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An ethnobotanical investigation of the annonaceae on Mount Cameroon

D. A. Focho^{1*}, E. A. Egbe², G. B. Chuyong², A. G. N. Fongod², B. A. Fonge², W. T. Ndam¹ and B. M. Youssoufa²

¹Faculty of Science, University of Dschang, P. O. Box 67, Dschang, Cameroon.

²Faculty of Science, University of Buea, P. O. Box 63, Buea, Cameroon.

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An ethnobotanical survey was carried out in the Mount Cameroon area, Southwest region of Cameroon to determine the uses of the different species of the Annonaceae. Ethnobotanical information was collected through the show-and-tell/semi-structured method and personal interviews during field trips. Eight villages were surveyed in the study: Njonji, Bakingili, Bomana, Mapanja, Likombe, Bwassa, Liwenni and Bimbia. Results indicated that 28 (68.3%) of the 41 species of Annonaceae present in the area are widely used by local people. Some 28 diseases are cured using 20 species. The barks and leaves of these species are the most commonly used plant parts. Seven other species provide wood used in the construction of houses and huts. These results show that there is need for protection of the Annonaceae in the region to ensure sustainability.

Key words: Annonaceae, ethnobotany, Mount Cameroon, diversity.

INTRODUCTION

The diversity of forests especially in plant life is an essential asset to both humans and animals as they depend directly or indirectly on these forests for survival. Humans currently use tens of thousands of plant species for multiple purposes such as food, fuel, fibers, oil, forage and medicine. Forest ecosystems render services of industrial, pharmaceutical, cultural and socio-economic importance to man contributing billions of dollars to the world economy (Mboh, 2001; WWF and IUCN, 1994). In the tropics alone, it has been estimated that 25 000 plant species are used in traditional medicines (WWF and IUCN, 1994).

The tropical rainforest of Mount Cameroon plays many important roles in the lives of the local inhabitants and in the Cameroonian economy as a whole. Not only does the forest provide a source of timber for commercial forest exploiters, but it also provides the local forest inhabitants with food, medicinal plants, hunting grounds, construction materials, fuel wood and many other non-timber forest products. This region is reputed for its biological diversity with several species of plants and animals being endemic

to it (Cable and Cheek, 1998).

The family Annonaceae commonly known as the "Soursop family" has for long been utilized by communities in forest areas where it is found (Letouzey, 1985). The economic importance of the Annonaceae is derived from the considerable range of non-timber products obtainable from its species. The non-timber products include kernels, edible fruits and medicines. The woods of some species are valued for fuel wood, furniture and in pharmaceutical research (Chatrou, 1998). The barks of others are used to produce ropes, straps and thongs (Letouzey, 1985). Although the family has been identified as one of the most important plant families in the region with regard to the usefulness of its species to the local communities, no ethnobotanical surveys have been conducted to assess this importance. The objective of this survey was therefore to study the ethnobotanical importance of Annonaceae species in the Mount Cameroon region.

MATERIALS AND METHODS

Location of the study area

Mount Cameroon is located in the Southwest Region of Cameroon

*Corresponding author. E-mail: derekfocho@yahoo.com.



Figure 1. Study area.

on the coastal belt of the Gulf of Guinea (Figure 1). It is the highest mountain in Central and West Africa, rising steeply from sea level to 4095 m at the summit. This huge volcanic mass has its long axis (about 45 km) running from SW to NE between $3^{\circ}57' - 4^{\circ}27' N$ and $8^{\circ}58' - 9^{\circ}24' E$; the peak is at $4^{\circ}7', 9^{\circ}10' E$ (Tchouto, 1996; Fraser et al., 1998; Ndam, 1998). The area has a humid tropical climate and the climatic pattern is modified by the topography from sea level to the top of the mountain. The annual rainfall of the mountain varies between 2085 and 9086 mm. The mean annual temperature is about $25^{\circ}C$ and this decreases by $0.6^{\circ}C$ per 100 m ascent (Fraser et al., 1998). The soils of the mountain are of volcanic origin and relatively fertile (Fonge et al, 2005). The mountain lies within the tropical rainforest of West Africa and shows a zonation of vegetation from sea level to the top. Species like *Rhizophora racemosa* and *Avicennia germinans* are found at sea level while *Triplochiton scleroxylon*, *Borassus aethiopica* and *Carapa dinklagie* characterize the montane forest. At the top the vegetation consists mainly of pioneer species like *Lanna welwitschii*, *Syzygium guineense* and *Musanga cecropioides*. This important forest area is presently subject to numerous human activities leading to its degradation and destruction.

