ASED http://e-ASED.org
Animal Systematics, Evolution and Diversity

Anim. Syst. Evol. Divers. Vol. 35, No. 1: 1-5, January 2019
https://doi.org/10.5635/ASED.2019.35.1.027

Reexamination of Five Caddisfly Species (Trichoptera, Insecta) Recorded from South Korea by Kobayashi (1989)

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ABSTRACT

The specimens of caddisflies previously recorded as *Sortosa distincta* (Walker, 1852), *Rhyacophila uchidai* Kobayashi, 1989, *Rhyacophila jirisana* Kobayashi, 1989, *Crunobiodes koriaensis* Kobayashi, 1989, and *Ganonema odaenum* Kobayashi, 1989 from South Korea were reexamined. *Rhyacophila uchidai* and *R. jirisana* are newly synonymized with *R. retracta* Martynov, 1914 and *R. vicina* Botosaneanu, 1970, respectively. We reconfirm two synonyms, *C. koriaensis* with *Lepidostoma sinuatum* (Martynov, 1935) and *G. odaenum* with *Psilotreta locumtenens* Botosaneanu, 1970, and a misidentification of *Dolophilodes affinis* Levanidova and Arefina, 1996 as *S. distincta*. Some specimens recorded as *G. odaenum* are identified as *Psilotreta falcula* Botosaneanu, 1970.

Keywords: taxonomy, synonym, misidentification, type specimen, Kobayashi's collection

INTRODUCTION

Kobayashi (1989) studied caddisflies collected from South Korea, and added five species to the fauna of the Korean Peninsula: *Sortosa distincta* (Walker, 1852), *Rhyacophila uchidai* Kobayashi, 1989, *Rhyacophila jirisana* Kobayashi, 1989, *Crunobiodes koriaensis* Kobayashi, 1989, and *Ganonema odaenum* Kobayashi, 1989. After that, Arefina et al. (1996) pointed out that the species recorded as *S. distincta* is the same species as *Dolophilodes affinis* Levanidova and Arefina, 1996. Subsequently, Ito (2001) synonymized *C. koriaensis* with *Goerodes sinuatus* (Martynov, 1935), and Oláh and Johanson (2010) synonymized *G. odaenum* with *Psilotreta locumtenens* Botosaneanu, 1970. However, the specimens used by Kobayashi (1989) were not examined in these more recent studies. Furthermore, Malicky (2013) mentioned a possibility that *R. uchidai* belongs to the genus *Himalopsyche*. The male genitalia of *R. jirisana* illustrated by Kobayashi (1989) are similar to those of *R. vicina* Botosaneanu, 1970. Kobayashi did not provide diagnostic characteristics separating his species from allied species.

To solve these taxonomic problems, we examined all the specimens of these five species used by Kobayashi (1989), and recognize six species. In this paper, *R. uchidai* and *R. jirisana* are synonymized with *R. retracta* Martynov, 1914 and *R. vicina*, respectively. Furthermore, we reconfirm synonyms proposed by Ito (2001) and Oláh and Johanson (2010), and a misidentification mentioned by Arefina et al. (1996). We also report that some specimens recorded as *G. odaenum* are misidentifications of *Psilotreta falcula* Botosaneanu, 1970.

MATERIALS AND METHODS

Specimens examined in this study are deposited in the Natural History Museum and Institute, Chiba (Fig. 1). Male(s) and female(s) of each species are preserved separately in a small glass tube with a handwritten label "number + ♂ or ♀," and a male abdomen or a male and female abdomens together are also preserved in a small glass tube separated from his or her body with a handwritten label "number + ♂ or ♂♀." These tubes are kept in a vial with a handwritten label (Fig. 1A, C, D) or directly in a large bottle used in the museum (Fig. 1B, E).

