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Revision of the genus *Arotes* Gravenhorst (Hymenoptera: Ichneumonidae: Acaenitinae) from Japan

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Abstract

Three Japanese species of the genus *Arotes* Gravenhorst, 1829 are revised. A new species, *A. japonicus* Ito & Watanabe, **sp. nov.**, is described from the four main islands of Japan. This species can easily be distinguished from congeneric species by the black body without yellow markings and the entirely black hind tibia. *Arotes sugiharai* Uchida, 1934 is newly recorded from the islands of Kyushu and Tsushima, and the males of this species are described for the first time. The synonymy of *A. moiwanus* (Matsumura, 1912) and its color variant *alboannulatus* Uchida, 1928 are confirmed by DNA sequence analysis of the mitochondrial COI gene. The key to the world's species of *Arotes* proposed by Castillo *et al.* (2011) is updated and a key to the Japanese species is provided.

Key words: mtCOI, color variation, new species, parasitoid, taxonomy

Introduction

The genus *Arotes* Gravenhorst, 1829 is a medium-sized genus of the subfamily Acaenitinae (Hymenoptera: Ichneumonidae), containing 16 described species worldwide (Yu *et al.*, 2012). Of these, seven species are recorded from the Palearctic region, six from the Nearctic region, three from the Oriental region, and three from the Neotropical region (Yu *et al.*, 2012).

Three families of Coleoptera (Melandryidae, Mordellidae, Cerambycidae) have been reported as hosts of this genus (Yu *et al.*, 2012). Shaw *et al.* (1989) reported that a species of the related genus, *Acaenitus dubitator* (Panzer), is a koinobiont endoparasitoid of larvae of the endophytic beetle *Cleonis piger* (Scopoli) (Curculionidae), and thus *Arotes* may also have the same parasitoid strategy.

In Japan, two species of *Arotes*, *A. moiwanus* (Matsumura, 1912) and *A. sugiharai* Uchida, 1934, have been recorded. *A. moiwanus* was first described by Matsumura (1912) as *Phaenolobus (Acoenitus) moiwanus*. Uchida (1928) transferred it from *Phaenolobus* to *Arotes* and described a variety of *moiwanus* having a white band on the antennal flagellum as *alboannulatus* (Fig. 19). Thereafter, Uchida (1953) changed the taxonomic status of *moiwanus* from species to a variety of *A. albicinctus* Gravenhorst, 1829 and Townes *et al.* (1965) synonymized the variety *alboannulatus* with *moiwanus*. However, these taxonomic revisions by Uchida (1953) and Townes *et al.* (1965) were based on insufficient morphological comparisons. Recently, Castillo *et al.* (2011) reviewed the world's species of *Arotes* and concluded that *moiwanus* and *albicinctus* are distinct species, although they did not include a taxonomic treatment of the variety *alboannulatus*.

The purpose of this paper is to revise the Japanese species of *Arotes*, including a description of a new species and a reconsideration of the taxonomic status of *A. moiwanus* var. *alboannulatus* based on morphological and molecular evidence. We also provide a key to the Japanese species and insert a couplet in the key to the world's species proposed by Castillo *et al.* (2011).

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