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EFFECT OF POT SIZE AND NURSERY PERIOD ON THE GROWTH PERFORMANCE OF CASHEW (*Anacardium occidentale*) ON THE FIELD OF ESTABLISHMENT.

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ABSTRACT

Post transplanting effect of pot size and nursery period on the growth performance of cashew (*Anacardium occidentale*) seedlings were investigated at the Cocoa Research Institute of Nigeria (CRIN), Ibadan. Cashew seedlings raised in the nursery black polythene pots of dimensions 30 x 12.50cm, 30 x 6.25cm and 15 x 12.50cm were transplanted to the field at 4, 8, 12, and 16 weeks after sowing (W.A.S.) in the nursery. Growth parameters of cashew under the various treatments were evaluated. Results revealed that the treatment effects of neither pot sizes nor the various nursery periods on the cashew seedlings were not significant on the height of cashew while stem girth and leaf area per plant of seedlings raised in 30x 6.25cm and 15.0x 12.50cm polythene pots were either similar or superior to those raised in 30x 12.50cm polythene pots which served as control treatment. Similarly, stem girth and leaf area were similar in all the nursery periods except those transplanted at 4-8 WAS that occasionally produced larger leaf area.

Keywords: Nursery period, growth, post-transplanting, pot size., cashew, seedlings.

INTRODUCTION

Cashew is an important tree crop useful as food for man and livestock, as important raw material in industries and as foreign exchange earner. Fresh apple is used for the production of assorted table wines and some acid formulations while the nuts are used for confectionary purposes. It is also a source of vegetable oil and edible nuts for human consumption. The shells and cakes from the nuts are used as fertilizer and animal feed respectively. The trunk is used as local bridges on rivers and streams in rural areas while the leaves serve as litter/mulch for erosion control. These are indications that virtually, all parts of cashew are utilizable and beneficial to human beings. As such, high premium and attention should be put on technologies that can improve its production as well as enhance the reduction in the cost of its production. Reduction in the pot size and the nursery period for seedlings to half of the initial values may amount to about 50% reduction in the inputs required in the nursery and reduction in the total production cost of cashew. (Adeyemi, 1998a) The nursery inputs from which saving would be obtained include water, soil, nursery space, labour and cost of containers or pots.

In spite of the good performance of cashew in small sized nursery pots in the nursery (Adeyemi 2011), there is still the need to evaluate the performance of the crop raise under conditions of reduced pot size and nursery period on the field. This study will therefore appraise the performance of cashew seedlings raised from different pot sizes when planted on the field. The effects of nursery shade and coconut fabric pot, on cocoa on the fields was reported by Freeman (1965) and Adeyemi and Chude

(1999) This study was therefore conducted to further evaluate the post trans-planting effects of pot size and nursery periods on the growth performance of cashew on the field.

MATERIALS AND METHOD

Experiments were conducted to determine the effect of pot size and nursery period on the growth and development of cashew on the field of Cocoa Research Institutes of Nigeria, Ibadan (7°25'E 3°32'E) from 1998 to 2000. Cashew seedlings were raised in 30x12.50, 30x6.25 and 15x12.50cm black polythene pots and kept in the nursery for 4, 8 and 16 weeks (nursery periods) before transplanted to the field. There were 12 treatments from the factorial combination of 3 pot sizes and 4 levels of nursery periods. The treatments were arranged on the field using randomized complete block design (RCB) with three replications. Clear felling method of land preparation was engaged in field preparation as described by Longworth (1963). Plot size was 18x27m consisting of 6 cashew trees/plot. Transplanting of cashew seedlings to the field was done early in the morning to reduce transplanting shock. The operation was carried out from the second week of April to first week of July at four weekly intervals throughout the three experimental years. The experimental site was maintained by regular hand-weeding. Five to six hand weedings per annum were carried out. Data collection on growth parameters of cashew including plant height, stem girth and total leaf area per plant was done bi-annually (6-months interval) from June to December. Plant height was recorded through the use of wooden metric ruler while the stem girth was measured using Veneer scale or caliper.

The total leaf area per plant was measured using leaf area meter (LICOR 300 model) while leaf size estimation in the third year of experimentation was recorded through canopy scores due to the preponderance of leaves which were too difficult to enumerate. Data were subjected to analysis of variance (ANOVA) and means were compared using Duncan's Multiple Range Test (DMRT).

