



## Research Article

# Additional Fauna of hymenopterous parasitoids (Insecta: Hymenoptera) from Manipur, India

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**ABSTRACT:** Through a faunal survey of parasitoids using yellow pan trap in Manipur, a total of 2469 parasitoids were recovered representing major superfamilies of *Hymenoptera*. Detailed diagnoses of genera and distribution revealed additional record of 24 genera of platygastriids, 14 of mymarids and five each of aphelinid and chalcidid from Manipur.

**KEY WORDS:** *Aphelinidae, Chalcididae, Mymaridae, Parasitoids, Platygastriidae*

(Article chronicle: Received: 24-07-2014; Revised: 22-08-2014; Accepted: 03-09-2014;)

## INTRODUCTION

Manipur, one of the eight states of the North Eastern India, is located in the extreme north eastern border of the Indian Union between 23° 83' and 25° 68' N latitude and 93° 03' and 94° 78' longitude. The state has a total geographical area of 22, 356sq. km. The topography is divided into two natural regions, viz., the central plain or the Imphal valley and the hills surrounding the central plain, with an elevation varying from 130 to 2,995 m above MSL. Manipur comes under 'Indo-Burma Hotspot' which is the second largest hotspot in the world. Such an important hotspot is sprayed with chemicals for crop pest management which is detrimental to this rich biodiversity. Hence a survey was taken up to list out additional parasitoids from the state apart from those listed from Manipur (Subharani *et al.*, 2007 and Manickavasagam and Palanivel, 2013) so that biological control can be boosted by just following the conservation practices.

## MATERIALS AND METHODS

Survey for collection of parasitoids was made between January, 2012 and February, 2014 in Manipur, in and around Kakching Khunou Lamkhai village, Thoubal district, (containing pineapple orchard, cauliflower and cabbage cultivated mainly in between plenty of fish ponds, mustard crop

with other vegetables like cabbage, onion and coriander each in two rows in between and non crop area in hills consisting of various weeds, trees and the river Tarang running nearby) using only yellow pan trap. Parasitoids belonging to the families Platygastriidae, Chalcididae, Mymaridae and Aphelinidae alone were diagnosed up to generic level and rest only up to family. All the collected parasitoids were deposited with Entomology Department, Annamalai University, Chidambaram, Tamil Nadu.

## RESULTS AND DISCUSSION

From the survey a total of 2,469 parasitoids were collected belonging to the superfamilies Ichneumonoidea (258), Chalcidoidea (1361), Platygastroidea (291), Proctotrupoidea (267), Ceraphronoidea (101), Cynipoidea (76), Evanioidea (69), and Chrysidoidea (46). Genera of parasitoids belonging to families Platygastriidae, Chalcididae, Mymaridae and Aphelinidae were compared with the distributional records of Subharani *et al.*, (2007), Noyes (2014) and Johnson (2014) and the list of additional parasitoids recorded from the present survey is furnished below:

### Family: Platygastriidae

#### 1. *Telenomus* Haliday

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 93.52 E),

37 Female, 21 Male through yellow pan trap in pineapple orchard and forest ecosystem 21, 26.i.13 (Coll. Sophis Singh).

## 2. *Trissolcus* Ashmead

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 9 Female, 10 Male through yellow pan trap in pineapple orchard 21, 24.i.13 (Coll. Sophis Singh).

## 3. *Paratelenomus* Dodd

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 11 Female, 3 Male through yellow pan trap in pineapple orchard 21, 24.i.13 (Coll. Sophis Singh).

## 4. *Psix* Kozlov and Le

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 10 Female, 16 Male through yellow pan trap in pineapple orchard 26.i.13 (Coll. Sophis Singh).

## 5. *Eumicrosoma* Gahan

**Specimens examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 4 Male through yellow pan trap in forest ecosystem 10.vii.14 (Coll. Sophis Singh).

## 6. *Trimorus* Forster

**Specimens examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female, 3 Male through yellow pan trap in pineapple orchard 21.i.13 (Coll. Sophis Singh).

## 7. *Odontoscelio* Kieffer

**Specimens examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 5 Female through yellow pan trap in pineapple orchard and forest ecosystem 26.i.13 (Coll. Sophis Singh).

## 8. *Scelio* Latreille

**Specimens examined:** INDIA; Manipur, Chandal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 5 Female, 2 Male through yellow pan trap in pineapple orchard and vegetables 9.i.14 (Coll. Sophis Singh).

