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RESEARCH PAPER

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Labiobaetis species of Japan, Taiwan, and Korea, with a new synonym of *L. atrebatinus* (Eaton 1870) and reerection of the subspecies *L. atrebatinus orientalis* (Kluge 1983) (Ephemeroptera, Baetidae)

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Abstract We associated nymphs of *Labiobaetis* sp. G and *Labiobaetis* sp. Q from Japan with imagoes reared from nymphs in the field. *Labiobaetis* sp. G was identified with *L. atrebatinus* (Eaton 1870) based on characters of the reared male and female imagoes, nymphs, and eggs. We also synonymized a Taiwanese species, *L. morus* (Chang and Yang 1994), with *L. atrebatinus*. After further examination of the characters of male imagoes from Japan and Korea and nymphs from Japan and Taiwan, we found them to be correspondent to subspecies *L. atrebatinus orientalis* (Kluge 1983). Thus, we reerected the subspecific status of *L. a. orientalis*, although it had been considered not distinguishable from the nominotypical subspecies *L. a. atrebatinus*. *Labiobaetis a. orientalis* is distributed in the Russian Far East, Japan, Korea, and Taiwan. We identified *Labiobaetis* sp. Q with *L. tricolor* (Tshernova 1928) based on characters of the reared male and female imagoes, nymphs, and eggs. *Labiobaetis tricolor* was recorded from Japan for the first time.

Key words *Labiobaetis* · Subspecies · New synonym · Rearing · Baetidae

Introduction

Novikova and Kluge (1987) established a subgenus *Labiobaetis* in the genus *Baetis* and designated *Baetis atrebatinus* Eaton, 1870 as the type species of the subgenus. McCafferty and Waltz (1995) raised the subgenus to the generic rank. Species of the subgenus *Mullerbaetis* Kang and Yang, 1994 belonging to the genus *Baetis* from Taiwan were transferred to the genus *Labiobaetis* by Waltz and McCafferty (1997). Lugo-Ortiz et al. (1999) synonymized *Labiobaetis* with *Pseudocloeon* Klapálek, 1905. We (Fujitani et al. 2003a), however, followed Gattolliat (2001) who retained the validity of *Labiobaetis*. The genus *Labiobaetis* is recorded throughout the world, excluding the neotropical region (McCafferty and Waltz 1995; Lugo-Ortiz and McCafferty 1997; Gattolliat 2001).

In Japan, Kobayashi (1987) distinguished nymphs of 13 *Baetis* species and gave them alphabetical provisional names. Ishiwata et al. (2000) concluded that *Baetis* sp. L is conspecific with *Baetis bicaudatus* Dodds, 1923, but we need to describe the remaining 12 species with their imagoes. Although Fujitani et al. (2003a,b) transferred *Baetis* sp. G and *Baetis* sp. Q to *Labiobaetis*, their imagoes were not known. By examination of nymphs and imagoes reared from them, here we reveal the association of *Labiobaetis* sp. G and *Labiobaetis* sp. Q with species that were given valid names.

Materials and methods

To associate nymphs of *Labiobaetis* sp. G and *Labiobaetis* sp. Q with their imagoes, we reared the nymphs in the field (Müller-Liebenau 1969; Edmunds et al. 1976). Mature nymphs were put in plastic cups with pores. We covered their mouths with pieces of nylon stocking to collect the imagoes and subimagoes. The cups were set in holes in a urethane mat floating on slow flowing water near the channel margin. We also collected imagoes and subimagoes in a light trap. Most subimagoes were reared to imagoes. We preserved the imagoes and subimagoes in 80% ethanol and nymphs in 5% formalin or 80% ethanol.

