

Full Length Research Paper

Ethnobotany of acanthaceae in the Mount Cameroon region

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A study was conducted on the ethnobotany of the Acanthaceae in the Mount Cameroon region in the South West Region of Cameroon. An inventory of identified Acanthaceae used by different individuals and traditional medical practitioners (TMPs) was established from information gathered through interviews, well semi structured questionnaires and data analyzed based on the focus data collection strategy. The research yielded 18 plant species used for treating different diseases and 16 species with ornamental potentials and qualities out of the over seventy species of Acanthaceae identified. Three age groups; 20 to 29, 30 to 49 and ≥ 50 years were identified, with the highest number of respondents being above 50 years (68%) and the least 20-years old (10%) indicating that the older individuals believe and are more involved in using plants in the treatment of different ailments. The survey revealed that 32% of species were being used medicinally, while 76% were employed or being used for food, rituals, forage and hunting. The most used plant part was the leaf. Most of the plants were being used to treat more than one disease and some were also used in combination with others to which the TMPs alluded that, there was increased efficacy. The species with the highest frequency of use was *Eremomastrax speciosa* Hotsch. with 29 respondents followed by *Acanthus montanus* (Nes.) T. Anders. The study reveals the medicinal, socio-cultural and other important uses of the Acanthaceae in the Mount Cameroon Region and a need for proper investigation of the medicinal potentials of these plants. The extensive use of these plants by the population warrants their conservation.

Key words: Ethnobotany, Acanthaceae, traditional medical practitioners (TMPs), inventory, medicinal plants.

INTRODUCTION

Ethnobotany is the study of how people of a particular culture and region make use of indigenous plants. This explores how plants are used as food, shelter, medicine, clothing, hunting and traditional ceremonies. According to the Conservation of Biological Diversity, ethnobotany acknowledges the close relationship between individual people and their lands and the critical importance of their knowledge of their local environment and biological resources. Mount Cameroon is one of the centers of plant diversity in the world in terms of food, timber and medicinal plants as well as many endemics (Davis et al., 1994).

The Acanthaceae (Acanths) derived from *Acanthus* are

made up of 221 genera and 4000 species (Scotland and Vollesen, 2000). The family is known from a variety of very diverse tropical and subtropical habitats, and its four main centers of distribution are Indo-Malaysia, Africa, Brazil and Central America. It is composed of mainly annual and perennial herbs, shrubs and climbers, but also includes some large trees. The leaves are simple, opposite, estipulate and usually entire-margined, with round to quadrangular stems. The leaf margins are entire, serrated or dentate and they have solitary or racemose inflorescence (Ben, 1980; Lucinda et al., 2000). Cystoliths (deposits of calcium carbonate) are characteristics of some taxa, with some produced or

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appearing as streaks on leaves. Flowers are in spikes, racemes or cymes, large and showing involucre bracts that are fairly characteristic, with tubular gamopetalous corolla, 1-2-lipped or 5-lobed, stamens 2 or 4, inserted on corolla, anthers 1- or 2-theous, with thecae together or one above the other. Ovary is superior, 2-locular with (1-)2(-3 or more) ovules in each loculus. The fruit is a loculicidal capsule, often explosively dehiscent. Some of the familiar genera in addition to *Acanthus* are *Justicia*, *Thunbergia*, *Ruspolia*, *Barleria* and *Ruellia*. Many species are popular ornamentals and others like zebra plant and nerve plant are commonly grown as house plants. Acanths are mostly considered as weeds and are invasive in some parts of the world (Cuba and Sutton, 2008). This family is classified under the order Lamiales and clade Euasterids (APG III, 2009; Haston, 2008). Inhabitants are not aware of their virtues as ornamentals as well as medicinal plants.

Most, if not all, non-native alien plant species of the family Acanthaceae, found in tropical islands were intentionally introduced as garden ornamentals because of their showy coloured flowers, bracts or leaves. Some have 'escaped' gardens and have naturalized in human-disturbed areas as weeds, adventives, or ruderal species. A few species have successfully invaded secondary and relatively undisturbed native wet forests (Meyer and Christophe, 2004). Acanths are widely used in horticulture for their numerous flowers or bracts with showy colours and/or for their variegated or bicolorous foliage (for example, *Graptophyllum pictum*, *Hypoestes phyllostachya*, *Pachystachys lutea*, *Pseuderanthemum carruthersii* var. *artropurpureum*, *Strobilanthes dyerianus*, *Thunbergia mysorensis* are among the most well-known tropical species).

