

Uses and conservation of some highland species of the genus *Sansevieria* Thunb in Kenya

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Abstract Approximately 75 species constitute *Sansevieria* Thunb, a tropical terrestrial genus of Asparagaceae Juss family. About 40 of these species are found in E.A, while 27 are endemic to Kenya. Information on ethnobotany and conservation of these species in Kenya is limited and in order to conserve wild plants they must carefully be documented. The selected species were: *Sansevieria suffruticosa*, *Sansevieria parva*, *Sansevieria raffillii* and *Sansevieria ehrenbergii* growing naturally in Nakuru and Maragua districts. Data was collected by means of a questionnaire and observation schedules. The results indicate that leaves of *S. suffruticosa* and *S. ehrenbergii* were valued for treatment of ear-ache (78%) and open fresh wounds (94%), while their rhizomes are used to treat snakebites (36%) and stomach ulcers (20%). The results indicate that *Sansevieria* fibres can be used for weaving (51%). Man is the main threat of *Sansevieria* species in the field destroying over (80%).

Key words: Conservation, ethnobotany, *Sansevieria* species

Résumé Approximativement 75 espèces constituent *Sansevieria* Thunb, espèces des terres tropicales et de la famille des Asparagaceae Juss. A peu près 40 de ces espèces sont trouvés en Afrique de l'est, tandis que le 27 sont endémique au Kenya. Information sur l'ethnobotanique et la conservation de ces espèces au Kenya est limitée et en vue de conserver les plantes sauvages devront être soigneusement conservées. Les espèces sélectionnées étaient : *Sansevieria suffruticosa*, *sansevieria parva*, *sansevieria raffillii* et *Sansevieria ehrenbergii* croissant naturellement dans Nakuru et Maragua districts. Les données étaient collectées par le biais d'un questionnaire et des observations. Les résultats indiquent que les feuilles de *S. suffruticosa* et *S. ehrenbergii* étaient indiqués pour être traités de douleur de l'oreille (78%) et les plaies fraîches (94%), alors que leur rhizomes étaient utilisés pour traiter les morsures des serpents (36%), les ulcères d'estomac (20%). Les résultats indiquent que les fibres de *Sansevieria* pourraient être utilisées pour tresser (51%). L'homme est la plus grande menace des espèces de *Sansevieria* dans les champs détruisant plus de 80%.

Mots clés: Conservation, ethnobotanique, espèce de *Sansevieria*

Introduction

Sansevieria is a genus of xerophytic, rhizomatous, evergreen perennial plants and is known variously as Bow-string Hemp, Snake plant, Zebra Lily, Mother-in-laws tongue, Cow tongue Agnew and Agnew (1974) and Konge mwitu in Kiswahili. The genus *Sansevieria* was established by Thunberg in 1774 and comprises 50 to 75 species according to Bryon (1950-51). It is chiefly confined to the African continent and the islands near its coast and Arabia Anonymous (1907). In Kenya, 19 species are recognised of which 8 are widespread and are found from the sea level to around 1800m (a.s.l).

In order to harness the use of Plant Genetic Resources (PGR), it is very important to know as much as possible about these plants. The data on *Sansevieria* are scanty on their ethnobotany and phenology Agnew and Agnew (1994); Mbugua (1995). In order to carry out comprehensive conservation strategies of *Sansevieria* plants they must be carefully documented Newton (1994). The complete documentation of ethnobotany of the genus *Sansevieria* has not been done.

The genus *Sansevieria* is important from the economic point of view for the numerous textiles species which it is comprised of Chahinian (1986, 1994-1996). Besides being

useful ornamental plants Pfenning (1979); *Sansevieria* species are important for their leaf fibres, which are used for matting, rope or cordage, hats, bowstrings and articles of clothing Dodge (1993). The medicinal uses vary from uses of leaf concoction for treatment of ear-aches, stomach-aches, tooth-aches, wounds, ulcers, and haemorrhoids to expelling of intestinal worms Kokwaro (1993). These accounts however do not state which specific species, what parts and how those parts can be used in any of the above ailments. The main objective of this study was to generate information concerning ethnobotany of *Sansevieria* species as well as record the disappearing traditional knowledge in order to conserve and promote sustainable utilization of *S. suffruticosa*, *S. parva*, *S. raffillii* and *S. ehrenbergii*.