Most material examined in this study is deposited in the Entomological Laboratory, Graduate School of Agriculture and Biological Science and the Ecological Laboratory,

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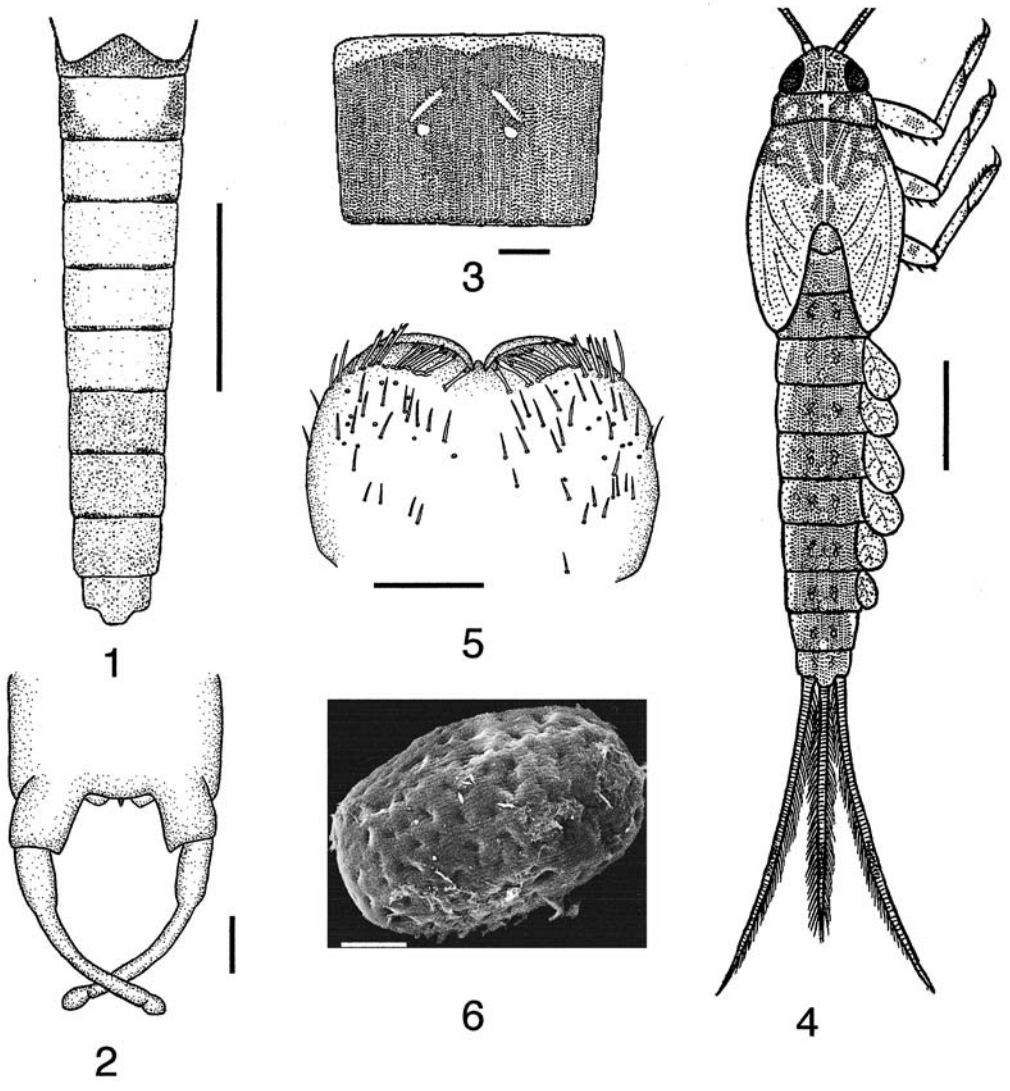

Figs. 1–6. *Labiobaetis atrebatinus orientalis* (Kluge 1983). **1,2** male imago: **1** abdominal terga, **2** forceps. **3** Female imago: abdominal tergum V. **4,5** Nymph: **4** habitus, **5** labrum. **6** Egg. *Scale bars*: 1 mm in Figs. 1, 4; 0.1 mm in Figs. 2, 3, and 5; 0.02 mm in Fig. 6

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In regard to type material, here we could only examine a paratype of *L. morus* loaned from Chung Hsien University, Taiwan. (We also tried to borrow and examine the type specimens of *L. atrebatinus orientalis* and *L. tricolor*, but this was not possible). By referring to papers in which the characters of *L. atrebatinus orientalis* and *L. tricolor* were sufficiently described, we compared their characters with those of *Labiobaetis* sp. G and *Labiobaetis* sp. Q.

