

New Host Records of Three Ichneumon Flies (Hymenoptera: Ichneumonidae) from South Korea

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한국산 맵시벌과(벌목) 3종의 새로운 숙주 보고

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ABSTRACT: This paper reports new hosts for three ichneumonids (*Apophua evanescens evanescens*, *Teleutaea minamikawai*, and *Trathala flavoorbitalis*) from South Korea. These three species were discovered from the lepidopteran pupae, viz., *Cleora leucophaea* (Butler) (Geometridae), *Adoxophyes honmai* Yasuda (Tortricidae), and *Pyrausta phoenicealis* (Hübner) (Crambidae), respectively. Among these, the lepidopteran family Geometridae and Crambidae are also newly recorded as host groups for the genera *Apophua* and *Trathala*.

Key words: Taxonomy, Parasitic wasps, Moth, Larva, Lepidoptera

조 록: 본 연구에서는 한국산 맵시벌과 3종 (운문점박이납작맵시벌, 잎말이나방살이몽톡맵시벌, 안경꼬마자루맵시벌)의 새로운 숙주를 보고하고자 한다. 새로운 숙주는 각각 자나방과, 잎말이나방과, 풀명나방과에 속하며, 이 중 자나방과와 풀명나방과는 각각 쌍점박이납작맵시벌속, 안경꼬마자루맵시벌속의 숙주로써 처음으로 기록된다. 여기에 맵시벌과 3종의 간략한 특징과 우화된 표본의 사진, 숙주의 성충 사진을 제공하였다.

검색어: 분류, 기생벌, 나방, 나비목, 생태

Members of the family Ichneumonidae usually attack the larvae and pupae of holometabolous insects or adult spiders (Quicke, 2015; Takasuka et al., 2018). Generally, many ichneumon wasps are parasitoids of lepidopteran larvae or pupae. This study reports new hosts for the three ichneumon species (*Apophua evanescens evanescens*, *Teleutaea minamikawai*, and *Trathala flavoorbitalis*) in South Korea. Among these, the genus *Apophua* and *Teleutaea* belong to the subfamily Banchinae.

The genus *Apophua* is a moderately large group encom-

passing 38 species worldwide. Of these, seven species are found in South Korea. This genus is an endoparasitoid of the lepidopteran larva, especially the leaf-roller Caterpillar (Tortricidae) (Kamijo, 1973; Momoi et al., 1975). These species are also known to attack other lepidopteran larvae (Noctuidae and Zygaenidae) and coleopteran larvae (Atelabidae, Cerambycidae, and Curculionidae) (Yu et al., 2016). One South Korean species, *Apophua evanescens evanescens*, is easily distinguished from other species by the following characteristics: without areolet, simple convex clypeus, 2nd to 4th tergites with oblique grooves, and 2nd tergite longer than its apical width. This species is a known parasitoid of Nolidae, Tortricidae, and Zygaenidae. Nine species have been reported as hosts for this species, with only two species recorded in South Korea. In this

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study, this species was additionally recovered from *Cleora leucophaea* (Butler) (Lepidoptera: Geometridae).

Teleutaea is a moderately sized genus comprising 20 described species from the Palaearctic, Neotropic, and Oriental regions (Yu et al., 2016). Eight species have been recorded in South Korea. These species are known entoparasitoids of the leaf-roller Caterpillar (especially Tortricidae). One South Korean species, *Teleutaea minamikawai*, is easily distinguished from other species in having a large yellow spot on the mesopleuron, a thick yellow mark on the pronotum, and a simple antennal socket (not prolonged). Five species have been reported as hosts for this species, with four species recorded from South Korea. In this study, this species was also discovered in *Adoxophyes honmai* (Lepidoptera: Tortricidae).

The genus *Trathala* belonging to Cremastinae, is a large cosmopolitan group comprising 102 species (Yu et al., 2016). Among them, only two species have been recorded from South Korea. Most of these species are known endoparasitoids of the superfamily Pyraloidea (Lepidoptera). The characteristics of one South Korean species, *T. flavoorbitalis*, easily distinguish it from other species: visible sternite, complete occipital carina, and entirely yellow body color. In all, 80 species have been reported as hosts to this species, with 22 species recorded in South Korea. This species has now been recovered from *Pyrausta phoenicealis* (Hübner) (Lepidoptera: Crambidae).

