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WEED FLORA OF UNIVERSITY OF BENIN IN TERMS OF DIVERSITY AND RICHNESS USING TWO ECOLOGICAL MODELS

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ABSTRACT

Weeds are as important as man to himself and its environment. Weed flora in terms of diversity and richness of University of Benin, Ugbowo campus were determined from four habitable parts using two ecological models: Margalef species richness (d) and Shannon-Wiener diversity (H). Primary data were collected from an inventory obtained from tossing 20 quadrants of (1 X 1) m^2 randomly. A total of 81 weed species distributed in sixty one genera were encountered from counts within the quadrats. Two life forms were recorded: herbaceous life form with 76 representatives (93.83 %) and five shrubby life forms (6.17 %). The total weed flora is distributed among two plant groups of 20 families. These included three families belonging to monocotyledonous group and 17 belonging to dicotyledonous group. The dominant weeds are commonly found in families of Compositeae, Amaranthaceae, Euphorbiaceae, Lamiaceae, Commelinaceae, Poaceae and Cyperaceae. Weed taxa of these families are usually annual and ephemeral in life cycle. The study revealed enormous diversity in weed flora in the sites assessed based on Margalef species richness (d) and Shannon-Wiener diversity (H). These ecological models suggest that site B is the richest and most diverse followed by sites D, A and C respectively. Sorensen index at 50 % significance suggest the sites are similar. Among the dominant weed flora encountered include: Synedrella nodiflora, Sporobolus pyramidalis, Setaria barbata, Peperomia pellucida, Oldenlandia corymbosa, Mariscus flabelliformis, Kyllinga erecta, Gomphrena celosioides, Euphorbia hyssopifolia, Eleusine indica, Desmodium ramossisimum, Cyperus rotundus, Commelina diffusa, Cleome rutidosperma, Axonopus compressusandAlternanthera sessilis. The results suggest that these weeds encountered are significantly associated with man. Thus, require further studies on their dispersal, crop-plant-need association and weed-tree plant-association.

Key words: Weed flora, Nigerian University, Margalef model (d), Shannon-Wiener index (H), Sorensen index, Edo State, Nigeria.

INTRODUCTION

The biotic and abiotic components which make up the natural systems are constantly undergoing physical, chemical and biological interactions (Das, 2000). These interactions are dynamic, and fairly in a balanced state. Humans in search for higher agricultural produce have constantly tried to modify the environment thereby threatening its integrity, food supply and the existence of other organisms. This has enhanced inter and intra specific competition for increasingly diminishing resources. Man accepted weeds as a natural consequence of cultivation (Akobundu and Agyakwa, 1988). However, weeds are undesirable plants (Ross and Lembi, 1985).

Macneish (1964) opined that man first started domesticating plants and animals around 10,000 years ago. Weeds have probably been present since that time. Thus, it is likely that man is responsible for the evolution of weeds as he is responsible for the evolution of crops (Baker, 1965; Muzik, 1970). According to DeWet and Harlan (1975) there are three classes of plants in nature namely; wild plants (which grow naturally outside the human disturbed habitat), weeds (which thrive in habitats that are continuously disturbed by humans) and domesticates/crops (which are artificially propagated and often require cultivation and care by humans in order to grow and make optimum use of environmental resources).

Weeds are plants easily adapted to disturbed habitat. They may affect the quality and quantity of crop production as well as resource utilization and income generation activities of humans (Harlan and DeWet, 1975; EWRS, 1986; Zimdahl, 1999 and WSSA, 1994). When natural vegetation is alteredand abused, weeds take over. According to Baker (1975) and DeWet and Harlan (1975) weeds are wild species long adapted to sites of natural and human disturbances and new species varieties that evolved since agriculture was developed.

Man in pursuit of agriculture caused a vast and rapid disturbance in the natural vegetation as well as in the composition of soil. Many weeds currently in existence did not exist before man started agriculture (Das, 2000).They reproduce, multiply and spread to colonize newer and safer niches than one they originally infested (Akobundu, 1989). They are crop pests that have almost the same growth requirements as crops. Consequently, weed increase cost of crop production and reduce crop yield. Weeds amongst crop plants can reduce yield from 30-50% (Akobundu, 1989; Sidhu and Bir, 1983). In the tropics, particularly in the developing countries, losses incurred are in the range of 10 – 70% (Bartolome, 1966; Gill and Onyibe, 1986 and 1988; Kolade, 1991; Sahid and Sagau, 1993; Grist and Menze, 1996). Therefore, weeds are problematic in agriculture.