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eISSN 2234-8190

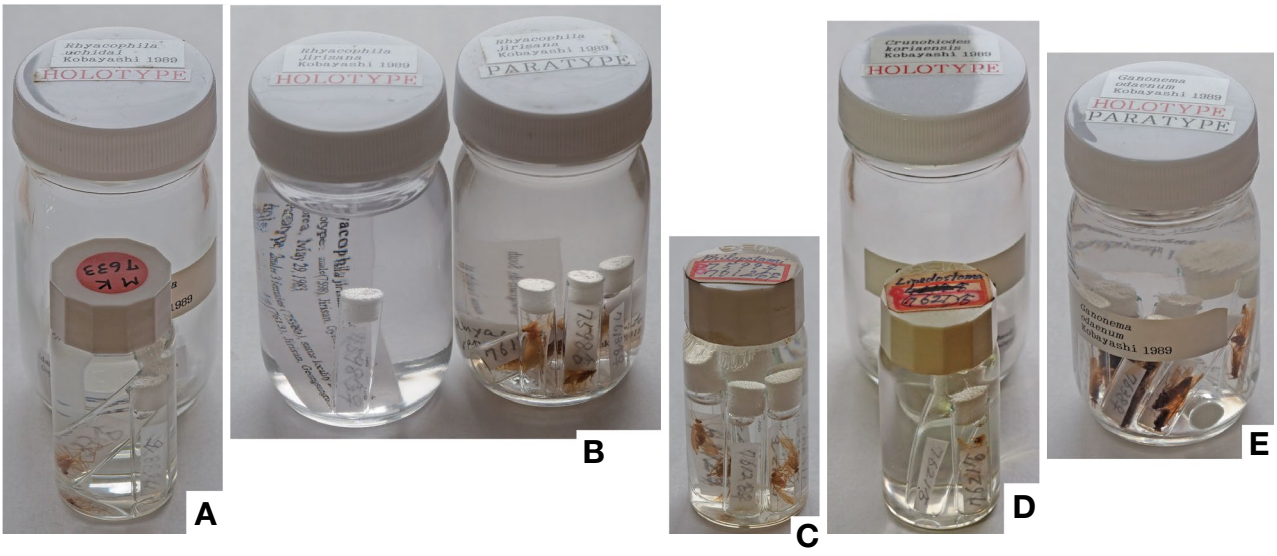

Fig. 1. Specimens used by Kobayashi (1989). A, *Rhyacophila uchidai* Kobayashi, 1989; B, *Rhyacophila jirisana* Kobayashi, 1989; C, *Sortosa distincta* (sensu Kobayashi, 1989); D, *Crunobiodes koriaensis* Kobayashi, 1989; E, *Ganonema odaenum* Kobayashi, 1989.

SYSTEMATIC ACCOUNTS

Order Trichoptera Kirby, 1813
Family Rhyacophilidae Stephens, 1836
Genus *Rhyacophila* Pictet, 1834

***Rhyacophila retracta* Martynov, 1914 (Figs. 1A, 2A–C)**

Rhyacophila retracta Martynov, 1914: 75–77, male.
Rhyacophila uenoi Tsuda, 1940: 123–124, male. Synonymized by Ross (1956).
Rhyacophila uchidai Kobayashi: 1989, 4–5, male. **Syn. nov.**

Material examined (Fig. 1A). *Rhyacophila uchidai*: holotype male (abdomen separated) with hand written label "7633♂."
Male genitalic morphology (Fig. 2A–C). Segment IX with three short lobes posterodorsally, median lobe wide in dorsal aspect, curved ventrad. Segment X rectangular in dorsal aspect, each lateral margin protruding posterodorsally. Anal sclerite weakly bilobed apically in dorsal aspect, apices dark pigmented. Inferior appendages large, basal segment rectangular in lateral aspect, distal segment thumb-like in lateral aspect, dorsal margin concaved in lateral aspect. Pair of parameres very long (apical half of left one lost), with acute apex.
Remarks. Kobayashi (1989) described *R. uchidai* based on a single male collected from Mt. Gayasan, Gyeongsangnam-do on 25 May 1983 by S. Uchida, and designated it as the holotype. We examined this male, and conclude that *R. uchidai* is the same species as *R. retracta*. The genitalic morphology of Kobayashi's male agrees well with that in the original description by Martynov (1914), and also those in redescriptions by Ross (1956), Schmid (1970), Emoto (1979), and Arefina (1997). *Rhyacophila retracta* is widely distributed from Central Asia to Far East Asia including Korea (Morse, 2018). No related species are known from Korea.

[1]***Rhyacophila vicina* Botosaneanu, 1970 (Figs. 1B, 2D–F)**

Rhyacophila vicina Botosaneanu, 1970: 287–288, 327, male, female.
Rhyacophila jirisana Kobayashi, 1989: 4, 6, male. **Syn. nov.**

Material examined (Fig. 1B). *Rhyacophila jirisana*: 1 male and 1 female abdomens labeled "7598♂♀" in large bottle labeled "HOLOTYPE"; 3 males (1 abdomen lacking) labeled "7598♂," 3 females (1 abdomen lacking), labeled, "7598♀" in large bottle "PARATYPE"; 16 males, 3 females labeled "7613♂," "7613♀," or "7613♂♀" in large bottle labeled "PARATYPE."
Male genitalic morphology (Fig. 2D–F). Segment X long triangular in lateral aspect, bilobed from basal 1/3, forceps-like in dorsal aspect. Anal sclerite long, round apex with median slit in dorsal aspect. Inferior appendages short rectangular in lateral aspect, basal segment with acute posterodorsal projection, curved mesad; distal segment bilobed, dor-

