Weeds of Oil Palm (*Blaeis qelineenses* Jacq.) Plantations in Nigeria

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ABSTRACT

An ecological survey of the weeds of oilpalm plantations in Nigeria was carried out. 174 species of weeds were encountered in Nigerian oil palm plantations. Of these 117 are dictos belonging to 39 families, 52 are monocots belonging to 4 families while 5 are ferns belonging to 4 families. On the basis of their Summed Dominance Ratio (SDR), the five most dominant weeds of the oilpalm plantations are *Pueraria phaseoloides* (Roxb). Benth., *Eupatorium odoratum* L. (Syn. *Chromolaena odorata*), *Panicum lasum* Sw., *Brachiaria humidicola* (Rendle schweick and *Mariscus alternifolius* Vahl.)

INTRODUCTION

Weeds steal food from hungry mouths (Anonymous 1986). According to Ross and Lembi (1985), the above is as a result of the competitive, persistent, pernicious and undesireable nature of the weeds as well as thier interferance with human (agricultural) activities. Weeds have been on the agricultural scene as far back as when man started cultivating plants for food and other beneficial purpose. Although it is generally believed that the age long battle between crop plants and weeds anti-dates the modern man's arrival on the scene, much attention and energy is being put into it so as to give crop plants the upperhand. Consequently, many developed countries have been reducing the marginal yield losses due to weeds considerably while in many less-developed countries, losses incurred due to weed competition is still very high.

As a result of the enormous energy input and man-hours spent on weeding tree crops in Nigeria, weed biology of tree crops has attracted the attention of many scientists. From Nigeria, Adenikinju (1969), Komolafe (1976 & 1978), Oladokun (1978) and Olunuga & Abokundu (1987) have studied the weed problems of Nigerian tree crop plantations, but no such study has been carried out on the oilpalm plantations. Gill and Onyibe (1986) have carried out the phytosociological survey of the epiphytic flora of Nigerian oil palm plantations. The present is the first on the ecology of weeds of the oil palm plantation.

MATERIALS AND METHODS

The oil palm plantations chosen for the study were the Okomu oilpalm plantations located within the Okomu Forest Reserve and covering an area of 3,525 hectares of land situated between lat. 6° 14'N – 6° 24'N and long. 5° 7'E - 5° 20'E in Nigeria. The elevation of the area is just above sea level.

Sampling was done during the dry and rainy season using a 1.441m x 0.74m

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rectangular quadrat. All weed species encountered were collected, identified and quantitative coefficients for their density and frequency were determined following Dansereau (1957). The Relative Density, Relative Frequency and Summed Dominance Ratio (SDR) were calculted following the formula outlined by Pancho (1986).

RESULTS AND DISCUSSIONS

A total of 174 weed species were recorded in the oil palm plantations. The weeds have been listed in table 1 along with values for their relative density, relative frequewncy and percentage SDR. The 174 weeds are distributed in 51 families. Of these, 5 species are ferns belonging to 4 families, 52 species are monocots distributed in 8 families while the rest 117 are dicots belonging to 39 families. From the above, it is apparent that more broadeleaved weeds (142 species) infest the oil palm plantation than either of the grasses (22 species) or the sedges (10 species). Most of the marginal or boundary weeds are grasses and in areas like drainage trenches and irrigation water troughs, the grasses are frequently replaced by the sedges.

Based on the percentage SDR of each weed species, a list of the first 25 weeds is given in table 2. From this table, it is apparent that problematic weeds among the dicots are *Pueraria phaseolodies* (a cover crop) and *Eupatorium odoratum* (Syn. *Chromolaena odorata*): the grasses are *Panicum laxum and Brachiaria humidicola* and the sedges is *Mariscus alternifolius*. Altogether, the three most dominant species of weeds of the oilplam plantations in Nigeria are *Pueraria phaseoloides, Eupatorium odoratum and Panicum laxum* while the two most important weed families are Poaceae (28 species) and Asteraceae (11 species).

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Table 1. Relative density, Relative frequency and summed dominance ratio (SDR) of weeds of oil-palm plantations in Nigeria.