This paper provides the diagnosis, plate, and host record of three parasitoids, *Apophua evanescens evanescens*, *Teleutaea minamikawai*, and *Trathala flavoorbitalis*.

Materials and Method

The materials used in the present study were collected by rearing and were deposited at the Daegu National University of Education (DNUE, Daegu, South Korea). Distributional data and host records were categorized according to Yu et al. (2016). A host list recorded from Korean fauna is hereby provided. All Korean species are as per the National Species List of KOREA (2019).

The abbreviations used in the present study are as follows: **DEL**, Deutsches Entomologisches Institut, Eberswalde, Germany; **SEHU**, Laboratory of Systematic Entomology, The Hokkaido University Museum, Hokkaido University, Sapporo, Japan;

NHM, The Natural History Museum, Department of Entomology, London, England; **USNM**, United States National Museum of Natural History, Smithsonian Institute, Washington D.C., U.S.A.; **TD**, Type depository; **TL**, Type locality.

The South Korean provinces examined were: **CB**: Chungcheongbuk-do; **JJ**: Jeju-do.

All specimens were examined using an AxioCam MRc5 camera attached to a stereomicroscope (Zeiss SteREO Discovery V20; Carl Zeiss, Göttingen, Germany), processed using AxioVision SE64 software (Carl Zeiss), and optimized with a Delta imaging system (i-solution, IMT i-Solution Inc. Vancouver, Canada). The morphological terminology followed that of the American Entomological Institute website (<http://www.amentinst.org/GIN/morphology.php>).

Results

Subfamily Banchinae

Genus *Apophua* Morley

Apophua Morley, 1913: 231. Type species: *Apophua carinata* Morley.

Apophua evanescens evanescens (Ratzeburg, 1848) (Fig. 1A, B)

Glypta evanescens Ratzeburg, 1848: 103. Type: lost.

Glypta albifrons Holmgren, 1856: 104. Type: female, TL: Sweden, TD: unknown.

Glypta sapporensis Uchida, 1928a: 74. Type: female, TL: Japan, TD: HU.

Diagnosis. Black body. Antenna brown. Scape blackish-brown. Scutellum entirely yellow with anterior brown spot. Dorsoposterior part of pronotum with a yellow spot. Hind coxa and femur orange with brown lateral part. Tibia blackish-brown with a yellow basal part. 5th to 7th tergites tinged yellowish-white. Malar space approximately 0.7 times as long as basal mandibular width. Antenna with 46 flagellomeres. Epicnemial carina present with incomplete lateral. Propodeum with only posterior transverse carina. Apical part of 1st tergite 1.7 times as wide as basal part, with median dorsal carina being more than half and median longitudinal carina absent. 2nd-3rd tergites

have a median longitudinal carina only at basal part. Ovipositor shorter than metasoma.

Collecting data of new host. JJ, Seogwipo-si, Hwasun Gotjawal, 29.vi.2020, SS Kim (host plant: *Sapindus mukorossi* Gaertn.).

Remark. The new host of *Apophua evanescens* e., *Cleora leucophaea* was collected in *Sapindus mukorossi* Gaertn. Adult *Apophua evanescens* e. was discovered in the pupa of *C. leucophaea* approximately after a month (22.v.2020). The family Geometridae was also newly recorded as a host group. *C. leucophaea* is therefore termed polyphagous.

Genus *Teleutaea* Förster

Teleutaea Förster, 1869: 164. Type species: *Lissonota striata* Grevengorstr.

Hoplitophrys Förster, 1869: 164. Type species: *Glypta brischkei* Holmgren.

Teleutaea minamikawai Momoi, 1963 (Fig. 1C, D)

Teleutaea minamikawai Momoi, 1963: 100. Type: female, TL: Japan; TD: SEHU.

