

What are Bartenev's (1930) forgotten Japanese species »*Gomphus acutus*« and »*Gomphus excavatus*« (Odonata: Gomphidae)?

Akihiko Sasamoto¹ & Ryo Futahashi²

¹ 531-3 Oh Tawaramoto-cho, Shiki-gun, Nara pref. 636-0345 Japan; akssmt@sea.plala.or.jp

² National Institute of Advanced Industrial Science and Technology (AIST), Central 6, Tsukuba, Ibaraki 305-8566 Japan; ryo-futahashi@aist.go.jp

Abstract. The true identities of *Gomphus acutus* Bartenev, 1930 and *Gomphus excavatus* Bartenev, 1930, two forgotten taxa named from Japan, are discussed. *G. acutus* is ranked as a junior synonym of *Trigomphus melampus* (Selys, 1869) (syn. nov.). The earlier proposed synonymy of *G. excavatus* with *Asiagomphus pryeri* (Selys, 1883) is confirmed.

Further key words. Dragonfly, Anisoptera, new synonymy

Introduction

BARTENEV (1930) described two new gomphid species based on specimens from Japan: *Gomphus acutus* and *G. excavatus*. Both names are available and these taxa have been listed as valid species, as *Trigomphus acutus* and *Gomphus excavatus*, in the world catalogues of Odonata by DAVIES & TOBIN (1985), BRIDGES (1994) and STEINMANN (1998). BRIDGES (1994) considered the generic combination of *acutus* uncertain and listed the species as *Trigomphus* (?) *acutus*. Moreover he added a comment »perhaps a *nomina oblita*« to both species. TSUDA (2000) listed only the former taxon, using the combination *Trigomphus acutus*, and gave the provenance incorrectly as Russia. *G. acutus* Bartenev, 1930 still appears as available name in the latest version of the World Odonata List (SCHORR & PAULSON 2016) but in this list *G. excavatus* is treated as synonym of *Asiagomphus pryeri* (Selys, 1883). Despite the fact that these taxa were recorded from Japan, Japanese authors have ignored and never mentioned these species (e.g., HAMADA & INOUE 1985; SUGIMURA et al. 1999; OZONO et al. 2012). In this paper, we discuss their status.

What is *Gomphus acutus*?

BARTENEV'S (1930) four page German paper titled »Über eine kleine Odonatensammlung aus Japan und Nordchina« included the following description of *G. acutus* (the underlines and superscripts are made by us, indicating the part mentioned in the below):

»3. *Gomphus acutus* sp. n., Japan. 1♂ und 2♀. Ähnlich dem *G. melampus* SEL.

♂. Labium schwarzbraun. Labrum gelb, beinahe die ganze vordere Hälfte desselben schwarz und ebenso das schmale schwarze Streifchen an der Basis. Rhinarium schwarzbraun. Nasus gelb. Die untere Hälfte der Vorderseite der Stirn schwarz. Die

Grenze zwischen dem gelben Nasus und der schwarzen Stirn wellenförmig. An der übrigen Fläche Stirn gelb. Vertex schwarz mit einem gelben Fleck hinter den Ocellen. Occiput oben schwarz und hinten schwarz mit einem gelben Fleck, der nach oben bis zum Hinterrande des Occiputs reicht; dieser Fleck nimmt den Hinterrand des Occiputs ein und erscheint von oben als eine gelbe Linie. Prothorax schwarz mit einem gelben kleinen Flecken in der Mitte, der längs durch eine schwarze Linie zerteilt ist, und mit je einem großen gelben Fleck an den Seiten. Hinterrand des Prothorax schwarz.

