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Insect biodiversity of medicinal value

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Abstract : Manipur state located in the easternmost boundary of Indian Union where the hotspot of the Internationally recognised biodiversity has been identified as Indo-Myanmar boarder hotspot region. Insects of various economic values in terms of food, medicinal, biological control, pest and nevertheless the maintenance of economic balance are remarkable there. The predominance of insect fauna is Insect order-Lepidoptera and the next predominant Insect fauna is order- Coleoptera so far the available relevant literatures concerned. These available insects in this region give economic values to the inhabitants since time immemorial. Within the economic values of insects, the medicinal value is remarkable for the natives who are living apart of modern medical facilities. The insects under ethno-entomology includes Orthoptera, Hemiptera, Coleoptera, Lepidoptera, Hymenoptera, Diptera . The natives used to consume or medicinally use these insects with the advice of the local physicians and elder persons. For example, larvae and pupae of *Bombyx mori* for bronchitis or pneumonia; *Lethocercus indicus* (Belostoma species) and *Hydrophidae* species are used for revival of lost of appetite; Bed bug (*Cimex* species) is used for relief of pain and inflammation happening to the leg fingers due to the nail inserting or other injuries; Mud from the inner part of white ants (termites) nest is used for curing of inflammation on the body; Honey, larvae and pupae of *Apis* species are used for various aspects of health like ailment of alimentary tract, relief of gastric trouble, mental relief and so on. Even though insects covered 90% of the whole animal population, the economic and medicinally valued insect species are to be conserved in order to meet the future requirements in terms of nutrition, medicinal and balancing of environment for the enormous increase in population of human.

Keywords: Biodiversity Hotspot, Indo-Myanmar Border, Ethno-Entomology, Medicinal Valued, Insect conservation.

INTRODUCTION

Manipur is a small state having an area 22,325 sq.km. It locates between 23.8° N to 25.7° N latitude and 93.5 E to 94.8 E longitudes. It has an altitude of 780m from the sea level in the valley area and above 1500m in the hilly areas. The Hilly area covers 90 % (20089 sq.km) of the total area (Fig.-1). Its climatic condition are 20°C to 35°C during summer and 4°C to 25°C during winter season respectively and its relative humidity is 60 to 90%. It has 32 communities inhabiting in both the valley and hilly area. These communities are using various insects traditionally for food and medicinal aspects since time immemorial.

The treatment of varieties of illness with insects had already been reported (Aguirre, 1947 and Clavijero 1980,

Sahagun, 1980)^{1,2,3} in the countries like America, Mexico, Africa, India, China, Thailand and others (Cheng and Feng 2009)⁴. These communities use these insects with the advice of local physicians and elders for the diseases like Kidney diseases, treatment of swelling, intestinal disorder, fortified blood, Post child birth anemia, lung diseases like asthma & chronic cough, liver and stomach ailments, toothache, rheumatics and so on(Sharma et al. 2014)⁵. These insects are included under the orders Orthoptera, Hemiptera, Coleoptera, Lepidoptera, and Hymenoptera. For example, larvae and pupae of *Bombyx mori* for bronchitis or pneumonia; *Lethocercus indicus* and *Hydrophilous olivaceous* are used for relief of lost appetite; Bed bug is used for relief of pain and inflammation happening to the leg fingers due to the nail inserting or other injuries; Mud from the white ants nest is used for curing of inflammation on the body; Honey, larvae and

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pupae of *Apis* species are used for various aspects of health like ailment of alimentary tract, relief of gastric trouble, mental relief, healing of external wounds, Maggot therapy (Paul Chermiak,2010)⁶ and so on. Insects e.g. Chinese Black Mountain Ant, *Polyrhachis vicina* are commonly incorporated as a part of herbal medicine component of Traditional Chinese Medicine (TCM) which is modern medical care throughout East Asia and some parts of South east Asia like Thailand. The therapeutics of insects and insect products in South Indian traditional medicine are also described in detail (Wilsanand et al. 2007)⁷. The scientific works on medicinal insects have not been taken up in the region of north east India so far the relevant literature concerned except some works on the Practices of entomophagy and entomo-therapy by members of Nyishi and Galo tribes two ethnic groups of the state of Arunachal Pradesh (Chakravorty et al.2011)⁸.



