DEMOGRAPHIC DETERMINANTS OF EDIBLE INSECT CONSUMPTION IN IDO LOCAL GOVERNMENT AREA OYO STATE.

[1]Rotowa, T.O, [2]Oyewo, I.O, [2]Adekunle, A. O, [3]Adesope, A. A, [3]Owoloja, A.O, [3]Bobadoye, B.O
[1]Department of Wood Technology, Poznan University of Life Science, Poland.
[2]Federal College of Forestry Ibadan, P.M.B 5057, Oyo state, Nigeria.*
[3]Forestry Research Institute of Nigeria, PMB 5054, Ibadan Oyo state, Nigeria
**Email: - ojerry2@gmail.com, tobrot2003@gmail.com, +2348035751159, +2348164183530*

ABSTRACT
This study examined the determinant of edible insect consumption among rural dwellers in Ido Local Government Area, Oyo State. It was conducted to examine the level of understanding of the consumption of edible insect on the nutritive and health benefits. Snowball sampling techniques were used to select the respondents from Akinyemi, Ajibade, Araromi and Akufo communities in the LGAs. Data collected were analyzed using descriptive statistics to examine the relationship between the socio economic characteristics of the respondents and edible insects' consumption. The result revealed that a range of edible insects such as crickets, winged termites and grass-hopper were commonly harvested at adult stage at seasonal peaks which is raining season, while the palm weevil, rhinoceros beetle, Africa silkworm and Pallid emperor moths were harvested at larva stage. The study also showed that 44.78% of the respondents consume the edible insects as a food condiment, 61.46% consumed it as a cultural food while 10.42% consumed this insects as replacement for fish or meat. All (100%) of the respondents roasted and smoked the insects before consumption, 98.96% fried it and 1.04% consumed it in raw and boiled form. Majority 94.8% of the respondents encountered no challenge in harvesting the edible insects during the season. In conclusion, this study recommends the need for rearing of insects such as Africa silkworm (Ekuku), and Pallid emperor (Monimoni) in the study in order to enhance food security, improve accessibility for home consumption and commercialization as potential food, feed, nutritive supplements and Health benefits.

***Key words**: Edible insects, Consumption, Rural dwellers, Nutritive, Ido LGA.*

INTRODUCTION

Edible insects play an important role as part of human nutrition in different regions in the world and over half of people residing in rural areas in such regions suffer from malnutrition, especially protein energy (Siriamornpun and Thammapat, 2008). Insects account for the greatest amount of biodiversity in forests; and are the least studied of all fauna (Yen, 2009). Many of the poorest populations in the world such as Africa, Asia consume edible insects as part of their diet (Shockley and Dossey, 2014; FAO 2013; West Africa Trend Team 2014). Ordinarily, insects are not used as emergency food to ward off starvation, but are included as a normal part of the diet throughout the year or when seasonally available (Balinga, Fitzpatrick and Dierenfeld 2004).

Worldwide, more than 400 insect species are reportedly consumed by humans as food as most are harvested from natural forests, while others are harvested within human settlements (Ramos Elorduy, 2005). While 30 species or more of these edible insects are used by indigenous populations in many developing countries as food. DeFoliart (1990; 2002) reported that scores of species of edible insects are dominant items of commercial value in town and village markets of Nigeria as well as tropical and semi- tropical regions of the world. Nonetheless, the potentially substantial benefits of farming and utilizing insects as a primary dietary component, particularly to supplement or replace foods and food ingredients made from vertebrate livestock, are gaining increased attention in Africa. In addition to their fundamental contribution for pollen dissemination, insects also contribute significantly to livelihoods in both rural and urban areas (Stack, DeFoliart and Benevenge 2003). FAO (1995) noted that insects are important non wood forest products that under-privileged people gather, particularly women and children for either food or animal feed. According to Balinga, *et al.,* (2004) said that insects are not a source of protein alone but also vitamins, minerals and fats. Many insects contain abundant stores of lysine, an amino acid deficient in the diets of many people who depend heavily on grain. Further, more insects are easily converted as a protein supplement source more efficiently than meat and fish. Protein production for human consumption from edible insects would be more ecologically effective as they emit less carbon into the atmosphere and consume fewer resources than animal protein. This makes insect meat more ecologically sensible and climate smarter than vertebrate meat (Jongema, 2012). According to Banjo, Lawal and Songonuga, (2006,) the consumption of non-toxic insects should therefore be encouraged. Insects are traditional foods in most cultures, playing an important role in human nutrition as they can be reared with little or no specialized techniques for their high nutritional qualities and sold to the populace that regards them as delicacies (Finke, 2002). The potential of insects needs to be more seriously considered in food security and sustainable development goal (SDG) strategies in Sub-Saharan Africa (De Foliart, 1992).