Methodology

Study area. The study was carried out in two districts, namely Nakuru and Maragua districts of Kenya where *Sansevieria* species grow naturally in Rift Valley Province. In Maragua district of Central Province, Maragua and Makuyu divisions were selected to study *Sansevieria ehrenbergii* and *Sansevieria raffillii*. Households were sampled in Maragua Ridge and Kambiti sub locations of

Maragua and Makuyu divisions respectively. In Nakuru district Naivasha and Gilgil divisions were selected to study *Sansevieria suffruticosa* and *Sansevieria parva*. Households were sampled in Maai-Mahiu and Mbaruk sub locations of Naivasha and Gilgil divisions respectively.

The main survey. After identification of sites and households where *Sansevieria* grows naturally, the questionnaire and PRA tools were used to collect detailed information. Two districts were sampled using simple random sampling method. In Nakuru the sampled area in Maai-Mahiu sub location had about 1150 households and Mbaruk sub location had approximately 950 households (Republic of Kenya, 1999) of which 10% of each sub-location were sampled. In Maragua the sampled area in Maragua Ridge had 1000 households and Kambiti had 920 households (Republic of Kenya, 2001) of which 10% of each sub-location was sampled. The interviews started from the sub chiefs' camp, then to randomly selected households.

Questionnaires and interviews. Structured questionnaires were used for households using a modified PRA approach and instrument as applied by Nagel (1992). This had both open and closed ended questions and was administered with the help of a specimen of the species under study. A speaker of the local dialect also called an interpreter was hired for this part of data collection for each site.

The questionnaire was pre-tested on ten farmers to make sure that all the topics were adequately covered, relevant and phrased correctly. Necessary changes were made before the research work begun. The questions were asked in the local dialect and therefore the assistants were trained before administering the questionnaire so that the questions were correctly interpreted. In case a farmer was not found in the homestead, a call back card was issued. If not found a second time, then the farmer was replaced by a different one in the reserve list. Intellectual property rights were strictly adhered to for the benefits of the

stakeholders especially the locals who gave information on uses of *Sansevieria* species. The key issue is that data elucidate from the locals will only be used with their permission.

Results and discussions

There were twenty-four different reported uses by the respondents as shown in Figure 1 for all the four *Sansevieria* species that were broken down into five use categories as those described from previous ethnobotanical studies Johnstone and Colquhoun (1996). The specific use categories included medicine (33%), fibres (24%), soil conservation (22%), fodder (18%) and others 14%. The fibre use category includes- construction, folk products (baskets, straps, table mats and ropes) and threats for sewing clothes and sacks. Soil conservation category includes- live fence, ornamental, rehabilitation of degraded sites and stabilization of riverbanks while other uses includes cultural beliefs.

Benefits of *Sansevieria* species as perceived by local population. As shown in Table 1, farmers reported benefiting from *Sansevieria* species in several ways. They reported using *Sansevieria* species for medicinal, fodder, soil conservation, and fibres.

***Sansevieria* species used for medicinal purposes in Nakuru and Maragua Districts.** As shown in Table 1, it is apparent that *Sansevieria* species are used for treatment of various diseases in the study area. *Sansevieria suffruticosa* was highly valued for treatment of fresh wounds (95%), ear-aches (73%) and snake bites (55%) among others. The study found out from respondents that *Sansevieria parva* is valued for treatment of skin diseases (90%), fresh wounds (70%) and expulsion of intestinal worms (62%), ear-ache (52%) among others. *Sansevieria raffillii* was valued for skin diseases (72%) and ear-aches (36%) and finally *Sansevieria ehrenbergii* were best used for treatment of wounds (93%), ear-aches