Data collection and analysis

The field survey was conducted from March, 2004 - June, 2005.

Prior to the field survey visits were made to the different villages concerned and contacts established with the chiefs to solicit their help in the research. In each of the villages, a general meeting was convened during which the following issues were discussed: purpose of the survey, approach to be adopted, local participation, semi-structured interviews/discussions. Given the topography of the mountain, a reconnaissance mission was undertaken during which transects of 10×500 m were established at three different altitudinal ranges: low altitude (0 - 650 m), mid altitude (700 - 1800 m) and high altitude (above 1800 m). Five sites were established at the low and mid altitudinal ranges each and two sites at the high altitudinal range. Eight villages were surveyed: Njonji, Bakingili, Bomana, Mapanja, Likombe, Bwassa, Liwenni and Bimbia. The field team in each of the villages consisted of traditional healers, herbalists, guides knowledgeable of the uses of plants in the region of study and the researchers themselves. To determine the uses of the various species, the show-and-tell/semi-structured method was used. A questionnaire was prepared to obtain information on local names of identified plants, their local uses and importance. Also for those that had medicinal uses, the diseases treated, mode of preparation and administration were noted. For villagers, elderly persons and other traditional healers and herbalists in the village, photographs and fresh plant specimens from the field were presented to them and questionnaires were filled from their responses. Interviewees were chosen without distinction of gender after seeking the consent from each respondent. People from all

age groups, except children below 18 years were interviewed on their knowledge about the uses of the Annonaceae presented to them. The random sampling technique was used and a total of 160 questionnaires were distributed out to 108 males and 52 females. Specimens were collected, pressed and dried following the stipulations of Olorode (1984). Identifications were later validated in the herbarium of the Limbe Botanic Garden (SCA) and the Cameroon National Herbarium (YA). Voucher specimens were deposited in the University of Buea Teaching Herbarium. The data collected included local names of the plants, uses, plant parts used, origin and availability. For the medicinal Annonaceae information was obtained regarding method of preparation of remedies and mode of administration.

Data on plant species, uses, origin, availability, and vernacular names and diseases treated were entered into excel worksheets where frequencies and abundances of the species were worked out. Data regarding plant uses were summarized as proposed by Cook (1995). The frequencies of occurrence of species were calculated in percentages per transect. Species present in 40 - 100% of transects were termed available, 20 - 40% were occasional or few and less than 20% were rare.

RESULTS

A total of 41 species belonging to 20 genera of the family Annonaceae was recorded in this study. Table 1 shows that 13 of them did not have any local uses while 28 of them were used locally. Twenty-eight of the 41 species (68.3%) are considered to be rare in the area. These rare species include important medicinal plants such as *Annona senegalensis*, *Greenwayodendron suaveolens*, *Uvaria baumannii*, *Piptostigma fasciculata*, *P. multinervum*, *P. pilosum* and several *Xylopi* species. Other rare species provide materials for the construction of houses. For example, *Xylopi quintasii*, *X. rubescens* and *X. staudtii*. *Uvariopsis* species growing in the region are used to fabricate handles of local guns used for hunting and during traditional ceremonies. Table 1 also reveals that medicine, construction of houses and carving were the most common uses of the Annonaceae in the region. Twenty of these plants were used to treat some 28 diseases affecting the population. The bark of trees with 205 citations was the most used plant part in medicine followed by the leaves (55) and fruits (45) respectively. The sap, seeds and roots were the least medicinally used plant parts (Figure 2). The methods of preparation of medicines were mostly decoctions (171 citations), powders (78 citations) and juices (32 citations) while macerations, infusions and concoctions were seldom employed (Figure 3). Treatments were administered topically, orally, by inhalation and as steam baths. The oral route was the most frequently used route of administration (182 citations) followed by topical application (78 citations) (Figure 4).