Diagnosis. Black body. Upper part of pronotum with thick yellow line and lower part with a yellow mark. Lower part of malar space yellow. Dorso-anterior part of mesopleuron with a small yellow mark, and lower part with a large yellow mark. Scutellum with V-shaped yellow mark. Hind coxa orange with dorsally yellow mark; femur gradated brown base to orange; apical tibia blackish-brown. Apex of 4th-7th tergites with a yellow band (4th tergite with pale yellow). Face flat, sparsely punctate with long pubescence, 0.6 times as long as wide. Antennal socket not prolonged (simple form). Malar space about 0.7 times as long as basal mandibular width. Only posterior transverse carina of propodeum developed. Dorso-median carina of 1st tergite present extends to anterior half. 2nd to 5th tergites with one pair of oblique grooves.

Collecting data of new host. JJ, Seogwipo-si Jungmun, 30.iii.2020, SS Kim (host plant: *Boehmeria tricuspis* (Hance) Makino); ditto, 11.iv.2020, SS Kim (host plant: *Piper kadsura* (Choisy) Ohwi).

Remark. The new host of *Teleutaea minamikawai*, *Adoxophyes honmai* was collected in *Oehmeria tricuspis* (Hance)

Makino and *Piper kadsura* (Choisy) Ohwi. Adult of *T. minamikawai* was discovered in the pupa of *A. honmai* approximately 10-20 days later (09.iv.2020 and 11.iv.2020 each). Tortricidae, belonging to *Adoxophyes honmai*, is a pest that damages fruit trees by feeding on leaves or preventing further growth by rolling them. Especially, *A. honmai* is known to attack young leaves and reduce the yield of green tea.

Subfamily Cremastinae

Genus *Trathala* Cameron

Trathala Cameron, 1899: 122. Type species: *Trathala striata* Cameron.

Epicremastus Szépligeti, 1905: 51. Type species: *Epicremastus concolor* Szépligeti.

Paurolexis Cameron, 1906: 282. Type species: *Paurolexis flavus* Cameron.

Haristaeus Cameron, 1909: 442. Type species: *Haristaeus nigrifrons* Cameron.

Trathala flavoorbitalis (Cameron, 1907) (Fig. 1E, F)

Tarytia flavoorbitalis Cameron, 1907: 589. Type: female; TL: India; TD: NHM.

Cremastus hymeniae Viereck, 1911: 189. Type: female; TL: U.S.A.; TD: USNM.

Diaparsis coreanus Uchida, 1928b: 285. Type: female; TL: Korea; TD: SEHU.

Diaparsis coreanus kondonis Uchida, 1928b: 286. Type: female; TL: China; TD: SEHU.

Cremastus kigaonis Uchida, 1932: 196. Type: female; TL: Taiwan; TD: DEI.

Diagnosis. Yellowish-brown body. Vertex yellow except black ocelli area and behind vertex. Antenna brown. Scutellum dark brown. Propodeum with blackish-brown spots. Legs yellowish-brown, with dark brown hind tibia apically. Black 1st to 2nd tergite. Frons weakly concave above base of antennae, with transverse wrinkles. Occipital carina meeting hypostomal carina slightly distant from the base of the mandible. Ocelli small, distance between eye and lateral ocellus as long as ocellus diameter. Areola and petiolar area of propodeum weakly separated by transverse carina. Metasoma very compressed,