RESULTS AND DISCUSSION

Table 1 shows the height of cashew as influenced by pot size and nursery period at the various growth stages on the field. There were, no significant differences in the height of cashew at the various sampling stages. This is an indication that reduction in the size of polythene pots did not suppress the height of cashew seedlings considering the similarity in the height of cashew grown in the small (30x6.25cm,15x12.50cm) and large(30 x12.50cm) polythene pots. Similarly, transplanting cashew seedlings from the nursery to the field at 4-8 WAS in the nursery may not hinder the growth of cashew in terms of its height. The data presented in Table 2 illustrate the effects of pot size and nursery period on the stem girth of cashew. Girth of seedlings in the small sized pots (30x6.25 and 15x12.50cm polythene pots) was either superior or similar to that of cashew in 30 x 12.50cm polythene pot. This is a further confirmation that polythene pots with reduced size can be successfully used in raising cashew seedlings in the nursery without subsequent adverse effect on its growth and development. This is so because stem girth of cashew was comparable in all the nursery containers. Stem girth has been

shown to be highly correlated to yield as well as an index of preciosity in cocoa.(Adeyemi and Chude, 1999). Similarly Olukotun (1986) and Adeyemi (1998b) demonstrated the importance of stem girth in the evaluation of cashew performance grown either as sole crop or intercropped with other crops. Although not statistically significant except in June, in the second year of study, girth still tended to decrease with increase in the nursery period indicating that cashew seedlings transplanted at 4-8 WAS were better than those transplanted to the field at 12-16 WAS. The implication of these results is that cashew seedlings can be transplanted to the field at tender age without deleterious effects on the field performance. The effects of pot size and nursery period on the total leaf area per plant was similar in the three different pot sizes and various nursery periods except in December 2000, when leaf area was larger in the shorter nursery duration (4-8WAS) than the longer nursery duration (16WAS) of cashew. Generally, results obtained from this study on growth response of cashew to pot size treatment are in consonance with the findings of Adeyemi and Chude (1999) in which the growth performance of cocoa in the fabric pot (a small pot equivalent to 18.75 x8.75cm to 30x6.25cm polythene pot were either superior or similar to that of cocoa in 30x12.50cm polythene pots. From the results obtained from this study, it is very glaring that cashew seedlings can be successfully raised in small sized nursery pots such as 30 x 6.25 and 15 x 12.50cm polythene pots and also be transplanted to the field at tender ages of 4 and 8 WAS in the nursery without any detrimental effects of pot size and nursery period reduction noticed on the crop.

Table 1: Height of cashew as influenced by pot size and nursery period at different growth periods on the field.

Experi- mental year	Pot Size	Height (cm)									
		June					December				
		Nursery Period (WAS) ¹					Nursery Period (WAS)				
4	8	12	16	Mean	4	8	12	16	Mean		
1998	30x12.50cm (control)	- ²	-	-	-	Mean	40.00	36.00	38.00	38.00	Mean
	30 x 6.25cm	- ²	-	-	-	-	35.00	40.00	35.00	38.00	38.00a
	15x12.50cm	-	-	-	-	-	38.00	33.00	37.00	38.00	37.00a
	Mean	-	-	-	-	-	37.67a	36.33a	38.67a	38.00a	36.50a
	SE										
	CV(%)										0.49
1999	30x12.50cm										13.02
	30x6.25cm	99.00	97.00	98.00	98.00	98.00a	189.00	185.00	188.00	189.00	187.75a
	15x12.50cm	97.00	99.00	96.00	97.00	97.25a	185.00	191.00	185.00	187.00	187.00a
	Mean	97.00	96.00	96.00	96.00	96.25a	187.00	185.00	188.00	188.00	187.00a
	SE	97.67a	97.33a	96.67a	97.00a		187.00a				
	CV(%)										0.90
2000	30x12.50cm										3.42
	30x6.25cm	269.00	257.00	263.00	266.00	263.75a	310.00	295.00	305.00	306.00	304.00a
	15x12.50cm	255.00	272.00	253.00	260.00	260.00a	300.00	315.00	295.00	298.00	304.00a
	Mean	262.00	255.00	266.00	260.00	260.25a	303.00	295.00	307.00	303.00	302.00a
	SE	262.00a	261.33a	260.64a	262.00a		304.00a	301.67a	302.00a	302.00	
	CV(%)										1.34
					1.22					2.09	

WAS = Weeks after sowing ² = No data collection by this time in the first experimental year

