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LITTLE BEAR MOTH OF THE GENUS *PHYKODES* RINDSBERG (LEPIDOPTERA: BRACHODIDAE): A LESSER-KNOWN AND NEW PEST FROM THE WESTERN GHATS OF INDIA

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ABSTRACT

This study reports a new pest, *Phykodes radiata* (Ochsenheimer (Lepidoptera, Cossoidea) from a poorly known family of moths, the Brachodidae on *Ficus* from Western Ghats of India.

Key words: *Phykodes radiata*, Phycodinae, Cossoidea, Sesioidea, Ficus, cucurbits, new record, Western Ghats, Gaganbawda, Maharashtra, day flying

An interesting day-flying moth, *Phykodes radiata* (Ochsenheimer, 1808) was collected from Gaganbawda of Kolhapur district, Maharashtra, India by the first author in 2016. Gaganbawda is situated on the Western Ghats, locally known as Sahyadri, an undisturbed beautiful hilly village of Kolhapur district, known for its rich biodiversity. *P. radiata* is known to feed on *Ficus glomerata*, *F. religiosa*, *F. carica*, *F. bengalensis*, *F. indica*, *F. tisela*, *F. benjamina var. nuda* (Moraceae) (Fletcher, 1917, 1919; Beeson, 1941; Wadhi and Batra, 1964; Nair et al., 1976; Kumar and Ramamurthy, 2010); *Paulownia* sp. (Scrophulariaceae) (Bajwa and Gul, 2000); *Mimusops elengi* (Sapotaceae) (Kumar and Ramamurthy, 2010); *Momordica charantia*, *Trichosantes anguina*, *Lagenaria siceraria* (Cucurbitaceae) (Kumar and Ramamurthy, 2010). In India, it is reported as a minor and sporadic pest of fig from Bihar, New Delhi, Kerala (Kavvai River basin) and Punjab parts of India (Kumar and Ramamurthy, 2010; Alex et al., 2021). The literature published on moths covering Western Ghats and Maharashtra did not record *P. radiata* or the family Brachodidae (Gurule and Nikam, 2013; Shubhalaxmi et al., 2011; Kalawate et al., 2018; Kalawate, 2021; Mitra et al., 2019). Till the present study, there is no published record of *P. radiata* from Western Ghats. Hence, this first report of *P. radiata* and the family Brachodidae from the Western Ghats and Maharashtra.

The family Brachodidae is small and comprising of only three subfamilies: Brachodinae, Pseudocossinae, and Phycodinae distributed worldwide with the exception of North America (Nieukerken et al., 2011;Kallies, 2013). It is a family of day-flying, rare moths, and was earlier assigned to the superfamily Sesioidea (Heppner and Duckworth, 1981; Minet, 1991). Recently, Nieukerken et al. (2011) included Brachonidae in the superfamily Cossoidea and the same is followed by Kallies (2013, 2016) and also in the present study. Brachodidae is well studied in the Sub-Saharan Africa, Oriental and Australia regions (Kallies, 1998; Kallies, 2004; Kallies, 2016), but poorly studied in India. The recorded host plant for the subfamily, Brachodinae are monocotyledonous; dicotyledons (also *Ficus*) for Phycodinae; palms for Pseudocossinae (Kallies, 2016). As per the various reports, number of extant species in Braconidae varies: 137 species (Heppner and Duckworth, 1981; Nieukerken et al., 2011; Kallies, 2013); approximately 135 (Heppner, 1981; Kallies, 2004); and < 150 (Kallies, 2016).

MATERIALS AND METHODS

Phykodes radiata was collected in the field by hand sweeping using insect net around the agricultural fields and was transferred to a killing bottle containing ethyl acetate vapours. After killing, the specimen was transferred to an insect packet made of butter paper and brought to the laboratory for further studies. It was stretched, pinned and stored in the entomological boxes filled with preservatives. For morphological studies the specimen was examined under Leica EZ4E stereomicroscope. The collected specimen was identified as per Kallies (2004) and Kumar and Ramamurthy (2010). The identified specimen is deposited in the National Zoological Collections of the Zoological Survey of India, Western Regional Centre, Pune, Maharashtra, India (ZSI/WRC).