*Taxon	(Rd) Relative density	(Rf) Relative frequency %	(SDR) Summed dominance Ratio
ACANTHACEAE			
Elytraria marginata Vahl.	0.59	3.13	1.86
Ruellia praetermissa Schweirf. ex Lindau	1.93	2.34	2.135
ADIANTHACEAE			
Pteris mildbraedii Jieron.	2.70	2.70	2.70
AMARANTHACEAE			
Amaranthus dubius Mart. ex Thell.	0.62	0.90	0.76
Amaranthus hybridus L.	0.07	0.78	9.425
Amaranthus spinosus L.	0.20	0.83	0.515
Amaranthus viridis L.	1.16	0.23	0.695
Alternanthera sessilis (L.) R. Br. ex Roth	4.20	2.80	3.50
Celosia argentea L.	0.2	1.04	0.62
Celosia laxa Schum. & Thonn.	1.82	0.96	1.39
Celosia trigyna L.	1.06	1.69	1.375
Cyathula prostrata (L.) Blume	2.3	2.82	2.56
Gomphrena celosioides Mart.	0.15	0.78	0.465
APOCYNACEAE			
Landolophia owariensis P. Beauv.	1.57	1.65	1.61
Pleioceras barteri Bail	0.39	1.65	1.02
ARACEAE			
Anchomanes difformis (Bl.) Engl.	9.10	2.36	5.73
Calcasia scandens P. Beauv.	0.30	1.13	0.72
Raphidophora africana N.E. Br.	1.01	1.13	1.07
Xanthosoma mafaffa Schott	0.14	0.78	0.46

ARECACEAE			
Ancistrophyllum secundiflorum (P. Beauv) Wendl.	0.59	0.36	0.71
Elaeis guineensis (Seedlings)	0.21	0.90	0.56
ASCLEPIADACEAE			
Gorgronema latifolium Benth.	0.08	1.4	0.74
ASPLENIACEAE			
Asplenium adianthum-nigrum L.	0.40	2.00	1.20
ASTERACEAE			
Ageratum conyzoides L.	7.64	3.94	5.79
Conyza sumatrensis (Retz.) Walker	4.50	1.40	2.95
Crassocephalum rubens (Juss. ex. Jacq) S.Moore	0.27	1.40	0.84
Eclipa prostrata(L.) L.	0.41	0.9	0.66
Emilia sonchifolia (L.) L. D.C	2.39	4.17	3.28
Eupatorium odoratum L.	15.66	7.61	11.64
Mikania cordata Barm.f) B.L. Robinson	0.49	0.78	0.64
Struchium sparganphora (L.) O. ktze	0.45	1.13	0.79
Synedrella nodiflora Gaerta.	0.83	0.90	0.87
Vernonia cinerea (L.) Less	2.03	1.57	1.80
Vernonia perrottetii Sch. Bip	2.97	2.34	2.66
CAPPARIDACEAE			
Cleome ciliata Schum. & Thonn.	1.27	0.83	1.05
Cleome gynandra L.	1.66	1.90	1.78
Cleome spinosa Jacp.	1.56	1.13	1.35
CARYOPHYLLACEAE			
Polycarpon prostratum (Forsk.) Asch. & Schweinf.	0.89	0.78	0.84

Table 1 continued

*Taxon	(Rd) Relative density %	(Rf) Relative frequency %	(SDR) Summed dominance Ratio %
CELASTRACEAE			
Hippocratea africana L.	0.11	0.82	0.47
Salacia pallescens Olive.	0.59	0.83	0.71
COMBRETACEAE			
Combretum dolichopetalum Engl. & Diels	0.45	0.96	0.71
Combretum grandiflorum G. Don.	0.33	0.82	0.56
Terminalia superba Engl. & Diels	0.10	1.04	0.57
COMMELINACEAE			
Aneileme beniniense (P. Beauv.) Kunth	4.60	3.13	3.87
Commelina benghalensis L.	2.08	1.56	1.82
Palisota ambigua (P. Beauv.) C.B. Cl. DC.	2.70	2.00	2.350
Palisota hirsuta (Thunb.) K. Schum.	0.50	0.23	0.37
CONVOLVULACEAE			
Ipomoea involucrata P. Beauv.	1.63	0.78	1.21
CUCURBITACEAE			
Coccinia barteri (Hook.f.) Keay	0.59	0.83	0.71
Cucumis melo L.	0.20	1.04	0.62
Luffa cylindrica (L.) M.J. roem	0.10	1.04	0.57
Momordica charantia L.	2.30	3.38	2.84
Momordica multiflora Hook.f.	0.23	0.96	0.60
CYPERACEAE			
Cyperus compactus Retz.	0.40	1.04	0.72
Cyperus distans. L.F.	0.30	1.04	0.67
Cyperus esculentus L.	1.82	0.96	1.39
Cyperus sp. L.	0.30	1.04	0.67
Fimbristylis dichotoma L. Vahl.	0.60	3.13	1.87
Fimbristylis littoralis Gaud	0.91	0.96	0.94
Mariscus alternifolius Vahl.	10.65	4.70	7.68
Mariscus dubius Rottb.) C.B. C. Fisher	1.26	0.78	1.02