Consumption of edible insects in Nigeria has not been socially acceptable. This may not be unconnected with the fact that most people have little or no knowledge about the nutritive value or health benefit that could be derived from consumption of edible insects. Edible

insects have great potential for addressing food insecurity in Africa as they serve as a source of essential nutrients and food to rural dwellers. This will give us an insight into the species of edible insects that are consumed in the rural community in the study area. It will also enable us to know various means and sources where these edible insects could be obtained. In addition, this study will help us to know what influences their consumption of these insects as well as the challenges faced by the rural dwellers in accessing edible insects, hence, the need for this study. In addition, understanding the contributory factors that influence rural dwellers to consume edible insects need to be assessed. This study was therefore carried out to address this knowledge gap by providing answers to the following questions;

i. What are the edible insects species available in the area of study?
ii. From what sources can edible insect be collected from by the rural dwellers?
iii. What are the challenges faced in harvesting/ collecting edible insects?

Therefore this study access demographic determinants of edible insects consumed by rural dwellers in Ido Local Government Area of Oyo state Nigeria, in order to identify the species of edible insects available in the study area and to ascertain the means by which edible insects are sourced by the respondent in the study area. Finally, highlight the constraints to the rural dwellers accessibility to edible insects.

METHODOLOGY

Study area

The study was conducted in Ido Local Government Area of Oyo state, Ibadan in Nigeria. It headquarters at Ido Village. The Local Government covered a total area of 986km^2 and a total population of 103,261 based on 2006 National Population Census (NPC)**.** Ido local Government shares boundary with Oluyole Local Government, Ibarapa-East Local Government, Akinyele Local Government, Ibadan North West Local Government, Ibadan South West Local Government ,Ibadan North Local Government Area of Oyo state and Odeda Local Government in Ogun State. It covers an area of about 8,000 square kilometers and lies between latitude 6^0'451 and 9^0'451 North of the equator and longitude 2^0 301and 9a^0 451 East of Greenwich Meridian. Ido is characterized by two distinct seasons; the dry and rainy season. Ido enjoys abundant rainfall of over 1800mm annually and the south –westerly winds blow most of the year (OYSADEP, 2006).

Procedure for data collection

The focal area of study selected is Ido Local Government Area Oyo State Ibadan**.** Since there was no sample frame for this study, non probability method was used, specifically snowball, was used to locate insect consumer at Akinyemi there was 26 respondents, at Ajibade there was 22 respondents, at Araromi 20 respondents and at Akufo there was 28 respondents in these communities from which a total number of ninety six (96) respondents were selected for the study. Data was collected using interview schedule guide.

Method of data analysis:

Data was analyzed using descriptive statistics to examine the relationship between the socio economic characteristics of the respondents and edible insects' consumption**.**

RESULTS AND DISCUSSION

Socio-characteristics of respondents

Table 1 Presents the socio-economic characteristics of the respondents.

Age: Most of the respondents (45.8%) belong to the age range of 41-50 years while 40.6% were in the age range of 51 and above. It can be seen from this result that the respondents are still within the active age of farming.