Various studies have been carried out on weeds in areas around the study site (Adeikinju, 1969;Gill and Onyibe, 1986,1988; Dania-Ogbe and Osawaru, 1988;Gill and Nyawuame, 1991; Eze and Gill, 1992).The present study aims to sample and compute the weed flora found in some habitable places in the University of Benin, Ugbowo Campus, Benin City. The result will contribute to the database of weed flora of Edo state as well as in the development of a Flora manual. More so, it will be essential in future developmental plans of weed control in the University of Benin.

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MATERIALS AND METHODS

Study area

This covers the main campus of the University of Benin situated on the Ugbowo axis of Benin City metropolis (6.20 ^{0}N - 5.37 ^{0}E). It lies within the humid tropical rain forest belt. The climate includes high rainfall (2000 mm-3000 mm) of bimodal pattern with peaks at June/July and September respectively, high temperature ranging between 20 ^{0}C - 40 ^{0}C and high atmospheric humidity.

Seasonally, the climate is affected by two opposing air masses, tropical continental and tropical maritime. The tropical continental air mass originates and blows from Eurasia Arabia high pressure between October-March. It is dry and brings the harmattan. The tropical maritime air mass blows from the Atlantic between April-September. The vegetation is comparable and similar to the rain forest but with visible anthropogenic influence (Dania-Ogbe *et al.,* 1992). Most of the water bodies within the campus drain into Ikpoba River. This flows across the campus at the Northern axis into the Ikpoba Dam situated about 3 Km away from the site of the University.

The main activity of the campus is teaching and research. However, at leisure time variety of recreational and economic activities are common including catering services, small scale trading and farming activities. The farming activities are carried out in marginal land within residential quarters.

Sampling frame

The study was carried out in the University of Benin during the year 2012 - 2013. Four habitable sites were randomly selected within the University of Benin, Ugbowo Campus namely;

1). Site A: Sciences (Life Sciences and Physical Sciences Faculty),
2). Site B: Worship Centres (All Saints' Chapel, Saint Albert Catholic Church and Central Main Mosque),
3). Site C: Faculty (Art, Social Sciences and Management Sciences) and
4). Halls of Residence (Hall three and four).

The selection was done based on constant mowing of associated lawns and degree of human activities at the respective sites. For random sampling in each site, a one metre square quadrat was thrown twenty times with counts made. The guided walk was carried out on each site to inventory weed species.

Identification of weed flora

Each selected site was surveyed for weed flora. After which the weed species were enumerated with the aid of*A Handbook of West African Weeds* Akobundu and Agyakwa (1988), *Flora of West TropicalAfrica* (Hutchinson and Dalziel, 1954-1972),*The useful plants of West Tropical Africa* (Burhill, 1985, 1994, 1995, 1997 and 2000). Herbarium collections were referred with those of FHI, Ibadan and local names were also used to identify taxonomic species. Vouchers of weeds collected were deposited in the Herbarium unit, Department of Plant Biology and Biotechnology, University of Benin, Benin City.

Data analysis: The following parameters were determined

Margalef species richness index (d) = $\frac{S-1}{\ln(N)}$

Where S= total number of species

N=Total number of individuals

In=Natural logarithm

Shannon Wiener Diversity Index (H) = $\frac{N \log N - \Sigma^{s}_{i=1} fi \log fi}{N}$

Where N=Number of individuals

f_i= Frequency of individuals of ith species

Sorenson Similarity Index (C_s) = $\frac{2j\ (100)}{a+b}$

Where j=Number of species common to both sites compared

a=Number of species in site A

b=Number of species in site B

Critical level of significance=50% for similarity

RESULTS

The botanical name, common name, family, habitat, habit and economic uses of the weed flora encountered are summarized in Table 1. Some of the weed species include *Phyllanthus amarus*, *Euphorbia* species, *Sida* species, *Commenlina* species, *Tridaxprocumbens*, *Eleusine indica*, *Acalypha* species, *Cyperus* species, *Kyllinger* species, *Croton hirtus* and *Tithonia diversifolia*.

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Table 1: **List of some weed flora encountered in the four study site in the University of Benin, Ugbowo, Benin City**

