



EFFECT OF CASHEW/RICE/PLANTAIN INTERCROPPED ON WEED INCIDENCE IN EDO STATE, NIGERIA

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ABSTRACT

This study determined the effects of weed incidence and biomass on cashew intercropped with rice and plantain in Cocoa Research Institute of Nigeria (CRIN) Uhonmora Substation, Edo State between 2007 and 2008. There were six treatments comprising of cashew sole, rice sole, plantain sole, cashew/rice, cashew/plantain and cashew/rice/plantain. Cashew and plantain were planted 4.5m and 3.1m apart, respectively while rice 30cm apart using small teaspoonful as a standard measure adopted per hole in this trial. The experiment was laid out in a randomized complete block design with three replicates. Data were collected on plant height, plant girth, leaf area, weed incidence and biomass monthly. Grain and bunch obtained from rice and plantain were recorded. Result obtained showed that cashew sole gave the highest weed biomass, closely followed by cashew/rice and then cashew/plantain. The least was recorded in cashew/rice/plantain intercrop. Considering the morphological parameters (plant height, leaf, and plant girth and leaf area) no significance difference between the sole cashew, cashew/rice and cashew/plantain intercropped. However, cashew/rice/plantain with lowest weed biomass was lower than other treatment in terms of these growth parameters. Therefore, cashew/rice and cashew/plantain intercrops with lower weed biomass and comparable vegetative growth could be recommended to cashew farmers instead of sole cropping.

Keywords: weed, cashew, rice, plantain, intercropping.

INTRODUCTION

The production of cashew in Nigeria is faced with serious problem of weed management because of the large spacing between the cashew stands which do not allow the crop to close canopy quickly despite the fast rate of growth (Adeyemi, 1989). The intercropping of cashew in association with maize, cassava and plantain has proved useful in reducing weed incidence in cashew plots (Adeyemi, 1986). Furthermore, when cashew was intercropped with maize, cassava, cowpea and melon its morphological growth parameters were not affected except the girth that was slightly reduced under cashew/cassava mixture (Komolafe, 1980).

Hoe weeding, a traditional method of weed control is very expensive and a times not readily available. Intercropping has reduced weeding period of cashew by about 50 per cent when compared to sole cashew (Adeyemi, 1989). Herbicides that should have been found to be more effective in weeds control are very expensive for peasant farmers who are the major cashew growers in Nigeria. There is need for farmers to maximize profit by reducing production cost. Hence, there is need for appropriate cropping system that will enhance good growth and reduce labour cost on weeding in cashew production at early stage of establishment. Therefore, the objective of this study is to evaluate the effect of weed incidence and biomass on cashew when intercropped with rice and plantain.

MATERIALS AND METHOD

This study was carried out in 2007 and 2008 at Cocoa Research Institute of Nigeria (CRIN), Uhonmora

Substation, Edo State in the derived savanna (6° 50'N, 5° 50'E) with altitude of 140 M above sea level. The cashew nuts and plantain suckers were obtained from the Substation. Rice was obtained from open market in Ekpoma, Owan East Local Government area of the State.

Land clearing and preparation were done in July 2007 by removal of all trash and debris. There were six treatments comprising cashew sole, rice sole, plantain sole, cashew/rice, cashew/plantain, and cashew/rice/plantain. The plot layout, and planting were done in August 2007. Cashew were planted at stake 4.5m apart while rice was sown 30 cm apart using a small tea spoonful as a standard measurement adopted for uniformity per hole. Rice was planted twice (2007 and 2008) throughout the trial. The experimental layout was randomized complete block design replicated three times.

Weeding was carried out six times during the trial. In each treatment quadrant of 1m x 1m square was thrown twice to take the weed sample before weeding at each weeding period. Data were collected on plant height, girth and leaf area. Yields on rice grain and plantain bunch were taken. Weed species collected were identified, and fresh weight determined using sensitive weighing balance. The weeds were later oven dried for 72 hours to constant weight at 85°C. Data collected were statistically analyzed using ANOVA. LSD was used to separate the means.

RESULTS AND DISCUSSIONS

Table-1 showed the common weed species identified in the study location.

