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Diversity of plants used to treat respiratory diseases in Tubah, northwest region, Cameroon

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This study was conducted in Tubah subdivision, Northwest region, Cameroon, aiming at identifying plants used to treat respiratory diseases. A semi-structured questionnaire was used to interview members of the population including traditional healers, herbalists, herb sellers, and other villagers. The plant parts used as well as the modes of preparation and administration were recorded. Fifty four plant species belonging to 51 genera and 33 families were collected and identified by their vernacular and scientific names. The Asteraceae was the most represented family (6 species) followed by the Malvaceae (4 species). The families Asclepiadaceae, Musaceae and Polygonaceae were represented by one species each. The plant part most frequently used to treat respiratory diseases in the study was reported as the leaf. Of the 54 plants studied, 36 have been documented as medicinal plants in Cameroon's pharmacopoeia. However, only nine of these have been reported to be used in the treatment of respiratory diseases.

Key words: Medicinal plants, Tubah subdivision, respiratory diseases, diversity.

INTRODUCTION

Traditional medical practices in Africa date as far back as 4000 years. They were the only medical system in Africa for health care before the advent of modern or orthodox medicine. Today, traditional medicine is still the predominant means of health care in developing countries where about 80% of their total population depends on it for their well being (WHO, 1978). Knowledge of medicinal plants is however, rapidly dwindling due to the influence of western lifestyles, reduction in number of traditional healers and lack of interest of the younger generations to carry on the tradition (Bussman et al., 2006; Muthu et al., 2006). In Cameroon, as in all developing countries, plants are an important source of medicine due to high costs of modern synthetic drugs offered by orthodox medicine. Besides the high costs, the causal agents of many diseases have been reported to

be resistant to modern drugs but not to traditional medicine (Hussain, 1988; Iwu, 1993; Bussmann, 2006; Ramesh and Okigbo, 2008). Also, many of the herbal remedies used are quite readily available. Previous studies have led to the publication of a pharmacopoeia for Cameroon (Adjanohoun et al., 1996). The pharmacopoeia does not cover many parts of the country including the Tubah area of the Northwest Region which is an area that relies much on traditional health care. There are few functioning government or private health centres in Tubah and natives often have to travel to the Regional capital about twenty kilometres away to consult a doctor. During the rainy season the most common illnesses in the area of study include various forms of cough and other respiratory diseases. Many of these are treated locally using common herbs (both cultivated and growing in the wild). The objective of this study was to interact with local traditional healers and villagers and document indigenous knowledge on plants used to treat ailments of the respiratory system.

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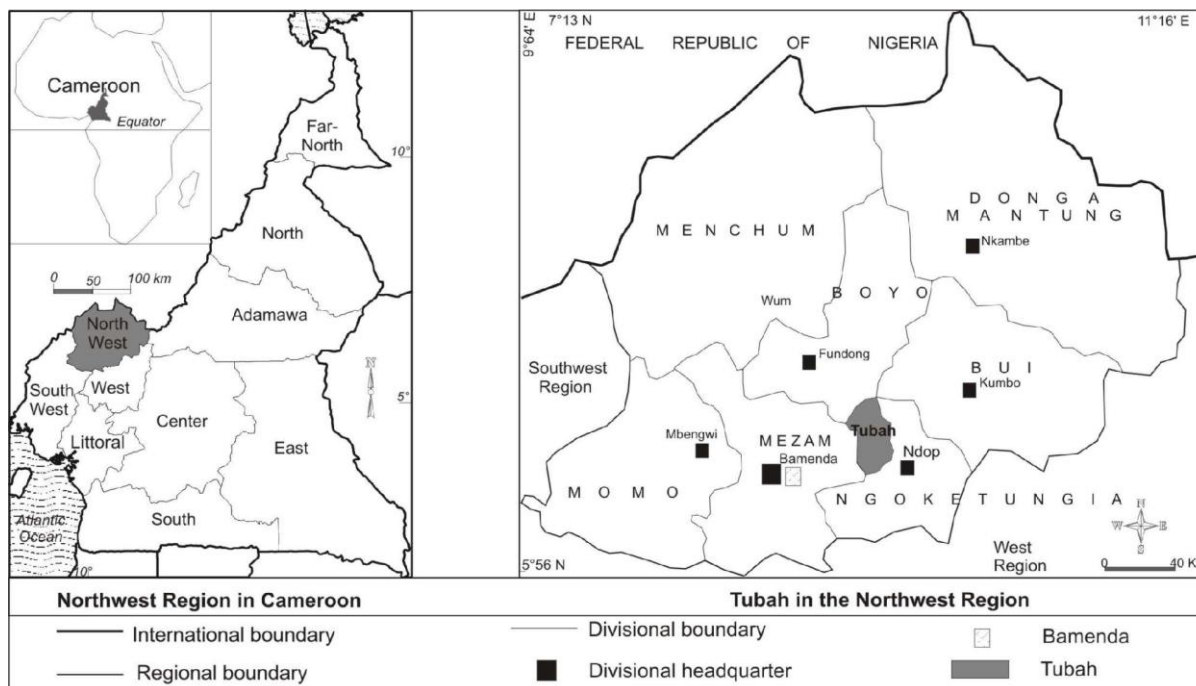


