International Scholars Journals

International Journal of Medicinal Plants Research ISSN 2169-303X Vol. 14 (2), pp. 001-014, February, 2025. Available online at www.internationalscholarsjournals.org © International Scholars Journals

Full Length Research Paper

Ethnobotanical Survey of Medicinal Plants for Reproductive Health in Ndop Central, Cameroon

Focho D. A.[1], Nkeng E. A. P.[2], Lucha C. F.[1*], Ndam W, T.[1] and Afegenui A.[1]

[1]Department of Plant Biology, University of Dschang, Cameroon.

[2]Department of Chemistry, University of Dschang, Cameroon.

Accepted 6 December, 2024

Ethnobotanical investigations and chemosystematic analyses of plants were carried out in Ndop Central Sub-division to identify medicinal plants that treat diseases of the reproductive system and to know the characteristic compounds in the family Malvaceae that have chemotaxonomic value. A total of 88 plant species belonging to 77 genera and 42 families were sampled treating about 24 different reproductive ailments. Their scientific names, vernacular names, parts used, modes of preparation and administration are presented. Chemical screening involved 8 species and 4 families. From the chemical analyses, alkaloids and phenolic compounds are characteristic compounds of the family Malvaceae indicating that they have chemotaxonomic value in the family. Ecdysterone and ajugasterone are not present in the plants tested, indicating that they are not the characteristic ecdysones in that family.

Key words: Ethnobotany, chemosystematics, malvaceae, medicinal plants, reproductive system, Ndop.

INTRODUCTION

The study area

Ndop Central Sub-division is found in Ngoketunjia Division of the Northwest Region of the Republic of Came-roon (Figure 1A and B). It lies between latitudes 5°40 N and 7°N to the North of the equator, and between lon-gitudes 9°45 E and 11°10 E. Ndop Central Sub-division has a surface area of 410 km² (Statistical data, (Ndop Council, 2006). Ndop shares a common boundary to the West with Sabga, to the North with Babungo, to the East with Baba I. The study area includes Ndop town and four villages: Bamunka, Bamali, Bambalang and Bamessing (Figure1C), with a population of about 56,532. This population is made up of the Tikari tribe (Nkouandou, 2005).

The main activity of the people is agriculture that includes animal rearing and fishing. The relief is characterized by the Ndop plain surrounded by numerous hills where rivers take their rise. The altitude varies from 300 to 2000 m. The average altitude is 1200 m (Ministry of Environment and Forestry (MINEF), 1999). The climate comprises two distinct seasons: a dry season from mid-November to mid-March and a rainy season which extends from mid-March to mid-November. Annual rainfall is estimated at about 1600 mm (Nkouandou, 2005) . The mean annual temperature is about 30°C (Ministry of Environment and Forestry (MINEF), 1999). The climate is subtropical with low temperatures.

The pristine vegetation is composed of two main types: the high altitude shrub savannah and swampy vegetation. The high altitude shrub savannah is dominated by fire-resistant species such as: *Annona senegalensis, Terminalia lecardii, Schefflera abyssinica* and *Croton macrostachyus*. This area is subject to intense non- sustainable practices (grazing, bushfires, over-harvesting of firewood and medicinal plants).

The swampy vegetation is found on the plain and is dominated by *Elaeis guineensis* Jasq (oil palm), *Raphia hookeri* G. Mann and H. Walt (raphia palm) and remnant economic species such as *Piptadeniastrum africana*, *Ceiba pentandra* and *Milicia excelsa*. (Nkouandou, 2005).

*Corresponding authors. dfocho@yahoo.co.uk.

Table 1. Distribution of people interviewed in terms of villages.

Villages	N° of TMPs	N° of Herbalist	N° of TBAs	N° of Herb Sellers	N° of Lay pop°	Total
Ndop	7	15	6	10	60	98
Bamunka	14	18	8	8	80	128
Bamali	3	5	5	3	30	46
Bamessing	4	10	8	4	40	66
Bambalang	6	9	9	5	45	74
Total	34	57	36	30	255	412
Percentage (%)	8.25	13.83	8.73	7.28	61.89	100

Maize is the main food crop. The main cash crop is rice which is cultivated on an industrial scale by the Upper Noun Valley Development Authority (UNVDA).

Information from ethnobotanical surveys and subsequently phytochemical screening of plants have been used in the past and are currently being pursued espe-cially in developing countries as a means to initiate drug discovery efforts (Farnsworth, 1966). According to medi-cal records of the district hospital in Ndop Central Sub-division, about 31,093 people (55% of the population) suffer from diseases linked to the reproductive system.

In this rural community, childbirth is of great importance and most ailments related to the reproductive system are treated traditionally using plants. However, the people that hold the indigenous knowledge on the uses of plants are the older generation and the traditional healers. The younger generations have little interest in the practice due to urbanization and technological advancement (Focho et al., 2009). Hence, there is danger that this knowledge will eventually disappear if nothing is done. Also, ethnobotanical surveys carried out in Cameroon by Adjanohoun et al. (1996) reported only very few medici-nal plants of Ndop Central sub-division. There is there-fore, need for an exhaustive documentation of the medici-nal plants of Ndop.

Plant chemosystematics is the application of plant chemodata to the systematic problem (Judd et al., 1999). It is rapidly expanding inter-disciplinary field concerned with using chemical constituents to explain relationships between plants and inferring phylogeny. The family of Malvaceae was chosen for the chemotaxonomic study because recent studies on alkaloids, ecdysones and phenolic compounds show that they are important compounds for chemotaxonomic studies of some genera of the Malvaceae (Dinan et al., 2001; Karou et al., 2000; Darwish and Reinecke, 2003; Ghosals et al., 1975).

Four different genera containing eight different species of this family were chosen for screening. Also from the ecological point of view, the Malvaceae constitutes one of the most important angiosperm families (Cobley, 1962) . It is cosmopolitan in distribution. This screening aims at helping taxonomists in their endeavour to arrive at a truly natural classification of the Malvaceae.

The objectives of this study were to identify and document plants traditionally used for the treatment of reproductive diseases in Ndop and conduct phytochemical screening for bioactive components of some species of the Malvaceae family.

METHODOLOGY

Ethnobotanical Survey

An ethnobotanical survey was carried out in Ndop Central Sub-division from 28th December, 2005 to 10th July, 2006. Interviews were conducted in the field during collection trips and by examination of freshly collected specimens with informants, after seeking oral consent. Inquiries on the prevalence, types, mode of transmission and symptoms of reproductive ailments were made by orally interviewing doctors in government health centres in Ndop and some specialized healers. Local traditional healers, birth atten-dants, herbalists, herb-sellers and aged persons having practical knowledge of the use of plants for health care were interviewed.

