

Discovery of an Aquatic Wasp, *Agriotypus silvestris* Konishi & Aoyagi (Hymenoptera: Ichneumonidae: Agriotypinae) in South Korea

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한국산 물벌속(벌목: 맵시벌과: 물벌아과)의 미기록 1종 보고

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ABSTRACT: An aquatic wasp, *Agriotypus silvestris* Konishi & Aoyagi, 1994 is newly recognized in South Korea. A diagnosis and photographs of the diagnostic characters for the species and an identification key to the South Korean *Agriotypus* species are provided herein.

Key words: *Agriotypus silvestris*, Aquatic wasp, Key, New record, Trichoptera

초록: 한국산 맵시벌과의 미기록종인 물벌속(물벌아과)의 국내분포를 처음으로 보고한다. 물벌속의 식별형질의 기재와 주요형질에 대한 사진과 함께 한국산 물벌속의 검색표를 제시한다.

검색어: 물벌속, 수서성 벌, 검색표, 미기록종, 날도래목

Agriotypinae Curtis, 1832, a monotypic subfamily of family Ichneumonidae Latreille, 1802 has been previously reported from the Palearctic and the Oriental regions and 16 species have been described (Bennett, 2001). Up to date only one species, *Agriotypus gracilis* Waterston, 1930 has been known from South Korea.

Agriotypinae can be easily distinguished morphologically from other ichneumonid subfamilies by fully sclerotized posterior sternites of the metasoma. Members of Agriotypinae are known to be aquatic ectoparasitoids of trichopteran pupae or prepupae inhabiting fast-running streams.

In the present study, *Agriotypus silvestris* Konishi and Aoyagi is newly recognized from South Korea. A key to the

South Korean *Agriotypus*, diagnosis and photographs are provided.

Materials and Methods

The terminology used in the present study follows that of Townes (1969) and Bennett (2001). The images were captured with a Leica DFC 495 camera on a Leica M205A Stereozoom stereomicroscope (Leica, Microsystems, Solms, Germany). The multi-stacked pictures were produced using the LAS software (version 4.1.0., Leica Microsystems, Switzerland). The figure plates were prepared using Adobe Photoshop CS6 (Adobe Systems Incorporated, San Jose, United States of America).

The following abbreviations are used throughout the text: OOL = the shortest distance between posterior ocellus and

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compound eye; POL = the shortest distance between posterior ocelli; T1-T3 = metasomal tergites 1-3; CNCI = Canadian National Collection, Ottawa, Canada; KNA = Korea National Arboretum, Pocheon, South Korea.

Systematic accounts

Genus *Agriotypus* Curtis, 1832

Agriotypus Curtis, 1832: 389. Type species: *Agriotypus armatus* Curtis, 1832.

Crotopus Holmgren, 1858: 353 (synonymized by Dalla Torre,

1902). Type species: *Crotopus abnormis* Holmgren, 1859 (= *Agriotypus armatus* Curtis, 1832).

Atopotypus Chao, 1992: 325 (synonymized by Bennett, 2001). Type species: *Atopotypus succintus* Chao, 1992.

Diagnosis. This genus can be distinguished from other ichneumonid by the following combination of characters: the scutellum produced posteriorly into a spine, T2 and T3 fused and sternites of metasoma completely sclerotized. About other detail generic descriptions, see Townes (1969) and Bennett (2001).

