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Exploration of Coccinellid (Coleoptera : Coccinellidae) fauna of different Ecosystems in Champhai District of Mizoram state, North East India

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Abstract

Studies on lady bird beetles were conducted at Champhai district of Mizoram state, North East India, in three different ecosystems like Agriculture fiends (including vegetable gardens), unprotected forests, along riverine habitat from June 2012 to June 2013, over a period of 13 months, occasional sightings were also taken into consideration. A total of 13 species of bird beetles have been observed including 9 predatory and 4 polyphagous in different ecosystems. Fauna of Mizoram, of Zoological Survey of India does not mention Coccinellids in the state, probably due to lack of literature, hence all the species are being reported for the first time

Keywords: Exploration, Coccinellids, Champhai, Mizoram, North East India.

Introduction

Mizoram, which lies between $21^0$58'-$24^0$30'N latitude and $92^0$16'-$93^0$25' E longitude, with an area of 21081 sq. km having rich biodiversity. It receives average rainfall around, 2500 mm per year. Winter and summer temperature of the area ranges from 11^0C to 21^0C and 20^0C to 30^0C respectively. Champhai is one of the districts of Mizoram state, lying along Indo-Myanmar border of North East India.

Champhai district has an area of about 3185 sq km located between 23^0 to $24^0$05' N latitude and 93^0 to $93^0$26'E longitude, situated in east of Mizoram state, bordering with Myanmar. A significant river called Tiau separates India and Myanmar. The altitude of Champhai district varies from 500 to 2200 m above msl.

Lady bird beetles are round, oval or semi circular in shape. They have variously coloured elytra with different typical bright markings which are also used as an aid for identification to the beetles up to some extent. Size of beetles goes up to 10 mm. Coccinellidae is a family of order Coleoptera, which includes both predatory and polyphagous beetles. Predatory Beetles feed on aphids, scale insects, ticks and mites and acts a biological control agent to these pests of agriculture and forests significance. Polyphagous Bird Beetles are herbivorous and acts as pests of crops.

Bird Beetles (Coleoptera : Coccinellidae) are beneficial insects (except polyphagous). Since both the larva and adults are predaceous in habits[1-4], and found in association with aphid colonies[5], to feed on, they are used as bio control agents to control these aphids etc. It is also stated that during eighties naturalists like Erasmus Darwin and other American Entomologists suggested that the Coccinellids, bird beetles should be employed to combat aphid colonies[6].

Approximately 5200 species have been described worldwide[7] and around 400 species have been listed from India[8]. Author has not come across any precise record of Lady Bird Beetles from North East India and there has been no record / report from the state of Mizoram, a biodiversity Hot Spots of the India / World. However many studies on Lady Bird Beetles have been conducted from different parts of India and outside, on various aspects, like Coccinellids from Haridwar[9], Biology of *Coccinella septempunctata*[10-11], Biology of *Cheilomenes sexmaculata*[12], Bionomics of mycophagous beetle *Psyllobora bisoctonitata*[13], life cycle of *Coccinella transversalis*[14], life cycle of *Coccinella septempunctata*[15], age specific survival and fecundity of *Coccinella septempunctata* on different aphids feed[16], relative abundance of Coccinellid predators[17], diversity and abundance of Coccinellids in irrigated rice field ecosystems of Madurai, Tamil Nadu[18], predatory potential of *Coccinella septempunctata*[19], predatory potential of *Adalia tetraspilota*[20], biodiversity and natural enemies in paddy ecosystem[21], succession and status of important pests of linseed and their natural enemies[22], effect of prey densities on reproductive attributes of *Harmonia dimidata*[23], effects of insecticides on population of *Coccinella septempunctata*[24]. Author has not come across any published record of Lady Bird Beetles from this state. Fauna of Mizoram[25], published by Zoological Survey of India also does not reflect any record of occurrence. Hence it was decided to explore the occurrence of Lady Bird Beetles from the state, mainly used as bio control agent to control Aphids, Scale insects etc. The study would further encourage the researchers to undertake and explore the Lady Bird Beetles from various parts of the state, which falls in one of the biodiversity hot spots of the world / India.

