Weed Flora of a Maize/Cassava Intercrop under Integrated Weed Management in an Ecological Zone of Southern Guinea Savanna of Nigeria

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ABSTRACT

Weed flora of different management techniques under different cropping systems have been reported but no sufficient information on weed flora of integrated weed control method in maize/cassava intercrop in southern Guinea savanna of Nigeria. This study assessed the weed flora and relative frequencies of weeds in a maize/cassava intercrop under integrated weed management involving two pre-emergence herbicides (Primextra and Galex, each at 2.5 kg/ha alone or with one or two supplementary hoe-weeding, at 6 weeks after planting (WAP) or 6 and 12WAP, a hoe-weeded check (hoeing at 3, 6 and 12WAP) and a weedy control.

A total of 41 weed species belonging to 35 genera and 19 families comprising of Poaceae, Euphorbiaceae, Asteraceae, Rubiaceae, Cyperaceae among others were encountered in the experimental plots during 2002 and 2004 cropping seasons. The very abundant weed species included *Paspalum obiculare* Forst, *Digitaria horizontalis* Willd and *Brachiaria deflexa* (Schumach) while those with moderate abundance were *Bulbistylis arbotiva* (Steudel), *Cleome viscosa* L., *Croton lobatus* L., *Dactylocterrium aegyptium* (L) P. Beauv., *Tridax procumbens* L. and *Vernonia galamensis* (Cass.) Less. The remaining weed species had rare abundance. The relative frequency of the weed species was generally reduced under all the weed control treatments except *Paspalum obiculare* whose relative frequency was consistently high in all the assessment periods under all the weed control treatments.

INTRODUCTION

In Nigeria and in many other developing nations, intercropping has remained the traditional farming practice. It is a wide spread food crop production system in the humid and subhumid tropics of West Africa (IITA, 1981; Akobundu, 1980; Anuebunwa, 1991). Cassava/maize seems to be the most common crop combination preferred by small-scale farmers (Akobundu, 1980; Unamma and Ene, 1984; Unamma *et al.*, 1986). Okigbo and Greenland (1976) estimated that about 50% of the cassava grown in tropical Africa is intercropped with cereals, legumes, leafy vegetables and fruits as well as tree crops.

Weed seeds are abundant in cultivated fields and many species will germinate independent of the crop density, spatial arrangement and species (Akobundu, 1987). Both maize and cassava have been shown to be sensitive to weed infestation, maize in the first 4 weeks and cassava in the first 10-12 weeks after establishment (Onochie, 1975). It has been estimated that yields of crops can be reduced by between 60-90% in cases of poor weed management practices (Ogunremi, 2005). Uncontrolled weed growth causes yield loss of 40-60% in maize in the tropics (Akobundu, 1980). Yield components of cassava most affected by weeds are tuber number and weight. The most damaging effects of weeds were reported to occur during early canopy formation and when tuberization is taking place (Onochie, 1975). Whereas yield losses due to weed is to weed in the developing countries (Anon 1982), in Nigeria, yield losses due to weed interference vary between 40 and 100% depending, among other things, on type of crops, type of weeds hensity (Fadayomi, 1991). Weed flora of different weed flora of maize/cassava intercrop using integrated weed control method in maize/cassava intercrop is southere.

Materials and Methods

Each year, the experimental site was ploughed and harrowed, after which ridges which are approximately 1.3 m apart were made. The experiment consisted of eight main treatments and six sub treatments. The main treatments were made up of the application of two pre-emergence herbicides [Primextra and Galex, each at 2.5 kg a.i./ha alone or with one or two supplementary hoe weedings at 6 weeks after planting (WAP) or 6 and 12WAP], a hoe-weeded check (hoeing at 3, 6 and 12WAP) and a weedy control. The size of each main treatment was 280m² with 6 ridges of 6m long. Maize (var. DMRY) and cassava ('Okoyawo' a local var.) were planted after land preparation. The herbicide treatments were applied as pre-emergence sprays at the rate of 2.5 kg.a.i/ha, one day after planting of maize using a CP3 knapsack sprayer, fitted with a green deflector nozzle, which was calibrated to deliver a spray volume of 240L/ha.