Data on plant species, local name, part used, diseases treated, mode of preparation and administration of herbal medicine were recorded following the standard questionnaire of the Scientific Technical and Research Commission (STRC) of the Organisation of African Unity-OAU (Adjanohoun et al., 1996). The informants guided us to the field where we could see and collect specimens of the plant in question, in cases where they were not found around their homes. Standard methods were used in plant material collec-tion, drying, mounting, preparation and preservation (Jain and Rao, 1976).

Plants were identified first by their vernacular names and later validated by Dr. Tchiengue Barthelemy, Mr Paul Mezili and Dr. Jean Michel Onana, botanists at the Cameroon National Herbarium Yaounde (YA). Voucher specimens were deposited in the Univer-sity of Dschang Teaching Herbarium. A total of 412 persons were interviewed amongst which were 34 TMP, 57 herbalists, 36 TBA, 30 herb sellers and 255 lay population (Table 1).

Chemical Screening Methodology

Considering that identification of plants may sometimes be difficult using only morphological characters, a chemotaxonomic study was conducted in an attempt to solve such a problem.

Eight species, medicinal and non-medicinal in Ndop belonging to four genera of the family Malvaceae were chosen for the chemical screening namely: *Abelmoschus cailei* (A.Chev) J.M.C Stevels, *Hibiscus asper* Hook.f, *H. rosa-sinensis* Linn, *H. sabdariffa* Linn, *H. schizopetalus* Hook.f, *Malvaviscus arboreus* Cav, *Sida acuta* Burm.f and *Sida rhombifolia* Linn.

Collection and preparation of the plant material

Fresh plant specimens were harvested and weighed using a capa-

Table 2. Plant species, parts, weights of plant material, quantity of methanol used, the extract weights obtained and the percentage yields of the extracts of the plants.

S/No	Plant	Part	Weight of plant (g)	Quantity of Methanol (ml)	Extract weight (g)	% Yield of the extracts
1	*Abelmoschus cailei* (A.Chev) J.M.C Stevels.	Leaves	50	550	3.74	7.48
		Stem	50	600	5.45	10.9
2	*Hibiscus asper* Hook.f.	Whole plant	50	650	14.74	29.48
3	*Hibiscus rosa-sinensis* Linn.	Whole plant	50	600	13.81	27.62
4	*Hibiscus sabdariffa* Linn.	Whole plant	50	650	5.16	10.32
5	*Hibiscus schizopetalous* Hook.f.	Leaves	50	550	3.65	7.30
		Stems	50	600	3.46	6.92
6	*Malvaviscus arboreous* Cav.	Leaves	50	600	10.41	20.82
		Stems	50	550	15.03	30.06
7	*Sida acuta* Burm.f.	Whole plant	50	650	12.55	25.1
		Leaves	50	600	8.53	17.06
8	*Sida rhombifolia* Linn.	Stems	50	700	2.94	5.88

city weighing balance. They were cut into pieces and dried in an electric drier at 45°C - 55°C maximum, after which the dried plants were reweighed. They were separated into their various parts to be used and ground into uniform powder using a Gondard milling machine ('Broyeurs GONDARD Paris' N°4106, France).

Preparation of the plant extract

50 g of each dried powdered sample was macerated in about 600 ml of pure methanol-99% (Table 2) for 24 h, then filtered by vacuum filtration using a Pfeiffer vacuum filtration set (BUCHI RE.120, Switzerland). The methanol extracts were concentrated using a Rota-tory evaporator R.110 (at about 54°C) . After concentration they were weighed using a Mettler P.1200N electric weighing balance and their weights recorded as shown on table 2 below.

Chemical tests were carried out on the concentrated methanol extracts using standard procedures as described by Sofowora (1993), Trease and Evans (1989) and Harborne (1973). These tests were the tests for: Alkaloids, coumarines, flavonoides, hydroxyl of phenolic compounds (OH-Phenols), fatty acids or saponification oils, sterols and triterpenoids.

Ecdysterone and ajugasterone c, were tested for in the stem bark extracts from *Sida rhombifolia*, *Malvaviscus arboreus*, *H. schizopetalus* and *A. cailei,* using flash column chromatography or dry flash chromatography followed by TLC analysis (Trease and Evans, 1989) with the aim of identifying the presence of ecdysones using authentic ecdysterone and ajugasterone c samples as references. The method of chromatographic analysis consisted of setting up a column of 4.2 cm diameter and 5.5 cm height with a Pfeiffer vacuum filtration set. 2.5 g of each of the plant extracts was dissolved separately in methanol and 5 g of celite was added to fix each of them. 45 g of pure silica was mixed with methylene chloride and introduced on top of the column chromatography set and the extract fixed on celite was introduced on top of the silica gel column.

The column was run successively with the system of the fol-lowing solvents: CH_2Cl_2-MeOH (95:5); CH_2Cl_2-MeOH (85:15); CH_2Cl_2-MeOH (80:20) and MeOH-H_2O (80:20) . Fractions of 15 ml were collected and evaporated in a 100 ml flat bottom flask. These concentrated extracts permitted TLC analysis to be conducted with the ecdysone references.

Dry plates were separately migrated in the CH_2Cl_2-MeOH-Acetone (7:2:1) solvent system in a covered 250 ml beaker. The chromatogram was removed when the solvent attained the front, dried using an electric hand-drier, then observed under ultra violet (UV) light to visualise the spots and determine the presence or absence of ecdysones in the extracts under investigation.

RESULTS

Distribution of people interviewed

Four hundred and twelve persons were interviewed amongst which were 34 traditional healers, 57 herbalists, 36 traditional birth attendants, 30 herb sellers and 255 lay population (Table 1). From the above table it is noted that Bamunka village had the highest number of people who participated during the inquiry. In all, 128 persons in this village were interviewed.

The inquiry permitted the sampling of a total of 88 species of plants belonging to 77 genera and 42 families. The most represented family is the Asteraceae, with 16 species belonging to 14 genera, followed by the Euphorbiaceae with 5 species belonging to 4 genera, closely followed by the families Lamiaceae and Malva-ceae each having 4 species.

The leaves or entire plants were mostly used for herbaceous plants. Stem bark for trees, Buds, flowers, seeds, fruits, bulbs, roots and tubers were also used as medi-cine. Plant products like palm oil, kernel oil, castor oil, palm and raphia wine were also used for most of the pre-parations.

24 different types of reproductive related complications were encountered. The most mentioned diseases treated in decreasing order of magnitude were female sterility, male sterility, dysmenorrhoea, gonorrhoea, syphilis, impotence and candidiasis. The different modes of preparation of medicine employed include concoctions, decoctions and macerations.

Acanthus montanus had the highest frequency as it was recommended by many people as an ingredient in

the concoctions for the treatment of female sterility, followed by *Cissus quadranqularis* to treat impotence and oligospermia. It was observed that some plants are active against many diseases while some cure only a disease. These plants were either used in a mixture or singly for the treatments. Table 3 shows the plants surveyed in the present study.

