

Full Length Research Paper

## Ethnobotany of Acanthaceae in the Mount Cameroon region

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An ethnobotanical survey was carried out in the Mount Cameroon area, southwest region of Cameroon to determine the uses of different species of the Acanthaceae. An inventory of identified Acanthaceae used by different individuals and traditional medical practitioners (TMPs) was established from information gathered through the show-and-tell/semi-structured method and interviews during field expeditions. Sixteen villages were selected for this research: Munyenge, Mundongo, Ekona, Lelu, Bokoso, Bafia, Bakingili, Ekonjo, Mapanja, Batoke, Wututu, Idenau, Njongi, Likoko, Bokwango and Upper farms. The study yielded 18 plant species used for treating twenty five different diseases and 16 species with ornamental potentials out of the Acanthaceae identified. Results revealed that 76% of species are used medicinally, while 34% are employed or used for food, rituals, forage and hunting. The leaves of these species are the most commonly used plant parts. The species with the highest frequency of use was *Eremomastax speciosa* (Hotsch.) with 29 respondents followed by *Acanthus montanus* (Nes.) T. Anders. The study reveals the medicinal and socio-cultural 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:** Acanthaceae, Mount Cameroon, TMPs, ethnobotany, inventory, medicinal plants

### INTRODUCTION

Ethnobotany is defined as 'the study of the utilitarian relationship between human beings and vegetation in their environment' (Harshberger 1896). It takes into account an appraisal of plant-human relations in all phases and the impact of plant environment on humanity. The Mount Cameroon region is considered as 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, Cable and Cheek, 1998).

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 and Welle, 1980; Lucinda et al., 2000). Cystoliths (deposits of calcium carbonate) are characteristics of some taxa, some producing or appearing as streaks on leaves. Flowers are in spikes, racemes or cymes, large and showy involucre bracts that are fairly characteristic. The fruit is a loculicidal capsule, often explosively dehiscent. Some of the familiar genera in addition to the type genus, *Acanthus* include *Justicia*,

*Thunbergia*, *Ruspolia*, *Barleria* and *Ruellia*. Cable and Cheek (1998) placed the Acanthaceae as the sixth most abundant family in the Mount Cameroon region. This family is currently classified under the order Lamiales and clade Euasterids (Haston, 2009).

Many, 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 (Jean et al., 2007). Acanths are widely used in horticulture for their numerous flowers or bracts with showy colours and/or for their variegated or bicolorous foliage (e.g. *Graptophyllum pictum*, *Hypoestes phyllostachya*, *Pachystachys lutea*, *Pseuderanthemum carruthersii* var. *artropurpureum*, *Strobilanthes dyerianus*, *Thunbergia mysorensis* are among the most well-known tropical species).

This group of plants is important to both man and animals being used as food and medicine. In Kenya, for example, some species provide fodder for grazing animals especially goats (Burkill, 1985). Acanthaceae could also be used as bio-indicators to understudy the spatial distribution of plant communities (Adjonohoum et al., 1996; Kouao et al., 2008).

Ethnobotanical knowledge is a cumulative body of traditional knowledge, the interaction between human societies and the plant kingdom, precisely, how indigenous people perceive, manage and utilize plants around them (Suminguit, 2005). Ethnobotanical documentation is one way of securing this body of knowledge in written and graphic form that 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, revitalize agriculture, increase food security, improve health and promote a sense of cultural pride within the community.

More than 80% of traditional medicines used for primary health care are derived from plants (Farnsworth, 1988). 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 well being. 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. The Acanthaceae has been identified as one of the most important plant families in the region pertaining to abundance and importance of its

species. Proper identification and documentation of the ethnobotanical uses of these plants is very pivotal as no ethnobotanical surveys have been conducted to assess their values. The research therefore sought to carry out a survey of the ethnobotanical importance of Acanthaceae species in the Mount Cameroon region.

## MATERIALS AND METHODS

### Présentation of the Study area

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 2700 km<sup>2</sup> encompassing the main massif which is about half the total area of 1500 km<sup>2</sup> and a summit at 4095 m above sea level (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 10000 mm in Debundscha and slowly decreasing in an eastern 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, rainfall and temperature, decrease with altitude (Tchouto, 1995; Cable and Cheek, 1998). The mountain, by virtue of its volcanic origin has soils that are first class for agriculture except recent lava flows that have poor evolved mineral soil (Cable and Cheek, 1998). On the mountain there exist critical elevations at which there are discontinuities in vegetation or flora: 800 m, 1500 m, 2300 m, 3000 m 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).