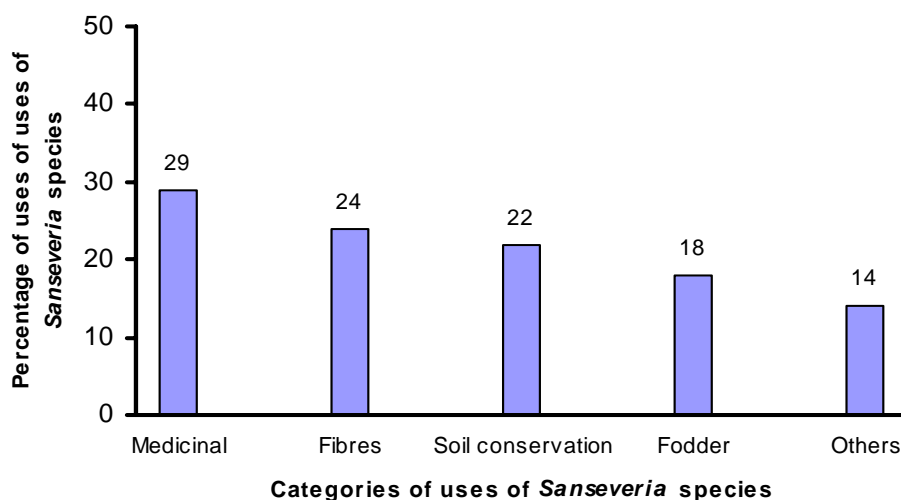


Figure 1. Uses of *Sansevieria* species in Nakuru and Maragua Districts.

(82%), and skin diseases (27%). This concurs with Tekateya (1995) who reported that *Sansevieria* leaves are wrung and the extracts are used medicinally in treatment of serious wounds such as loin and snake bites. The findings also concur with Kokwaro (1993) who reported that *Sansevieria* species are used in expulsion of intestinal worms, treatment of ear-aches, wounds and ulcers. The study found that some diseases were exclusively healed using *Sansevieria* species only e.g. ear ache, swollen skin, wounds and snake bites.

Impact of medicinal plant use on conservation of *Sansevieria* species. Different *Sansevieria* species were harvested for medicinal purposes. As shown in Table 2, it was found out that all the *Sansevieria* species were being used for treatment of various ailments. From field interviews, discussion and workshops 66% of the respondents reported that they were using the leaves *Sansevieria* species as follows: *S. suffruticosa*, 98% of *S.*

parva, and 76% of *S. raffillii* while 92% were *S. ehrenbergii* as shown in Figure 2 A few respondents reported that they use rhizomes of *Sansevieria* species for medicinal purpose. Most of the respondents use leaves (83%) and rhizomes (17%). They reported that they rarely use fruits or seeds for medicinal purposes. This is a practice that is lethal to a single leaf plant like *S. raffillii*.

Fibre uses of *Sansevieria* species in Nakuru and Maragua Districts. As shown in Table 3 it was found that *Sansevieria ehrenbergii* (44%) and *Sansevieria suffruticosa* (39%) were valued for their fibres which were used for making of folk items , tying, construction and washing of utensils. *Sansevieria raffillii* fibres were fairly used, while there was no reported use of *Sansevieria parva* fibres. They are also used for making ropes and fibres for fine matting, rope, bowstrings and articles of clothing (Chahinian, 1986). From group discussions it was revealed that *S. suffruticosa*, *S. raffillii* and *S. ehrenbergii* fibres

Table 1. Benefits of *Sansevieria* species as perceived by the local community in Maragua-Ridge, Kambiti, Maai-Mahiu and Mbaruk sub-locations.