Members of the Acanthaceae are very important to both man and animals. They are used as food and medicine. In many parts of Africa some species are used to feed goats and pigs. In Kenya, some members provide fodder grazing for animals especially goats (Burkill, 1985). Species of Acanthaceae play an important ecological role because many different classes of pollinators, from bees, butterflies, hawkmoths, hummingbirds, sunbirds and bats depend upon their nectar and pollen for survival (Adjonohoum et al., 1996). Kouao et al. (2008) concluded that the Acanthaceae could be used as bio-indicators to proxy the spatial distribution of plant communities.

A wide variety of essential, medicinally active ingredients have been identified and extracted from some members of the family. Many scientists have worked on some members of the family and have discovered some very essential active ingredients present in them. Patra et al. (2009) investigated the inflammatory activity of *Hygrophilla spinosa* T. Anders leaves in rats where they reported that leaves of *H. spinosa* actually have antiinflammatory and antipyretic activities on rats. *Thomandersia hensii* De Wild and Th. Dur has been

reported to have antimalarial activity in crude extracts in Cameroon (Jean et al., 2007). Dabasish et al. (2009) also studied the hepatoprotective effect of *Hygrophilla diformis* roots against paracetamol induced hepatotoxicity in rats. Julius and Sheila, (2006) investigated the effect of *Eremomastax speciosa* on diarrhea. The leaves are the most important parts in the plants. The flowers of *Barleria eranthemoides* are nectariferous and are often sucked by children for the sweet nectar to get the honey in Kenya. The leaves are used in laundry as they contain oil, it is said that there is no need to use pomade hence the 'Acan' name which means 'it washes' (Mabberly, 2008).

Cable and Cheek (1998) placed the Acanthaceae as the sixth most abundant family in the Mount Cameroon region. Indigenous people around the world have sought knowledge of physical reality throughout the ages. Their understanding of physical universe is codified in their indigenous knowledge systems, a major component being their ethnobotanical knowledge which is a cumulative body of traditional knowledge, the interaction between human societies and the plant kingdom, more specifically, how indigenous people perceive, manage and utilize plants around them (Suminguit, 2005). Ethnobotanical documentation is one way of capturing this body of knowledge in written and graphic form, and can serve effectively to improve the living conditions of indigenous communities without degrading the environment (Alfredo, 2002). It can also be used to increase and enhance livelihood options, revitalizing agriculture, increase food security, improve health and promote a sense of cultural pride within the community.

It is of common knowledge that a plant of known economic importance (such as food, folk medicine, shade etc) to a region is often not easily destroyed when clearing for agricultural or building purposes (Jiofack and Ayissi, 2006). With all the advances made in modern medicine, the practice of traditional medicine, as an adaptive self-reliant effort, is still very much alive and playing a very important role in the health care of Cameroonians.

The World Health Organization (WHO) (2003) defines traditional medicine as practices, knowledge and belief systems which use minerals, plants and animal based remedies, spiritual therapies and exercise to prevent, treat and maintain wellbeing. A medicinal plant is any plant, in which one or more of its organs contain active ingredients which can be used for therapeutic purposes or contain foundation compounds that can be used for synthesis of useful drugs (Sofowora, 1993). The absence of reliable and affordable healthcare has caused a high proportion of the population especially members of the local community to rely on medicinal plants for good health. It is therefore necessary to properly identify and document the medicinal uses of these plants to ward off the incorrect use of these plants. Acanths are mostly considered as weeds and are invasive in some parts of the world (Cuba and Sutton, 2008). Sven et al. (2006)

