

Utilization of *Blighia sapida* (K.D. Koenig) in Rainforest and Savanna Zones of South-West, Nigeria

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ABSTRACT

Indigenous knowledge of *Blighia sapida* (Ackee) from rainforest and savanna vegetation zones of Ondo, Osun and Oyo states, Nigeria were investigated. Ten percent (10%) of the total Local Government Areas (LGA) in each vegetation zone were randomly selected. Information on the uses of *Blighia sapida* was collected from eight (8) respondents in three communities of each selected LGA using a semi-structured questionnaire. Descriptive statistics was further used to analyze the data. The results indicated that respondents across the study areas depended on the various products of *Blighia sapida* to meet their needs (for food, laundry, building, etc). Specifically, both young and old respondents across the study areas eat the aril of *B. sapida* while some other persons cook it with vegetable. However, the difference observed in the level of knowledge of the respondents suggests that people should be enlightened more on the effective uses of Ackee. There is need to create more awareness on *B. sapida* because it is not widely known unlike other forest fruit trees such as *Garcinia kola*, *Chrysophyllum albidum*. Efforts should be made towards the domestication of *B. sapida* because the trees are relatively low in abundance due to its timber that has been harvested.

Key words: *Blighia sapida*, Ackee, Utilization, Rainforest and savanna vegetation zones, socio-economic importance, fruit tree

INTRODUCTION

The wide range of indigenous fruit trees available in many parts of the world can enable farmers to meet their various household needs for food, nutrition and medicines (Schreckenber *et al.*, 2006). These forest fruit tree species are often part of the traditional diet which provides food during seasonal and food shortage periods. However, these important tree species are often neglected leading to the erosion of their diversity and usefulness (Ekue *et al.*, 2010). A study by Ekue *et al.* (2010) showed that *Blighia sapida* (Ackee) has emerged a high priority species for domestication in Benin Republic because of its ability to generate more than US\$10,000 of revenue per annum.

Blighia sapida is a forest food tree species that belongs to the Sapindaceae family and it is native to tropical West Africa in Cameroon, Nigeria, Ghana, Gabon, Sao Tome, Benin, Burkina Faso etc. The species is planted in countries such as Côte d'Ivoire, Jamaica and Haiti. The generic name *Blighia* honours Captain William Bligh who introduced the plant to the English scientific community at Kew in 1793 (ICRAF, 2009). It is commonly known as Ackee apple, and known as Gwanja Kusa in Hausa, Isin in Yoruba and Okpu in Igbo languages of Nigeria.

Ackee trees are integrated in different land use systems (Dossou *et al.*, 2004; Ekue' *et al.*, 2004). At maturity, arils can be consumed fresh or added to sauce to replace sesame (*Sesamum indicum* L.) seeds or peanuts (*Arachis hypogaea* L.), it is usually grounded into powder and added to the sauce for its oil contents. Arils are also fried in peanut oil (*A. hypogaea*) or palm oil (*Elaeis guineensis* Jacq.) (Ekue *et al.*, 2010)

Young leaves of the species may be parboiled and used like any other African leafy vegetable. Ackee is used in the allied surfactant, coating, pharmaceutical, cosmetic and oleo-chemical industries (Kyari, 2008). The seeds contain about 26% oil, which is suitable for industrial applications (Kyari, 2008). Perfumed water obtained from the fragrant flowers is used as a cosmetic. *Blighia sapida* wood is mainly used for timber (Oke and Oyedare, 2008), light construction and furniture, but sometimes it is used for casks, boxes, crates, food containers, packing cases, tool handles, paddles, pestles, mortars, handicrafts, carving and turnery (Quattara *et al.*, 2010). It is suitable for interior trim, vehicle bodies, sporting goods, joinery and railway sleepers (Aubréville, 1959 and Oteng-

Amoako, 2006). The wood is also used as firewood and for charcoal production. Capsules of the fruits have the potentials of producing saponins, which are used for washing. In the Pobè region of South-East Benin Republic, the whole immature fruits are cut in small pieces and plunged into water for washing clothes (Ekué *et al.*, 2009), the fruit is also used as a mordant for dyeing. Dried fruit husks are rich in potash and the ashes are used in making soap. In Benin Republic, the bark, seeds and capsules of Ackee are dried, reduced into powder and used to poison fishes so that they are rendered easier to catch (Ekué *et al.*, 2010).

