



Research note

Cautionary note on the presence of *Homalotylus turkmenicus* Myartseva (Hymenoptera: Encyrtidae) in the colonies of *Phenacoccus manihoti* Matile-Ferrero (Hemiptera: Pseudococcidae) in southern India

ANKITA GUPTA^{1*}, M. MOHAN¹, M. SAMPATHKUMAR¹, A. N. SHYLESHA¹, S. R. VENKATACHALAM²
and N. BAKTHAVATSALAM¹

¹ICAR-National Bureau of Agricultural Insect Resources, 2491, H. A. Farm Post, Bellary Road, Hebbal, Bengaluru - 560 024, Karnataka, India

²TCRS, TNAU, Yethapur - 636 117, Tamil Nadu, India

*Corresponding author E-mail: ankitagupta.nbaii@gmail.com

ABSTRACT: High percentage of *Homalotylus turkmenicus* Myartseva (Hymenoptera: Encyrtidae) parasitizing *Hyperaspis maindroni* Sicard (Coleoptera: Coccinellidae) predated on the colonies of the Cassava Mealybug (CMB) *Phenacoccus manihoti* Matile-Ferrero (Hemiptera: Pseudococcidae) is observed in southern India. In the present study, cautionary note on the presence of *H. turkmenicus* in the food web of insects associated with the CMB and brief diagnosis of the parasitoid is presented for quick identification. The parasitism of *Hy. maindroni* grubs by *H. turkmenicus* ranged from 65.67 to 80.95 per cent. However, no primary parasitoid of the cassava mealybug was observed so far.

KEY WORDS: Cassava Mealybug, Hyperparasitoid, Predation

(Article chronicle: Received: 05-06-2020; Revised: 22-06-2020; Accepted: 25-06-2020)

In early months of 2020, the cassava mealybug (CMB) *Phenacoccus manihoti* Matile-Ferrero (Hemiptera: Pseudococcidae), known as the most destructive pests of cassava in the world, was reported from Thrissur, Kerala (Joshi *et al.* 2020). Of the numerous parasitoids reported from the coccinellid larvae associated with/predating upon *P. manihoti*, five species of the genus *Homalotylus* Mayr (Hymenoptera: Encyrtidae) are reported worldwide viz., *H. africanus* Timberlake, *H. eytelweinii* Ratzeburg, *H. flaminus* Dalman, *H. hemipterinus* De Stefani and *H. quaylei* Timberlake (Noyes, 2020). Out of these five *Homalotylus* species, *H. africanus* is not reported from India (Noyes, 2020). In the present finding, *Homalotylus turkmenicus* Myartseva is reported to be gregariously parasitizing grubs of *Hyperaspis maindroni* Sicard (Coleoptera: Coccinellidae) in the colonies of *P. manihoti* in Tamil Nadu, India. Globally, this is the first report of *H. turkmenicus* playing an active role in the food web of insects associated with the cassava mealybug. *Homalotylus turkmenicus* is widely distributed in many states of India (Andhra Pradesh, Haryana, Punjab, Rajasthan, Tamil Nadu and Uttar Pradesh) and in the Palaearctic region it is prevalent in Iran and Turkmenistan (Noyes, 2020). It is well known to primarily attack many species of Coccinellidae (Coleoptera) and few species of Pseudococcidae (Hemiptera).

The aim of this study is to highlight the role of *H. turkmenicus* in the CMB colony as it can be easily mistaken as a primary parasitoid of *P. manihoti*.

Surveys were undertaken for tracing the cassava mealybug infestation at multiple locations in Namakkal and Salem districts of Tamil Nadu, India. Morphological studies of the pest and the parasitoids were conducted at the ICAR-National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru. The specimens/vouchers of the present study were deposited in the National Insect Museum of ICAR-NBAIR. Images of the parasitoid were taken with a Leica M 205 A stereo zoom microscope with Leica DC 420 inbuilt camera using automontage software (version 3.8).

The cassava mealybug colonies were collected from Namakkal and Salem districts in Tamil Nadu, India (Table 1) and were later sorted (separating the predators/mummified grubs) and kept in glass tubes (Fig. 1) for further observation in the laboratory.

The cassava mealybug colony harbours many parasitoids and predators which are directly or indirectly associated with the CMB. However, it is extremely important to check for

Table 1. Observations on the per cent parasitism by *Homalotylus turkmenicus* on *Hyperaspis maindroni* grubs predating on CMB in the susceptible (unsprayed) cassava varieties

S. No.	Collection locality in Tamil Nadu	Name of the cassava variety	Number of <i>Hyperaspis maindroni</i> grubs collected	Number of <i>Hyperaspis maindroni</i> grubs parasitized	Per cent parasitism by <i>Homalotylus turkmenicus</i>
1	Thoppapatti	Mulluvadi	96	69	71.87
2	Kalkurichi	Sree Athulya	34	26	76.47
3	T. Jeddarpalayam	White Thailand	42	34	80.95
4	So. Pachadiyampalayam	Sree Vijaya	67	44	65.67

**Fig. 1. Sorted cassava mealybug colonies in the glass tubes**

the main source of parasitism as coccinellids are one of the predominant predators in the CMB colony and are prone to high parasitism. In the observed CMB colonies (Fig. 2A), *Hy. maindroni* was found actively predating on *P. manihoti* (Fig. 2B). Based on literature review, many species of *Homalotylus* have already been reported from *P. manihoti* (Noyes, 2020). Based on our observations, *H. turkmenicus* was the common parasitoid attacking *Hy. maindroni* (Figs. 2 C & D) in the colonies of *P. manihoti* from multiple locations in Tamil Nadu. When dissected, up to seven wasps of *H. turkmenicus* were observed per mummified *Hy. maindroni* grub. The brief diagnosis of parasitoid is as follows:

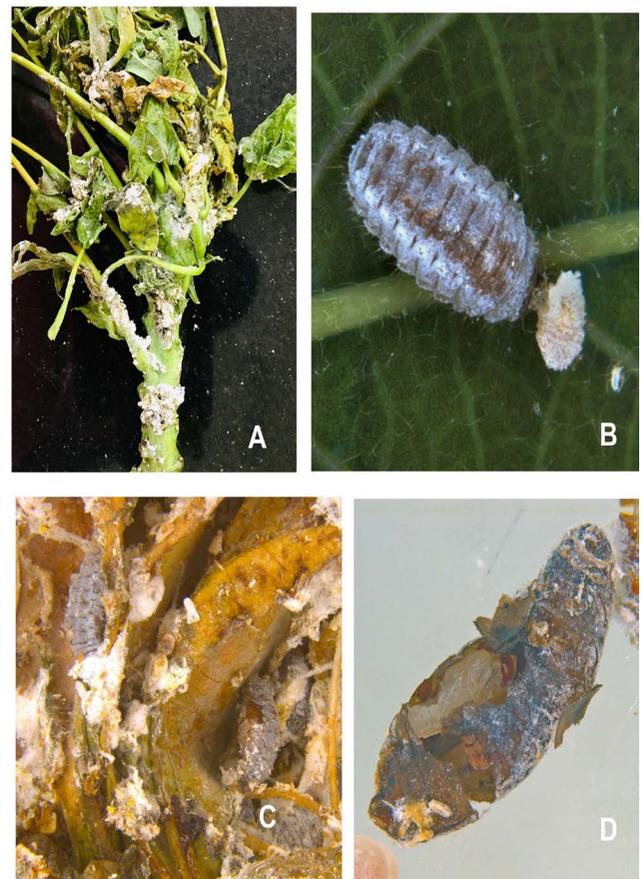
**Fig. 2. A. Colony of *Phenacoccus manihoti* on Cassava; B. Larva/grub of *Hyperaspis maindroni* feeding *P. manihoti*; C. Mummified *Hy. maindroni* in *P. manihoti* colony; D. Immature *Homalotylus turkmenicus* Myartseva inside mummified *Hy. maindroni***



Fig. 3A. *Homalotylus turkmenicus* Myartseva (habitus, in dorsal aspect)



Figure 3B. *Homalotylus turkmenicus*(habitus, in lateral aspect)

Brief diagnosis of *Homalotylus turkmenicus* Myartseva, 1981

(Figs. 3A&B)

Colour: Body dark brown with metallic shine antenna dark brown to blackish brown except white clava. Fore legs dark brown with light brown tarsi; mid and hind legs dark brown excluding off-white to white tarsi (Figs 3A & B).

Body measurements: Frontoververtex 0.25–0.27 times head width. Antenna with pedicel about 2 times as long as wide; pedicel 0.72 times as long as combined length of funicular segment one and two; scape about 8.28 times as long as wide. Ovipositor (exerted part) 0.65 times as long as

length of mid tibia. Relative measurements of mid tibia: mid tibial spur: mid tarsi- 10.51: 3.75: 8.01.

Details of specimens examined (*Homalotylus turkmenicus*)

Ten females and ten males, Tamil Nadu: Nammakal: T. Jeddarpalyam, 01.vi.2020, coll. M. Mohan; 10 females and 10 males, Tamil Nadu: Salem: Thalaivasal, 5.vi.2020, coll. M. Mohan.

Based on our surveys and findings, so far we have not come across any primary parasitoid of the cassava mealybug in India. However, we are still undertaking multiple location surveys and looking for potential parasitoids.

ACKNOWLEDGMENTS

The authors remain grateful to the Indian Council of Agricultural Research for providing research facilities. We profusely thank Dr Sunil Joshi, Principal Scientist, ICAR-NBAIR for the identification of cassava mealybug and predator *Hyperaspis maindroni* and for providing the image of *Hy. maindroni* grub as well as for his expert comments on the manuscript. We are thankful to Dr C. R. Ballal (ex-Director ICAR-NBAIR) for encouraging the team for CMB surveys. Thanks to Dr S. Vennila, Principal Scientist, ICAR-NCIPM and Ms Yoganayagi, ADH, Sendamangalam Block, Namakkal Dt. for their help in collecting mealybug infested samples from Namakkal district. We are grateful to Dr Mohammad Hayat for the expert comments.

REFERENCES

- Joshi S, Pai SG, Deepthy KB, Ballal CR & Watson GW. 2020. The cassava mealybug, *Phenacoccus manihoti* Matile-Ferrero (Hemiptera: Coccoomorpha: Pseudococcidae) arrives in India. *Zootaxa* **4772**(1):191–194. <https://doi.org/10.11646/zootaxa.4772.1.8>
- Myartseva SN. 1981. Species of *Homalotylus* Mayr (Hymenoptera, Encyrtidae) - parasites of coccinellids (Coleoptera, Coccinellidae) in Turkmenistan. *Izvestiya Akademii Nauk Turkmenskoy SSR (Seriya Biologicheskikh Nauk)* **6**: 35–41. [In Russian]
- Noyes JS. 2020. Universal Chalcidoidea Database. World Wide Web electronic publication. Retrieved from: <http://www.nhm.ac.uk/chalcidoidea>