Weed sampling was carried out at 6 and 12WAP in 2002 and at 6, 12, 20, 36, 44 and 48WAP in 2004 from each main treatment using wooden quadrats (0.5m²). Twelve throws were made per main treatment and weed species within each quadrat were uprooted, sorted into grasses and broad leaves and identified to the species level using a standard text by Akobundu and Agyakwa (1987). Thereafter, each weed species was counted and the value recorded to compute the Relative frequency.

RESULTS

A total of 41 weed species belonging to 19 families and 35 genera were found in the experimental plots during the 2002 and 2004 cropping seasons. The weed species consisted of 13 Poaceae, 5 Euphorbiaceae, 4 Asteraceae, 3 Rubiaceae and 2 Cyperaceae. The remaining families: Amaranthaceae, Commelinaceae, Nyctaginaceae, Papilionaceae, Papilionaceae, Portulacaceae, Cleomaceae, Leguminoceae, Lamiaceae, Solanaceae, Malvaceae, Loganiaceae, Fabaceae and Tilaceae had one (1) each (Table 1).

The very abundant weed species included Paspalum obiculare, Digitaria horzontalis and Brachiaria deflexa while those with moderate abundance were Bulbostylis arbotiva, Cleome viscosa, Croton lobatus, Dactyloctenium aegyptium, Tridax procumbens and Vernonia galamensis. The remaining weed species had rare abundance. In both cropping seasons grasses were the predominant weeds in the experimental plots. Broadleaved weeds were, however, more abundant in 2004 than in 2002, while sedges were very few in both cropping seasons.

Weed species	Growth	Abundance		Family
-	form	2002	2004	-
Andropogon	PG	-	+	Poaceae
gayanus Kunth.				
Boerhavia	PBL	-	+	Nyctaginaceae
diffusa L.				
Brachiaria	AG	+	+++	Poaceae
deflexa				
(Schumach)				
Brachiaria	AG	-	+	Poaceae
jubata Stapf				
Brachiaria lata	AG	-	+	Poaceae
(Schum) C.E.				
Hubbard				
Bulbostylis	AG	++	++	Poaceae
arbotiva				
(Steudel)				
Celosia sp	ABL	+	+	Amaranthaceae
Cleome viscosa	ABL	++	+	Cleomaceae
L.				
Commelina	PBL	+	+	Commelinaceae
benghalensis L.				
Croton lobatus	ABL	++	+	Euphorbiaceae
L.				
Cyperus	PS	+	+	Cyperaceae
rotundus L				
Dactylocternium	AG	++	++	Poaceae
aegyptium (L)				
P. Beauv.				
Digitaria	AG	+++	+	Poaceae
horizontalis				
Willd				
Euphorbia	ABL	+	+	Euphorbiaceae
heterophylla L.				
Euphorbia hirta	ABL	+	+	Euphorbiaceae
L.	ABL			Euphorbiaceae
Euphorbia	ABL	+	+	Eupnorbiaceae
hyssopifolia Linn.				
Hyptis	AB		+	Lamiaceae
suaveolens Poit	AD	-	Ŧ	Lannaceae
Imperata	PG	+	+	Poaceae
cylindrica (L)	10	Ŧ	Ŧ	Foaceae
Raeuschel				
Indigofera	ABL	_	+	Papilionaceae
hirsute Linn.	ADL	-	Ŧ	r apmonaceae
Marisus	PS		+	Cyperaceae
alternifolius	1.5	-	Ŧ	Cyperaceae

Va	hl.				
	tracarpus	ABL	++	++	Rubiaceae
vil	osus (SW)				
Dc					
Ma	mechma	ABL	-	+	Acanthaceae
cili	atum Jacq.				
Ol	lenlandia	ABL	+	++	Rubiaceae
her	bacea (L)				
Ro	xb				
Pa	lisota hirsute	ABL	-	+	Poaceae
(TI	umb.) K.				
Scl	um.				
Pa	spalum	AG	++	+++	Poaceae
ob	culare Forst				
Pe	rotis indica	AG	-	+	Poaceae
(Li	nn) O. Ktze.				
Pe	nisetum	AG	+	+	Poaceae
vio	laceum				
(La	un.) L. Rich				
Po	rtulaca	ABL	-	+	Portulacaceae
ole	racae Linn.				
Ph	illanthus	ABL	-	+	Euphorbiaceae
am	arus Schum				1
&	Thonn				
	ysalis	ABL	+	+	Solanaceae
	gulata Linn.				
	ynchelythrum	AG	+	+	Poaceae
	ens (Wild.)				
	E. Hubbard				
Sia	a acuta	PBL	-	+	Malvaceae
Bu	rnm. F.				
	ermacoce	ABL	-	+	Rubiaceae
	ticillata				
Liı					
	gellia	ABL	+	+	Loganiaceae
	helmia Linn.				8
	losanthes sp	PBL	-	+	Leguminoceae
	dax	ABL	++	++	Asteraceae
pro	ocumbens L.				
	ohrosia	ABL	-	+	Fabaceae
	acteolata				
	ill & Perr.				
	umfetta	ABL	-	+	Tiliaceae
	difolia A.				
Rie					
Ve	rnonia	ABL	-	+	Asteraceae
	erea (Linn.)				
Le					
	rnonia	ABL	-	++	Asteraceae
	amensis				
	ass.) Less.				
	rnonia	ABL	-	±	Asteraceae
	ottetti Sch.		-	-	
Bi					