Momordica multiflora Hook.f.	0.23	0.56	
CYPERACEAE			
Cyperus compactus Retz.	0.40	1.04	0.72
Cyperus distans. L.F.	0.30	1.04	0.67
Cyperus esculentus L.	1.82	0.96	1.39
Cyperus iria L.	0.30	1.04	0.67
Fimbristylis dichotoma (L.) Vahl	0.60	3.13	1.87
Fimbristylis littoralis Gaud.	0.91	0.96	0.94
Mariscus alternifolius Vahl.	10.65	4.70	7.68
Mariscus dubius (Rottb.) C.E.C. Fisher	1.26	0.78	1.02
Mariscus [illegible] Kunth	1.04	0.90	0.97
Scleria bracteata Cav.	1.20	0.70	0.95
DAVALLIACEAE			
Davallia chaerophylloides (Poir.) Steud.	0.89	0.78	0.84
Nephrolepis biserrata (Sw.) Schoot.	2.23	2.34	2.29
DIOSCOREACEAE			
Dioscorea cayenensis Lam.	0.05	0.23	0.14
EUPHORBIACEAE			
Cleistanthus polystachus HOOK.f. ex Planch	0.15	0.78	0.47
Euphorbia heterophylla L.	0.55	0.82	0.69
Euphorbia hirta L.	0.91	1.69	1.30
Euphorbia prostrata Ait.	0.27	0.70	0.49
Hevea brasiliensis (Kunth) Mull. Arg.	0.29	2.48	1.39
Marcaranga hurifolia Baille	0.30	3.13	1.72
Manihot glaziovii Mull. Arg.	7.83	3.13	5.57
Neoboutonia velutina Prain	1.96	0.83	1.40
Phyllanthus amarus Schum. & Thonn.	1.31	1.13	1.22
Phyllanthus muellerianus (O. krze) Exell	0.91	6.73	3.92
FABACEAE			
Baphiastrum confusum (Hutch. & Dalz.) Pellegr.	0.30	2.08	1.17
Centrosema pubescens Benth.	1.00	2.30	1.65
Dalbergia saxatilis Hook.f.	0.15	0.78	0.47
Mimosa pudica L.	0.78	1.04	0.91
Pentaclethra macrophylla Benth.	0.20	1.65	0.93
Pueraria phaseoloides (Rpxb.) Benth.	26.84	13.12	19.89
Sphenostylis stenocarpa (Hochst. ex.A.Rich.) Harms	3.19	1.92	2.56

*Taxon	(Rd) Relative density %	(Rf) Relative frequency %	(SDR) Summed dominance Ratio %
HYPERICACEAE			
Harungema madagascariensis Lam. ex poir.	0.21	0.90	0.56
ICACINACEAE			
Icacina tricantha Oliv.	1.21	5.74	3.48
LAMIACEAE			
Solenostemona rotundifolius (Poir.) J.K. Morton	0.69	0.83	0.76
LOGANIACEAE			
Spigelia anthelinia L.	4.15	1.90	3.03
MALVACEAE			
Sida acuta L.	1.66	4.76	3.21
Urena lobata L.	0.41	1.90	1.16
MELASTOMATACEAE			
Dissotis erecta (Guill. & Perl.) Dandy	0.75	0.23	0.49
Dissotis rotundifolia (Sm.) Triana	3.12	0.78	1.95
MENISPERMACEAE			
Cissampelos owariensis P. Beauv. ex DC.	0.29	0.83	0.56
Epinetrum undulatum Hiern.	0.27	0.70	0.49
Jateorhiza macrantha (Hook.f) Exell & Mendonca	0.30	0.78	0.54
Sphenocentrum jollyanum Pierre	0.10	0.83	0.47
Synclisia scabrida Miers	0.89	1.56	1.23
Triclisia dictyophylla Diels	0.39	1.65	1.02
MORACEAE			
Chlorophora excelsa (Welw.) Benth.	0.15	0.78	0.47
Ficus mucoso Welw. ex Ficalho	2.09	0.82	1.46
	0.23	0.96	0.60