Use categories of <i>Sansevieria</i> species	Percentage frequencies of respondents response on uses of <i>Sansevieria</i> species per sub-location																Average %
	<i>S. ehrenbergii</i>				<i>S. raffillii</i>				<i>S. suffruticosa</i>				<i>S. parva</i>				
	MR		KB		MR		KB		MM		MB		MM		MB		
	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	Frq	%	
Medicinal	14	14	26	28	24	24	19	21	70	61	25	26	22	19	33	35	29
Fibres	22	22	45	47	5	5	4	4	90	78	34	37	0	0	0	0	24
Fodder	1	1	11	12	6	6	12	13	19	17	24	25	19	17	51	54	18
Soil Conservation	28	28	36	39	10	10	12	13	51	44	43	45	1	1	0	0	23
Others	2	2	26	28	4	4	12	13	51	44	20	21	0	0	0	0	14
Average %	13		31		10		13		49		40		7		18		21

Key:
Frq = Frequency, MR-Maragua-Ridge, KM-Kambiti, MM-Maai-Mahiu, MB-Mbaruk.

Table 2. Different plant parts of *Sansevieria* species used for medicinal purposes in the study area.

<i>Sansevieria</i> species	Part of <i>Sansevieria</i> species	Method of extraction of <i>Sansevieria</i> species	Ailment treatment with <i>Sansevieria</i> species
1,2 and 3	Leaves	Squeezing	Tooth-ache-Man
1 and 4	Leaves	Squeezing	Ear-ache- Man
1,3 and 4	Leaves	Boiling	Lung diseases- Animals
1	Leaves	Boiling	Trypanomiasis- Animals
1 and 4	Rhizomes	Boiling	Gout- Man
1,2,3 and 4	Leaves	Warming in hot ashes-Pounding then applying on skin	Skin diseases- Man
1 and 4	Leaves	Squeezing	Wounds- Man
1 and 2	Rhizomes	Boiling	Ulcers- Man
1 and 3	Rhizomes	Squeezing	Snake bite- Man
1	Leaves	Boiling	Digest polythen paper in livestock- Animals
1 and 2	Leaves	Pounding	Expels intestinal worms from Livestock- Animals

Key:
1-*Sansevieria suffruticosa*.
2- *Sansevieria parva*.
3- *Sansevieria ehrenbergii*.
4- *Sansevieria raffillii*.

are tender, smooth and have a long life span. This result indicates that domestication of *Sansevieria* species could earn our country some revenue and help alleviation of poverty in Arid and Semi-Arid areas by sell of folk items to foreign countries.

Comparative of uses of *Sansevieria* Species in Maragua-ridge, Kambiti, Maai-Mahiu and Mbaruk sub-locations.

No significant differences ($P > 0.05$) in use of *S. raffillii* and *S. suffruticosa* was found. The results thus supports the hypothesis and that the communities in Maragua district share similar uses of *S. raffillii* with the communities in Nakuru district who use *S. suffruticosa* for medicinal and fibre.

Significant differences ($P \leq 0.05$) in use of *S. ehrenbergii* and *S. suffruticosa* in soil conservation and fodder were found. This means the respondents interviewed in Maragua district on knowledge of uses of *S. ehrenbergii* differed and are not similar. While the respondents interviewed in Nakuru district on knowledge of uses of *S. suffruticosa* for soil conservation and fodder similarly differed. This could be attributed to the fact that

one community depends more on *Sansevieria* species than the other.

Conclusions and recommendations

Eight uses of *Sansevieria parva* were enumerated by the respondents of Maai-Mahiu and Mbaruk sub-locations. More respondents knew use of *S. parva* as source of fodder for livestock and wildlife. This species is also used in treatment of diseases such as skin infections, ear-ache and expulsion of intestinal worms. Plant parts mainly used for treatment were leaves by squeezing out the sap directly to the affected area or pounding to apply the extracts to affected area. These plants were also valued as ornamental due to their leaves with bandings and sweet scented flower that opens at night. The respondents of Maai-Mahiu and Mbaruk enumerated twenty one uses of *S. suffruticosa*. This species was highly known for its fibre value for construction of structures, tying, and sewing, washing and making brooms among others. The leave sap was known for treatment of diseases such as ear-ache, wounds and rhizome powder for treatment of ulcers, gout and snake

Figure 2. Percentage of Plant parts of *Sansevieria* species used for medicinal purposes.

