

Entomophagy with Special Reference to Assam

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Abstract: Edible insects are natural renewable source that provides food to many ethnic groups in Assam. The paper explored the traditional knowledge related to the practice of eating different insects as food. Practice of entomophagy is quite common among the ethnic peoples of Assam especially among the tribes of Dhemaji, Morigaon, Udalguri and Karbi anglong districts. The ethnic people consume these insects as their regular diet or during special occasions. The edible insects have high nutritional value and they are rich in nutrients especially in proteins, suggesting their use as good dietary supplements of balanced diet.

Keywords: Edible insects, North-east India, Assam, Nutrition, Tradition, Culture.

I. INTRODUCTION

The word entomophagy is derived from Greek work “*entomon*” meaning insect and “*phagein*” meaning to eat. Entomophagy literally means consumption of insects by human as their food. The vast diversity of habitats of insect species that serve as traditional foods presents an almost never-ending diversity of situations in which recognition and progressive management of the food insect resource can result not only in better human nutrition but simultaneously help in maintaining diversity of habitats for other forms of life [1]. The primitive malnourish peoples of Africa, Asia and America use insects as their food [2]. Ants, bees, termites, caterpillars, waterbugs, beetle larvae, flies, crickets, cicadas and dragonfly nymphs are consumed as edible insects that provide nutrition for the people of Asia, Australia, Africa, South America, the Middle East and the far East [3]. Consumption of insects are supplement to the dietary requirement of these people and help to prevent the development of diseases among them due to the therapeutic value of the insect’s products. They are rich in protein, carbohydrates, fats, minerals and vitamins [4]. According to the “2004 United Nations Food and Agricultural Organization” (FAO) report, maggots of many edible insect species are high sources of potassium, calcium, magnesium, zinc, iron as well as B-vitamins [5].

The Northeast India comprises of seven sister states namely Arunachal Pradesh, Assam, Meghalaya, Mizoram, Manipur, Nagaland, Tripura and Sikkim. The geographical area of this region lies between 20°50’- 29°30’N latitude and 89°49’-97°30’ E longitude. The use of edible insects as food is common among the ethnic people of Northeast India mainly among the tribes of Arunachal Pradesh, Assam, Manipur and Nagaland. The tribes of Meghalaya and Mizoram also use insects as their food to some extent. The studies have revealed that almost 255 insect species are used as food by different tribes of India. Among these, the highest consumption of edible insect species are belonging to the family Coleoptera (34%), followed by Orthoptera (24

%), Hemiptera (17 %), Hymenoptera (10 %), Odonata (8 %), Lepidoptera (4 %) and Isoptera (2 %) [6]. The native people inhabiting in the north-eastern states of India consume edible insect species at their different developmental stages. These people use their traditional wisdom to determine which species to be eaten at what stage. However, they agree that insects must be healthy and should be processed immediately. However the ethnic tribes of this region eat insects both immature as well as adult stages. The members of various tribes choose the edible insects on the basis of their traditional belief, taste and regional and seasonal availability [6]. This review focuses on entomophagy practiced in different tribes of Assam.

II. ENTOMOPHAGY IN NORTH EAST INDIA

In Arunachal Pradesh about 158 species of edible insects has been enlisted [7]-[10]. Two tribal communities of Arunachal Pradesh namely Nyishi and Galo tribal communities consume about 102 species of insects [10]. The tribes of Arunachal Pradesh prefer highest number of insects belonging to the order Orthoptera as compared to other tribal communities of India [11]. Six Tribes of Eastern Arunachal Pradesh namely Nocte, Wangcho (Wancho), Singpho, Tangsa, Deori and Chakma consumed insects as delicacy and 51 insect species have been documented as edible [12]. The preference of edible insects variable with different tribes and regions. The choice of insects as food by ethnic people of India depends on the palatability of the insect, availability, nutritional value, customs and traditions. In Manipur, 46 species of edible insects are documented [13]. Five different tribes of Manipur namely Meitei, Tarao, Tangkhul, Chothe and Thadou tribes consume the highest number of insect species (28–30) as compared to other communities in Manipur [14]. The ethnic groups of Manipur prefer to consume highest number of hemipteran insects. On the otherhand, the lepidopteran insects are not preferable as food by the Meitei community. In Nagaland, about 42 different insect species are consumed

by Ao tribes of Nagaland [15]. This list is extended upto 60 edible insect species [16].