**Table-1.** Common weed species identified at the experimental site (CRIN Uhonmora).

Weed species	Family	Level of occurrence	
		2007	2008
Broad leaves			
<i>Chromoleana odorata</i> (L)	Compositae	+++	++
<i>R.M. King and Roinson</i>			
<i>Euphorbia heterohylla</i> (L)	Eu;phorbiaeae	++	++
<i>Talinum fruticosum</i> (Jacq)	Portulaceaceae	++	+
<i>Ageratum conyzoides</i> (L.)	Asteraceae	++	+
<i>Euphorbia hirta</i> (L.)	Euphorbiaceae	+	+
<i>Aspilia Africana</i> (Pers)	Asteraceae	++	+
<i>Biden pilosa</i> (L.)	Asteraceae	+	+
<i>Amaranthus spinosis</i> (L.)	Amaranthaceae	+	+
Grasses			
<i>Eleusine indica</i> (Gaertn)	Poaceae	+	+
<i>Imperata cylindrical</i> (L.)	Poaceae	++	+
<i>Cynodon dactylon</i> (L.) Pers	Poaceae	+	+
<i>Paspalum scrobiculatum</i> (L.)	Poaceae	+	+
<i>Panicum maximum</i> (Jacq)	Poaceae	+	+
Sedges			
<i>Cyperus esculentum</i> (L.)	Cyperaceae	+	+
<i>Cyperus rotundus</i> (L.)	Cyperaceae	+	+
<i>Maricus alternifolius</i> (Vahl)	Cyperaceae	+	+

+++ High infestation (60-90% occurrence)

++ Moderate infestation (40--59% occurrence)

+ Low infestation (1-39% occurrence)

Broad weeds were highest closely followed by grasses and sedges. Weed incidence gradually reduced in 2008. This might have been due to shade provided by the plantain in the intercropped. This agrees with the earlier work of Adeyemi (1989) who reported on high weed

incidence at early stage of cashew field establishment due to wider spacing that did not allow the quickly canopy closure.

The plant height, girth and leaf area are shown in Tables 2, 3 and 4, respectively.

Table-2. Plant height (cm) of cashew with rice and plantain.

Treatment	2007				2008								
	Months				Months								
	S	O	N	D	J	F	M	A	M	J	J	A	S
Cashew sole	40.6	50.1	57.2	61.4	63.2	68.8	70.3	73.2	78.0	81.3	86.5	90.1	94.7
Cashew/rice	41.2	52.3	58.9	62.5	64.7	70.5	73.9	77.1	80.4	84.7	90.7	98.4	103.5
*Cashew/p	39.4	48.6	54.5	63.9	68.5	73.8	78.5	85.0	90.3	97.2	101.3	107.0	113.3
**Cashew/rice/p	38.9	48.3	52.4	55.8	59.7	61.9	63.1	67.2	72.5	76.0	80.5	83.2	85.9
Mean	40.0	49.8	55.7	60.9	64.0	68.8	71.5	75.6	80.3	84.8	89.8	94.9	99.4
LSD (P=0.05)	1.5	2.5	4.0	4.89	5.80	6.91	8.96	10.28	10.25	12.41	12.07	14.19	16.19

* Cashew/plantain

** Cashew/rice/plantain

S - D September - December

J - S January - September

**Table-3.** Plant girth (cm) of cashew with rice and plantain.

Treatment	Months in 2007				Months in 2008								
	S	O	N	D	J	F	M	A	M	J	J	A	S
Cashew sole	0.88	0.92	1.22	1.37	1.68	1.72	1.78	1.8	1.9	2.0	2.1	2.10	2.17
Cashew/rice	0.87	0.90	1.15	1.39	1.69	1.74	1.79	1.81	2.0	2.01	2.10	2.13	2.18
*Cashew/p	0.87	0.90	1.27	1.43	1.70	1.75	1.81	1.86	1.99	2.07	2.30	2.23	2.25
**Cashew/rice/p	0.88	0.91	1.13	1.33	1.60	1.70	1.75	1.78	1.85	1.90	1.95	2.00	2.07
Mean	0.88	0.91	1.20	1.38	1.67	1.70	1.75	1.78	1.85	1.90	1.95	2.00	2.07
LSD (P=0.05)	0.01	0.05	0.09	0.06	0.06	0.03	0.03	0.05	0.08	0.10	0.14	0.13	0.10

* Cashew/plantain ** Cashew/rice/plantain
 S-D September - December J - S January - September

Table-4. Plant leaf (cm²) of cashew with rice and plantain.