Note: AG = Annual Grass PG = Perennial Grass ABL=Annual Broadleaf PBL= Perennial Broadleaf +++ = Very abundant (60-100%) +++ Moderate abundant (40-59%)

++ = Noderate abundant (40-599 + = Rare abundant (<10-39%)

- = Absent

In 2002, a total of 8 weed species were recorded at 6WAP from the experimental plots across the main treatments. *Digitaria horizontalis* had the highest relative frequency across all the weed control treatments (63.8 – 94.4%) followed by *C. lobatus* (11.1 – 88.8%), *B. arbotiva* (0 –61.1%). *Brachiaria deflexa*, *C. viscosa and T. procubens* were rare in all the main treatments at his sampling period (Table 2). At 12WAP, more weed species were encountered under the weed control treatments (Table 3). Just as it was observed at 6WAP, *D. horizontalis* had the highest frequency (77.7 – 94.4%). This was, however, followed by *P. obiculare* (38.9 –72.2%) which occurred at very low frequency at 6WAP. Weed species with relative frequencies of 5.6 – 55.6% included *B. deflexa*, *B. arbotiva*, *C. viscosa D. aegyptium*, *M. villosus*, and *T. procumbens*. Those weed species with relative frequency of 10% included *Celosia sp. C. benghalensis*, *C. rotundus*, *E. hyssopficia*, *J. cylindrica*, *Pennisetum violaceum*, *Physalis angulata and Spigellia anthelmia*.

In 2004, a total of 20 weed species were encountered at 6WAP (Table 4) with P. obiculare, B. arbotiva, D. horizontalis and T. procumbens occurring at relative frequencies of 22.8 – 72.2%, while B. deflexa, C. benghalensis, E. herterophylla, Oldenlandia herbacea, Rhynchelythrum repens and Vernonia galamensis had relative frequencies of 11.1 – 66.7%. The rest of the weeds had less than 10% relative frequencies.

Table 2. Relative frequencies of weed species encountered in the main treatment plots at 6WAP in 2002 at Ilorin, Nigeria.

Weed	Prim	Prim+	Prim+	Galex	Galex	Galex	3Hw	Weedy
species	alone	1Hw	2Hw	alone	+	+		-
					1Hw	2Hw		
1.	5.6	0	0	0	0	0	0	0
Brachiaria								
deflexa								
Schumach								
2.	0	27.7	5.6	27.7	16.7	0	27.8	61.1
Bulbostylis								
arbotiva								
Steudel								
3. Cleome	0	0	0	0	0	0	0	5.6
viscosa L.								
4. Croton	50	44.4	50	67.7	61.1	88.8	11.1	61.1
lobatus L.								
5. Digitaria	88.8	77.7	94.4	88.8	63.8	67.7	67.7	88.9
horizontalis								
Willd								
6.	5.6	11.1	0	11.1	11.1	27.7	0	11.1
Euphorbia								
heterophylla								
L.								
7.	5.6	33.3	5.6	11.1	16.7	0	0	11.1
Paspalum								
obiculare								
Forst								
8. Tridax	0	0	0	0	0	0	5.6	0
procumbens								
L.								