Ashes from calcined Ackee capsules are used as repellent for some insect pests to culture such as cowpea (*Vigna unguiculata* (L.) Walp.) or common bean (*Phaseolus vulgaris* L.) in the region of N'Dali (North- East Benin) (Ekué *et al.*, 2009). The bark is first dried, then crushed and afterwards mixed with seeds of pearl millet (*Pennisetum glaucum* (L.) and African finger millet (*Eleusine coracana* (L.) before sowing to avoid insects' attacks (Ekué *et al.*, 2009). Also, aqueous seed extracts are administered to expel parasites in Brazil. After industrial processing, Ackee aril is put in cans and sold in the United Kingdom and Canada (Orane *et al.*, 2006). In Jamaica, the aril of the species has been reported to generate more than 13 million US Dollar per year (Orane *et al.*, 2006). Ackee tree is planted as ornamental shade tree in India and tropical America. It is useful for soil improvement and erosion control. An ink for tattoos is also made from Ackee seeds. The main objective of the study is to investigate the socio-economic importance of *Blighia sapida* to the people in rainforest and savanna vegetation zones of Ondo, Osun and Oyo States, Nigeria.

METHODOLOGY

Method of Data Collection

Sampling technique

A multistage sampling technique was used for this study. Two ecological zones in Ondo, Oyo, and Osun states, Nigeria (rainforest and Guinea savanna) were purposefully randomly. Out of the 18 LGAs in Ondo State, four (4) are found in the Guinea savanna while ten (10) are located in the rainforest vegetation zone. In Oyo state 24 LGAs are located within the Guinea savanna while nine (9) are found in the rainforest. Out of the 30 LGAs in Osun state, 18 LGAs are in the Guinea savanna zone while 12 are within the rainforest vegetation zone. For this study, ten percent (10%) of the total LGAs in each vegetation zone of each state were selected for field data collection. Where the 10% of all the LGAs in any of the vegetation zones in each of the states could not yield one (1) LGA, one (1) LGA was however randomly chosen from all available LGAs in the zone. Three (3) communities were randomly selected from each LGA selected for this study as shown on Table 1. Information on the uses of Ackee was obtained from eight (8) randomly selected respondents from each community. Thus, a total of two hundred and sixteen (216) questionnaires were distributed in this study.

Statistical Analysis

The questionnaire collected from respondents was coded to obtain quantitative data. The data was thereafter subjected to descriptive statistics such as frequencies, percentages, means, *etc* and the results presented in form of tables, charts, etc. The analyses were conducted using SPSS15.0 for Window.

Table 1: Distribution of LGAs and communities visited across the states and vegetation zones

State	Vegetation Zone	LGAs	Communities visited
Oyo	Rainforest	Oluyole	Alata, Aba-nla, Idi-ayunre
		Saki East	Ogbooro, Ago-amodu, Oje-owode
	Guinea savanna	Saki West	Saki, Idi-Ero, Palapala
Osun	Rainforest	Ife South	Akeredolu, Olode, Ifetedo
		Ife East	Omi-toto, Ifesowapo, Ifedapo
	Guinea savanna	Odo-Otin	Okua, Inisha, Okuku
		Ifelodun	Ikirun, Obaagun, Eko-ende
Ondo	Rainforest	Akure South	Awule, Ijomu, Araromi
	Guinea savanna	Akoko South-west	Akungba-Akoko, AyegunleAkoko, Oba-Akoko

RESULTS AND DISCUSSION

Demographic Characteristic of Respondents

The results in Table 2 revealed that the ages of respondents across the study areas ranged from less than 20 to 80 years. The results indicated that majority of the respondents were found within the middle age range of 21 – 50 years (Table 2). Results on Table 2 indicated that 54.2%, 56.3% and 70.8% of the respondents in the Guinea

savanna zones of Oyo, Osun and Ondo states, respectively were male while 45.8%, 43.8% and 29.2% were Female. In rainforest zone of Oyo, Osun and Ondo, 50%, 62.5% and 45.8%, respectively were male while 50%, 37.5% and 54.2% were female. In the Guinea savanna zone, 85.4%, 77.1% and 54.2% of Oyo, Osun and Ondo states respectively indicated that they are married. Between 10.4% and 41.7% of the respondents in the Guinea savanna zones of the three states are single. Also in

Table 2: Socio-economic characteristics of respondents in the study areas.