Results from chemical tests

It was noticed that the alkaloids, phenols, essential or volatile oils, fatty acids, sterols and triterpenoids were present in all the Malvaceae tested. The coumarines and flavonoids were not present in all the Malvaceae (Table 4). The search for ecdysones, ecdysterone and ajuga-sterone c in the stems extracts of *S. rhombifolia*, *M. arbo-reous*, *H. schizopetalous* and *A. cailei*. No presence of ecdysones, ecdysterone and ajugasterone.

DISCUSSION

Out of the eighty-eight plant species sampled to treat diseases linked to the reproductive system in Ndop Central Sub- division, thirty-two of them have been reported to treat ailments of the reproductive system in Cameroon. Some of these plants are *A. montanus*, *Centella asiatica*, *C. quadrangularis, Emilia coccinea, H. asper* and *Leea guineensis*. Twenty-five of the eighty-eight plants have also been reported to treat other diseases in Cameroon. These include *Sanseviera liberica*, *Mangifera indica*, Eryngium *foetidium*, *Colocasia esculenta*, *Ageratum conyzoides*, *Chromolaena odorata, Spilanthes filicaulis*, and Spathodea *campanulata*.

The remaining thirty-one have not been cited in the Cameroon pharmacopoeia by Adjanohoun et al. (1996). These include, *Pseudospondias microcarpa*, *Xanthosoma sagittifolium*, *Cocos nucifera*, *Ambrosia maritima*, *Microglossa angolensis*, *Mikania scandens*, *Vernonia ambigua*, *Cyathea manni*, *Clerodendrum scandens*, *S. urens* and *Erythrina senegalensis.* The results of these findings are therefore a contribution to the completion of the work of Adjanohoun et al. (1996). Some of these plants are also known to treat diseases of the reproduc-tive system in other parts of Africa (Ayensu, 1978; Bep, 1986; Iwu, 1993; Megne, 1998; Focho et al., 2009). These may be proof of their efficacy.

Others are known in some parts of Africa to treat different ailments (Iwu, 1993; Ayensu, 1978; Adjanohoun et al., 1988). The diversity observed in the usage of these plants can be appropriately explained in the ecological variations observed in the different regions. As signalled by Bep (1986), this may be attributed to differences in climate, soil or other ecological conditions. In effect, the climatic and edaphic conditions can influence the chemical composition of these plants. The different uses can also be explained by the fact that, a single plant can contain many compounds which perform different functions in the body.

Some of the plants may be considered to be endangered because of over exploitation. For example, *A. montanus, V. guinensis, Leonotis nepetifolia, Aloe buetneri, S. urens, Entada africana, Mondia whiter, E. senega-lensis and C.*q*uadrangulari*s.

The majority of plants used as medicine in the study area were herbs, with the family Asteraceae topping the list. This may be because the study area is in the shrub savannah, which favours the growth of various herbs. Also the Asteraceae is one of the most represented plant family.

Leaves were the most popular plant part used in the various herbal preparations followed by the bark and the whole plant for herbs while oil, seeds, stems and tubers were the least used parts. Leaves are known to accumulate alkaloids, tannins and inulins which are the active components of most herbal preparations (Okoegwale and Omefezi, 2001; Focho et al., 2009). This variation in the part used could be explained by the process of photosynthesis. Mostly the secondary metabolites of plants convey to them, their medicinal properties (Husain, 1988).

Thus, during photosynthesis there is synthesis of primary metabolites that are converted to secondary metabolites and stored in different parts of the plants. Some traditional healers are knowledgeable of this and usually precise the period of collection of certain medicines.

The main methods of preparation of remedies were concoctions, decoctions and macerations while the mode of administration was mostly oral. According to Igoli et al. (2005), the joint use of multiple medicinal plants in concoctions could be due to synergistic or additive effects of constituents. Most of the plant species were multipurpose medicinal plants used in the treatment of several reproduction related diseases. For example, *C. quadragularis* was used to treat oligospermia, impotence, poor ejaculation, low sperm count, pelvic inflammatory disease, spurious labour pains and post partum haemorrhage.

We deduced from the results of chemical screening that the alkaloids and phenols which are characteristic compounds used in chemosystematics were present in all the eight species of the family Malvaceae tested.

Coumarines and flavonoids are also important classes of compounds used in chemotaxonomy but they are not present in all the plants tested. They are not important classes of compounds to be used in chemotaxonomic studies of the Malvaceae.

Fatty acids, sterols and triterpenoids were present in all the plants tested but they are not important compounds used in chemosystematics since they are present in all angiosperms.

Phytoecdysteroids, for example ecdysones, have chemotaxonomic value in the genus *Sida* because of their presence in the seeds of *S. acuta, S. rhombifolia* and *S. filicaulis* (Dinan et al., 2001). The ecdysteroids also present in aerial parts of *S. spinosa* L. (Darwish and Reinecke, 2003) were absent in the Malvaceae analysed and so are

Table 3. Medicinal plants, parts used, diseases treated, mode of preparation and frequency of citation of remedy.

No	Species and Family	Vernacular / Common name	Part Used	Diseases treated	Mode of preparation and administration	Freq
1	*Acanthus montanus* (Nees) T. Anders (Acnthaceae) (Voucher: Lucha016)	Kehboh (Bamunka) Kemedie (Bambalang)	Leaves	Female infertility (pelvic inflammatory disease) Dysmenorrhoea Post partum pains Gonorrhoea Threatened abortion	Concoction with whole plant of *Euphobia hirta,* leaves *of Aloe buettneri*, bark of *Leea guineensis* and seeds of *Aframomum melegueta* is taken orally Concoction with leaves of *Sanseviera liberica* and bulbs of *Crimum zeylanicum* and raphia wine is taken orally.	87
2	*Aframomum danielli* K. Schum (Zingeberaceae) (Voucher : Lucha051)	KenchouChukeh(Bamunka)	Roots	Gonorrhoea Syphilis Candidiasis Infertility (low sperm count, poor ejaculation, pelvic inflammatory disease)	Decoction is taken orally.	7
3	*Aframomum melegueta* K. Schum (Voucher: Lucha012)	Alagata pepper Soh(Bamunka	Seeds	Male / female infertility (poor erection, poor ejaculation, pelvic inflammatory disease), Dysmenorrhoea Threatened abortion	Concoction with whole plant of *Euphobia hirta,* leaves *of Aloe buettneri and Acanthus montanu*s , bark of *Leea guineensis* and seeds of *Aframomum melegueta*is taken orally	65
4	*Ageratum conyzoides* Linn (Asteraceae) (Voucher : Lucha020)	Goat weed King grass	Leaves Stems	Dysmenorrhoea	Chew fresh leaves.	12
5	*Alchornea cordifolia* (Schum & Thonn) Mull. Arg (Euporbiaceae) (Voucher : Lucha050)	Biehbieh (Bambalang)	Leaves	Vaginal candidiasis	Infusion is taken orally.	5
6	*Alchornea laxiflora* Pax & K. Hoftm. (Euporbiaceae) (Voucher: Lucha072)	Mechango (Bambalang)	Leaves	Post partum pain	Decoction is taken orally	4
7	*Ambrosia maritima* Linn (Asteraceae) (Voucher: Lucha053)	Beuchekeh (Bamunka)	Leaves	Female infertility (pelvic inflammatory disease)	Concoction with fresh leaves of *Centella asiatica* and leaves of *Ambrosia maritime* is taken orally.	18
8	*Aloe barbadensis* Linn (Liliaceae) (Voucher : Lucha021)	Bajojoh (Bamunka) Aloe vera	Leaves	Dysmenorrhoea Female infertility (pelvic inflammatory disease)	Maceration is taken orally.	40
9	*Aloe buettneri.* A Berger *&* Engl (Liliaceae) (Voucher : Lucha028)	Wild aloe vera	Leaves	Female infertility (pelvic inflammatory disease) Dysmenorrhoea Post partum pains Chronic gonorrhoea	Concoction with leaves of *Acanthus montanus,* leaves of *Euphobia hirta,* leaves *of Aloe buettneri*, bark of *Leea uineensis* and seeds of *Aframomum melegueta* is taken orally	7
10	*Aspilia fricana* (Pers) C.D Adams (Asteraceae)	Chikeh (Bamunka) Iodine grass	Leaves Buds	Gonorrhoea	Maceration is taken orally.	4
11	*Basella alba* Linn (Basellaceae) (Voucher: Lucha080)	Lobekwebefon (Bamunka) Twin grass	Whole plant	Infertility (pelvic inflammatory disease, orchitis, epididymytis) Threatened abortion Spurious labour	Maceration is taken orally.	47