III. ENTOMOPHAGY IN ASSAM

Doley and Kalita, 2012 investigated the entomophagy in the Mishing tribes of Dhemaji district of Assam and they recorded 15 edible insect species belonging to 15 genera and 12 families. Order Hymenoptera constitute with maximum number of 4 species followed by Lepidoptera with 3 species, Orthoptera with 3 species, Hemiptera with 2 species, Coleoptera with 2 species and Isoptera with 1 species respectively. They reported that the Giant Water Bugs (*Lethocercus indicus*), Eri silkworm (*Samia ricini*), Muga Silk-worm (*Antheraea assama*) and House cricket (*Acheta domesticus*) were the most preferable edible insects among the *Mishings* tribe. The *Mishings* tribe and the Ahom Community of Assam uses Green Weaver ant (*Oecophylla smaragdina*) as one of the food items during the Assamese Bohag Bihu Festival in the month of April. These insects keep the health free from infection of various diseases. The formic acid of these insects used in treatment of scabies, malaria, tooth aches, stomach disorders, blood pressure anomalies etc [17]. They documented that members of the *Mishings* tribe consumed immature stages such as egg, larva, pupa, nymph as well as adult insects as their foods.

Dutta et al., 2016 documented 16 terrestrial edible insect species belonging to 6 orders in the Moridhal Panchayat of Dhemaji district. They recorded Lepidoptera order with 3 species, Orthoptera with 5 species, Hymenoptera 5 species, Isoptera 1 species, Blattodea 1 species and Hemiptera only 1 species. People of Moridhal panchayat use the pupae and larvae of Mulberry silkworm (*Bombyx mori*) and Muga silkworm (*Antheraea assama*) to treat constant itching and soreness of the throat. They also used the pupae and larvae of Eri silkworm (*Samia cynthia ricini*) for curing “dudmur” or infection of mouth and tongue in small children. Cicada (*Pomponia sp*), *Eupreponotus sp* (short horned grasshopper), *Choroedocus sp* (short horned grasshopper), *Mecopoda elongate elongate* (long horned grasshopper), adult cricket (*Tarbinskiellus sp*) and the mole cricket (*Gryllotalpa sp*) were consumed by local peoples for their delicacy. They use the green weaver ant (*Oecophylla smaragdina*) for the treatment of nose infection, sinus and throat infection. They consumed termite (*Odontotermes sp.*) in the alate stage for its food value. The larvae and eggs of

yellow jacket wasp (*Vespa orientalis*, *Vespa (magnifica)*) and the “nest” of potter wasp (*Eumenus sp.*) was used to treat stomach problems. Egg, larvae of honey bee (*Apis sp*) and its product honey was used to cure whooping cough. Cockroach (*Periplaneta americana*) was consumed for the treatment of asthma problems.

The entomophagy practiced was recorded among the Tiwa community of Morigaon district by Rahman et al, 2018 and they recorded 15 species of insects belonging to 6 orders and 14 families were consumed by the Tiwa people in Morigaon district. Out of these, three species belong to order Hemiptera, two to Coleoptera, four to Orthoptera, three to Hymenoptera and one each to Odonata, Lepidoptera and Isoptera. They recorded different nutritional value of edible insects. The highest amount of protein was recorded in Giant water bug (19.8%), carbohydrate content was highest in cricket (5.1%) and lipid in Giant water bug (8.3%).

Ronghang and Ahmed., 2010 documented the entomophagy in Karbi anglong district. Among the ethnic tribes– the Karbis and the Rengma Nagas were found to be the highest insects consumer and they consumed 32 species of edible insects according to their seasonal availability. Out of the 32 species, 4 species belonging to the family Apidae, 3 species belonged to the family Formicidae, Gryllidae, Curculionidae, Cerambycidae, Lucanidae, Dynastidae, Saturnidae, Acridoidae and Rhinotermitidae shared with 2 species each, Gryllotalpidae, Mantodeae, Belostomatidae, Lyctidae, Polistenae, Cicadidae, Oryctidae, Dytiscidae, Vespidae, Aeshnidae and Libellulidae with 1 species each. They reported that the Eri-Silk worm (*Samia ricini*) and Red ants (*Myrmica rubra*) are the most preferable among the majority of the tribes in Karbi Anglong district. The Ahom Community uses Red ants (*Myrmica rubra*) as one of the Bihu food items during an Assamese festival called Bohagi Bihu in the month of April and just after two days of the festival it is compulsory to consumed the insects.

