



FIRST RECORD OF PARASITOID *BRACHYMERIA EUPLOEAE* WESTWOOD ON *ACAREA TERPSICORE* L.

A N PATIL AND S M GAIKWAD*

Department of Zoology, Shivaji University, Kolhapur 416004, Maharashtra, India

*Email: smg_zoo@unishivaji.ac.in (corresponding author): ORCID ID: 0000-0001-5182-9861

ABSTRACT

Life cycle stages of butterflies parasitized by natural enemies. Many species of Chalcid wasps are parasites of the pupae of many insects, especially the *Brachymeria* genus. During field visits, it has been observed that pupae of butterfly *Acaria terpsicore* (Linnaeus, 1758) are parasitized by the chalcid wasp *Brachymeria euploae* (Westwood, 1837). Pupae that become infested are blackish and their activity does not resemble that of normal pupae. The record of *B. euploae* as a parasitoid is not only the first record on pupae of *A. terpsicore* but also for Maharashtra, India.

Key words: Lepidoptera, butterfly, *Acaria terpsicore*, pupa, natural enemy, parasitoid, chalcid, *Brachymeria euploae*.

Lizards, birds, spiders and predatory insects are the most common enemies of butterflies. Life stages- egg, larva and pupa of butterflies are attacked by parasitoids, mainly by hymenopteran wasps and dipteran flies (Haribal, 1992). Butterflies support a range of parasites like wasps (Bhakare and Ogale, 2018). According to Nacua et al. (2020), natural enemies affect the entire life cycle of the butterflies from egg, larva, pupa and adult. The butterfly *Acaria terpsicore* (Linnaeus, 1758) is ochreous orange with a black border at the margins of the wings (Noor et al., 2021). According to Sheela et al. (2003) multiple parasitism, super parasitism and hyper parasitism are very common among chalcids and larvae of chalcids are entomophagous parasites. *Brachymeria* species cause high mortality of a few butterfly species and are considered as one of the biological controlling agents (Santosh and Basavarajappa, 2017). A parasitoid *Brachymeria euploae* (Westwood, 1837) is a common species parasitizing various Lepidoptera (Sureshan, 2009). In the present study, *B. euploae* is recorded for the first time as a pupal parasitoid of the butterfly *A. terpsicore*.

MATERIALS AND METHODS

A sampling of infested pupae of *A. terpsicore* was done in April and May 2022 and observations were made on parasitoids in the Department of Zoology, Shivaji University, Kolhapur. The identification of emerged parasitoids was done by following Narendran (1989) and Narendran and Achterberg (2016). Photography of emerged parasitoids was done under a stereozoom microscope (Lynx LM-52-3621) with an attached

camera. The photos were stacked in Helicon Focus 7 software. Stacked photos were edited in Photoshop C53. For the measurement of length IMAGE J software is used.

RESULTS AND DISCUSSION

During regular visits to study the life cycle of the butterfly *Acaria terpsicore* (Linnaeus, 1758), it was observed that some pupae became blackish and were not showing normal activity. Such pupae were collected and kept under observation in the laboratory and found that a single black-bodied, about 5 mm long, grey-eyed and 11 segmented antennal parasitoid emerged from the pupa of *A. terpsicore* after 10 days by making an exit hole on 5th May 2022. (Fig. 1c). This parasitoid was identified as *Brachymeria euploae* (Westwood, 1837) (Hymenoptera: Chalcididae) (Fig. 1c) based on swollen hind femora (Fig. 1d, e) which is distinguishing character of the family Chalcididae (Sheela et al., 2003). Besides, apices of all femora, fore and mid tibiae and all tarsi pale yellow; wings are hyaline with dark brown veins, hind tibia yellow with a black base (Joseph et al. 1973, Narendran and Achterberg, 2016). The record of *B. euploae* is not only the first record on pupae of *A. terpsicore* but also for Maharashtra, India.

