



## FIRST RECORD OF *MEGASELIA SCALARIS* (DIPTERA: PHORIDAE) AS A PARASITOID OF *THYAS CORONATA* (LEPIDOPTERA: EREBIDAE)

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### ABSTRACT

*Thyas coronata* (Fabricius) (Lepidoptera: Erebeidae) is one of the most significant fruit-piercing moths, particularly on citrus fruits, and as a result of feeding, it causes significant injury. The parasitoid, *Megaselia scalaris* was observed on the exterior surface of last instar larva of *T. coronata*. The fly laid egg on the exterior surface of the host larva, the incubation period was three to four days. The fly went through larval instars, each lasting three to four days, then pupated for seven to eight days. Adults lived for five to eight days. This study first time reports the parasitisation of dipteran scavenger fly *Megaselia scalaris* on the serious fruit piercing moth *Thyas coronata* from India.

**Key words:** *Thyas coronata*, *Megaselia scalaris*, humpbacked fly, Diptera, Lepidoptera, Erebeidae, fruit piercing, parasitoid, Kerala, India, new record

*Megaselia scalaris* (Loew), known as the scuttle fly or humpbacked fly, is a widely dispersed insect with forensic significance (Disney 1994, Campobasso et al. 2004, Reibe and Madea, 2010). These flies have a broad range of biological and environmental niches that they can explore (Disney, 2008). It was also shown that this species parasitized and preyed upon a variety of arthropods (Costa et al., 2007; Koch et al., 2013).

According to field reports, this fly can parasitise a wide range of living arthropods, including species from the Orthoptera, Diptera, Lepidoptera, Coleoptera, Hymenoptera, Ixodida, and Araneae—some of which are essential for agriculture and the environment—as well as the orders Orthoptera, Diptera, Lepidoptera, and Coleoptera. Due to its remarkable ecological adaptability, *M. scalaris* has also gained a reputation as a laboratory pest for infesting invertebrate cultures. Adult *Thyas coronata* are well known fruit piercing moths belonging to the family Erebeidae recognised as a serious pest of several synthetic and wild fruits. Their sclerotized proboscises are used to penetrate ripening fruit, and they macerate the fruit to extract the juice. Adults presumably preferred to consume slices of citrus, pineapple, banana, and papaya fruits, according to study on eating preferences and phototaxis in adults (Suthapradit et al. 2006). Adult possess two white bands on the black head, body brown to blackish, marked with black spots and red longitudinal streaks. The pupa is black-brown. The adult moth has rufous and fuscous forewings tinged with a black spot in the middle. The hind wings are bright yellow with a dark band at the

anterior and the posterior borders. Time required for egg to adult development is  $40.35 \pm 0.59$  days (mean  $\pm$  SEM). As a result, citrus fruits suffer considerable harm. For the first time in India, the humpbacked fly *Megaselia scalaris* (Loew) (Diptera: Phoridae) was identified as a parasitoid of *Thyas coronata* and it is studied herein.

### MATERIALS AND METHODS

The parasitoid flies were collected from the Banasura forest (75.93467811°N, 11.67662398°E), Wayanad district of Kerala, India. The flies were identified as *Megaselia scalaris* through published literature (Deshmukh et al., 2021). During the time of survey five flies were seen to be attacking the larvae of *Thyas coronata*. Together with the larva the flies were collected and reared under laboratory conditions. The rearing of maggots was carried out as per methodology adopted by Deshmukh et al. (2021). The experiment was repeated to confirm the results. The adults emerged from the pupae of the reared maggots were transferred to containers which contained the 5<sup>th</sup> instar larva of *Thyas coronata*. The adult parasitoid flies were fed with 10% honey solution.

### RESULTS AND DISCUSSION

*Thyas Coronata* (Fabricius, 1775) (Fig. 1,2)

*Noctua coronata* Fabricius, 1775, Syst. Ent.: 596.  
*Noctua leonina* Fabricius, 1775, Syst. Ent.: 596.  
*Noctua ancilla* Fabricius, 1794, Ent. Syst. III, 2: 17. *Corycia magica* Hübner, 1827, Zuträge



Fig. 1. *Thyas coronata* last instar larva parasitoid by *Megaselia scalaris*

Samml. exot. Schmett., 3: 32. *Ophiodes ponderosa* Mabilie, 1879, Annl. Soc. ent. Fr., (5) 9: 346. *Anua coronata* Fabricius; Holloway, 1976: 2. *Ophiusa coronata* Fabricius; Kobes, 1985: 36.