Table 3. Contd

12	*Bidens pilosa* Linn (Asteraceae) (Voucher: Lucha030)	Kiyanuh (Bamunka)	Whole plant	Acute mastitis Post partum haemorrhage Male /female infertility (pelvic inflammatory disease, poor erection, poor ejaculation) Impotence	Concoction with barks of *Tabernaemontana c.f ventricosa* and limestone is taken orally.	6
13	*Bryophyllum pinatum* (Lam.). Oken (Crassulaceae) (Voucher: Lucha049)	Atunlabieh (Bamessing) Wander of the world	Leaves	Lactation failure	Juice is taken orally.	17
14	*Capsicum frutescens* Linn (Solanaceae) (Voucher: Lucha032)	Small red pepperGwocoffi(Bamunka)	Fruit	Gonorrhoea	Concoction with fresh leaves of *Sida veronicifolia* is taken orally.	
15	*Carica papaya* Linn (Caricaceae) (Voucher: Lucha042)	Pawpaw	Leaves	Gonorrhoea	Maceration with limestone is taken orally.	13
16	*Centella asiatica* (Linn.) Urb (Apiaceae) (Voucher: Lucha031)		Whole plant	Female infertility (pelvic inflammatory disease)	Concoction with leaves of *Ambrosia maritime* is taken orally.	5
17	*Chromolaena odorata* (L) R.M King & Robinson (Asteraceae) (Voucher: Lucha025)	Mbiah (Bamunka)	Leaves	Urithritis Gonorrhoea	Maceration in raphia wine is taken orally.	14
18	*Cissus quadrangularis* Linn (Vitaceae) (Voucher: Lucha071)	Bekteh (Bamunka)Jinpuh (Bamali) Michereh (Bambalang)Four corners	Whole plant	Oligospermia Impotence Male / female infertility (poor erection, low sperm count, pelvic inflammatory disease) Spurious labour Post partum haemorrhage	Maceration in raphia palm wine is taken orally.	70
19	*Citrus aurantifolia* (Christm.) Swengle (Rutaceae) (Voucher: Lucha014)	Lime	Fruit	Post partum prophylaxis Male / female infertility (poor ejaculation, preorgasm ejaculation) Gonorrhoea Syphilis Vaginal candidiasis Dysmenorrhoea	Maceration is taken orally.	
20	*Citrus sinensis* (L). Obs (Rutaceae) (Voucher: Lucha022)	Lamachi (Bamessing)Sweet orange	Roots	Impotence	Concoction with roots of *Vernonia amygdalina* and roots of *Psidium guajava* is taken orally.	5
21	*Clerodendrum scandens* P. Beauv (Lamiaceae) (Voucher: Lucha057)	Kogseh (Bamunka)	Leaves	Dysmenorrhoea	Maceration is taken orally.	48
22	*Cocos nucifera* Linn (Arecaceae) (Voucher: Lucha005)	- Vechoukeh (Bamunka) - Coconut	Fruit	Difficult lactation	Maceration is taken orally.	7

Table 3. Contd

23	*Cola nitida* Schott and Bandl (Stercliaceae) (Voucher: Lucha039)	Small red colanuts Beh (Bamunka)	Fruit	Gonorrhoea Male / female infertility (pelvic inflammatory disease, preorgasm ejaculation, orchitis)	Concoction with young shoots of *Aspilia africana* is taken orally.	4
24	*Colocasia esculenta* (L) Schott (Araceae) (Voucher: Lucha027)	Achu – coco Kebeh(Bamunka)	Leaves	Painful breasts	Maceration is taken orally.	3
25	*Commelina benghalensis* Linn (Commelinaceae) (Voucher: Lucha006)	Yiukeh (Bamunka)	Leaves	Menorrhagia Infertility (pelvic inflammatory disease)	Fresh juice is taken orally.	7
26	*Costus afer* Ker-Gawl (Costaceae) (Voucher: Lucha084)	Chuichumba (Bamunka) Monkey sugar cane	Roots	Threatened abortion	Decoction is taken orally.	14
27	*Crassocephalum biafrae.* S. Moore. (Asteraceae) (Voucher: Lucha041)	Borjusehkon (Bamali)	Whole plant	Male / female infertility (poor erection, poor ejaculation, pelvic inflammatory disease)	Concoction with *Emilia coccine, Sida veronicifolia,* and *Vernonia ambigua* is taken orally.	9
28	*Crinum c.f jagus* (Thomps). Dandy. (Amaryllidaceae) (Voucher: Lucha040)	Kulong (Bamali)	Bulbs	Dysmenorrhoea Threatened abortion	Maceration of leaves and bulbs is taken orally.	12
29	*Crinum zeylanicum* (L).L (Amaryllidaceae) (Voucher: Lucha010)	Anoshukunu (Bambalang) Bush onions	Bulbs	Threatened abortion	Concoction with leaves of *Acanthus montanus* and leaves of *Sanseveira liberica* and raphia wine is taken orally.	6
30	*Cupressus benthamii* Var. Lucitanica (Cuppessaceae) (Voucher: Lucha002)	Cypress	Leaves Bark	Dysmenorrhoea	Decoction is taken orally.	5
31	*Cyathea manni* Hook (Cyatheaceae) (Voucher: Lucha045)	Tekah (Bamunka) Fern tree	Bark	Oligospermia Impotence	Maceration in palm wine is taken orally.	8
32	*Cymbopogon citratus* (D.C) Stapf (Gramineae) (Voucher: Lucha076)	Fever grass Foshokou (Bambalang)	Leaves	Post partum pains	Concoction with bark of *Erythrina senegalensis* is taken orally.	3
33	*Dichrocephala integrifolia* (Linn. F) O. Ktze. (Asteraceae) (Voucher: Lucha074)	Funfonfeh (Bamali)	Whole plant	Gonorrhoea	Concoction of pulverized whole plant with fresh leaves of *Carica papaya* is taken orally.	5
34	*Dychoriste perrotteti* (Nees) O. Ktze Acanthaceae (Voucher: Lucha024)	Buohoh (Bamunka)	Leaves	Female infertility (pelvic inflammatory disease)	Decoction is taken orally.	25
35	*Elaeis guinensis* Jacq (Arecaceae) (Voucher: Lucha007)	Palm tree Teh (Bamunka)	Sap	Post partum prophylaxis Difficult lactation	Decoction is taken orally.	42
36	*Elephantopus mollis* H.B & K (Asteraceae) (Voucher: Lucha065)	god tobacco Lapa- fundie (Bambalang)	Leaves	Gonorrhoea	Pulverized leaves with salt and red oil are taken orally.	4
37	*Emilia coccinea* (Sims) G. Don (Asteraceae) (Voucher: Lucha061)	Yeyiukeh (Bamali)	Whole plant	Male / female infertility (preorgasm ejaculation, pelvic inflammatory disease)	Concoction with *Crassocephalum biafrae, Emilia coccinea*, *Sida veronicifolia* and *Vernonia ambigua* in raphia wine is taken orally.	6