Der gelbe 7-förmige Fleck (Abb. 1) des Thoraxrückens unterscheidet sich von *G. melampus* folgendermaßen (vgl. F. Ris, H. Sauters Formosa-Ausbeute. Odonata. Supplementa Entomologica, 1916, Nr. 5., p. 54/53, fig. 31, 32, 34): 1. Die vertikalen Teile der Flecken sind am vorderen Ende etwas divergierend (bei *G. melampus* nicht); 2. die horizontalen Teile desselben sind ebenso breit wie die vertikalen und ragen nach innen in gleicher Breite hervor; 3. die horizontalen und vertikalen Teile des Flecks bilden miteinander einen scharfen (nicht geraden) Winkel. Am Sinus interalaris ein großes gelbes Punktum; doch fehlt der gelbe Humeralstreifen⁽¹⁾. Die schwarze 1. Thoraxseitenbinde überragt kaum die Stigma⁽²⁾; die 2. Binde komplett, der Vorderrand der letzteren gerade, Hinterrand wellenförmig. Die Unterfläche des Thorax und Beine schwarz.

Appendices superiores ♂ (Abb. 2, 3 u. 4) etwas länger als das 10. Segment; die Apices stark und lang zugespitzt; die Basisbreite der Appendices ist in ihrer Länge > 2 mal enthalten. Außen- und Oberzahn der Appendices⁽³⁾ beinahe wie bei *G. melampus*. Hinterrand der Appendices superiores zwischen dem 4. (distalen) Zähnnchen und dem Spitzchen beinahe gerade. Appendix inferior reicht bis zum 4. (distalen) Zähnnchen der Appendices superiores; nach oben stärker als bei *G. melampus* gebogen. Die Äste des Appendix inferior divergieren nicht mehr als die Appendices superiores.

♀ ist dem ♂ gleich. Die gelben Humeralstreifchen des Thorax vorhanden wie bei *G. melampus*⁽⁵⁾; bei einem ♀ Exemplar nimmt der gelbe Fleck des Occiputs nicht den Hinterrand des letzteren ein. Die Lappchen (Abb. 5) der Genitalplatte sind schmaler und länger als bei *G. melampus*, die Apices spitz⁽⁶⁾. Basisbreite der Lappen 2mal kürzer als ihre Länge. Die Lappentrennung tiefer als bei *G. melampus*. Die Genitalplatte ein wenig länger als Sternit 9.

♂: Hinterflügel 25 mm⁽⁴⁾; Pterostigma 2,5 mm. ♀: Abdomen 29 mm; Hinterflügel > 25 mm⁽⁷⁾; Pterostigma 3 mm.

G. acutus unterscheidet sich von *G. unifasciatus* Oguma (Insecta Matsumurana, I, 1926, Nr. 2, p. 92) durch kleinere Dimensionen, spitze Lappchen der Genitalplatte und sehr schwache Haarbekleidung. *G. unifasciatus* ist leider zu kurz beschrieben.«

Judging from the text and figures of the thoracic markings and anal appendages, *G. acutus* apparently belongs to the genus *Trigomphus* Bartenev, 1911. If the collec-

tion locality really is in Japan as given, there are four species with which it may be compared; *Trigomphus melampus* (Selys, 1869), *T. interruptus* (Selys, 1854), *T. ogumai* (Asahina, 1949) and *T. citimus tabei* (Asahina, 1949). In his text BARTENEV (1930) compared *G. acutus* with *T. melampus* (and *T. unifasciatus* Oguma, 1926, which is synonym of *T. melampus*). However, these comparisons were made only on the basis of literature sources. Moreover, the material of »*Gomphus melampus*« in RİS [1916], to which he referred, seems to include multiple species, according to the collecting localities. Bartenev pointed out the subtle differences of thoracic L-shape markings, male appendage and female genital plate between these two species, characters not useful for identification. From the original description, we consider that the following characters are important for identification:

Male:

- (1) Lacking the ante-humeral yellow stripe, under the yellow spot, on mesepisternum (Fig. 1, Abb. 1).
- (2) The black stripe on 1st lateral suture of synthorax is short, not extending beyond the stigma.
- (3) Superior appendages without prominent dorsal protuberance in lateral view, but presumably this may be present in oblique views, with dentate protuberances seen dorsally and latero-ventrally (Fig. 1, Abb. 2–4).
- (4) The hind wing length is 25 mm.

Female:

- (5) Ante-humeral stripe is present on mesepisternum, as in *T. melampus*.
- (6) The cleft of valvula vulvae is deeper, and each of apices is relatively sharp (Fig. 1, Abb. 5).
- (7) The length of abdomen is 29 mm, with the hind wing over 25 mm.