Weed species	Prim	Prim	Prim	Galex	Galex	Galex	3Hw	Weedy
	alone	+1Hw	+2Hw	alone	+	+		
1.Brachiaria	33.3	11.1	167	55.6	1Hw 16.7	2Hw 16.7	5.6	5.6
1.Brachiaria deflexa	33.3	11.1	16.7	55.0	16.7	16.7	5.0	5.0
Schumach								
2.Bulobstalis	11.1	33.3	33.3	11.1	5.6	27.7	44.4	0
arbotiva	11.1	55.5	55.5	11.1	5.0	27.7	44.4	0
Steudel								
3.Celosia sp	0	0	0	0	5.6	0	0	0
4.Commelina	ö	5.6	0	Ö	0	5.6	5.6	ő
benghalensis L.	-		-	-	-			-
5.Cleome viscosa	33.3	5.6	11.1	33.3	22.2	11.1	16.7	5.6
L.								
6.Croton lobatus	0	5.6	0	33.3	0	0	16.7	5.6
L.								
7.Cyperus	0	0	0	5.6	0	0	0	0
rotundus L.								
8.Dactylocternium	27.8	5.6	22.2	33.3	44.4	0	16.7	16.7
aegyptium (L) P.								
Beauv.								
9.Digitaria	77.7	88.8	88.8	94.4	94.4	94.4	88.8	88.8
horizontalis								
Willd								
10.Euphorbia	0	0	0	11.1	22.2	0	5.6	5.6
heterophylla L.								
11.Euphorbia	5.6	0	0	0	0	0	0	0
hyssopifolia Linn								
12.Imperata	0	0	0	0	5.6	0	0	0
cylindrical (L)								
Raeuschel								
13.Mitracarpus	16.7	16.7	0	44.4	5.6	22.2	0	5.6
villosus (Sw) Dc	_	_			_		_	
14.Oldenlandia	0	0	11.2	16.7	0	5.6	0	16.7
herbacea (L)								
Roxb 15.Paspalum	61.1	38.9	61.1	73.3	44.4	38.9	38.9	38.9
obiculare Forst	01.1	58.9	01.1	72.2	44.4	38.9	58.9	38.9
16.Pennisetum	5.6	0	5.6	5.6	0	0	0	0
violaceum	5.0	0	5.0	5.0	0	0	0	0
(Lam.) L. Rich								
17.Physalis	0	0	0	5.6	0	0	0	0
angulata Linn	0	0	0	5.0	0	0	0	0
18.Rhynchelythrum	0	0	0	5.6	22.2	5.6	0	11.2
repens (Wild.) E.	-	-						
E. Hubbard								
19.Spigellia	5.6	0	0	0	0	0	0	5.6
anthelmia Linn		-	-			4.0		
20.Tridax	11.1	5.6	5.6	38.9	11.1	0	11.1	16.7
procumbens L.								

Table 4. Relative frequencies of weed species encountered in the main treatment plots at 6WAP in 2004 at Ilorin, Nigeria.

Weed species	Prim	Prim	Prim	Galex	Galex	Galex	3Hw	Weedy
	alone	+ 1Hw	+2Hw	alone	+1Hw	+2Hw		
1.Brachiaria deflexa Schumach	33.3	55.6	38.9	16.7	33.3	44.4	16.7	16.7
2. Brachiaria alata (Schum) C. E. Hubbard	0	0	0	5.6	0	0	0	0
3.Bulbostylis arbotiva Steudel	27.7	38.8	27.8	50.0	72.2	66.7	72.2	72.2
4.Commelina benghalensis L.	11.1	5.6	0	11.2	0	5.6	0	0
5. Croton lobatus L.	5.6	0	0	5.6	0	22.2	5.6	5.6
6.Cyperus rotundus L.	5.6	0	0	0	5.6	0	11.1	0
7.Dactylocternium aegyptium (L) P. Beauv.	0	0	0	0	0	0	0	5.6
8.Digitaria horizontalis Willd	55.6	33.3	61.1	55.6	72.2	50	22.2	44.4
9.Euphorbia heterophylla L.	5.6	11.1	5.6	11.1	11.1	0	0	16.7
10.Hyptis suaveolens Poit	0	0	0	0	0	0	0	5.6
11.Indigofera hirsute Linn.	0	5.6	0	5.6	0	5.6	0	0
12.Mitracarpus villosus (SW) DC	5.6	0	0	5.6	0	0	0	0
13.Oldenlandia herbacea L. Roxb	5.6	0	5.6	5.6	11.1	33.3	5.6	11.1
14.Paspalum obiculare Forst	72.0	61.1	33.3	55.6	27.8	27.8	50.0	44.4
15.Portulaca oleracea Linn	0	0	0	5.6	0	0	0	0
16.Rhynchelythrum repens (Wild)	5.6	11.1	5.6	11.1	5.6	0	16.7	5.6
17. Sida acuta Burum F.	0	0	0	0	5.6	0	0	0
18. Tephrosia sp	0	0	0	5.6	0	0	0	0
19.Tridax procumbens L.	22.2	55.6	27.8	66.7	44.4	38.9	22.2	22.2
20.Vernonia galamensis (Cass.) less	27.8	5.6	11.1	33.3	22.2	11.1	11.1	27.7

