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Ethnobiological Study of Valley Districts of Manipur Northeastern India: Edible and Medicinal Insects

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Abstract

Surveys involving enquiry of five valley districts of Manipur State revealed that majority of the indigenous people were fond of eating both the immature and adult insects. Most adult insects are consumed by kabui, rongmei, meitei and chothe tribe either in fried or roasted form. Among the edible insects only the larval stage of Hymenoptera is consumed by ethnic groups. However, pentatomid bugs are consumed both as raw and roasted form. Analysis of the data revealed the occurrence of 50 species of edible insects belonging to 39 genera, 23 families and 8 orders. Out of 50 species 16 belonged to Coleoptera, 16 under Hemiptera, 8 Hymenoptera and the rest under other 5 orders. The present data gives additional information than previously reported by researchers. Among the 50 species, 5 species with medicinal value were identified and documented for various ailments for which they were used and how prepared along with respective local tribes.

Key words: Edible and Medicinal Insects, Manipur, documentation, conservation, Sustainable Food

INTRODUCTION

To study the biological knowledge of a particular ethnic group encompassing various aspects of traditional and cultural knowledge of plants and animals and their interrelationships is termed as Ethnobiology (Anderson *et al.,*2011). Ethnobiology is an amalgamation of two broad earlier fields ethnobotany and ethnozoology (Ford, 2001; Hunn, 2007), before that it was in an underdeveloped situation. In broad sense, the study of ethnoscience is the combination of linguistics and communication studies (Sanga and Ortalli 2003). They should know ethnobiological methods have gone mainstream and they have forgotten the work of H. R. Bernard's text (2006) on Research Methods in Anthropology that from or similar general works of Ethnobiology.

Ethnobiology reached international level in 1988, when the International Society of Ethnobiology emerged (Stepp *et al.,* 2002). Ethnobiology has been something of a western hemisphere field, but rapidly increasing numbers of studies in the eastern hemisphere are making it more international (Anderson *et al.,*2011). The history ad origin of Ethnobiology in the opinion by different scientists often rely on the historiography of Clement (1998). He further commented that utilization of natural resources is an important approach for further studies along with specific natural environment but also various cultures of the New World (Clement, 1998). Parallel terms include ethnobotany (Harshberger 1896 a,b,c), ethnozoology (Mason 1899), ethnoscience (Murdock *et al.* 1950), ethnolinguistics (mid-20th century), ethnohistory (mid-20th century), and so on.

Since time immemorial part of the human nutritive items were preferably attracted by the tasty insects, and there are many reports from different corners of our Globe, some of them are worth mentioning from Africa, Asia and Latin America (Bodenheimer,1951; De Foliart,1991; Paoletti and Bukkens,1997). Over 1700 species of insects are

known to be consumed by humans from over 300 ethnic groups in 113 countries (Mac Evilly, 2000). Some of the important edible insect groups are beetles, bugs, winged termites, queen termites, bees, wasps, winged ants, cicadas, earwig and a number of aquatic insects. These are consumed in roasted and fried form, but some Hemipteran insects are consumed in raw form. Insects are known to have nutritive value and may be important sources of essential dietary elements like protein, fat, vitamins and minerals (Gope and Prasad, 1983, Alka *et al.*,2013, Chakravorty *et al.*, 2011, Chanu, 2017). Some medicinal insect groups include beetles, bugs, cockroaches and stick insects.

In the field of medicinal category, insects and other arthropods are also widely used as drugs in traditional medicine (Pemberton,1999). Animal based medicines have always played a significant role in the healing practices, religious of indigenous and western societies all over the world (Angeletti *et al.*,1992, Rosner,1992). In recent years insects are targeted as a source of antibiotic and anticancer drugs (Ranjit Singh *et al.*, 2004) Studies of edible and medicinal insects of Manipur are scanty and are can be preferable to only a few scattered works *viz.* Gope and Prasad (1983), Shantibala *et al.* (2012), Singh *et al.* (2013) and Natasha *et al.* (2013) in which about 80 species of insects were reported.

Wild edible insects have long been an integral part of the diet and culture in Manipur, a northeastern state of India. The valley districts of Manipur, characterized by their rich biodiversity and unique ecosystems, have traditionally been home to various species of edible insects. These insects provide not only a source of nutrition but also play a significant role in the livelihoods of local communities. However, recent observations and studies indicate a concerning trend, the populations of these wild edible insects are decreasing. The decline in insect populations has far-reaching implications for both the environment and the local communities that rely on them. Factors contributing to this trend include habitat loss, overharvesting, climate change, and pollution. As the demand for sustainable and alternative protein sources grows globally, understanding and addressing the causes behind the decreasing populations of wild edible insects in Manipur's valley districts become crucial.

