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Stem Barks and Roots Extravitism in Ekiti State Nigeria: Need for Conservation as a Sustainable Innovation in Healthcare Management in Rural Areas

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Abstract: A combination of field surveys and direct observation was used to identify botanicals whose stems and/or roots were extracted for healthcare purposes in the rural communities of Ekiti State, Nigeria. Diverse number of species was identified as being used for health care by respondents in the study area. The respondents' consensus factor which specifies the agreement degree of the respondents revealed that their preference for healthcare maintenance was skewed towards the use of botanicals rather than the orthodox drugs. Respondents' fidelity level was determined and the results obtained revealed that the botanicals were perceived as safe, cheap, readily available with little or no side effects. Considerable proportions of these botanicals were not cultivated and their collection pattern was mostly annihilative and unsustainable. Thus they were mostly rare on the abundance scale used in this study. Most of the uncultivated species were indigenous tree species that has forest as their primary source. With increasing and unprecedented deforestation rate in the study area, there is the need for conservation of these species.

Keywords: Stem Barks, Roots, Extravitism, Conservation, Sustainable Innovation, Healthcare

1. Introduction

Ekiti State (Longitude 4°5' and 5°4' East, and Latitude 7°45' and 8°5' North) is located in the south western part of Nigeria. Majority of the *Ekitis*, like other Yoruba tribes, live mainly in the rural areas. Over 70% of the population in the state resides in the rural areas. [1], [2] asserted that most of these people depend on the environment for the maintenance of their health.

Recently a resurgence of interest on the use of botanicals for health management and maintenance evolved in Nigeria [3]. This is considered necessary particularly now that the forest that constituted the primary source of these botanicals is seriously under threat. Recent initiatives revealed that Nigeria has lost most of its total forest cover. The rate of deforestation in the country has been estimated to be at an average of about 3.5 per cent per annual. Deforestation at this rate translates to loss of 350,000 to 400,000 ha of Nigeria's forest land per year [4].

In view of the above, a number of studies are being carried out in the Department of Plant Science, Ekiti State University, Ado-Ekiti, Nigeria to document botanicals that have medicinal value with a view to determining their abundance, identifying the endangered species and evolving strategies that would conserve the identified rare species thus enhancing their sustainability for the present and future generations. The study being reported here aimed at compiling the list of botanicals whose stems and/or roots are extracted for medicinal purposes in the state and propose strategies that would enhance their conservation.

2. Materials and Methods

The methods of [5,6,7] which consisted of a combination of social surveys and direct field observation was used in this study. Ekiti State was divided into three zones based on the existing political delineation. In each zones, 10 communities that were still relatively free from urban influence were selected.

In each community, 10 indigenes that had maintained

continuous domicile for a period of 10 years and above were selected and interviewed with the aid of a semi-structured questionnaire matrix. The interviews were conducted with a fairly open framework that allowed for focused, conversational and two-way communication as suggested by [8].

Botanicals whose stems and/or roots were extracted and used for medicinal purposes were identified and their voucher specimens were collected. The sources of such botanicals and their methods of utilization were also identified. The abundance of the species was also determined using the time taken to physically come in contact with the sample of the botanical within the aboriginal plant communities in the community. Where a sample was sighted within 20 minutes, it was considered as very abundant, it was abundant when sighted within 21-60 minutes but rare when it takes more than 60 minutes.

The fidelity level (FL) of the species was determined to establish the level of awareness of the medicinal suitability of the species among the respondents.

FL was determined as follow:

$$FL = Nr \text{ X } 100 / N$$

Where, Nr is the number of respondents that mention the species, and

N is the total number of respondents interviewed.

The voucher specimens were collected, identified scientifically and deposited at the herbarium of the Department of Plant Science, Ekiti State University, Ado-Ekiti, Nigeria.

Key informants that were made up of officials of Health Department of the Local Governments Authorities, Ministry of Health, Hospitals and other stakeholders, were interviewed. Also, in each community, group interviews were also carried out. Three groups, each consisted of not less than three respondents, were interviewed. This was done to attain group consensus on the suitability of the species identified at the individual level as advocated by [9].