Treatment	Months in 2007				Months in 2008								
	S	O	N	D	J	F	M	A	M	J	J	A	S
Cashew sole	118.1	120.5	124.7	130.2	134.4	139.1	143.4	148.7	150.3	155.2	163.6	169.3	17.6
Cashew/rice	117.5	119.3	123.4	129.1	132.7	138.3	140.6	146.4	152.0	157.4	165.1	170.3	17.1
*Cashew/p	117.3	119.6	121.7	127.3	130.2	137.4	145.1	153.3	159.0	163.5	168.3	173.4	18.7
**Cashew/rice/p	119.3	120.5	123.8	125.1	129.2	130.3	136.2	138.7	142.3	147.7	151.4	157.2	18.0
Mean	118.1	120.1	123.7	127.9	131.6	136.3	141.3	146.8	150.9	155.9	162.1	167.5	17.6
LSD (P=0.05)	1.4	0.9	2.2	3.1	3.3	5.6	5.4	7.2	9.5	9.0	10.2	9.8	9.0

* Cashew/plantain ** Cashew/rice/plantain
 S-D September - December J - S January - September

The growth performance (plant height, girth and leaf area) in all indicated higher growth in the intercrop than in sole planting except for cashew/rice/plantain that was lower than cashew sole but without any significance difference between them. The low performance observed in cashew/rice/plantain might have been due to underground and aerial competition for soil nutrients and sunlight by associated crops. There was reduction in weed incidence and biomass of cashew/rice and cashew/plantain without adverse effect on in the morphological growth of the main crop (cashew). This shows that these two combinations were better than the other intercrop or sole planting. This was in consonant with report of Komolafe (1980) on the good growth observed when cashew was grown in mixture of cashew/cassava. The result also agrees with Adeyemi (1985) who reported the superiority of growth performance of cashew in the intercropped treatments than in sole cashew.

Cashew sole gave the highest weed biomass of 25 and 17 tonnes per hectare followed by rice sole 20 and 15 t/ha and plantain sole 15 and 10 t/ha in the first and second year, respectively (Table-5).

Table-5. Mean weed biomass of Cashew/rice/plantain intercrop.

Treatment	Mean weed biomass (t/ha)	
	2007	2008
Cashew sole	25	17
Rice sole	20	15
Plantain sole	15	10
Cashew/rice	13	10
Cashew/plantain	13	8
Cashew/rice/plantain	12	5
LSD (p = 0.05)	4.9	4.3

The intercropped gave 13 and 10 for cashew/rice, 13 and 8 for cashew/plantain and 12 and 5 t/ha for cashew/rice/plantain in 2007 and 2008, respectively. This also indicated that intercropping reduces weed as the crops in the intercrops cover spaces that could be occupied by weeds. The least weed biomass was recorded in cashew/rice/plantain. Cashew sole gave the highest weed biomass that was significantly higher (P<0.05) than other treatments. Cashew/plantain was lower in weed incidence than cashew/rice intercropped. This reduction in weed



biomass in the intercropped suggests a reduction in labour requirement than sole cashew. This is in consonant with the report of Olukotun (1983) that appropriate intercropping of cashew with food crop(s) would increase labour efficiency and reduce cost of production.

Table-6 shows the average yield of the associated crops. This show that with the addition of rice and plantain there were benefit of was beneficial to food production beside the weed reduction observed in the intercropped. This confirms that cashew intercropping was more beneficial than sole cropping. Therefore, cashew/rice and cashew/plantain intercrops of lower weed biomass, better morphological growth and economic yield return (rice grains and plantain bunches) could be recommended to cashew farmers instead of sole cashew planting at early stage of field establishment.

Table-6. Average yield of rice and plantain in t/ha when intercropped with cashew in Uhonmora.

Treatment	Yield t/ha	
	Grain	Bunch
Sole rice	2.3	-
Sole plantain	-	60.8
Cashew/rice	2.1	-
Cashew/plantain	-	60.0
Cashew/rice/plantain	1.8	59.5
Mean	2.1	60.1

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