According to Shaw et al., (2009), wasps from the family Chalcididae attack the pupal stage of European butterflies. Several *Brachymeria* (Chalcididae) attack the pupae of *Erionota* species including *B. albotibialis*, *B. lasus*, *B. thracis* and *B. euploae* (Waterhouse and Norris, 1989). In India, *B. euploae* so far known



Fig. 1. *Acarea terpsicore* adult just after emergence (a), Pupa of *A. terpsicore* (b), parasitized pupae showing exit hole (c), pupal parasitoid of *A. terpsicore* (Dorsal view) (d) and (Lateral view) (e), swollen femur of parasitoid (f)

from Kerala (Sureshan, 1999), Andamans and Tripura (Sheela et al., 2003) as a first report, Arunachal Pradesh, Bihar, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Manipur, Odisha, Punjab, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal (Narendran, 1989). Considering the states mentioned above and as this species is not mentioned in the fauna of Maharashtra published in 2012 and a checklist of Chalcididae (Binoy et al., 2021), the record of this species from the present study is new to Maharashtra. Hosts of *B. euploee* are from the family Nymphalidae and various Lepidoptera which are crop pests (Narendran, 1989; Sureshan, 2009) and is a hyperparasitoid in the family Nymphalidae (Narendran and Achterberg, 2016). Gowri et al., (2016) newly recorded *B. euploee* as a pupal parasitoid from Manipur, Mizoram and Nagaland without mentioning the name of the host. The present study reports a similar observation i.e. parasitism of *B. euploee* on the nymphalid butterfly *A. terpsicore*. The *B. euploee* also attack on butterfly pupae of the banana pest *Erionota thrax* (banana skipper) (Waterhouse and Norris, 1989) and the Rice green moth, *Latoia bicolor* from rice growing zones of Tamil Nadu, India (Daniel and Ramaraju, 2017). There are some other species of *Brachymeria* genus which are reported as a parasitoid of different insects like *Brachymeria albotibialis* a pupal parasitoid of the banana skipper (*Erionota thrax*) (Okolle et al., 2008), *Brachymeria albicrus* a pupal parasitoid of *Pieris rapae* (Hasanshahi et al., 2013), *Brachymeria tibialis* a pupal parasitoid of butterfly

Aporia crataegi (Obregon et al., 2015), *Brachymeria jambolina* a pupal parasitoid of *Graphium doson* and *Euploea core* (Santhosh and Basavarajappa, 2017). Basak et al. (2020) recorded *Brachymeria burksi* on *Aspidomorpha miliaris* (Coleoptera: Chrysomelidae) and *Brachymeria podagrica* on different species of Diptera and Lepidoptera. Kaplan and Yildirim (2022) described a new species of Chalcididae, *Brachymeria zelihae* from Turkey. Prasanthi et al. (2023) recorded *Brachymeria excarinata* as a hyperparasitoid of *Charops bicolor* (Hymenoptera: Ichneumonidae) from India for the first time. As this species is a natural enemy of many lepidopteran insects and is not popular in the IPM and hence can be used as a biocontrol agent against lepidopteran crop pests.

ACKNOWLEDGEMENTS

The authors are thankful to the Department of Zoology, Shivaji University Kolhapur for providing laboratory facilities.

FINANCIAL SUPPORT

This work receives financial assistance from the Chhatrapati Shahu Maharaj National Research Fellowship (CSMNRF), 2022, Government of Maharashtra.

AUTHOR CONTRIBUTION STATEMENT

SMG is involved in the design of the research, identification of specimens and writing up the manuscript. ANP collected, reared, identified and gathered biological data of species under study.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- Basak N, Rameshkumar A, Saroj S, Kazmi S I. 2020. On the collection of Chalcididae (Hymenoptera: Chalcidoidea) from Dadra and Nagar Haveli, India. Records of Zoological Survey of India 120(3): 257-262.
- Bhakare M, Ogale H. 2018. A guide to butterflies on Western Ghats (India) Includes butterflies of Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra and Gujarat. pp. 496.
- Binoy C, Santhosh S, Nasser M. 2021. A Checklist of Chalcididae (Insecta: Hymenoptera: Chalcidoidea) of India. Version 1.0. <http://zsi.gov.in>
- Daniel J A, Ramaraju K. 2017. Diversity of chalcids (Chalcididae: Hymenoptera) among three rice growing zones of Tamil Nadu, India. Journal of Entomology and Zoology Studies 5(3): 541-546.
- Gowri P, Manickavasagam S, Kanagaragan R. 2016. New records of chalcid (Hymenoptera: Chalcididae) pupal parasitoid from