27.7 - 88.8%. Others with low relative frequencies of 5.6 - 44.4% included B. jubata, C. benghalensis, C. rotundus, E. heterophylla, M. villosus, O. herbacea, S. anthelmia, V. galamensis, V. cinerea, A. gayanus, C. ciliata, C. lobatus, E. hirta, I. cylindrica, Mariscus sp., P. hirsuta, P. violaceum, P. angulata, R. repens and Vernonia perotetti.

At 20WAP, the number of weed species encountered had reduced to 18 but *P. obiculare* still had the highest relative frequency of (44.4 -66.7%) followed by *O. herbacea*, *T. procumbens*, *D. horizontalis*, *V. galamensis*, *M. villosus* with relative frequencies of 11.1 - 55.6%. The other weed species occurred at low relative frequencies of 5.6 – 16.7%. These included *B. deflexa*, *C. benghalensis*, *C. ciliata*, *C. rotundus*, *Monecma ciliatum*, *R. repens*, *Stylosanthes sp., Tephrosia bracteolata*, *Triunmfetta cordifolia*, *D. aegyptium*, *Hyptis suaveolens and I. cylindrica* (Table 6). The relative frequency of occurrence of the weed species was generally reduced under all the weed control treatments.

Weed species	Prim	Prim	Relative frequencies of weed species en Prim	Galex	Galex	Galex	3Hw	Weedy
·· •• ••	alone	+1Hw	+2Hw	alone	+	+		,
					1Hw	2Hw		
1.Andropogon gayanus Kunth	5.6	0	0	0	0	0	0	0
2.Brachiaria deflexa Schumach	72.2	61.1	66.7	72.2	55.6	88.8	66.7	55.6
3.Brachiaria jubata Stapf	0	5.6	0	27.8	5.6	0	0	0
4.Bulbostylis arbotiva Steudel	61.1	38.9	61.1	55.6	16.7	66.7	50	55.6
5.Cleome viscosa L.	0	0	0	5.6	0	0	0	0
6.Commelina benghalensis L.	16.7	5.6	5.6	16.7	0	0	0	0
7. Croton lobatus L.	5.6	0	0	5.6	0	0	5.6	11.1
8. Cyperus rotundus L.	16.7	33.3	5.6	11.1	11.1	0	27.8	22.2
9.Dactyloctenium aegyptium (L) P. Beauv	44.4	33.3	50.0	44.4	33.3	11.1	55.6	22.2
10.Digitaria horizontalis Willd	66.7	61.1	61.1	61.1	72.2	50.0	72.2	38.9
11.Euphorbia heterophylla L.	11.2	0	0	5.6	0	0	0	22.2
12. Euphorbia hirta L.	0	0	0	11.2	0	0	0	0
13.Hyptis suaveolens Poit	5.6	0	0	5.6	0	0	0	5.6
14.Imperata cylindrica (L) Raeuschel	5.6	0	0	5.6	0	5.6	0	5.6
15.Marisus sp.	0	0	0	0	0	0	0	5.6
16.Mitracarpus villosus (SW) DC	11.1	0	16.7	16.7	11.1	5.6	11.1	44.4
17.Oldenlandia herbacea (L) Roxb	16.7	16.7	0	16.7	11.1	22.2	27.8	5.6
18.Palisota hirsuta (Thumb.) K. Schum	0	0	0	5.6	0	0	0	5.6
19.Paspalum obiculare Forst	94.4	88.8	100	100	100	100	100	100
20.Pennisetum violaceum (Lam.) L. Rich	0	0	0	0	0	0	0	5.6
21.Physalis angulata Linn.	0	0	0	5.6	0	0	0	5.6
22.Rhynchelythrum repens (Wild) C. E. Hubbard	5.6	0	0	5.6	5.6	0	0	5.6
23.Spermacoce verticillium Linn	0	0	0	0	0	0	0	5.6
24.Spigellia anthelmia Linn	0	11.1	0	0	0	11.1	0	0
25.Tridax procumbens L.	65.6	44.4	38.9	50	88.8	33.3	27.7	56.5
26.Vernonia cinerea Linn	11.1	0	5.6	5.6	11.1	0	5.6	5.6
27.Vernonia galamensis (Cass.) Less	11.1	16.7	5.6	16.7	11.1	16.7	5.6	16.7
28.Vernonia perottetti Sch. Bip.	0	0	0	5.6	0	0	0	5.6