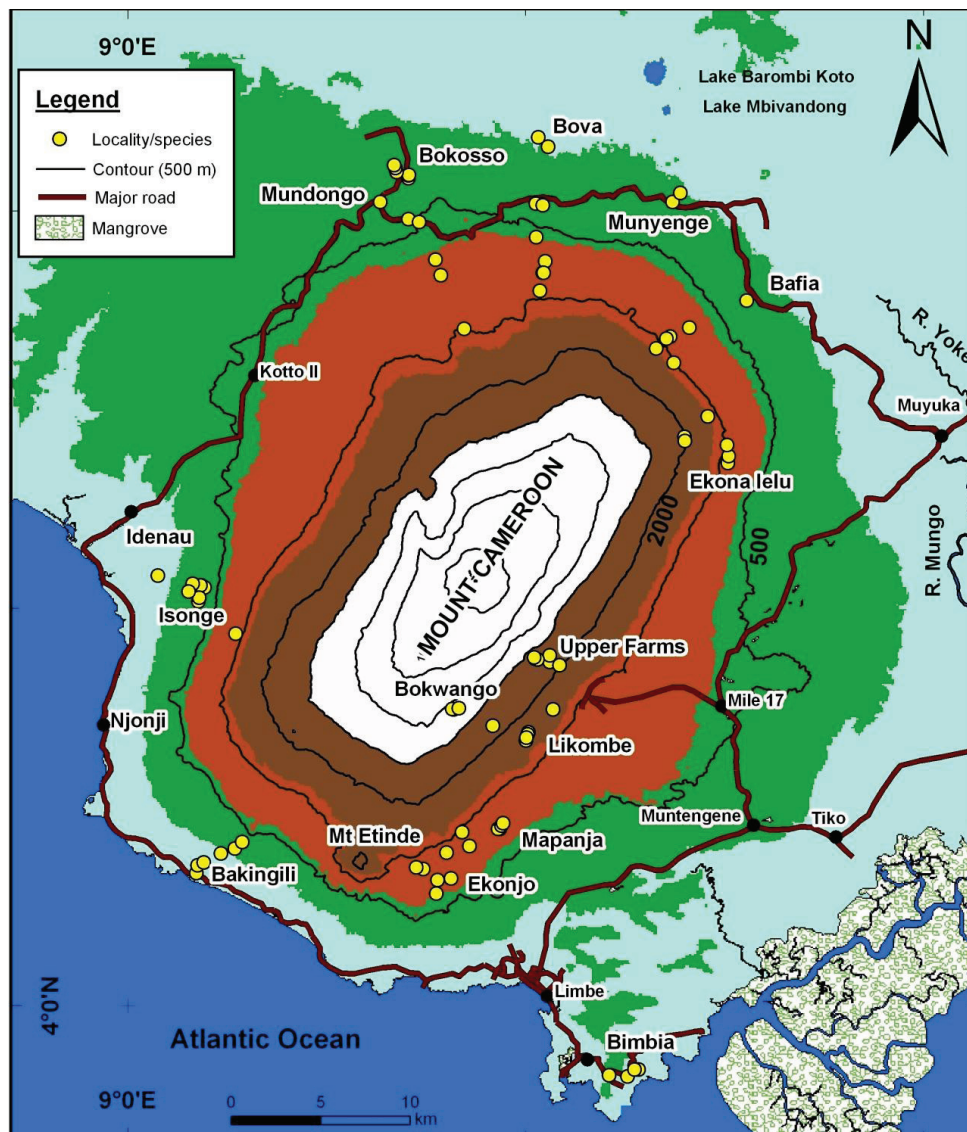


Figure 1. Map of study area.

during their explorations discovered a new species of Acanthaceae, *Acanthus greuterianus* from N.W Greece. Cameroonians are yet to recognize the intrinsic virtues of these plants as ornamentals, therapeutic, as well as cultural. The research therefore sought to carry out an ethnobotanical survey of members of the Acanthaceae in the Mount Cameroon region in order to identify and document the ethno botanical uses.

MATERIALS AND METHODS

The study was carried out in the Mount Cameroon Region, located on the coastal belt of the Gulf of Guinea (Central Africa) in the South West Province of Cameroon (Figure 1). It lies between latitudes 3° 57' and 4° 27' N and longitudes 8° 58' and 9° 25' E (Tchouto, 1995). The region is roughly ovate and covers approximately 2,700 km² encompassing the main massif which is