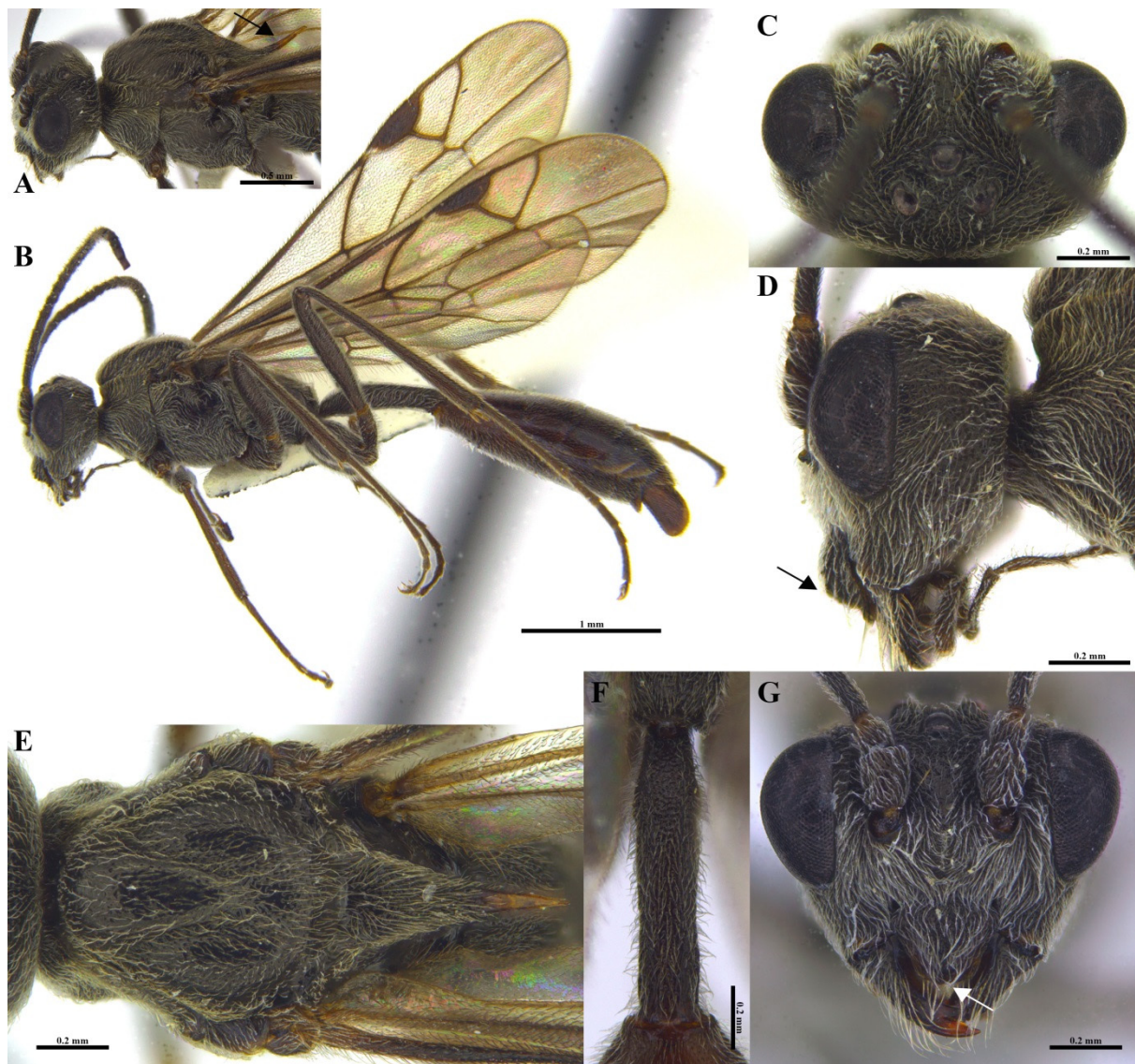


Fig. 1. *Agriotypus silvestris* Konishi and Aoyagi, 1994, male. A, spine of scutellum in lateral view; B, habitus in lateral view; C, head in dorsal view; D, head in lateral view; E, mesosoma in dorsal view; F, metasomal tergite I in dorsal view; G, head in frontal view.

Biology. Solitary idiobiont ectoparasitoids of pupal and prepupal Trichoptera.

Distribution. Palearctic and Oriental regions.

Key to the species of South Korean *Agriotypus*

- 1. Clypeus with pointed at apex in frontal view (Fig. 2A), strongly convex and angulate in lateral view (Fig. 2B) *A. gracilis*
- Clypeus without pointed at apex in frontal view (Fig. 1G), moderately convex and smoothly rounded in lateral view (Fig. 1D) *A. silvestris*

***Agriotypus silvestris* Konishi and Aoyagi, 1994 목록물별(신칭) (Fig. 1A-G)**

Agriotypus silvestris Konishi and Aoyagi, 1994: 422.

Diagnosis of male. Body length 4.94 mm, fore wing length 3.83 mm. Body black to dark brown, except tips of mandibles reddish brown and spine of scutellum brown to yellowish brown (Fig. 1B). Head strongly setose and punctate (Fig. 1C). POL : OOL = 2 : 3 (Fig. 1C). Supraclypeal area without a medial ridge (Fig. 1G). Clypeus without pointed at apex in frontal

view, moderately convex and smoothly rounded in lateral view (Fig. 1D-G). Occipital carina complete. Antenna with 30 flagellomeres. Epomia long and very weakly visible. Mesoscutum strongly setose and punctate (Fig. 1E). Spine of scutellum 0.75× length of propodeum, produced dorstposteriorly and sinuous apically (Fig. 1A). Median longitudinal carinae of propodeum weakly present and convergent posteriorly. Metasomal tergite I (T1) 4.56× length of apical width, dorsolateral longitudinal carinae complete, dorsal longitudinal carinae incomplete, basal 0.40× its length (Fig. 1F).

Type material examined. Paratypes, 1 ♀ 1 ♂, JAPAN, Honshu, Nagano, Mt. Yatsu, Inakoyu, 14.VIII.1975, Yata leg. (CNCI).

Additional material examined. SOUTH KOREA: 1 ♂, Gyeongsangnam-do, Geochang-gun, Buksang-myeon, Wolseong-ri, Wolseong valley (fast-running stream), 21.VII.2013, C.J. Kim & B. Park leg. (KNA).