This paper aims to explore the status of wild edible insect populations in the valley districts of Manipur, identify the key factors driving their decline, and propose potential strategies for conservation and sustainable use. By shedding light on this issue, we hope to contribute to the broader discourse on biodiversity conservation, food security, and sustainable development in the region. Hence, the present study aims at the validation of the edible insects and collection of information regarding the medicinal insects from different valley Districts of Manipur State having various ethnic groups with varied indigenous knowledges of cultural, traditional, etc., has been discussed.

MATERIALS ANS METHODS

Extensive surveys were carried out during 2022 to 2024 in Manipur to collect edible and medicinal insect species of five Valley Districts Viz., Bishnupur, Imphal East, Imphal West, Kakching and Thoubal, of Manipur were covered. Insects were collected, sorted out and identified with valid key characters and preserved in the laboratory following standard methods (Ghosh and Sengupta,1982, Natasha *et al.*2014). Digital photographs were taken. A household survey was undertaken through questionnaire format given by DBT, GOI, New Delhi and photographs with simple questions like type of insects they use; local name; stages of the edible insects; mode of consumption; collection method and uses. These data were sorted out, compiled and arranged sequentially.

RESULTS AND DISCUSSION

As many as 46 species, belonging to 39 genera, 26 families and 9 orders served as an important source of nutritional food item for many tribal communities. Details about the collected species from different habitats along with the mode of consumption were also provided. Insects are rich in proteins and other nutrients beneficial for human health. Further research and study are necessary on the usage of insects as food as well as for other beneficial purposes like therapeutics.

Analysis of the data revealed the occurrence of 50 species of edible insects belonging to 39 genera, 23 families and 8 orders. Out of 50 species 16 belonged to Coleoptera, 16 under Hemiptera, 8 Hymenoptera and the rest under other 5 orders (Table 1). The present data gives additional information than previously reported (Gope and Prasad,1983; Shantibala *et al.*, 2012; Singh *et al.*, 2013; Natasha *et al.*, 2013).

The surveys involving enquiry revealed that majority of the indigenous people were fond of eating both the immature and adult insects. Most adult insects are consumed by kabui, rongmei, meitei and chothe tribe either in fried or roasted form. The collected insects are washed thoroughly with water and fried in a pan with little edible oil and added some salt, chilly and spices for better taste. Among the edible insects only the larval stage of Hymenoptera is consumed by ethnic groups. However, pentatomid bugs are consumed both as raw and roasted form.

Among the 50 species, 5 species with medicinal value were identified and documented for various ailments for which they were used and how prepared along with respective local tribe are given in Table 2. The report on curing bed wetting is in conformity with those of Shantibala *et al.*, (2012), SNNRRDA (2023) and Srivastava *et al*. (2009).

CONCLUSION

The decreasing population trend of wild edible insects in the valley districts of Manipur poses significant ecological, socio-economic, and cultural challenges. The decline in insect populations is driven by factors such as habitat loss, overharvesting, climate change, and pollution. These insects are not only vital for maintaining ecosystem balance but also serve as an essential food source and cultural heritage for local communities (Van Huis *et al.* (2013). To address this pressing issue, it is crucial to implement comprehensive conservation and sustainable management strategies. Habitat restoration and protection, coupled with sustainable harvesting practices, can help mitigate the decline in insect populations. Community-based conservation initiatives and raising awareness about the importance of edible insects can empower local communities to actively participate in conservation efforts to conserve from extinction.

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Table 1. Edible insects of Valley Districts of Manipur, Northeastern India