Table 3. Summary of items made from *Sansevieria* fibres per species in Nakuru and Maragua Districts.

Uses of <i>Sansevieria</i> fibres	Percentage of respondents response on items made of <i>Sansevieria</i> fibres				Average%
	<i>S. suffruticosa</i>	<i>S. parva</i>	<i>S. raffillii</i>	<i>S. ehrenbergii</i>	
Making fork items	75	0	12	70	39
Tying	72	0	13	75	40
Washing	24	0	0	70	24
Construction	80	0	30	90	50
Earrings	23	0	34	17	19
Necklaces	34	0	30	23	22
Toys	25	0	0	27	13
Sewing	12	0	0	12	6
Brooms	9	0	0	15	6
Average %	39	0	13	44	24

Table 4. Comparative of reported use of *Sansevieria suffruticosa* and *S. parva* at Maai-Mahiu and Mbaruk Sub-locations.

Use of <i>Sansevieria</i> species	Maai-Mahiu		Mbaruk		Chi-square (cal)	Chi-square (table)	df	Significance P>0.05
	Freq	%	Freq	%				
<i>S. suffruticosa</i>								
Medicinal	82	97	43	98	0.05	3.84	1	N/S
Fibres	80	95	43	98	0.58	3.84	1	N/S
Fodder	43	98	19	23	67	3.84	1	S
S. Con	51	61	43	98	346	3.84	1	S
<i>S. parva</i>								
Medicinal	22	71	42	82	27.6	3.84	1	S
Fodder	19	21	43	100	5.8	3.84	1	S

Table 5. Comparative of reported use of *Sansevieria raffillii* and *Sansevieria ehrenbergii* at Maragua-Ridge and Kambiti Sub-locations.

Use of <i>Sansevieria</i> species	Maragua-Ridge		Kambiti		Chi-square (cal)	Chi-square (table)	df	Significance P>0.05
	Freq	%	Freq	%				
<i>S. ehrenbergii</i>								
Medicinal	14	28	26	57	8.3	3.84	1	S
Fibres	22	57	38	83	17.52	3.84	1	S
Fodder	1	2	11	24	8.53	3.84	1	S
S. Con	28	36	36	78	6.63	3.84	1	S
<i>S. raffillii</i>								
Medicinal	24	49	19	41	0.17	3.84	1	N/S
Fibres	5	10	4	9	0.11	3.84	1	N/S
Fodder	6	12	12	26	2.45	3.84	1	N/S
S. Con	10	20	12	26	0.94	3.84	1	N/S

Key:

Freq-Frequency, Cal-Calculated, df-degree of freedom, S- Difference is Significant at P>0.05, S/ N-Difference is not significant, Soil con-Soil conservation.

bite among others. It's also known for soil improvement due to its adventitious roots and fence due to presence of thorns. The respondents of Maragua-Ridge and Kambiti knew seventeen uses of *S. raffillii* and the most reported use was medicinal where the species is used in treatment of skin infections, ear-ache and wounds among others. The plant parts mainly used were the leaves by direct squeezing to the affected part. Its fibres are used for necklaces and earrings while its rhizome is very poisonous. The respondents of Maragua-Ridge and Kambiti knew twenty uses of *S. ehrenbergii*. It was mainly valued for fibre and herbal medicine. The fibres were used for making household items, construction, tying and washing among others. The leave sap is used in treatment of ear-ache, lung diseases, and wounds while the rhizome sap is used in the treatment of snake-bite among others.

The government and non-governmental organisations should work closely with the farmers to promote conservation of *Sansevieria* species, which is the main solution and stop destruction as research on other uses

is undertaken. More research is needed to determine fodder nutritional value and chemical compounds which lead to treatment of diseases and better methods of *Sansevieria* briquette production.

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