Table 3. Contd

38	*Entada africana* Guill & Perr (Mimosaceae) (Voucher: Lucha052)	- Tchikwohkeh (Bamunka)	Bark	Gonorrhoea Syphilis Vaginal candidiasis Female infertility (pelvic inflammatory disease)	Concoction with roots of *Aframomum danielli* is taken orally.	32
39	*Eragrostis atrovirens* (Desf) Steud (Gramineae) (Voucher: Lucha056)	Yeikehneh (Bamunka)	Leaves	Analgesic during labour	Pulverized inflorescence is applied topically on the breast.	3
40	*Eremomastrax speciosa* (Hochst) Cufod. (Acanthaceae) (Voucher: Lucha003)	Keon (Bamunka) Banjime (Bamessing) Jiban (Bamali) Konteh (Bambalang)	Leaves	Menorrhagia Dysmenorrhoea Male / female infertility (pelvic inflammatory disease, orchitis, epididymitis)	Juice is taken orally. Concoction with leaves of *Vernonia ambigua* is taken orally.	45
41	*Eryngium foetidum* Linn (Apiaceae) (Voucher: Lucha078)	Fukwokoh (Bamunka)	Whole plant	Acute mastitis Post partum haemorrhage Threatened abortion	Decoction is taken orally. Concoction with fresh plant of *Bidens pilosa* and fresh leaves of *Isodon ramossissimus* is taken orally. Concoction with stem of *Rhipsalis cassytha* is taken orally.	9
42	*Erythrina senegalensis D.C* (Fabaceae) (Voucher : Lucha088)	Fongmeunchowa (Bamessing)	Bark	Post partum pains	Decoction is taken orally.	
43	*Euphorbia hirta* Linn (Euporbiaceae) (Voucher: Lucha037)	Ndoyi (Bamunka)	Leaf twigs	Analgesic during labour Female infertility (pelvic inflammatory disease)	Concoction with leaves of *Acanthus montanus,* leaves *of Aloe buettneri*, bark of *Leea guineensis* and seeds of *Aframomum melegueta* is taken orally	9
44	*Ficus benghalensis* Vahl (Moraceae) (Voucher: Lucha043)	Fick treeKunekeh(Bamunka)	Bark, leaf	Syphilis	Concoction with barks of *Persea mericana*, *Mangifera indica* and fresh leaves of *Psidium guajava* is taken orally.	3
45	*Ficus exasperata* Vahl (Moraceae) (Voucher: Lucha029)	Gweh (Bambalang) Yonteikeh (Bamunka) Sand leaf	Buds, bark	Infertility (pelvic inflammatory disease) Post partum haemorrhage Analgesic during labour	Decoction with raphia wine is taken orally.	7
46	*Harungana madagascariensis.* Lam (Hypericaceae) (Voucher : Lucha059)	Bonechi (Bamunka)	Buds	Post partum pain	Pulverized buds with salt and red oil are taken orally.	6
47	*Hibiscus asper* Hook. F. (Malvaceae) (Voucher: Lucha034)	Wihneh (Bamessing)	Leaves	Gonorrhoea Dysmenorrhoea Male /female infertility (pelvic inflammatory disease)	Maceration is taken orally.	18
48	*Impatiens burtonii* Hook. F (Balsaminaceae) (Voucher : Lucha087)	Mesotutuh (Bamunka)	Leaves Stems	Spurious labour	Fresh juice is taken orally.	42