RESULTS AND DISCUSSION

Taxonomy

Family Brachodidae
Subfamily Phycodinae Rebel 1907

Type genus. *Phycodes* Guenee 1852 (*Phykodes* Rindsberg 2019)

Phycodes Guenee 1852 preoccupied name by well known trace fossil (ichnofossil) *Phycodes* Richter 1850; hence, was replaced by *Phykodes* Rindsberg 2019.

Genus *Phykodes* Rindsberg 2019

1852. *Phykodes* Rindsberg, The Journal of the Lepidopterists' Society 73(1): 54-55.

Type Species. *Phykodes hirudinicornis* Guenée 1852 = *Phykodes radiata* (Ochsenheimer, 1808).

Phykodes radiata (Ochsenheimer, 1808)

1808. *Chimaera radiata* Ochsenheimer, *Schmett. Europa* 1 (2): 5.

Type locality. Austria.

Material examined: Stonarc resort, Gaganbawda, 16.5445N, 73.8266E, altitude 615 m, sweep netting sample, 03.x.2016, 1 ♀ (A.S. Kalawate).

Diagnosis: Adult (Fig. 1A). Female: Wing expanse. 26 mm. Head greyish smooth, eyes quite large, antennae filiform; thorax grey with purplish tinge under light. Forewings greyish with black irregular bands, scales greyish and in some places blackish with white spot on its tip; cilia greyish. Hind wing dark brown, the costal margin yellow, centre with two yellow prominent markings; cilia yellowish. Female Genitalia (Fig. 1B). Corpus bursae oval, membranous, with a single signum; signum consists of many small cornute (Fig. 1C), the surface surrounding the signa is scobinated; ductus bursae long, membranous; ostium bursae simple, sclerotized; anterior apophyses longer than posterior, reaching till corpus bursae; papilla analis long, sclerotized, covered with setae.

Distribution: India (Bihar; Kerala, Maharashtra (New record); New Delhi; Punjab); Afghanistan; Iran; Nepal; Pakistan, Peshawar; Sri Lanka (Kallies, 2004; Kumar and Ramamurthy, 2010; Ramezan et al. 2011; Alex et al., 2021).

Larval hosts: *Ficus glomerata*, *F. religiosa*, *F. carica*, *F. bengalensis*, *F. indica*, *F. tisela*, *F. benjamina var. nuda* (Moraceae); *Paulownia* sp. (Scrophulariaceae); *Mimusops elengi* (Sapotaceae); *Momordica charantia*, *Trichosantes anguina*, *Lagenaria siceraria* (Cucurbitaceae) (Fletcher, 1917, 1919; Beeson, 1941; Wadhi and Batra, 1964; Nair et al., 1976; Bajwa and Gul, 2000; Kumar and Ramamurthy, 2010).

The present study is a new record of pest of figs and cucurbit crops from the Gaganbawda village of Kolhapur district, Maharashtra, India. The detailed taxonomic characters of adults and larvae of *P. radiata*, its feeding habit has been provided by Kumar and Ramamurthy (2010). Hence, the present study provides only the key characters. *P. radiata* was reported from the Northern part of India (Kumar and Ramamurthy, 2010), and recently in 2021 it is reported from the Kavvai River Basin of Kerala, India (Alex et al., 2021). There are no reports of this pest from the Western Ghats and Maharashtra so far.

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AUTHOR CONTRIBUTION STATEMENT

ASK conceived, design the research, written the MS, PS contributed for dissection, photographs, spreading of the specimen.

CONFLICTS OF INTEREST

No potential conflict of interest was reported by the author(s).