Respondents consensus factor (RCF) was determined and used to analyse the agreement degree of the respondents' awareness of the medicinal suitability of the species.

RCF was calculated as follow:

$$RCF = N_x / N_Y$$

Where N_x is the number of groups that identify the species, and

N_Y is the total number of groups interviewed.

3. Results and Discussion

The results obtained revealed that a total of 76 plant species that belonged to 37 families have their stems or stem barks and/ or roots extracted for medicinal purposes in the study area (Table 1). Respondents were observed to possess immense knowledge on the medicinal values of these species. Table 1 revealed that the FL value on each of the identified species was not less than 70. This suggests that the level of awareness of the medicinal suitability of the species was high among the respondents. Similarly, the RCF values were equally high, thus corroborate the awareness level of the respondents. Apart from the fact that the RCF values were 0.90 and above in all the species, 37% of the species had RCF value of 1.00. Previous study by [10] had asserted that the indigenous residents were quite familiar with the ethno medicinal values of species in their environment. They equally believed in their efficacies [11]. Most of these species were those used in the cure of malaria. Malaria constitutes the most prevalent disease in the study area [7].

Most of the identified species were not cultivated in the study area. Species cultivated were mostly for other purposes other than medicine. Thus the medicinal value was mostly secondary or tertiary products thus confirming the previous assertion of [6]. Most of the cultivated species (13% of the identified species, Table 1; Species number 5, 10, 15, 19, 20, 21, 27, 37, 45 and 58) were done purely for provision of fruits and/or income, some for provision of shade (3%, Species number 9 and 32, Table1), some purely as ornamental (3%, Species number 39 and 71, Table 1), fencing (1%, Species number 68, Table1) and timber (1%, Species number 36, Table 1). Some grow widely in the study area as weeds (8%, Species number 2, 17, 30, 46, 49 and 50, Table 1). Others grow as wildlings and were preserved by the respondents. The dependence on wildlings in the study area had been observed in previous studies by [12] and [13, 14]. Most of the uncultivated species were indigenous tree species. Numerous disincentives had been attributed to the apparent lack of interest in their cultivation by [1], [9] and [15], thus their major source of supply had been the forest. Unfortunately, the supply from the forest is no longer sustainable due to the unprecedented deforestation, increase use of fire in farm preparation and increase in land fragmentation in the study area.

Table 2 gives the checklist of the species whose stems or stem barks were extracted for the cure of major prevailing diseases in the study area. While 8 species were extracted for the treatment of asthma, 18 were used for cough, 22 for diabetes and hypertension, 12 for jaundice, 32 for malaria, 14 for sexually transmitted diseases and 11 for skin diseases. The checklist of the species whose roots were extracted for the cure of the diseases stated above is shown in Table 3. 8 species were used to cure asthma,18 for cough, 17 for diabetes and hypertension, 9 for jaundice, 32 for malaria, 11 for sexually transmitted diseases and 7 for skin diseases.

The examination of the respondents' perception on the identified species (Table 4) revealed that the use of the species were safe and cheap. The species were considered as being readily available in the study area although some of them were *rare* on the abundance scale used in this study (Table 5). Results obtained (Table 5) revealed that 26, 37 and 37% of the species were observed to be very abundant, abundant and rare respectively in the study area The need for the conservation of these rare species is therefore required particularly when the extraction being examined in this study

is annihilative and predatory. Studies have revealed that debarking often lead to the death of most plants [10, 16]. Also, field observation revealed that debarking of the species were carried out indiscriminately and crudely executed. These indigenous species involved had been observed to regenerate poorly [10]. Quite unfortunate too, is the fact that the indigenous residents lacked requisite knowledge on their silviculture. Thus, the inference from this study revealed that the rate of regeneration of these species would be slower than the rate at which they are extracted. This situation would compromise the integrity of the mother plants, their protection would no longer be guaranteed and extraction *ad infinitum* will not be guaranteed hence strategies that would enhance the sustainable supply of the species to both the present and future generations need to be proposed. A number of strategies proposed by [3, 6, 9. 10, 16, 17] would still be relevant in the study area. These, no doubt, would constitute benign strategies to sustainable health care management especially in the rural areas.