DISCUSSION

This survey has shown that the inhabitants of the surrounding villages of Mount Cameroon depend on

these enumerated species of the Annonaceae for their livelihood and provision of basic health care. Among the 41 species identified in this area, 28 of them were employed by the local population either for medicines or other local uses for livelihood (Table 1). The different local uses include construction of houses and huts, sawing of planks, carving of paddles for canoes, ornamentals and carving of gun handles. Most of the population at low altitude is along the sea and practice fishing which explains why *Xylopi acutiflora* is highly used for production of canoe paddles. Also, the construction of plank houses and huts is a common practice in these villages thereby explaining why some species like *Friesodelsia enghiana*, *Monodora crispata*, *Pachypodanthium staudtii*, *Xylopi acutiflora*, *Xylopi rubescens* and *Xylopi staudtii* are over-exploited in this area. Some of the resistant tree species like, *Xylopi rubescens* and *Xylopi staudtii* used for hut construction have as well become rare. Because of the multifunction of some of the species, they are either cultivated in homes as ornamental plants or in gardens for their fruits. These include *Greenwayodendron suaveolens*, *Monodora crispata* and *Monodora myristica*. The food plants encountered in this study either produce fruits (*Annona senegalensis*, *Piptostigma fasciculata*, *Uvaria baumannii* and *Uvarioidendron connivens*) or seeds that are used as spices in soups (*Monodora brevipes*, *Monodora myristica* and *Monodora tenuifolia*). Others were used for household equipments like the production of local guns (*Uvarioidendron connivens*, *Uvariopsis barkiana*, *Uvariopsis dioica* and *Uvariopsis korupensis*).

Traditional medicine is very popular with rural dwellers particularly in the villages around Mount Cameroon. Plant medicines are generally the first resource for rural households, and the people only turn to orthodox medicine when it fails to treat the disease (Azeke, 2002). Some 20 species of Annonaceae were used in these villages to treat 28 different diseases. The barks of trees (205 citations) were the most used plant parts, followed by the leaves (55 citations) and fruits (45 citations) while the seeds, sap and roots were the least used plant parts (Figure 2). The high utilization of stem barks, leaves and fruits could be due to the availability of these parts. They have also been reported to be over-exploited in traditional medicines by Okoegwale and Omefezi, 2001; Focho et al., 2009a; Focho et al., 2009. Also depending on the different modes of preparation of medicines, decoctions were the most used with 171 citations and macerations were the least used with only 10 citations (Figure 3). The modes of application of remedies are mostly internal or external. Internal application is through the oral route or by inhaling vapour from decoctions, concoctions or infusions. This form of administration is common for remedies against malaria, yellow fever, diarrhea, dysentery, cough and anti-poisons. External administration involves steam baths, compressing (plant part is crushed and applied directly on the skin), rubbing

Table 1. Ethnobotany of Annonaceae species of Mount Cameroon.

Scientific name	Local name	Observation	Traditional uses	Parts used in medicine	Diseases treated	Preparation/ administration	Frequency
<i>Annickia chloranta</i> (Oliv.) Setten and P.T. Maas	Mfo'o, Njie (Ntoumou)	Available	Medicine	Bark	Sores Ulcers, fevers, tuberculosis, vomiting, jaundice and urinary tract infection Rheumatism and fatigue.	Powder is applied on the sore Decoction is taken orally Decoction is used as hot bath	8
<i>Annona senegalensis</i> Persoon	Mvié élé	Rare	Fruits are eaten	Bark Fruits	Fever and Dysentery Diarrhoea and dysentery	Decoction is taken orally Decoction is taken orally	9
<i>Annonidium floribundum</i> Pelegr	Eboum, Libanga (Ntoumou) Ebom	Available	Fruits are eaten by animals	Roots Root / Bark Leaves	Poison antidote Dysentery and fevers	Decoction is taken orally Infusion or decoction is taken orally.	16
<i>Artabotrys arantiacus</i> Engl and Diels	-	Rare	none	-	-	-	-
<i>Artabotrys rhopalocarpus</i> Le Thomas	Lonkosso (Ntoumon)	Rare	Medicine	Sap	Aphrodisiac	Drink sap	1
<i>Artabotrys velutinus</i> Scott-Elliot	-	Rare	none	-	-	-	-
<i>Boutiquea platypetala</i> (Engl and Diel) Le Thomas	-	Rare	Medicine	Leaves	Fresh wounds	Leaf juice is applied locally	15
<i>Friesodelsia enghiana</i> (Diels.) Verde	Lonkosso (Ntoumou)	Available	-	Bark	Body pains	Decoction of bark is taken orally.	19
<i>Friesodelsia gracilipes</i> (Benth.) V. Streenis	Lonkosso (Ntoumou)	Available	Construction of houses Medicine	Bark	Sores, ulcers, leprosy, skin diseases and jaundice	Decoction is taken orally	11

Table 1. Continued.