Figure 1. Study area (Administrative map of Cameroon, INC 1996, realization: CEREHT, Univ. Dschang, June 2009).

MATERIALS AND METHODS

Study area

Tubah subdivision is located in Mezam Division, Northwest Region of Cameroon. It includes four main villages (Bambili, Bambui, Kedjom-keku and Kedjom-ketingoh) located between latitude 4°50' - 5°20'N and longitude 10°35' - 11°59'E (Figure 1) with a total population of about 52635 inhabitants. The altitude ranges between 950-1500 m above sea level. The vegetation consists, to a large extent of savannah grassland, with the Poaceae forming the main vegetation layer, interspersed with a few other annuals and perennials and trees (Ngwa, 1979). According to Aswingnue (2003), the vegetation of this region is both natural and cultivated. The cultivated vegetation consists of planted trees like cola nut, eucalyptus, raffia palm and other fruit trees.

The zone has two seasons, the dry season from November to February and the rainy season from March - October. The mean annual rainfall is about 2200 mm with July, August and September registering the highest rainfall and December having the lowest rainfall. The mean annual temperature is about 20.67°C with January and February registering the highest and July, August and September registering the lowest temperatures (Yuninui, 1990).

Collection of information

A reconnaissance survey was first carried out in the region to identify possible informants in Tubah and also to meet with traditional rulers (fons, chiefs and quarter heads) to obtain their permission to conduct the study. Field trips were made between December, 2007 and June, 2008 to collect and identify plants used traditionally for the treatment of respiratory diseases.

Ethnobotanical information was collected using the method described by Jovel et al. (1996), consisting of general conversation and questionnaires. The respondents were traditional healers,

herbalists, herb sellers, and other villagers who had practical knowledge in the use of medicinal plants in the treatment of diseases of the respiratory system. Respondents were asked to collect plant specimens they knew and used in the treatment of diseases of the respiratory system. They accompanied the researchers to the field to identify the various plant species when they were not growing or cultivated near their homes. Methods of selecting informants depended on the distribution of the local people having folk knowledge. Specimens of medicinal plants indicated by informants were collected, pressed and dried following stipulations of Olorode (1984). Data collected included local names of the plants, diseases treated, the plant parts used, the methods of preparation and administration. Dried plant specimens were identified by their local names and later validated at the National Herbarium Yaounde (YA). Voucher specimens were deposited in the University of Dschang Teaching Herbarium.

RESULTS

Table 1 shows that of the 338 informants in the study, 87 (25%) were traditional medical practitioners. A total of 187 (55.3%) informants were villagers with practical knowledge of plants used to treat respiratory diseases.

Table 2 shows that it is common for a plant to be called differently in villages within the study area (*Bryophyllum pinnatum* is called fezoh in Bambui and niwuh in Bambili). Also, some of the plants bear the same vernacular/common names in the region (*Ocimum gratissimum* is called masepo in all the villages).

The survey permitted the sampling of fifty four (54) plant species belonging to 51 genera and 33 families. The Asteraceae was the most represented family (6

Table 1. Number of informants interviewed.