Table 1. *Checklist of species identified with stem and roots being extracted in Ekiti State, Nigeria.*

S/n	Species*	Vernacular Name	Family	FL	RCF
1	*Abrus precatorius*	Oju-Ologbo	Papilionaceae	75	0.90
2	*Alchornea laxiflora***	Pepe, Iya	Euphorbiaceae	82	0.96
3	*Allanblackia floridunda*	Orogbo-erin	Clusiaceae	84	1.00
4	*Alstonia booneei*	Ahun	Apocynaceae	84	1.00
5	*Anacardium occidentale**	Kaasu	Anacardiaceae	90	1.00
6	*Anthocleista djalonensis*	Shapo	Loganiaceae	72	0.93
7	*Anthocleista vogelii*	Apara	Gentianiacaea	74	0.92
8	*Axonopus compressus***	Idi	Poaceae	81	0.92
9	*Azadirachta indica**	Dongoyaro	Meliaceae	95	1.00
10	*Blighia sapida**	Isin	Sapindaceae	92	1.00
11	*Blighia unijugata*	Ako-Isin	Sapindaceae	90	0.92
12	*Borascus aethiopum*	Agbon-Aja	Arecaceae	70	0.92
13	*Bridelia ferruginea*	Ira	Euphorbiaceae	97	1.00
14	*Caesalpinia bonduc*	Ayoo	Caesalpiniaceae	92	0.91
15	*Carica papaya**	Ibepe	Caricaceae	93	1.00
16	*Ceiba pentandra*	Araba	Bombacaceae	92	0.96
17	*Chromolaena odorata***	Akintola	Asteraceae	97	1.00
18	*Chrysophyllum albidum*	Agbalumo	Sapotaceae	96	0.94
19	*Citrus aurantifolia**	Osan wewe	Rutaceae	98	1.00
20	*Citrus aurantium**	Gayingayin	Rutaceae	92	0.97
21	*Citrus sinensis**	Orombo	Rutaceae	98	0.97
22	*Combretum mucronatum*	Ogan	Combretaceae	72	0.94
23	*Cordial millenii*	Omo	Boraginaceae	70	0.92
24	*Corchorus olitorius,*	Ewedu	Tiliaceae	86	0.92
25	*Costus afer*	Teteregun	Zingiberaceae	74	0.94
26	*Croton zambesicus*	Ajekobale	Euphorbiaceae	96	0.95
27	*Elaeis guineensis**	Ope	Arecaceae	97	0.96
28	*Enantia chloranthia*	Awopa	Annonaceae	93	0.92
29	*Entada africana*	Ogurobe	Mimosaceae	88	0.92
30	*Euphorbia hirta***	Iroko iju	Euphorbiaceae	73	0.90
31	*Ficus asperifolia*	Epin	Moraceae	72	0.92
32	*Ficus ptatyphylla**	Ogbagba	Moraceae	71	0.92
33	*Ficus thonningii**	Odan	Moraceae	92	0.94
34	*Garcinia kola*	Orogbo	Clusiaceae	94	1.00
35	*Glyphaea brevis*	Atori	Tiliaceae	85	0.95
36	*Gmelina arborea**	Melainia	Verbanaceae	89	0.94
37	*Gossypium barbadense**	Owu	Malvaceae	96	1.00
38	*Harungana madagascariensis*	Arunje	Hypericaceae	92	1.00
39	*Hibiscus rosasinensis**	Adodo abisikosi	Malvaceae	78	0.90
40	*Jatropha curcas**	Lapalapa	Euphorbiaceae	97	1.00
41	*Khaya ivorensis*	Oganwo	Meliaceae	96	1.00
42	*Lecaniodiscus cupanioides*	Akika	Sapindaceae	95	1.00
43	*Lippie miltiflora*	Efinrin gogoro	Verbanaceae	87	0.97
44	*Mallotus oppositifolius*	Orokoro	Euphorbiaceae	94	1.00