REFERENCES

Alex C J, Soumya K C, Sajeev T V. 2021. A report on the moth (Lepidoptera: Heterocera) diversity of Kavvai River basin in Kerala, India. Journal of Threatened Taxa 13(2): 17753-17779.

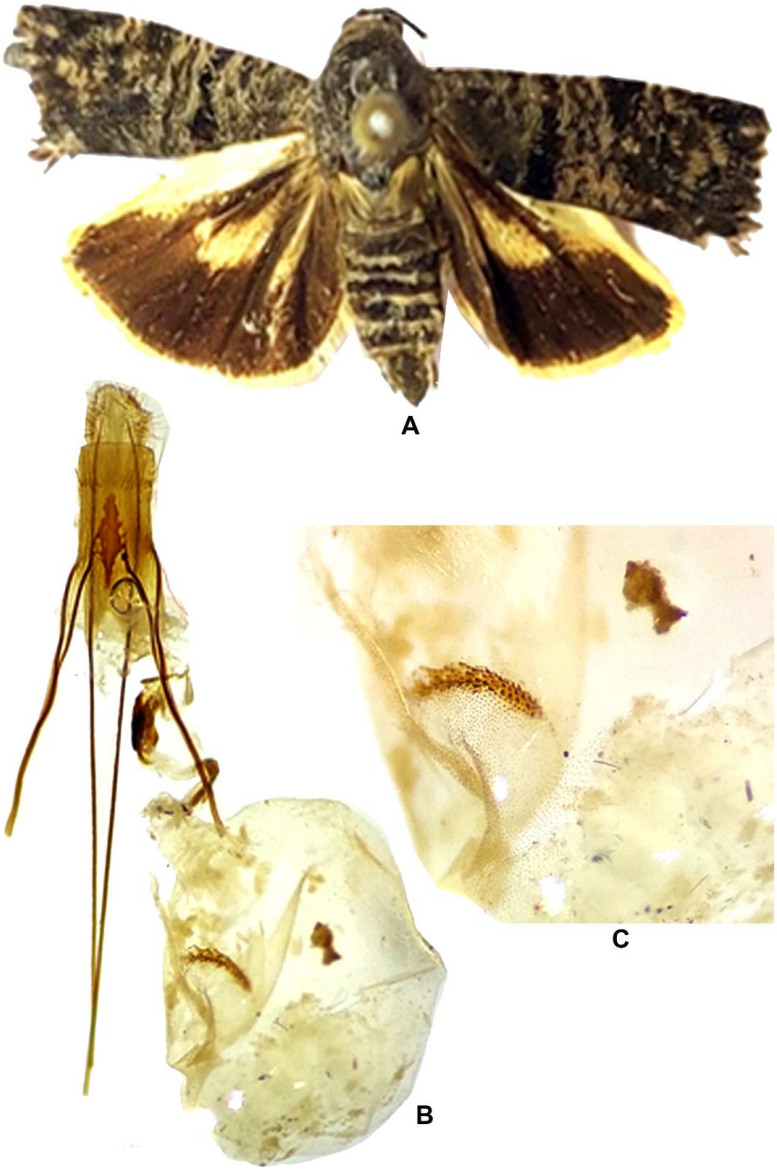

Fig. 1. *Phykodes radiata*: A. Female adult; B. Female genitlaia; C. enlarged view of spiny signum

Bajwa G A, Gul H. 2000. Some observations on insect species of Paulownia species at Pakistan Forest Institute Campus Peshawar. Pakistan Journal of Forestry 50: 71-80.

Beeson C F C. 1941. The ecology and control of the forest insect of India and the neighbouring countries. Forest Research Institute, Dehra Dun, India. 1007 pp.

Fletcher T B. 1917. Fruit trees fig (*Ficus carica*). Proceedings of the second entomological meeting, Pusa. pp. 250-251.

