ABUNDANCE OF Solaneciobiafrae AND STRUCTURE OF WEEDS COMMUNITIES IN SOME COCOA PLOTS IN APOJE, IJEBU IGBO OGUN STATE, NIGERIA

OLUKOKUN FUNMILAYO FOLASADE
Matric No: 13 06 2787

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OLUKOKUN FUNMILAYO FOLASADE

MATRIC NO: 13/06/2787

DEPARTMENT OF SCIENCE LABORATORY TECHNOLOGY, ABRAHAM ADESANYA POLYTECHNIC, IJEBU – IGBO, OGUN STATE, NIGERIA.

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CERTIFICATION

This is to certify that this research work was carried out by **Olukokun Funmilayo Folasade** with the Matriculation number **13/06/2787** in the department of Science Laboratory Technology, School of Science, Abraham Adesanya Polytechnic, Ijebu – Igbo, under my supervision.

MISS BOLANLE O.O
BSc. (UNAAB), MSc. (UI)
(Project Supervisor)

28/10/15
DATE

DEDICATION

This project work is dedicated to Almighty God and to my lovely parent Mr. and Mrs. O.A Olukokun.

I am also dedicating this project work to my Aunty Mrs. Oluwaseun Dawodu-Olorunloju of blessed memory

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I am indebted to Almighty God the author and finisher who guided me throughout my stay in school. He saw me through the smooth and odds and made me laugh at last.

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I am grateful to everyone that stood by me to achieve this success.

ABSTRACT

Solaneciobiafrae is an important indigenous vegetable collected in the wild from cocoa plantation. The enumeration of *S. biafrae*and other low growing plant species was carried out in five coca plot in Apoje Farm, Ijebu North Local Government Ogun State, Nigeria, in July 2015 using random sampling techniques. Relative frequency, relative density and relative importance value (RIV) were determined for each plant species. Shannon – wieners index (H^I) and evenness (J^I) indices were calculated to determine the community structure.

Average of nineteen weeds species were enumerated for the each of the five plots. *Solaneciobiafrae*was found on two plots out of the five plots enumerated with RIV of 5.4% and 7.1%. Domesticationand cultivation of *S. biafrae*should be encourage to avast the extinction of this vegetable.

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CHAPTER ONE

1.0 INTRODUCTION

Nigeria is an agricultural giant nation in Africa, with a total and area of 93.7million square kilometres out of which cultivable land area is about 71.2million hectares. This land area accommodates several species of vegetables. Nigerian is recognized worldwide for its vast fauna and flora biodiversity, which can be employed in several ways such as culinary, medicinal, therapeutic and nutritional, for the benefit of mankind(Adebooye*et al.*,2003).

Vegetables play an important role in human nutrition. Most are low in fat and calories but are bulky and filling. The term "vegetable" is somewhat arbitrary, and largely defined through culinary and cultural tradition. It normally excludes other main types of plant food, fruits, nuts and cereal grains but includes seeds such as pulses. (Ajala, 2009)

Vegetables can be exotic, those that are introduced from a foreign country, which were not naturally occurring in an ecosystem but were brought into

the new ecosystem such *Brassilaoleraceae*, *Lactucasativa* and *L. longifolia* or indigenous vegetables which are mostly cultivated locally or collected from the wild, in its natural growing condition. Examples of indigenous vegetables in Nigeria are *Amarathussp*, *Veroniaamygdalina*, *Corchorusolitorus* and *Solaneciobiafrae* (Adebooye and Opabode, 2004).

Vegetables can be group into fruity and leafy vegetables. Examples of fruity vegetables are *Lyioporsicumescullentum*, *Capsicum sp* and *Pseudomonas solanacirum*.

Leafy vegetables constitute an indispensable constitute of human diet in Africa generally and West Africa in particular. The varieties of leafy vegetables utilized are diverse, ranging from leaves of annuals and shrubs to leaves of trees. Leafy vegetables are generally good sources of nutrients, important protective foods, highly beneficial for the maintenance of health and prevention of diseases as they contain valuable food ingredients which can be utilized to build up and repair the body. Examples of leafy vegetables are *Solaneciobiafrae*, *Corchorusolitorius*,

Vernoniaamygdalina, Telfarriaoccidentalis, Amaranthuscruentus L. and Solaniummacrocarpon L. (Adebooyeet *al*., 2004).

Cocoa plot diversity and structurally complex shade present a land use that may perfectly simulate the forest land use and thus conserving a significant portion of the original tropical forest biodiversity (Alves, 1990; Rice and Greenberg, 2000; Scorthet *al*., 2004). The biodiversity conservation potential of cocoa plots is well documented for bats, ants and birds.(Rice and Greenberg, 2000) but poorly documented for floral diversity especially indigenous leaf vegetables.

The close canopy of mature cocoa trees creates a microclimate for shade – loving herbs (sciophytes), both annuals and perennials, to establish. Thus cocoa plot continue to serves as the land use where some useful plot herbs like *Solaneciobiafrae* are collected for consumption (Adebooye et al., 2003).