MENISPERMACEAE			
Cissampelos owariensis P. Beauv. ex DC.	0.29	0.83	0.56
Epinetrum undulatum Hiern.	0.27	0.70	0.49
Jateorhiza macrantha (Hook.f) Exell & Mendonca	0.30	0.78	0.54
Sphenocentrum jollyanum Pierre	0.10	0.83	0.47
Synclisia scabrida Miers	0.89	1.56	1.23
Triclisia dictyophylla Diels	0.39	1.65	1.02
MORACEAE			
Chlorophora excelsa (Welw.) Benth.	0.15	0.78	0.47
Ficus mucoso Welw. ex Ficalho	2.09	0.82	1.46
Musanga cecropioides R. Br.	0.23	0.96	0.60
NYCTAGINACEAE			
Boerhavia coccinea Mill.	1.96	1.65	1.81
Boerhavia diffusa L.	3.33	8.26	5.80
ONAGRACEAE			
Jussiaea erecta L.	0.50	1.04	0.77
Jussiaea suffruticosa L.	0.21	0.90	0.56
PANDACEAE			
Microdesmis puberula Hook.f. ex Planch.	0.30	0.78	0.54
PASSIFLORACEAE			
Barteria fistulosa Mast.	0.14	0.70	0.42
Passiflora foetida L.	0.40	1.13	0.77
PHYTOLACCACEAE			
Phytolacca dodecandra L'Herit.	0.62	0.90	0.76
PIPERACEAE			
Peperomia pellucida (L.) H.B. & K.	1.92	1.13	1.53
Piper umbellatum L.	3.20	3.50	3.35
POACEAE			
Acroceras zizanioides Dandy	1.10	0.70	0.90
Axonopus compressus P. Beauv.	0.80	1.40	1.10
Brachiaria deflexa Robyns	1.66	0.83	1.25
Brachiaria humidicola (Rendle) Schweick	12.32	3.13	7.73

Table 1 continued

*Taxon	(Rd) Relative density %	(Rf) Relative frequency %	(SDR) Summed dominance Ratio
Vhloris barbata Sw.	1.20	0.82	1.01
Cynodon dactylon Pegs.	0.89	0.78	0.84
Dactyloctenium aegyptium P. Beauv	2.73	1.92	2.33
Digityaria ciliaris (Retz.) Koel	3.91	1.65	2.78
Digitaria horizontis Willd.	1.00	2.08	1.54
Echinocloa coloum (L.) Link	1.24	0.90	1.07
Ecoinocloa crus-galli (L.) Beauv.	0.60	1.04	0.82
Eleusine indica Geatn.	0.83	0.90	0.87
Eragrostis domingensis (Pers.) Stend.	1.10	2.08	1.59
Eragrostis tenella Roem. & Scholt.	2.05	0.96	1.51
Leptochloa coerules cens Steud	7.08	4.17	5.63
Panicum brevidlorum L.	5.28	0.82	3.05
Panicum griffonii franch	0.68	0.96	0.82
Panicum laxum Sw.	16.31	5.51	10.91
Panicum maximum Jacq.	0.90	2.36	1.63
Paspalum conjugatum Berg.	3.70	1.40	2.55
Paspalum scrobiculatum L.	4.40	2.26	3.33
Pennisetum polystachion Schult.	0.21	1.99	1.10
Pennisetum purpureum Schum.	2.37	0.23	1.30
Perotis patens Gand.	6.66	2.36	4.51
Poa annua L.	0.40	1.04	0.72
Setaria barbata Kunth	0.91	1.92	1.42
Setaria megaphylla dur. & Schinz	0.15	0.23	0.19
Sporobolus pyramidalis P. Beauv.	3.19	1.92	2.56
POLYGALACEAE			
Carpolobia lutea G. Don.	0.14	0.7	0.42
POLYMATODES			
POLYPODIACEAE			
Phymatodes scolopendria (Burm.f.) Ching	0.15	0.78	0.47
PORTULACACEAE			
Portulaca foliosa Ker. Gawl.	0.10	1.04	0.57
Portulaca oleracea L.	0.80	2.08	1.44
Talinum triangular (Jacq.) Willd.	1.04	2.34	1.69
RUBIACEAE			