Korean name: [1]*집게물날도래 (신칭)

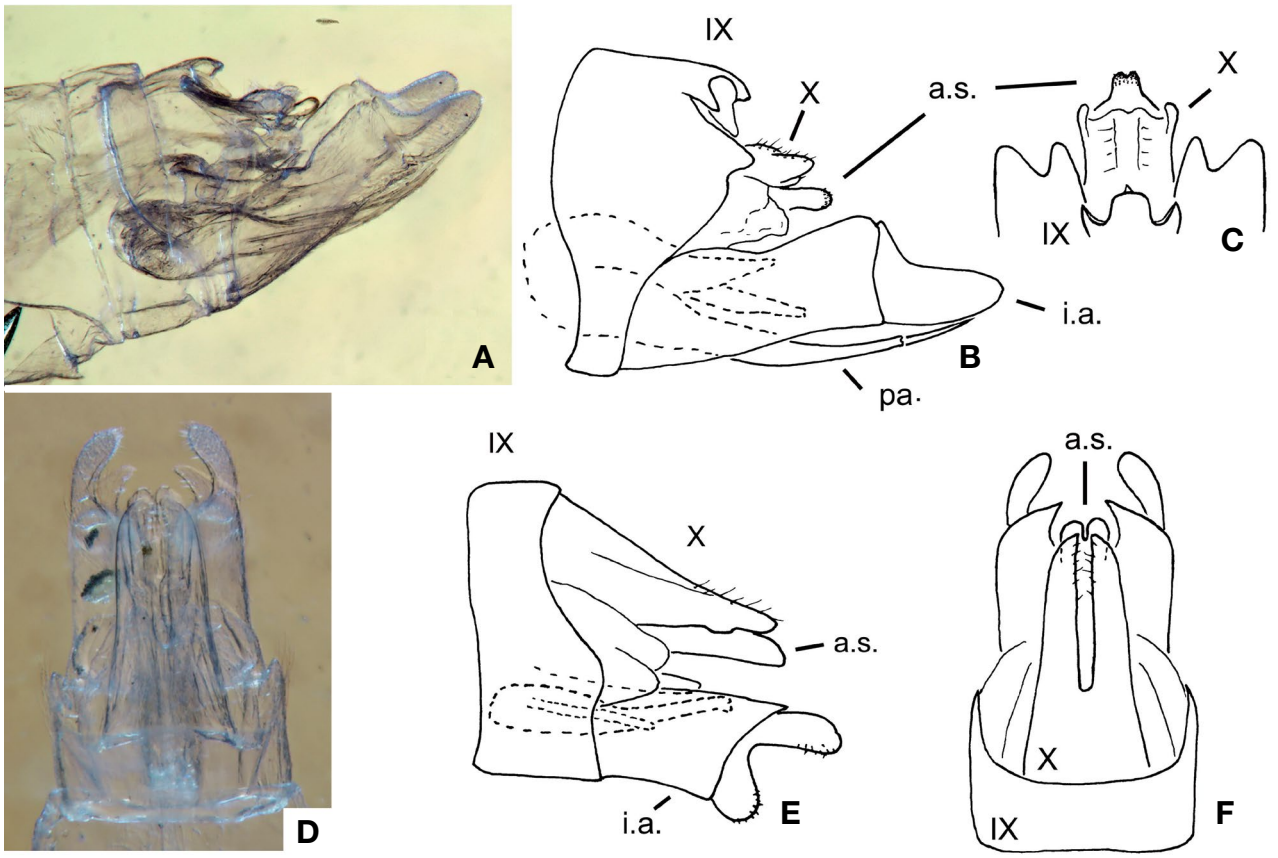

Fig. 2. Male genitalia of *Rhyacophila uchidai* Kobayashi, 1989 and *Rhyacophila jirisana* Kobayashi, 1989. A–C, *R. uchidai*: A, Lateral; B, Lateral; C, Dorsal. D–F, *R. jirisana*: D, Dorsal; E, Lateral; F, Dorsal. IX–X, abdominal segments IX–X; a.s., anal sclerite; i.a., inferior appendage; pa., paramere.

sal lobe longer than ventral lobe, each apex round in lateral aspect.