The combination of the four characters in male indicates that *G. acutus* is most probably the same as *Trigomphus melampus*. First, *T. interruptus* and *T. ogumai* typically have ante-humeral stripes [\neq (1)], in *T. melampus* these may be present or absent; Second, *T. interruptus* usually has black stripes on the 1st suture extending beyond the stigma [\neq (2)] and only an obtuse angle, without dorsal protuberance on the superior appendages [\neq (3)]. Third, the lateral view of anal appendage (»Abb. 4«) is quite similar to that of *T. melampus* (Fig. 2b), rather than *T. citimus tabei* and *T. ogumai*, the latter two species have a stronger protuberance on their superior appendages in lateral view (OZONO et al. 2012: 280). Although we cannot understand the part of explanation of Abb. 3 »en trois cars«, Abb. 3 seems to be the upper oblique view of anal appendages. If it is true, the dorsal protuberance which can be seen in some oblique views is compatible with that of *T. melampus* (Fig. 2a). Fourth, the hind wing length is also within the range of that in *T. melampus* (22 ~ 27 mm [OZONO et al. 2012]) [= (4)].

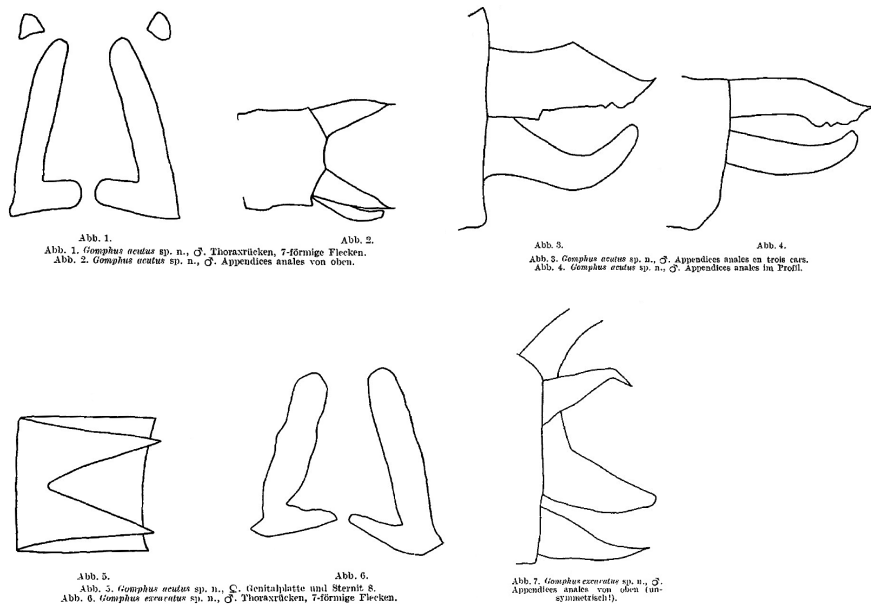


Fig. 1. The figures of BARTENEV (1930), with the original captions; **Abb. 1–4.** *Gomphus acutus* (= *Trigomphus melampus*), **1)** dorsal view of synthorax in male; **2)** dorsal view of anal appendages in male; **3)** supposedly upper oblique view of the same (the meaning of «en trois cars» in the text is unknown); **4)** lateral view of the same (probably a little lower oblique view); **5)** ventral view of distal abdomen in female. **Abb. 6–7.** *Gomphus excavatus* (= *Asiagomphus pryeri*). **6)** dorsal view of synthorax in male; **7)** inverted oblique view of anal appendages.

