

Two new species of *Baetis* Leach (Ephemeroptera: Baetidae) from Taiwan

Shih-Chang Kang* and Chung-Tu Yang Department of Entomology, National Chung Hsing University, Taichung 402, Taiwan, R.O.C.

ABSTRACT

Two new species, *Baetis (Fallceon) candidus* sp.n., and *B. (Labiobaetis) mustus* sp.n. collected from Taiwan, and their nymphs are described herein. Furthermore, 2 subgenera of this genus, *Margobaetis* Kang and Yang and *Mullerbaetis* Kang and Yang should be suppressed as synonyms of *Fallceon* Waltz and McCafferty and *Labiobaetis* Novikova and Kluge, respectively.

Key words: *Baetis*, *Fallceon*, *Labiobaetis*, new species, Taiwan.

Introduction

The genus *Baetis* Leach of Taiwan has been revised by Kang and Yang (1994) in which, 13 species are described. In recent collections from Taiwan, we have added 2 new species to this genus that are named *B. (Fallceon) candidus* sp.n., and *B. (Labiobaetis) mustus* sp.n.

Abbreviations used in the depository of the material are: Department of Entomology, National Chung Hsing University, Taichung, Taiwan (**NCHU**), National Museum of Natural Science, Taichung, Taiwan (**NMNS**).

Subgenus *Fallceon* Waltz and McCafferty, 1987

Fallceon Waltz and McCafferty, 1987, Ann. Entomol. Soc. Amer., 80: 668.

Type species: *Baetis quilleri* Dodds.

Baetis (Fallceon) Kluge, 1992, Zool. Zhurnal, 71: 38.

B. (Margobaetis) Kang and Yang, 1994, J. Taiwan Mus., 47: 11, **new synonym**.

Type species: *Baetis mundus* Chang and Yang

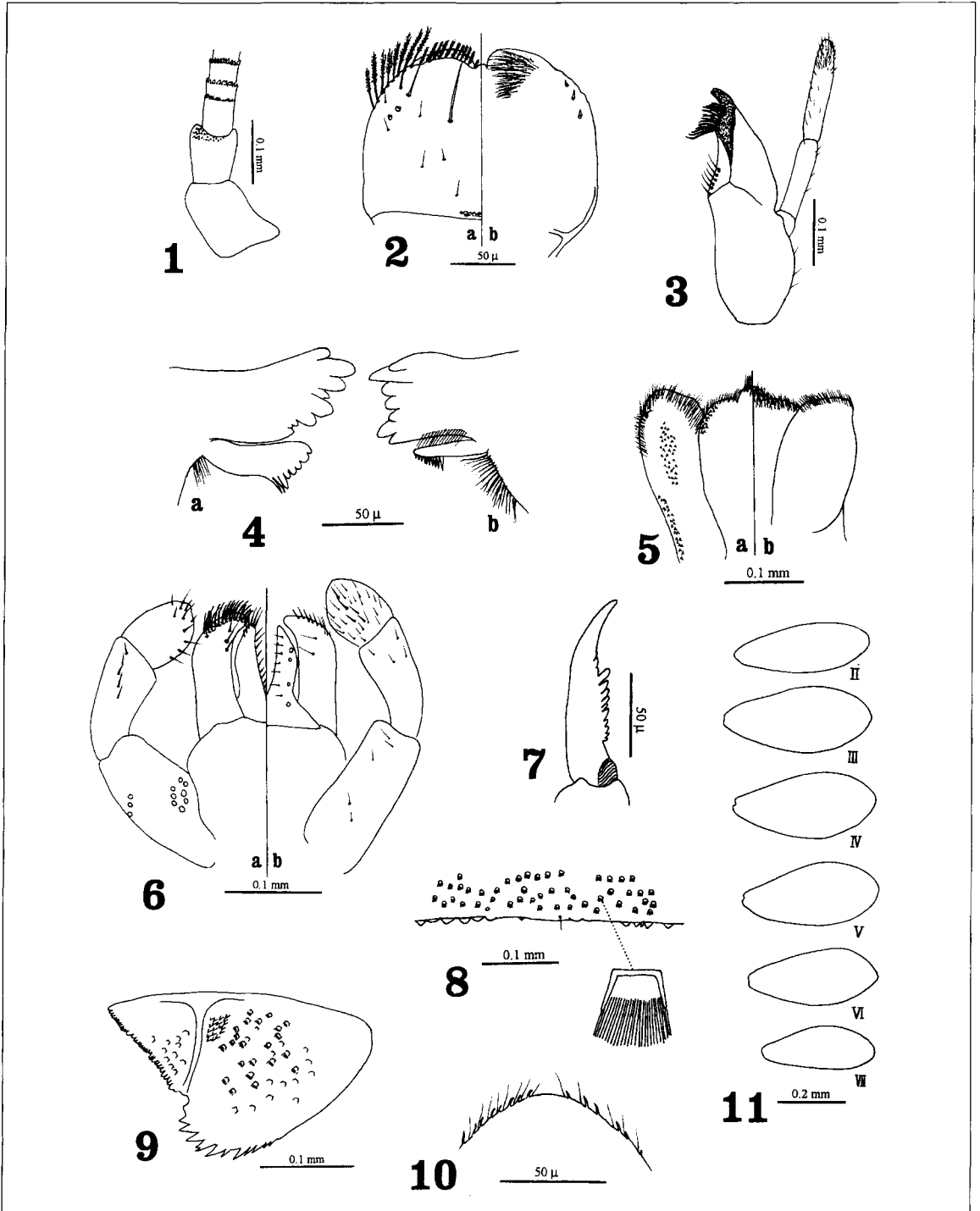
Baetis (Fallceon) candidus Kang and Yang, sp.n.