Hosts. *Neophylax japonicus* Schmid, *N. ussuriensis* (Martynov) (Trichoptera: Uenoidea) (Konishi and Aoyagi, 1994).

Distribution. South Korea (new record), Japan, Russia (Primorsky krai) (Konishi and Aoyagi, 1994; Kasparyan and Khalaim, 2007).

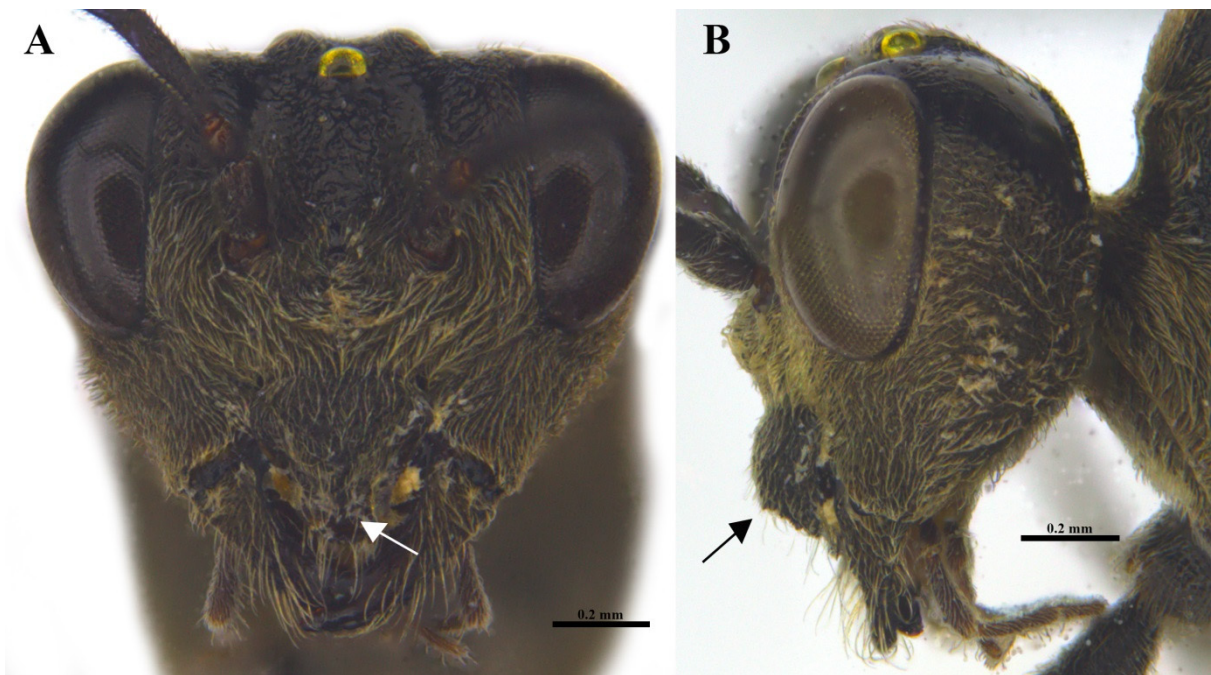


Fig. 2. *Agriotypus gracilis* Waterston, 1930, female (collected near a larval case of *Goera japonicus* from a site in under Bogwanggyo bridge, Yeosu-gun, Gyeonggi-do, South Korea). A, head in frontal view; B, head in lateral view.

Discussion

The species occurrences of the genus in South Korea seem to be very confusing through numerous studies made during the last two decades. The study on South Korean Agriotypinae started as Kim (1963) made a first record of *Agriotypus armatus* from South Korea. However, ESK & KSAE (1994), Paek et al. (2010) and Jung et al. (2011) recorded only *A. gracilis* while excluding *A. armatus* from South Korean insect fauna. Choi et al. (2012) specified that both *A. armatus* and *A. gracilis* were distributed in South Korea while Yu et al. (2016) recorded that only *A. armatus* were distributed in South Korea. However, Konishi & Aoyagi (1994) and Bennett (2001) stated that *A. gracilis* and *A. armatus* are very similar but clearly distinguishable with the following characters: morphological characters (clypeus, mesonotum, 1st metasomal segment), ecological traits (hosts record), and geographical distribution (*A. gracilis* only distributed in Japan and South Korea; *A. armatus* widely distributed in Europe). To clear up this, all of the related references were reviewed, and all the specimens of the genus collected in South Korea were re-examined to confirm the occurrence of both species. Unfortunately we were not able to locate the very first specimen of *A. armatus* that was made by Kim (1963). Furthermore, we confirmed that all the specimens available at the present time were *A. gracilis*. The occurrence of *A. armatus* in South Korea is doubtful, based on the literature review and specimen examination, so that we hereby exclude the record of *A. armatus* from South Korean insect fauna.

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