Table 3. Contd

49	*Isodon ramosissimus* (Hook. f) Codd (Lamiaceae) (Voucher: Lucha083)	Jijeh (Bamunka)	Leaves	Acute mastitis Post partum haemorrhage	Concoction with fresh plant of *Bidens pilosa* and *Eryngium foetidium* is taken orally.	5
50	*Jatropha curcas* Linn (Euporbiaceae) (Voucher: Lucha062)		Bark Roots	Placenta retention Infertility (pelvic inflammatory)	Decoction is taken orally.	4
51	*Kigelia africana* Benth (Bignoniaceae) (Voucher: Lucha047)	Kokgehtei (Bamunka)	Fruit	Male / female infertility (pelvic inflammatory disease, poor erection) Prostatitis Chronic cystic mastitis	Concoction with *Leonotis nepetifolia* and inflorescenxce of *Musa sapientum* in raphia wine is taken orally.	31
52	*Leea guineensis* G. Don. *(Leeaceae)* (Voucher: Lucha079)		Bark	Female / male infertility (pelvic inflammatory disease, poor ejaculation)	Concoction with leaves of *Euphorbia hirta,* leaves of *Aloe buettneri* and seeds of *Aframomum melegueta* is taken orally.	87
53	*Leonotis nepetifolia* (Linn) Ait.f. (Lamiaceae) (Voucher: Lucha077)	Koklehteifengei (Bamunka)	Whole plant; Flower	Female infertility (pelvic inflammatory disease) Painful breast	Concoction with fruit of *kigelia africana* and inflorescence *of Musa sapientum* is taken orally.	41
54	*Mangifera indica* L Anacardiaceae (Voucher: Lucha019	Mango	Bark	Syphilis	Concoction with barks of *Persea americana, Ficus benghalensis* and fresh leaves of *Psidium guajava* is taken orally.	3
55	*Markhamia tomentosa* (Ben.) K. Sch. Ex. Engl (Bignoniaceae) (Voucher: Lucha068)	Puing (Bambalang)	Bark	Male / female infertility (pelvic inflammatory disease, preorgasm)	Decoction is taken orally.	19
56	*Microglossa angolensis* Oliv & Hiern (Asteraceae) (Voucher: Lucha086)	Sukwoh (Bamunka)	Leaves	Vaginal candidiasis Trichomoniasis	Fried leaves with castor oil are taken orally before meals.	13
57	*Mikania scandens* Willd (Asteraceae) (Voucher: Lucha082)	Valeucheche (Bamunka)	Leaves	Analgesic during labour	Infusion is taken orally.	32
58	*Mondia whitei* Skeels (Periplocaceae) (Voucher: Lucha066)	Cutingeukeh (Bamunka)	Roots	Oligospermia Male infertility (poor ejaculation, preorgasm ejaculation) Impotence	Roots are chewed. Infusion of pulverized roots is taken orally.	
59	*Musa paradisiaca* Walker and Sillans. (Moraceae) (Voucher: Lucha044)	Plantain Yeikeh (Bamunka)	Leaves	Acute mastitis	Juice from warm leaves and those of *Ficus exasperata* is applied topically.	30
60	*Musa sapientum* Linn (Moraceae) (Voucher: Lucha023)	Banana Kwilei (Bamunka)	Flower	Prostatitis Chronic cystic mastitis Syphilis	Concoction with whole of *Leontis nepetifolia* taken orally.	15
61	*Oxalis corniculata* Linn (Oxalidaceae) (Voucher: Lucha035)	Seineh (Bamunka)	Whole plant	Gonorrhoea	Maceration with leaves of *Sida acuta* is taken orally.	14
62	*Paullinia pinnata* Linn (Sapindaceae) (Voucher: Lucha018)	Keiong (Bamunka)	LeavesBark	Syphilis	Concoction with inflorescence of *Musa sapienta* is taken orally.	
63	*Persea americana.* Miller (Lauraceae) (Voucher: Lucha069)	Pear Bier (Bambalang)	Bark	Syphilis	Concoction with barks of *Mangifera indica*, Ficus *benghalensis* and fresh leaves of *Psidium guajava* is taken orally.	3

Table 3. Contd

64	*Plectranthus* c.f *glandulosus* Hook. F (Lamiaceae) (Voucher: Lucha081)	Fenky (Bamunka) Lilui (Bamessing)	Leaves	Dysmenorrhoea Female infertility	Maceration is taken orally.	4
65	*Psidium guajava* Linn (Myrtaceae) (Voucher: Lucha046)	Megueba(Bamunka) Guava	Roots	Impotence	Concoction with roots of *Citrus sinensis* and roots of *Vernonia amygdalina* ais taken orally.	3
66	*Pseudospondias microcarpa* Engl (Anacadiaceae) (Voucher: Lucha064)	Wuoh (Bamunka)	Bark	Female infertility (pelvic inflammatory disease)	Decoction with honey is taken orally.	14
67	*Pteridium aquilinum* (Linn). Kohn. (Dennstaedteaceae) (Voucher: Lucha058)	Shesheh (Bambalang) Fern herb	Buds	Male infertility (poor erection, low sperm count)	Decoction is taken orally.	3
68	*Raphia hookeri* G. Mann and H. Walt (Arecaceae) (Voucher: Lucha008)	Raphia Sap Kuh (Bamunka)		Male and female infertility (pelvic inflammatory disease, low sperm count, urethritis)	Maceration is taken orally.	60
69	*Rhipsalis cassytha* Gaerth (Cactaceae) (Voucher: Lucha017)	Kurbeh Stem (Bamessing)		Threatened abortion	Decoction is taken orally.	5
70	*Ricinus communis* Linn (Euporbiaceae) (Voucher: Lucha073)	Castor plant	Castor oil	Vaginal candidiasis Trichomoniais	Used as oil to fry leaves and stem barks of *Microglossa angolensis* and taken orally.	9
71	*Sanseviera liberica* Hort.ex. Gerome & Labroy. (Agavaceae) (Voucher: Lucha026)	Tohnekeh (Bamunka) Liee (Bambalang)	Leaves	Threatened abortion	Decoction is taken orally. Concoction with leaves of *Acanthus montanus* and bulbs of *Crimum zeylanicum* and raphia wine is taken orally.	8
72	*Senna alata* (Linn). Roxb (Caesalpinaceae) (Voucher: Lucha009)		Leaves	Female infertility (pelvic inflammatory disease)	Infusion is taken orally.	6
73	*Sida acuta* Burm. F. (Malvaceae) (Voucher: Lucha001)	Sheineh (Bamunka)	Leaves	Analgesic during labour Gonorrhoea	Juice is taken orally. Maceration with leaves of *Oxalis corniculata* is taken orally.	42
74	*Sida urens* Linn (Malvaceae) (Voucher: Lucha067)	Chochin (Bamunka)	Leaves	Threatened abortion Analgesia during labour	Maceration is taken orally.	8
75	*Sida veronicifolia* Lam (Malvaceae) (Voucher: Lucha036)	Longbah (Bamunka)	Whole plant	Analgesia during labour Dysmenorrhoea Male infertility (poor erection) Gonorrhoea Post partum pain	Concoction with *Crassocephalum biafrae, Emilia coccinea*, and *Vernonia ambigua* in raphia wine is taken orally.	14
76	*Solanum aculeastrum* var. *albifolium* (Solanaceae) (Voucher: Lucha070)	Leikeh (Bamunka)	Fruit	Female infertility (pelvic inflammatory disease)	Decoction is used as anal wash.	3
77	*Sonchus exauriculata* O. Hoftm Asteraceae (Voucher: Lucha054)	Ngenkeyih (Bamunka) Feutia (Bamessing	Leaves	Acute mastitis	Juice from warm leaves is applied topically.	7