## 9. *Baryconus* Forster

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 4 Female, 2 Male through yellow pan trap in pineapple orchard 26.i.13 (Coll. Sophis Singh).

## 10. *Cremastobaeus* Ashmead

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 3 Female, 3 Male through yellow pan trap in pineapple orchard 26.i.13 (Coll. Sophis Singh).

## 11. *Palpoteleia* Kieffer

**Specimens examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female, 1 Male through yellow pan trap in pineapple orchard 24.i.13 (Coll. Sophis Singh).

## 12. *Idris* Forster

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 9 Female, 10 Male through yellow pan trap in pineapple orchard 24.i.13 (Coll. Sophis Singh).

## 13. *Macroteleia* Westwood

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 8 Female through yellow pan trap in pineapple orchard 15, 24.i.13 (Coll. Sophis Singh).

## 14. *Baeus* Haliday

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.59 E), 3 Female, 5 Male through yellow pan trap in pineapple orchard 15, 26.i.13 (Coll. Sophis Singh).

## 15. *Gryon* Haliday

**Specimen examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female through yellow pan trap in pineapple orchard 1.i.14 (Coll. Sophis Singh).

## 16. *Ceratobaeus* Ashmead

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E),

10 Female, 1 Male through yellow pan trap in pineapple orchard 21.i.13 (Coll. Sophis Singh).

#### 17. *Opisthacantha* Ashmead

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.52 E), 11 Female, 25 Male through yellow pan trap in pineapple orchard 21.i.13 (Coll. Sophis Singh).

#### 18. *Probaryconus* Kieffer

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 16 Female, 7 Male through yellow pan trap in pineapple orchard 19.i.14 (Coll. Sophis Singh).

#### 19. *Psilanteris* Kieffer

**Specimen examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female through yellow pan trap in pineapple orchard 21.i.13 (Coll. Sophis Singh).

#### 20. *Paridris* Kieffer

**Specimen examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Male through yellow pan trap in pineapple orchard 21.i.13 (Coll. Sophis Singh).

#### 21. *Dicroscelio* Kieffer

**Specimens examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 6 Female, 3 Male through yellow pan trap in pineapple orchard 21.i.13 (Coll. Sophis Singh).

#### 22. *Aradophagus* Ashmead

**Specimen examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female through yellow pan trap in pineapple orchard 15.i.13 (Coll. Sophis Singh).

#### 23. *Duta* Nixon

**Specimens examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 9 Female, 4 Male through yellow pan trap in pineapple orchard 15.i.13 (Coll. Sophis Singh).

#### 24. *Fusicornia* Risbec

**Specimens examined:** INDIA; Manipur, Imphal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female, 8 Male through yellow pan trap in pineapple orchard 19.i.14 (Coll. Sophis Singh).

#### Family: Chalcididae

##### 1. *Antrocephalus* Kirby

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.52 E), 20 Female, 4 Male through yellow pan trap in pineapple orchard and forest ecosystem 21, 26.i.14 (Coll. Sophis Singh).

##### 2. *Hockeria* Walker

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 5 Female, 3 Male through yellow pan trap in pineapple orchard and vegetables 24, 26.i.14 (Coll. Sophis Singh).

##### 3. *Epitranus* Walker

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 2 Female, 5 Male through yellow pan trap in pineapple orchard 1.vii.13 (Coll. Sophis Singh).

##### 4. *Kriechbaumerella* Dalla Torre

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.52 E), 3 Female, 2 Male through yellow pan trap in pineapple orchard 21, 26.i.13 (Coll. Sophis Singh).

#### Family: Mymaridae

##### 1. *Acmopolynema* Ogloblin

**Specimen examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female through yellow pan trap in forest ecosystem 24, i.vii.13 (Coll. Sophis Singh).

##### 2. *Alaptus* Westwood

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 7 Female through yellow pan trap in pineapple and vegetables 21, i.vii.13 (Coll. Sophis Singh).

### 3. *Arescon* Walker

**Specimen examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female through yellow pan trap in pineapple orchard, 21. i. 13 (Coll. Sophis Singh).

### 4. *Anagrus* Haliday

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 80 Female, 7 male through yellow pan trap in pineapple orchard and forest ecosystem 21, i.vii.13 (Coll. Sophis Singh).

### 5. *Anaphes* Haliday

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 18 Female through yellow pan trap in pineapple orchard and vegetables 21, i.vii.13 (Coll. Sophis Singh).

### 6. *Camptoptera* Forster

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (760mts. MSL, 24.24 N; 093.54 E), 30 Female, 6 Male through yellow pan trap in pineapple orchard, 24, 26.i.13 (Coll. Sophis Singh).