Village	No. of traditional healers	No. of herbalists	N° of villagers	N° of herb sellers	Total
Bambili	31	17	61	1	110
Bambui	23	20	42	3	88
Kedjom – Keku	6	10	25	2	43
Kedjom– Ketingoh	27	11	59	0	97
Total	87	58	187	6	338
Percentage (%)	25.7	17.2	55.3	1.8	100.0

Table 2. Documentation of plants used in the treatment of reparatory diseases in Tubah subdivision.

	Species and Family names	Local names	Parts used	Diseases treated	Preparation and administration	Freq*
1	<i>Acanthus montanus</i> (Nees).T. Anders (Acanthaceae)	Acninuwi-sechen (Bambili)	Leaves	Pneumonia	Concoction with leaves of <i>Hibiscus asper</i> , <i>Polyscias fulva</i> , <i>Pavonia burchelli</i> , stem of <i>Kigelia africana</i> and seeds of <i>Aframomum melegueta</i> in water is taken orally.	14
2	<i>Eremomastax speciosa</i> (L.) Juss. (Acanthaceae)	Banjam-moh (Bambui)	Leaves	Cough	Concoction with leaves of <i>Pavonia burchelli</i> and leaves and stem of <i>Melinis minutifolia</i> in water or palm wine is taken orally.	6
3	<i>Mangifera indica</i> (Linn.) R. Br. (Anacardiaceae)	Mangro (Bambili)	Leaves	Cough/Sore throat	Decoction of young leaves in water is taken orally.	27
4	<i>Xylopia aethiopica</i> (Dunal.) A. Rich. (Annonaceae)	Kii (Bambili)	Fruits	Cough	Decoction of fruits in water is taken orally.	91
5	<i>Centella asiatica</i> (Linn) Urb. (Apiaceae)	Lelapse (Balesing)	Leaves	Cough/Hiccup	Decoction of leaves in water is taken orally for cough. Leaves are chewed for hiccup.	53
6	<i>Ageratum conyzoides</i> Linn. (Asteraceae)	Dsehshi (Bambili)	Whole plant	Cough/Asthma/ Catarrh	Concoction of ground leaves with honey is taken orally	33
7	<i>Chromolaena odorata</i> (Linn.)King.& Robinson (Asteraceae)	Christmas Bush	Leaves	Cough	Decoction of leaves and stem in water is taken orally.	23
8	<i>Conyza sumatrensis</i> H.B. and K. (Asteraceae)	Sidji (Lamsu)	Leaves	Catarrh / Nasal congestion	Leaf juice is applied as nasal drops.	10
9	<i>Dichrocephala intergrifolia</i> L. (Asteraceae)	Tsishi (Kedjom-Ketingoh)	Leaves	Cough	Leaves are chewed	22
10	<i>Emilia coccinea</i> A. Don. (Asteraceae)	Mbode (Bambili)	Leaves	Asthma/Cough	Infusion of young leaves in warm water is taken orally.	6
11	<i>Spilanthes filicaulis</i> (Shum. and Thon.) C.D. Adams (Asteraceae)	Titege-nwi (Bambili)	Flowers	Pneumonia	Concoction of flowering heads with leaves of <i>Hibiscus asper</i> , <i>Polyscias fulva</i> , <i>Pavonia burchelli</i> , stem of <i>Kigelia africana</i> and seeds of <i>Aframomum melegueta</i> in water is taken orally.	34

Table 2. Contd.