Table 3. Contd

78	*Sorghum bicolar* (Linn). Moench (Gramineae) (Voucher: Lucha075)	Guinea corn Suyih (Bamunka)	Flower	Painful breast Chronic cystic mastitis	Pulverized leaves are used to massage the breast.	32
79	*Spilanthes filicaulis* (Schum & Thonn) C.D. Adams (Asteraceae) (Voucher: Lucha038)	Knuwnih (Bamunka) Bamogo (Bamali) Eeye for fowl	Leaves	Impotence	Maceration in palm wine is taken orally.	12
80	*Spathodea campanulata* P. Beauv (Bignoniaceae) (Voucher: Lucha055)	Kijejih (Bamunka); Mefuolofuoloh (Bamessing)	Bark	Male / female infertility (pelvic inflammatory disease, poor erection) Post partum pain Ascended testes	Decoction is taken orally.	12
81	*Sterculia tragacantha* Lindl (Sterculiaceae) (Voucher: Lucha033)	Kukukeh (Bamunka)	Bark	Male / female infertility (preorgasm ejaculation, orchitis) Dysmenorrhoea	Decoction is taken orally.	16
82	*Tabernaemontana c.f ventricosa* Hochst.ex. A.D.C (Apocynaceae) (Voucher: Lucha063)	Teuneh (Bamunka)	Bark	Male / Female infertility (Urethritis, Orchitis) Impotence	Concoction with whole plant of *Bidens pilosa* and limestone is taken orally.	20
83	*Triumfetta cordifolia* A. Rich (Tiliaceae) (Voucher: Lucha071)	Kuhgunuh (Bambalang)	Leaves	Vaginal candidiasis	Concoction with bark of *Persea Americana*, *Ficus benghalensis* and fresh leaves of *Psidium guajava* is taken orally.ken orally.	5
84	*Vernonia ambigua* Kotschy & Peyr (Asteraceae) (Voucher: Lucha048)	Venegegihkeh (Bamunka); Shufeng (Bambalang)	Leaves	Male / female infertility (pelvic inflammatory disease, low sperm count) Gonorrhoea Impotence Post partum pains Dysmenorrhoea	Concoction with *Crassocephalum biafrae, Emilia coccinea*, and *Vernonia ambigua* in raphia wine is taken orally.	30
85	*Vernonia amygdalina* Del (Asteraceae) (Voucher: Lucha011)	Yiekeh (Bamessing) Bitter leaf	Roots	Impotence	Concoction with roots of *Citrus sinensis* and roots of *Psidium guajava* is taken orally.	3
86	*Vernonia guineensis* Benth (Asteraceae) (Voucher: Lucha015)	Kerkun (Bamali)	Roots	Syphilis Gonorrhoea Male and Male / female Infertility (pelvic inflammatory disease, orchitis, epididymytis) Dysmenorrhoea	Maceration with lime is taken orally.	15
87	*Xanthosoma sagittaefolium* Schott (Araceae) (Voucher: Lucha004)	Red macabo	Tubers	Female infertility (pelvic inflammatory disease)	Pulverized tubers are mixed with water and limestone, exposed in sunlight for 4 hours is taken orally.	3
88	*Zehneria scabra* (L.f). Sond (Cucurbitaceae) (Voucher: Lucha085)	Valeih (Bamunka)	Leaves	Threatened abortion	Maceration is taken orally.	13

not the characteristic ecdysones in this family.

Conclusion

Eighty-eight plant species were sampled belonging to seventy-seven genera and fourty-two plant families. Amongst these plants, thirty-two have been reported to treat diseases linked with the reproductive system in Ndop Central Sub-division of Cameroon. Some of them have also been reported to treat diseases of the repro-ductive system in other parts of Africa. Ndop Central Sub-division shares the same medicinal plants knowledge

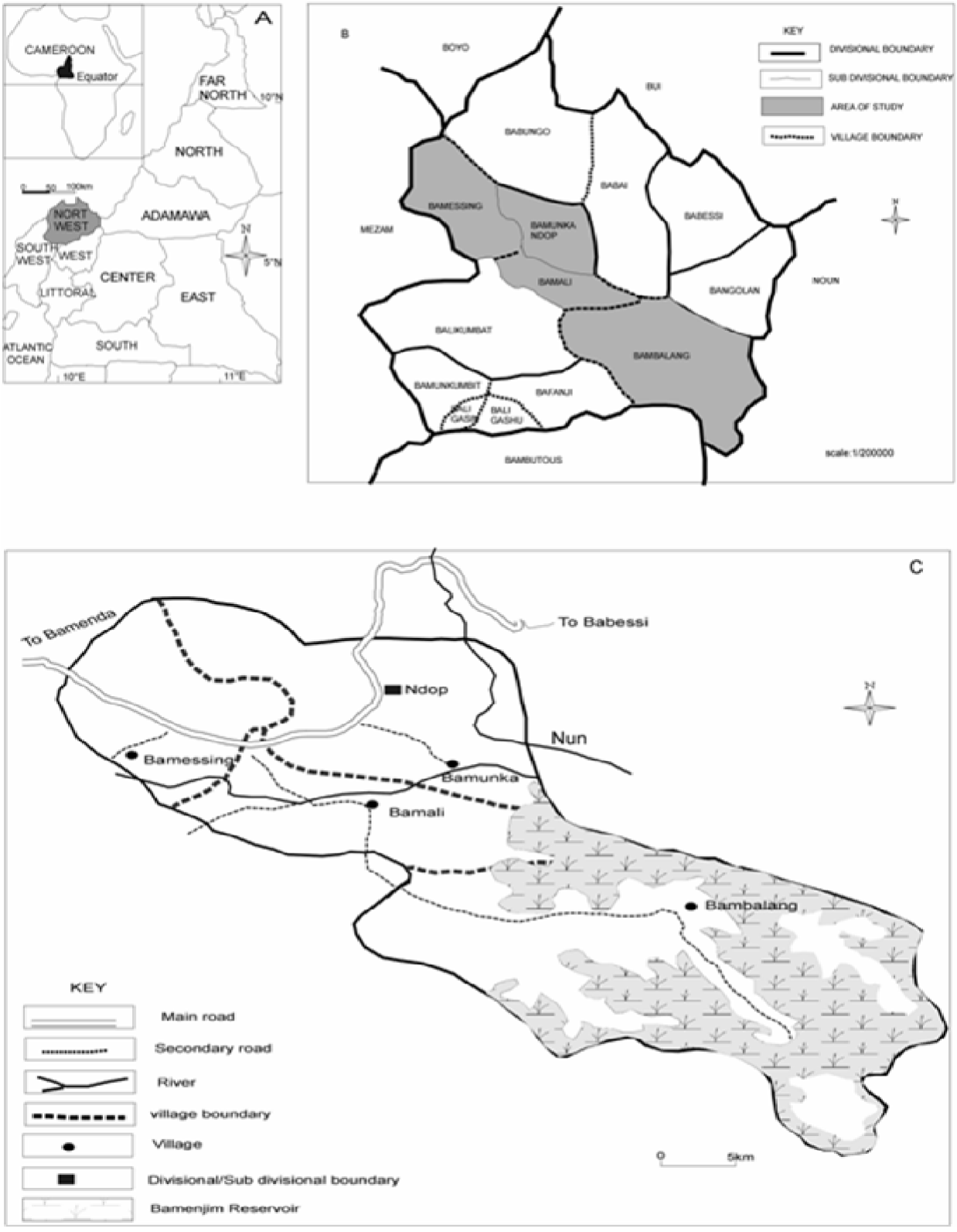

Figure 1. Geographical location of study area.
A: Northwest Region of Cameroon.
B: Ndop Central Sub-division in Ngoketunjia Division.
C: Ndop Central Sub-Division Lay-out.
Source: Adapted from the map of the Northwest Region. MINUH, Bamenda.

Table 4. Results of chemical tests.