S/n	Species*	Vernacular Name	Family	FL	RCF
45	*Mangifera indica**	Mangoro	Anacardiaceae	98	1.00
46	*Melanthera scadens***	Abo-yunriyun	Asteraceae	76	0.91
47.	*Milicia excelsa*	Iroko	Meliaceae	96	0.96
48.	*Millettia thonningii*	Ito	Papilionaceae	90	0.96
49.	*Momordica charantia***	Ejirin wewe	Cucurbitaceae	98	1.00
50.	*Momordica foetida***	Ejirin	Cucurbitaceae	92	0.98
51.	*Morinda lucida*	Oruwo	Rubiaceae	93	1.00
52.	*Nauclea latifolia*	Gberesi	Rubiaceae	90	1.00
53.	*Ocimum basilicum*	Efirin wewe	Lamiaceae	98	1.00
54.	*Ocimum gratissium*	Efirin aja	Lamiaceae	98	1.00
55.	*Olax subscorpioidea*	Ifon	Olacaeae	92	0.91
56.	*Parkia biglobosa*	Igba	Mimosaceae	95	0.92
57.	*Persea americana*	Pia	Lauraceae	87	0.90
58.	*Piper guineensis**	Ata iyere	Piperaceae	94	1.00
59.	*Pterocarpus erinaceus*	Imo-osun	Papilionaceae	81	0.91
60.	*Pterocarpus osun*	Osun	Papilionaceae	92	0.92
61.	*Rauvolflia vomitoria*	Asofeyeje	Apocynaceae	90	0.92
62.	*Sarcocephalus latifolius*	Ogbase	Rubiaceae	88	0.91
63.	*Senna alata*	Asunrin	Caesalpiniaceae	91	0.90
64.	*Senna arabica**	Kasia	Caesalpiniaceae	92	0.92
65.	*Senna siamea*	Kasia	Caesalpiniaceae	80	0.92
66.	*Senna podocarpa*	Asunrin ibile	Caesalpiniaceae	90	0.90
67.	*Solanum torvum*	Igba yanrin elegun	Solanaceae	76	0.90
68.	*Spondias mombin**	Okikan	Anacardiaceae	94	0.97
69.	*Tapinanthus bangwensis*	Afomo onisana	Loranthaceae	87	1.00
70.	*Tapinathus buntingii*	Afomo	Loranthaceae	86	1.00
71.	*Terminalia catappa**	Furutu	Combretaceae	92	0.91
72.	*Trema orientalis*	Ofefe	Ulmaceae	94	0.90
73.	*Vernonia amygdalina**	Ewuro	Asteraceae	98	1.00
74.	*Zanthotylum rubenscens*	Ata	Rutaceae	92	0.91
75.	*Zanthoxyhim xanthoxyloides*	Ata fagara	Rutaceae	96	1.00
76.	*Zingiber officinale*	Ajo	Zingiberaceae	95	1.00

* Cultivated species, ** species that grow widely as weeds

Table 2. *Checklist of species whose stems were extracted for medicinal use in Ekiti State, Nigeria.*

Diseases	Species extracted and used for cure
Asthma	*A. compressus, C. pentandra, E. guineensis, E. hirta, H. rosasinensis, M. indica, P. osun, S. Arabica*
Cough	*A. precaterius, A. booneei, B. sapida, C. aurantifolia, C. mucronatum, C. millenii, C. afer, E. hirta, F. ptatyphylla, G. kola, J. curcas, M. indica, M. thonningii, O. gratissium, T. orientalis, S. latifolius, S. mombin* and *Z. rubenscens*
Diabetes and hypertension	*A. occidentale, A. vogelii, B. unijugata, B. ferruginea, C. pentandra, C. aurantifolia, C. afer, E. hirta, H. rosasinensis, L. multiflora, M. indica, M. foetida, M. charantia, M. lucida, P. biglobosa, P. americana, R. vomitoria, S. arabica, S. mombin, V. amygdalina, T. buntingii* and *T. bangwensis.*
Jaundice	*A. indica, C. aurantifolia, E. chloranthia, H. madagascariensis, K. ivorensis, L. cupanioides, L. miltiflora,M. charantia, M. lucida, O. subscorpioidea, R. vomitoria* and *T. orientalis.*
Malaria	*A. floribunda, A. boonei, A. occidentales, A. compressus, A. indica, B. sapida, B. ferruginea, C. pentandra, C. albidum, C. aurantifolia, C. sinensis, E, guineensis, F. thonningii, F. ptatyphylla, G. kola.* *H. madagascariensis, J. curcas, J. gossypifolia, K. ivorensis, L. cupanioides, M. indica, M. thonningii, M. lucida, O. gratissiumum, O. subscorpioidea, P. biglobosa, P. angolensis, R. vomitora, S. podocarpa, S. mombin, T. orientalis* and *V. amygdalina.*
Sexually Transmitted Diseases	*A. laxiflora, A. indica, B. ferruginea, C. potandra, C. aurantifolia, C. zambesicus, G. brevis, O. basilicum, O. subscorpioidea, S. arabica, S. mombin, T. catappa, Z. rubenscens* and *Z. xanthoxyloides*
Skin Diseases	*A. floribunda, A. djalonensis, A. indica, C. aurantifolia, E. guineensis, J. curcas, K. ivorensis, N. latifolia, P. osun, S. alata* and *S. mombin.*

