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Full Length Research Paper

Ethnobotanical survey of a fallow plot for medicinal plants diversity in Idena village Ijebu-Ode, South-western Nigeria

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A survey was conducted on a piece of land at Idena village previously used as engineering site, but abandoned to fallow for the last 20 years at the outskirts of Ijebu-Ode Town in South-Western Nigeria, for medicinal plants diversity. The 2.4 hectares fallow plot was subdivided into compartments and transect sampling technique was used for data collection. Data collected included; plant taxa, habit, species frequency, diversity and ethnobotanical values. Altogether 48 different medicinal plants represented by 25 different families were encountered, shrubs being the most prominent (18 species), trees (14), herbs (13), climbers (2) and 1 each for ferns and palms. Compartment 2 had the highest number (21 different medicinal plants) while compartment 6 had the least (4 medicinal plant species). The first three compartments accounted for over 50% of all the medicinal plants found. For taxonomic and frequency distribution, the family Euphorbiaceae had the highest (7), followed by Papilionaceae (4) and Rubiaceae (4), while seventeen other families had 1 species in each case. Relative density (RD) values ranged from 2.08 - 50% with the Euphorbiaceae accounting for the highest (50%), followed by Moraceae (22.9%), while seven other families had 2.08%. Computed Sørenson (Ss) coefficients of similarity between pair compartments ranged between 0.06 - 0.37 with highest value obtained between compartments 1 and 5 (0.37) and least between compartments 2 and 9 (0.06). Results also revealed that thirty three (33) different ailments could be managed with the different medicinal plants encountered. A large number of the medicinal plants encountered were indicated for the management of some prominent ailments including; Diabetes, Hypertension, Fever/Malaria and Fertility thus suggesting high medicinal potential for the fallow plot. The need to develop sustainable conservation management plan for the fallow plot for its multiple roles is highlighted from this study.

Key words: Fallow plot, medicinal plants, species diversity, ailments, conservation.

INTRODUCTION

Ecosystems in Nigeria are naturally endowed with arrays of floristic composition of different plant forms including trees, shrubs, herbs and other non-wood forest resources (Olajide, 2003). Over the years, the forests have been managed exclusively for timber production and the density of timber trees has often been used as the main parameter for determining the value of a tract of natural forest (Olajide, 2003). This approach had led to gross under-valuation of the forest as various non-timber resources, which in most cases were much more valuable, had been neglected (Panayotou and Ashton, 1992). Unlike timber exploitation which degrades the eco-systems, the non-timber exploitation impacts infinitesimal perturbation and degradation on the ecosystem (Olajide, 2003). Within the natural forest, abound several valuable non-timber resources of edible and highly nutritious plants whose fruits, twigs, barks, roots, rattan, gum, latex or dyes are of medicinal value (Mgeni, 1991; Owonubi and Otegbeye, 2004). Mgeni (1991) opined that with the unique diversity of plant and animal life, tropical rain forest represents biologically renewable resources of food, medicine and fuel if well managed.

However, many of these valuable plants species are fast disappearing with the rapid rates of natural forest conversion to mono species plantation and commercial agriculture. A major trend in natural forest resources in Nigeria is the continuous decline in stock over the years (Ajakaiye, 2001). Identification and documentation of various medicinal plants species that are sources of raw materials for both rural health care and pharmaceutical

industries are critical components of achieving environmental sustainability and primary health services. Gbile (1989), carried out a comprehensive inventory on Nigerian plants including many medicinal plants, but tremendous disturbances have taken place both in floristic composition and physiognomy in many of the agro-ecological zones. Consequently, there is the need to update information especially in fallow and natural forests for the formulation of appropriate *in-situ* management programmes.

In recent times, despite all the advances made in modern and orthodox medicine, traditional medicine has gained renewed interest in health care services of Nigerians. This may be attributable to increased awareness in the potential and curative ability of the alternative medicines and particularly as a result of the various shortcomings revealed for several synthetic drugs (Ugbogu and Odewo, 2004). In Tropical Africa, inadequate access to western medicine and physicians coupled with high procurement cost for drugs have led to about 70% of the population to rely greatly on different plants to meet their traditional health care services (Kesparek, 1997; Ugbogu and Odewo, 2004). According to the World Health Organization (WHO) (1991), about 80% of the world's population uses medicinal plants in the treatment of diseases. WHO (1991) also reported that medicinal plants represented a primary health source for the pharmaceutical industry and has produced a guideline for the use of traditional medicine all over the world.