This study enumerated the low growing plant species in selected cocoa plot in Apoje village, Ijebu-Igbo, Ogun State. One of the 14 cocoa growing states in Nigeria, to determine the spatial distribution and abundance of *Solaneciobiafrae*related to other under storey herbs as they determine structure of weeds communities and to identify the invasive weed species.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 PLANT OF STUDY:*Solaneciobiafrae*

Solaneciobiafrae is known as Bologi in Sierra Leone, also called Worowo vegetable in Nigeria. It isa perennial climbing plant, producing stems up to 3 meters long that twine into other plants for supporting. The plant branches profusely about 50cm above ground level. The plant is and important and very popular leaf crop in West Africa, and is also harvested as a traditional medicine. It is cultivated in West Africa for its edible leaves and commonly sold in local market.(Adebooye, et.al., 2003)

The plant is available all year round because high humidity and moist conditions under the canopy in cocoa plots supports its growth, even in the dry season. Today, the importance of African indigenous leaf vegetables to human nutrition, medicine and nature has been realized.

2.2 SCIENTIFIC CLASSIFICATION

Solaneciobiafrae belongs to Kingdom - *Plantae*, Phylum - *Tracheophyta*, Class - *Tagnoleopsida*, Family - *Asteraceae*, Genus - *Solanecio*, Specie - *Solaneciobiafrae*, and Scientific Name - *Solaneciobiafrae*

2.3 GEOGRAPHICAL DISTRIBUTION

It is found in the rainforest zone of West Central Africa where annual rainfall is up to 1500mm and at attitude up to 1800 m high. It has medical and cultural uses in Nigeria, Cameroun, Sierra Leone, Liberia, Ghana, Cote d'ivoire and Congo where it is used to treat bleeding from cut and injury, and in treating sore eyes (Schippers, 2000; Adebooye, 2004).

Though "*Worowo*" (as it is called in Nigeria) is cultivated and staked on trellis about 1m tall in few home stead gardens, much of the plant consumed as pot herb is collected from the wild and in cocoa and kolanut plot where they are spared during weed control, which is mainly by manual method. The plant is available all year around because highly humidity and moist

conditions under the canopy in cocoa plots support it growth, even in the dry season. (Schippers, 2000).

2.4 IMPORTANCE OF *Solaneciobiafrae*

The indigenous species are also adapted to many tropical conditions, pest and diseases. Therefore, they can be very good sources of genes for genetic improvement of cultivated species especially in the area of pests and diseases resistance. Also, the indigenous species can be improved by introducing desirable trails from cultivated species into them.

This plant continues to grow in the dry season when planted under the moist conditions of cocoa plantations. Plants quickly form a dense, weed-excluding canopy under the trees. They provide adequate amount of many vitamins and minerals for humans.

2.4.1 Nutritional Importance

Solaneciobiafrae provides adequate amount of many vitamins and minerals for humans. The potassium content of leafy vegetable is good in the control

of diuretic and hypertensive complications (George, 2003). The 100g dry matter of leaves of the green-stemmed and purple-stemmed types of *Solaneciobiafrae* is reported to contain respectively 12.3g and 11.6g of crude protein; 11.8g and 10.5g of crude fibre; 342mg and 320mg of calcium; 39mg and 46mg of potassium; and 52mg and 53mg of iron (Adebooye, 2004).

2.4.2 Mdical Importance

The plant has a reputation as a cough-cure, for heart trouble, and to be appetitive and tonic, and for these uses it is eaten as vegetable. The plant is pulped into a paste for application to the breasts as a galactogene. The leaves, or a leaf extract, are used as a wound dressing and to stop bleeding, a leaf extract is used to treat sore eyes. The sap is also rubbed on the body to relieve rheumatic pain, prurigenic allergies and localized oedemas. The sap is also taken by draught for treating cough in children. The plant can also be used for pregnant women for safe delivery.

2.5 WEEDS

A weed is a plant considered undesirable in a particular situation, "a plant in the wrong place". They are plants unwanted in human – controlled settings, such as farm fields, gardens, lawns, and parks. Taxonomically, the term "weed" has no botanical significance, because a plant that is a weed in one context is not a weed when growing in a situation where it is in fact wanted, and where one species of plant is a valuable crop plant, another species in the same genus might be serious weed, such as a wild bramble growing among cultivated loganberries. The term also is applied to any plant that grows or reproduces aggressively or is invasive outside the native habitat (Janick, 1979).

The concept of weed in many parts of the world came with man's disturbances of the natural vegetation to meet his agricultural and recreational needs in conform to his aesthetic value (Akobundu and Agywakwa 1998).

Many plants terms weed are medicinal and economic importance and their importance in agro – ecosystem cannot be underestimated. This is need to identify and differentiate the beneficial and detrimental effect of weeds in our environment in order to determine the weed to keep and be aware of their special peculiarities and to determine how best to control and prevent the spread of noxious weeds.