A total of sixteen villages were selected for this research. To the North, sites included Mnyenge, Mundongo, Ekona Lelu, Bokoso and Bafia; To the South, Bakingili, Ekonjo, Mapanja, Batoke and Wututu. To the West, Idenau and Njongi and to the East, Likoko, Bokwango, and Upper farms. There are many traditional medical practitioners in these sites and the principal activities of most of the inhabitant's livelihood include farming and petty trading.

### Methods

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 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 data was collected and considered valid if at least two respondents provided similar uses about a medicinal plant. Photographs of all species were taken to show all features that could be lost during drying, such as the colours and shapes of flowers and leaves. Voucher specimens for species encountered were collected and descriptions recorded. The plants were pressed, dried and taken to the Limbe Botanical Garden, Herbarium (SCA), Cameroon, for identification. Plant specimen preparation method generally followed those of Foreman and Bridson (1989). Pressing was done *in situ*. Voucher specimens were deposited at the



Figure 1. Map of study area.

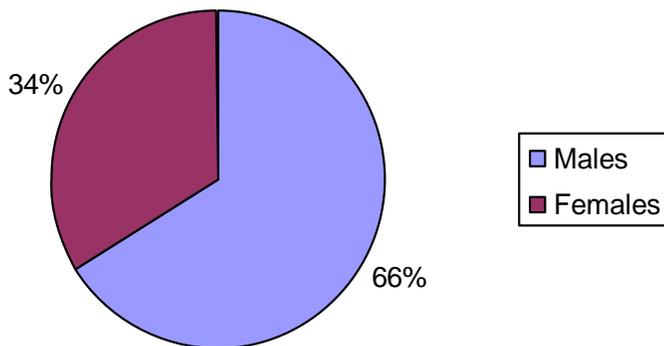


Figure 2. Percentage male and female respondents.

University of Buea Teaching Hebarium.

## RESULTS

Informants in the age group of 20 to 75 years were interviewed during the course of the study and the males (66%) were more interested and involved in the use of the plants for medicinal purposes than females (34%) (Figure 2). 68% of respondents were above 50 years, 22% were between thirty and forty nine years old and 10% were between twenty and twenty nine years (Figure 3). It was observed that the younger generation is not very interested in the use of plants for medicinal purposes. Acanths are highly used medicinally (76%), with the

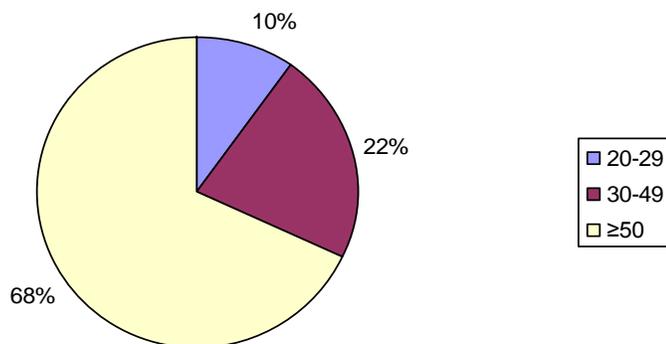


Figure 3. Percentage age of Respondents.

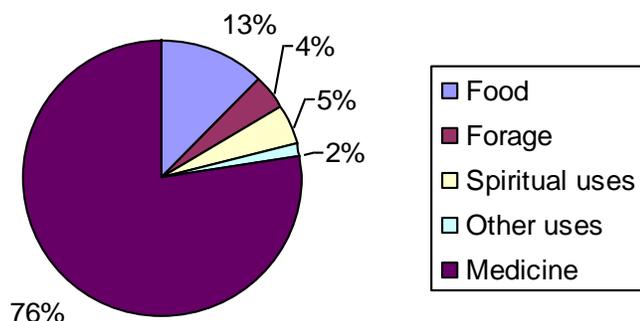


Figure 4. Results of Ethnobotanical survey

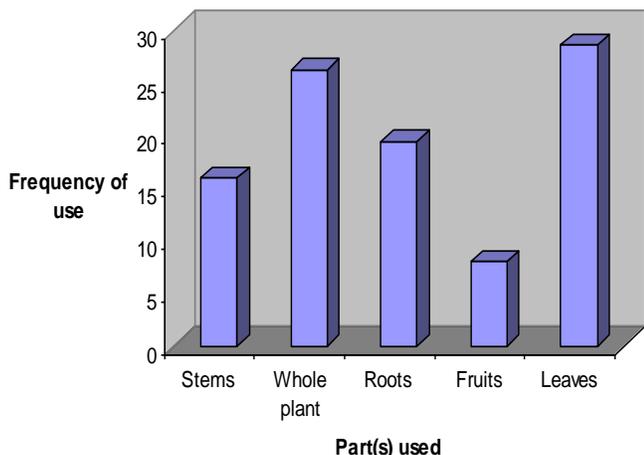


Figure 5. Frequency of parts used.

with the least being spiritual use (5%), as demonstrated in Figure 4. The high rate of medicinal uses reflects the dependence of the rural community on plants for their health concerns. The most used plant parts were the leaves and the least were stems and fruits (Figure 5).