Weed species	Prim	Prim	Prim	Galex	Galex	Galex	3Hw	Weedy
	alone	+1Hw	+2Hw	alone	+	+		
					1Hw	2Hw		
1.Brachiaria	5.6	0	0	0	0	0	0	5.6
deflexa								
Schumach								
2.Commelina	0	0	5.6	0	0	0	0	5.6
benghalensis L.								
3. Cleome viscosa	0	5.6	0	0	0	0	0	0
L.								
4.Cyperus	0	0	0	0	0	11.1	0	0
rotundus L.								
5.Dactyloctenium	0	5.6	11.1	5.6	0	0	16.7	0
aegyptium (L) P.								
Beauv.								
6.Digitaria	22.2	11.1	27.8	27.8	0	0	22.2	38.9
horizontalis								
Willd								
7.Hyptis	0	0	0	0	0	0	0	16.7
suaveolens Poit								
8.Imperata	0	0	0	5.6	0	0	0	0
cylindrical (L)								
Raeuschel								
9.Mitracarpus villosus (SW)	11.1	5.6	33.3	5.6	11.1	11.1	5.6	11.1

10.Monechma ciliatum Jacq	0	0	0	0	0	0	0	16.7
11.Oldenlandia herbacea (L)	55.6	50.0	27.7	38.9	44.4	44.4	16.7	38.9
Roxb 12.Paspalum obiculare Forst	66.7	66.7	50.0	61.1	61.1	67.8	61.1	44.4
13.Rhynchelythrum repens (Wild.) C. E. Hubband	0	0	5.6	5.6	5.6	0	0	22.2
14.Stylosanthes sp	0	0	5.6	0	0	0	0	11.1
15.Tephrosia sp	0	0	0	0	0	0	0	5.6
16.Tridax	50.0	33.3	50.0	33.3	38.9	44.4	27.8	27.8
procumbens L. 17.Triumfetta cordifolia A.	0	5.6	5.6	0	0	0	0	0
Rich 18.Vernonia galamensis	22.2	33.3	11.1	50.0	0	0	27.8	27.8
(Cass) Less.								

At 44WAP, 15 weed species were recorded under all the weed control treatments (Table 7). Paspalum obiculare had the highest relative frequency (88.8 –94.4%) followed by T. procumbens (11.2 – 65.6%). and B. deflexa (5.6 – 22.2%). Many of the other species that were recorded had low relative frequencies of 5.6 –16.7%. These weeds were B. diffusa, E. heterophylla, E. hirta, C. benghalensis, C. lobatus, H. suaveolens, O. herbacea, P. indica, R. repens, Stylosanthes sp. and I. cylindrica.

At 48WAP, 17 weed species were recorded in the weed control treatments (Table 8). Paspalum obiculare and B. deflexa occurred at fairly high relative frequencies of 33.3 – 66.7% and 16.7 – 66.7%, respectively while the rest of the weed species (B. jubata, C. benghalensis, D. aegyptium, D. horizontalis, E. heterophylla, H. suaveolens, I. cylindrica, Phillanthrus amarus, R. repens T. bracteolata and E. hirta) occurred at frequencies of 5.6 – 33.4%.