Methodology

Study area: Periodic surveys were conducted at different parts of Champhai district of Mizoram state (figure-1). Three survey sites were chosen from the areas which include agriculture fields (including vegetable gardens), unprotected forests area, approachable riverine habitat along river Tiau and river Tuipui (table-1). All the possible approachable areas have been surveyed for the proper exploration of Lady Bird Beetles.

Tools: Insect nets have been used for collection of live specimens, it is however very much possible to collect Lady Bird Beetles by hand carefully. Species were collected and preserved dry as per entomological procedures used elsewhere and were identified with the help of standard literature available and with the help of expert scientists of Lady Bird beetles.

Table -1
Different study sites

Sl. No.	Study sites	Site no.
1.	Agricultural and Vegetable fields	Site – 1
2.	Unprotected forests areas	Site – 2
3.	Along Riverine habitats	Site – 3
4.	Opportunistic sightings	00

Results and Discussion

This paper highlights the occurrence of richness of 6 genera and 13 species of Lady Bird Beetles in Champhai district of Mizoram, North East India, belonging to 3 sub families. Sub family Chilocorinae is represented by *Chilocorous circumdatus* and *Chilocorous* sp. sub family Coccinellinae is represented by *Chilomenes sexmaculata*, *Coccinella sexempunctata*, *Coccinella transversalis*, *Oenopia kirbyi*, *Oenopia sexareata*, *Oenopia* sp., *Psyllobora* sp. sub family Epilachninae is represented by for species of *Epilachna*. (specific identification is to be done) (table-2).

The total of 13 species, genus *Chilocorus* represents 15.3%, *Chilomenes* represents 7.6%, *Coccinella* represents 15.3%, *Oenopia* represents 23.0%, *Psyllobora* represents 7.6% and *Epilachna* represents 30.7%, of the total bird beetles as far as the species richness is concerned. Whereas Predatory Beetles constitute 69.7% and Pollyphagous constitute 30.7%, of the total Bird Beetles of the area (table-3).

People in this area are very fond of making vegetable gardens, especially in villages due to availability of lands for the purpose. All the Beetles have been observed in all the ecosystems of the study area. The wide range of distribution of bird beetles is probably due to small geographical area and availability of wide spread prey species. Most difficult terrain was avoided due to lack of facilities during surveys.