The research yielded 18 plant species (Table 1) used

for treating different ailments and 16 species (Table 2) with ornamental potentials out of the species of Acanthaceae identified. The plants are enumerated alphabetically with respect to their botanical names, parts used, mode of usage/ preparation, dosage and the number of respondents.

## DISCUSSION

A number of ethnomedicinal, ornamental and other uses of species of Acanthaceae have been reported. A perusal of published literature (Idu et al., 2010; Adjonohoum et al., 1996; Focho et al., 2009; Jiofack et al., 2009; Duncan et al., 1989) indicates the use of some of these plants but in most cases, the mode of administration and application is different as far as plant part used and methods are concerned. Some of the ethno medicinal uses in Table 1 are reported for the first time. The leaves in addition to different parts of the plant species were the most commonly used. Mabberly (2008), reported the use of leaves of Acanthaceae 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'.

Methods of preparation ranged from decoctions, infusions, macerations, boiling with single plants and others compound plant preparations to which the TMPs alluded that, there was increased efficacy. These preparations were used for external and internal applications. In some cases a single plant was employed in the treatment of several diseases as was the case with *Elytaria marginata* (Vahl.) and *Eremomastax speciosa* (Hochst) Corfod.

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 *Acanthus montanus* (Nees) T. Anders. Julius and Sheila, (2006) investigated the effect of *Eremomastax speciosa* on diarrhea. Identification and extraction of medicinally active ingredients have been reported from some members of the family by some scientists. 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. Dabasish et al (2009) also studied the hepatoprotective effect of *Hygrophilla diformis* roots against paracetamol induced hepatotoxicity in rats.

## Conclusion

The study has revealed the medicinal and socio-cultural uses of the Acanthaceae in the Mount Cameroon Region. The extensive use of these plants including their potentials in treating ailments by the population warrants their conservation. Biochemists and pharmacologists could exploit the medicinal potentials of this group of

**Table 1.** List of species and their medicinal uses.

| Species                                     | Parts used                     | Use(s)  | Mode of usage/mode of preparation   | Dose   | Duration  | No of respondents |
|---|--------------------------------|---|---|--|---|-------------------|
| <i>Acanthus montanus</i> (Nees.) T.Anders   | Leaves                         | Cough, pneumonia, fever   | (1) Concoction with leaves and seeds of <i>Aframomum melegueta</i> in water is taken orally;<br>(2) Leaves are squeezed and water added.  | (1) Frequently;<br>(2) Half a glass  | (1) Until cough disappears.<br>(2) 3 days   | 28                |
| <i>Asyatasia gangentica</i> (L.)T.Anderson  | (1) Leaves;<br>(2) Whole plant | (1) Eaten by cattle; (2) Pregnant women; (3) Wounds   | (1) Prepared like vegetables;<br>(2) Infusion of whole plant;<br>(3) Plant is macerated and applied as paste on the spot that hurts   | (1) Frequently;<br>(2 and 3) Small quantity  | Till wound is healed  | 10                |
| <i>Asystasia spp</i>                        | Leaves                         | Headache  | A handful of leaves are pounded and inhaled   | 5 to 10 leaves   | 3 to 7 days   | 5                 |
| <i>Brillantaisia nitens</i> P.Beauv.        | Leaves                         | Asthma  | (1) Leaves squeezed, mixed with water and drank   | 1 glass per day  | 3 months  | 4                 |
| <i>Elytaria marginata</i> Vahl.             | (1) Leaves                     | (1) Hunting; (2) Charms; (3) Nervous problems; (4) Fever  | (1) 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;<br>(3) Root is macerated and applied as paste on the navel.  | (1) Before going for hunting;<br>(3) Small quantity  | (1) Not applicable;<br>(3) 1 month  | 6                 |
| <i>Eremomastax speciosa</i> (Hochst) Corfod | (1) Whole plant;<br>(2) Leaves | (1) Convulsion;<br>(2) blood shortage;<br>(3) headache;<br>(4) fever; (5) malaria;<br>(6) herpes, zoster;<br>(7) dysentery and diarrhea;<br>(8) anemia;<br>(9) yellow fever;<br>(10) labour pains | (1) Infusion of whole plant in a water medium;<br>(2 and 3) leaves are macerated and boiled for about 5 to 30 min in water. Milk may be added to it for strength;<br>(4 and 5) leaves are macerated with paw paw leaves boiled in water and used as enema;<br>(6) leaves are squeezed mixed with palm oil and applied on rashes;<br>(7) Leaves squeezed, mixed with water and drank;<br>(8 and 9) Leaves are pounded with <i>Aloe vera</i> (infusion used as enema) | (1) ½ glass, three times a day;<br>(2 to 5) 1 glass, morning and evening;<br>(6) 4 L, every other day;<br>(7) 1 glass, 3 time/day;<br>(8 and 9) 1 glass, twice a day | (1) Two weeks; (2 to 5) 4 to 7 days;<br>(6) till rashes disappear;<br>(7) 3 to 5 days; (8 and 9) 3 weeks to 1 month | 34                |
| <i>Hypoestes rosea</i> P. Beauv             | Whole plant                    | Typhoid   | Infusion of plant (whole plant, leaves and stems)   | 1 glass, 4 times a day   | -   | 3                 |
| <i>Hypoestes Forskalei</i> Sol ex R.Br,     | 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 day  | 5 to 10 days  | 3                 |

