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Host range expansion of *Distatrix papilionis* (Viereck) (Hymenoptera: Braconidae), a gregarious endoparasitoid of lepidopterous pests, in India

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Abstract

Distatrix papilionis (Viereck) (Hymenoptera: Braconidae) is reported to parasitize caterpillars of *Graphium nomius* (Esper) (Lepidoptera: Papilionidae) in southern India. This is the first association of *D. papilionis* being recorded as a gregarious endoparasitoid of *G. nomius*, hitherto commonly collected from *Papilio demoleus* L. in Bengaluru. The number of wasp cocoons per host caterpillar ranged from 21–34 which is directly proportional to the host size. In the present study an illustrated account of parasitism with diagnostic details are presented.

Keywords: *Distatrix papilionis*, larval endoparasitoid, *Graphium nomius*

Introduction

The genus *Distatrix* Mason (1981) ^[4] belongs to the family Braconidae which consists of parasitoids attacking economically important lepidopterous pests across the globe. *Distatrix* is equivalent to the Nixon's *formosus* group (Mason, 1981) ^[4] and is mainly reported from the Oriental region- India, China, Indonesia, Malaysia, and Myanmar. The gregarious cocoons formed by this wasp species generally mimic flower heads (Whitfield, 1997) ^[7]. By far, barely one species, *Distatrix papilionis* (Viereck) is recorded from India attacking *Papilio demoleus* Linnaeus (Gupta & Fernández-Triana, 2014) ^[2]. The number of wasp cocoons/ host caterpillar varied with the larval instar ranging from 15–158 cocoons/caterpillar. This characteristic showed positive correlation between the number of cocoons and the larval mass/size (Gupta & Fernández-Triana, 2014) ^[2].

Distatrix papilionis is recorded from multiple hosts from many geographical regions - *Graphium agamemnon* (L.), *G. sarpedon* (L.), *Papilio demoleus* L., *P. polytes* L., *Papilio* sp., and *Spilarctia obliqua* (Walker) (Yu *et al.* 2016) ^[9]. However, since the last one and a half decade, the first author has reared *D. papilionis* multiple times from sole host- *P. demoleus* on *Citrus* spp. from Bengaluru urban and rural regions. In the present study, the authors report host range expansion of *D. papilionis* to yet another species of *Graphium*, which is an unusual host for the wasp.

Materials & Methods

Two caterpillars of *Graphium nomius* (Esper, 1799) ^[1] were collected from Rachanamadu situated in the Bengaluru urban district of Karnataka on the host plant *Milium tomentosum* (Roxb.) J. Sinclair. The caterpillars were reared on *M. tomentosum* inside the cage at room temperature. Both caterpillars were found to be parasitized. The wasps on emergence were dry mounted on card. The specimens of the present study are deposited at the National Insect Museum of the ICAR- National Bureau of Agricultural Insect Resources, Bengaluru, India.

Results

The genus *Distatrix* can be diagnosed by the following characters: Antenna with false division; propodeum smooth without carinae; first tergite of metasoma rounded apically; second tergite having partial and widely diverging anterior grooves.

Distatrix papilionis (Viereck, 1912) ^[6]
(Figure 1F)

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Fig 1: A- Egg of *Graphium nomius*; B- Fourth instar caterpillar of *G. nomius* (dorsal view); C- Fourth instar caterpillar of *G. nomius* (lateral view); D- Adult of *G. nomius*; E- parasitized caterpillars of *G. nomius* with cocoon masses; F- Female wasp of *Distatrix papilionis*

Apanteles papilionis Viereck, 1912. Holotype female, USNM. *Apanteles agamemnonis* (Wilkinson, 1928)^[8].

Diagnosis: Female body length – 3 mm. Head and mesosoma black. Antenna 18 segmented; apex of scape and flagellum dark brown to black; flagellomeres with placode sensillae arranged in two ranks giving appearance of false division within a flagellomere. First and second metasomal tergites stramineous or yellowish brown; third and succeeding tergites dark brown. Apical fourth of hind tibia, hind tarsi, tegula and costal vein brownish. Mesosoma punctate anteriorly. Mesosoma and scutellum setose. Propodeum smooth and shiny. Second metasomal tergite divergent anteriorly.

Male: Similar to female, except metasoma mostly black with yellow colouration basally.

Material examined: 8 females and males, India: Bengaluru urban district: Rachanamadu, 12°51'15.1"N 77°30'26.6"E, ex *Graphium nomius* (Esper) on *Miliusa tomentosa*, 8.vi.2019, coll. Manidip Mandal.

Distribution: Oriental region: India, China, Indonesia, Malaysia, and Myanmar.

Remarks: Wilkinson (1928)^[8] mentioned that type series was reared from *P. polytes* and paratypes were reared from *P. demoleus* in Bengaluru (=Bangalore). The type locality of this species is Mysuru (=Mysore), India. The duration of wasp development decreased with increasing host age (Krishnamoorthy, 1987)^[3]. The degree of parasitism varies from almost nil to considerable levels and is closely

associated with minimum temperature and rainfall (Singh, 1994)^[5].

Conclusion: The genus *Distatrix* is known to parasitize many host species including three species of *Graphium*- *G. agamemnon*, *G. angolanum* and *G. sarpedon*. Out of these three papilionid species, *G. agamemnon* and *G. sarpedon* are known to occur in India. This wasp genus is ecologically important for agricultural and horticultural ecosystems as it is a gregarious parasitoid of many economically important lepidopterous pests viz., *Helicoverpa armigera* (Hübner), *Mythimna* sp., *Papilio demoleus*, *P. polytes*, *Spilarctia obliqua* and *Spilosoma* sp. (Yu et al. 2016)^[9]. Possibly, *D. papilionis* is expanding its host range for better adaptability and survival and has more affinity towards papilionid hosts.

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