<i>Friesodelsia montana</i> (Engl and Diels) V. Steenis	-	Rare	none	-	-	-	-
<i>Greenwayodendron suaveolens</i> (Engl and Diels) Verde	Otounga (Ntoumou)	Rare	Ornamental Medicine	Root	Aphrodisiac and vermifuge	Chew roots	17
				Leaves/ bark	Rheumatic pains, fevers, headache, stomach-ache	Pulverized leaves or bark mixed with seeds of <i>Aframomum melegueta</i> and oil is eaten	
				Bark	Headache	Juice is used in nasal inhalation	
<i>Isolona zenkeri</i> Engl.	-	Rare	none	-	-	-	-
<i>Meiocarpidium lepidotum</i> (Oliv.) Engl. and Diels	-	Rare	none	-	-	-	-
<i>Mischogyne elliotanum</i> (Eng and Diels) R. E. Fries	-	Rare	none	-	-	-	-
<i>Monathotaxis foliosa</i> ((Engl and Diels) Verde	-	Rare	none	-	-	-	-
<i>Monodora brevipes</i> Benth.	Nom nding bilobi	Available	Seeds as spices in soups Medicine	Bark Seeds	Purgative	Decoction is taken orally	9
<i>Monodora crispata</i> Engl and Diel	African nutmeg, Ebom osoé	Available	Ornamental, Construction of houses, seeds as spices in soups				
<i>Monodora myristica</i> (Gaertn.) Dunal	Ebom osé	Available	Ornamental, Medicine Seeds as spices in soups	Bark	Haemorrhoids, stomach ache, and febrile pains	Decoction is taken orally	14

Table 1. Continued.

<i>Monodora tenuifolia</i> Benth	Ebo osé	Available	Seeds as spices in soups	Root Root/Bark	Toothache Dysentery and fevers	Used as toothbrush Decoction is taken orally and as enema	17
<i>Pachypodanthium staudtii</i> (Engl. and Diels) Engl. and Diels	Ntuen, Ntom	Available	Construction of houses, Fruits are eaten by monkeys	Bark	Cough Arrow poison	Decoction is taken orally Pulverized bark is added to poison mixture.	3
<i>Piptostigma fasciculata</i> (De Wild,) Boutique	-	Rare	none	-	-	-	
<i>Piptostigma multinervum</i> Engl. and Diels	-	Rare	Medicine	Bark	Arrow poison	Pulverized powder is added to arrow poison mixture	7
<i>Piptostigma pilosum</i> Oliv.	-	Rare	Fruits are eaten by monkeys Medicine	Bark	Arrow poison	Pulverized powder is added to poison mixture	11
<i>Polyceratocarpus parvifolrus</i> (Bak.f.) Ghesq.	-	Rare	Medicine	Bark	Wounds Stomach ache	Administered as a poultice topically. Decoction is taken orally and as enema	5
<i>Uvaria anonoides</i> Bak.f.	Iju oko'oaje (Igbo)	Rare	Medicine	Root	Yellow fever	Decoction is taken orally	5
<i>Uvaria baumannii</i> Engl and Diels	-	Rare	Edible fruits, Medicine	Leaves Bark	Fever and jaundice. Gonorrhoea, cough, bronchial trouble and stomach ache. Old wounds	Concoction with pepper is taken orally Decoction is taken orally. Administered as a poultice topically	12

Table 1. Continued.

