

SYNOPSIS

Taxonomic studies on the Torymidae (Hymenoptera: Chalcidoidea) of Kerala and adjacent areas

Chalcidoidea (Hymenoptera: Apocrita: Parasitica) are the most important group of entomophagous insects which are utilized in various biological control programmes. Torymidae is one of the families of Chalcidoidea. They are myriad, diverse, ecologically significant and economically important insects. Since their hosts include several pests of agricultural importance, torymids are potential biological control agents which can be utilized against insect pests. Torymids play both positive and negative roles in the ecosystem. Majority of torymids are primary parasitoids of pests of agricultural crops (eg. Tephritidae) and some torymids are phytophagous pests of various crop plants. Thus in view of their positive role as beneficial primary parasitoids of pests of crops and negative role as primary pests of crops, studies on the biosystematics of torymidae is very important in the economic point of view. Studies on the biosystematics of these interesting insects can supply a lot of information necessary for undertaking biological control or integrated pest management programmes involving these insects.

Walker (1833) proposed the name Torymidae for the family. Later Mayer (1874), Thomson (1876), Ashmead (1904), Cameron (1905-1912), Girault (1913-1915) and many others worked in this area. Nikolskaya (1952), Boucek (1970-1981) and Grissell (1995) contributed to the study of Torymidae, mainly of Western and Australian regions. Torymid fauna of the Oriental region was studied mainly by Mani (1989) and Narendran (1994).

Objectives of the present research work was to 1) conduct faunal explorations and survey of insect parasitoids of the family Torymidae (Chalcidoidea) from diverse geographical locations of Kerala and adjacent areas; 2) To conduct taxonomic studies of the little known genera and species occurring in the area and to bring out a clear

picture of the torymid fauna of this region; 3) To describe new species and to redescribe little known ones with key to genera and species; 4) to review the diagnosis, distribution, host parasitic record and present taxonomic status of all genera and species occurring in India and 5) to prepare a checklist of torymid fauna of India with their synonyms.

Periodic collections were made from diverse habitats of Kerala and adjacent areas. Collections were made mainly by sweeping among varied vegetation types. Other methods of insect collections such as malaise trap and yellow pan trap were also used. Rearing of plant galls and ootheca were also made for the collection work. The collected specimens were mounted on small rectangular cards which in turn were pinned by entomological pins. The mounted specimens were labelled with all collection data and are dried and preserved in specially made insect boxes. Naphthalene balls and thymol crystals were used as insecticide and fungicide respectively. Taxonomic studies were carried out under and Leica MZ 6 stereozoom microscope with camera lucida and photographs were made with the help of Leica EZ 4D stereozoom microscope with inbuilt camera. Identification of specimens were made by referring relevant literature and seeking guidance from the research supervisor.

Worldwide, the family Torymidae currently includes 1138 species under 77 genera in two subfamilies, namely subfamily Megastigminae and subfamily Toryminae. Out of this, 29 genera and 182 species were reported from the Oriental region whereas 23 genera and 107 species from India and 13 genera and 36 species from Kerala. The present investigation includes 15 genera from Kerala, one genus from Tamil Nadu and one genus from Karnataka. Thus a total of 17 genera were discussed from Kerala and adjacent areas. In the present work two subfamilies of Torymidae were collected from different localities of Kerala and adjacent areas. The thesis altogether deals with 52 species belonging to 17 genera. Among these one genus and seven species are new to science. All these new taxa are described. Since the available descriptions are

inadequate for recognition of some poorly described species, they are redescribed. Other known species are diagnosed based on published literature since these species are not represented in the collections of the present investigation.

In this work all the observations including main morphological characters of the family, illustrated dichotomous keys to subfamilies, genera and species were prepared. Data Matrix of seven genera of Podagrionini was prepared for the identification of new genus. Host parasitoid index of the Torymid species were also prepared. Check list of torymid fauna of India with all the synonyms were also included in this work. Distribution map of torymid genera of Kerala and graphical representation of abundance of distribution based on number of specimens collected were also prepared. Plates were prepared for all the species of Torymidae which were examined. Each plate includes images of species with images of its important body parts like head-anterior view, head-dorsal view, antenna, mesosoma, forewing, hind leg, propodeum and metasoma. Figures were added for all other species which are not included in the collection. Both plates and figures were added for the new genus.

The important finding of this investigation is the establishment of a new genus and seven new species to the torymid fauna. Thus, there are 30 genera and 189 species in the oriental region; Out of these, 23 genera and 107 species were reported from India and 15 genera and 43 species from Kerala state. The present investigation also enabled to discover new hosts of Torymidae. The important findings are the following:-

A. New genus discovered:

1. *Podagriomicron* gen. nov.

B. New species discovered:

1. *Podagriomicron wayanadense* gen. nov., sp. Nov.
2. *Podagrion christyi* sp. Nov.

3. *Podagrionella harithae* sp. Nov.
4. *Podagrionella nupera* sp. Nov.
5. *Rhynchotocida keralensis* sp. Nov.
6. *Torymoides longigastralis* sp. Nov.
7. *Torymus harithus* sp. Nov.

C. New hosts discovered:

1. Ootheca of *Humbertiella similis* as host of *Podagrionella haithae* sp. Nov.
2. Ootheca of *Mantis* sp. as host of *Podagrion christyi* sp. Nov.
3. Ootheca of *Hierodula membranacea* as host of *Podagrion dineni* Narendran
4. Ootheca of *Humbertiella similis* as host of *Palmon orchesticus* Masi
5. Ootheca of Mantid as host of *Podagrion manii* Narendran
6. Ootheca of *Humbertiella similis* as host of *Podagrion keralensis* Narendran

D. First report of genera from Kerala:

Genus *Rhynchotocida* Bouček

E. First report of species from Kerala

1. *Podagrion aligarhensis* Narendran
2. *Podagrion scylla* Fernando

F. First report from Karnataka

1. *Podagrion manii* Narendran
2. *Podagrion keralensis* Narendran
3. *Torymoides amabilis* Walker

G. First report from Tamil Nadu

1. *Palmon orchesticus* Masi