2.5.1 Weeds as Adaptable Species

An alternate definition often used by biologists is any species, not just plants that can quickly adapt to any environment (Quammen 1998). Some traits of weedy species are the ability to reproduce quickly, disperse widely, live in a variety of habitats, establish a population in strange place successes in disturbed ecosystem and resist eradication once established. Other weedy species have been able to expand their range without actually living in human environments, as human activity has damaged the ecosystem of their species. These include the coyote, the white – tailed deer and the brown headed cowbird (Quammen, 1998).

In response to the idea that human may face extinction due to environmental degradation, paleontogist David Jablosky counters by arguing that human area need weedy species. Like other weedy species human are widely dispersed in a wide variety of environments, and are highly unlikely to go extinct no matter how much damage the environment faces (Quammen, 1998).

2.5.2 Dispersal of Weeds

Many weed species have moved out of their natural geographic ranges and spread around the world in tandem with human migrations and commerce. Weeds seeds are often collected and transported with crops after the harvesting of grains, so human are a vector of transport as well as a producer of the disturbed environment to which weed species are well adapted, resulting in many weeds having a close association with human activities (Rashid *et al.*, 2005).

2.5.3 Beneficial Effect of Weed

Not all weeds are nuisances in all location. Weeds serve good purpose in different ecosystem, they provide vegetation cover for soil against direct insolation; they also prevent and reduce soil erosion. A study in diurnal soil temperature under different soil cover showed that while temperature at 5 cm soil depth at 18:00 h was 30.98°C on weedy plot, it was 34.18°C on weed-free plot (Awodoyin and Ogunyemi, 2005).

Weed help in recycling soil nutrients. Deep-rooting weeds serves as nutrients pump, mop up nutrients leached to the sub-soil layer and bring them to the surface soil; weeds on decomposition increase the organic matter content of the surface soil. Leguminous weed such as *Crotalaria retusa, Mimosa pudica, Desmodiumadscendens,* and *Tephrosiabrateolata*enhance soil fertility through nitrogen fixation. Weed serve as source of genetic materials for the improvement of cultivated crops, for example, wild cowpea is used in the genetic improvement of *Vignauguiculata* (Awodoyin and Ogunyemi, 2005).

2.5.4 Noxious Effect of Weed

Weeds compete with crop for space, moisture and nutrients, they affect crop growth and performance and subsequent yield several scientists have shown that different weed species induced economic yield losses in rice, maize, yam and other crops. Weed reduces crop quality by contaminating agricultural produce. *Paspalumorbiculare*seeds often contaminate rice grain. Also for the perfect resemblance, seed of *Ruilliatuberosa*will contaminate the seed of tomatoes. Fruits of *Solaniumnigrum* will contaminate the fruits of green cowpea (*Pisiumsativa*). Weed also harbour vertebrate pest, providing food and shelter. For example, green cutters are more devastating in unwedded maize filed than in clean ones (Awodoyin and Ogunyemi, 2005).

Some weeds are poisonous to man and his livestock, for example, *Spigeliaanthelmia* and *Amaranthusspinosus* are poisonous to sheep and goats; weeds may cause discolouration of animal products. Some weed interferes with farm operations and may cause damages to farm machinery.

Weeds are unsightly and usually reduce the aesthetic value and outlook of well laid farm and recreational areas. "To thy fair flower add the ranks smell of weeds; but why thy odour matcheth not thy show, the soil is this, that thou dost common grow" (Baker, 1974).

2.5.5 Weed Control

Weed management within an organic farm relies on an integrated cropping-system approach. Weeds are plant that people view as undesirable in a particular place. Throughout the long human history of horticulture, people have worked to control weed for many reason. Weed control is a highly developed field of knowledge.

Weed control methods vary according to the growth habit of the weeds in questions, as well as the context. For example, different methods of weed control may be used on a food crop versus a fibre crop or a golf course, because there is often more concern about health effects of chemicals used on food crops, because they are ingested.

Weeds can be categorized by their life habitat. They can generally either be grouped as annuals or perennials. An annual weed grows from the seeds dropped in the previously growing season. Perennial weeds regrow from previously established roots, dormant stolon's, tubers, rhizomes, as well as the seed.

CHAPTER THREE

3.0 MATERIALS AND METHODS

3.1 STUDY SITES AND SAMPLING METHOD

The enumeration was carried outinApoje village, Ijebu North Local Government area of Ogun State. Ten cocoa plots were found in Apoje Village respectively. 20 x 20m area was marked out.At the centre of each cocoa plot a and using X-and Y-ordinate random sampling technique/ ten points were located for the placement of wooden quadrant (1 x 1m) for weed species enumeration.

3.2IDENTIFICATION OF WEED SPECIES.

All weeds and other low-growing plants (including samplings of tree plants) that rooted within each quadrant were identified and counted. Weed identification and naming were done using West African weeds(Akobundu and Agwkwa, 1998) the species that cannot be identified immediately on the field were preserved in wooden press and identified in the Herbarium

section, Department of Plant Science, OlabisiOnabanjoUniversity, OgunState, Nigeria.