### 7. *Cleruchus* Enock

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 20 Female through yellow pan trap in pineapple orchard; Kakching Khunou Lamkhai (760mts. MSL, 24.24 N; 093.59 E), 16 Female, 2 male through yellow pan trap from forest ecosystem 21.i.13 & 5.ii.13 (Coll. Sophis Singh).

### 8. *Gonatocerus* Nees

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 129 Female, 58 Male through yellow pan trap in pineapple orchard and forest ecosystem, 21, 26.i.13 (Coll. Sophis Singh).

### 9. *Himopolynema* Taguchi

**Specimen examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (760mts. MSL, 24.24 N; 093.54 E), 1 Female through yellow pan trap in pineapple orchard and hills ecosystem, 21, 26.i.13 (Coll. Sophis Singh).

### 10. *Mymar* Curtis

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 73 Female, 17 Male through yellow pan trap in pineapple orchard and hills ecosystem, 21.i.13 (Coll. Sophis Singh).

### 11. *Omyomymar* Staff

**Specimen examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (790mts. MSL, 24.24 N; 093.54 E), 1 Female through yellow pan trap in pineapple orchard and hills ecosystem, 21.i.13 (Coll. Sophis Singh).

### 12. *Polynema* Haliday

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 8 Female, 11 Male through yellow pan trap in pineapple orchard and hills ecosystem, 21.i.13 (Coll. Sophis Singh).

### 13. *Stethynium* Enock

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 1 Female, 1 Male through yellow pan trap in pineapple orchard and hills ecosystem, 21.i.13 (Coll. Sophis Singh).

### 14. *Eofoersteria* Mathot

**Specimen examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (790mts. MSL, 24.24 N; 093.54 E), 1 Female through yellow pan trap in fish ponds, 21.i.13 (Coll. Sophis Singh).

## Family: Aphelinidae

### 1. *Aphelinus* Dalman

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 40 Female, 10 Male through yellow pan trap in pineapple orchard, 24.i.13 (Coll. Sophis Singh).

### 2. *Encarsia* Foerster

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (790mts. MSL, 24.24 N; 093.54 E), 30 Female, 7 Male through yellow pan trap in pineapple orchard and vegetables, 21.i.13 (Coll. Sophis Singh).

### 3. *Coccobius* Ratzeburg

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E),

10 Female, 10 Male through yellow pan trap in pineapple orchard, 26.i.13 (Coll. Sophis Singh).

#### 4. *Centroдора* Foerster

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (798mts. MSL, 24.24 N; 093.54 E), 5 Female, 3 Male through yellow pan trap in vegetables, 21.i.13 (Coll. Sophis Singh).

#### 5. *Aphytis* Howard

**Specimens examined:** INDIA; Manipur, Thoubal, Kakching Khunou Lamkhai (790mts. MSL, 24.24 N; 093.54 E), 14 Female, 9 Male through yellow pan trap in fish ponds, 21.i.13 (Coll. Sophis Singh).

Further there are few new species, especially from the mymarid genera *Cleruchus* Enoch, *Anagrus* Haliday and *Gonatocerus* Nees and also from platygastriids for which efforts are on to describe.

The survey covered only Thoubal district out of nine districts in Manipur and even that showed a rich diversity of parasitoid availability and hence it is pertinent to conclude that conservation of parasitoids is of paramount importance to preserve the existing fauna by avoiding reducing insecticide load to protect the biodiversity hotspot. Already farmers are practicing row cropping of mustard in vegetables that helps in the conservation of existing parasitoids through nectar supply. If special efforts are initiated from government side through mass media to create awareness among farmers to protect the biodiversity hotspot by encouraging natural enemies through conservation methods like habitat and food provision, selective insecticides, etc. It will help to conserve the biodiversity hotspot. Further efforts should also be initiated to bring to book other unknown fauna from this hotspot.

#### ACKNOWLEDGEMENTS

Authors are thankful to Dr. John T Huber of Ottawa, Canada and to lab mates Dr. C. Menakadevi, Mr. S. Palanivel, Mr. N. Gowthaman and Ms. J. Gowri Prakash

for their help in identification of parasitoids. Help rendered by Mr. Kh. Mangoljao Singh in collection of parasitoids from Manipur is gratefully acknowledged. Dr. J. Poorani's (NBAIR, Bangalore) help in capturing a good image of *Cleruchus* is also thankfully acknowledged.



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