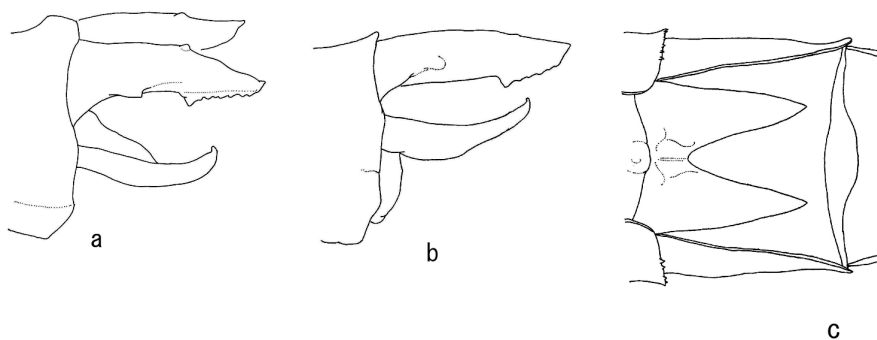


Fig. 2. *Trigomphus melampus* (Nagano Prefecture, Japan), for comparison with the figures in Bartenev's Abb. 3–5. **a)** upper oblique view of anal appendages in male (the right inferior appendage is omitted); **b)** lateral, slightly lower oblique view of the same; **c)** valvula vulvae in female.

In addition, the three female characters of *G. acutus* coincide with those of *T. melampus*. Especially, the shape of valvula vulvae (i.e., shape of cleft and extent of divarication) (Fig. 1, Abb. 5) is most similar to that of *T. melampus* (Fig. 2c, OZONO et al. 2012: 280–281) [= (6)]. The length of the female abdomen is also within the range of *T. melampus* (26 ~ 34 mm and 23 ~ 29 mm [OZONO et al. 2012]) [= (7)]. Thus, »*Gomphus acutus*« can most probably be identified as *T. melampus*.

BARTENEV (1930) gave the collection locality as »Japan«. Had he been able to give a more detailed locality, the identification could be made more confidently, because *T. melampus* is distributed mainly in northern Japan and is very local in the western regions, whereas the other three species are common in the lowland in the central and western regions.

Why have all Japanese researchers neglected this species in their papers and monographs? No doubt this is because the late Dr S. Asahina, who arranged and established Japanese odonate taxonomy in the 20th century, did not make any treatment of this species in his publications. He surely knew this paper. In his own reprint, now deposited in the collection of Dr S. Eda, there is a handwritten note by Asahina. It reads: »[in male] black band on first suture is short and only reaches under the stigma, therefore it is supposed to be *melampus*, *ogumai* or *citimus tabei*. However, in the female, because the presence of a humeral band is stated, and from morphology of valvula vulvae (Abb. 5), it reminds me of *ogumai*. But there is possibility that both of sexes would be *melampus*. [The exact identification] is impossible because the collecting locality was not clear. ♂ = *tabei*? ♀ = *ogumai*?«. This indicates that even the late Dr Asahina couldn't clearly identify *G. acutus*, and so its identity has remained inconclusive.

What is *Gomphus excavatus*?

Gomphus excavatus was described as a new species from »Japan, Nippon, Kobe«. This species has already been pointed out to be a junior synonym of *Asiagomphus pryeri* (Selys, 1883) by KOBAYASHI (1942) as was also suggested by ASAHINA (1995), both as brief comments in papers written in Japanese. We agree with this synonymy, because the text describing *G. excavatus* gives as one of the differences from the allied *A. melaenops* (Selys, 1854) »Appendix inferior etwas länger als die Appendices superiores« and *A. pryeri* inhabits in the collection locality »Kobe« (in Hyogo prefecture, middle Japan) (AOKI, 1998). Because both of the previous two papers were written in Japanese, »*Gomphus excavatus*« remained as a valid species in the world catalogues by DAVIES & TOBIN (1985), BRIDGES (1994) and STEINMANN (1998).

How did Bartenev obtain these specimens?

The address of Bartenev in this paper was given as »Rostov am Don (USSR)« and the date of receipt of this article is »9. Febr. 1930«. According to his bibliography by