Fig.1 : Map of Manipur.

Therefore the present works has been attempted in order to fill up the scientific gap. Even though insects covered 90% of the whole animal population, the economic and medicinally valued insect species are to be conserved in order to meet the future requirements in terms of nutritional security, medicinal and balancing of environment for the enormous increase population.

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Fig.2: Map of North East India.

MATERIALS & METHODS

An ethno-entomological Survey on the edible insects and medicinal value of insects has been carrying out from March 2013. Insects mentioned in the present works are collected from the five districts of Manipur namely Sanapati, Tamenglong, Bishnupur, Thoubal Churachandpur and Ukhrul respectively. The natives of the areas are having conversation with the researchers on the traditional use of insects in the remote areas where there are no hospital facilities. Moreover, the investigator surveyed on the medicinal valued insects, identification, preparation and usages of derived materials. So collected insects have been identified by comparing descriptions with insect specimens of entomological research laboratory, Nambol L.Sanoi College, Nambol, Manipur. For data on the traditional medicinal value of these insects have been collected from the local physician, senior people and personal experiences. The insects are used in raw, roasted or fried. And the derived of insects like honey from *Apis mellifera* is used by mixing with drinking water and herbals in appropriate proportion. The medicinal raw material samples were collected and deposited in the laboratory for further studies.

RESULTS & DISCUSSIONS

11 species of medicinal insects were identified. These insects belong to six orders of insects namely Orthoptera, Hemiptera, Coleoptera, Lepidoptera, Hymenoptera & Isoptera respectively. The food and medicinal values of these insects are shown in the table -1. The natives used to consume these insects with the advice of the local physicians and elder persons (Table-1). *Gryllotalpa orientalis* (Photo-1) both larvae adult in raw or roasted after taken out the wings and legs are grinding properly and are used for Asthma, sprain and external infections by the communities like chhothe and Kukis in Manipur. The Adult *Locust migratoria* (photo-2) is used for nutritional supplement which is coincided with the publications of FAO-1973⁹ and It has further, been used for blood fortification and relief of chronic cough. The adult *Lethocerus indicus* (Photo-3) and its bunching eggs are tasty. The smoked adult gives a sort of chili hot like due to the presence of capsaicin proteins when eat. The fried or smoke adults are mixed with a little amount common salt, chili, spices along with boiled tender banana pseudostm and the mixer has been taken. The bug

Prinosoma podopioides (Photo-4) are used for external on the white patches of the skin. The abdomen part of the bug is rubbing slowly on the disease area two three time daily. After 4-5 day there will be positive results. Bed bug, *Cimex lecticularius* (Photo-5) is used for the relief of pain and inflammation happening to the leg fingers due to the nail inserting or other injuries. 2 or 3 matured bed bugs have been taken and crushed with hand or other devices. Immediately, the crushed sample of *Cimex* species is inserted or applied to the injured portion by forceps and keep at least 5-6 hours. The injured portion will gradually change into whitish. Then, the portion becomes painless. Mud from the white ants, *Odontotermes formosanus* (Photo-11) nest is used for curing of external inflammation on the human body. A little amount of mud from the inner portion of termite is taken and homogenized with pure water properly. Such homogenized solution is coated on the inflamed portion. The inflamed portion is dry up in general because the portion has temperature in all time till cure. The coated mud mixture will also dry up due to the temperature but the coating will be continued when the portion is drying up till the portion becomes cure. The larvae and pupae of *Bombyx mori* or silk worms like Oak Tasar silk worm, *Antheraea proylei* (Photo-7) and *Samia Cynthia recini* (Photo-8) are used for relief of bronchitis and Pneumonia by the farmers and tribal natives. Meitei communities used *Hydrophilous olivaceous* (Photo-6) and *Cybister species* after proper smoking for relieve of lost of appetite. Honey, larvae and pupae of *Apis mellifera* (Photo-9) are used for various aspects of health like ailment of alimentary tract, relief of gastric trouble, mental relief and so on. And insect *Polistes annularis* (Photo-10) is used for recovery of nerve weakness. These observations on the medicinal values of Insects have been reported in different parts of the world (Aguirre, 1947, Clavijero, 1980, Wilsanand et al. 2007 & Paul Chermiak, E, 2010)^{1,2,7,6}.