In the list of material examined, the following abbreviations are used: sw, collected by sweeping; re, reared from nymph. The dates for reared imagoes show when they molted from subimagoes. Collectors are abbreviated as follows: TF, T. Fujitani; NK, N. Kobayashi; KT, K. Tanida; HCC, H. C. Chang; YJB, Y. J. Bae; SYP, S. Y. Park.

Labiobaetis atrebatinus orientalis (Kluge 1983) (Figs. 1–4) n. comb.

Baetis atrebatinus orientalis Kluge, 1983, 74 (♂, ♀, nymph).

Baetis (*Labiobaetis*) *atrebatinus orientalis*: Tshernova et al., 1986, 131 (♂); Novikova and Kluge, 1987, 13 (nymph).

Baetis sp. G: Kobayashi, 1987, 42 (nymph); Yamasaki, 1987, 13 (nymph, ecology); Kobayashi, 1989, 60 (nymph); Ishiwata and Kobayashi, 2003, 304 (nymph).

Baetis (*Mullerbaetis*) *morus* Chang and Yang, in Kang et al., 1994, 33 (nymph). n. syn.

Baetis (*Labiobaetis*) *atrebatinus*: Kluge, 1995, 14 (list).

Labiobaetis atrebatinus: McCafferty and Waltz, 1995, 21 (list) (in part), Bae and Park, 1998, 8 (♂, ♀, nymph).

Labiobaetis morus: Waltz and McCafferty, 1997, 137 (list).

Pseudocloeon atrebatinum: Lugo-Ortiz et al., 1999, 26 (list) (in part).

Labiobaetis sp. G: Fujitani, 2002, 114 (nymph, ecology); Fujitani et al., 2003b, 130 (list).

Pseudocloeon morum: Soldán and Yang, 2003, 415 (list).

Eaton (1871) showed that the male imago of *Baetis atrebatinus* Eaton, 1870 from Europe has a pair of brown short streaks on abdominal terga II–VII, and Müller-Liebenau (1969) pointed out that the abdominal terga are brown and terga II–VI have pale brown spots. Kluge (1983)

Table 1. Number of setae of the labrum and paraglossa and denticles of the claws to distinguish nymphs between *Labiobaetis atrebatinus atrebatinus* and *L. a. orientalis*

	Broad setae near anterior margin of labrum	Pectinate setae on distal margin of paraglossa	Small denticles on inner margin of the claw		
			Foreleg	Middle leg	Hind leg
L. a.atrebatinus					
England: Macan (1950)	16–21	n. d.		*About 20	
England: Müller-Liebenau (1969)	16–21	About 25		*About 20	
L. a.orientalis					
Russian Far East: Novikova and Kluge (1987)	11	n. d.	n. d.	n. d.	n. d.
Japan $n = 32$	6–15	14–23	11–20	10–18	11–18
Taiwan $n = 3$	9–13	17–22	13–18	13–18	12–16
Korea $n = 2$	13	21–23	12–14	12–13	12–13

n. d., not described in the reference
*Legs not specified

described *Baetis atrebatinus orientalis* from Barabashevska River and Narva River in Kedrovaya Pad Reserve, Primorsky Province, and Kuenga River in Shew'ya Settlement, Chita Province, Russia, and treated the white abdominal terga II–VI of the male imago of *B. atrebatinus orientalis* as a diagnostic character to distinguish the subspecies from the nominotypical subspecies, *B. atrebatinus atrebatinus*. Kluge (1983) also showed that the male imago of *B. atrebatinus orientalis* has brown bands on the posterior margins of abdominal terga II–VI and brown broad stripes on lateral margins of tergum II and sometimes on those of the following terga.

Later, however, Kluge (1995) concluded that these subspecies are not distinguishable from each other. McCafferty and Waltz (1995) transferred *B. atrebatinus* to *Labiobaetis*. We follow McCafferty and Waltz (1995) and treat this species as *Labiobaetis*.