3.3 ANALYSIS OF DATA ON SPECIES ABUNDANCE

The following measures of abundance were calculated for each species: density (D), Relative density (Rd) (%), Frequency (F) (%), Relative frequency (Rf) (%) and Relative Importance Value (RIVs) (Barbour et al., 1999).

$$\text{Density} = \frac{\text{Number of individuals of a species}}{\text{Area sampled}}$$

$$\text{Relative Density} = \frac{\text{Density of a species}}{\text{Total density for all species}} \times 100\%$$

$$\text{Frequency} = \frac{\text{Number of quadrats in which a species occurs}}{\text{Total number of quadrats samples}} \times 1000\%$$

$$\text{Relative frequency} = \frac{\text{Frequency of a species}}{\text{Total frequency value for all species}} \times 100\%$$

$$\text{RIV} = \frac{(\text{Relative Frequency} + \text{Relative Density})}{2} \%$$

3.4 MEASUREMENTS OF COMMUNITY STRUCTURES ON THE FIELDS

Measures of community structures in the four fields were calculated as follows; species richness (R) Shannon – wiener index (H^I) and evenness index (J^I)

Species Richness (R) = number of species present in a given area

Shannon – Wiener index (H^I) = -£pi. In Pi

Evenness Index (J^I) = $\frac{(H^I)}{}$

CHAPTER FOUR

4.0 RESULTS

4.1 SPECIES RICHNESS OF THE PLOT

Fifty (50) quadrats were laid in the farm during this study. In all, (48) forty - eight weed species belonging to thirty - one (31) plants families were enumerated (Table). The average number of species per cocoa plots during this study was 18, 18, 19, 20, and 21 respectively.

Families *Asteraceae*, *Poaceae*, *Convolvulaceae*and*Commecinaceae* had the highest number of species 5, 3, 3 and 3 respectively (Table 1). Table 2, 3, 4, 5, and 6 shows the frequencies, relative frequencies, densities relative densities and RIVs of each weed species for the five plots during this study.*Chromolenaoditara* and the highest RIVs (10.9%) in plot 1, *Sennaobtusifolia* had the highest RIV (14.7%) in plot 2, *Commelinadiffusa*had the highest RIV (15.3%) in plot 3, *Laporteaovalifolis*had the highest RIV (10.2%) in plot 4, *Syndrellanocliflora* has the highest RIV (12.5%) in the plot 5. Out of the five cocoa plots

enumerated *Solaneciobiafrae*was found on plot 4 and 5, the RIV of*Solaneciobiafrae* was low in comparism with other species on this two plot, RIVs of 5.4% and 7.1% respectively.

Table 1: Identified Weed Species in the Five Cocoa Plots for Abundance of *SolanecioBiafrae*

S/N	FAMILY	WEED SPECIES	COMMON NAME	LOCAL NAME
1	*Adoxaceae*	*Viburnumsuspensum*	Viburnum plant	
2	*Amaranthaceae*	*Acthyranthusaspera*	Devil horse whip	Aboro
		Alternantherarepens	Paper thorns	Dagunro
3	*Araceae*	*Colocasiaessulenta*	Cocoyam	Koko
4	*Asteraceae*	*Ageratum conyzoides*	Goat weed	Imi-esu
		Aspiliaafricana	Haemorrhage plant	Yinyin
		Chromolaenaodorata	Siam weed	Akintola
		Solaneciobiafrae	Sierra Leone bologi	Worowo
		Syndrellanodiflora	Node weed/Starwort	aluganbi
5	*Azollaceae*	*Azollapinnata*	Water velvet	

6	*Caesalpinoidae*	*Sennahirtusa*	Stinking cassia	Asunwon
		Sennaobtusifolia	Foeid cassia	Ako-rere
7	*Combretaceae*	*Combietumlospidum*	Combietum	
8	*Commelianaceae*	*Aneilemabeninense*	Aneilema	
		Commelinabenghalensis	Day flower	
		Commelinadiffusa	Scurvy weed	
			Commelina	
9	*Convolulaceae*	*Ipomea aquatic*	Ipomea	Ododo-oke
		Ipomeainvolucrata	Morning glory	Afewogbe
		Ipomeatriloba	weed	
			Little bell	
10	*Curcubribitaceae*	*Curcubribitapepo*	Pumpkin	Elegede
11	*Denstaeditiaceae*	*Pterdiumaquilinum*	Bracken	
12	*Dioscoreaceae*	*Discoreadumetorum*	Yam	Isu
13	*Ebenaceae*	*Diorphyrus kaki*	Persimmon plant	Origoge
14	*Euphiorbiaceae*	*Manihotessculenta*	Cassava	Ege, garri
		Phyllanthusamarus	Phyllanthus	Iyin-olole
15	*Fabaceae*	*Sennaoccidentalis*	Coffee senna	Rere
16	*Lamiaceae*	*Solenostemonmonostachyus*	Solenostemon	Aranpoo
17	*Lauraceae*	*Laurusnobilis*	Bay lavel	
18	*Leguminosae*	*Albiziazygia*	Albizia	
		Anthonanthamacrophylla	Anthonantha	Agoin
		Piptadeniastrumafricanum	Piptadeniastrum	