HUSAINOVA & BELYSHEV (1971), in 1925, Bartenev was elected a professor of North Caucasus State University (now Southern Federal University) in Rostov-on-Don, southern Russia, until he secured the position of professor at Krasnodar from 1930 to 1933. During these years, he paid much attention to the odonate fauna of the Caucasus and Poland, where he undertook expeditions. He also obtained material during short trips to Germany, Austria, Belgium and Canada. In addition to the two species discussed above, he also listed the following two species in the same paper; »*Anax julius* Br.« (= *Anax parthenope julius* (Selys, 1839)) (Nordchina, Tshifu), and »*Aeschnophlebia anisoptera* Sel.« (Japan). However, it is known that he himself never visited Japan or China, and he did not write any comments on collector, data of collection or acknowledgements. The collection data given in his descriptions is inconsistent (i.e., some species were supplied with a detailed locality, whereas others like »*G. acutus*« were given with only the country name), suggesting that these materials were not received from a known collector, but examined in various university or museum collections. The first author once asked Dr Oleg Kosterin, Russian odonatologist well acquainted with the collection of Bartenev, whether the type series of *G. acutus* are present or not, but his answer was negative, because most of the type specimens which Bartenev described are lost (O. Kosterin pers. comm.).

As regards two new species described by BARTENEV (1930) from Japan we therefore present the following synonymy and draw attention to the taxonomic status, respectively:

Trigomphus melampus (Selys, 1869)

= *Gomphus acutus* Bartenev, 1930, **syn. nov.**

Asiagomphus pryeri (Selys, 1883)

= *Gomphus excavatus* Bartenev, 1930 (cf. KOBAYASHI 1942; ASAHINA 1995).

Acknowledgements. We are grateful to Dr. Matti Hämäläinen for careful reading and advices for our draft, to Dr Oleg Kosterin for kind advice for the type specimens and information of bibliography of Bartenev, to Dr Shigeo Eda, Messers Naoji Katatani and Ken-ichi Watanabe for help to see the reprint with notes by late Dr Asahina.

References

- AOKI T. 1998. [Odonata of Kobe]. Kobe-shi-Sports-Kyoiku-Kosha. [In Japanese]
- ASAHINA S. 1995. A criticism on the old papers regarding dragonflies published by T. Kobayashi. *Tombo* 38: 36-40 [In Japanese, English title]
- BARTENEV A.N. 1930. Über eine kleine Odonatensammlung aus Japan und Nordchina. *Zoologischer Anzeiger* 88: 326-329 [In German]
- BRIDGES C.A. 1994. Catalogue of the family-group, genus-group & species-

- group names of the Odonata of the World (Third edition). Privately published, Urbana
- DAVIES D.A.L. & TOBIN P. 1985. The dragonflies of the world: A systematic list of the extant species of Odonata Vol. 2 Anisoptera. *Societas Internationalis Odonatologica Rapid Communications (Supplements)* 5
- HAMADA K. & INOUE K. 1985. [The dragonflies of Japan in colour]. Kodansha [In Japanese]
- HUSAINOVA N.Z. & BELYSHEV B.F. 1971. Pamyati Aleksandra Nikolaevicha Barteneva (1882-1946). *Biologicheskije Nauki, Alma-ata* 3: 213-225 [In Russian]
- KOBAYASHI T. 1942. [Additions and corrections to the anisopterous dragonflies (Odonata) of Kansai]. *The Transactions of the Kansai Entomological Society* 12: 50-53 [In Japanese]
- OZONO A., KAWASHINA I. & FUTAHASHI R. 2012. Dragonflies of Japan. Bun-ichi Sogo Shuppan [In Japanese, English summaries]
- RIS F. 1916. H. Sauter's Formosa-Ausbeute. Odonata. *Supplementa entomologica* 5: 1-81
- SCHORR M. & PAULSON D. 2016. World Odonata List. Online on the internet, URL (22-xi-2016): <http://www.pudget-sound.edu/academics/academic-resources/slater-museum/biodiversity-resources/dragonflies/world-odonata-list/>
- STEINMANN H. 1997. World catalogue of Odonata. Volume II Anisoptera. In: Wermuth H. & Fischer M. (Eds), Das Tierreich. Teilband 110. W. de Gruyter, Berlin & New York
- SUGIMURA M., ISHIDA S., KOJIMA K., ISHIDA K. & AOKI T. 1999. Dragonflies of the Japanese Archipelago in color. Hokkaido University Press, Sapporo [In Japanese, English title]
- TSUDA S. 2000. A distributional list of World Odonata 2000. Privately published, Osaka [In Japanese and in English]

Received 10th December 2016