SL. NO.	INSECT [scientific name (SN), local name (LN), common name (CN)	ORDER	FAMILY	EDIBLE STAGE	EDIBLE PROCESS
1.	SN: *Oxya hyla intricate,* LN: Koujeng, CN: Rice Grasshopper	Orthoptera	Acrididae	Adult	Fried
2.	SN: *Gryllus testaceus,* LN: Koujeng, CN: Criket	,,	Gryllidae	Adult	Fried/ Roasted
3.	SN: *Gryllotalpa grylllotalpa*, LN: Wahibi, CN: Mole cricket	,,	Gryllotalpidae	Adult	Fried/ Roasted
4.	SN: *Brachytrupes portentosus*, LN: Harou, CN: Cricket	,,	Gryllidae	Adult	Fried/ Roasted
5.	SN: *Schistocerca* sp., LN: Koujeng, CN: Bird grasshopper	,,	Acrididae	Adult	Fried/ Roasted
6.	SN: *Cyrtotrachelus buqueti* Guerin, Yangkrungpui, Nengson,Tuinin Gulung, Waktubi, CN: Weevil	Coleoptera	Curculionidae	Adult	Fried/ Roasted
7.	SN: *Sipalus hypocrite* Boheman, LN:, CN: Weevil	,,	,,	Adult	Fried/ Roasted
8.	SN: *Lucanus lunifer* Hope, LN: Faochet, Phaochiat, CN: Stag beetles,	,,	Lucanidae	Adult	Fried/ Roasted
9.	SN: *Batocera davides* Deyrolle, LN: Uchet,Ange, Samjabi CN: Longhorned beetle	,,	Cerambycidae	Adult	Fried/ Roasted
10.	SN: *Stromatium longicorne* Newman, LN: Samjabi, CN: Longhorned beetle	,,	,,	Adult	Fried/ Roasted
11.	SN: *Aphrodisium gibbicolle* (White), LN: Samjabi, CN: Longhorned beetle	,,	,,	Adult	Fried/ Roasted
12.	SN: *Xystocera globosa* (Olivier), LN: Samjabi, CN: Longhorned beetle	,,	,,	Adult	Fried/ Roasted
13.	SN: *Machrochenus isabellinus* Aurivillius, LN: Samjabi, CN: Longhorned beetle	,,	,,	Adult	Fried/ Roasted
14.	SN: *Aegosoma sinicum ornaticolle* White, LN: Samjabi, CN: Longhorned beetle	,,	,,	Adult	Fried/ Roasted
15.	SN: *Agrypnus* sp., LN: Thu, CN: Beetle	,,	Elateridae	Adult	Fried/ Roasted
16.	SN: *Cybister limbatus* (Fabricius), LN: Tengbi, CN: True water beetle	,,	Dytiscidae	Adult	Fried/ Roasted
17.	SN: *Cybister posticus* Aube, LN: Tengbi, CN: True water beetle	,,	,,	Adult	Fried/ Roasted
18.	SN: *Cybister tripunctatus asiaticus* Sharp, LN: Gangmeikaikm, Marimkokropi, Tolpot,Tengbi, CN: True water beetle	,,	,,	Adult	Fried/ Roasted
19.	SN: *Cybister confuses* Sharp LN: Tengbi, CN: True water beetle	,,	,,	Adult	Fried/ Roasted
20.	SN: *Cybister tripunctatus asiaticus* Sharp, LN: Tengbi, CN: True water beetle	,,	,,	Adult	Fried/ Roasted