19	*Loganiaceae*	*Spigeliacanthelmia*	Pink-weed/wormush	Aparan/aran
20	*Malvaceae*	*Abutilon mauritianum*	Africa mallow	Furu
		Sidaacuta	Broom weed	Isekutu
21	*Moraceae*	*Ficusexasperata*	Sand-paper	Ewe-ipin
		Morus species	plant	
			Burbak	
22	*Musaceare*	*Musa sp*	Banana	Ogede
23	*Onagraceae*	*Ludwigiadecurrens*	Water promerose	
24	*Palmea*	*Cocosnucifera*	Coconut palm	Agbon
25	*Passifloraceae*	*Adeniasp*		Aro-kek
26	*Poaceae*	*Andropogontectrum*	Giant bluestem	
		Brachiariadeflexa	Signal grass	
		Sorghiumarandinaceum	Sorghium	
27	*Portulaceae*	*Talinumfruticosum*	Water lettuce	Gbure
28	*Solanaceae*	*Capsicum fruitescens*	African pepper	Ata-jije
29	*Tiliaceae*	*Triumfettacordiflora*	Chinnes bur	Aku-eri
30	*Urticeceae*	*Larpoteaaestuans*	Stinging nuttleschmach	Fovefu
		Larpoteaovalifolia		Mpupu

Table 2: Density, Relative Density, Frequency, Relative Frequency and RIVs of Weeds Enumerated Around Cocoa Plot One (1).

Weeds species	Density	RD%	FR%	RFr%	RIV%
Abutlilonmauritianum	12.5	1.5	10	1.9	2.7
Adeniasp	37.5	4.6	50	9.3	6.9
Albiziazygia	7.5	0.9	10	1.9	1.4
Alternantariarepens	22.5	2.8	20	3.7	3.3
Andropogontectorum	7.5	0.9	20	3.7	2.3
Aneilemabeninense	20.0	2.4	20	3.7	3.1
Anthonathamacrophylla	7.5	0.9	20	3.7	2.3
Azollapinnata	2.5	0.3	10	1.9	1.1
Brachiariadeflexa	12.5	1.5	10	1.9	1.7
Capsicum species	2.5	0.3	10	1.9	1.1
Lapoteaaestuans	30	3.7	40	7.4	5.6
Chromolaenaodorata	87.5	10.7	60	11.1	10.9
Commelinabenghalensis	15	1.8	30	5.6	3.7
Commelinadiffusa	122.5	14.9	20	3.7	9.3
Ludwigiadecurrens	5	0.6	20	3.7	2.2
Musa species	2.5	3.1	10	1.9	2.5
Pteridiumaquitinum	45	5.5	30	5.6	5.6
Sennaobtusifolia	25.5	31.2	50	9.3	20.3
Sennaoccidentalis	15	1.8	20	3.7	2.8
Senna hirsute	27.5	3.4	20	3.7	3.6
Syndrellanodiflora	80	9.8	60	11.1	10.5

Table 3: Density, Relative Density, Frequency, Relative Frequency and RIVs of Weeds Enumerated Around Cocoa Plot Three (3).

Weeds Species	Density	RD%	RF%	RFr%	RIV
Abutilon mauritinum	40	4.9	20	4.8	4.9
Adenia species	32.5	3.9	20	4.8	4.4
Ageratumconyzoides	187.5	22.9	20	4.8	13.9
Branchiariadeflexa	25	3.0	30	7.1	5.1
Chromolaenaodorata	15	1.8	40	9.5	5.7
Cocusnucifera	25	3.0	10	2.4	2.7
Colcasiaoseulenta	5	0.6	10	2.4	1.5
Diorpyrus kaki	15	1.8	20	4.8	3.3
Ficusexasperata	12.5	1.5	20	4.8	3.2
Laporteaaestuans	25	3.0	40	9.5	6.3
Laporteaovallifolia	70	8.5	30	7.1	7.7
Laurusnobilis	10	1.2	20	4.8	3.0
Morus species	7.5	0.9	10	2.4	1.7
Musa species	7.5	0.9	20	4.8	2.9
Sennaobtusipila	182.5	22.2	30	7.1	14.1
Sorghiumarundinaceum	17.5	2.1	10	2.4	2.3
Spigeliaanthelmia	57.5	7.0	20	4.8	5.9
Syndrellanodiflora	80	9.8	30	7.1	8.5
Triumfellacordifolis	5	0.6	20	4.8	2.7

Table 4: Density, Relative Density, Frequency, Relative Frequency and RIVs of Weed Enumerated Around Cocoa Plot Three (3)