CONCLUSION

It is concluded that the beneficial insects in terms of food, medicine and balancing of environment are required to make conserve and protected. Some therapeutic aspects from insects may be used directly and indirectly. From the relevant literatures and data collected from the natives of hilly area as well as valley, there will be huge scopes for varieties of medicines from insects. It is clear that the

Table-1: Showing Scientific Name, Medicinal Value , Insect Orders & family

Sl. No	Scientific name	Medicinal Valued	Orders , Family and Photo
1	<i>Gryllotalpa orientalis</i> Bunn	➤ Recovery of sprains, Recovery of sprains , dropsy & anemia. Preparation: Take out wings, legs and Head portion; raw or roasted or fried, then crush it mixed with a little amount of water, applied to the illness.	Ord.: Orthoptera Fam.: Gryllotalpidae  Photo-1 : <i>G. orientalis</i>
2	<i>Locust migratoria</i> Linn	➤ Dietary supplement to alleviate nutritional deficiencies (FAO-1973) ➤ Fortified the blood. Asthma & Chronic cough. Preparation: Take out wings, legs and Head portion; raw or roasted or fried, then eat or mix with a little common salt, chili and spices	Ord.: Orthoptera Fam.: Acrididae  Photo-2 : <i>L. migratoria</i>
3	<i>Lethocerus indicus</i> (Lep.& Ser)	➤ Recovery of lost of appetite and nutritional supplementary Preparation: Take out wings, legs and Head portion; raw or roasted or fried, mix it with tender banana Pseudostem and spices ; the eat. A warm hot taste like capsaicin protein of chilli is obtained.	Ord. : Orthoptera Fam.: Acrididae  Photo-3a: Dorsal view of <i>L. indicus</i>  Photo-3b: Ventral view of <i>L. indicus</i>
4	<i>Prionosoma podopioides</i> Uhler	➤ Recovery of white patches on the body skin Preparation: Catch the insect and rubbing the abdominal portion slowly to the skin disease or taken out wings & legs, grinding insect material with pure water and applied.	Ord. : Hemiptera Fam.: Pentatomoidae  Photo-4: <i>P. podopioides</i>
5	<i>Cimex lectularius</i> Latreille	➤ Relief of pain happening to the fingers of leg due to nail insertion or other injuries Preparation: Just take 2/3 mature bed bugs and crush collectively and apply to the pain area/spot.	Ord. : Hemiptera Fam.: Cimicidae  Photo-5: <i>C. lectularius</i>
6	<i>Hydrophilous olivaceous</i> Fab.	➤ Dietary supplements, recovery of lost of appetite Preparation: Take out wings, legs and Head portion; raw or roasted or fried, mix it with salt & a little amount of chili and eat.	Ord. : Coleoptera Fam.: Hydrophilidae  Photo-6: <i>H. olivaceous</i>
7	<i>Antheraea proylei</i> Jolly	➤ Relief of bronchitis & pneumonia. Preparation: the 3 rd to 5 th Instar directly may be taken for the illness & pupa insect with cocoon boiled and taken our the boiled pupae and fried. And then consumed	Ord.: Lepidoptera Fam.: Saturniidae  Photo-7: Larvae of <i>A. proylei</i>