21.	SN: *Mylabris pustulata* (Thunberg), LN: Khangratin, CN: Blister beetle	,,	Meloidae	Adult	Fried/ Roasted
22.	SN: *Forficula sp.*, LN: Meicheppi, CN: Earwig	Dermaptera	Forficulidae	Adult	Fried/ Roasted
23.	SN: *Heirodula unimaculata* Olivier, LN: Pang,Uishom, Uicho, Timbong, CN: Preying mantis	Dictyoptera	Mantidae	Adult	Fried/ Roasted
24.	SN: *Humberteilla sp.*, LN: Uicho, Timbong, CN: Preying mantis	,,	Mantidae	Adult	Fried/ Roasted
25.	SN: *Periplaneta Americana* (Linnaeus), LN: Keikranpei, Kongkraopi, Khaolang, CN: Cockroach	,,	Blattidae	Adult	Fried/ Roasted
26.	SN: *Eusthenes sp.*, LN: Tameng, Usingsa, CN: Bug	Hemiptera	Tessaratomidae	Adult	Fried/ Roasted
27.	SN: *Tessaratoma quadrata* Distant, LN: Usingsa, CN: Bug	,,	Tessaratomidae	Adult	Fried/ Roasted
28.	SN: *Tessaratoma sp.*, LN: Usingsa, CN: Bug	,,	Tessaratomidae	Adult	Fried/ Roasted
29.	SN: *Asiarcha sp.*, LN: Tamheng, Usingsa, CN: Bug	,,	Tessaratomidae	Adult	Fried/ Roasted
30.	SN: *Catacanthus incarnates* (Drury), LN: Usingsa, CN: Stink Bug	,,	Pentatomidae	Adult	Fried/ Roasted
31.	SN: *Nezara viridula* (Linnaeus), LN: Thangde, Thangkili, CN: Stink Bug	,,	,,	Adult	Fried/ Roasted
32.	SN: *Cresson vallida* Dallas, LN: Usingsa, CN: Stink Bug	,,	,,	Adult	Fried/ Roasted
33.	SN: *Cryptotympana sp.*, LN: Thu, Rengchiang, Ngiang, Hari, CN: Cicada	,,	Cicadidae	Adult	Fried/ Roasted
34.	SN: *Cosmopsaltria sp.*, LN: Thu, Rengchiang, Ngiang, Hari, CN: Cicada	,,	,,	Adult	Fried/ Roasted
35.	SN: *Pomponia fusca* Olivier, LN: Thu, Ngiang, CN: Cicada	,,	,,	Adult	Fried/ Roasted
36.	SN: *Pomponia sp.*, LN: Thu, Ngiang, CN: Cicada	,,	,,	Adult	Fried/ Roasted
37.	SN: *Anoplocnemis compressa* Dallas LN: Konglongpui, Usingsa, CN: Bug	,,	Coreidae	Adult	Fried/ Roasted
38.	SN: *Cantao ocellata* (Thunberg), LN: Usingsha CN: Bug	,,	Scutelleridae	Adult	Fried/ Roasted
39.	SN: *Geris* sp., LN: Huinaopi, CN: Bug	,,	Gerridae	Adult	Fried/ Roasted
40.	SN: *Cosmoscarta* sp., LN: Asamchitak, CN: Bug	,,	Cercopidae	Adult	Fried/ Roasted
41.	SN: *Xylocopa irridipennis* Lepeletier, LN: Khoigoupui, Huimu, wakhoi, CN: Carpenter bee	Hymenoptera	Apidae	Larva	Fried
42.	SN: *Xylocopa aestuans* (L), LN: Wakhoi, CN: Carpenter bee	,,	,,	Larva	Fried
43.	SN: *Delta conoidium* (F.), LN: Khoijin, Areihui, Khoingal, CN: Yellow hornets	,,	Vespidae	Larva	Fried
44.	SN: *Rhynchium brunneum* (F.), LN: Khoikhan, Khoingang, CN: Wasp	,,	,,	Larva	Fried
45.	SN: *Vespa tropica* L., LN: Khoirang, Huibe, Lamdou, CN: Wasp	,,	,,	Larva	Fried
46.	SN: *Vespa mandarinia magnifica* Smith, LN: Khoidae, Khoingal,Ngalen, CN: Wasp	,,	,,	Larva	Fried
47.	SN: *Oecophylla smaragdina* Fabricius, LN: Tenkhiang, Tenkgiang khoi, Kakcheng Ningjaobi (Thaopubi), CN: Weaver ants	,,	Formicidae	Adult	Fried/ Roasted

48.	SN: *Odontotermes* sp., LN: Talhum, Leithapunu, Tarum,Tukthrubi, Mukthrubi, CN: Termite	Isoptera	Termitidae	Adult	Fried/ Roasted
49.	SN: *Macrotermes* sp., LN: Timbukang, Phulim, CN: Termite	,,	Termitidae	Adult	Fried/ Roasted
50.	SN: *Carausius* sp., LN: Thiratinkhut, CN: Stick insect	Phasmida	Phasmatidae	Adult	Fried/ Roasted

Table 2. Medicinal insects of Valley Districts of Manipur, Northeastern India

SL. NO.	**INSECT** [scientific name (SN), local name (LN), common name (CN)	**ORDER**	**FAMILY**	**PREPARATION**	**AILMENT**
1.	SN: *Oecophylla smaragdina* Fabricius, LN: Tenkhiang, Tenkhiang khoi, Kakcheng Ningjaobi (Thaopubi), CN: Weaver ants	Hymenoptera	Formicidae	Some parts of the ant's nests were made a paste, with water and the latter is applied on the boil area.	Boil cases
2.	SN: *Cimex rotundatus* Signorat, LN: Tak,Tuk, Maa CN: Bed bug	Hemiptera	Cimicidae	Killed bed bug is inserted in a portion of banana fruit and taken.	Pile cases
3.	SN: *Periplaneta a mericana* (Linnaeus), LN: Keikranpei, Kongkraopi, Khaolang CN: Cock-roach	Dictyoptera	Blattidae	One or two insect is Fried and applied to the patient	Saliva Dripping habit and wetting bed
4.	SN: *Mylabris pustulata* (Thunberg), LN: Khangra tin, CN: Blister beetle	Coleoptera	Meloidae	Generally, head is removed from the beetle and a body fluid comes out the fluid is applied to the injured part	Wound
5.	SN: *Carausius* sp., LN: Thiratinkhut, CN: Stick insect	Phasmida	Phasmatidae	Crushed insect is applied to the injured part	Wound