Table 3. *Checklist of species whose roots were extracted for medicinal use in Ekiti State, Nigeria.*

Diseases	Species Extracted
Asthma	*A. compressus, B. aethiopum, C. olitorius, E. guineensis, E. hirta, G. barbadense, M. indica,* and *P. osun*
Cough	*A. precaterius, A. booneei, B. sapida, C. aurantifolia, C. aurantium, C. mucronatum, C. afer, E. hirta, F. asperifolia, G. kola, G. arborea, M. indica, M. thonningii, O. gratissium, S. latifolius, S. torvum, S. mombin* and *Z. rubenscens.*
Diabetes and hypertension	*B. unijugata, B. ferruginea, C. papaya, C. aurantifolia, C. afer, E. hirta, G. barbadense, L. multiflora, M. indica, M. charantia, M. lucida, P. guineense, R. vomitoria, S. mombin, V. amygdalina, T. buntingii* and *T. bangwensis.*
Jaundice	*C. aurantifolia, H. madagascariensis, K. ivorensis, L. cupanioides, L. miltiflora, M. charantia, M. lucida, O. subscorpioidea* and *R. Vomitoria*
Malaria	*A. indica, A. occidentale, B. sapida, C. papaya, C. aurantifolia, C. sinensis, C. olitorius, E. guineesis, F. thonningii, F. ptatyphylla, M. indica, S. siamea, V. amydgalina, Z. officinale, A. boonei, A. floridunda, B. ferruginea, C. bonduc, C. albidum, C. odorata, E. africana, E. chlorantha, K. invorensis, L. cupanioides, M. oppositifolius, M. scadens, M. excels, M. thonningi, M. lucida, O. subscorpioidea, P. guineensis* and *P. erinaceus*
Sexually Transmitted Diseases	*A. laxiflora, B. ferruginea, C. aurantifolia, C. zambesicus, G. arborea, O. basilicum, O. subscorpioidea, S. podocarpa, S. mombin, Z. rubenscens* and *Z. xanthoxyloides*
Skin Diseases	*A. floribunda, A. indica, C. aurantifolia, J. curcas, K.ivorensis, P. osun* and *S. mombin.*

Table 4. *Respondents' perception on the identified species in Ekiti State, Nigeria.*

Rank	Feature	Proportion (%) of Respondents
1	Safe	99
2	Cheap	98
3	Ready availability	97
4	Have little or no side effects	96