about half the total area 1,500 km² and a submit at 4095 m.a.s.l (Cable and Cheek, 1998). The mountain has a strong influence on climate causing a considerable orographic rainfall especially on the rain bearing windward western side of the mountain where mean annual rainfall is maximum, reaching 10,000 mm in Debundscha and slowly decreasing in an easterly direction to less than 2000 mm. Temperature varies more on the west slopes (24 to 28°C) than on the east slopes (27 to 28°C). Relative humidity, as rainfall and temperature decrease with altitude (Tchouto, 1995; Cable and Cheek, 1998; Ndam et al., 2001). The mountain, by virtue of its volcanic origin, has soils that are first class for agriculture except recent lava flows that have poorly evolved mineral soil (Cable and Cheek, 1998). On the mountain, there exist critical elevations at which there are discontinuities in vegetation or flora: 800, 1500, 2300, 3000 and 4000 m (Lovett, 1996). Forest vegetation goes up to only about 2000 m a.s.l. giving way to savanna (Cable and Cheek, 1998) (Figure 1).

There are three distinct areas, each with its own distinct characteristics and each with unique species. They include the Southern Bakundu Forest reserve to the North, secondly the

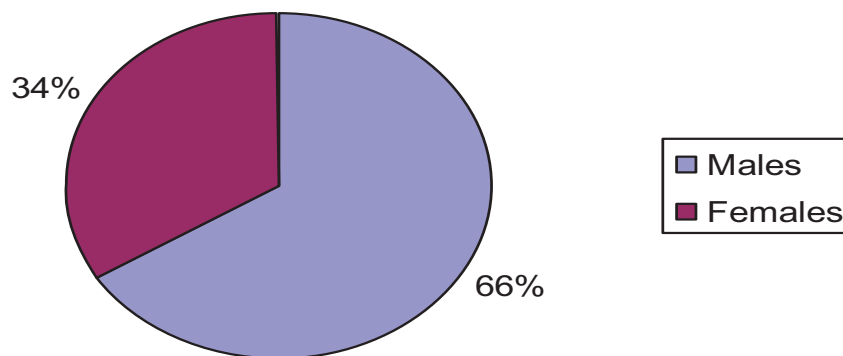


Figure 2. Percentage male and female Respondents.

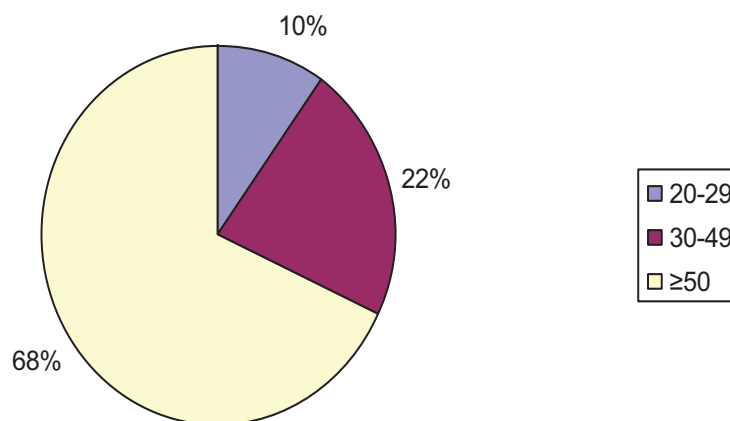


Figure 3. Percentage age in respondents.

Western foothills forests of Onge and Mokoko, thirdly the eastern foothills of the Mabeta-moliwe (Bimbia-Bonadikombo) reviewed by Cheek (1992).

A total of sixteen villages were selected for this research. To the North, sites included Munyenge, Mundongo, Ekona Lelu, Bokoso and Bafia and to the South, Bakingili, Ekonjo, Mapanja, Batoke and Wututu. To the West, Idenau and Njongi and to the East, Likoko, Bokwango and Upperfarms. The localities chosen were separated by at least 5 km, depending on accessibility to forest and level of disturbance in the forests. There are many traditional medical practitioners in these selected sites. The study was carried out from November, 2010 to June, 2011. A field questionnaire was prepared and the approach used was the semi-structured/show-and-tell method developed by Wendy Brombley in 1988 in Korup (Duncan et al., 1989). A total of 200 informants including herbalists or TMPs, farmers and housewives from different age groups were asked to collect all fresh samples of the plants they use, and all Acanthaceae present in the collections were selected and questions were asked about uses of the plant, local name of plant/disease, preparation methods and conservation strategies taken by the TMPs using semi-structured questionnaires. The use of fresh specimens is advantageous as the indigenous people find it difficult to recognize dry specimens. Photographs of all species were taken to show all features that could be lost during drying such as flower colour, leaf colour and flower shape. Voucher specimens for species encountered were collected and descriptions of the species recorded. Adequate samples of all the organs

available were collected whenever possible. The plants were described using books such as Letouzey (1985), pressed, dried and taken to the Limbe Botanic Garden for identification using standard taxonomic principles. Plant specimen preparation method generally followed those of Foremen and Bridson (1989). Pressing was done *in situ*. Voucher specimens were deposited at the University of Buea Teaching Herbarium.