Carpolobia lutea G. Don.	0.14	0.7	
POLYMATODES			
POLYPODIACEAE			
Phymatodes scolopendria (Burm f.) Ching	0.15	0.78	0.47
PORTULACACEAE			
Portulaca foliosa Ker. Gawl.	0.10	1.04	0.57
Portulaca oleracea L.	0.80	2.08	1.44
Talinum triangular (Jacq.) Willd.	1.04	2.34	1.69
RUBIACEAE			
Genphila obvallata (Schumach.) F. Didr.	1.19	0.78	0.99
Mitracarpus villosus (Sw.) DC.	3.03	1.65	2.34
Mitragyna ciliata Aubrev. & Pellegr.	0.21	1.90	1.06
Mussaenda elegans Schum. & Thonn.	0.41	0.90	0.66
Oldenlandia corymbosa L.	0.91	0.96	0.94
Psychotria kitsonii Hutch. & Dalz.	0.81	0.70	0.76
Sabicea calycina Benth.	0.30	0.78	0.54
SAPINDACEAE			
Paullinia pinnata L.	0.15	0.78	0.47
SCROPHULARIACEAE			
Sco-aroa dioos L.	0.45	1.92	1.19
Veronica abyssinica Fres.	1.04	1.56	1.3
Veronica anagalis-aquatica L.	0.27	0.70	0.49
SMILACACEAE			
Smilax kraussiana Meisn.	0.27	0.70	0.49
SOLANACEAE			
Lycopersicon esculentum Mill	0.21	0.78	0.50
Physalis angulata L.	0.59	0.83	0.71
Physalis micrantha L.	0.78	1.65	1.22
Solanum nigrum L.	0.77	0.78	0.78
Solanum toruvum Sw.	0.28	0.78	0.53
Solanum verbascifolium L.	3.64	7.69	5.67
STERCLIACEAE			
Pterygota bequaertii De. Wild	0.33	0.82	0.58

Table 1 continued

Table 1 continued

*Taxon	(Rd) Relative density	(Rf) Relative frequency	(SDR) Summed dominance R.I.
TILIACEAE			
Corchorus tridens L.	0.23	0.96	0.60
Triumfertta rhomboides Jacq.	0.15	0.23	0.19
ULMACEAE			
Trema guineensis (Schum. & Thonn.) Ficalho	0.30	1.04	0.67
URTICACEAE			
Fleurya aestuans (L.) Gaud. Mig.	0.49	1.57	1.03
Urera cordifolia Engl.	0.30	0.78	0.54
VERBENACEAE			
Clerodendrum splendens G. Don.	0.33	0.82	0.59
Clerodendrum volubile P. Beauv.	0.70	0.78	0.43
Stachytarpheta cayennensis (L. C. Rich.) Schau.	1.57	2.48	2.03
Vitex ferruginea Schum. & Thonn.	0.27	0.70	0.49
VIOLACEAE			
Hybanthus enneaspermus (L.) F.V. Muell	0.10	1.04	0.57
ZINGIBERACEAE			
Aframomum sceptrum (Oliv. & Hnab.) K. Schum	0.30	0.78	0.54
Costus dubius Afzel. (K. Schum	2.70	1.30	2.00

*Plant families are arranged in alphabetical order

Table 2. The first weeds in oilpalm plantations

S.No.	*Weed species	SDR(%)
1	*Pueraria phaseoloides* (Roxb. Benth	19.98
2	*Eupatorium odoratum* L.	11.64
3.	*Panicum laxum* Sw.	10.91
4.	Brachiaria humidicola (Rendle) Schweick	7.73
5.	*Mariscus alternifolius* Vahl.	7.68
6	*Boerhavia diffusa* L.	5.80
7.	*Ageratum conyzoides* L.	5.79
8.	*Auchomanes difformis* (bl.) Engl.	5.73
9.	*Solanum verbascifolium* L.	5.67
10.	*Leptochloa caerulescens* steud	5.63
11	*Manihot glaziovii* Mull. Arg.	5.57
12.	*Perotis patens* Gand.	4.51
13.	Phyllanthus muellarianus (O.Ktze) Exell	3.92
14.	*Anehema beninense* (P Beauv.) Kunth	3.87
15.	*Alternanthera sessilis* (L.) R. Br. ex Roth.	3.50
16.	*Icacina tricantha* Oliv.	3.48
17.	*Piper umbellatum* L.	3.35
18.	*Paspalum scrobiculatum* L.	3.33
19.	*Emilia sonchifolia* (L.) L.	3.28
20.	*Sida acuta* L.	3.21
21.	*Panicum breviflorum* L.	3.05
22.	*Spigelia anthelimia* L.	3.03
23.	*Conyza sumatrensis* (Rentz.) Walker	2.95
24.	*Momordica charantia* L.	2.84
25.	*Digitaria ciliaris* (Retz.) Koel.	2.78

*The arrangement of weed species is in descending order of SDR.

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