Table 1. Contd.

|   |                                    |   |  |  |  |    |
|---|------------------------------------|---|--|--|--|----|
| <i>Mimulopsis solmii</i><br>Schweinf.       | (1) Leaves;<br>(2) Whole<br>plant  | Diarrhoea   | Decoction of leaves; Infusion of plant (whole plant,<br>leaves, leaves and stems)  | 1 glass, twice per day                                   | 2 to 4 days  | 2  |
| <i>Spp F</i>                                | Leaves                             | Food  | Eaten by grazers   | -  | Not applicable                                     | 15 |
|   |                                    | Shortage of blood   | Leaves are boiled and the extract drank  | 2 glasses, four times<br>per day                         | 3 to 7 days  | -  |
| <i>Nelsonia smitti</i> Oersted              | (1) Leaves;<br>(2) Whole<br>plant. | (1) Stars in the eyes;<br>(2) Cough                         | (1) Leaf sap is dropped in the eyes;<br>(2) Infusion of plant leaves are macerated and<br>boiled for about 5-30 min and drank or;<br>(3) Plant is macerated and the liquid is boiled | (1) Once per day;<br>(2) ½ glass, three times<br>per day | One week   | 6  |
| <i>Phaulopsis ciliata</i> (Wild)<br>hepper  | (1) Whole<br>plant                 | To crack nuts   | Plant is macerated, held in palms & hit on nut to<br>crack it  | Not applicable   | Not applicable                                     | 15 |
| <i>Phaulopsis angolona</i> S<br>Moore       | Leaves and<br>stems                | Stomach disorder  | Eaten as vegetables Frequently   | Not applicable   | Not applicable                                     | 5  |
| <i>Phaulopsis<br/>falcisepala</i> C.B Clack | Whole plant                        | (1) Wounds, skin parasite;<br>(2) laxative; (3) Aphrodisiac | (1) Plant macerated and applied to wound and skin;<br>(2 and 3) Infusion of whole plant  | Not applicable   | (1) Till wound is<br>healed;<br>(2) Not applicable | 5  |
| <i>Rungia grandis</i> Nees.                 | Leaves                             | Malaria   | Leaves are ground and an infusion made   | Half a glass, twice daily                                | 1 week   | 3  |
| <i>Thunbergia<br/>battescombeii</i> Retz.   | Leaves                             | Respiratory infection, cough                                | Leaf decoction   | Not applicable   | Not applicable                                     | 3  |

plants which may lead to the discovery of new bioactive molecules with therapeutic potentials for the development of drugs. Due to urbanization and unscientific exploitation of natural forests and ecosystems, the valuable information and plant species are depleting fast consequently, documentation of such precious knowledge is

very important to increase awareness among the rural communities for the conservation and sustainable use of plant wealth.

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**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                                 |
| <i>Ruellia cordata</i> L.   | Garden Plant  |
| <i>Sanchezia nobilis</i> Rutz & Pavon                                     | Garden/bedding plant                                |
| <i>Thunbergia alata</i> Bojer. (Black eyed Susan)                         | Hedge and Lawn plant                                |
| <i>Thunbergia erecta</i> Retz.  | Hedge or lawn plant                                 |
| <i>Thunbergia vogeliana</i> Retz.   | Climber used for arches                             |

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