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Diversity of Edible Insects and Their Host Plants in Eastern Kogi State, Nigeria

Abah, O.O.I.[1*] Audu, P.A.[2] Matur, Ekpah, P.B.M.[3] Dagona, M.B.[4] Kayode, V.O.[5]

[1,4] *Department of Biological Sciences, Federal University Gashua, P.M.B. 1005, Gashua, Yobe State* [2] *Department of Biological Sciences, Federal University Lokoja, P.M.B. 1154. Lokoja, Kogi State* [3] *Department of Biological Sciences, Kogi State University Anyigba, P.M.B. 1008, Anyigba, Nigeria* [5] *Department of Zoology, University of Jos, P.M.B. 2084, Jos, Plateau State* [6] *Department of Agric. Tech., Kogi State Polytechnic, P.M.B. 1101, Lokoja, Kogi State.*

Abstract: A survey to determine the distribution of edible insects in relation to host plant species, periods and methods of collection, in Eastern Senatorial District of Kogi State, Nigeria was carried out between 2019 to 2020. Host plant species also play sanothersignificantrole in the distribution of edible insects, in which Cashew, Anacardium occidentale (Kachiu) had the highest distribution 73(17.4%), followed by Blackplum, Vitex doniana (Ejiji) 66(15.7%), Jambolan, Syzgium cumini (Ugolo) 54(12.9%) Neem, Anzadrichta indica (Iyaloda) 44(10.5%), Lannea, Lannea acida (Ogele) 42(10.0%), Annona, Annona senegalensis (Ukpokpo) 37(8.8%) and the least Velvet tamarind, Dialium indum (Aigele) 12(2.8%) respectively. The results of this study also revealed that the periods of collection especially Morning had the highest occurrence due to climatic factors that favour their emergence in the morning, while frying had highest method of preparation, followed by roasting and the least method was raw or improper preparation. Hence, government at levels and non-governmental organizations should embark on entomological survey to determine the appropriate method of collection, preparation and preservation of edible insects among the people who cherish them as a special delicacy in the area. The results of this study has shown that edible insects as one of the major sources of animal proteins is densely distributed among their host plant species in the eastern zone of Kogi State, Nigeria.

Keywords: edible insects, host trees, eastern, Kogi, Nigeria

INTRODUCTION

Entomophagy (human insectivory) is common to cultures in most parts of the world, including North, Central and South America, Africa, Asia, Australia and New Zealand. Edible insects include 235 species of grasshoppers, crickets, and cockroaches, 235 species of butterflies and moths, 344 species of beetles, 313 species of ants, bees and wasps, 39 species of termites, as well as 20 species of dragonflies, among others are known to be edible in 80% of the world's nations [1, 2, 3].

Edible insects play very important role in the provision of cheap animal protein for humans, in many countries throughout the world [4], The total number of ethnic groups recorded to practice entomophagy is about 3,000 [1]. Edible insects from forests are an important source of protein, and unlike those from agricultural land, they are free of pesticides. For every 100 grams of dried edible insects, there are about 50 grams of protein, about 15 percent of fat and about 17 percent of carbohydrates. The edible insects are also believed to have a higher proportion of protein and fat than beef and fish with a high energy value [5]. Also, Edible insects form a rich source of food for man and it is second to meat and poultry as stable animal protein food in most part of the world [7]. Research has shown that 100 grams of edible insects provide more than 100% of the daily requirements of the respective minerals and vitamins. According to [8] about 85% of Central Africans consume edible insects, 70% in the Democratic Republic and 91% in Botswana consume edible insects such as crickets, termites, caterpillars and grubs respectively [8].