Weed Species	Density	RD%	FR%	RFr	RIVs
Adenia species	25	1.4	10	2.1	1.8
Andropogontectorum	15	0.8	40	8.5	4.1
Agapanthus africnu	22.5	1.2	10	2.1	1.7
Azollaplinnata	25	1.4	10	2.1	1.8
Brachiariadeflexs	117.5	6.4	20	4.3	5.4
Chromolaenaodorata	62.5	3.4	30	6.4	4.9
Colocasiaessulents	55	2.9	20	4.3	3.6
Commelinadiffusa	102.5	5.6	30	6.4	15.3
Curcubribitaceae	67.5	3.7	30	6.4	5.1
Ipomea aquatic	225	12.3	30	6.4	9.4
Laporteaaestuans	47.5	2.6	30	6.3	4.5
Phyllanthusamarus	112.5	6.1	30	6.4	6.3
Plastostomaafricanum	90	4.9	10	2.1	3.5
Pteridiumaquilinum	12.5	0.7	30	6.4	3.6
Sennaobtusifolia	112.5	6.1	20	4.3	5.2
Sidaacuta	112.5	6.1	30	6.4	6.3
Solenostemonmonostachyus	12.5	0.7	10	2.1	1.4
Spigeliaanthelmis	442.5	24.1	30	6.4	15.3

Syndrellanodiflora	170	9.3	40	8.5	8.9
Syndrellanodiflora	170	9.3	40	8.5	8.9
Viburniumsuspensum	5	0.3	10	2.1	1.2

Table 5: Density, Relative Density, Frequency, Relative Frequency and RIVS of Weeds Enumerated Around Cocoa Plot Four (4).

Weed Species	Density	RD%	FR%	RFr%	RIV
Adenia species	5	0.7	30	2.1	1.4
Aneilemabeninense	55	8.1	30	6.3	7.2
Chromolaenaodorata	47.5	6.9	30	6.3	6.6
Commelinabenyhalensis	15	2.4	30	6.3	4.3
Commelinadiffusa	57.5	8.4	30	6.3	7.2
Curcubritaceae	75	10.9	20	4.2	7.5
Discoreadumetorum	85	12.5	30	6.3	9.4
Ficusexasperata	7.5	1.1	20	4.2	2.6
Ipomea aquatic	22.5	3.3	40	8.3	5.8
Ipomea involucrate	40	5.9	30	6.3	6.1
Laporteaovalifolia	82.5	12.1	40	8.3	10.2
Ludwigiadecurrens	5	0.7	20	4.2	2.5
Musa sp	40	5.8	20	4.2	5.0
Phyllanthusamarus	42.5	6.2	20	4.2	5.2

Seniaobtusifolia	17.5	2.6	30	6.3	4.5
Solaneciobiafrae	30	4.4	30	6.3	5.4
Syndrellanodiflora	45	6.6	30	6.3	6.5
Talinumfruiticosum	10	1.5	20	4.2	2.8

Table 6: Density, Relative Density, Frequency, Relative Frequency Ad RIVs of Weeds Enumerated Around Cocoa Plot Five (5).

Weed Species	Density	RD%	FR%	RFr%	RIVs
Achyranthusaspera	2.5	0.3	10	2.2	1.3
Aneilemabeniense	70	9.5	30	6.7	9.8
Capsicum sp	7.5	1.0	20	4.4	2.7
Chromolaeanaodorata	20	2.7	30	6.7	4.7
Commelina diffuse	10	1.3	20	4.4	2.7
Combietumhispidum	5	0.7	20	4.4	2.6
Curcubribitaceae	5	0.7	10	2.2	1.5
Ipomea involucrate	22.5	3.0	20	6.7	4.9
Ipomeatriloba	22.5	3.0	20	4.4	3.7
Larpoteaaestuans	50	6.8	20	4.4	5.6
Larpoteaovalifolia	117.5	15.9	30	6.7	11.3
Manihotessculenta	15	2.0	10	2.2	2.1
Phyllantusamarus	42.5	5.7	30	6.7	6.2

Seniaobtusifolia	62.5	8.4	40	8.9	8.7
Sennaoccidentalis	35	4.7	20	4.4	4.6
Solaneciobiafrae	55	7.4	30	6.7	7.1
Syndrellanodiflora	102.5	13.9	50	11.1	12.5
Talinimtriangulare	9.5	12.8	30	6.7	9.8

4.2 SPECIES DIVERSITY AND EVENNESS OF THE FIELDS

Shannon-wiener index of species diversity (H^I) obtained were 2.4, 2.4, 2.5.3, 2.5.9, 2.8 (Table 7), H^I was highest in plot 3, 4, and 5 than plot 1 and plot 2 respectively (Table 7).

Evenness index (J^I) was used to measure the distribution of individuals in a community, the value obtained for (J^I) at the five plots were 0.83, 0.82, 0.84, 0.86 and 0.76 respectively, this tending towards 1 in plot 4, plot 3, plot 2 and plot 1 indicates equal representation or similar abundance of individual species in the four plots.