<i>Uvariastrum insculptum</i> (Engl and Diels) Spr. and Hutch	-	Rare	none	-	-	-	-
<i>Uvariastrum pynaetii</i> De Wild	-	Rare	none	-	-	-	-
<i>Uvariastrum zenkeri</i> Engl. and Diels	-	Rare	none	-	-	-	-
<i>Uvari dendron connivens</i> (Benth.) R. E. Fries	Igbere (Bakweri) Kwaadu (Ntoumou)	Available	Fruits are edible, Medicine, Production of local guns	Leaves	Fevers	Steam bath	10
<i>Uvari dendron fuscum</i> (Benth.) R. E. Fries	-	Rare	none	-	-	-	-
<i>Uvari dendron giganteum</i> (Benth.) R. E. Fries	Igbere (Bakweri)	Available	Medicine	leaves	Fevers	Steam bath	20
<i>Uvariopsis barkeriana</i> (Hutch. and Dalz.) Robyn and Ghesq.	Ntala	Rare	Handles of local guns Fuel wood	-	-	-	-
<i>Uvariopsis dioica</i> (Diels.) Rob. and Ghesq.	Ntala	Rare	Handles of local guns	-	-	-	-
<i>Uvariopsis korupensis</i> Gereau and kenfack	Ntala	Rare	Handles of local guns Medicine	Bark	Fevers	Decoction of bark is taken orally	14
<i>Xylopi a acutiflora</i> (Dunal.) A. Rich	Mbungu (Bakweri) Owongo (Ntoumou)	Available	Paddles for canoes and construction of houses. Medicine	Bark	Pneumonia and febrile pains	Decoction of bark is taken orally	11

Table 1 Cont.

<i>Xylopiya africana</i> (Benth.) Oliv.	Hweneta (Ghana)	Available	Medicine	Fruit / Bark Bark	Bronchitis, dysentery and febrile pain Asthma, stomach ache and rheumatism	Decoction of fruits or bark is taken orally. Maceration of pulverized bark in palm wine is taken orally.	10
<i>Xylopiya hypolampra</i> Milbbr.	Ndong ele, Akoi (Ntoundou)	Rare	Medicine	Bark Fruits	Pneumonia and febrile pains Childbirth, stimulant and hemorrhagia	Decoction of bark is taken as a purgative orally. Chew the fruits.	8
<i>Xylopiya quintasii</i> Engl. and Diels	Odjobi, odjobi nzam (Ntoundou)	Rare	Construction of houses Medicine	Bark Fruit	Pneumonia and febrile pains	Powder is eaten.	4
<i>Xylopiya rubescens</i> Oliv.	Odjobi, Odjobi nzam, Ntom (Ntoundou)	Rare	Construction of houses	-	-	-	-
<i>Xylopiya staudtii</i> Engl. and Diels	Ntom, Odjobi (Ntoundou)	Rare	Construction of houses. Medicine	Bark	Colds and headache	Powder is eaten.	11

(plant parts are crushed and mixed with water or oil and rubbed on the body). These modes of application are commonly used in swellings, fractures, abscesses, skin diseases and wounds (Figure 4).

Considering the different plant species that were used, *Uvariadendron giganteum* (20 citations) was the most used plant. It was used as steam bath for treatment of fevers. The other most used plant species were *Friesodelsia enghiana* (19 citations) for treatment of body pains, *Monodora tenuifolia* (17 citations) for treatment of dysentery,

toothache and fevers, and *Annonidium floribunda* (16 citations) as poison antidote and treatment for fever and toothache. Among the multipurpose medicinal plants was *Annickia chloranta* that enters in numerous medical preparations. The bark powder is applied on sores, decoctions taken orally for fevers, tuberculosis, vomiting, jaundice and urinary tract infection while a hot bath with the decoction is used to treat rheumatism and fatigue. Also, similar uses have been reported in South East Benin where the bark juice is used to treat wounds, ulcers, leprosy, rheumatism, stomach

and gall-bladder problems (Gessler et al., 1994). A decoction of the bark is taken for fatigue and by mouth and vapour baths for rheumatism, intercostals pain and to facilitate conception (Bouquet, 1969). The bark of *Greenwayodendron suaveolens* is considered to be a purgative and is either used as an aqueous extract or as a powder for constipation and hernia, and also to facilitate childbirth and treat female infertility (Aubréville, 1959). In addition to the uses of *Pachypodanthium staudtii* for arrow poison and treatment of cough, other uses have been reported in other parts of