Category	Oyo				Osun				Ondo				
	Guinea savanna (n = 48)		Rainforest (n = 24)		Guinea savanna (n = 48)		Rainforest (n = 48)		Guinea savanna (n = 24)		Rainforest (n = 24)		
	F	%	F	%	F	%	F	%	F	%	F	%	
Age of Respondents	<- 10years	0	0	0	0	0	0	2	4.2	0	0	0	0
	11-20years	2	4.2	2	8.3	0	0	1	2.1	2	8.4	1	4.2
	21-30years	7	14.7	1	4.2	6	12.6	5	10.5	8	33.4	6	25
	31-40years	12	25.2	7	29.2	6	12.6	3	6.3	2	8.4	6	25
	41-50years	8	16.8	8	33.3	17	33.6	16	33.6	6	25.2	2	8.4
	51-60years	11	23	5	20.8	7	14.7	12	25.2	3	12.6	3	12.6
	61-70years	3	6.3	0	0	4	8.4	8	16.7	1	4.2	3	12.6
	71-80years	4	8.4	1	4.2	8	16.8	1	2.1	2	8.4	2	8.4
Sex	Male	26	54.2	12	50	27	56.3	30	62.5	17	70.8	11	45.8
	Female	22	45.8	12	50	21	43.8	18	37.5	7	29.2	13	54.2
Marital Status	Married	41	85.4	20	83.3	37	77.1	41	85.4	13	58.4	15	62.5
	Single	5	10.4	3	12.5	7	14.6	7	14.6	10	41.7	6	25
	Widow	2	4.2	1	4.2	4	8.3	0	0	0	0	3	12.5
Household Size	1	2	4.2	0	0	0	0	1	2.1	2	8.3	0	0
	2	7	14.6	3	12.5	5	10.4	4	8.3	2	8.3	4	16.7
	3	9	18.8	1	4.2	7	14.6	9	18.8	3	12.5	6	25
	4	13	27.1	12	50	12	25	20	41.7	2	8.3	4	16.7
	5	5	10.4	2	8.3	4	8.3	3	6.3	2	8.3	10	41.7
	6	2	4.2	1	4.2	17	35.4	2	4.2	13	54.2	0	0
	7	2	4.2	1	4.2	3	6.3	0	0	0	0	0	0
	8	1	2.1	0	0	0	0	0	0	0	0	0	0
	Others	7	14.6	4	16.7	0	0	9	18.8	0	0	0	0
Educational Status	No Formal	20	41.7	3	12.5	16	33.3	6	12.5	0	0	8	33.3
	Primary School	8	16.7	7	29.2	13	27.1	10	20.8	3	12.5	1	4.2
	Secondary School	11	22.9	11	45.8	12	25	16	33.3	13	54.2	6	25
	Tertiary	9	18.8	3	12.5	7	14.6	16	33.3	8	33	9	37.5
Means of Livelihood	Farming	15	31.3	2	8.3	13	27.1	2	4.2	1	4.2	3	12.5
	Civil Service	7	14.6	4	16.7	5	10.4	15	31.3	2	8.3	2	8.3
	Trading	8	16.7	8	33.3	13	27.1	12	25	7	29.2	5	20.8
	Artisan	8	16.7	5	20.8	8	16.7	13	27.1	9	37.5	9	37.5
	Others	10	20.9	5	20.8	9	18.8	6	12.5	5	20.8	5	20.8

n = number of respondents, F = Frequency of answer, Source: Field Survey 2014

Table 3: Level of knowledge of *Blighia sapida* by respondents in the study areas