TABLE 7: Measurement of the Community Structure of The Five Cocoa Plots Enumerated At Apoje Village

	R	H^1	J'
Plot 1	18	2.4	0.83
Plot 2	19	2.4	0.82
Plot 3	20	2.53	0.84
Plot 4	19	2.59	0.86
Plot 5	18	2.8	0.96

4.3 MEDICAL WEEDS IDENTIFIED ON THE COCOA PLOTS

Twenty-six weed species of medicinal importance were identified in the five cocoa plots. The major indicator listed for these weed species are against malaria, stomach disorder, cough, disbarred, fever, dysentery, rheumatism, ulcer, wound, anti-poison, convulsion, skin-diseases, tuberculosis, gonorrhoea, abortifacient, galactagogue, anti-microbial and blood purifier properties. Detailer list and indicated of these plants are represented in Table 8.

Table 8:Weed of Medicinal Importance Identified On The Cocoa Plot At Apoje Village

S/N	Weed species	Constituents	Part used	Medicinal uses
1	*Abutilonmautitianum*		Leaves, root	Gonorrhea, inflammation, ulcer, diarrhea
2	*Achyranthesaspera*	Alkaloid, potassium salt	Whole plant, leaves	Stomach disorder, cough, diarrhea, fever, dysentery, rheumatism
3	*Adenia species*		Bark, leaves & Roots.	Cough and respiratory disorder
4	*Ageratum conyzoides*	Flavonoid, limonene, pinene, tannins	Whole plants, seed and leaves	Dressing wounds, ulcers, inflammation, redness of the eyes
5	*Alterntherarepens*	Alkaloid	Whole plant	Dysentery, galactagognes
6	*Aneilemabeniniense*	Inulins	Whole pant	Laxative
7	*Chromolaemaodorata*	Essential oil, pinene, limonene, pinene, tannins	Leaves	Malaria, fever and dysentery
8	*Commelinadiffusa*	Alkaloids, inulins, saponin, mannins	Leaves, entire plat	Yellow fever, premature labour
9	*Cucurbritapepo*	Resin, taxolbumin, oil	Seeds	Diuretic, demulant&vemifuge
10	*Ficus exasperate*	Tannins	Leaves, bark, root, seed	Stomach urinary disorder, tumors
11	*Ipomeatriloba*		Whole plant	Headache
12	*Laporteaaestuans*		Leaf	Dressing burns, wounds and rickets
13	*Laporteaovalifolia*		Leaf	Haemostatic on cuts and wounds, anti-irritant, poison antidote
14	*Manihotessulenta*	Leaves contain alkaloid, saponins& tannins	Leaves, tubers	Anticoagulant, gonorrhea, ulcer & burns
15	*Musa sp*	Inulin, tannins, alkaloid-5, hydroxytryptamine	Leaves, roots, fruits	Fresh wounds, cut, dysentery, hysteria, abortifacient
16	*Phyllanthusamarus*	Inulin, saponin,	Whole plant	Purgatives, vemifuge

		tannin		
17	*Pteridiumaquilinum*		Whole plant	Cancer
18	*Sennaobtusifolia*	Chysarobin, postagladin, tannins	Leaves, root, seed	Mild laxative, skin-disease
19	*Sennahirtusa*	Azuline, saponin, tannins	Leave, stem, bark, seed, flower	Blood purifier, asthma, skin-disease
20	*Sidaacuta*	Saponin, tannins, postagladin	Leaves, root	Ulcer, fever, antipyretic
21	*Solenostemonmonostrachyus*	Essential oil, tannin alkaloid	Leaves	Convulsion, tuberculosis
22	*Spigellaanthelmia*	Alkaloids, spigeline	Whole	Intestinal worms, convulsion, muscle
23	*Syndreallanodiflora*	Inulins, tannins, saponins	Leaves, whole pant,	Laxative, leprosy.
24	*Talinumtriangulare*	Steroidal saponins	Tuber leaves	Premenstrual, kidney disorder, syndrome virility, rheumatoid
25	*Triumfeltacordifolia*	Inulins, saponin	Leaves, flowers	Malaria, laxative.

CHAPTER FIVE

5.0 DISCUSSION AND CONCLUSION

18, 18, 19, 20 and 21 weed species were identified on the five plots (5) respectively. The high species richness (R) of these fields are similar to (Sonwal*et al.*, 2007) who reported average species richness ranging from 15-20 for cocoa plantation in different areas of forest of South Camerron. High R is peculiar to tropical rain forest zone because of favourable environmental factor. *Solaneciobiafrae* was found in two cocoa plots out of the five cocoa plots enumerated with RIVs of 5.4% and 7.1% on plot 4 and 5 respectively. The relatively high RIVs of *Solaneciobiafrae* on plot 5 may be attributed to the deliberate cultivation and preservation of the plant by the farmer.