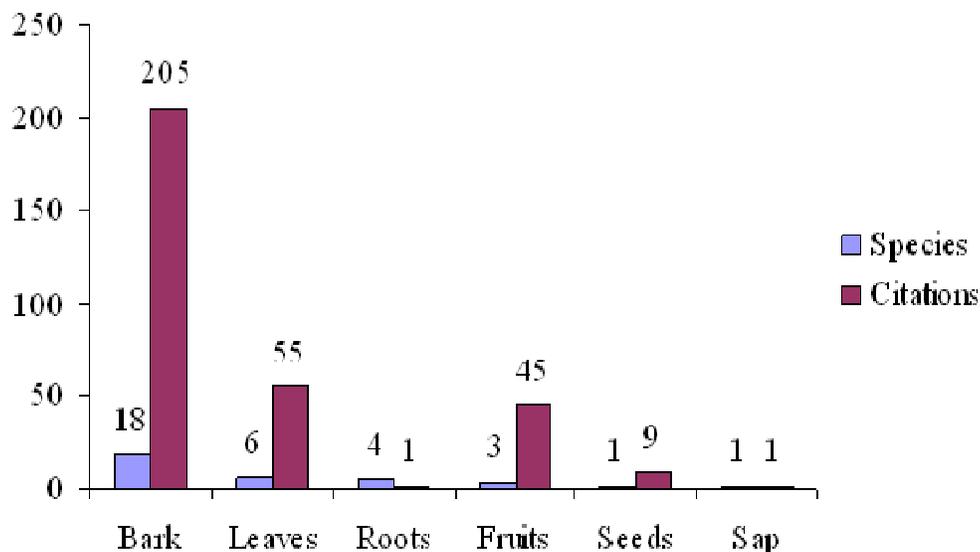


Figure 2. Parts of plants used as medicine.

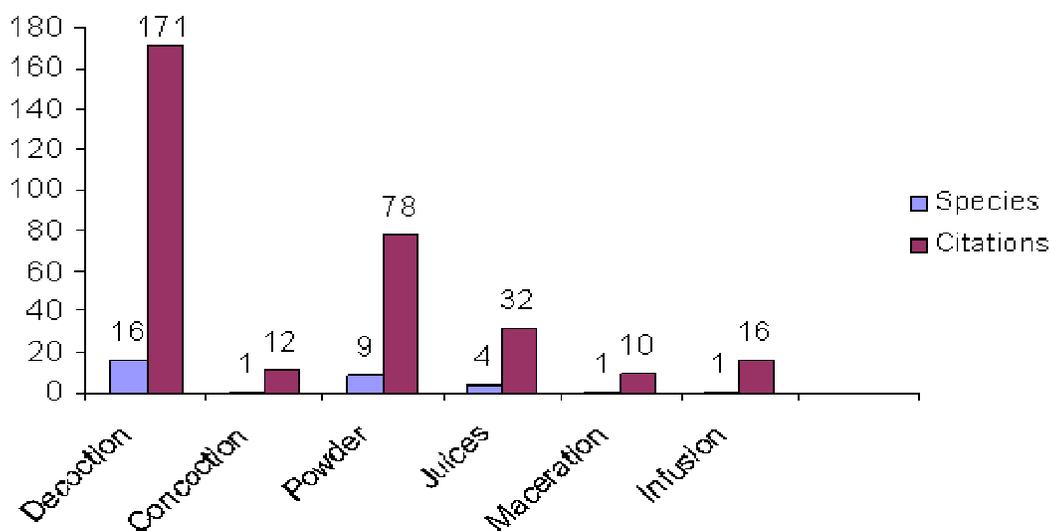


Figure 3. Modes of preparation of remedies.

Africa. In Ghana, the bark decoction is used for lower abdominal pains and for benign tumours (Sarpong et al., 1990). The fruits of *Xylopia quintassi* are eaten to assist in childbirth and taken for mucous discharges such as bronchitis and gonorrhoea (Burkill, 1988). Burkill (1988) also reports that pieces of the bark of this species are used to make hut-walls.

In addition to the different medicinal uses of the Annonaceae species in this study, the leaves of *Annona senegalensis* are used to treat dystosia in the Northern Region, the stem bark of *Monodora myristica* is used as a panacea for witchcraft in Akwaya in Southwest Cameroon, *P. staudtii* is used by the Ewondo people in

the Centre Region for filariasis and the bark of *Polyathea sauveolensis* is used by Mankon people in the Northwest Region to treat dysmenorrhoeal (Adjanohoun et al., 1996).