Weed species	Prim	Prim	Prim	Galex	Galex	Galex	3Hw	Weedy
-	alone	+1Hw	+2Hw	alone	+	+		-
					1Hw	2Hw		
1.Boerhavia diffusa L.	0	0	0	0	5.6	0	0	0
2.Brachiaria deflexa (Schumach)	22.2	5.6	11.1	11.1	11.1	16.7	11.1	16.7
3.Bulbostylis arbotiva Steudel	11.1	0	0	0	0	5.6	0	5.6
4.Commelina benghalensis L.	5.6	5.6	0	0	0	0	0	0
5. Croton lobatus L.	5.6	0	0	00	0	0	0	0
6.Euphorbia heterophylla L.	0	5.6	0	0	0	0	0	0
7. Euphorbia hirta L.	0	0	0	0	0	5.6	0	0
8.Hyptis suaveolens Poit	0	0	0	5.6	0	5.6	5.6	16.7
9.Oldenlandia herbacea (L) Roxb	0	0	0	0	0	0	11.2	0
10.Paspalum obiculare Forst	94.4	88.8	88.8	88.8	88.8	94.4	94.4	88.8
11.Perotis indica (Linn.)	0	0	0	11.2	0	0	0	0
12.Rhynchelythrum repens Wild C. E. Hubbard	0	0	0	0	0	0	0	5.6
13. Stylosanthes sp	0	0	0	0	0	0	0	5.6
14.Tridax procumbens L.	27.6	33.3	38.8	65.6	38.9	38.9	44.4	11.2
15.Imperata cylindrica (L)	0	5.6	0	11.2	0	5.6	11.2	11.2

Weed species	Prim	Prim	Prim	Galex	Galex	Galex	3Hw	Weedy
	alone	+1Hw	+2Hw	alone	+	+		,
					1Hw	2Hw		
.Andropogon	5.6	5.6	0	0	0	0	5.6	11.1
gayanus Kunth								
Boerhavia diffusa.	0	0	0	0	0	0	0	5.6
L.								
Brachiaria deflexa.	27.8	33.3	16.7	66.7	44.4	33.3	38.9	33.3
Schumach								
Brachiaria jubata.	33.3	22.2	27.8	16.7	27.8	33.4	33.4	17.4
Stapf								
Commelina	11.2	5.6	0	0	0	0	0	0
benghalensis L.								
Dactyloctenium	0	5.6	5.6	11.1	27.8	11.1	16.7	33.3
aegyptium (L) P.								
Beauv.								
Digitaria	5.6	5.6	5.6	5.6	16.7	5.6	5.6	27.8
horizontalis Willd								
Euphorbia	0	0	0	0	0	0	0	5.6
heterophylla L								
Hyptis suaveolens.	5.6	0	0	0	5.6	0	5.6	33.3
Poit								
0.Imperata	0	5.6	0	0	0	0	0	0
cylindria (L)								
Raeuschel								
1.Paspalum	55.6	66.7	61.1	55.6	66.7	66.7	55.6	33.3
obiculare Forst								
2.Phillanthrus	0	0	0	0	0	0	5.6	0
amarus Schum &								
Thonn								
3.Rhynchelythrum	0	0	0	0	0	0	5.6	0
repens (Wild) C.								
E. Hubbard								
4.Sida acuta	0	0	0	0	0	5.6	0	0
Barrun								
5.Tephrosia sp	11.2	0	0	0	0	0	0	0

16.Tridax	33.3	22.2	11.1	33.3	27.7	17.4	11.1	33.3
procumbens L. 17.Euphorbia hirta	0	11.2	0	0	0	5.6	0	0

DISCUSSION

The weed flora for both years were of great species diversity and richness as was reported by Olofintoye and Fadayomi, 2005 and Olorumaiye, 2007. Weed species common to all the weed control treatments were: Grasses – *B. deflexa*, *B. arbotiva*, *D. horizontalis and P. obiculare* for both years though *D. horizontalis* was much more prominent in 2002 and *P. obiculare* in 2004. In addition to 2004, broadleaved weeds: *T. procumbers* and *V. galamensis* were abundant along with the grasses. Out of all these weeds mentioned in the weed control treatments, *P. obiculare* in 2004. In addition to 2004, broadleaved weeds: *T. procumbers* and *V. galamensis* were abundant along with the grasses. Out of all these weeds mentioned in the weed control treatments, *P. obiculare* seems to be difficult to control by these integrated weed control treatments as is relative frequency was consistently high in all the assessment periods. Earlier study by Akobundu (1987) has shown that *P. obiculare* being an annual grass can behave as a perennial grass if given enough moisture. In this present study, it regenerated easily from the old stump and became much more prominent than others at 44WAP where its relative frequency ranged between 88.8% - 94.4% and at cassava harvest with 33.3 - 66.7%. Akobundu (1987), observed that *P. obiculare* and *D. horizontalis* have tendency to grow densely around economic plants and are adapted to overcrowding hence they are able to compete better with crops because of the numerical superiority they have over weeds.

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