Forty-Seven (47) weed species were least ubiquitous across the five cocoa plots, these weed species were found only in one field. Five weed species were most ubiquitous across the five cocoa plot, these include *Chromolaenaodorata*, *Syndrellanodiflora*, *Ipomeainvolucrata*,

*Commelinadiffusa*and *Laporteaovalifolia.* Twenty weed species were found in two or three cocoa plots. This shows that geographical location and evaluation, which determine soil properties, landscape and level of inter and intraspecific competition, has significant effect on species diversity and richness of these cocoa plots. This is similar to the findings of *Tuomistio*and *Poulsen,* (2000) who found that weed diversity is often related to local condition, level of inter and intraspecific competition and the landscape

This study shows that twenty-five medicinal plants were found on the five cocoa plots. This implies that while there are medicinally useful plants in the study area, most of their species are rare and may be endangered. Conservation of medicinal plants is therefore recommended. This study shows that *Solaneciobiafrae*is been threatened and might be endangered if not cultivated. This studies also shows that many weed species have many medicinal or economical important, many are termed weed because their uses are not yet been discovered. It is therefore recommended that researches should be done more on low – growing plants termed

weed.*Chromolaenaodirata*, *Adeniasp*, *Ipomeasp*,are invasive plants and might be a treat to the existence of *S.biafrae*this is in accordance with the founding of Awodoyin, *et al.*,(2013) that *Chromolaenaodorata*, *oplimenisburmanni* and *Adeniscissampeloides*are treat to the existence of *S.biafrae*.In some cocoa plots in Oyo, Ekiti and Cross river states. It is also recommended that similar studies on a large scale be carried out in order to ascertain species diversity, determine threatened species and make informed decision on the use of herbicide.

REFERENCES

Adebooye O.C.,Jeffery C. Grubben G. J. H. and Denton O. A. (2004):*Solaneciobiafrae* (Oliv&Hiern) In: (E.d.s.) PROTA 2: Vegetables / Legumes (CD - Rom) PROTA. Wageningen, Netherleands.

Adebooye O.C. (2004):*Solaneciobiafrae*(Olive and Hiern) C. Jeffery. In: PROTA 2: Vegetables and legumes, Grubben G.J.H. and Deton, O.A (Editors). PROTA, Wageningen, Netherland.

Adebooye O.C. andOpara J. T (2004): Status of conservation of the indigenous leaf vegetables and fruit of Africa. *Africa Journal of Biodiversity 3(12): 700 – 705.*

Ajala L. (2009): The effect of boiling on the Nutrients and Anti – nutrient in two non-conventional vegetables. *Pakistan Journal of Nutrition 8 (9): 1430 – 1433.*

AkobunduI.O. and Agyakwa C.W. (1998): A handbook of West African weeds. IITA, Ibadan. 564pp

Alves M.C. (1990): The role of cocoa plantations in the conservation of the Atlantic forest of Southern Bahia, Brazil

Awodoyin R. O. and Ogunyemi S. (2005): Weed Taxonomy, Biology and control. The distance learning center, University of Ibadan.Pg 1 – 23.

Baker H.G. (1974): The Evolution of Weeds. Annual review of Ecology and Systematic, vol. 5:1 – 24.

Barbour M.G., Burk J.H., Gillian F.S. and Schwartz M.W. (1999):*Terrestial plant ecology.* 3rd Edition, Benjamin Cummings.

George P.M. (2003): Encyclopaedia of food, human press, Washington, 1:526

Janick J. and FreemanH. W. (1979): Horticultural science (3rd ed:) San Francisco: P.308.ISBN 0 – 7167- 1031 – 5.

Rashid M. H., Robert S. and Neville A. (2005): Ecosystems and Human Well – Being: current state and Trends: Findings of the condition and Trends working group.

Rice and Greenberg R. (2000): Cocoa cultivation and the conservation of biological diversity, (*Ambio 29:167 – 173).*

Schippers R. R. (2000): African indigenous vegetables and overview of the cultivated species. National Resources Institute / ACP. EV Technical Center for Agriculture and Rural Comperation, Charham, United Kingdom pp 214

SchrothG.,Harvery G. and Vinant G. (2004): Complex Agro Forest Structure, Diversity and Potential Role in Landscape Conservation. A.M.N. (eds). Agro forest and biodiversity conservation in tropical landscape island press, Washington, D.C.pp. 227- 260.

Sonwal D.J., Nkongmeneck B.A., Weise S.F., HatatM., Adesina A.A and Jenssens M.J.J. (2007): Diversity of plants in Cocoa agro forest in the humid forest zone of southern Cameroon. Biodiversity and conservation. 10.1007/s/10531.007 – 9187 – 1.

Tuomistro H. and Paulsen A. D. (2000): Pteridophyte diversity and species composition in four Amazonian rainforests. J. vey sci. 11:383 – 396.

Quammen D. (1998): "Planet of weeds" (http:// Sep.Csumb.edu/class/ESSP 645/readings/ Quammen% 201998. pdf) (PDF), Harper's Magazine, retrieved November 15, 2012.