Table 5. *The abundance of the identified species in Ekiti State, Nigeria.*

Abundance	Species	Proportion (%) of the species
Very Abundant	*A. laxiflora, A. occidentale, A. compressus, A. indica, B. sapida, C. papaya, C. odorata, C. sinensis, C. olitorius, E. guineensis, H. rosasinensis, J. curcas, M. indica, M. scadens, M. charantia, N. latifolia, O. basilicum, O. gratissium, P. guineensis* and *V. amygdalina.*	26
Abundant	*A. precaterius, A. booneei, A. djalonensis, A. vogelii, B. ferruginea, C. albidum, C. aurantifolia, C. aurantium, C. afer, E. hirta, F. asperifolia, F. ptatyphylla, F. thonningii, G. brevis, G. arborea, G. barbadense, M. foetida, P. biglobosa, P. americana, S. alata, S. arabica, S. podocarpa, S. torvum, S. mombin, S. siamea T. bangwensis, T. buntingii* and *T. catappa.*	37
Rare	*A. floridunda, B. unijugata, B. aethiopum, C. bonduc, C. pentandra, C. millenii, C. mucronatum, C. zambesicus, E. chloranthia, E. africana, G. kola, H. madagascariensis, K. ivorensis, L. cupanioides , L. miltiflora, M. oppositifolius, M. excelsa, M. thonningii, M. lucida, O. subscorpioidea, P. erinaceus, P. osun, R. vomitoria, S. latifolius, T. orientalis, Z. rubenscens, Z. xanthoxyloides* and *Z. officinale*	37

References

[1] Kayode, J. 2004. Conservation Perception of Endangered Tree Species by Rural Dwellers of Ekiti State, Nigeria. Journal of Sustainable Forestry 19(4): 1-9.

[2] Kayode, J. and Omotoyinbo, M. A. 2008a. Conservation of Botanicals Used for Dental and Oral Healthcare in Ekiti State, Nigeria. Ethnobotanical leaflets 12, 7-18.

[3] Kayode, J. 2006. Conservation of indigenous medicinal botanicals in Ekiti State, Nigeria. Journal of Zhejiang University SCIENCE-B 7 (9): 713-718.

[4] Repetto, R. 1988. The forest for the trees: Government policies and misuse of forest resources. World Resources Institute, Washington DC., pp: 16.

[5] Lipp, F. J. 1989. Methods for ethno-phamacological fieldwork. Journal of Ethno-Pharmacology 25: 139-150.

[6] Kayode, J. 2005. Ethno botanical survey and conservation of medicinal compositae species in Benin Kingdom, Nigeria. Compositae Newsl. 42, 48-54.

[7] Molnar, A. 1989. Community Forestry: A rapid appraisal. FAO, Rome, p.60.

[8] Kayode, J. and Omotoyinbo, M. A. 2009. Ethnobotanical utilization and conservation of chewing sticks plant species in Ekiti State, Nigeria. Research Journal of Botany 4(1):1-9.

[9] Kayode, J. 2008. Survey of Plant Barks Used In Native Pharmaceutical Extraction In Yorubaland of Nigeria. Research Journal of Botany 3(1): 17-22

[10] Kayode, J. 2003. Conservation and Yoruba forest taboos. The Nigerian Field 69: 53-61.

[11] Kayode, J. 2010. Reconciliation of the supposedly irreconcilable: Conservation and Development. 26th Inaugural Lecture of The University of Ado-Ekiti, Ado-Ekiti, Nigeria. University of Ado-Ekiti Press, Ado-Ekiti, 57pp.

[12] Kayode, J., Christmas, E. and Kayode, G. M. 2008. Checklist and Conservation of Botanicals Used For Natality by the Okpe-Speaking People of Delta State, Nigeria. Research Journal of Medicinal Plants 2*(*1): 16-21.

[13] Kayode, J., Olanipekun, M. K. and Tedela, P. O. 2009. Medicobotanical studies in relation to veterinary medicine in Ekiti State, Nigeria: Checklist of botanicals species used for the treatment of poultry diseases. Ethnobotanical Leaflets 13: 40-46.

[14] Kayode, J. and Ogunleye, T. 2008. Checklist and Status of Plant Species Used as Spices in Kaduna State of Nigeria. Research Journal of Botany, 3 (1), 35-40

[15] Cunningham, A. B. 1988. Collection of wild plant food in Tembe Thonga society. A guide to Iran age gathering activities. Ann. Natal Museum 29: 437-446.

[16] Kayode, J. 2007. Conservation Implications of Timber Supply Pattern in Ekiti State, Nigeria. Research Journal of Forestry 1(2): 86-90.

[17] Kayode, J. and Omotoyinbo, M. A. 2008b. Cultural Erosion and biodiversity: Conserving chewing stick knowledge in Ekiti State Nigeria. African Scientist 9(1): 41-51.