The entomophagy among the Bodos of Udalguri district was investigated by Hazarika and Goyari, 2017. They recorded 23 species of edible insects belonging order Hemiptera, Coleoptera, Hymenoptera, Orthoptera, Lepidoptera, Isoptera and Odonata. They recorded that the Giant water bug (*Lethocercus indicus*) and the Eri silk worm larvae (*Samia ricini*) were most preferred edible insect species in their community.

Table 1: List of different insect species consumed by various community of Assam

SI No.	Order	Family	Species	Tribes
1	Hymenoptera	Formicidae	<i>Dorylus orientalis</i> , <i>Atta sp.</i>	Dimasa, Rengma Nagas, Karbis, Bodo
	Hymenoptera	Formicidae	<i>Myrmica rubra</i>	Ahom

2				And others
3	Hymenoptera	Formicidae	<i>Oecophylla smaragdina</i>	Ahom and others
4	Hymenoptera	Formicidae	<i>Formica indica</i>	Tiwa
5	Hymenoptera	Apidae	<i>Apis indica</i>	Tribes of Dhemaji district
6	Orthoptera	Gryllidae	<i>Acheta domestica</i> , <i>Brachytrupes spp.</i> , <i>Bombina orientalis</i>	Dimasa, Rengma Nagas, Karbis, Bodo
7	Orthoptera	Acrididae	<i>Cytacanthacris aeruginosus unicolour</i> , <i>Hieroglyphus banian</i> , <i>Schistocerca gregaria</i> , <i>Chondracris rosea</i>	Bodo, Dimasa, Rengma Nagas, Karbis
8	Orthoptera	Gryllotalpidae	<i>Gryllotalpa africana</i> , <i>Gryllus campestris</i>	Rengma Nagas, Karbis, Bodo
9	Orthoptera	Mantidae	<i>Mantis inornate</i>	Tiwa
10	Lepidoptera	Saturniidae	<i>Philosoma ricini</i> , <i>Antheraea assama</i>	Rengma Nagas, Karbis, Bodo
11	Lepidoptera	Bombycidae	<i>Bombyx mori</i>	Tribes of Dhemaji district
12	Lepidoptera	Notodontidae	<i>Anaphe infracta</i> , <i>A. reticulata</i> , <i>A. venata</i>	Bodo
13	Hemiptera	Belostomatidae	<i>Lethocerus indicus</i>	Rengma Nagas, Karbis, Bodo, Dimasa
14	Hemiptera	Pentatomidae	<i>Ochrophora montana</i>	Rengma Nagas, Karbis, Bodo, Dimasa
15	Hemiptera	Cicadidae	<i>Pomponia imperatoria</i>	Bodo, Rengma Nagas, Karbis,
16	Hemiptera	Naucoridae	<i>Pelocoris femoratus</i>	Tiwa
17	Hemiptera	Nepidae	<i>Laccotrephes ruber</i>	Tiwa
18	Coleoptera	Scarabaeidae	<i>Analeptes trifasciata</i>	Bodo
19	Coleoptera	Dytiscidae	<i>Hydrochera Rickseckeri</i> , <i>Dytiscus marginalis</i>	Rengma Nagas, Karbis, Tiwa

20	Coleoptera	Lyctidae	<i>Hydrochera rickseckeri</i>	Rengma Nagas, Karbis
21	Coleoptera	Buprestidae	<i>Batocera horsefieldi</i>	Tiwa
22	Isoptera	Rhinotermitidae, Termitidae	<i>Odontotermes obesus</i> , <i>Macrotermes natalensis</i> , <i>Macrotermes sp.</i>	Boro, Dimasa, Karbis, Rengma Nagas, Tiwa
23	Dictyoptera	Mantodea	<i>Mantis religiosa</i>	Rengma Nagas, Karbis, Bodo
24	Odonata	Aeshnidae, Libellulidae	<i>Crocothemis servilia</i>	Rengma Nagas, Karbis, Bodo

IV. CONCLUSION

Thus, insects are an important component in the diets of the different communities of Assam. Consumption of the insects which are usually pest on different agri-horticultural crops benefits us by decreasing their numbers and also reduces the need to make use of pesticides. Insects also form an important source of animal protein so more research should be conducted to rear them artificially for the purpose of making them an essential component in our diet. Many people use insects as a source of income for their livelihood either by selling their by-products like honey, silk, etc or by directly collecting and selling different insects as food. Thus, insects play an important role in the socioeconomic lives of the different communities of Assam. Thus, further research on edible insects should include key factors like ecology, management and conservation implications, industrialization and marketing. It would also be helpful to document entomophagy and techniques of artificial rearing so that edible insects can be used as food and they can also used as a medicine in a sustainable manner for the benefit of mankind.

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