According to [9,10] the high cost of animal protein has directed more interest towards several edible insects as potential source of proteins for humans. Entomological study has majorly focused on biology, taxonomy, and ecology of insects. Therefore, more attention is needed to fully assess the potential of edible insects, to provide a natural source of essential carbohydrates, proteins, fats, minerals and vitamins and offer an opportunity to bridge the gap in protein consumption between poor and wealthy nations, and also to lessen the ecological footprint [11]. There is paucity of information on the various edible insect species associated with host plant species found in the eastern zone of Kogi State, Nigeria. In view of the foregoing it is pertinent to conduct a survey to determine the distribution of edible insects in relation to their host plant species that are available within agro-ecological zone of the eastern zone of Kogi State, Nigeria.

MATERIALS AND METHODS

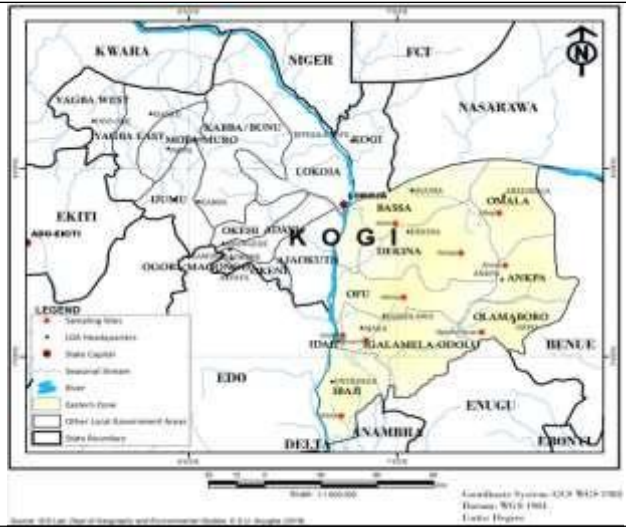
Study Area

The study was carried out in the Eastern Senatorial District of Kogi State, North-Central Geo-political Zone of Nigeria, which were randomly selected by balloting. The Eastern Senatorial District is situated approximately between Latitude 6^0 30^l and 8^0 40^l North and Longitude 6^0 30' and 7^0 40^l East and covers an area of about 13,665 sq.km^2. The Eastern Senatorial District (Igalaland) has a population of over two million inhabitants [12] and the area has an unusual and richly endowed environment, consisting of arable fertile land and freshwater bodies for fishing. This lies within the

***CorrespondingAuthor:** Abah, O.O.I.*

"middle-belt,"thewarmhumid,climate,climatezoneof Nigeria that has an advantage of the climate of the drier savannahvegetationtotheNorthandWetforestregions to the South. There is a distinctive wet and dry season dichotomy.ThewetseasonlastsfromaboutApriltothe endofSeptemberorearlyOctober,whiledryseasonlasts from about October to about the end of March or early. Rainfall can be heavy and the effects of the harmattan canbesevere,especiallyfromaboutNovember.Thearea has an averagerainfall of about 50[ll]ayear.Thelowland riverine areas are flooded seasonally and the vegetation is mainly deciduous, with the major rivers (Benue and Niger) [13].

420edibleinsectsofvariousOrders,Families and Species were collected by digging, picking, harvesting and trapping from the soil, stem, bark and leaves of their host plant species [4]. The samples were conveyed from the sampling locations in a transparent plastic bucket to the Parasitology and Entomology Research Laboratory, Department of Biological Sciences, Kogi State University, Anyigba, Nigeria. In addition,visitswerealsomadetomajorpointswherethe insects were being sold in order to assess the economic valuesoftheedibleinsectstothepeople.Afterstudying the specimens, the partial bodies of those samples were kept in insect box with camphor as preservative in the Department of Biological Sciences (Parasitology and Entomology Unit), Faculty of Natural Sciences, Kogi State University, Anyigba, Nigeria.