Figs. 1-11

Mature nymph (in 70% alcohol). Body length, female 5.5-5.9 mm (n=4), male 5.1-5.6mm (n=3). General color pale.

Head: Frons with longitudinal carina between bases of antennae. Antenna (Fig. 1): ca. 3x as long as head capsule; scape oblique; pedicel with fine scales at apex. Labrum (Fig. 2): width ca. 1.4x length; anteromedial margin cleft, with a round lobe; dorsum with a row of branched setae along anterior margin, anterolateral setae longer than anteromedial. Mandibles (Fig. 4): left incisor with 3+1+3 denticles; right incisor with 3(1)+1+2 denticles and a row of long fine setae near mesial margin; left prostheca stout, base with setal tuft; right prostheca combshaped. Maxillae (Fig. 3): galea-lac-

*Correspondence / reprint request address



Figs. 1-11. Nymphs of *Baetis candidus*. 1, antenna, dorsal; 2, labrum (a, dorsal; b, ventral); 3, maxilla, ventral; 4, mandible (a, left; b, right), dorsal; 5, hypopharynx (a, dorsal; b, ventral); 6, labium (a, dorsal; b, ventral); 7, fore claw; 8, posterior margin of tergum VI, dorsal; 9, paraproct, dorsal; 10, apex of gill VI; 11, gills of abdominal segments II -VII.

inae with 5-8 long fine setae near basomesial margin; palpi 2-segmented, ca. 1.4x as long as galea-lacinia, segment II slightly longer than segment I and with fine setae densely on apical 1/3. Hypopharynx (Fig. 5): dorsum with fine scales on anterolateral corners of lingua and on medial area, posterolateral corners of superlinguae. Labium (Fig. 6): glossae smaller than paraglossae, venter with 3-4 pores; labial palpi with 3 segments, segment I with dorsal pores and segment III with ventral, densely covered with fine setae.

Thorax: Nota: pale; hind wing pads distinct. Legs: pale; anterior and posterior margins of femora, inner margins of tibiae and tarsi with acute setae; ratio of tarsus: tibia:femur of foreleg of female ca. 1:1.6:1.8, of male ca. 1:1.3:1.6; claws bluntly serrated on half of inner margins (Fig. 7).

Abdomen: Terga: uniformly light brown, each tergum darkish medially and washed-out on margins; posterior spines present on terga VI-X but indistinct on tergum VI (Fig. 8), Sterna: pale; posterior spines present on sterna VIII-IX; paraprocts acutely dentate on posterior margins, with acute, fine scales submedially and trapezoidal-based scales medially (Fig. 9). Gills (Fig. 11): 6 pairs, oval, present on abdominal segments II-VII; tracheae of each gill obscure or only distinct on trunks; margins of gills with spines and long fine setae alternately (Fig. 10). Caudal filaments: pale, darkish on basal half; cerci ca. 0.8x body length and 2.3x terminal filament; lateral margins of terminal filament and basal 2/5 of mesial margins of cerci fringed with fine setae.

Type material: All are mature nymphs and in 70% alcohol. Holotype: mature female nymph, TAICHUNG HSIEN: Wufeng, 140 m, 28-IX-1994, S.C. Kang (NCHU). Paratypes: 6 males and 7 females, same data as for holotype (3 males and 4 females in NCHU; 3 males and 3 females in NMNS).

Distribution: Taiwan.

Etymology: *candidus*, L., masculine, meaning shining, white.

Remarks: Nymphs of this new species resemble *Baetis terminus* Chang and Yang but can be differentiated using the following 2 characters: (1) gills 6 pairs, the first abdominal segment lacking gill and (2) posterior spines of terga and sterna are present on abdominal segments VI-X and VIII-IX, respectively, instead of III-X for *B. terminus*.