	Species and Family names	Local names	Parts used	Diseases treated	Preparation and administration	Freq
12	<i>Asclepias curassavica</i> Linn. (Asclepiadaceae)	Touhii (Kedjom-Ketingoh)	Leaves	Cough	Decoction of leaves in water is taken orally.	14
13	<i>Polyscias fulva</i> J. R. and Forst (Araliaceae)	Ake-kwe (Bambili)	Leaves	Pneumonia	Concoction with leaves of <i>Hibiscus asper</i> , <i>Pavonia burchelli</i> , stem of <i>Kigelia africana</i> and seeds of <i>Aframomum melegueta</i> in water is taken orally.	47
14	<i>Kigelia africana</i> (Lam.) Benth. (Bignoniaceae)	Etenge (Bambui, Bambili)	Stem	Pneumonia	Concoction with leaves of <i>Hibiscus asper</i> , <i>Polyscias fulva</i> <i>Pavonia burchelli</i> and seeds of <i>Aframomum melegueta</i> in water is taken orally.	74
15	<i>Cordia platythirsa</i> Bak. (Boraginaceae)	Cordia	Leaves	Cough	Leaves are chewed.	5
16	<i>Ananas comosus</i> Linn. (Bromeliaceae)	Pineapple	Fruit	Cough	Concoction of juice and honey is taken orally.	22
17	<i>Canarium shweinfurthii</i> L. (Burseraceae)	Imboh (Bambili) Imbeh (Bambui)	Resin	Catarrh	Smoke produced by burning resin in charcoal is inhaled.	26
18	<i>Dacryodes edulis</i> Eng. (Burseraceae)	Atzoh (Bambui)	Resin	Catarrh	Smoke produced by burning resin in charcoal is inhaled	11
19	<i>Carica papaya</i> Linn. (Caricaceae)	Pawpaw	Leaves	Asthma / cough	Smoke produced by burning dried leaves is inhaled for asthma. Decoction of roots is taken orally for cough	102
20	<i>Garcinia kola</i> Haeckel. (Clusiaceae)	Bitter kola	Seeds	Cough	Seeds are chewed	113
21	<i>Bryophyllum pinnatum</i> (Lam.) Oken (Crassulaceae)	Fezoh (Bambui) Niwh (Bambili)	Leaves	Asthma / Nasal congestion	Juice extracted from warm leaves is taken orally for asthma in children. It is applied as nasal drops for nasal congestion.	98
22	<i>Brassica oleracea</i> L. (Cruciferae)	Cabbage	Leaves	Sore throat	Concoction of juice with honey is taken orally.	4
23	<i>Cupressus semperivens</i> Mills. (Cupressaceae)	Cypress	Resin	Catarrh	Burn resin in charcoal and inhale smoke.	5
24	<i>Euphorbia hirta</i> Linn (Euphorbiaceae)	Asthma plant	Whole plant	Asthma	Burn dried plants and inhaled smoke.	102
25	<i>Arbrus precatorius</i> L. (Fabaceae)	Nzo-zurang (Babessi)	Leaves	Cough	Leaves are chewed	20
26	<i>Ocimum gratissimum</i> L. (Lamiaceae)	Masepo (all four villages)	Leaves	Cough	Warm leaves are crushed and the aromatic odour produced is inhaled.	103
27	<i>Thymus vulgaris</i> L. (Lamiaceae)	Thyme	Whole plant	Cough/ catarrh	Tisane prepared with whole plants in water is taken orally.	75
28	<i>Allium cepa</i> Linn. (Liliaceae)	Nioshi (Bambili, Bambui)	Bulb	Cough / Asthma	Cooked or raw bulb is taken orally.	88
29	<i>Allium sativum</i> Linn. (Liliaceae)	Garlic	Bulb	Cough	Concoction of ground bulb with ginger rhizome in honey is taken orally.	70

Table 2. Contd.