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8	<i>Samia cynthia recini</i> Dury	➤ Boiled pupae were used for hemorrhages. ➤ Relief of bronchitis & pneumonia. Preparation: the 3rd to 5th Instar directly may be taken for the illness & pupa insect with cocoon boiled and taken out the boiled pupae and fried. And then consumed	Ord.: Lepidoptera Fam.: Saturniidae  Photo-8: Larvae of <i>S. cynthia recini</i>
9	<i>Apis mellifera</i> Esch	➤ Memory is enhancing Preparation: Honey from <i>Apis mellifera</i> mix with fluid of grinded <i>Centella asiatica</i> (50%+50%) v/v drink in the morning makes back up of memory lost ➤ Relief of any gastric troubles Preparation :Honey mix with grinded <i>Ocimum sanctum</i> (50%+50%) drink before meal. The solution will be diluted with drinking water and take a full of common glass. ➤ Coated with pure honey on the External Wound makes good healing Preparation : Honey directly coated to the injured spot slowly, it gives quick healing and recovery.	Ord.: Hymenoptera Fam.: Apidae  Photo-9: Adult <i>A. mellifera</i>
10	<i>Polistes annularis</i> (Linn)	➤ recovery of nerve weakness (Conconi, 1982); recovery of lost of appetite. Preparation : Larvae and pupae from the comb taken out and mix with common salt, chili and spices, consumed or roasted the larvae and pupae with common salt, chili and spices, consumed. Good taste	Ord.: Hymenoptera Fam.: Vespidae  Photo-10a: Adult <i>P. annularis</i>  Photo-10b: Adults on the comb of <i>P. annularis</i>
11	<i>Odontotermes formosanus</i> (Shiraki)	➤ Recovery of External inflammations. Preparations: Mud from the inner part of nest mix with certain amount of filtered water homogenized and immediately applied to the inflamed area of the body till fully recovered the inflammation. When dry up the coated mud, again coated till the drying up is slowing.	Ord.: Isoptera Fam.: Termitidae  Photo-11a: <i>O. formosanus</i>  Photo-11a: Nest of <i>O. formosanus</i>

insects and their derivative alone and along with some herbs like *Centella asiatica*, *Ocimum santum*, *Musa species* mixed with appropriate proportion give good and positive results for health. Therefore, human beings require natural products from insects for future health.

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REFERENCES

1. Aguirre, B.G. 1947. La Medicina indigena, *America Indigena*. Vol.VII No2 p-107-127.
2. Clavijero,F.J.1980. General History of things of New Spain. *Paris* p-320.
3. Sahagun,C.A. de 1980.Codice Florentino Ed. *Nacion, Libro XI*.p.221-261.
4. Cheng,XM and Feng,Y. 2009. *An Introduction to Resource Entomology*. Science Press, Beijing.
5. Sharma, P.C. et al. 2014 .Survey studies on Insect-Pests associated with important medicinal plants in Himachal Pradesh. *Indian J.Sci.Research and Tech.* 2(4) : 2-7.
6. Paul Chermiak,E,2010. Bugs as Drugs,part 1: Insects. The “new” Alternative Medicine for the 21st Century. *Alternative Medicine Review*.Vol.15(2), p124-135.
7. Wilsanand V,Preema Varghese & Rajitha P 2007. Therapeutics of insects and insect products in South Indian Traditiona; medicine. *Indian J. of Traditional knowledge*. Vol 6(4), p 563-568.
8. Chakravorty,J.,Ghosh,S. and V.B.Meyer-Rochow. 2011. Practices of entomophagy and entomotherapy by members of nyishi and Galo tribes two ethnic groups of the state of Arunachal Pradesh(North East India).*Journal of Ethnobiology and Ethnomedicine* 7(5).
9. F.A.O. 1973. Energy & Protein requirements. FAO Nutritional Meetings, Report Series N0 52.*Food & Agricultural Organization, Rome*, p 12
10. Feng,Y et al. 2009. Research and Utilization of medicinal insects in China. *Entomological Research*, 39 : p 313-316
11. Gope B & Prasad B, 1983. Preliminary observation on the nutritional value of some edible insects of Manipur. *J.Adv.Zool*,4: p 55-61
12. Wossler, T.C. 2002. Pheromone mimicry by “Apis mellifera capensis” social parasites leads to reproductive anarchy in host “Apis mellifera scutellata” colonies. *Apidologie*. 33: 139-163.