RESULTS

A total of 66% of the respondents were males while 34% were females (Figure 2). From the survey, 68% of respondents were above 50 years of age, 22% were between thirty and forty nine years old and 10% were between twenty and twenty nine years (Figure 3). Acanths are highly used medicinally (76%), with the least being spiritual uses (5%), as demonstrated in (Figure 4). The most used plant parts were the leaves and the least were stems and fruits (Figure 5).

The research yielded 18 plant species used for treating different diseases and 16 species (Table 1) with ornamental potentials (Table 2) and qualities out of the over seventy species of Acanthaceae identified. There were

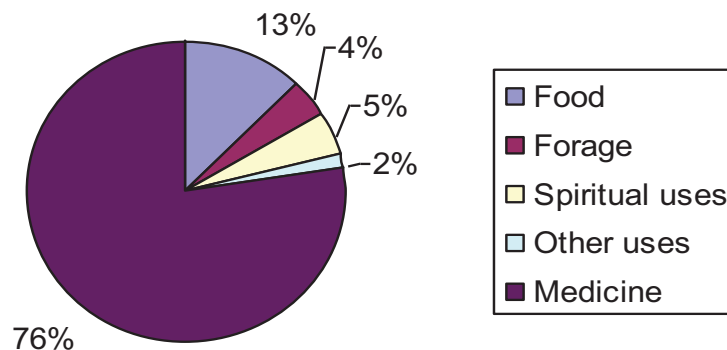


Figure 4. Results of ethnobotanical survey.

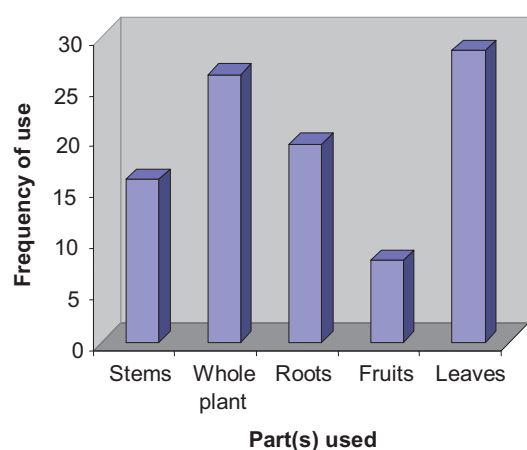


Figure 5. Frequency of parts used.

varied modes of administration of the medicinal plants and about 50% of the plants were mentioned by more than five respondents indicating the importance attached to these groups of plants in the study area. Some of the plants had multiple uses and we noticed an abundance of these around homes, especially the herbaceous species.

DISCUSSION

A number of ethnomedicinal ornamental and other uses of species of Acanthaceae have been reported. A perusal of published literature (Focho et al 2009, Jiofack et al 2009, Bussman, 2006, Duncan et al 1989, Adjonohoum et al 1996) indicates the use of some but in most cases, the mode of administration and application is different as far as plant part used and methods are concerned. 18 species of Acanthaceae are being employed for medicinal purposes, among which 50% were cited more than five times (Table 1) indicating the importance of these species in these localities. Ethnomedicines are used in different forms which include concoction, infusion,

decoctions, and maceration of leaves. Others reported here are based on single plant species, however, in a few cases mixtures of species have been used.

The results of the ethnobotanical survey revealed that the males were more interested and involved in the use of the plants for medicinal purposes which could be explained by the fact that males are closer to chiefs who were informed about the survey indicating more participation and their importance in decision making in villages. The group with the highest number of respondents was above 50 years (68%) and the least was between 20 and 29 years (10%). The older people usually believe in the treatment of ailments using plants than the young people who are not interested in traditional medical practice because it is less profitable compared to growing cash crops (David, 2010). The ethnobotanical survey showed that, out of the over 70 species of Acanthaceae, 76% were used by the indigenes for food, shelter and other uses, while at least 32% of species collected were used for medicinal purposes.