Subgenus *Labiobaetis* Novikova and Kluge, 1987

Baetis (*Labiobaetis*) Novikova and Kluge, 1987, Vestn. Zool., 1987: 14.

Type species: *Baetis atrebatinus* Eaton.

B. (*Mullerbaetis*) Kang and Yang, 1994, J. Taiwan Mus., 47: 32, **new synonym**.

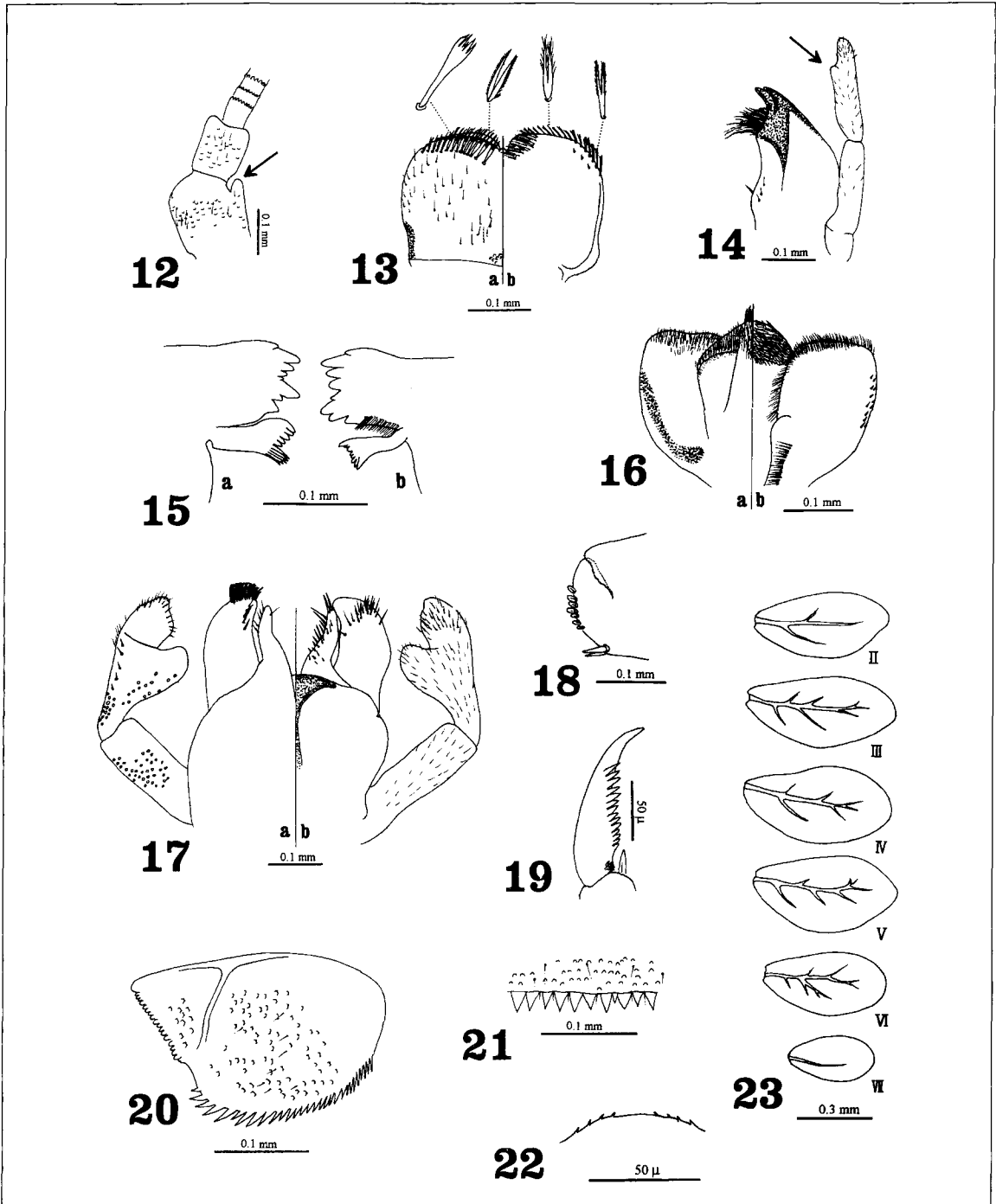
Type species: *Baetis molawinensis* Müller-Liebenau.

***Baetis* (*Labiobaetis*) *mustus* Kang and Yang, sp.n.**

Figs. 12-23

Mature nymph (in 70% alcohol). Body length, female 5.9-6.6 mm (n=5), male 5.2-5.7 mm (n=4). General color pale yellow to light brown.