Fletcher T B. 1919. Life histories of Indian Microlepidoptera. Proceedings of the third entomological meeting, Pusa. pp.838-857.

Gurule S. Nikam, S. 2013. The moths (Lepidoptera: Heterocera) of northern Maharashtra: a preliminary checklist. Journal of Threatened Taxa 5 (12): 4693-4713.

Heppner, J B, Duckworth W D. 1981. Classification of the superfamily Sesioidea (Lepidoptera: Ditrysia). Smithsonian Contribution to Zoology 314: 1-144.

Kalawate A S. 2018. On a collection of moths (Lepidoptera: Heterocera) from the northern Western Ghats of Maharashtra, India. Zoology and Ecology 28 (3): 231-251.

Kalawate A S. 2021. Insecta: Lepidoptera: Heterocera (Moths). Fauna of Koyna Wildlife Sanctuary, Maharashtra, Conservation Area Series, 66: 137-186. Director, Zoological Survey of India, Kolkata.

Kallies A. 1998. A contribution to the knowledge of the Oriental and Australian Brachodidae (Lepidoptera, Sesioidea). Tinea 15(4): 312-337.

Kallies A. 2004. The Brachodidae of the Oriental region and adjacent territories (Lepidoptera: Sesioidea). Tijdschrift voor Entomologie 147(1): 1-19.

Kallies A. 2013. New and little known Brachodidae from tropical Asia and Papua New Guinea (Lepidoptera, Cossoidea). Zootaxa 3641 (3): 241-259.

Kallies A. 2016. The Brachodidae of Sub-Saharan Africa (Lepidoptera,

Cossoidea), with implications for the origin of the family. Zootaxa 4083 (1): 001-039.

Kumar R, Ramamurthy VV. 2010. Morphology and bionomics of *Phycodes radiata* Ochsenheimer (Lepidoptera: Brachodidae) from New Delhi, India. Tijdschrift voor Entomologie 153: 15-24.

Mitra B, Chandra K, Shah S K R, Kumar J. 2019. Insecta: Lepidoptera. Fauna of Maharashtra, State Fauna Series 20(Part-3): 89-209. Director Zoological Survey of India, Kolkata.

Nair K K, Ananthakrishnan T N, David B V. 1976. General and Applied Entomology. Tata McGraw Hill Publishing Company Ltd., New Delhi. 589 pp.

Nieukerken E J van, Kaila L, Kitching I J, Kristensen N P, Lees D C, Minet J, Mitter C, Mutanen M, Regier J C, Simonsen T J, Wahlberg N, Yen S-H, Zahiri R, Adamski D, Baixeras J, Bartsch D, Bengtsson B Å, Brown J W, Bucheli S R, Davis D R, De Prins J, De Prins W, Epstein M E, Gentili-Poole P, Gielis C, Hättenschwiler P, Hausmann A, Holloway J D, Kallies A, Karsholt O, Kawahara A Y, Koster S J C, Kozlov M, Lafontaine J D, Lamas G, Landry J-F, Lee S, Nuss M, Park K-T, Penz C, Rota J, Schintlmeister A, Schmidt B C, Sohn J-C, Solis M A, Tarmann G M, Warren A D, Weller S, Yakovlev R V, Zolotuhin V V, Zwick A. 2011. Order Lepidoptera Linnaeus, 1758. Zhang, Z.-Q. (eds.), Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness. Zootaxa 3148: 212-221.

Shubhalaxmi V, Kendrick R C, Vaidya A, Kalagi N, Bhagwat A. 2011. Inventory of moth fauna (Lepidoptera: Heterocera) of the Northern Western Ghats, Maharashtra, India. Journal of the Bombay Natural History Society 108(3): 183-205.

Wadhi S R, Batra H N. 1964. Pests of tropical and subtropical fruit trees. N C. Pant (ed.) Entomology in India. The Entomological Society of India, New Delhi. pp. 227-260.

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