V.6 DISCUSSION

The family Torymidae is divided into two subfamilies based on presence or absence of enlarged stigma on the wing. The subfamily Megastigminae is with enlarged stigma whereas the subfamily Toryminae is with very minute stigma. The diagnostic feature of the family Torymidae is the presence of exserted ovipositor in most of the genera. However in *Chrysochalcissa*, *Amoturoides* and *Anneckeida* the ovipositor is hardly protruding out, in *Ecdamua*, the length of ovipositor is 3x the length of body. In all other genera, the length of ovipositor is in between these two categories. The antennal formula is 11173 in all the genera whereas in *Chrysochalcissa* and *Torymoides* the antennal formula is 11263.

The size of the clava also varies in different genera. The length of the clava is more than the combined length of all the preceding funicular segments as in *Palmon*, but in *Torymoides*, *Torymus*, *Pseudotorymus*, *Chrysochalcissa* etc the length of clava is less than combined length of three preceding funicular segments. In all other genera, the length of clava varies in between these two categories.

Some genera are with petiolate gaster (eg. *Ecdamua*, *Palmon*, *Podagrion* etc.), but some other genera are with sessile gaster. The length of PMV is equal to MV in *Ecdamua*, but in all other genera MV is longer than PMV.

The length and breadth of hind leg varies in different genera. Some genera with normal hind leg, eg. *Megastigmus*, *Mangostigmus*, *Bootanelleus*, *Pseudotorymus*, *Torymoides* etc. Hind femur with a subapical tooth in *Ecdamua*, *Amoturoides*, *Torymus* etc., hind femur with two or three teeth in *Palachia*, *Propalachia* etc. with a row of broad equal sized teeth in *Rhynchoticida*, with a row of comb like teeth in *Chrysochalcissa*, hind femur with four to nine irregular teeth in *Podagrion*, *Palmon*, *Podagrionella* etc.

The colour of specimens varies in different genera. Yellowish brown in *Megastigmus*, blackish brown in *Mangostigmus*, black in *Chrysochalcissa*, dark blue in *Rhynchoticida*, metallic green in some species of *Podagrion*, *Podagrionella*,...
*Torymus, Torymoides* etc., metallic green mesosoma with yellowish gaster in some species of *Podagrion, Torymoides, Bootanelleus* etc. Colour of eye also varies, it includes black, gray red etc. Most of the genera are with reddish eyes.

The genus *Bootanelleus* differs from the genus *Mangostigmus* in having metallic green coloured head and mesosoma with yellowish gaster; forewing without brownish tuft of hairs and are phytophagous in the seeds of *Casuarina*. The genus *Mangostigmus* generally blackish brown in colour, it differs from all other genera in having forewing with two brownish hair tufts near stigma and parastigma and are parasitic on the leaf galls of *Mangifera indica*. In *Palachia mangalae* forewing bears one brownish patch near parastigma. The genus *Megastigmus* differs from the genus *Mangostigmus* in having yellowish body; expanded STV; absence of brownish hair tufts on the forewing and are parasitic in the bud galls of *Calycopterus*. It differs from all other genera in having expanded stigma.

The genus *Amoturoides* differs from the genus *Anneckeida* in having hind femur moderately wide, with a subapical tooth on ventral margin; straight hind tibia with truncated apex and with two spurs. The genus *Anneckeida* differs from all other genera in having distinct frenal groove; the enlarged hind femur having an outer row of regular, saw like teeth and an inner row of similar but much reduced teeth; the curved hind tibia that is apically truncate; ovipositor sheath and ovipositor strongly protruded as a spine, reaches up to the tip of gaster. The genus *Chrysochalcissa* differs from all the genus *Anneckeida* in having antennal formula 11263; scutellum without frenal area; hind coxa distinctly larger than half of the ovoid femur; outer region with wide meshed reticulation; hind femur on outer margin with shallow groove to receive tibia; outer ventral margin of femur with a row of small regular teeth; only apex of ovipositor sheath visible.