Male imagoes reared from *Labiobaetis* sp. G have brown posterior fringes on abdominal terga II–VIII, of which the lateral parts are darker than the medial part (Fig. 1). The forceps lack a distinct projection on the posteromedial margin of segments II (Fig. 2). Female imagoes reared from *Labiobaetis* sp. G have pale brown antenna except for a dark brown pedicel, brown abdominal terga, and a gray cercus. Nymphs of *Labiobaetis* sp. G (Fig. 4) have broad setae with serrated distal ends near the anterior margin of the labrum (Fig. 5) and a pair of submedial pale brown spots and short oblique streaks on abdominal terga II–IX (Fig. 4). Eggs have a depression of irregular shape (Fig. 6), fine longitudinal folds, and pores. These characters are diagnostic of *Labiobaetis atrebatinus* in the male imago (Eaton, 1870 1871; Müller-Liebenau 1969), female imago (Eaton 1871), nymph (Macan 1950; Müller-Liebenau 1969), and egg (Kopelke and Müller-Liebenau 1981). Therefore, we ascertained that *Labiobaetis* sp. G is *L. atrebatinus*.

However, abdominal terga II–VI of the male imagoes of *L. atrebatinus* from Japan are white. Additionally, the male imago has a pair of brown stripes that are broader in the posterior parts than in the anterior parts on abdominal tergum II (Fig. 1) and pale brown antenna except for the dark brown pedicel as described for *L. atrebatinus orientalis* (Kluge 1983). Comparing descriptions between the two subspecies, *atrebatinus* and *orientalis*, we ascertained that their nymphs are distinguishable by the number of broad setae with serrated distal ends along the anterior margin of the labrum: 16–21 in *atrebatinus* (Macan 1950; Müller-Liebenau 1969), but 11 in *orientalis* (Novikova and Kluge 1987). We also examined nymphs of *L. atrebatinus* from Japan and confirmed that they have 6–15 broad setae with serrated distal ends near each side of the anterior margin of the labrum (Fig. 5), 10–20 denticles on the inner margin of the claw, and 14–23 pectinate setae on the distal margin of the paraglossa. The numbers of these denticles and setae are smaller in *L. a. orientalis* than in *L. a. atrebatinus* (Table 1). Additionally, the number of robust setae on the outer margin of the femur is mostly larger than on the distal end in *L. atrebatinus orientalis* from Japan (Table 2), although Macan (1950) pointed out that *L. a. atrebatinus* nymphs have more robust setae on the distal end than on the outer margin. Kluge (1995) concluded that the two subspecies *atrebatinus* and *orientalis* were not distinguishable, but we reerected the subspecific status on the basis of these morphological differences. Concerning the female imagoes of *L. atrebatinus orientalis* from Japan, we ascertained that abdominal terga II–IX have a pair of short oblique streaks and spots in the median region and dark brown posterior fringes (Fig. 3).

Labiobaetis morus (Chang and Yang 1994) was described in the nymphal stage from Taiwan by Kang et al. (1994), and only the nymph was known. We examined the material of *L. morus*, including a paratype, and confirmed that *L. morus* has the following characters: broad setae with serrated distal ends along the anterior margin of the labrum (Fig. 5), and a pair of submedial pale brown spots and short oblique streaks on abdominal terga II–IX or II–X (Fig. 4). Based on these characters, we concluded that *L. morus* is a junior synonym of *L. atrebatinus*.

Kang et al. (1994) showed that the paraglossa of *L. morus* was 4.0 times as wide as the glossa, but the paratype of *L. morus* has paraglossae which are 2.8 times as wide as the glossae. The paratype also has nine broad setae with serrated distal ends along each side of the anterior margin of the labrum, 17–18 pectinate setae on the distal margin of the paraglossa, and 12–15 denticles on the inner margin of

Table 2. Number of legs of *L. atrebatinus orientalis* from Japan, Taiwan, and Korea in relation to the number of robust setae on the outer margin and the distal end of the femur

Number of robust setae on the distal end of femur	Number of robust setae on the outer margin of femur																											
	Japan											Taiwan										Korea						
	7	8	9	10	11	12	13	14	15	16	17	10	11	12	13	14	15	16	17	18	19	12	13	14	15	16	17
3				1		4	1																				
4				3	4	3	2																				
5			2	3	5	6	2	2																1			
6				1	9	4	8	1	1	1	1	1															
7	1	2		7	1	2	6	2	3	1			1		1												
8				1	6	6	8	4	2						1				1	2					1		
9				1	4	3	8	2	2	3			1				1		1			1				1	
10				1	2	7	3	3	1		1					3				1	1		1				
11					1	2	2	1	1	1							1										
12						3	4	1								1											
13						2	2																				
14					1		1																				
15						1	1	1	1																		
16																											
17																											
18									1																		1