The medicinal uses of some of the plants have been verified and validated in anterior phytochemical studies. The methanol extract of the stem bark of *Annona senegalensis* has been shown to have antidiarrhoeal properties both *in vivo* and *in vitro* (Suleiman et al., 2008). Ajaiyeoba et al. (2006) have also reported that methanol extracts of leaves of *A. senegalensis* have intrinsic antimalarial properties that are dose-dependent. Annonaceous acetogenin extracts have been shown to be very active against chloroquino-resistant strains of

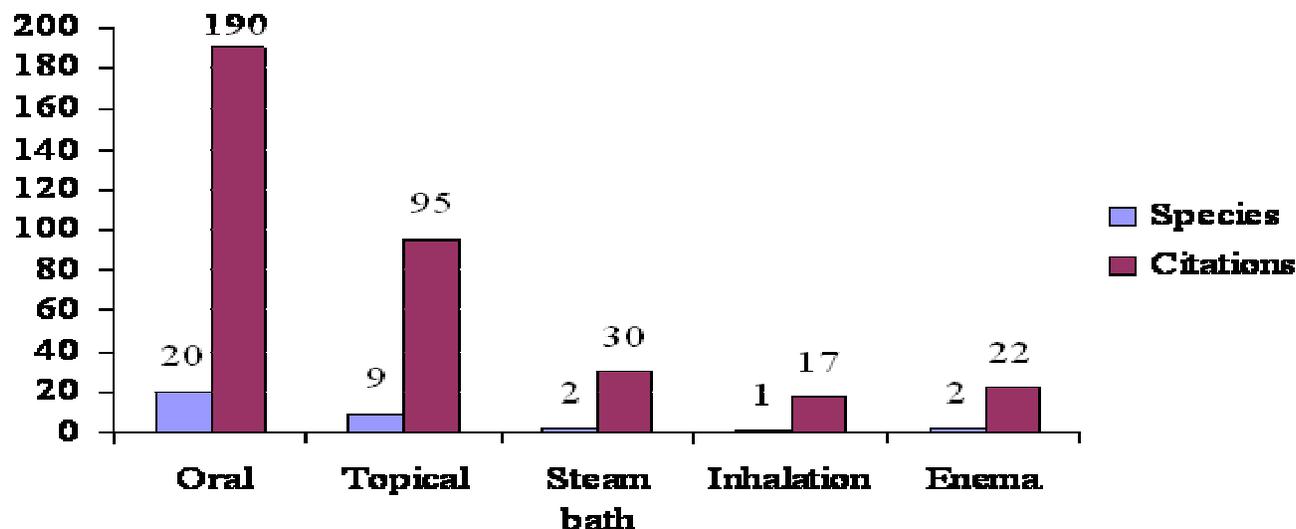


Figure 4. Modes of administration of remedies.

Plasmodium falciparum (Fall et al., 2003). These reports therefore confirm the use of the plant locally for the treatment of fever, dysentery and diarrhoea. Antibacterial indolosesquiterpenes and suaveolindole extracts from *Greenwayodendron suaveolens* have been shown to possess significant antibacterial activity against Gram-positive bacteria (*Bacillus subtilis*, *Staphylococcus aureus*, and methicillin resistant *Staphylococcus aureus*) (Yoo et al., 2005), thereby explaining the use of this plant for stomachaches. The essential oils from *Monodora myristica* have been shown to have antibacterial and antifungal activity (Tatsadjeu et al., 2003). This explains its use in the treatment of stomachaches. Some of the plants have been shown to have other activities. For example, *P. staudtii* produces oliverine which exhibits microfilaricidal activity against female *Onchocerca volvulus* (Titanji et al., 1990), thereby validating its use by the Ewondo people for the treatment of filariasis.

Conclusion

This study reveals that many of the species of the Annonaceae growing in the Mount Cameroon region are of significant ethnobotanic importance. The few (13) species that were not identified as useful may be useful elsewhere in the tropics. Almost all of the useful species in the region are used in traditional medicines. It is suggested that management strategies be developed in the region to ensure the sustainable exploitation of species of the Annonaceae.

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