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Identification of medicinal plant species in Bauchi State – Nigeria

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Abstract
With the help of structured questionnaires, medicinal tree species in Bauchi state were identified and their ecological status noted. The state was stratified based on the prevailing three ecological zones and within each ecological zone, three Local Government Areas (LGAs) were randomly selected. The LGAs selected were Toro Dass and Bogoro from Northern Guinea Savanna, Alkaleri, Ganjuwa and Ningi from Sudan Savanna and Jama'are, Zaki and Gamawa from Sahel Savanna ecological zone. Within each LGA, twenty five questionnaires were distributed. The study reveals that twenty nine (29) tree species from nineteen (19) Botanical families are being used to cure such health problems as hypertension, cough and respiratory disorders, rheumatism, cancer, yellow fever, whitlow, pile, dysentery, diarrhea, tooth ache and ulcer among others. The study also reveals that nine of the identified tree species were rare, four occasional and five were ecologically frequent with only four trees each, for abundant and very abundant respectfully. Majority of the respondents (90%) claimed to be aware of tree planting campaign but only 5% had ever participated, even though, most of them have indicated their willingness to take part in future. Concerted effort towards production and planting of medicinal tree species and the need for orienting the herbalist on the importance of sustainable collection of plant resources were recommended.

Key words: Ecological status, ecological zones, health problems, Medicinal trees,

Introduction

Forest was blessed with numerous resources capable of providing comfort for man's existence on earth. These resources were of flora and fauna origin in addition to varied mineral resources which co-exist and either individually or collectively ensures the success of man on earth. These resources are renewable for ensuring the continuity of man. Forest accommodates plant resources of diverse form, ranging from microscopic to higher trees through herbs and shrubs. Forest is a store house for food and feed, ameliorator of weather and a primary source of renewable energy and medicine for cure of human ailment (Wakili and Abdullahi, 2013). For many decades forest has been the major source of important natural drugs responsible for curing many pathogenic problems. Ethno botanical research provide a wealth of information regarding both past and present relationship between plant and traditional use and societies investigation in to traditional use and management of local flora have demonstrated the existence of extensive local knowledge not only about the physical and chemical properties of many plant species but also the phonological ecological features (Gills,1992).

Traditional medicinal plants have become famous, and many have now found their way in to western medicinal treatment and aromatherapy (Bennett and Prance, 2000; Abdullahi *et al*., 2010). The plant base traditional medicinal systems continue to provide the primary health care to more than three quarters of the world populace (Shinwari and Khan, 1999). The World Health Organization has estimated that over 80% of the global population relies chiefly on traditional medicine (Bennett and Prance, 2000). Indigenous herbal and spiritual treatments are a part of the culture and dominant mode of therapy in any developing countries (Akerele, 1992). These traditional remedies with a considerable extent of effectiveness, are socially accepted, economically viable and mostly are the only available means (Reddy, 2004). Again one third of the modern pharmaceutical preparations have botanical origin (Akerele, 1992; Gills, 1992). International trade on medicinal plants is, therefore, increasing rapidly meanly as a result of intensified adoption of crude extracts for self medication by the general public in the developed countries (Vedavathy *et al*., 1994; Reddy *et al*., 2009).

With advent of human civilization, many systems of therapy have been developed primarily based on plants. In china for example, herbal medicine is used in conjunction with acupuncture, the insertion of the fine needles in to specific points of the body to free its energies (Reddy *et al*., 1998).

In Nigeria many fruits, spices, herbs and leafy vegetables used as food and for medicinal purposes have been reported and are obtained from wild where there may be as many as a thousand species (Soforowa, 1984). Plants have been used both in the cure and prevention of various diseases of human and their pets. Much of the traditional knowledge about plants, especially medicinal plants, is being lost with time, either because of the lack of studies or by the inadequate use of plant resources (Huxley, 1994; Reddy, 2004).