Species and Family names	Local names	Parts used	Diseases treated	Preparation and administration	Freq
30 <i>Aloe barbadensis</i> Linn. (Liliaceae)	Aloe vera	Leaves	Asthma / bronchitis catarrh	Concoction with leaves of <i>Eucalyptus globulus</i> is administered as steam therapy	84
31 <i>Hibiscus rosa-sinensis</i> L. (Malvaceae)	Hibiscus flower	Flowers	Throat infection	Flowers are chewed	9
32 <i>Hibiscus vitifolius</i> L. (Malvaceae)	Wild hibiscus	Leaves/ flowers	Pneumonia	Concoction with leaves of <i>Polyscias fulva</i> , <i>Pavonia burchelli</i> , stem of <i>Kigelia africana</i> and seeds of <i>Aframomum melegueta</i> in water is taken orally.	6
33 <i>Hibiscus asper</i> Hook.F.E (Malvaceae)	Nchone (Bambili)	Leaves	Pneumonia	Concoction with leaves of <i>Polyscias fulva</i> , <i>Pavonia burchelli</i> , stem of <i>Kigelia africana</i> and seeds of <i>Aframomum melegueta</i> in water is taken orally.	6
34 <i>Pavonia burchelli</i> (D.C.) R.A.Duer. (Malvaceae)	Igebuo (Bambili)	Whole Plant	Cough/ Asthma	Concoction of whole plant with inflorescence of <i>Musa paradisiaca</i> in palm wine or water is taken orally.	4
35 <i>Ficus exasperata</i> Val. (Moraceae)	Achwini (Bambui)	Leaves	Cough/ catarrh	Concoction with leaves of <i>Eucalyptus globulus</i> and <i>Psidium guajava</i> in water is taken orally.	14
36 <i>Ensete gilletti</i> Linn. (Musaceae)	Tonguo (Bambili)	Roots	Tuberculosis	Decoction in water or palm wine is taken orally.	6
37 <i>Musa paradisiaca</i> Walker & Sillans. (Musaceae)	Akodong (kedjom- keku)	Fruit peelings/ flowers	Cough / asthma	Burn dried green fruit peelings, make a paste of the ash with palm oil and take orally.	2
38 <i>Eucalyptus globulus</i> Libille. (Myrtaceae)	Fosigar (Kedjom- keku)	Leaves / flowers	Cough/catarrh/ asthma	Decoction of leaves and flowers is taken orally for catarrh. Steam therapy is administered for cough and asthma.	98
39 <i>Psidium guajava</i> L. (Myrtaceae)	Ngabang (Bambui)	Leaves	Cough/catarrh/ bronchitis	Concoction with leaves of <i>Eucalyptus itrates</i> and <i>Ficus exasperate</i> is taken orally.	107
40 <i>Elaeis guineensis</i> Jacq. (Palmae)	Njanbih (Bambili)	Cones and oils	Cough	Paste of burnt empty fruit bunches mixed with palm oil is taken orally.	18
41 <i>Raphia hookeri</i> A. Don. (Palmae)	Atoh (Bambui)	Sap	Various ailments	Raffia palm wine used as solvent in many preparations	9
42 <i>Piper umbellatum</i> Torr. (Piperaceae)	Mbode (Bambui)	Leaves	Cough	Paste cooked in palm oil is taken orally.	17
43 <i>Cymbopogon citratus</i> (D.C) Staph. (Poaceae)	Fever grass	Leaves	Catarrh/colds	Crush leaves to produce aromatic odour for catarrh. A tisane of leaves in water and honey is taken orally for cough.	109

Table 2. Contd.

Species and family names	Local names	Parts used	Diseases treated	Preparation and administration	Freq*
44 <i>Melinis minutifolia</i> L. (Poaceae)	Nivabeng (Bambili, Fishifebeh, Kedjom-ketingoh)	Whole plant	Cough	Maceration of whole plant and leaves of <i>Eremomastax speciosa</i> , <i>Solanum torvum</i> and <i>Pavonia burchelli</i> palm wine is taken orally.	12
45 <i>Zea mays</i> L. (Poaceae)	Ngwashang (Bambili)	Style	Cough	Burn styles with an empty bunch of palm infructescence, mix ash with palm oil and take orally.	15
46 <i>Rumex bequaertii</i> de Wild. (Polygonaceae)	Sessotcha (Bamena)	Roots	Cough	Roots are chewed.	8
47 <i>Clematis sinensis</i> Freb. (Ranunculaceae)	Ntsoi (Lamso)	Leaves	Catarrh	Crush fresh leaves to produce strong aromatic odour and inhale.	11
48 <i>Citrus lemon</i> (L.) Burn. F. (Rutaceae)	Lamshi (Bambili)	Fruits	Cough	Juice mixed with honey is taken orally.	73
49 <i>Nicotiana tabaccum</i> Linn. (Solanaceae)	Ndabah (Bambui)	Leaves	Catarrh	Soak leaves in fermented raffia wine, dry and grind to produce a snuff. Administer nasally.	5
50 <i>Solanum torvum</i> Swartz. (Solanaceae)	Ananah (Bambili)	Fruits	Cough	Fruits are roasted, pulverised, mixed with palm oil and taken orally.	7
51 <i>Kola nitida</i> Schott and Bandl (Sterculiaceae)	Nibih (Bambui)	Fruit husk	Cough	Burnt dried pericarps of the fruit mixed with palm oil are taken orally.	6
52 <i>Aframomum danielli</i> K. Schum (Zingiberaceae)	Ntsoh (Bambui)	Seeds	Cough	Seeds are chewed	6
53 <i>Aframomum melegueta</i> (Rox.) K. Schum (Zingiberaceae)	Titege-nwi (Bambili)	Seeds	Pneumonia	Concoction of seeds with leaves of <i>Hibiscus asper</i> , <i>Polyscias fulva</i> , <i>Kigelia africana</i> stem and leaves of <i>Pavonia burchelli</i> and in water is taken orally.	34
54 <i>Zingiber officinale</i> Roscoe. (Zingiberaceae)	Ginger	Rhizomes	Cough	Rhizomes are chewed.	102