MapofKogiStateshowingtheSamplingSites(Eastern Zone)

RESULTS

Table-1:Distributionoftheedibleinsectsintheeasternzone ofKogiState

EdibleInsects/Igala Names	Numbers Collected	Percentage
Cirinaforda(Ikpeta)	76	18.1
Macrotermesbellicosus(Ako)	87	20.7
Apismellifera(Ino)	21	5.0
Zonocerusvariegatus(Akpachi)	13	3.1
Locustamigratoria(Imiejo)	54	12.9
Rhychophorusphoenicis(Ago)	56	13.3
Oryctesmonoceros(Akpa-edudu)	15	3.6
Brachytrupesmembranaceous(Olule)	98	23.3
Total	**420**	**100**

Table-2:DistributionoftheedibleinsectsinrelationtoHostPlantSpecies

TreeSpecies/IgalaNames	Numbers Collected	Percentage
Vitexdoniana(Ejiji)	66	15.7
Dialiumindum(Aigele)	12	2.8
Annonasenegalensis(Ukpokpo)	37	8.8
Newbouldialaevis(Ogichi)	23	5.5

Syzygiumcumini(Ugolo)	54	12.9
Anacardiumoccidentale(Kachiu)	73	17.4
Lanneaacida(Ogele)	42	10.0
Sarcocephalusesculentus(Ogbahi)	20	4.8
*Alconia*species(Oyi)	27	6.7
Tectonagrandis(Oli-roba)	22	5.2
Anzadrichtaindica(Iyaloda)	44	10.5
Total	420	100

Table-3:Distributionoftheedibleinsectsinrelationtoconsumptionby Agegroups

AgeGroups	Frequency	Percentage
Young(0-10ys).	131	31.2
Adolescent(11-19years)	149	35.5
Adult(20years& above)	140	33.3
Total	**420**	**100**

Table-4:DistributionoftheedibleinsectsinrelationtoMonthsofthe Year

Months	Numbers Collected	Percentage
January	-	
February	-	
March	-	
April	78	18.6
May	97	23.1
June	85	20.2
July	81	19.3
August	69	16.4
September	10	2.4
October	-	-
November	-	-
December	-	-
Total	**420**	**100**

Table-5:Distributionofedibleinsectsinrelationtoperiodofcollection

PeriodofCollection	No. collected	% Collected
Morning	298	70.9
Afternoon	12	2.9
Evening	110	26.2
Total	**420**	**100**

DISCUSSION

The current study has shown that various host tree species [4] determine the distribution of different edible insects associated with them. Edibleinsects from forests are an important source of protein, and unlike those from agricultural land, they are free of pesticides. For every 100grams of dried edible insects, there are about 50 grams of protein, about 15 percent of fat and about17percentofcarbohydrates.Theedibleinsectsare also believed to have a higher proportion of protein and fatthanbeefandfishwithahighenergyvalue[5].Also, Edible insects form a rich source of food for man and it is second to meat and poultry as stable animal protein foodinmostpartoftheworld[7].Theindigenouspeople inhabiting various communities within the eastern zone ofKogiStateconsumedifferentspeciesofedibleinsects, and this corroborate with findings of [9, 10, 16] that variouscommunitiesinNigeriaeatinsectforfood,while other relish them as delicacies. Insects commonly consumed are mostly those which can be collected in large numbers [17]. These include locust in the gregarious phase, winged termites, caterpillars, grasshoppers, and the large African field crickets.

CONCLUSION AND RECOMMENDATION

Edibleinsectsareusuallyeatenacrossthe countryespeciallyamongtheruralandurbanchildren in

order to douse the pangs of hunger. The edible insects could be prepared by boiling, sun-drying, frying and roasting methods [9].[18] advocated the eating of a selected list of vegetable eating insects, which he described as ‘’clean, palatable, wholesome and nutritious’’. however, some adults consume them as snacks, or as a pas-time and some of the most common insect species consumed in the area are: *Cirina forda* (Ikpeta), *Macrotermes bellicosus* (Ako), *Apis mellifera* (Ino), *Zonocerus variegatus* (Akpachi), *Locusta migratoria* (Imiejo), *Rhychophorus phoenicis* (Ago), *Oryctes monoceros*(Akpa-edudu) and *Brachytrupes membranaceous* (Olule) [19, 20, 21, 22].

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