S/N	Botanical Name	Common Name	Family	Group	Habitat	Habit
1.	*sia gangetica* (Linn.) T.Anders		Acanthaceae	D	T	H
2.	*Cyathula prostrata* (L.) Blume		Amaranthaceae	D	T	H
3.	*Gomphrena celosioides* Mart.		Amaranthaceae	D	T	H
4.	*Amaranthus spp* Linn.		Amaranthaceae	D	T	H
5.	*Achyranthes aspera* L.	Devil's horsewhip	Amaranthaceae	D	T	H
6.	*Alternanthera sessilis* (L.)R. Br. Ex. Roth		Amaranthaceae	D	T	H
7.	*Alternanthera brassiliana*		Amaranthaceae	D	T	H
8.	*Celosia leptostachya* Benth.		Amaranthaceae	D	T	H
9.	*Synedrella nodiflora* Gaertn.	Nodeweed,starwort	Asteraceae	D	T	H
10.	*Tridax procumbens* Linn.	Tridax,coat button	Asteraceae	D	T	H
11.	*Ageratum conyzoides* Linn.	Goatweed	Asteraceae	M	T	H
12.	*Emilia coccinea* (Sims) G.Don	Yellow tassel flower	Asteraceae	D	T	H
13.	*Sclerocarpus africanus* Jacq. ex Murr.		Asteraceae	D	T	H
14.	*Chromolaena odorata* (L.) R. M. King and Robinson	Siamweed	Asteraceae	D	T	Sh
15.	*Vernonia ambigua* Kotschy and Peyr.	Ironweed	Asteraceae	D	T	H
16.	*Vernonia cinerea* (Linn.) Less.	Little ironweed	Asteraceae	D	T	H
17.	*Conyza sumatrensis* (Retz.) Walker	Fleabane	Asteraceae	D	T	H
18.	*Tithonia diversifolia* (Hemsl.) A.Gray	Mexican sunflower, Tree marigold	Asteraceae	D	T	H
19.	*Cleome rutidosperma* D. C.		Cleomaceae	D	T	H
20.	*Commelina diffusa* Burm. f.	Spreading dayflower	Commelinaceae	M	T	H
21.	*Commelina erecta* L.		Commelinaceae	M	T	H
22.	*Commelina benghalensis* L.	Wandering Jew, tropical spiderwort	Commelinaceae	M	T	H

23.	*Aneilema beniniense* (P. Beauv.) Kunth		Commelinaceae	M	T	H
24.	*Ipomoea involucrata* P. Beauv	Morning glory	Convolvulaceae	D	T	H
25.	*Cyperus haspan* Linn.		Cyperaceae	M	T/A	H
26.	*Cyperus esculentus* Linn.	Yellow nutsedge	Cyperaceae	M	T/A	H
27.	*Cyperus iria* Linn		Cyperaceae	M	A	H
28.	*Cyperus rotundus* Linn.	Purple nutsedge	Cyperaceae	M	A	H
29.	*Kyllinga bulbosa* Beauv.		Cyperaceae	M	A	H
30.	*Kyllinga erecta* Schumach. Var.		Cyperaceae	M	A	H
31.	*Kyllinga squamulata* Thonn. ex Vahl		Cyperaceae	M	A	H
32.	*Fimbristylis littoralis* Gaudet.		Cyperaceae	M	A	H
33.	*Fimbristylis ferruginea* (Linn.) Vahl		Cyperaceae	M	A	H
34.	*Phyllanthus amarus* Schum. and Thonn.		Euphorbiaceae	D	T	H
35.	*Euphorbia hirta* Linn.	Snakeweed,gardenspurge,Australian asthma plant	Euphorbiaceae	D	T	H
36.	*Euphorbia hyssopifolia* Linn.		Euphorbiaceae	D	T	H
37.	*Euphorbia heterophylla* Linn.	Spurgeweed,wild poinsettia	Euphorbiaceae	D	T	H
38.	*Acalypha ciliata* Forsk.		Euphorbiaceae	D	T	H
39.	*Alchornea laxiflora* (Benth.) Pax. and K. Hoffm.		Euphorbiaceae	D	T	Sh
40.	*Croton hirtus* L'Herit		Euphorbiaceae	D	T	H
41.	*Senna obtusifolia* (L.) Irwin and Barneby		Fabaceae	D	”	H
42.	*Senna occidentalis* (L.) Link	Coffee senna	Fabaceae	D	”	H
43.	*Desmodium ramosissimum*		Fabaceaea	D		H
44.	*Solenostemon monostachyus* P. (Beauv.)		Lamiaceae	D	T	H