The most used plant part was the leaf. Leaves of plants have been reported to accumulate insulins, tannins and other alkaloids which may be responsible for their medicinal properties (Okwegalle and Omefirze, 2001). Other studies also reported the leaves as the most widely used plant part for medicinal purposes (Alfredo et al., 2002; Focho et al., 2009; Signorini et al., 2009). Most of the plants could be used to treat more than one disease. This is because most of them contain many secondary metabolites which could have different pharmacological activities and consequently treat different diseases (David, 2010).

The species with the highest frequency of use was *Eremomastax speciosa* Hotsch where the morphological features of the plant (two-coloured leaves) fascinate so many people, which probably motivated them to uncover more of its uses, followed by *A. montanus* (Nees) T. Anders (Table 1). Many uses were reported for *E. speciosa* including diarrhoea, which corroborates with the findings of Julius and Sheila (2006) where they stated

Table 1. List of plant species, their medicinal uses and mode of administration.

Species	Parts used	Use(s)	Mode of usage/mode of preparation	Dose	Duration	No of respondents
<i>Acanthius montanus</i> (Nees.) T.Anders	Leaves	Cough, pneumonia	Concoction with leaves of seeds of <i>Aframomum melegueta</i> in water is taken orally	Frequently	Until cough disappears	28
		Fever	Leaves are squeezed and water added.	Half a glass	3 days	
	Leaves	Eaten by cattle	Prepared like vegetables	Frequently	Not applicable	
<i>Asyatasia gagentica</i> (L.)T.Anderson	Whole plant	Pregnant women for energy and immunity	Infusion of whole plant	Frequently	Not applicable	10
	-	Wounds	Plant is macerated and applied as paste on the spot that hurts	Paste applied three time a day	Till wound is healed	
<i>Asystasia spp</i>	Leaves	Headache	A handful of leaves are pounded and inhaled	5-10 leaves	3-7 days	5
<i>Brilliantaisia vogeliana</i> P. Beauv.	Roots	Wounds	Roots are ground and applied as paste	Every morning	Till wound disappears	12
		Hypertension	Leaves infused and taken as tea	Every morning	Not applicable	
<i>Brilliantaisia nitens</i> P. Beauv.	Leaves	Asthma	Leaves squeezed, mixed with water and drank	1 glass per day	3 months	4
		Hunting	Plant is squeezed in dog's nostrils and cause dog to become brave, bold and smells presence of animals even after days so it can trace it	Before going for hunting	Not applicable	
<i>Elytaria marginata</i> Vahl.	Leaves	Navel problems	Root is macerated and applied as paste on the navel	Small quantity	Until it is healed.	6
		Nervous problems	Leaves are macerated and rubbed on the face and hands	-	-	
		Fever	Leaves are infused in hot water and inhaled	3 times a day	3 days	
		Convulsion	Infusion of whole plant in a water medium	½ glass, three times a day	Two weeks	
		Blood shortage, Headache	Leaves are macerated and boiled for about 5 to 30 min in water. Milk may be added to it for strength	1 glass, Morning and evening	4-7 days	
		Fever, malaria	Leaves are macerated with paw paw leaves boiled in water and used as enema	4 L, every other day	Till fever disappears	
<i>Eremomastax speciosa</i> (Hochst) Corfod	Whole plant, Leaves	Herpes, zoster	Leaves are squeezed mixed with palm oil and applied on rashes	1 glass, 3 time/day	3 to 5 days	34
		Dysentery and diarrhoea	Leaves squeezed, mixed with water and drank	1 glass, twice a day	3 days	
		Anemia, yellow fever	Leaves are pounded with <i>Aloe vera</i> (infusion used as enema)	Twice a day	3 weeks to a month	
		Labour pains	Leaf infusion used as enema	During labour	Not applicable	

Table 1. Contd.