* = Frequency of citation of plant.

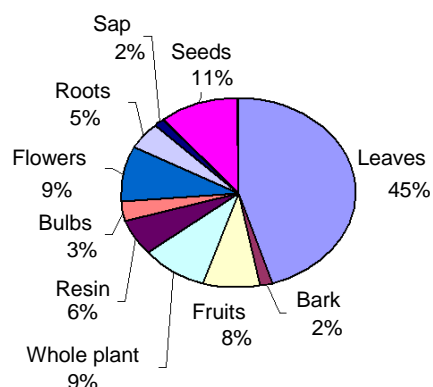


Figure 2. Percentages of parts of plants used.

species) followed by the Malvaceae (4 species). The families Asclepiadaceae, Musaceae and Polygonaceae were represented by one species each. The leaves or whole plants were mostly used for herbaceous plants, stem barks for trees while the bulbs, flowers, fruits, seeds, resin and sap were least used (Figure 2). Nine different respiratory ailments were encountered namely cough, catarrh, asthma, pneumonia, hiccup, sore throat, nasal congestion and tuberculosis (Table 3). The major modes of preparation of remedies were concoctions, followed by decoctions, infusions, maceration and steam inhalation.

Garcinia kola had the highest frequency of citation (113) as an ingredient for the treatment of respiratory

Table 3. Diseases and herbs used.

Disease	Plant used (numbers as in Table 2)
Pneumonia	1,11,13,32,33,53
Cough	2,3,4,5,6,7,9,10,12,15,16,19,20,25,26,27,29,34,35,37,38,39,40,42,43,44,46,48,50,51,52,54
Hiccup	5
Sore throat	3,22,31
Asthma	6,10,21,24,28,30,35,37,38
Catarrh	6,8,17,18,23,27,30,38,39,43,47,49
Nasal congestion	8,21
Bronchitis	30,39
Tuberculosis	36

diseases, followed by *Carica papaya* and *Euphorbia hirta* (102) for cough.

In Table 3, the plants are regrouped according to the respiratory ailments they are used to manage. It indicates that most of the plants are used to treat cough and only *Ageratum conyzoides*, *Aloe barbadense*, *Eucalyptus globulus* and *Psidium guajava* were multipurpose plants, each used to treat more than one disease.

Figure 2 gives the percentages of plant parts used. The leaves are the commonly used plant parts while the sap and barks are the least used.

DISCUSSION

Plant nomenclature in the Tubah dialects is complex. Plant names are mostly related to their appearances and uses. Bussmann et al. (2006) made a similar observation while studying the ethnobotany of the Maasai people in Kenya, and concluded that this phenomenon prevails in all traditional societies. In this study a total of 54 different species belonging to 51 genera and 33 plant families were noted as medicinal plants used to treat 9 different types of respiratory diseases namely: asthma, bronchitis, catarrh, cough, hiccup, pneumonia, sore throat, colds and tuberculosis. The most frequently used plant part was the leaf (45%). This is because it is the site of manufacture and storage of many chemical compounds through photosynthesis, including alkaloids, tannins, coumarines, flavonoids, essential oils and inulins which are active components of most herbal preparations in high concentrations. These compounds have been reported to give relief to patients suffering from respiratory diseases (Okoewale and Omezezi, 2001; Okigbo and Igwe, 2007; Ramesh and Okigbo, 2008). Other important plant parts used are fruits, flowers and seeds. The major modes of drug preparation were in the form of concoctions and decoctions. Adjanahoun et al. (1996) also reported that these are the common forms of preparation of remedies for the treatment of diseases of the human respiratory system. 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. The most common mode of administration was oral. Occasionally, the drugs are administered by inhalation.