Head: Antenna pale, scape, pedicel and basal part of flagellum brown; scape with an anterolateral lobe (Fig. 12). Clypeus wider than labrum, anterior margin concave. Labrum (Fig. 13): width ca 1.5x length, anteromedial margin cleft, with 1 round lobe; dorsum with row of biforked setae along anterior margin and row forked setae near anterior margin. Mandibles (Fig. 15): left incisor with 3(1)+1+3 denticles; right incisor with 3(1)+4 denticles, with row of long fine setae near mesial margin; left prostheca stout; right prostheca palmshaped. Maxillae (Fig. 14): palpi 2-segmented, segment II longer than segment I and lobed at mesoapical 1/3. Hypopharynx (Fig. 16): dorsum of lingua with medial carina;



Figs. 12-23. Nymphs of *Baetis mustus*. 12, antenna, dorsal, anterolateral lobe indicated; 13, labrum (a, dorsal; b, ventral); 14, maxilla, ventral, lobe indicated; 15, mandible (a, left; b, right), dorsal; 16, hypopharynx (a, dorsal; b, ventral); 17, labium (a, dorsal; b, ventral); 18, distal part of fore femurs, dorsal; 19, fore claw; 20, paraproct, dorsal; 21, posterior margin of tergum VI, dorsal; 22, apex of gill IV; 23, gills of abdominal segments II-VII.

superlinguae with chitinized band posterodorsally and several fine acute setae lateroventrally. Labium (Fig. 17): glossae much smaller than paraglossae; paraglossae with oblique row of acute setae ventrally; labial palpi 3-segmented, articulations of segments II and III indistinct, segment II with an anteromesial lobe.

Thorax: Hind wing pads distinct. Legs: pale, femora with a brown marking medially, tibiae and tarsi darkish distally; anterior and posterior margins of dorsum of femora and inner margins of tibiae and tarsi with acute setae; distal margins of femora with 5-9 closely set blunt setae (Fig. 18); venter of femora with small blunt setae near anterior margins; ratio of tarsus:tibia:femur of foreleg of female ca. 1:1.8:2, of male ca. 1:1.6:1.8; claws acutely serrated on basal 3/4 of inner margins (Fig. 19).

Abdomen: Terga: light yellow to brown, terga II-IX with 4 pale dots medially. Posterior spines acute, present on every tergum (Fig. 21). Sterna: pale to yellow; posterior spines present on sterna VII-IX, medial spines blunt, laterals acute, irregular; paraprocts acutely dentate on posterior margins (Fig. 20). Gills (Fig. 23): 6 pairs, oval, present on abdominal segments II-VII; tracheae of each gill distinct; margins of gills with fine spines and with a few or no setae (Fig. 22). Caudal filaments: light yellow, middle part of cerci and distal part of terminal filament dark brown; cerci ca. 0.67x body length and 1.55x terminal filament; lateral margins of terminal filament and basal 1/2 of mesial margins of cerci fringed with fine setae.

Type material: All are mature nymphs and in 70% alcohol. Holotype: mature female nymph, TAICHUNG

HSIEN: Hsinshue, 480 m, 7-III-1995, S.C. Kang (NCHU). Paratypes: 7 males and 6 females, same data as for holotype (5 males and 4 females in NCHU; 2 males and 2 females in NMNS).

Distribution: Taiwan.

Etymology: *mustus*, L., masculine, meaning young, new, fresh.

Remarks: This new species resembles *Baetis morus* Chang and Yang but can be differentiated in nymphs by the lack of a gill at abdominal segment I.

Acknowledgments

This report was financially supported by the National Science Council (NSC) project NSC84-2321-B-005-062.

References

- Kang, S. C., H. C. Chang, and C. T. Yang. 1994. A revision of the genus *Baetis* in Taiwan (Ephemeroptera). *J. Taiwan Mus.* 47(2): 9-44.
- Kluge, N. Yu. 1992. Cuban mayflies of the family Baetidae (Ephemeroptera): 3. subgenus *Fallceon* of the genus *Baetis*. *Zool. Zhurnal* 71(15): 38-48. (in Russian)
- Novikova, E. A., and N. Yu. Kluge. 1987. Systematics of the genus *Baetis* (Ephemeroptera, Baetidae) with description of a new species from Middle Asia. *Vestn. Zool.* 1987(4): 8-19. (in Russian)
- Waltz, R. D., and W. P. McCafferty. 1987. New genera of Baetidae for some Nearctic species previously included in *Baetis* Leach (Ephemeroptera). *Ann. Entomol. Soc. Amer.* 80(5): 667-671.

Received for publication July 21, 1995;

Revised manuscript accepted January 17, 1996.