No doubt the search for raw materials for drugs that are plant-based has been on the increase with the Industrialized nations taking the lead. This shift has increased the level of exploitation for many of the medicinal plants which had hitherto affected both their availability and natural population. In view of these developments, there is the dire need for increased ethno-botanical survey and inventories for the different natural community forests and fallow plots particularly those close to urban areas. This will provide information on the development of appropriate *in-situ* conservation and management programme. Updating ecological and ethno-botanical information on non-timber forest resources assists in resource management (Olajide, 2003). The study therefore was carried out in other to asses the diversity of medicinal plant species of a 20 year fallow plot at Idena village along Ijebu-Ode-Ikorodu road of Lagos State, Nigeria.

MATERIALS AND METHODS

Study area

The study was carried out at Idena village (Longitude 6º 47'N, and Latitude 3º 58'E) which lies on Kilometre 25 along Ijebu-Ode-Ikorodu road in Epe Local Government Area of Lagos State, Nigeria. The study site belongs to the Lowland rain forest vegetation zone, corresponding to the Guineo-congolian regional Centre (White, 1983a). The site was previously used by SAPON Engineering Construction Company as their engineering workshop when they were constructing the petroleum pipelines from Warri (Edo State) to Lagos State in 1987 in Nigeria. The physical structures constructed by the company occupied about 30% of the land area up to date, while the remaining 70% lay fallow since then. The fallow plot had however reverted into secondary forest re-growth comprising different plant species. The study which lasted for 1 month was carried out between April – May, 2007.

Materials and resource persons

Transects were constructed along the base line of the plot as well at every 25 m internal along the breadth after the determination of the entire fallow plot length. Prior to commencement of study data sheet containing relevant information were prepared (Appendix 1), the services of 2 field assistants and a technical taxonomist staff knowledgeable on medicinal plants was employed to assist in plants identification and providing ethnobotanical information.

Enumeration and identification of plant species using transects

The transect method as described by Dowdeswell (1984), Osemeobo (1992) were used for this purpose. An initial reconnaissance survey was carried out by cutting fairly straight line transects along the length and breadth of the main plot in the West–east direction. To allow for uniform area for assessment and to accommodate some obstructions observed at the boundary of the fallow plot, a setback of 3 m was made at the boundary. Using a 50 m length fibre tape, the total land area was measured. The fallow plot was subsequently sub-divided into 9 fairly uniform compartments of 25 x 107 m each. The remaining part of the plot was bordered by marginal lands and concretions hence overlooked in the study.

At the onset of the inventory, each compartment was opened up by the 2 field assistants by cutting line transect through the compartments using cutlasses. Progressively, all the different medicinal plants encountered were identified, recorded and tagged and information was also recorded for their medicinal values. In addition to these, information on the frequency, diversity and richness for all the different plant species in all the 9 compartments were systematically recorded. After the field work, all medicinal plants that could not be immediately identified or whose identification was in doubt were sent for confirmation/identification at the Forestry Herbarium Ibadan (FHI). In addition Gbile (1984) and Burkill (2000) were also consulted for other taxonomic clarifications for the different medicinal plants. The botanical names, families and habitats of the taxa were determined using the Flora of West Tropical Africa (Hutchinson and Dalziel, 1963; Keay, 1989). In addition to the field information on different medicinal plants uses, additional ethnobotanical information was obtained from literatures (Sofowora, 1984; Anselm-Addodo, 2000; Ugbogu and Odewo, 2004). The total number of the different medicinal plant species per compartment, frequency of occurrence and relative density were calculated using the formula as described by Balslev et al. (1987).

$$\text{Relative density (RD)} = \frac{\text{Number of individuals of a species per unit area X 100\%}}{\text{Total number of individual of all species}}$$

For the comparison between compartments, Sørenson's (1948) coefficient of similarity Index (S_S) as shown in the equation below was employed:

$$Ss = \frac{2a}{2a + b + c}$$

Where: Ss = Index of similarity.