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45.	*Spigelia anthelmia* Linn.	Pinkweed,Wormbush	Loganiaceae	D	T	H
46.	*Sida acuta* Burm. F.	Broomweed	Malvaceae	D	T	Sh
47.	*Sida garckeana* Polak.		Malvaceae	D	T	Sh
48.	*Ficus exasperata* Vahl.	Sandpaper tree	Moraceae	D	T	Sh
49.	*Boerhavia diffusa* L.	Redspiderling	Nyctaginaceae	D	”	H
50.	*Peperomia pellucida* (L.)H.B. and K.		Piperaceae	D	A	H
51.	*Setaria barbata* (Lam.) Kunth	Bristle foxtail grass	Poaceae	M	T	H
52.	*Eleusine indica* Gaertn	Goosegrass, bullgrass	Poaceae	M	T	H
53.	*Axonopus compressus* (Sw.) P.Beauv.	Carpetgrass	Poaceae	M	T	H
54.	*Sporobolus pyramidalis* Beauv.	Cat’s tail grass	Poaceae	M	T	H
55.	*Mariscus flabelliformis* Kunth var.		Poaceae	M	T	H
56.	*Mariscus alternifolius* Vahl.		Poaceae	M	T	H
57.	*Panicum maximum* Jacq.	Guineagrass	Poaceae	M	T	H
58.	*Eragrostis tennella* (Linn.) P. Beauv.	Feathery lovegrass,bug’segggrass	Poaceae	M	T	H
59.	*Brachiaria lata* (Schumach) C. E. Hubbard		Poaceae	M	T	H
60.	*Brachiaria falcifera* (Trin.) Stapf		Poaceae	M	T	H
61.	*Cynodon dactylon* (linn.) Pers.	Bahama grass	Poaceae	M	T	H
62.	*Paspalum conjugatum*Berg.	Sourgrass	Poaceae	M	T	H
63.	*Paspalum scrobiculatum* Linn.	Ditch millet	Poaceae	M	T	H
64.	*Dactyloctenium aegyptium* (Linn.) P. Beauv.	Crowfoot-grass	Poaceae	M	T	H
65.	*Chloris pilosa* Schumach	Fingergrass	Poaceae	M	T	H
66.	*Chrysopogon aciculatus* (Retz.) Stapf		Poaceae	M	T	H
67.	*Digitaria gayana* (Kunth) Stapf		Poaceae	M	T	H
68.	*Brachiaria deflexa* (Schumach.) C.E. Hubbard		Poaceae	M	T	H
69.	*Digitaria Horizontalis* Willd	Digitgrass, Crabgrass	Poaceae	M	T	H
70.	*Fuirena ciliaris* (Linn.)Roxb.		Poaceae	M	A	H

71.	*Talinum triangulare* (Jacq.)Willd	Waterleaf	Portulacaceae	D	T	H
72.	*Portulaca oleracea* Linn.	Common purslane	Portulacaceae	D	T	H
73.	*Portulaca quadrifida* Linn.	Ten o'clock plant	Portulacaceae	D	T	H
74.	*Oldenlandia corymbosa* Linn.		Rubiaceae	D	T	H
75.	*Spermacoce ocymoides* Burm. F.		Rubiaceae	D	”	H
76.	*Pentodon pentandrus* (Schum. and Thonn.) Vatke		Rubiaceae	D	A	H
	Mitrocarpus villosus (Sw.) D. C.		Rubiaceae	D	T	H
77.	*Diodia sarmentosa* Sw.		Rubiaceae	D	T	H
78.	*Solanum nigrum* L.	Black nightshade	Solanaceae	D	T	H
79.	*Physalis angulata* Linn.	Wildcape gooseberry	Solanaceae	D	T	H
80.	*Laportea aestuans* (Linn.) Chew.	Tropical nettleweed	Urticaceae	D	T	H

T= Terrestrial, A=Aquatic (wet/moist place), H=Herbs, S=Shrub, D=Dicot, M=Monocot

Note: Weed species are arranged in alphabetical orders of families.

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The distribution of species based on number of cotyledons is presented in Figure 1. The results suggest 52 (64.19 %) of the weed species are dicots while 29 (35.81 %) are monocots.