The genus *Ecdamua* differs from all other genera in having long petiole and in the female with ovipositor more than 3x as long as the body; scutellum with distinct longitudinal furrow on prefrenal part; small tooth on ventral side of hind femur near apex; PMV almost as long as MV; In all other genera PMV smaller than MV.
The genus *Palachia* differs from the genus *Palmon* in having antenna black with pale yellow scape and with pale yellow distal three segments of funicle; hind femur with two or more irregular teeth; wings sub hyaline with a small brownish patch at parastigma. The genus *Propalachia* differs from *Palachia* in having forewing with a broad central infumation; hind femur infuscate distally and on teeth, apically truncate hind tibia, apical half of ventral surface of hind femur with at least two large teeth, and often with several other irregular teeth.

The genus *Palmon* differs from Genus *Podagrion* in having anellus longer than wide; clava prominent; gaster with distinct petiole. ovipositor longer than body. The genus *Podagrion* differs from *Palmon* in having anellus wider than long; the apical spine of hind tibia less than 2x the tibial width; hind coxa and femur swollen; hind femur with a row of irregular teeth on ventral side; propodeum with a pair of developed submedian carinae which are united at anterior part and in inverted 'V' shape or forming median carina at anterior part. The genus *Podagrionella* differs from other genera in having relatively long curved spine at the apex on ventral side of hind femur; the length of spine about quarter or more than quarter length of hind tibia; It differs from *Podagriomicron* in having only one median carina between hind coxae.

The new genus *Podagriomicron* differs from all other genera in having lower half of frons and face with dense silvery white setal scales; metasternum with two submedian carinae; It differs from Podagrion in having ovipositor sheath shorter than gaster.

The genus *Pseudotorymus* differs from other genera in having propodeum without median carina; hind femur occassionally with small distinct apical denticle. It resembles *Torymoides*, but differs from the genus *Torymoides* in having antennal formula 11173. The genus *Torymoides* differs from the genus *Pseudotorymus* in having antennal formula 11263; hind tibia with two spurs; unmodified propodeum.

The genus *Rhynchoticida* differs from the genus *Anneckeida* in having body metallic blue; all coxae concolorous with mesosoma; dark and densely pubescent mesosoma; hind femur swollen with a row of broad ventral teeth. In the genus
**Torymus**, ovipositor 1.5 to 2x as long as gaster; hind coxa large, hind femur relatively thick with distinct apical tooth or denticle; hind tibia with two spurs at apex.

From the field work in different localities, different habitats, and different seasons and at different times of the day it is clear that the torymid activity is high during morning hours of the day between 8 am to 11 am. The best method for collecting large number of specimens is by sweep net followed by malaise trap. Undisturbed habitats are good for insect collections. Rubber and coffee plantations also gave good collections where mantids are also found abundant whereas forests gave poor results. However, for knowing host associations the best method is rearing the parasitoids from their hosts. Different species and even different genera emerged from the same ootheca along with mantid nymphs. For example, from the ootheca of *Humbertiella similis, Podagrionella haritha* sp. nov. and *Podagrion keralensis* were emerged along with mantid nymphs. From the ootheca of *Hierodula* sp., *Podagrion scylla* and *podagrion dineni* were emerged along with mantid nymphs. The ootheca of *Hierodula* gave good collections of torymid species. Host parasitoid index shows that torymids are phytophagous or entomophagous. Subfamily Megastigminae is mainly phytophagous whereas subfamily Toryminae is mainly entomophagous.

As per the study, the collection data shows that the most abundant genus of Torymidae in Kerala is *Torymoides* followed by *Podagrion*. The least abundant is *Rhynchoticida*. From the collection data, Koorachundu near Kakkayam in Kozhikode district (11°29’N 75°50’E) is found very rich in torymid fauna, from where good collections of *Rhynchoticida keralensis* sp. nov., *Torymus harithus* sp. nov., *Torymoides longigastralis* sp. nov., *Podagrion aligarhensis*, *Podagrion keralensis*, *Podagrion dineni*, *Podagrion scylla*, *Torymoides keralensis*, *T. amabilis*, *T. sureshani*, *T. kiesenwetteri*, *Mangostigmus malabaricus, Megastigmus viggianii* etc. were made. Wayanad District which is coming under the Western Ghat region also gave good collections of Torymidae.