Appendix 1. Field survey date sheet for the collection of Ethnobotanical records at Idena village along Ijebu-Ode –Ikorodu Lagos state

Location of study:
Date of data collection:
Coordinates of Site:
Name of data collector:

S/No	Compartment No	Name of plant observed	Ethno-botanical importance	Other remarks

a = Number of species common to both sites.
b = Species in site 1 only.
c = Number of species in site 2 only.

RESULTS AND DISCUSSION

Land area and distribution of medicinal plants across the different compartments at the fallow

Result indicated that the fallow land under investigation had an estimated land area of (230 x 107 m) or 2,4150 m^2 or approximately 2.42 ha. Results of the study also revealed the presence of a total of 48 families of medicinal plants with 104 different plant species across the 9 compartments of the 2.4 ha of fallow plot studied (Table 1). Medicinal plants species distribution and density on compartment basis showed that compartment 2 had the highest number of medicinal plants (21 species) closely followed by compartment 3(19 species) while the least number of medicinal plants were recorded in compartment 6(4 species) (Figure 1). From the study, the first three compartments accounted for slightly more than 50% or (53 different species) of medicinal plants in the fallow plot, while across the compartments, there was a gradual decrease in medicinal plants population per compartment in a West-east direction (Figure 1) and this was probably due to the terrain which became gravely towards the West-east direction.

The frequency distribution for the different medicinal plants ranged between 1 - 10 with 1 - 4 species of per family. *Harungana madagascarensis* of the family Coranaceae was the most frequently encountered with a frequency of ten (10), followed by *Watheria indica* (7), while *Anthoclestia nobilis* had (6) and five other different species had frequency of five (5) in each case (Table 1). Similar results were reported on studies carried out at the Ribako Strict Natural Reserve (SNR) in Kaduna (Ugbogu and Akinyemi, 2004) and at Omo Forest Reserve Akinyemi et al. (2004)

The 48 different medicinal plants encountered were represented by all plant forms including trees, herbs, shrubs, palms, climbers and ferns. However the shrubs were the most abundant represented by seventeen (17) medicinal plants, followed by trees accounting for fourteen (14), herbs (13), climbers (2), while the ferns and palms were represented by one medicinal plant respectively.

The 48 individual medicinal plants encountered were distributed among 25 families. The Euphorbiacaeae family was the most represented (7), followed by Paplionaceae and Rubiaceae with 4 representatives. Seventeen other families were represented by single re-

Table 1. Frequency distribution and taxonomy of medicinal plants in the different compartments of the fallow plot studied.

S/No	Scientific names of plant species encountered	Families	Frequency distribution	Plant forms
1	*Abrus precatorius*	Paplionaceae	1	Climber
2	*Albizia ferruginea*	Mimosaceae	4	Tree
3	*Anthoclestia nobilis*	Longaniaceae	6	Tree
4	*Alchornia cordifolia*	Euphorbiaceae	4	Tree
5	*Ananas comosus*	Bromeliaceae	1	Herb
6	*Baphia nitida* Lodd.	Papilionaceae	1	Shrub
7	*Bombax buonopozense*	Bombaceacae	1	Tree
8	*Bridelia ferruginea*	Euphorbiceae	5	Tree
9	*Bridelia micrantha*	Euphorbiceae	4	Tree
10	*Cnestis ferruginea*	Euphorbiceae	5	Shrub
11	*Cassytha filiformis*	Lauraceae	3	Climber
12	*Calabium bicolor*	Araceae	1	Herb
13	*Citrus aurantium*	Rutaceae	1	Tree
14	*Crotolaria retusa*	Papilionaceae	1	Herb
15	*Cassia lodossa*	Ceasalpionaceae	1	Tree
16	*Ceasalpinia bonduc*	Mimosaceae	1	Herb
17	*Carica papaya*	Caucaceae	2	Shrub
18	*Dracaena mannii*	Agavaceae	1	Herb
19	*Draceania liberica*	Agaraceae	1	Herb
20	*Diodia scandens*	Rubiaceae	1	Shrub
21	*Funtumia elastica*	Apocynaceae	1	Tree
22	*Ficus asperifolia*	Moraceae	5	Shrub
23	*Ficus capensis*	Moraceae	5	Shrub
24	*Harungana madagascarensis*	Connoraceae	10	Tree
25	*Holarrhena floribunda*	Apocynaceae	1	Tree
26	*Icacina thrichantha*	Icaniaceae	3	Shrub
27	*Jatropha gossypifolia*	Euphorbiceae	2	Herb
28	*Lecaniodiscus cupanoids*	Sapindacaee	1	Herb
29	*Lantana camara*	Verbaceae	2	Shrub
30	*Magaritaria discordia*	Euphorbiceae	2	Herb
31	*Mangifera indica*	Anacardiaceae	3	Tree
32	*Morinda lucida*	Rubiaceae	1	Herb
33	*Mussaenda elegans*	Rubiaceae	1	Shrub
34	*Mageriteria indica*	Euphorbiceae	2	Shrub
35	*Macaranga bareti*	Anonaceae	3	Shrub
36	*Milicia excelsa*	Moraceae	1	Tree
37	*Nephrolepis bisserrata*	Polypodiaceae	1	Fern
38	*Psiduim guajava*	Mutaceae	5	Herb
39	*Paurdiantha hirtella*	Rubiaceae	2	Shrub
40	*Polyonom lutea*	Polynoaceae	1	Shrub
41	*Rauvofia vomitoria*	Apocynaceae	4	Herb
42	*Rahpia hookeri*	Palmae	1	Palm
43	*Starchytrapheta cayennesis*	Verbenaceae	2	Shrub
45	*Tephrosia vogelli*	Papilionacae	1	Shrub
46	*Terminalia catappa*	Combretaceae	3	Tree
47	*Vernonia amygdalina*	Compositae	3	Herb
48	*Watheria indica*	Sterculiacaeae	7	Shrub
47	*Vernonia amygdalina*	Compositae	3	Herb
48	*Watheria indica*	Sterculiacaeae	7	Shrub
Total			104	