Gray parts indicate that the number of robust setae on the outer margin is smaller than that for the distal end

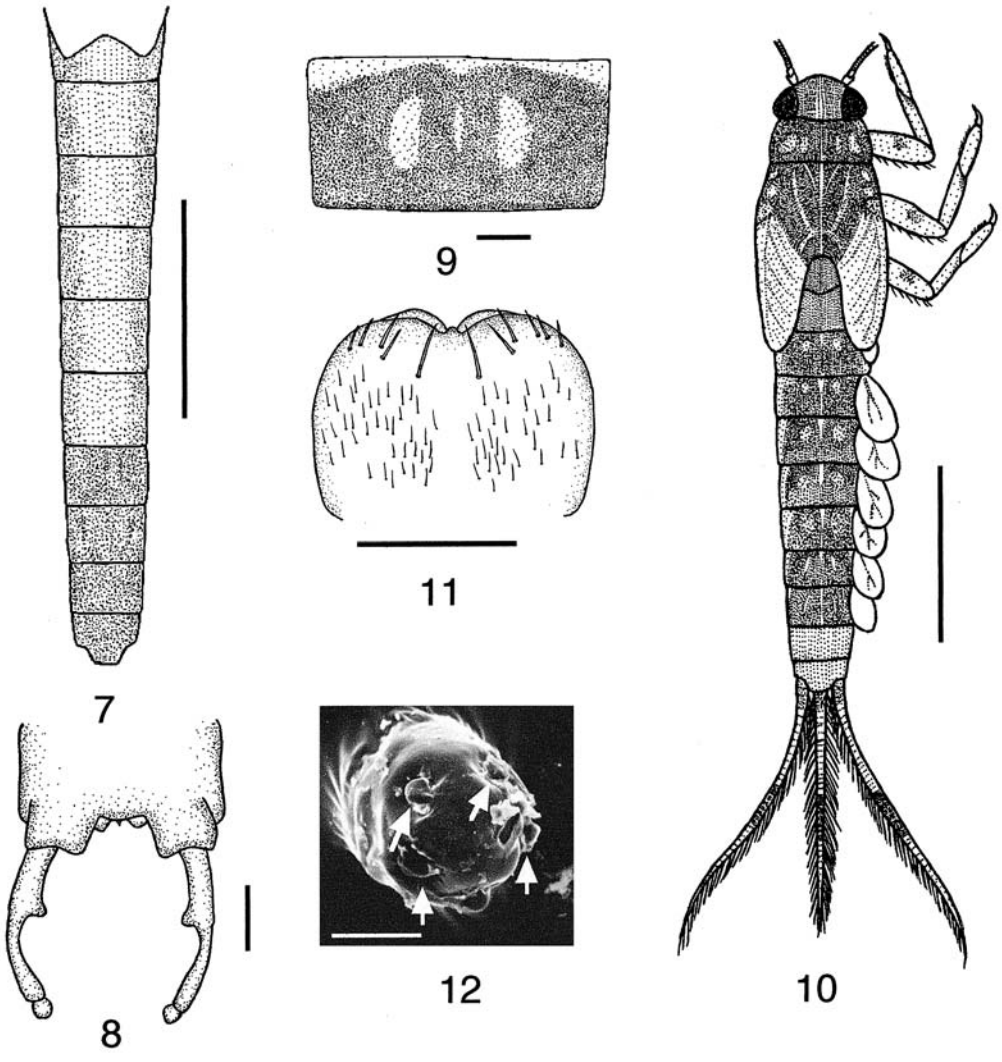
the claw. The other nymphs from Taiwan have paraglossae that are 2.9–3.1 times as wide as the glossae, 10–13 broad setae with serrated distal ends along each margin of the anterior margin of the labrum, 20–22 pectinate setae on the distal margin of the paraglossa, and 13–18 denticles on the inner margin of the claw. These characters of the material from Taiwan are not different from those of *L. atrebatinus orientalis* from Japan (Table 1). The number of robust setae on the outer margin of the femur is mostly larger than that on the distal end in the material from Taiwan, the same as for the Japanese material (Table 2). Thus, we concluded that *L. atrebatinus orientalis* is distributed also in Taiwan.

