0.92), *G. africana* (0.85), *Pelargonium ramosissimum* (0.81), *Oncosiphon suffruticosum* (0.78) and *Pentzia incana* (0.78). Other important medicinal plants include *Conyza scabrida* (0.75), *Carpobrotus edulis* (0.75), *Parmelia* sp. (0.73), *Sceletium tortuosum* (0.72), *Mentha longifolia* (0.71), *D. viscosa* (0.70), *Dicoma capensis* (0.69) and *B. haemanthifolia* (0.66). The papery scales of the bulb of *B. haemanthifolia* are used to treat asthma — several participants indicated that the scales are used to stuff a pillow, which is then either applied to the chest, or slept on by the patient. A number of exotic plants have become an integral part of the local culture. Of special importance is *P. granatum* (1.00) which has both food and medicinal uses. Another very important cultivated exotic is *Ruta graveolens* (0.78) which is one of very few medicinal plants that are specially grown in the Agter–Hantam for local use. The other is the indigenous *Artemisia afra* (0.69) which is not native to the Calvinia area but nevertheless

well known and widely used for colds, and to treat chest problems and stomach pain. *Ricinus communis* is also a popular medicinal plant, with a SPI of 0.75. For the latter plant a new use was also recorded: the leaves are heated, and placed on knees and joints for pain relief.

These few examples, as well as the statistics on new species records (14), new use records (99) and newly recorded vernacular names (at least 20) illustrate that scientific knowledge of Khoi–San ethnobotany is incomplete and that each survey of this type can make substantial contributions towards a more complete synthesis of what is believed to be the most ancient of human cultures.

3.2. The Matrix Method

Quantitative methods have become routine in ethnobotanical research (De Caluwé et al., 2009; Grace et al., 2009; Tardío and Pardo de Santayana, 2008; Teklehaymanot and Giday, 2010; Teklehaymanot, 2009). These studies deal with particular categories of plant use (e.g. medicinal plants or edible plants) and do not consider all categories at the same time. Some of these existing methods (or modifications thereof) are rather complicated. Details of the matrix methodology and how it relates to previously published methods will be given elsewhere. Here we only briefly highlight the main advantages and unique features of the new method: (1) It provides comparative quantitative data of indigenous plant use (across all categories of utilisation), allowing for future comparisons within and between different communities (e.g. average EKI-values) and between the same plant species in different communities (e.g. average SPI-values); (2) The use of images in combination with specimens makes the study independent of flowering season and the need to study the plants *in situ*. The most knowledgeable participants are often old and frail and are not able to walk long distances; (3) The fact that all species are shown to all participants excludes the possibility of false negative results. In all or most surveys done thus far, the data were based on information given by participants, and it is very likely that important plants were left out — not because they are not well known, but because they were momentarily forgotten.

The significance of this new methodology is perhaps not immediately obvious. For example, the first question “Do you know this plant?” is not trivial, because it establishes whether the person is familiar with the plant, even if he or she does not have a name for it. Young participants in the Agter–Hantam typically knew many plants for which they did not have names. They often recognised the plants by their flowers, colour or leaves, and can point them out in the veld. The second question (the name of the plant) allows for an accurate recording of the full variation of vernacular names of the species. Vernacular names often vary subtly from person to person, or farm to farm, in spelling and pronunciation. The results of our study indicate that the acquisition of knowledge of plants follow a predictable progression from young to old people. Children and young people first learn to recognise the edible plants and are able to communicate about them by learning their names. Those individuals that are particularly curious and interested in plants will typically be observant, and will come to know many other

species, *e.g.* medicinal plants, without necessarily bothering to learn their names. In the Agter–Hantam area, children could recognise a large number of plants, although they could not provide names for many of them. Adults know the names of a wider range of species, including those that are used for non-medicinal purposes, *e.g.* crafts. The elderly people fall in three categories; (1) those reasonably ignorant of plants and their uses; (2) people with knowledge about those plants that are in daily use in the community, and (3) local experts with a profound knowledge of the plants, their identities, and their sensory and pharmacological properties (in this survey, notably Jan Baadjies, with an EKI of 0.93). In our experience, the last-mentioned category is fast becoming rare and even extinct in large parts of the Cape region. This last category of people is typically the herbalist or *bossiedokters* (literally “plant doctors”; doctors that used plants to heal) (Van Wyk, 2008). In the Agter–Hantam we were fortunate enough to record the knowledge of one of the last *bossiedokters* (Jan Baadjies, who did his apprenticeship under a legendary female *bossiedokter* known as Kaatjie Hoesaar).

It is most interesting to compare the EKI values of the different age groups. Older people in the community (average age of 60) had an average EKI of 0.60, whereas adults (average age of 45 years) had a slightly higher EKI of 0.67. Children (average age of 15 years) had an EKI of 0.30. Comparative data from other rural localities are necessary to evaluate the full significance of these results but the method provides a tool for studying the broader patterns and persistence of ethnobotanical knowledge in the Cape region. Based on the experience gained in other surveys, we predict that the Agter–Hantam EKI values will prove to be relatively high, reflecting the fact that indigenous plants still make important contributions to the nutritional and medicinal needs of the Agter–Hantam community.

4. Conclusions

The new records of indigenous plant use revealed by this study show that the ethnobotany of the Hantam was incompletely recorded and that there is an urgent need to document this wealth of traditional knowledge in other parts of southern Africa, before it is lost forever. Khoi–San vernacular names still in everyday use (such as *aree*, *ghôba*, *ghôwa*, *kanni* and *karoena*) are of considerable historical and cultural interest. The new quantitative method described here may be a useful way of exploring the spatial patterns and the preservation of indigenous plant knowledge in a rigorous and comparable way. This study also highlights the need for a comprehensive and systematic account of Khoi–San ethnomedicine.

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