Source**:** Field work 2007.

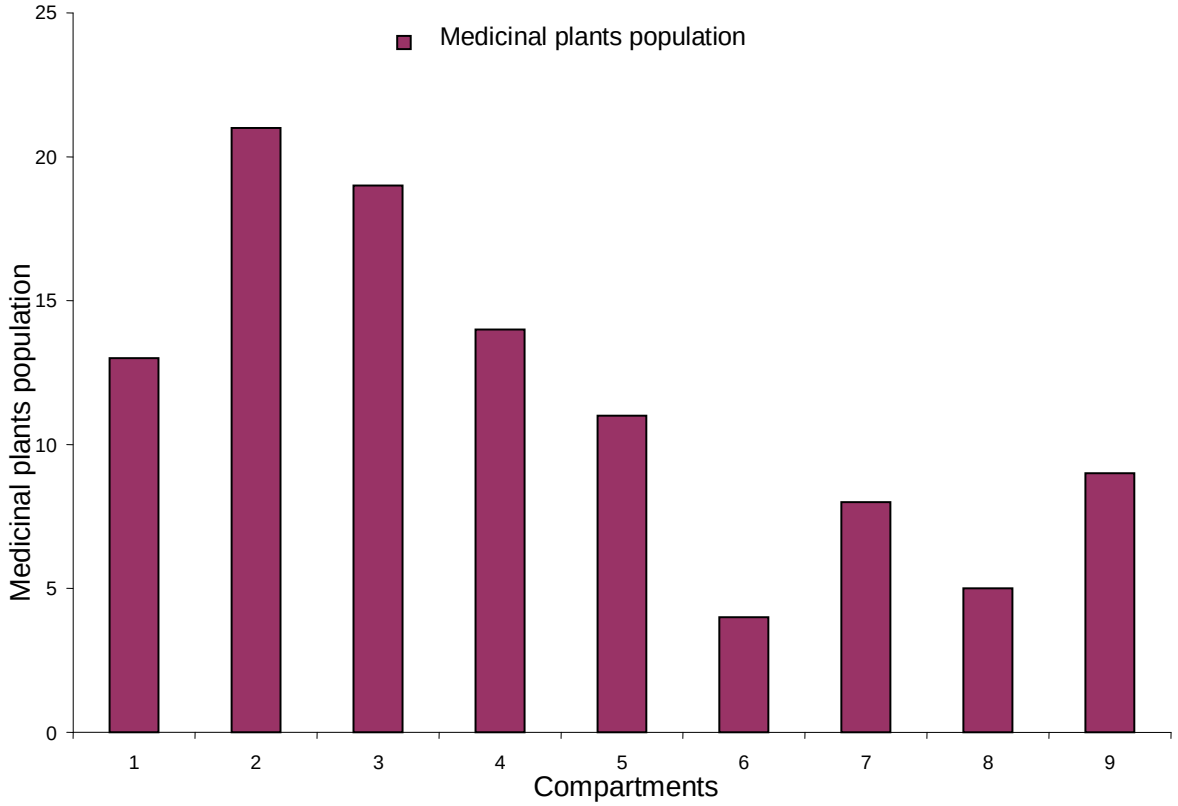

Figure 1. Population distribution of medicinal plants across the nine compartments of the plot studied.