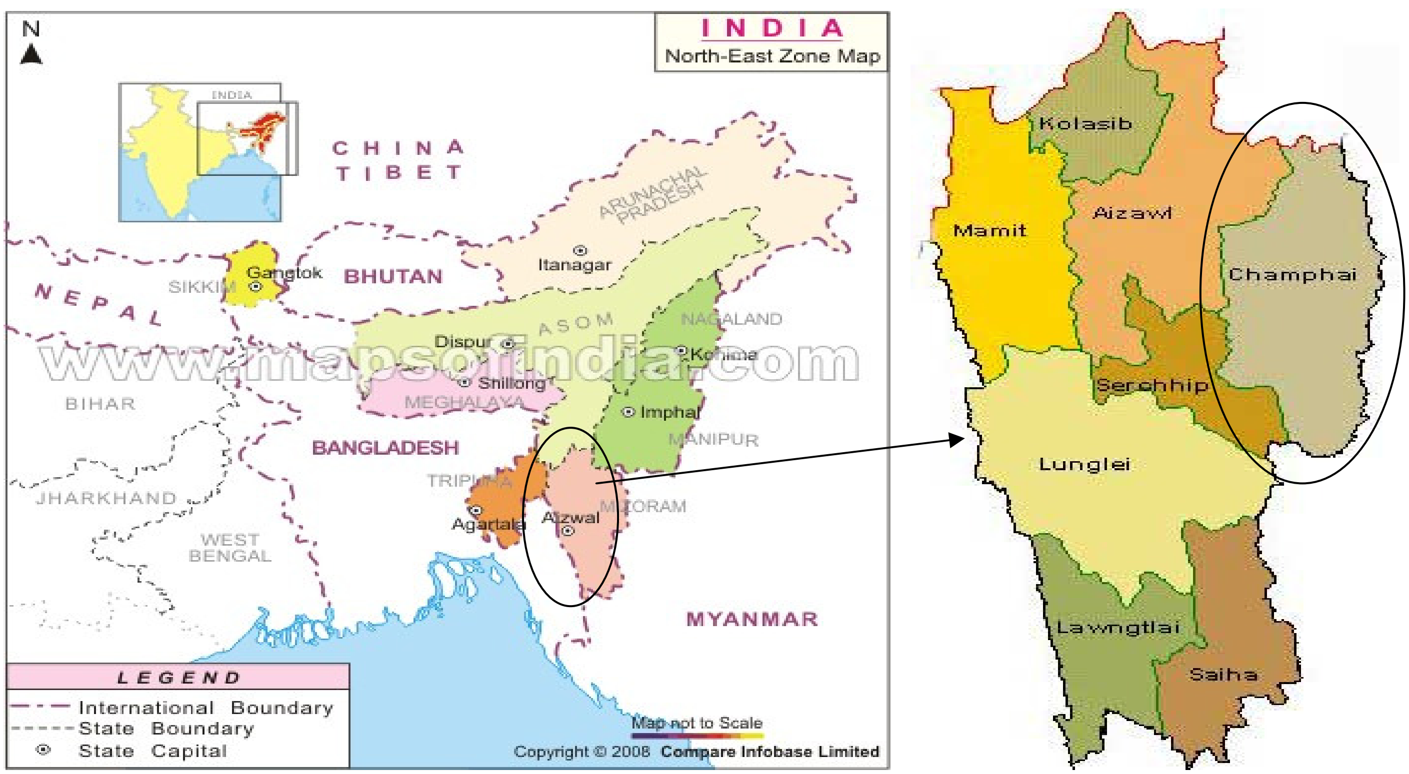

Figure-1
Map of North East India and Mizoram showing Champhai District, the survey sites

Table–2
Occurrence of Lady Bird Beetles on various Ecosystems in Champhai district of Mizoram, North East India

Family	Genus / Species	Site – 1	Site – 2	Site – 3
Chilocorinae	Chilocorus circumdatus	√	√	√
	Chilocorus sp.	√	√	√
Coccinellinae	Cheilomenes sexmaculata (Fabricius)	√	√	√
	Coccinella septempunctata (Linn.)	√	√	√
	Coccinella transversalis (Fabricius)	√	√	√
	Oenopia kirbyi (Mulsant)	√	√	√
	Oenopia sexareata (Mulsant)	√	√	√
	Oenopia sp.	√	√	√
	Psyllobora sp.	√	√	√
Epilachninae	Epilachna sp.	√	√	√
	Epilachna sp.	√	√	√
	Epilachna sp.	√	√	√
	Epilachna sp.	√	√	√
Total	13	13	13	13

Table–3
Generic richness of Bird Beetles

Genus	Species	Percentage	Feeding habits
Chilocorus	2	15.3	Predatory 69.2 %
Cheilonenes	1	7.6	
Coccinella	2.	15.3	
Oenopia	3	23.0	
Psyllobora	1	7.6	
Epilachna	4	30.7	Polygamous 30.7 %
Total	13	99.5	99.9

Conclusion

The Predatory Bird Beetles are very good bio control agents used to control aphids and scale insects specially. This paper reports richness of 6 genera and 13 species of Lady Bird Beetles in Champhai district of Mizoram, North East India, belonging to 3 sub families. Sub family Chilocorinae is represented by *Chilocorous circumdatus* and *Chilocorous* sp. sub family Coccinellinae is represented by *Chilomenes sexmaculata*, *Coccinella sexempunctata*, *Coccinella transversalis*, *Oenopia kirbyi*, *Oenopia sexareata*, *Oenopia* sp., *Psyllobora* sp. sub family Epilachninae is represented by for species of *Epilachna*. This is considered to be preliminary reports on Bird Beetles and possibility of occurrence of many more may be there, provided studies are conducted with more manpower and budget available throughout the state. The paper further suggests to undertaking thorough studies on various aspects of Coccinellids in entire state in order to explore complete richness and abundance of Coccinellids of the state. Rich coccinellids would help farmers to go for bio control to control aphids and scale insects etc. and would minimise the use of dangerous pesticides in the state.

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