Ethno botanical research can provide a wealth of information regarding both past and present relationships between plants and traditional societies. Investigation In to traditional use and management of local flora has demonstrated the existence of extensive local knowledge of not only about the physical and chemical properties of many plant species, but also their phenological and ecological features (Gills, 1992). In addition to its traditional roles in economic botany and exploration of human recognition, Ethno botanical research has been applied to current areas of study such as biodiversity prospecting and vegetation management (Reddy, 2004; Abdullahi and Ibrahim, 2009). It is hoped that in the future, ethno botany may play an increasingly important role in sustainable development and biodiversity conservation (Reddy *et al*., 2009). Ethno botanical investigation has led to the documentation of a large number of wild plants used by the local communities for meeting their multifarious requirements (Abdullahi *et al*., 2010)

Plant resources play a vital role in solving multidimensional health related problems. This relationship started since the beginning of mankind. People used the indigenous plant material in negotiating their numerous health problems. However, these floral compositions of earth are being wantonly removed without regards to suitability of utilization and regenerative capacity of the forest as a result of population explosion and its attendant industrialization and urbanization. The resulting effect of this scenario is rapid disappearance of these species of medicinal value and therefore calls for concerted effort in making same known to all and sundry before getting extinct. The objectives of this study were to:

a) Identify plant species being used in solving health related matters in Bauchi state,
b) Identify part (s) of plant used as medicine,
c) Investigate the efforts of herbalist in conservation of medicinal plant in Bauchi state, and
d) Determine the ecological status of medicinal plants in Bauchi state

Materials and Methods

Study area

According to Akpan *et.al*, 2007, Bauchi state has total land area of 49,259.01km2 with a population of 4.6million people. It is located between latitude90 301 and 12^{o} 30^{1} North of the equator and longitude 8^{0} 50^{1} and 11^{0} East of the Greenwich meridian. The state has a typical tropical climate marked clearly by

the dry and rainy seasons. The average rainfall is 700mm in the northern parts and 1300mm in the southern parts. The wettest months are July, August, and September. Dry season starts in November and ends in April. This is a period of harmattan, a period when the dust trade wind has a marked drying effect on the vegetation and general climate of the state (Udo and Mamman, 1993). The state is predominantly Sudan Savanna. It is marked by short trees interspersed by usually short shrubs mostly in the northern parts; the vegetation is thicker with tall trees (Udo and Mamman, 1993).

Procedures for Data Collection

For fair identification of plants used by people of Bauchi state in solving their multi-dimensional health related problems, the state was stratified according to the prevailing ecological zones: Northern Guinea savanna, Sudan Savanna and Sahel Savanna. From each of these ecological zones, three Local Government Areas (LGAs) were randomly selected and the selected LGAs includes Toro, Dass and Bogoro from Northern Guinea Savanna zone, Alkaleri, Ganjuwa and Ningi from Sudan Savanna zone and Zaki, Jama'are and Gamawa from Sahel Savanna zone. Within each of these LGAs, twenty five structured questionnaires were distributed among the target respondents (farmers and herbalist aged 50years and above, serving and retired) and in addition, random interviews were also conducted among the target respondents with a view to beef-up the quantum of the needed information. There were two hundred responses out of the two hundred and twenty five questionnaires distributed. The questionnaire is made of two sections: section 'A' deals with demographic information of respondents and section 'B' is purely on identification of medicinal plants and a test of conservation effort of the respondents in the past and their intention to take part in future. The generated data were coded and subjected to descriptive statistics.

Results and Discussion

Demographic Information of Respondents

The respondents of this ethno botanical investigation were mostly male, married and aged between 50-59 years. Their major occupation is collection and sell of traditional medicine of plants origin, the business which earned them between N5001- N10, 000 monthly and non among them attended formal educational system (Table1).

Table 1: Demographic information of respondents

Variable	Frequency	Percentage
Marital status		
Married	200	100
Single	00	00
Total	**200**	**100**
Gender		
Male	190	95
Female	10	05
Total	**200**	**100**
Age group		
50 – 59	150	75
60 – 69	45	22.5
Above 70	05	02.5
Total	**200**	**100**
Occupation		
Farming	50	25
Selling of herbs	150	75
Total	**200**	**100**
Monthly income (N)		
Below 5000	52	26
5001 – 10,000	130	65
10,001 – 15,000	13	6.5
15,001 – 20,000	05	2.5
Above 20,000	00	00
Total	**200**	**100**
Educational background		
Non-formal education	195	97.5
Primary education	05	2.5
Secondary education	00	0.0
Tertiary education	00	0.0
Total	**200**	**100**

Majority of the respondents claimed to be aware of tree planting but have never participated in the past (Table4). This clearly indicated that they have contributed a little or nothing towards sustenance of vegetation cover even though their lives solely depended on the trees as major source of market commodity (Medicine). There is a possibility for change to better, because 90% of the respondents have indicated their willingness to participate in tree planting in future (Table 4).