lative density expressed in percentage (RD%) of the plants in each compartment ranged between 2.08 - 50%, with the Euphorbiacaeae having the highest value of 50% followed by the Moraceae with a (RD), 22.9% and Connoraceae, 20.83%. However seven different families had RD of 2.08% each and were represented by only one medicinal plant species (Table 2).

Similarity index comparison for the different strips

The Sørenson (Ss) coefficients of similarity Index computed in other to compare the occurrence of the different medicinal plants in each compartment showed that the (Ss) coefficient ranged between 0.06 - 0.37 (Table 3). The highest coefficient was obtained between compartments 1 and 5 (Ss, 0.37) while the least was between compartments 2 and 9 (Ss, 0.06). Generally the closer the compartments to one another the higher the similarity index value and vice versa. This finding agreed to a greater extent with a similar study on the phytosociology of *Parkia biglobosa* (Jacq.) Benth carried out in the main range of the species in Nigeria (Oni, 1997).

Results of the investigation on the information concerning the medicinal values of the 48 different medicinal plants identified showed that the plants either individually or in combination can be used for the management of thirty three (33) different ailments (Table 4). Amongst the most common ailments that can be managed with these plants are diabetes, hypertension, fever/malaria and fertility problems. The plants have also been reported to be effective in the treatment of several other disease conditions (Sofowora, 1984; Anselm-Addodo, 2000; Ugbogu and Odewo, 2004). This is suggestive of the economic values and richness of the fallow plot in terms of potential for source of medicinal plant raw materials for the pharmaceutical industries. The advantage of this source is that the plants if adequately managed are renewable (Mgeni, 1991).

Conclusion

From this study, it could be observed that the fallow land contained different medicinal plants species that could be exploited for both commercial and community development purposes. With the increasing demand for land for urbanization, agricultural and industrial purposes and with the influence of harsh climatic conditions globally, there is therefore the need for more holistic and organized *in-situ* conservation and management programme for medicinal plants by both individuals, communities and the govern-

Table 2. Family distribution for medicinal plant species in the fallow plot studied.

S/N	Family	No of species	Relative density (%)
1	Araceae	1	2.08
2	Apocynaceae	3	12.5
3	Agaraceae	2	2.08
4	Anacardiaceae	1	6.25
5	Asteraceae	1	6.25
6	Anonaceae	1	6.25
7	Bombaceacae	1	2.08
8	Bromeliaceae	1	2.08
10	Ceasalpionaceae	1	2.08
11	Caucaceae	1	6.25
12	Connoraceae	1	20.83
13	Combretaceae	1	6.25
14	Euphorbiaceae	7	50
15	Lauraceae	1	6.25
16	Longaniaceae	1	12.5
17	Mimosaceae	3	14.58
18	Moraceae	3	22.9
19	Mutaceae	1	10.42
20	Paplionaceae	4	6.25
21	Palmae	1	2.08
22	Rutaceae	1	4.16
23	Rubiaceae	4	6.25
24	Sapindacaee	1	2.08
25	Sterculiacaeae	1	14.58

Table 3. Sørenson (Ss) similarity coefficient for pairing of the 9 compartments at the fallow plot.