Labiobaetis atrebatinus was recorded from Korea by Bae and Park (1998). We examined the male imagoes and nymphs that had already been examined by Bae and Park (1998). The male imagoes have pale brown antenna except for a dark brown pedicel, and segment II of the forceps is lacking a distinct projection on the distomedial margin (Fig. 2). We also confirmed that the male imagoes have white abdominal terga II–VI with brown posterior fringes, and tergum II has a pair of broad brown stripes on the lateral margins (Fig. 1). The nymphs have broad setae with serrated distal ends near the anterior margin of the labrum (Fig. 5) and a pair of submedial pale brown spots and short oblique streaks on abdominal terga II–IX or II–X (Fig. 4). The nymphs have paraglossa 2.4–2.6 times as wide as the glossa, 13 broad setae with serrated distal ends along the anterior margin of the labrum, 12–14 denticles on the inner margins of the claws, and 21–23 pectinate setae on the distal margin of the paraglossa (Table 1). The number of robust setae on the outer margin of the femur is larger than that on the distal end in the material from Korea (Table 2). These characters of the Korean material are not different from those of *L. atrebatinus orientalis* from Japan. Thus, we confirmed that *L. atrebatinus orientalis* is distributed also in Korea.

The nymphs of *L. a. orientalis* from Japan were collected from mountain streams and plain rivers (Kobayashi 1989; Fujitani 2002). Kobayashi (1989) reported that this species is abundant in lowland spring brooks in Japan. The nymphs usually inhabit the submerged part of plants (e.g., *Phragmites* sp., *Elodea nuttallii*) on the margins of channels (Fujitani 2002).

Material examined

Imagoes. JAPAN. HONSHU. Chiba: 2♂ (sw), 2-XI-2001, Noda, Edo River, Noda Stream, TF. Shizuoka: 1♀ (sw), 3-VIII-2000, Shimizu-chô, Kakita Stream, Kakitagawa Bridge, TF. Kyoto: 4♂ [1♂ (re), 26-IV-1999; 3♂ (re), 27-IV-1999], Ayabe, Yura Stream, Tamba Bridge, TF; 2♂ 2♀ [2♂ (re), 24-V-1998; 1♀ (re), 5-VIII-1998; 1♀ (re), 11-X-1998], Ôe, Habi, Yura Stream, TF; 1♂ 1♀ (re), 10-VIII-1999, Kyoto, Sakyô, Shimogamo, Kamo Stream, Izumoji Bridge, TF; 3♂ 1♀ [1♀ (re), 16-X-2004; 1♂ (re), 17-X-2004; 1♂ (re), 15-XI-2004; 1♂ (re), 17-XI-2004], Nishikyô, Ôharano, Yoshimine Stream, Yokoi Bridge, TF; 2♂ (re), 13-VI-1999, Wazuka, Wazuka Stream, Iwai Bridge, TF. Nara: 1♂(re), 23-IX-1999, Nara, Kawakami-chô, Saho Stream, TF; 3♂ 3♀ [1♂ (re), 2-IX-1999; 1♂ 2♀ (re), 7-XI-1999; 1♂ (re), 8-XI-1999; 1♀ (re), 24-VII-2000], Higashi-Yoshino, Kozugawa, Takami Stream, TF. Tottori: 1♂ 3♀ [1♀ (re), 23-XI-1999, TF.; 1♂ 1♀ (re), 24-XI-1999; 1♀ (re), 26-XI-1999; 1♀ (re), 27-XI-1999], Yonago, Kamifukubara, Hino Stream, TF; 1♀ (re), 25-VII-2000, Yonago, Hino Stream, Yawata Bridge, TF; 3♀ [2♀ (re), 26-XI-1999; 1♀ (re), 27-XI-1999], Mizokuchi, Hino Stream, Kimori Bridge, TF. KYUSHU. Fukuoka: 1♀ (re), 20-IX-2000, Kaho,