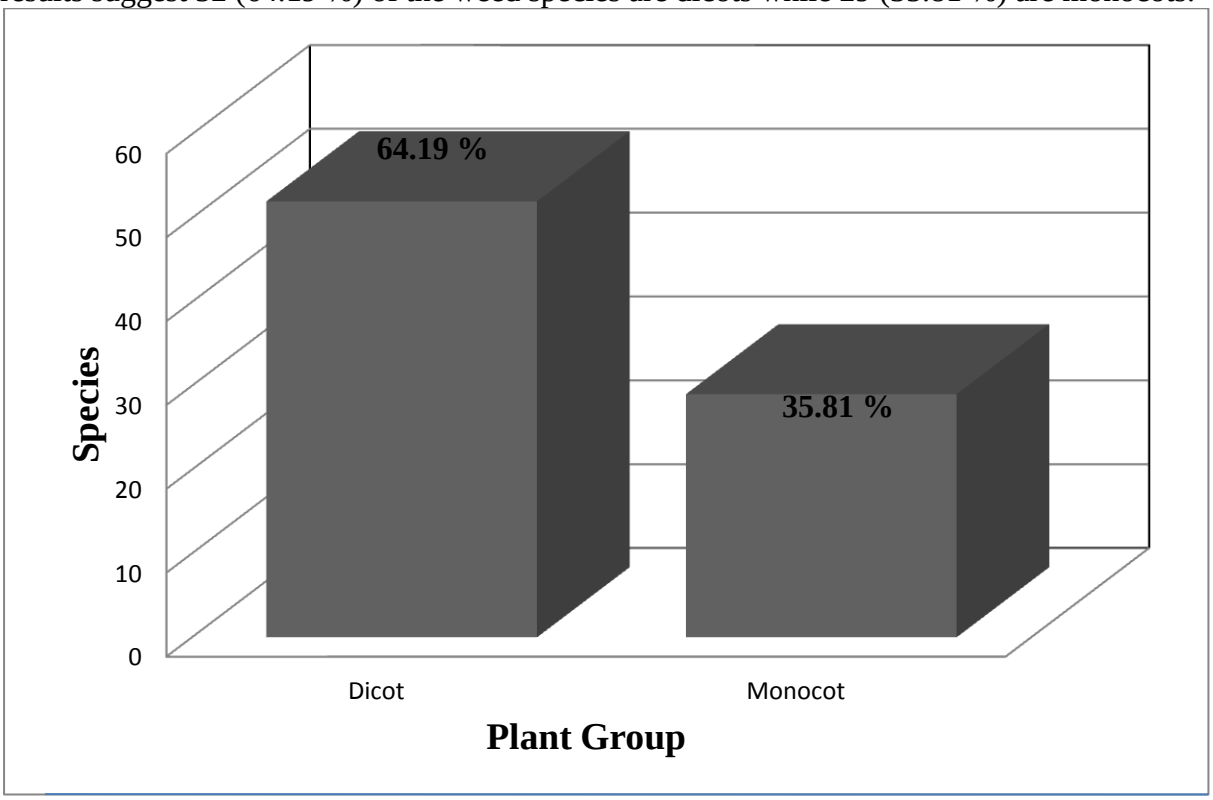

Figure 1: Distribution of weeds encountered based on number of cotyledon

The habit of weed species encountered are presented in Figure 2. The results suggest the dominant life form is herbaceous. Shrubby life form accounts for less than 20 % of the weed species.

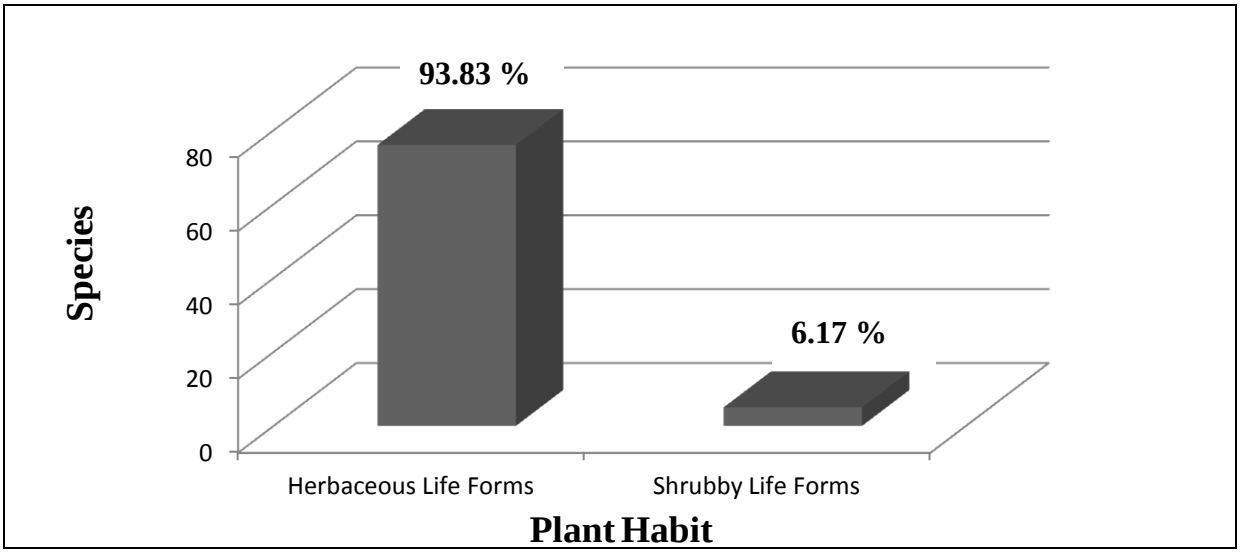

Figure 2: Habit of weed species encountered.

The results of habitat of weed species is presented in Figure 3. Most of the weed encountered were terrestrial as only less than 20 % are aquatic weeds (wet/waterlogged spots).