Remarks. Kobayashi (1989) used 19 males and six females collected from Mt. Jirisan, Gyeongsangnam-do on 29 May 1983 for the original description, and designated one of the males as the holotype (7598). Although he probably used a cleared male abdomen in the tube labeled "7598♂♀" (Fig. 1B left) for his description, three males also bears the same number as "7598♂." However, all males and females used in his study agree well with those of *R. vicina* described from North Korea by Botosaneanu (1970). Although we did not examine the holotype of *R. vicina*, *R. jirisana* must be a junior synonym of *R. vicina*. *R. vicina* is similar to a Korean species, *Rhyacophila confissa* Botosaneanu, 1970, but easily distinguished from the latter by the shape of segment X in dorsal aspect: Segment X is bilobed from basal 1/3 in *R. vicina*, but 2/3 in *R. confissa*. *Rhyacophila vicina* and *R. confissa* are sympatrically distributed in the Korean Peninsula (Botosaneanu, 1970; Ko and Park, 1988).

Family Philopotamidae Stephens, 1829
Genus *Dolophilodes* Ulmer, 1909

[1]***Dolophilodes affinis*** **Levanidova and Arefina, 1996 (Fig. 1C)**

Dolophilodes affinis Levanidova and Arefina, 1996 (in Arefina et al., 1996), 2–3, male, female.

Sortosa distincta (Walker, 1852): Kobayashi, 1989, 2, male. Misidentification mentioned by Arefina et al. (1996).

Material examined (Fig. 1C). 2 males and 2 females labeled "7612♂," "7612♀," or "7612♂♀"; 1 female labeled as "7599♀."

Remarks. Kobayashi (1989) recorded *S. distincta* from Mt. Jirisan, Gyeongsangnam-do based on two males and two females numbered "7612." We examined these specimens and

Korean name: [1]*배돌기입술날도래(신칭)

another female with a hand written label "7599♀" in the same vial labeled "Philopotami., 7599♀, 7612♂♀." Although the latter female was not used in Kobayashi (1989), we recognize all the males and females as *D. affinis*.

Family Lepidostomatidae Ulmer, 1903
Genus *Lepidostoma* Rambur, 1842

***Lepidostoma sinuatum* (Martynov, 1935) (Fig. 1D)**

Crunobiodes sinuata Martynov, 1935: 208, 376–379, male.
Crunobiodes koriaensis Kobayashi, 1989: 6–7, male. Synonymized by Ito (2001).

Material examined (Fig. 1D). 3 males labeled "7621♂."
Remarks. Kobayashi (1989) described *C. koriaensis* based on a single male collected from Mt. Gayasan, Gyeongsangnam-do on 25 May 1983, and designated the male as the holotype. However, we found three males in a vial labeled "*Lepidostoma* 7621♂." In the vial, one abdomen was preserved in a tube separate from the body. Although the holotype was not specified in these specimens, all males agree with the description by Kobayashi (1989). We agree with Ito's conclusion (2001) that Kobayashi's *C. koriaensis* is the same as *L. sinuatum*.

Family Odontoceridae Wallengren, 1891
Genus *Psilotreta* Banks, 1899

***Psilotreta locumtenens* Botosaneanu, 1970 (Fig. 1E)**

Psilotreta locumtenens Botosaneanu, 1970: 313–314, 316, 358–359, male, female.
Ganonema odaenum Kobayashi, 1989: 7–8, male. Synonymized by Oláh and Johanson (2010).

Material examined (Fig. 1E). 7 males and 5 females labeled "7638♂," "7638♀," or "7638♂♀."
Remarks. Kobayashi (1989) described *G. odaenum* based on specimens collected from three sites. He designated one male as the holotype and six males and five females as paratypes, all collected from Mt. Odaesan, Gangwon-do on 1 Jun 1983. Although the holotype was not clearly discriminated among these specimens, one of seven males must be the holotype. We determined all seven males and five females to be *P. locumtenens*.

Additionally, he also used three males and three females collected from Mt. Gayasan, Gyeongsangnam-do (7617, 7632) and one male from Mt. Jirisan, Gyeongsangnam-do (7611) in his description. However, these specimens do not belong to *P. locumtenens*. We identified them as *Psilotreta falcula* Botosaneanu, 1970.

***Psilotreta falcula* Botosaneanu, 1970**

Psilotreta falcula Botosaneanu, 1970: 314–316, 357, 359.
Ganonema odaenum Kobayashi, 1989: Kobayashi, 1989 (in part), 8. **Misidentification.**

Material examined. 1 male labeled as "7611♂"; 3 males and 3 females labeled "7617♂," "7617♀," "7617♂♀," "7632♂," "7632♀," or "7632♂♀."
Remarks. See remarks of *P. locumtenens*.

ACKNOWLEDGMENTS

We express our cordial thanks to David E. Ruiter, Oregon, USA, for critical reading of our manuscript. We are also grateful to Ryoichi B. Kuranishi, the Natural History Museum and Institute, Chiba for the loan of specimens in the Kobayashi's collection.

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Received July 16, 2018
Revised October 21, 2018
Accepted October 21, 2018