Compartments	1	2	3	4	5	6	7	8	9
1	-	.24	.36	.18	.37	.19	.22	.11	.21
2		-	.23	.26	.11	0.07	.26	0.07	0.06
3			-	.35	.25	.21	.27	.14	.13
4				-	.14	.1	.27	.24	.15
5					-	.21	.1	.11	.29
6						-	.14	.18	.13
7							-	.13	.19
8								-	.13
9									-

Table 4. Ethnobotanical uses of medicinal plants encountered at Idena fallow plot

S/No	Medicinal plant species	Families	Local names	Ailments managed
1	*Abrus precatorius*	Paplionaceae	Iwere jeje	Cough
2	*Albizia ferruginea*	Mimosaceae	Ayinreta	Cough
3	*Anthoclestia nobilis*	Longaniaceae	Sapo	Hypertension
4	*Alchornia cordifolia*	Euphorbiceae	Siin	Sight
5	*Ananas cosmos*	Bromeliaceae	Ope-oyinbo	Malaria
6	*Baphia nitida*	Papilionaceae	Iyere osun	Divinity
7	*Bombax buonopozense*	Bombaceacae	Poponla	Potency

8	*Bridelia ferruginea*	Euphorbiaceae	Ira odan	Diabetics
9	*Bridelia micrantha*	Euphorbiceae	Araasa	Diabetics
10	*Cnestis ferrugiena*	Euphorbiceae	Elemesan	Pimples/ Diarrhoea
11	*Cassytha filiformis*	Lauraceae	Omonigedegede	Pregnancy
12	*Calabium bicolor*	Araceae		Not available
13	*Citrus aurantium*	Rutaceae	Orombogaingain	Sickle cell
14	*Crotolaria retusa*	Papilionaceae	Saworo	Cough
15	*Cassia lodossa*	Ceasalpionaceae	Aidan tooro	Arthritis
16	*Ceasalpinia bonduc*	Ceasalpionaceae	Ayoo	Piles
17	*Carica papaya*	Caucaceae	Ibepe	Cirrhosis
18	*Dracaena mannii*	Agavaceae	Peregun	Longevity
19	*Draceania liberica*	Agaraceae	Peregun	Longevity
20	*Diodia scandens*	Rubiaceae	Ehin arigbe	Pain
21	*Funtumia elastica*	Apocynaceae	Ire	Cough
22	*Ficus exaspifolia*	Moraceae	Opoto	Scurvy
23	*Ficus capensis*	Moraceae	Epin	Hypertension/Cough
24	*Harungana madagascarensis*	Connoraceae	Amuje	Anti-snake bite
25	*Holarrhena floribunda*	Apocynaceae	Irena	Cough
26	*Icacina thrichantha*	Icancinaceae	Gbegbe	Potency
27	*Jatropha gossypifolia*	Euphorbiceae	Lapalapa	Piles
28	*Lecaniodiscus cupanoids*	Sapindacaee	Aaka	Potency
29	*Lantana camara*	Verbacae	Ewon aggogo	Purgative / Nervousness
30	*Magaritaria discordia*	Euphorbiceae	Not available	Pains
31	*Mangifera indica*	Anacardiaceae	Mangoro	Malaria/ Bronchitis
32	*Morinda lucida*	Rubiaceae	Oruwo	Malaria /Jaundice
33	*Mussaenda elegans*	Rubiaceae	Odo omode	NA
34	*Mageriteria indica*	Euphorbiacae	Not available	NA
35	*Macaranga bareti*	Annonaceae	Agbasa	NA
36	*Milicia excelsa*	Moraceae	Iroko	Divinity/ Cough
37	*Nephrolepis bisserrata*	Polypodiaceae	Iramu	NA
38	*Psiduim guajava*	Mutiaceae	Goroba	Stomach ache /Diarrhoea
39	*Paurijanthia hirtalla*	Rubiaceae	NA	NA
40	*Polyonom lutea*	Polynoaceae	NA	NA
41	*Rauvolfia vomitoria*	Apocynaceae	Asofeyeje	Diabetes/Hypertension/Impotence
42	*Rahpia hookeri*	Palmae	Oogoro	Potency / Sight
43	*Starchytrapheta cayennesis*	Verbenaceae	Obibo	Purgative
44	*Tapinathus dodonifolius*	Mimosaceae	Afomoonisana	Hypertension
45	*Tephrosia vogelli*	Papilionacae	Lakuta	Foot pains
46	*Terminalia catapa*	Combretaceae	Furutu	Insomnia/ STDs
47	*Vernonia amygdalina*	Asteraceae	Ewuro	Diabetes
48	*Watheria indica*	Sterculiacaeae	Ewe epo	Blood tonic/ Potency

Source: Field work 2007.
NA: Not available.

ment. Furthermore, deliberate efforts should be made in large scale surveys with a view to identifying more of such medicinal plants in various forests and fallows in other to map out conservation strategies.

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