Table 2: Medicinal plants and part (s) used as medicine

Species (Local name)	Family	Part(s) used	Diseases cured
Sclerocarya birrea A.Rich (Danya)	Anarcadiaceae	Bark	Hypertension
Securidaca longepedunculata (Sanya)	Polygalaceae	Root	Rheumatism
Parkia biglobossa (Jacq) (Dorawa)	Mimosaceae	Bark	Dysentery and fire burn
Calotropis procera (Tunfafiya)	Asclepiadaceae	Root	Rheumatism
Moringa oleifera Linn (Zogale)	Moringaceae	Root and bark	Toothache and Rheumatism
Bosweilla dalzilii Roxb ex.Co (Ararrabi)	Burseraceae	Bark	Cancer
Detarium macrocarpum Gull and Perr (Taura)	Combretaceae	Bark	Pile
Anogeissus leiocarpus (DC) Gull and Perr (Marke)	Combretaceae	Bark	Cough
Psidium guajava (Gwaiba)		Leaf	Dysentery
Prosopis africana(Gull and Perr) (Kirya)	Mimosaceae	Bark	Pile and dysentery
Khaya senegalensis(Desr)A.Juss (Madaci)	Meliaceae	Bark	Pile and stomach problems
*Acacia Senegal*Linn (Dakwara)	MImosaceae	Leaf	Boils
Guirrea senegalensis (Sabara)		Root and leaf	Dysentery and stomach problems
Allium cepa (Albasa)	Alliaceae	Leaf	Boils, Felons, stings, cough and lung related problems
Annona senegalensis Pers (Gwandar daji)	Anonaceae	Leaf	Respiratory infections and venereal diseases
Adansonia digitata Linn (Kuka)	Bombasaceae	Leaf and bark	Urinary track and ulcers
Azadirachta indica Linn (Maina)	Meliaceae	Leaf	Malaria, yellow fever and skin diseases
Ficus sycomorus ex. Bradi. (Baure)	Moraceae	Bark	Whooping cough
*Senna tora*Linn (Tafasa)	Fabaceae	Root	Ulcer, skin and Respiratory problems
Phonix dactylifera (Dabino)	Palmae	Root	Tooth and mouth problems
*Mangifera indica*Linn (Mangoro)	Anarcadiaceae	Bark and leaf	Pile and dysentery
*Acacia niloticа*Linn (Gabaruwa)	Mimosaceae	Bark and leaf	Dysentery and diarrhea
Ficus bengalensis (Yande)	Moraceae	Leaf	Typhoid fever
Cassia singueana (Runhu)	Caesalpiniaceae	Root	Ulcer
Cordia africana (Alilliba)	Boraginaceae	Leaf	Yellow fever
Citrus lemon (Lemon tsami)	Rutaceae	Leaf and bark	Typhoid fever
Jatropha curcas L. (Bitadazugu)	Irvingiaceae	Leaf	Pile
Acacia sieberiana DC (Farar kaya)	Mimosaceae	Root	Whitlow
Pennisetum americanum (Jero)	Pedaliaceae	Husk	Whitlow

Table 3: Ecological status of medicinal plants in Bauchi State

Relative abundance scale	Species
Rare	*Bosweilla dalzilii, Citrus lemon, Cordia africana, Ficus bengalensis, Annona senegalensis, Securidaca longepedunculata, Acacia nilotica, Acacia sieberiana* and *Ficus sycomorus*
Occasional	*Jatropha curcas, Parkia biglobossa, Adansonia digitata* and *Prosopis africana*
Frequent	*Khaya senegalensis, Anogeissus leiocarpus, Sclerocarya birrea, Psidium guajava, Cassia singueana*
Abundant	*Mangifera indica, Guirrea senegalensis, Moringa oleifera,* and *Calotropis procera*
Very abundant	*Azadirachta indica, Senna tora, Penisetum americanum* and *Allium cepa*