Figs. 7–12. *Labiobaetis tricolor* (Tshernova 1928). **7,8** Male imago: **7** abdominal terga, **8** forceps. **9** Female imago: abdominal tergum V. **10–11** Nymph: **10** habitus, **11** labrum. **12** Egg (arrows indicate attachment devices). *Scale bars*: 1 mm in Figs. 7, 10; 0.1 mm in Figs. 8, 9, and 11; 0.02 mm in Fig. 12

Shimomasu, TF; 1♀ (re), 24-IX-2000, Tachiarai, Nishibaru, Chikugo Stream, TF. RYUKYU IS. Okinawa: 1♂ (re), 18-III-2004, Okinawa Is., Kunigami, Yona, Yona Stream, TF; 1♂ (re), 18-III-2004, Kunigami, Benoki, Benoki Stream, TF.

KOREA. Gyonggi-do: 3♂, 13-X-1995, Wangsukchun Cr., SYP (SWU-EPH-441).

Nymphs. JAPAN. HONSHU. Yamagata: 2 exs, 17-X-1996, Yonezawa, Ôtaru Stream, NK. Chiba: 1 ex, 2-XI-2001, Noda, Edo River, Noda Bridge, TF. Kyoto: 5 exs (3 exs, 29-VII-2000; 1 ex, 30-VII-2000; 1 ex, 25-VII-2001), Ôe, Habi, Yura Stream, TF; 1 ex, 10-VIII-1999, Kyoto, Sakyô, Shimogamo, Kamo Stream, TF; 1 ex, 14-XI-2004, Kyoto, Nishikyô, Ôharano, Yoshimine Stream, Yokoi Bridge, TF; 2 exs, 13-VI-1999, Wazuka, Wazuka Stream, Iwai Bridge, TF. Nara: 2 exs, 17-IX-2001, Kawakami, Unokawa, Nakai Stream, TF. Tottori: 1 ex, 25-VIII-2000, Yonago, Hino Stream, Yawata Bridge, TF; 5 exs (1 ex, 22-XI-1999; 4 exs, 23-XI-1999), Yonago, Kamifukubara, Hino Stream, TF; 3 exs, 27-XI-1999, Mizokuchi, Hino Stream, Kimori Bridge, TF. SHIKOKU. Kagawa: 6 exs, 20-VII-1997, Shioe, Kaimata Stream, Kaimata Bridge, YJB; 5 exs, 20-VII-1997, Shioe, Koutou Stream, Kangetsu Bridge, YJB. KYUSHU. Fukuoka: 2 exs, 20-IX-2000, Usui, Onga Stream, Kodai Bridge, TF; 2 exs, 20-IX-2000, Kotake, Onga Stream, Gotoku Stream, TF. RYUKYU IS. Okinawa: 4 exs (3 exs, 14-V-1998; 1 ex, 16-III-2004), Okinawa Is., Kunigami, Yona, Yona Stream, TF; 2 exs (1 ex, 3-X-2002; 1 ex, 13-III-2004), Ishigaki Is., Hoshino, Tôro Stream, Tôro Bridge, TF. TAIWAN. Nantou Hsien: 1 ex, 20-II-1991, Kuohsing, HCC [paratype of *B.* (*M.*) *morus*]. Taipei: 2 exs, 2-I-1989, Shenkeng, Chingmei River, KT.

KOREA. Gongwon-do: 2 exs, 11-VIII-1993, Yeongwol, Pobhung-ri, YJB (SWU-EPH-442).

Distribution. Russia (Primorsky Province and Chita Province), Korea, Japan (Hokkaido, Honshu, Shikoku, Kyushu, Okinawa Is., Ishigaki Is.), Taiwan.

Labiobaetis tricolor (Tshernova 1928) (Figs. 7–12)

Baetis tricolor Tshernova, 1928, 320 (♂); Keffermüller, 1956, 182 (♀, subimago ♂, nymph); Bogoescu and Tabacaru, 1957, 261 (nymph); Müller-Liebenau, 1969, 158 (♂, nymph); Keffermüller, 1972, 212 (egg).