	Variant	OYO		OSUN		ONDO	
		Guinea savanna (n=48)	Rainforest (n= 24)	Guinea savanna (n= 48)	Rainforest (n= 48)	Guinea savanna (n= 24)	Rainforest (n= 24)
Areas found	in front of my house	22.9	0	22.9	18.8	33.3	20.8
	beside my house	12.5	0	6.3	20.8	25	16.7
	in my farm	20.9	50	43.8	2.1	4.2	4.2
	at the back of my house	2.1	0	4.2	8.3	4.2	4.2
	Around	31.3	0	4.2	0	33.3	50
	in the reserve	6.3	50	16.7	50.1	0	4.2
	Others	4.2	0	2.1	0	0	0
Shelf Life	1 day	2.1	0	35.4	50	0	4.2
	2 days	8.3	29.2	6.3	6.3	8.3	4.2
	2-3 days	27.1	16.7	35.4	14.6	37.5	58.3
	3 days	6.3	0	2.1	0	4.2	0
	3-4 days	43.8	45.8	16.7	29.1	29.2	25
	5 days	12.5	8.3	0	0	16.7	8.3
	1 week	0	0	4.2	0	4.2	0
Season of Abundance	Rainy season	41.7	12.5	43.8	58.3	20.8	50
	Dry season	10.4	83.3	45.8	35.4	58.3	41.6
	All year round	47	4.2	10.4	6.3	20.8	8.4
Method of gathering Ackee fruits	Tugging	95.8	75	60.4	39.6	91.7	83.3
	Selection	0	0	0	18.8	0	0
	Both	4.2	25	39.6	41.7	8.3	16.7
Fruit Preservation Method	Drying the Aril	10.4	0	0	10.4	12.5	12.5
	No Process	89.5	100	100	89.6	87.5	87.5
Adverse effect of eating Ackee fruit	No Adverse Effect	73	66.7	81.3	91.7	25	70.8
	Opening of Pod	27	33.3	18.8	8.3	75	29.2
	Forcefully						
Insects associated with Ackee fruit	Black ants	0	8.3	0	16.7	25	12.5
	Termite	0	0	10.4	0	25	0
	Red ants	22.9	54.2	70.8	62.5	50	58.3
	Bees	8.3	4.2	4.2	16.7	0	16.7
Pest Associated with Ackee fruit	Birds	68.8	33.3	14.6	4.2	0	12.5
Stage of Attack by insects/pests	Matured stage	79.2	100	12.5	6.3	37.5	29.2
	Flowering Stage	20.8	0	87.5	93.8	62.5	70.8
Tree parts attacked insects	Fruit	95.8	100	50	100	91.7	91.7
	Leaves	0	0	0	0	4.1	0
	Seed	4.2	0	50	0	4.1	8.3

n= number of respondents

the rainforest zone, 83.3%, 85.4% and 62.5% of Oyo, Osun and Ondo states respectively indicated that they are married. The household sizes for all the families of the respondents in both the rainforest and Guinea savanna ranges from three (3) to eleven (11).

The educational status of the respondents in the two vegetation zones in the states is presented in Table 2. In the rainforest zone, 12.5 to 33.3% of the respondents had no formal education, 4.2 to 29.2% had primary education while 25.0 to 45.8% and 12.5 – 37.5% of the respondents had secondary and tertiary education, respectively. Likewise in the Guinea savanna zone, 0.0% to 41.7% of the respondents had no formal education, 12.5 to 27.1% had primary education while 22.9 to 54.2% and 14.6 – 33.0% of the respondents had secondary and tertiary education, respectively. Some means of livelihood of the respondents across the study areas are shown in Table 2. The result indicated that rainforest vegetation zone of Oyo state had more traders (33.3%) than any other zone, rainforest vegetation zone of Osun state had the highest civil servants (31.3%) while in the rainforest and Guinea savanna zones of Ondo state, Artisans accounted for the highest (37.5%) occupation of the respondents.

Knowledge of *Blighia sapida* in the Study Areas

Out of the respondents sampled in the Guinea savanna vegetation zones of Ondo, Osun and Oyo State, 33.3%, 31.3% and 31.3%, respectively indicated that they collected Ackee fruits from its trees planted in their homegardens (i.e. around their houses). In the rainforest areas the percentage of respondents who collected Ackee fruits from their homegardens was higher than those of the Guinea savanna. Results show that 50%, 50.1% and 50% of respondents in the rainforest zone of Ondo, Osun and Oyo states respectively collected the fruits from trees around their houses.

Majority (43.8%) of the respondents in the Guinea savanna zone of Oyo state noted that the shelf life for the fruit of *B. sapida* is between 3-4 days, while 37.5% and 35.4% of the respondents in the Guinea savanna zones of Ondo and Osun states, respectively observed that the fresh fruit can only be stored for 2-3 days. In rainforest zone, the shelf life of the species was noted to be 2-3 days, 1 day and 3-4 days by 58.3%, 50% and 45.8% of the respondents in Ondo, Osun and Oyo states, respectively. Majority (58.3%) of the respondents in rainforest zone of Osun observed that the ackee fruits are found in abundance during rainy season, while majority (83.3%) of respondents in rainforest zone of Oyo noted that the fruits are found in abundance during dry season. In the Guinea savanna areas of Oyo, majority (47%) of respondents confirmed that the fruit is abundant all year round.