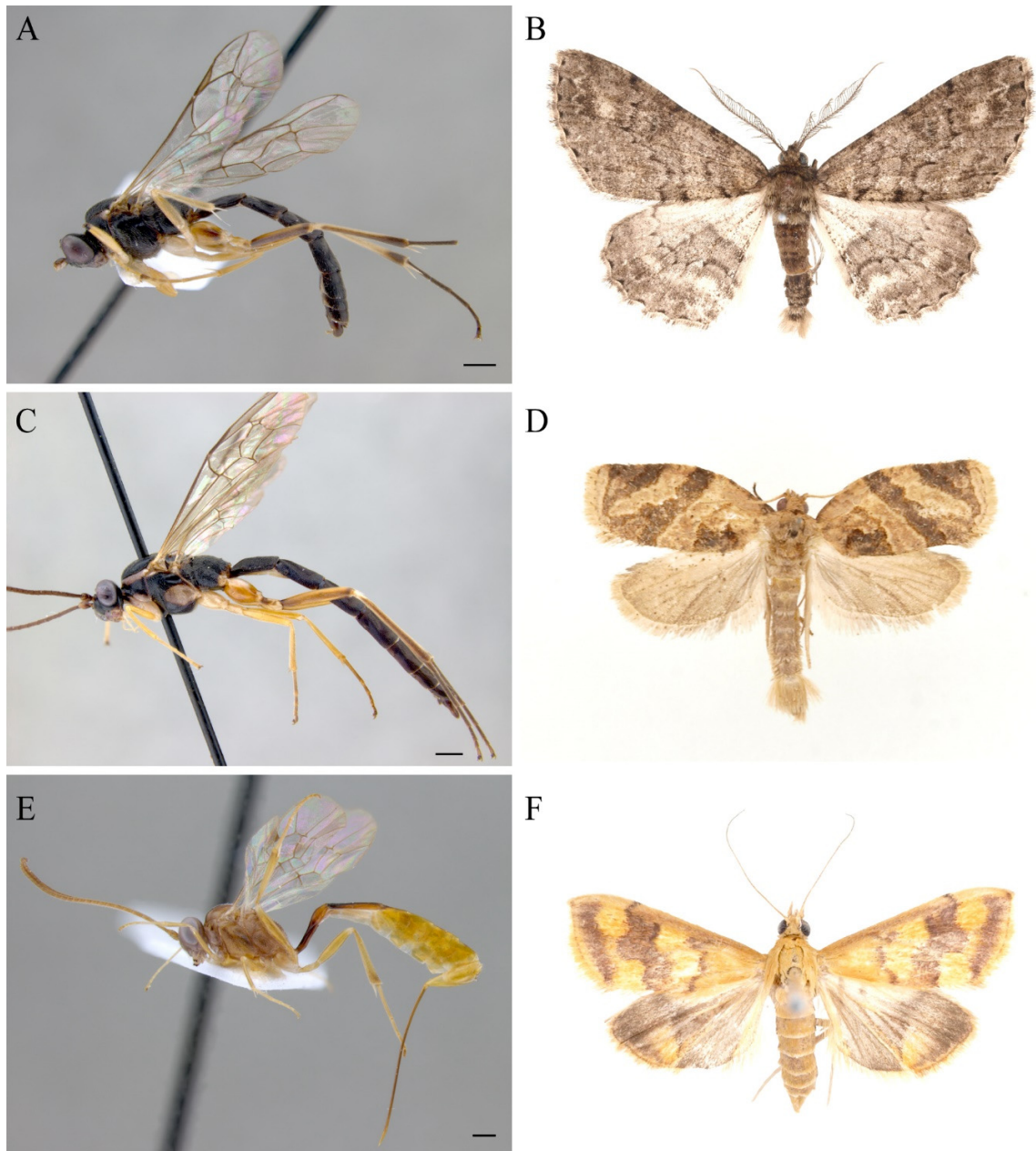


Fig. 1. Habitus of parasitoids and hosts. A. *Apophua evanescens evanescens*; B. *Cleora leucophaea*; C. *Teleutaea minamikawai*; D. *Adoxophyes honmai*; E. *Trathala flavoorbitalis*; F. *Pyrausta phoenicealis*. <Scale bars: A, C 1.0 mm; E 0.5 mm>

petiole with lateral carina. Ovipositor 1.8 times as long as hind tibia.

Collecting data of new host. CB, Cheongju-si, 19.vi.2020, SS Kim (host plant: *Perilla frutescens* (L.) Britton var. *frutescens*).

Remark. The new host of *Trathala flavoorbitalis*, *Pyrausta phoenicealis* was collected in *Perilla frutescens* (L.) Britton var. *frutescens*. Adult *T. flavoorbitalis* was discovered in the pupa of *P. phoenicealis* after 10 days (29.vi.2020). This lepid-

pteran species is a well-known pest of Labiatae, especially in green perilla plants (*Perilla frutescens*). The family Crambidae has also been newly recorded as a host group.

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Statements for Authorship Position & Contribution

Kang, G.-W.: Daegu National University of Education, Insect Inquiry Education Institute, Senior Researcher; performed overall procedures of research and wrote the manuscript

Kim, S.-S.: Research Institute for East Asian Environment and Biology, Researcher; Breeding and host identification

Choi, J.-K.: Daegu National University of Education, Department of Science Education, Professor; Designed the research and wrote the manuscript

All authors read and approved the manuscript

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