<i>Hypoestes rosea</i> P. Beauv	Whole plant	Typhoid	Infusion of plant (whole plant, leaves and stems)	1 glass, 4 times a day	2 weeks	3
<i>Hypoestes forskalei</i>	Whole plant	Skin infections	Macerate whole plant and apply topically	Twice a day		3
<i>Justicia secunda</i> Vahl.	Leaves	Shortage of blood	Leaves are boiled	1 glass, 3 to 5 times per ay	5 to 10 days	3
Spp F	Leaves	Food	Eaten by grazers	Frequently	Not applicable	15
		Shortage of blood	Leaves are boiled and the extract drank	2 glasses, four times per day	3-7 days	-
<i>Nelsonia smithii</i> Oersted	Leaves, whole plant.	Stars in the eyes	Leaf sap is dropped in the eyes	Once per day	One week	
		Cough	Infusion of plant leaves are macerated and boiled for about 5 to 30 min and drank or plant is macerated and the liquid is boiled	½ glass, three times per day	One week	6
<i>Phaulopsis ciliata</i> (Willd) hepper	Whole plant	To crack nuts	Plant is macerated, held in palms & hit on nut to crack it	Not applicable	Not applicable	15
<i>Phaulopsis angolona</i> S Moore	Leaves and stems	Eaten as vegetables	Frequently	Not applicable	Not applicable	5
<i>Phaulopsis falcisepala</i> C.B Clack	Whole plant	Wounds, skin parasite,	Plant macerated and applied to wound and skin	Not applicable	Till wound is healed	
		Laxative, aphrodisiac	Infusion of whole plant	Half a glass, twice daily	Not applicable	5
<i>Rungia grandis</i> Nees.		Malaria	Leaves are ground and an infusion made	Half a glass, twice daily	1 week	3
<i>Thunbergia battescombei</i> Retz.	Leaves	Respiratory infection, cough	Leaf decoction	Not applicable	Not applicable	3

that anti-diarrhoeal activity was due to the presence of tannins and flavonoids in the plant. Biren and Seth (2010) also reported the use of *A. montanus* as an anti-pyretic agent.

Some of the plants were also used in combination with others. The TMP's believe that combining more than one plant re-inforces the medicines, increasing their effectiveness or efficacy. A similar finding was observed in Ethiopia (Flafe et al., 2009). Some exotic species do not have names in the local language and were referred to by their English names. This is

because they are recently introduced species in the area as reported by the TMP's. Table 2 shows species of Acanthaceae with ornamental potentials. Acanths are widely used in horticulture for their numerous flowers or bracts with showy colours and/or for their variegated or bicolorous foliage. This group of plants can be considered as one of the most important tropical ornamental families based on the varied presentation of their flowers and foliage.

The study has revealed the medicinal, socio-cultural and other uses of the Acanthaceae in the

Mount Cameroon Region. The extensive uses of these plants including their potentials in treating ailments by the population warrant their conservation. Biochemists and pharmacologists could exploit the medicinal potentials of this group of plants. Due to urbanization and unscientific exploitation of natural forests and ecosystems, the valuable information and plant species are depleting fast. It is therefore very necessary to collect and document such valuable and precious knowledge and increase awareness among the tribal communities for conservation and sustain-

Table 2. Acanthaceae used as ornamentals.

Species	Plant use
<i>Crossandra infundibuliformis</i> Nees	Garden/bedding plant
<i>Fittonia albivenis</i> (Veitch) Brummitt	Potted plant/ground cover/hanging basket
<i>Graptophyllum pictum</i> (L.) Griff.	Hedge/garden plant, presents good colourful foliage
<i>Hypoestes phyllostachya</i> Baker.	Bedding plant/good colourful foliage
<i>Jacobinia carnea</i> Nees ex. Moricand.	Garden plant
<i>Justicia brandegeana</i> Wassh. & L.B. Sm. (shrimp plant/lobster plant)	Potted/bedding plant
<i>Justicia secunda</i> Vahl (Ink plant)	Garden/potted plant
<i>Odontonema strictum</i> Nees.	Bedding plant/window plant
<i>Pachystachys coccinea</i> Rzed.	Garden/bedding/hedge
<i>Pachystachys lutea</i> Nees.	Garden plant
<i>Pseuderanthemum alatum</i> , (Afzel.) Milne redh	Chocolate plant
	Window/garden plant

able use of plant wealth.

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