The result revealed that the prevalent method of fruit harvesting employed by respondents in two vegetation zones across the states is by tugging or ripping (pulling off or out from the place of growth), with this method being more prevalent in the Guinea savanna area of Oyo State (95.8%), except in Osun state where selection (collection of fruit on the ground after natural fruit-fall) is employed by respondents. The result shown in Table 3 revealed that a high percentage of respondents across the study states do not have a way of processing the ackee fruit. Few respondents in Guinea savanna areas of Oyo and Ondo as well as rainforest areas of Osun and Ondo dried the aril of the fruit to make it last longer.

From the result shown in Table 3, higher percentage of respondents of about 25-91% across the study states did not identify any negative effect related with the use of Ackee fruit. About 8.3-75% of the respondents identified the adverse effect to be the consumption of the aril when the pod is forcefully opened. Effects like cholestasis jaundice, vomiting, liver and intestine damage, severe hypoglycemia often accompanied by convulsions and death. Also, 22.9 - 70.8% of the respondents in the rainforest and Guinea savanna ecosystems of the three states mentioned that red ant (*Solenopsis mandibularis*) is the predominant insect attacking Ackee fruits while the only pest of Ackee identified by all the respondents is bird. About 79.2%, 12.5% and 37.5% of respondents in the Guinea savanna areas of Oyo, Osun and Ondo States, respectively observed that Ackee fruits are attacked by insects at their matured stage while 20.8%, 87.5% and 62.5% of respondents in Oyo, Osun and Ondo State respectively indicated that insects attack the plant during its flowering period (Table 3). In rainforest zones, 100%, 6.3% and 29.2% of respondents in Oyo, Osun and Ondo States, respectively, noted that insects attack the fruit at matured state while 93.8% and 70.8% respondents in Osun and Ondo states, respectively observed that that insect attacks on ackee is prevalent during the flowering period. The fruit of the species is the predominant part of the plant that is attacked by insects across the study states. Respondents in Guinea savanna zones of Osun and Oyo states mentioned that both the fruit and seed of the plant is attacked by insects while, in Ondo state the respondents noted that the fruit, leaves and seed of the species are attacked by insects.

Variation in the Uses of *Blighia sapida* across the study areas

Eating of the fresh Aril of Ackee fruit is the predominant consumption pattern of the species across the states under investigation (Table 4), followed by the cooking of aril.

Blighia sapida in rainforest and savanna

Table 4: Uses of *Blighia sapida* across the study areas

Criteria		Oyo				Osun				Ondo			
		Guinea savanna (n=48)		Rainforest (n=24)		Guinea savanna (n=48)		Rainforest (n=48)		Guinea savanna (n=24)		Rainforest (n=24)	
		F	%	F	%	F	%	F	%	F	%	F	%
Preference	Eating raw	46	95.8	24	100	41	85.4	48	100	22	91.7	24	100
	Cooking	34	70.8	7	29.2	1	2.1	30	62.5	0	0	2	8.3
	Medicine	10	20.8	1	4.2	11	22.9	11	22.9	4	16.7	9	37.5
	Soap making	8	16.7	0	0	4	8.3	3	6.3	1	4.2	7	29.2
	Toothpaste	0	0	0	0	1	2.1	0	0	0	0	0	0
	Building material	2	4.2	6	25	13	27.1	0	0	6	25	0	0
	Provision of Shade	0	0	0	0	0	0	0	0	1	4.2	3	12.5
	Carving material	0	0	4	16.7	0	0	0	0	0	0	0	0
	Furniture making	0	0	6	25	0	0	8	16.7	0	0	0	0
	Plant part Use	Aril	47	97.9	24	100	39	81.3	48	100	24	100	23
Seed		3	6.3	1	4.2	2	4.2	7	14.6	0	0	0	0
Tree bark		9	18.8	0	0	4	8.3	12	25	2	8.3	4	16.7
Leaves		16	33.3	0	0	2	4.2	3	6.3	3	12.5	6	25
Root		0	0	0	0	4	8.3	1	2.1	0	0	0	0
Bole		2	4.2	9	37.5	11	22.9	0	0	4	16.7	0	0
Pod		9	18.8	0	0	3	6.3	4	8.3	1	4.2	6	25
Tree branches		1	2.1	0	0	0	0	0	0	0	0	3	12.5

n= number of respondents, *F*= Frequency of answer

The result also indicated that between 4.2% and 37.5% of the respondents in the two vegetation zones of the three states use Ackee plant for medicinal purpose while others use the plant for other purposes such as soap making, toothpaste, building material, shade, carving and furniture, etc (Table 4). The predominant part of the fruit used by respondents across the states is the Aril. About 97.9%, 81.3% and 100% of the respondents in the Guinea savanna zones of Oyo, Osun and Ondo States, respectively indicated that they consume the Aril of the fruit while in the rainforest zones of Oyo, Osun and Ondo States, 100%, 100% and 95.8% respondents, respectively consume the Aril of the fruit. The leaves and bole of the plant are also used by 33.3% and 37.5% of the respondents.