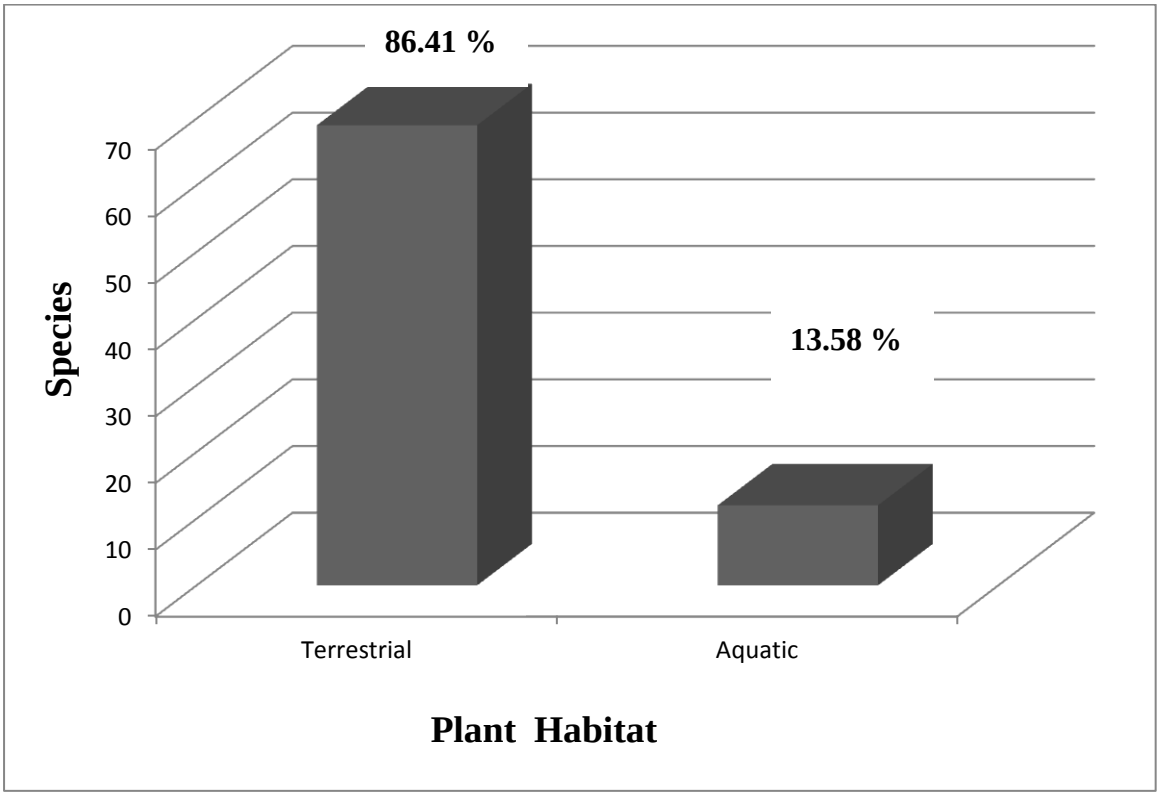

Figure 3: Habitat distribution of weed species encountered.

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Total count of weed species in each of the sampled site. This is represented as the sum of weed species encountered in Q_1 - Q_{20}. Where Q_n – nth quadrat tosssed

Table 2: Total count of weed species from each of the sampling site

S/N	Weed species	Total count of weed species Site A	Total count of weed species Site B	Total count of weed species Site C	Total count of weed species Site D
1	*Acalypha ciliata*	0	7	0	0
2	*Achyranthes aspera*	8	5	12	4
3	*Ageratum conyzoides*	47	98	3	16
4	*Alchornea laxiflora*	0	2	0	0
5	*Alternanthera brassiliana*	9	6	0	0
6	*Alternanthera sessilis*	142	28	79	119
7	*Amaranthus spinosus*	13	30	24	113
8	*Aneilema beniniense*	15	27	0	2
9	*Asystasia gangetica*	127	35	99	49
10	*Axonopus compressus*	393	213	395	53
11	*Boerhavia diffusa*	3	11	10	33
12	*Brachiaria deflexa*	0	18	0	0
13	*Brachiaria falcifera*	0	0	5	0
14	*Brachiaria lata*	3	0	0	0
15	*Celosia leptostachya*	0	13	0	0
16	*Centrosema pubescense*	0	21	0	0
17	*Chromolaena odorata*	12	4	7	7
18	*Chrysopogon aciculatus*	0	0	8	7
19	*Cleome rutidosperma*	49	47	75	69
20	*Commelina benghalensis*	55	9	16	15