Means followed by the same letter (s) within a column and a row are not significantly different at 5% level of probability using Duncan's Multiple Range Test (DMRT)

Table 2: influence of pot size and nursery period on the stem girth of cashew at different growth period on the field

Experi- mental year	Pot Size	Girth (cm)									
		June					December				
		Nursery Period (WAS)					Nursery Period (WAS)				
4	8	12	16	Mean	4	8	12	16	Mean		
1998	30x12.50cm (control)	- ²	-	-	-	-	1.30	1.20	1.20	1.20	1.23b
	30x6.25cm	-	-	-	-	-	1.40	1.50	1.30	1.50	1.43a
	15x12.50cm	-	-	-	-	-	1.40	1.30	1.50	1.40	1.40a
	Mean	-	-	-	-	-	1.37a	1.33a	1.33a	1.37a	
	SE										0.024
	CV(%)										7.82
1999	30x12.50cm	2.50	2.30	2.45	2.35	2.40a	4.00	3.85	3.75	3.60	3.80a
	30x6.25cm	2.45	2.50	2.30	2.40	2.41a	4.00	3.90	4.00	3.95	3.96a
	15x12.50cm	2.55	2.40	2.30	2.35	2.40a	4.00	4.00	3.85	4.00	3.96a
	Mean	2.50a	2.40ab	2.35b	2.37b		4.00	4.00	3.85	4.00	
	SE					0.020					0.073
	CV(%)					4.66					7.82
2000	30x12.50cm	6.00	5.60	5.90	6.10	5.90a	7.00	7.60	7.20	7.40	7.30a
	30x6.25cm	5.60	6.10	6.00	5.70	5.85a	7.80	7.70	7.20	7.30	7.50a
	15x12.50cm	6.20	5.70	5.60	5.75	5.86a	7.70	7.20	7.60	7.30	7.45a
	Mean	5.93a	5.80a	5.83a	5.85a						
	SE					0.068					0.071
	CV(%)					6.49					5.50

WAS = Weeks after sowing ² = No data collection by this time in the first experimental year

Means followed by the same letter (s) within a column and a row are not significantly different at 5% level of probability using Duncan's Multiple Range Test (DMRT)

Table 3: Influence of pot size and nursery period on the stem girth of cashew at different growth period on the field

Experimental Year	Pot size	Girth					Girth				
		June					December				
		Nursery period (WAS)					Nursery Period (WAS)				
		4	8	12	16	Mean	4	8	12	16	Mean
1998	30x12.50cm (control)	- ¹	-	-	-	-	0.16	0.14	0.17	0.13	0.15b
	30x6.25cm	-	-	-	-	-	0.16	0.22	0.17	0.21	0.19b
	15x12.50cm	-	-	-	-	-	0.21	0.15	0.20	0.16	0.18a
	Mean	-	-	-	-	-	0.18a	0.17a	0.18a	0.17a	
	SE										0.007
	CV(%)										20.51
1999	30x12.50cm	0.87	0.97	0.89	0.95	0.92	2.79	2.64	2.76	2.70	2.73b
	30x6.25cm	1.02	1.00	0.92	0.94	0.97a	2.80	2.92	2.83	2.89	2.86a
	15x12.50cm	0.99	0.89	0.97	0.91	0.94a	2.71	2.63	2.65	2.69	2.67b
	Mean	0.96a	0.95a	0.93a	0.93a		2.77a	2.74a	2.75a	2.75a	
	SE					0.017					0.020
	CV(%)					11.85					3.50
2000	30x12.50cm	6.74	6.60	6.70	6.64	6.67a	7.50	7.00	7.40	7.10	7.25a
	30x6.25cm	6.70	6.80	6.78	6.72	6.75a	7.00	8.00	7.75	7.25	7.50a
	15x12.50cm	6.65	6.67	6.55	6.55	6.61a	8.00	7.50	6.00	6.50	7.00a
	Mean	6.69a	6.69a	6.68a	6.63a		7.50a	7.50a	7.05ab	5.95b	
	SE					0.028					0.13
	CV(%)					1.79					7.99

¹Canopy scores on scale 0-10, where 0=poor canopy formation used in the third experimental year for leaf size estimation.

²WAS= weeks after sowing.

³. = No data collection by this time in the first experimental year

Means followed by the same letter(s) within a column and a row are not significantly different at 5% level of probability using Duncan's Multiple Range Test (DMRT)

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