Sex: Most of the respondents 63.5% were male while 36.5% were female which implies that most of the respondents were male farmers engage in edible insects' collection.

Marital status: Majority of the respondents 87.5% was married, 2% were divorce and 10.4% was widowed. The result showed that most of the respondents were married.

Educational qualification: Majority of the respondents 61.5% had no formal education, 22.9% were primary school educated, 11.5% had secondary school certificate while 4.1% had tertiary school education. This implies that most of the respondents had no formal education with only 38.5% had formal education.

Occupation: Findings revealed that the majority 56.2% were into farming, 35.4% were traders 4.1% were civil servants while 2.1% were artisan and bricklayers.

Household size: Findings shows that most of the respondents 53.12% fell within the categories of 4 and 5 household size, as presented in Table 1

Religion: This showed that 66.7% of the respondents were Muslims while 29.2% were Christians, and 4.1% were traditional religion. This means that most of the rural dwellers consuming edible insects were Muslims.

Tribe: It was revealed that 94.8% were Yoruba, 1.0% were Igbo while others 4.2% are other
Culture (Gara), as presented in Table 1

Table 1. Socio-characteristics of respondents (n=96)

	Range	Frequency	Percentage
Age			
	21-30	2	2.1
	31-40	11	11.5
	41-50	44	45.8
	51 and above	39	40.6
Sex			
	Male	61	63.5
	Female	35	36.5
Marital Status			
	Married	84	87.5
	Divorce	2	2.08
	Widow	10	10.4
Educational qualification			
	No education	59	61.5
	Primary education	22	22.9
	Secondary	11	11.5
	Tertiary education	4	4.1
Occupation			
	Farming	54	56.2
	Trading	34	35.4
	Civil Servant	4	4.1
	Artisan	2	2.1
	Others	2	2.1
Household size			
	1-4	40	41.67
	5-8	51	53.13
	9 and above	5	5.20
Religion			
	Christian	28	29.2
	Islam	64	66.7
	Traditional	4	4.1
Tribe			
	Yoruba	91	94.8
	Igbo	1	1.0
	Hausa	-	-
	Other culture (Gara)	4	4.2

Stages at which edible insect are collected for consumption

Table 2: Shows the list of edible insects available in the study area and the stage of harvesting them in the area. The result shows that 100% of the respondents harvested cricket (Ire), wings termite (Esunsun) at adult stage while 18.8% harvested grasshopper (Tata) at adult stage. 100% of the respondents agreed that palm weevil (Itun) and Rhinoceros (Ogongo), were harvested at larva stage, 84.4% harvested Africa silkworm (Ekuku), 41.7% harvested Pallid emperor (Monimoni) and 18.8% harvested grasshopper (Tata) at larva stage respectively.

Table 2: Stages at which edible insect are collected for consumption (n=96)

Name	Harvesting stage	Frequency	Percentage
Ccricket (Ire)	Adult	96	100
Wings termite (Esunsun)	Adult	96	100
Palm weevil (Itun)	Larva	96	100
Rinhocerus (Ogongo)	Larva	96	100
Pallid emperor (Monimoni)	Larva	40	41.7

Africa silkworm (Ekuku)	Larva	81	84.4
Grasshopper (Tata)	Adult	18	18.8

Harvesting techniques of edible insects

Table 3 shows the harvesting techniques of edible insects in the study area. The data collected shows that 100% of the respondents harvested cricket (ire) through digging soil with cutlass at night during full moon, wings termite (Esunsun) is taking water to where there is light at night, Palm weevils (Itun) and Rhinoceros (Ogongo) is by digging rusted palm tree and palm oil rusted trees respectively. While 84.38% of the respondent harvested Africa silkworm (Ekuku) by hand picking it from rusted trees, 41.7 % harvested Pallid emperor (Monimoni) by handpicking it from shear butter and 18.8% harvested grasshopper (Tata) by handpicking it from agricultural plant in the farm.