21	*Commelina diffusa*	50	19	20	60
22	*Commelina erecta*	95	7	41	4
23	*Conyza sumatrensis*	0	0	3	0
24	*Croton hirtus*	0	18	0	2
25	*Cyathula prostrate*	50	12	42	28
26	*Cynodon dactylon*	27	290	0	0
27	*Cyperus esculentus*	13	7	0	10
28	*Cyperus haspans*	11	29	5	27
29	*Cyperus iria*	8	14	30	0
30	*Cyperus rotundus*	14	137	22	16
31	*Dactyloctenium aegyptium*	0	80	0	27
32	*Desmodium ramossisimum*	723	355	519	146
33	*Digitaria horizontalis*	15	20	0	12
34	*Diodia sarmentosa*	0	0	0	2
35	*Eleusine indica*	88	74	83	72
36	*Emilia coccinea*	4	13	34	8
37	*Eragrostis tenella*	35	131	0	87
38	*Euphorbia heterophylla*	39	9	0	8
39	*Euphorbia hirta*	35	50	14	13
40	*Euphorbia hyssopifolia*	40	46	29	129
41	*Ficus exasperate*	0	3	6	7
42	*Fimbristylis ferruginea*	0	83	0	0
43	*Fimbristylis littoralis*	0	43	0	0
44	*Fuirena ciliaris*	0	0	0	7
45	*Gomphrena celosioides*	104	17	72	22
46	*Ipomoea involucrate*	23	50	56	21
47	*Kyllinga bulbosa*	70	60	15	72

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48	*Kyllinga erecta*	47	201	71	55
49	*Kyllinga pumila*	0	48	0	0
50	*Kyllinga squamulata*	3	0	10	0
51	*Laportea aestuans*	7	25	4	17
52	*Luffa cylindrical*	0	18	0	0
53	*Mariscus alternifolius*	69	0	54	4
54	*Mariscus flabelliformis*	71	13	60	22
55	*Mariscus longibracteatus*	0	0	45	0
56	*Mitrocarpus villosus*	0	41	0	0
57	*Oldenlandia corymbosa*	154	131	11	81
58	*Panicum maximum*	11	6	51	16
59	*Paspalum conjugatum*	0	38	0	0
60	*Paspalum scrobiculatum*	26	19	14	9
61	*Pentodon pentandrus*	9	23	0	4
62	*Peperomia pellucida*	20	104	16	59
63	*Phyllanthus amarus*	56	84	30	52
64	*Physalis angulate*	0	22	0	0
65	*Portulaca oleracea*	5	35	17	94
66	*Sclerocarpus africanus*	36	21	65	15
67	*Senna obtusifolia*	0	0	28	0
68	*Senna occidentalis*	2	0	0	0
69	*Setaria barbata*	133	131	120	123
70	*Sida acuta*	32	2	49	8
71	*Sida garkeana*	15	5	25	12
72	*Solanum nigrum*	0	7	0	0
73	*Solenostemon monostachyus*	73	17	7	36

74	*Spermacoce ocymoides*	24	90	27	8
75	*Spigelia anthelmia*	28	28	0	0
76	*Sporobolus pyramidalis*	74	45	266	8
	Synedrella nodiflora	227	218	30	146
78	*Talinum triangulare*	33	5	23	26
79	*Tithonia diversifolia*	26	0	0	0
80	*Tridax procumbens*	84	45	82	1
81	*Vernonia cinerea*	15	48	35	7

Keys:

Site A=Sciences,

Site B=All Saints', St. Albert and Main Mosque,

Site C=Faculty (Art, Management and Social Sciences),

Site D=Hall of Residence (Hall Three and Four).

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Table 3: Computed values of Margalef species richness (d) and Shannon-Wiener diversity (H) for each site.

Sites	Margalef species (d)	Shannon-Wiener diversity(H)
A	6.962	1.431
B	8.298	1.582
C	6.422	1.403
D	7.334	1.526

Table 4: Comparing the level of diversity between sites using t test at 0.05 confidence level.

Sites	Calculated t	Critical t	Inference
A and B	-8.988	1.6451	A is less diverse than B
A and C	1.911	1.6452	A is more diverse than C
A and D	-11.423	1.6452	A is less diverse than D
B and C	9.275	1.6451	B is more diverse than C
B and D	3.709	1.6453	B is more diverse than D
C and D	-9.762	1.6454	C is less diverse than D

Table 5: Computed values of Sorenson's index for comparing similarities between each sites at 50 % significance

Sites	Sorenson index at 50 % significance	Inference
A and B	83.5%	Similar
A and C	83.6%	Similar
A and D	85.2%	Similar
B and C	74.4%	Similar
B and D	81.0 %	Similar
C and D	82.6%	Similar