The Asteraceae constitute one of the largest and cosmopolitan angiosperm plant families. Its members have been reported to treat many ailments including respiratory diseases because they produce a broad range of secondary plant products such as terpenes and sesquiterpenes which give them their medicinal properties (Seaman, 1992; Sofowora, 1993; Adjanahoun et al., 1996; Bussmann, 2006; Focho et al., 2009a, b). Some of the plants listed in this work have also been reported in different parts of Cameroon as well as other countries in Africa and Asia as being effective against respiratory ailments (Ayensu, 1978; Bep, 1986; Adjanahoun et al., 1988; Bhattarai, 1992; Iwu, 1993 and Adjanahoun et al., 1996). Focho et al (2009) reported that *Bryophyllum pinnatum* is used by the Aguambu-Bamumbu people in Cameroon to treat difficult respiration in babies. Okigbo and Mmeka (2006) have also reported that *Euphorbia hirta* and *Ocimum gratissimum* are used to treat diseases of the respiratory system in Nigeria. The most utilized medicinal plants were *Cymbopogon citratus* (109 citations), *Psidium guajava* (107 citations), *Ocimum gratissimum*, (103 citations), *Euphorbia hirta* (102 citations) and *Zingiber officinale* (102 citations). Except for *Euphorbia hirta*, these are cultivated plants and should be encouraged for propagation. A few of the plants are multipurpose plants used in the treatment of other diseases. For example, stems and leaves of *Eremomastax speciosa* are used to treat dysentery, anaemia, regular menstruation and labour pains (Adjanahoun et al., 1996). The leaves of *Bryophyllum pinnatum* are used as an antiseptic on the infected navels of new born babies and to treat ear infections (Sunderland and Ndam, 2001). *Cymbopogon citratus* is dispensed as a diuretic and as a treatment of fevers and jaundice (Iwu, 1993). Some of the plants are listed for the first time in Cameroon as remedies for respiratory problems. These include *Dacryodes edulis*, *Asclepias curassavica* and *Xylopiya aethiopica*. Mekou (2005) reported that several species of *Xylopiya* other than

X. aethiopica are used in the treatment of respiratory problems like bronchitis, pneumonia and colds in the Mount Cameroon region. Iwu (1993) listed 150 African medicinal plants amongst which 38 were used to cure various respiratory disorders. Some of these are listed in Tubah for the same purpose including *Arbrus precatorius*, *Allium sativum*, *Elaeis guineensis*, *E. hirta* and *Xylopia aethiopica*. Of the 54 plants recorded in this study, 36 were listed as medicinal plants in Cameroon by Adjanohoun et al. (1996). Only nine of these 36 plants mentioned were reported to treat ailments of the respiratory system in Cameroon namely: *Eremomastax speciosa*, *E. hirta*, *Occimum gratissimum*, *Aframomum melegueta*, *Spilanthes filicaulis*, *Solanum torvum*, *Bryophyllum pinnatum*, *Polyscias fulva* and *Canarium scheinfurthii*.

Conclusion

The results of this study show that 54 medicinal plants belonging to 51 genera and 33 families are used to treat ailments of the respiratory system in Tubah subdivision in the Northwest Region of Cameroon. The family Asteraceae is the most represented family with 6 species followed by the families Liliaceae, Malvaceae, Poaceae and Zingiberaceae. Nine different respiratory diseases were encountered including coughs, catarrh, pneumonia, asthma, bronchitis, colds, sore throat, hiccup and tuberculosis. The plant parts used as medicine were leaves, fruits, flowers, seeds, bulb, roots, stems and sometimes the entire plant. Other plant products like resins, oils and sap are also considered as medicine or as essential parts of medicaments by some informants. Some of the plants reported have been previously listed in other pharmacopoeia either as treatments of respiratory diseases or other diseases.