Harvesting techniques of edible insects (n=96)

Name of insect	Frequency	Percentage	Harvest techniques
Crickets	96	100	Digging of the soil with cutlass
Wings termites	96	100	Taking water to where there is light
Palm weevil	96	100	Digging of rusted palm wine tree with cutlass
Rhinoceros	96	100	Digging of rusted palm oil tree with cutlass
Pallid emperor	40	41.7	Picking from share butter plant
Africa Silkworm	81	84.38	Picking from tree
Grasshopper	18	18.8	Picking from crop plant

Table 4: Purpose of collecting edible insect: **(n=96)**

	Frequency	percentage
Mainly for consumption purpose	96	100
Mainly for marketing purpose	-	-
For both consumption and marketing	-	-
Total	**96**	**100**

Why eat edible insects?

Table 5 shows that 61.46% of the respondents said they inherited the consuming of edible from their parent, 44.78% of the respondent eat edible insect because it serves as condiment while 28.13% said it's because it's serves as supplement for fish and meat.

Table 5: Why eat edible insect (n=96)

	Frequency	Percentage
Serve as condiment	43	44.78
Inherited	59	61.46
Supplement for fish and meat	27	28.13

Table 6 shows that 100% of the respondents roasted and smoked edible insects before consumption while 98.96% fried it and 1.04% consumed it in raw and boiled form.

Table 6: Form of consuming edible insects (n=96)

Form	Frequency	Percentage
Raw	1	1.04
Roasted	96	100
Smoked	96	100
Fried	95	98.96
Boiled	1	1.04

The result in table 7 shows that 94.8% of the respondents encountered no challenge during the harvesting of the edible insects, while 5.20% encountered low difficulty during harvesting, because most of the trees which they source the edible insects from have been fell by the commercial loggers as fuel wood and for other domestic uses.

Table 7: The Challenges encounter during the edible insect collection

	Frequency	Percentage
No Challenges	91	94.80
Trees getting them from has been fell	5	5.20
Total	**96**	**100**

CONCLUSION

This study examines the determinants of edible insect consumption among the rural dwellers in Ido Local Government Area in Ibadan Oyo State. It was thereby concluded age of the respondents ranged from 41 to 50 years old constituting 45.8%, majority 63.5% were male, 66.7% practice Islam, 87.5% were married, 38.5% were educated and 56.2% had faming as occupation. This study revealed the edible insects as crickets (100%), winged termites (100%) and grasshoppers (18.89%) were harvested at adult stage, all (100%) of the respondents' harvested Palm weevil and Rhinoceros at larva stage while (84.4%) harvested Africa silkworm and 41.7% harvested Pallid emperor at larva stage, 100% of the respondents source the cricket by digging soil with cutlass, wings termite by water and hand picking of grasshopper by 18.8% of the respondents. However, 100% of the respondents dug rusted palm wine and palm oil trees with cutlass for Palm weevil and Rhinoceros, 41.7% source Pallid emperor at larva stage by hand pinking. The respondents harvested edible insects for consumption alone, 53.13% of the respondents ate edible insects as condiment, 36.50% consumed edible insects as culture and 10.42% consumed the insect as replacement for fish or meat. All the respondents roasted and smoked edible insects before consumption, 98.96% fried it and 1.04% consumed it in raw or boiled form. Majority 94.8% of the respondents encountered no challenge to harvesting edible insects, while 5.20% encountered low problems in the harvesting of the edible insects for consumption. The study also concluded that the edible insects researched on had great acceptance and consumption among the respondents. It however recommended the need for rearing the insects on a commercial scale which will solve the multi- complexity of seasonality and improve accessibility as human food and animal feed such as micro-livestock, in the study and in order to enhance food security, improve accessibility for home consumption and commercialization as potential food, feed, nutritive supplements and Health benefits.

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