DISCUSSION

Knowledge and Uses of *Blighia sapida* in the Study Areas

B. sapida is not well known in the study areas. However, there are indications that the species has a long history of utilization, some of the people that know its usefulness still conserve it for its multipurpose uses. The tree species is mainly conserved in the farms and home gardens to meet their own needs.

The fruit of ackee (aril) is eaten raw and sometimes cooked with vegetables which have proven to be an efficient medical treatment of colds, fever and disease as varied as edema and epilepsy as established by both young and old respondents across the study areas (Table 4). *B. sapida* contains reasonable amount of carbohydrates, fibre, moisture, crude protein and relatively low fatty acid as reported by Akintayo *et al.* (2002), it supplies energy, aid digestion and reduces the risks of cardiovascular diseases as showed by the respondents result. Olawale *et al.* (2016) reported that *B. sapida* (both aril and seed) is very rich in Sodium, Calcium, Potassium and averagely in Magnesium and these mineral elements present in *B. sapida* can be used to enhance healthy and strong bone formation in man and animal, heal circulatory heart disease as confirmed by the results of the respondents.

Apart from these medical uses, the Ash content of the aril and the seed of Ackee is higher in quantity and rich in quality with 1.81% for seed and for the aril 1.22% which shows slight increase from other fruit trees which is major element of soap lather formation as reported by Quattara *et al.*, (2010) and Smart, (1996). This explains why the ash of the seed is good for making soap as concluded from the respondent results which ascertain the speculative report

of Ekue *et al.*, (2009) that ackee fruit can be used for soap like other fruit trees. The respondents also mentioned that they use the wood of the Ackee for building, carving, and for recreation/shade, which is similar to the results of the work of Ekue *et al.* (2010).

The shelf life of ackee fruit as reported in this study shows that fresh ackee fruit/aril cannot be preserved for long due to the high moisture content as reflected in the study of Olawale *et al.* (2016) except it is dried and kept in a cool place. ICRAF (2009) noted that *B. sapida* trees has been recorded to flower twice a year, first at the end of the dry season and a second time at the end of the rainy season, which could explain the differences in the ripening period of the fruit of the species in the study areas. According to the respondents interviewed, no special way of preserving Ackee fruits is used, except for drying of the aril. The result suggested that it cannot be stored for a long time without spoilage as shown in the report of Olawale *et al.* (2016) that higher water content can enhance microbial action thereby causing food spoilage.

The fruit of unripe Ackee is highly toxic and extremely dangerous to human health (Akintayo *et al.*, 2002) and the adverse effect of consuming the fruit of Ackee as reported in this study was that, if the aril is eaten when the pod is forcefully opened can lead to the death of such an individual, thus it is advisable never to consume until it naturally opens which is safe. This is known to few respondents across the study area. Various types of insects are associated with Ackee but the predominant insect that was identified by respondents was the red ant (*Solenopsis mandibularis*). This insect was said to attack the tree when the fruit matures or at flowering stage of tree (ICRAF, 2009). The part the insect attacks mostly on ackee tree are the fruits, leaves and seeds which results to loss of larger part of the production.

CONCLUSION AND RECOMMENDATION

The various uses that can be derived from Ackee (indigenous fruit tree) are not exhaustible. Hence, the uses of this forest fruit cannot be under-estimated in sustaining livelihood. Ackee fruit has reported by the respondents from the study area, depend on the various uses of *B. sapida* as a whole or in part to meet their various needs (for food, medicine, laundry and building) across the study areas. Red ant (*Solenopsis mandibularis*) was observed to be the most prevalent pest of Ackee that attack the tree when the fruit matured or at flowering stage of tree. It is therefore necessary to harness the domestication of *B. sapida* because the trees are relatively low in abundance due to its timber that has been harvested.

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