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REFERENCES

Adjanohoun EJ, Ahyi AMR, Akeasi L, Boniakian J, Cusset G, Doulon V, Euzanga A, Zyme J, Goudote EN, Keita A, Mbembon C, Mollet J, Moustsamboters JM, Mpati JM, Sita P (1988). Médecine traditionnelle et pharmacopée du Congo. Contribution aux études ethnobotaniques et floristique en République Populaire du Congo. ACCT. Paris. p. 609.

Adjanohoun JE, Aboubaka N, Dramane K, Ebot ME, Ekpere JA, Enow-Orock EI, Focho D, Gbrile Z, Kamanyi A, Kamsukom J, Keita A, Nkongmeneck B, Satapie B, Sofowora A, Tamze V, Wirmum CK (1996). Traditional medicine and pharmacopoeia. Contribution to Ethnobotanical and floristic studies in Cameroon. OAU/STRC Lagos, Nigeria. p. 640.

Aswingnue L (2003). Human adaptation to physical environment, case study: Tubah Subdivision. A DIPES research project. University of Yaounde I. pp. 46.

Ayensu ES (1978). Medicinal plants of West Africa. Reference Publications Inc. Algonac, Michigan.

Bep OB (1986). Medicinal plants of Tropical West Africa. Cambridge University Press, London. p. 289.

Bhattarai NK (1992). Folk Medicinal use of plants for respiratory complaints in Central Nepal. Fitoterapia LXIV. (2): 1163-1170.

Bussmann RW (2006). Ethnobotany of the Samburu of Mt. Nyiru, South of Turkana, Kenya. J. Ethnobiol. Ethnomed. 2: 35.

Bussmann RW, Genevieve GG, Solio J, Lutura M, Lutuluo R, Kunguru K, Wood N, Mathenge S (2006). Plant use of the Maasai of Sekenani Valley, Maasai Mara, Kenya. J. Ethnobiol. Ethnomed. 2: 22.

Focho DA, Ndam WT, Fonge BA (2009a). Medicinal plants of Aguambu-Bamumbu in the Lebiale highlands, Southwest Province of Cameroon. Afr. J. Pharm. Pharmacol. 3(1): 1-13.

Focho DA, Newu MC, Anjah MG, Nwana FA, Ambo FB (2009). Ethnobotanical survey of trees in Fundong, Northwest Region, Cameroon. J. Ethnobiol. Ethnomed. 5: 17.

Igoli JO, Ogaji 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). Hand book of African medicinal plants. CRC Press, Boca Raton (Florida, USA).

Jovel EM, Cabanillas J, Towers GHN (1996). An ethnobotanical study of the traditional medicine of the Mestizo people of Suni Mirano, Loreto, Peru. J. Ethnopharmacol. 53: 149-156.

Mekou YB (2005). Inventory, distribution and uses of the Annonaceae of Mount Cameroon. Unpublished MSc thesis, University of Buea, Cameroon.

Ngwa JA (1979). A new geography of Cameroon. Longman group Ltd London.

Okigbo RN, Igwe DI (2007). The antimicrobial effects of *Piper guineense* 'uziza' and *Phyllanthus amarus* 'ebe-benizo' on *Candida albicans* and *Streptococcus faecalis*. Acta Microbiologica et Immunologica. 54(4): 353-366.

Okigbo RN, Mmeka EC (2006). An appraisal of phytomedicine in Africa. KMITL Sci. Technol. J. 6(2): 83-94.

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

Olorode O (1984). Taxonomy of West African flowering plants. Longman group Ltd London. Pp. 158.

Ramesh P, Okigbo RN (2008). Effects of medicinal plant combinations as anti-infectives. Afr. J. Pharm. Pharmacol. 2(7): 130-135.

Seaman FC (1992). Sesquiterpene lactones as taxonomic characters in Asteraceae. Bot. Rev. 48:121-595.

Sofowora A (1993). Medicinal plants and traditional medicine in Africa. Spectrum books Ltd. Ibadan, Nigeria.

Sunderland T, Ndam N (2001). Medicinal plants of the Limbe Botanic Garden. Methir Tydfil, UK.

WHO (1978). The promotion and development of traditional medicine. Technical report series, Geneva. pp. 622.

Yuninui NM (1990). Initiation practical report on Bambili Village. A research report, Regional College of Agriculture, Bambili. Cameroon. p. 45.