S/No	Plants	Part used	Alkaloids	Phenols	Flavonoids	Coumarines	Fatty acids	Sterols	Triterpenoids
1	*Abelmoschus*	Leaves	+	+	-	+	+	+	+
	cailei (A.Chev) J.M.C. Stevels	Stem	+	+	-	+	+	+	+
2	*Hibiscus asper* Hook. f	Whole plant	+	+	-	-	+	+	+
3	*Hibiscus rosa-sinensis* Linn	Whole plant	+	+	+	-	+	+	+
4	*Hibiscus sabdariffa* Linn	Whole plant	+	+	+	-	+	+	+
5	*Hibiscus*	Leaves	+	+	-	-	+	+	+
	schizopetalous Hook.f	Stems	+	+	-	+	+	+	+
6	*Malvaviscus*	Leaves	+	+	+	-	+	+	+
	arboreous Cav	Stems	+	+	-	+	+	+	+
7	*Sida acuta* Burm.f	Whole plant	+	+	-	+	+	+	+
8	*Sida rhombifolia*	Leaves	+	+	-	-	+	+	+
	Linn	Stems	+	+	-	+	+	+	+

(+ Present; -Absent).

with other parts of Cameroon and Africa. Thisis a validation of the knowledge of Ndop Central Sub- divi-sion traditional healers to their counterparts in other parts of Cameroon.

The presence of alkaloids and phenolic compounds in the eight plant species belonging to four genera of the family Malvaceae can be of help in the chemosystematics of the family, if the types of compounds are known. Absence of ecdysones indicates that they are not the characteristic compounds in the family.

ACKNOWLEDGEMENTS

The authors appreciate the collaboration of the traditional medical practitioners and other villagers of Ndop Central Sub-division as well as Dr. Tchiengue Barthelemy, Dr. Onana Jean Michel and Mr. Paul Mezili of the Cameroon National Herbarium for validating plant identifications. We are also grateful to the Alango Foundation for providing facilities for the chemical analyses.

REFERENCES

Adjanohoun JE , Ahyi AMR, Assi Aké L , Baniakina J, Chibon P, Cusset G, Doulou V, Enzanza A, Eymè JE, Goudoté EN Keita A, Mbemba C, Mollet J, Moutsamboté JM, Mpati J, Sita P (1988). Mèdecine traditionnelle et pharmacopée. Contribution aux études ethnobotaniques et floristiques en République Populaire du Congo. Agence de Coopération Culturelle et Technique. Congo. Pp. 338-403.

Adjanohoun JE, Aboubakar N, Dramane K, Ebot ME, Ekpere JA., Enow-Orock EJ, Focho D, Gbile Z O, Kamanyi A, Kamsukom J, Keita A, Mbenkum, Mbi CN, Mbiele AL, Mbome LL, Mubiru NK, Nancy WL, Nkong Meneck B, Satabie B, Sofowora A., Tamze V, Wirmum CK (1996). Traditional medicine and Pharmacopoeia. Contribution to Ethnobotanical and Floristic Studies in Cameroon. OAU /STRC Lagos Nigeria. Pp. 422-491.

Ayensu ES (1978). Medicinal plants of West Africa. Reference publications Inc, U.S.A. pp. 129-174.

Bep OB (1986). Medicinal plants of Tropical West Africa. Cambridge University Press. London. pp 215-239.

Bhattarai NK (1992). Folk medicinal use of plants for respiratory complaints in Central Nepal. *Fitoterapia.* LXIV (2): 163-173.

Cobley LS (1962). An introduction to Botany of tropical Crops. Longman-London. pp. 134-147.

Darwish FM, Reinecke MG (2003). Ecdysteroids and Other constituents from *Sida spinosa* L. Phytochemistry 62(8): 1179-1184.

Dinan L, Bourne P,Whiting P (2001). Phytoecdysteroid Profiles in Seeds of *Sida spp,* (Malvaceae). Phytochem. Anal. 12 (2): 110-119.

Focho DA., Ndam TW, Fonge BA. (2009). Medicinal plants of Aguambu-Bamumbu in the lebialem highlands, southwest province of Cameroon.Afr. J. Pharm. Pharmacol. 3(1): 001-013.

Ghosals, Chauhan RB, Mehta R (1975). Alkaloids of *Sida cordifolia*. Phytochemistry 14(3): 830-832.

Harborne JB (1973). Phytochemical methods, London Chapman and Hall, Ltd. pp. 49 – 74.

Husain A (1988). Economic importance of exploitation of medicinal plants in the conservation of medicinal plants. Processing of an international consultation 21-27. March 1988, held at Chaing Mai Thailand Akerele O., Heywood V, and Synge, H. Cambridge University Press UK. pp. 1-15.

Igoli JO, Ogali OG, Tor-Anyiin TA., Igoli NP (2005). Traditional medicine practice amongst the Igede people of Nigeria. Part II. Afr. J. Trad. CAM. 2(2): 134-152.

Iwu MM (1993). Handbook of African medicinal Plants C.R.C Press Boca Raton. Ann. Arbor Florida U.S.A. pp. 215-235.

Jain SK, Rao RR (1976). A handbook of field and herbarium methods. Today and tomorrow printers and publishers. New Delhei. pp. 1-32 Judd WS, Campbell CS, Kellogg EA, Stevens PF (1999). Plant Systematics. A phylogenetic Approach. Sinauer Associates, Inc. Sunderland, U.S.A. pp. 84-88

Karou D, Dicko MH, Sanon S, Simpore J, Traore AS (2000). Antimalarial activity of *Sida acuta* Burm.f (Malvaceae) and *Pterocarpus erinaceous* Poir (Fabaceae). J. Ethnopharmacol. 73 (1-2): 233-241.

Megne BC (1998). Contribution à l'Etude des Plantes médicinales du Cameroun. Inventaire de quelques plantes médicinales utilisées dans le traitement des MST dans la région de Dschang. Mémoire de Maîtrise en Botanique. Université de Dschang. pp. 1-45.

MINEF. Annual report of Activities carried out by the Divisional Section for Forestry, 1999, Ngoketunjia. Ministry of Environment and Forestry. pp. 2-4

Nkouandou I (2005). Divisional Delegation of Forestry and Wildlife for Ngoketunjia.Annual Report.pp 2-7.

Okoegwale EE, Omefezi JU (2001). Some herbal preparations among the people of Isoko Clan of Delta State, Nigeria. J. Appl. Sci. 4: 2350-2371.

Olorode O. (1984). Taxonomy of West African Flowering Plants. Longman. London. pp.1-158.

Sofowora A (1993). Medicinal Plants and traditional medicines in Africa.2nd Edition. Karthala Ibadan Nigeria pp. 268-289

Statistical Data 2006. Approved Ndop Council Budget. p. 1

Trease GE, Evans WC 1(989). Pharmacognosy.11th Edition. Brailliar Tindel Can. Macmillian Publishers. pp. 124-127.