Fig. 2. Adult *Thyas coronata*

**Larva:** Bell (MS), Gardner (1941; 1947), Sevastopulo (1939a), and Bigger (DE) (1988) described and depicted the larva. The immature larvae are slender and green with black markings. The adult larva also has the usual ophiusine morphology of a thin body with a prognathous head. The head and body are longitudinally striped. The stripes are divided by thin darker brown lines with alternate colours (lighter fawn and deeper purple fawn). Three of the darker stripes appear in a row on each side, and the dorsal, thinner stripe is enlarged into ellipses on A5 and A6. On A8, the dorsolateral stripes include a pair of tiny, light yellow tubercles. The prolegs of A4 are short compared to third abdominal segment (Fig. 1).

#### ***Megaselia scalaris* Loew, 1866– biology and taxonomy**

Along with the sixth instar larva flies attached on it were collected in the closed containers. After two days white long oval eggs were observed on the body of the larva. After four days a few maggots (1<sup>st</sup> Instar) hatched and were visible feeding the larva. The first instar larva developed into second instar within two days. The third instar was developed after 3 days and matured to fourth instar larva in next two days. This fourth instar larva pupated within two days and the adult

of *M. scalaris* emerged after three to four days. The laboratory experiment was carried out to validate the results. The flies laid white oval eggs on the host larval's surface after two days (Fig. 3). After two to three days, the eggs hatched, and milky white maggots burst forth and started feeding the host larvae. After five to six days, the mature maggots developed. Typically, the larvae are relatively little, measuring about 1 and 6 mm in length. They pupated within two days (Fig. 4), and adult flies emerged from the pupae after seven to eight days (Fig. 5). It was observed that the male *Megaselia scalaris* fly pupated two days earlier than the female.

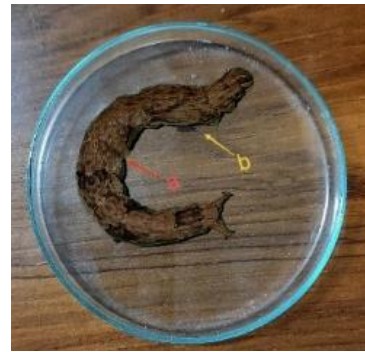


Fig. 3. Larva with *Megaselia scalaris* infestation. a-egg, b-larva



Fig. 4. Pupae of *Megaselia scalaris*

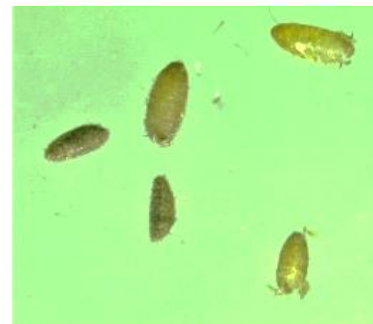


Fig. 5. Emptied pupae after the emergence of fly

The mature fly had equidistant supra-antennal bristles and was yellowish brown in colour. The thorax was brownish dorsally, the prothoracic pleura had several little hairs and 2-4 long ventral bristles, the mesopleuron lacked distinguishing bristles, and the scutum had a pair of long bristles at either end. Legs were whiter; the femur was larger; it was darker apically with dark brown tiny hairs; halteres were creamy yellowish; wings had half of the costal border densely fringed; and the abdomen was a deeper brown. The scutellum had two pairs of bristles (Fig. 6).



Fig. 6. *Megaselia scalaris* emerged from pupal stage as adult

This is the first report of parasitisation of the fruit piercing moth *T. coronata* by the dipteran scavenger fly *M. scalaris*. The species *M. scalaris* that infest *T. coronata* have been documented for the first time in India. Many studies have been carried out on the dipteran flies which have high forensic significance (Disney, 1994; Campobasso et al. 2004; Reibe and Madea, 2010). These flies have a broad range of biological and environmental niches that they can explore (Disney, 2008). It has also been noted that this species parasitized and preyed upon a variety of arthropods (Zwart et al., 2005; Costa et al. 2007; Koch et al. 2013). Due to its remarkable ecological adaptability, *M. scalaris* is considered as a laboratory pest for infesting invertebrate cultures. It was also reported as the laboratory parasitoid of *Spodoptera frugiperda* in India and China (Deshmukh et al., 2021; Tang et al., 2021).

#### ACKNOWLEDGEMENTS

The Kerala Forest Department, India is acknowledges for granting us permission. Thankful to Brain brown the Natural History Museum of Los Angeles County for his valuable suggestions.

#### AUTHOR CONTRIBUTION STATEMENT

RR AND RSM S: data collection. RR and RSM S: original draft writing. The manuscript's published version has been reviewed and approved by all authors.

#### FINANCIAL SUPPORT

No funding received.

#### COFLICT OF INTEREST

No conflict of interest.

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(Manuscript Received: April, 2023; Revised: June, 2023;

Accepted: July, 2023; Online Published: July, 2023)

Online First in www.entosocindia.org and indianentomology.org Ref. No. e23251