- India. Biodiversity Data Journal 4: e6900 <https://doi.org/10.3897/BDJ.4.e6900>
- Haribal M. 1992. The butterflies of Sikkim Himalaya and their natural history, Sikkim Nature Conservation Foundation, Gangtok. pp. 217.
- Hasanshahi G, Abbasipour H, Jahan F, Askew R, Escola A R. 2013. New record of *Brachymeria albicrus* (Klug) (Hymenoptera: Chalcididae), a pupal parasitoid of the cabbage white butterfly, *Pieris rapae* (Linnaeus) from Iran. Journal of Biological Control 27(2): 124-125.
- Joseph et al., 1973. A Monograph on the oriental species of *Brachymeria* (Hymenoptera: Chalcididae). Xaview Press, Calicut - 1, pp 1-125.
- Kaplan E, Yildirim E. 2022. A new species of *Brachymeria* Westwood, 1829 (Hymenoptera: Chalcididae) from Turkey. Zoology in the Middle East 68(3): 247-251
- Nacua A E, Clemente K J, Macalalad E P, Galvez M C, Belo L P, Orbecido A H, Deocariz C C. 2020. Butterflies behaviors and their natural enemies and predators in Manila, Philippines. Sian Journal of Conservation Biology 9(2): 240-245.
- Narendran T C. 1989. Oriental Chalcidoidea (Hymenoptera: Chalcidoidea). pp. 444.
- Narendran T C, Achterberg C V. 2016. Revision of the family Chalcididae (Hymenoptera: Chalcidoidea) from Vietnam, with the description of 13 new species. Zookeys 576: 1-202.
- Noor S, Abang F, Dieng H. 2021. Biology of exotic butterfly *Acareia terpsicore* (Linnaeus, 1758) (Nymphalidae: Heliconiinae), in a Newly Invaded Region, Sarawak, Borneo. Sarhad Journal of Agriculture 1(37): 235-246.
- Obregon R, Shaw M R, Fernandez-Haeger J, Jordano D. 2015. Parasitoid and ant interactions of some Iberian butterflies (Insecta: Lepidoptera). SHILAP Revta, lepid. 43(171): 439-454.
- Okolle J N, Ahmad A H, Mansor M. 2008. Host stage preferences of three major parasitoids of the banana skipper (*Erionota thrax*) (Lepidoptera: Hesperidae). Biol. Control 22(2): 271-276.
- Prasanthi G, Rath P C, Dey D. 2023. First record of *Brachymeria excarinata* Gahan, 1925 (Hymenoptera: Chalcididae) as a hyperparasitoid of *Charops bicolor* (Szepligeti, 1906) (Hymenoptera: Ichneumonidae) from India. National Academy Science Letters <https://doi.org/10.1007/s40009-023-01204-3>
- Sheela S, Narendran T C, Tiwari R N. 2003. Contribution to the knowledge of Chalcididae of India. Records of the Zoological Survey of India 101 (part 3, 4): 247-266.
- Sureshan P M. 1999. On a collection of Chalcidoidea (Hymenoptera) From Kasaragod district (Kerala State). Records of the Zoological Survey of India 97 (part 4): 75-82.
- Sureshan P M. 2009. On a collection of Chalcidoidea (Hymenoptera: Insecta) from Orissa, India. Records of the Zoological Survey of India 109 (part 4): 87-104.
- Santosh S, Basavarajappa S. 2017. Record of natural enemies of few butterfly species amidst agriculture ecosystems of Chamarajnagar District, Karnataka, India. Life Science Informatics Publication 2(5): 18-30.
- Shaw M R, Stefanescu C, Nouhuya S V. 2009. Parasitoids of European butterflies. Ecology of Butterflies in Europe. Cambridge University Press. pp. 130-156.
- Waterhouse D F, Norris K R. 1989. Biological control: Pacific prospectus Supplement 1. ACIAR Monograph no. 12 (vii). pp. 125.

(Manuscript Received: February, 2023; Revised: May, 2023;
Accepted: May, 2023; Online Published: May, 2023)

Online First in www.entosocindia.org and indianentomology.org Ref. No. e23108