Baetis (*Labiobaetis*) *tricolor*: Tshernova et al., 1986, 131 (♂); Kluge, 1995, 16 (list).
Baetis (*Labiobaetis*) *propinquus*: Novikova and Kluge, 1987, 13 (nymph).
Baetis sp. Q: Kobayashi, 1987, 54 (nymph); Kobayashi, 1989, 60 (nymph).
Labiobaetis tricolor: McCafferty and Waltz, 1995, 21 (list).
Pseudocloeon tricolor: Lugo-Ortiz et al., 1999, 25 (list).
Labiobaetis sp. Q: Fujitani et al., 2003b, 130 (list).

Tshernova (1928) described *Baetis tricolor* from the Moscow River of Zvenigorod, Moscow Province, Russia. McCafferty and Waltz (1995) transferred this species to *Labiobaetis*. We follow McCafferty and Waltz (1995) and treat this species as *Labiobaetis*.

Male imagoes reared from *Labiobaetis* sp. Q have white abdominal terga II–VI without brown patterns (Fig. 7) and forceps with a distinct projection on the posteromedial margins of segment II and a sclerotized plate between the basal segments (Fig. 8). Female imagoes reared from *Labiobaetis* sp. Q have brown abdominal terga and a white cercus. The nymphs have five to six fine setae near each side of the anterior margin of the labrum (Fig. 11) and a pair of pale brown submedial spots and a pale brown medial streak on abdominal terga II–VIII (Fig. 10). Eggs have no distinct structures except for five attachment devices in the polar region (Fig. 12). These characters are diagnostic of *L. tricolor* in male imago (Tshernova 1928; Keffermüller 1956; Müller-Liebenau 1969), female imago (Keffermüller 1956), nymph Keffermüller 1956); Bogoescu and Tabacaru 1957); Müller-Liebenau 1969), and egg (Keffermüller 1972). We also compared other morphological characters of material from Japan with those of European material described by Keffermüller (1956), Bogoescu and Tabacaru (1957), Müller-Liebenau (1969) and ascertained that there are not any differences to distinguish them from European material. Thus, we conclude that *Labiobaetis* sp. Q is conspecific with *L. tricolor*. Concerning the female imago, we ascertained that the antenna is pale brown and abdominal terga II–VIII have a pair of oval patches in the median region.

Novikova and Kluge (1987) treated *L. tricolor* as a junior synonym of *L. propinquus* (Welsh 1858), although Morihara and McCafferty (1979) pointed out that the posteromedian projection of segment II of the forceps is more acute in *L. propinquus* than in *L. tricolor*. In the material we examined, the apex of the projection was rounded (Fig. 8). Tshernova (1928) and Müller-Liebenau (1969) also showed that the projection of *L. tricolor* is rounded at the apex. Thus, here we do not consider *L. tricolor* and *L. propinquus* conspecific.

The nymphs of this species from Japan (Fig. 6) are mainly distributed in plain rivers (Kobayashi 1989). This species is abundant in Yonekawa Stream (listed below). The nymphs inhabit submerged parts of plants (e.g., *Phragmites* sp., *Elodea nuttallii*).

Material examined

Imagoes. JAPAN. HONSHU. Tottori: 6♂ 7♀ [2♂ 3♀ (re), 25-VII-2001; 1♂ (re), 27-VII-2001; 1♀ (re), 18-V-2003; 3♂ (re) 3♀ (sw), 19-V-2003], Sakaiminato, Koshinozu, Yonekawa Stream, TF.

Nymph. JAPAN. HONSHU. Ibaraki: 1 ex, 1-VI-1998, Iwai, Tone River, NK. Chiba: 3 exs, 2-XI-2001, Noda, Edo River, Noda Bridge, TF. Tottori: 7 exs (5 exs, 25-VII-2001; 2 exs, 26-VII-2001), Sakaiminato, Koshinozu, Yonekawa Stream, TF; 1 ex, 23-XI-1999, Yonago, Kamifukubara, Hino Stream, TF.

Distribution. Russia, Germany, Lithuania, Estonia, Poland, Rumania, Bulgaria, Macedonia, Japan (Hokkaido, Honshu, Shikoku, Kyushu).

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