Table 4: Awareness of tree planting campaign and level of involvement of respondents in the past and intention to take part in future

Variable	Frequency	Percentage
Awareness of tree planting Campaign		
Yes	180	90
No	20	10
Total	**200**	**100**
Planting in the past		
Yes	10	05
No	190	95
Total	**200**	**100**
Intention to plant trees in future		
Yes	180	90
No	20	10
Total	**200**	**100**

Twenty nine (29) different forest tree species were found to be used in Bauchi state as medicinal plants for solving such health problems as fever, stomach problems, respiratory disorders, malaria, typhoid fever, ulcers, diarrhea and dysentery, pile, cancer and boils. The family most presented is Mimosaceae represented by five tree species: *Acacia senegal, Acacia sieberiana, Acacia nilotica, Prosopis africana,* and *Parkia biglobossa.* This family is followed by Anarcadiaceae,Combretaceae,Meliaceae and Moraceae which were represented by two species each. The families of Palmae, Asclepiadaceae, Polygalaceae, Moringaceae, Burseraceae, Alliaceae, Anonaceae, Bombasaceae, Fabaceae, Caesalpiniaceae, Boraginaceae, Rutaceae, Pedaliaceae, Irvingiaceae were represented by *Phonix dactylifera, Calotropis procera, Securidaca longepedunculata, Moringa oleifera, Bosweilla dalzilii, Allium cepa, Annona senegalensis, Adansonia digitata, Senna tora, Cassia singueana, Cordia africana, Citrus lemon, Pennisetum americanum* and *Jatropha curcas* respectively.

The continuous trial of these tree species by people of primitive ages gave rise to selective utilization for specific purpose and the knowledge is being transferred from one generation to another (Gill, 1988) with little improvement in the method of collection and preparation as a result of the evolution of modern tools and means of preservation. This knowledge is still functional and many plant species are used to cure human diseases traditionally using parts of the plant or the whole plant as the case may be (Reddy *et al*., 2009). The persistent utilization of these medicinal plants with little or no effort in sustaining their generation through germplasm has rendered most of these important resources in to a state of an ecological rareness (Table3). Abdullahi *et al*., 2010 reported that such species as *Acacia sieberiana, Acacia macristachya, Khaya senegalensis, Borassus aethiopium, Cieva pentendra, Bombax costatum, Acacia nilotica, Ficus sycormorus, Ziziphus spinachristi* and *Syzygium guinensis* were rare in Savannah region of Nigeria. Whenever species selection for a particular purpose occurred, the species concerned stand the chance of an ecological threats and extinction (Abdullahi, 2009; Wakil and Abdullahi, 2013).

The part(s) of the plant mostly used in the preparation of herbal medicine are very vital to the survival of the affected plant species as these parts determine the chance of survival or otherwise of their host plant. The parts used were barks, leaves, twigs and roots (Table 2). Bark helps to transport food materials from the lower part of the plant to the upper part and distributes manufactured food to all parts of the plant. Leaves aid in photosynthesis, and roots draws water and mineral salt from the soil in addition to anchorage. These important organs of the plant when tempered negatively, the affected plant suffers to the extent of death in some cases (Inyang, 2000). Due to increased loss of floral biodiversity, plant resources are getting scarce with attendant high cost of the same and rapid environmental deterioration caused by deforestation which threatens

food production and even life support system (Barry *et al*., 1988).

Recommendations

Considering the immense contribution of medicinal tree species to the survival of mankind in the area of health and environmental sustenance, the following are here by recommended:

1. Serious and concerted effort should be intensified in the production and planting of medicinal tree species by both government and non - governmental organizations.
2. The traditional herbalists should be oriented on the importance of sustainable collection of forest resources.
3. Cottage industries be located in rural areas to enhance more hygienic means of herbal medicine.
4. People be oriented to incorporate medicinal trees in their avenue and border line planting.

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