DISCUSSION

The results from this study suggest that weeds are abundant in the Ugbowo campus of the University of Benin, Benin City. A total of 81 weed specieswere encountered. Weeds are distributed in twenty families of flowering plants. The number of represented species are Poaceae (20), Asteraceae (10), Cyperaceae (9), Amaranthaceae (7), Euphorbiaceae (7), Rubiaceae (5), Commelinaceae (4), Portulacaceae (3), Fabaceae (3), Solanaceae (2), Malvaceae (2), Acanthaceae (1), Lamiaceae (1), Utricaceae (1), Loganiaceae (1), Moraceae (1), Convolvulaceae (1), Nyctaginaceae (1), Piperaceae (1) and Cleomaceae (1). The entire weed species recorded are in two groups, dicotyledon (52 [64.19 %]) and monocotyledon (29 [35.81]). The abundance of weed species may be as a result of human activities targeted at altering the environment directly or indirectly. More so,

according to Radosevich*et al.* (2007) some ecosystems are altered by the presence of weed species through their effects on fire frequency, nitrogen depletion or addition, or allelochemicals as other weeds/invasive plants are adapted forchange in land use whereas often native species are not. Hence, there is need to investigate the effect of these weed species on ecological services, process and function. Among the weed species are some of the ten world worst weeds included in Holm (1997). This gives credence to the fact that weeds are no strictly associated with human activities.

The plant species habits and habitat encountered in all the study sites are shown in Figure 2 and 3. Seventy-six herbaceous [93.83 %] and five shrubby [6.17 %] life forms. Similar trend has also been reported by Onyibe and Gill (1986), Gill and Nyawuame (1991), Eze and Gill (1992). The shrubby life form may have resulted as a regrowth in fields established by seeds or vegetative stems. Whereas the herbaceous life form have fragile vegetative body, produce abundant seeds and are fast growing at the slight of rain. These factors and the tropical nature of the study area may be responsible for their abundance.

All the sites have 43 common weed species. These are *Achyranthes aspera, Ageratum conyzoides, Alternanthera sessilis, Amarnthus spp,Asystasia gangetica, Axonopus compressus, Boerhavia diffusa, Chromolaena odorata, Cleome rutidosperma,Commelina benghalensis, C. diffusa, C. erecta, Cyathula prostrata, Cyperus haspans, C. rotundus, Desmodium ramossisimum, Eleusine indica, Emilia coccinea, Euphorbia hirta, E. hyssopifolia, Gomphrena celosioides, Ipomoea involucrata, Kyllinga bulbosa, K. erecta, Laportea aestuans, Mariscus flabelliformis, Oldenlandia corymbosa, Panicum maximum, Paspalum scrobiculatum, Peperomia pellucida, Phyllanthus amarus, Portulaca oleracea, Sclerocarpus africana, Seteria barbata, Sida acuta, S. garckeana, Solenostemon monostachyus, Spermacoce ocymoides, Synedrella nodiflora, Sporobolus pyramidalis, Talinum triangulare, Vernonia cinerea, Tridax procumbens.*This may be due to the nature of weeds, proximity and mowing materials used for the sites.

From Tables 2, 3, 4 and 5, it was observed that site B had the highest species richness followed by site D, A and C as supported by Shannon-Wiener diversity (H) (1.582, 1.526, 1.431 and 1.403) and Margalef species index (d) (8.298, 7.334, 6.962 and 6.422). At H_0 (null hypothesis); diversity of site A = site B. At H_a (alternate hypothesis); diversity of site A site B. Comparing the level of diversity between the sites using t test at 0.05 confidences (Hutchinson, 1970). The calculated t value (-8.988) is less than the critical t (1.6451). Therefore, we reject the null hypothesis but accept the alternate hypothesis that site A is less diverse than site B. The total count of all the weed species encountered in all the sites, for instance in site, A, C, D, the sum of *Acalyphaciliata* from Q_1-Q_{20} is zero (0) but in site B it is seven (7); the sum of *Ageratumconyzoides* from Q_1-Q_{20} in site *A is 47, B is 98, C is 3, D is 16*. The similarity between the sites was studied using Sorenson's index at 50% similarity/significance. Biological diversity has become a widely recognized descriptorof the status of communities and ecosystems for its role in community stability (Radosevic *et al.*, 2007). The weed species richness and evenness determined in

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the present study will aid understanding of key ecological process. The model used in studying the weed diversity is in line with theGurevitch *et al.* (2002).

From the studies, notwithstanding of forms, density, benefits, when and where they occur; weeds can be disastrous or beneficial to man, his crops and environment. When weeds are not engaged in their characteristics activities, they may have admirable qualities. Aggressive weeds in one environment may be a charming wild flower in another. Consequently, there is a dire need to regulate and seek better methods of weed management and control. The diversity of weed flora in the Ugbowo campus of University of Benin can be described as enormous in spite of mowing activities. Although demographic study of these weed species is required to elucidate change in population size and structure over time as well as to determine invasiveness. There is need for their cognizance and tailor-suit developmental strides on campus to include weed considerations. This can go a long way in ensuring they are under control. More so, the university authorities can create a Department or Unit in the Estate Planning Department that will be charged with monitoring, maintenance and recording of weed species on campus to discourage extinction-capable activities.

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