



Description of a new species of *Fallceon* from Cuba, and redescription of the larva of *F. longifolius* (Ephemeroptera, Baetidae)

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Abstract

Fallceon grandis sp. n. is described based on larvae from Cuba. The new species shares some similarities with two other Cuban species of *Fallceon*, *F. planifrons* and *F. alcarrazae*, and can be separated from all species of the genus by the following characteristics: (1) frontal keel absent; (2) maxillary palp subequal to galea-laciniae; (3) tarsal claws with one subapical seta; (4) gills broad and richly tracheated; (5) tergal surface with abundant angulate scales bases and posterior margin with sharp triangular spines; (6) paraprocts with 13–14 irregular spines in posterior margin. *Fallceon longifolius* is redescribed based on material from Cuba, and the Mexican material previously assigned to this species is considered herein as a new species. An updated key to the larvae of *Fallceon* from Cuba is also presented.

Key words: *Fallceon*, Baetidae, Ephemeroptera, new species, Cuba

Introduction

The genus *Fallceon* (Ephemeroptera: Baetidae) was established by Waltz and McCafferty (1987) to incorporate those species previously included in *Baetis* s.l. characterized in the larvae by the absence of villopore, segment 2 of labial palp without distomedial process, at least the right mandible with a tuft of setae between the prosthema and molar, and by the presence in the adults of a distinct costal hook in the hind wing. Later, Lugo-Ortiz *et al.* (1994) considered that *Caribaetis*, originally described as a subgenus of *Baetis* (Kluge 1992a), was a synonym of *Fallceon*.

Currently *Fallceon* is known from Central America (Costa Rica, Guatemala, Belize, and Honduras), the Antilles (Cuba, Puerto Rico and Guadeloupe) and North America (Mexico and United States), and includes 17 species (Waltz and McCafferty 1987, Kluge 1992 a, b, Lugo-Ortiz *et al.* 1994, Lugo-Ortiz and McCafferty 1999, Hofmann *et al.* 1999, McCafferty 2006, 2007). Three additional species recently assigned to *Fallceon* (Lugo-Ortiz & McCafferty 1999) are also reported from South America, but as they are known exclusively at the imaginal stage and were tentatively included in this genus, the presence of *Fallceon* in South America should be regarded as dubious (Dominguez *et al.* 2006). In Cuba the following species of *Fallceon* have been described so far: *F. alcarrazae* (Kluge), *F. longifolius* (Kluge), *F. nikitai* McCafferty and Lugo-Ortiz, *F. planifrons* (Kluge), *F. sextus* (Kluge), *F. testudineus* (Kluge), and *F. poeyi* (Eaton) (Kluge 1992 a, b, McCafferty and Lugo-Ortiz 1994, Lugo-Ortiz *et al.* 1994).

Herein, based on larvae collected in Cuba's Eastern Region, a new species of *Fallceon* is described. *Fallceon longifolius* is redescribed based on material also from Cuba, and the Mexican material previously assigned to this species by Lugo-Ortiz *et al.* (1994) is considered herein as a new species. An updated key to

the larvae of *Fallceon* from Cuba is also presented. The types of the new species, as the material of *F. longifolius*, are deposited in the Colección Entomológica del Departamento de Biología, de la Universidad de Oriente, Santiago de Cuba, Cuba.

***Fallceon grandis* sp. n.**

(Figs. 1 – 12)

Larva. Body length, 7.5–8.0 mm, cerci 6.5–6.8 mm, paracercus 3.0–3.2 mm.

Head. Coloration of vertex pale brown, genae dark brown. Antennae pale yellow to pale brown, scape and pedicel pale brown, flagellum pale yellow. Frontal keel absent. Labrum (Fig. 1) rounded distally, with median emargination; one submedial and three submarginal simple setae present on each side; simple setae scattered dorsally on midposterior region; long, fine, simple setae on anterior margin, and long, fine, branched setae on anterolateral margin. Right mandible (Fig. 2) with eight denticles; tuft of simple setae between prostheca and molar present; base of incisors with 7–8 simple setae, distal end of molar with 2 long, simple setae. Left mandible (Fig. 3) with seven denticles, almost inconspicuous tuft of simple setae present between prostheca and molar; blunt triangular process present at base of molar; short, stout simple setae at base of triangular process and molar; distal end of molar with 1 long, simple seta. Maxillae (Fig. 4) short, robust, maxillary palps subequal to galea-laciniae; segment 1 0.7x length of segment 2, segments 1 and 2 with scattered fine, simple setae; 1+4-5 long, simple setae at base of galea-laciniae. Labium (Fig. 5) with palp segment 1 0.9x length of segments 2 and 3 combined, segment 2 with 5–7 simple setae dorsally, segment 3 apically rounded, with many spurs and fine setae of various lengths on surface; glossae 0.9x length of paraglossae, with 11-12 simple setae in inner margin and 6-8 simple setae ventrally, outer margin with 6 simple setae. Paraglossae basally broad, tapering distally, with 2 apical rows of simple setae. Hypopharynx as in Fig. 6.

Thorax. Nota pale brown to dark brown. Pronotum with medial pale markings, sterna pale yellow. Legs robust, pale yellow, proximal and distal end of femora, tibia and tarsi dark brown. Femora (Fig. 7) dorsally with 41 long, robust spurs (more abundant basally, 25 spurs), ventrally with 8 short spurs and medial pale brown macula on anterior face. Tibiae (Fig. 7) with 13–15 short, stout spurs and fine simple setae ventrally; dorsal margin with 3–4 long, stout spurs and fine, long simple setae. Tarsi (Fig. 7) with 9 stout spurs ventrally, those on distal end longer and more robust; dorsal margin with two rows of fine, long simple setae. Tarsal claws (Fig. 8) with 9–10 denticles, one subapical seta present.

Abdomen. Color pale yellow to dark brown. Terga 1–3 and 5–7 dark brown, terga 4 and 8–10 pale yellow, terga 8 and 9 anteriorly pale brown, terga 2–8 with two submedian dark spots. Sterna pale yellow. Tergal surface (Figure 9) with abundant angulate scale bases and scattered, fine simple setae, posterior margin with sharp triangular spines. Gills (Fig. 10) broad and richly tracheated, margins serrated, with fine simple setae between serrations (Fig. 11). Paraprocts (Fig. 12) with scattered small angulate scale bases, 13–14 irregular spines in posterior margin. Caudal filaments pale brown.

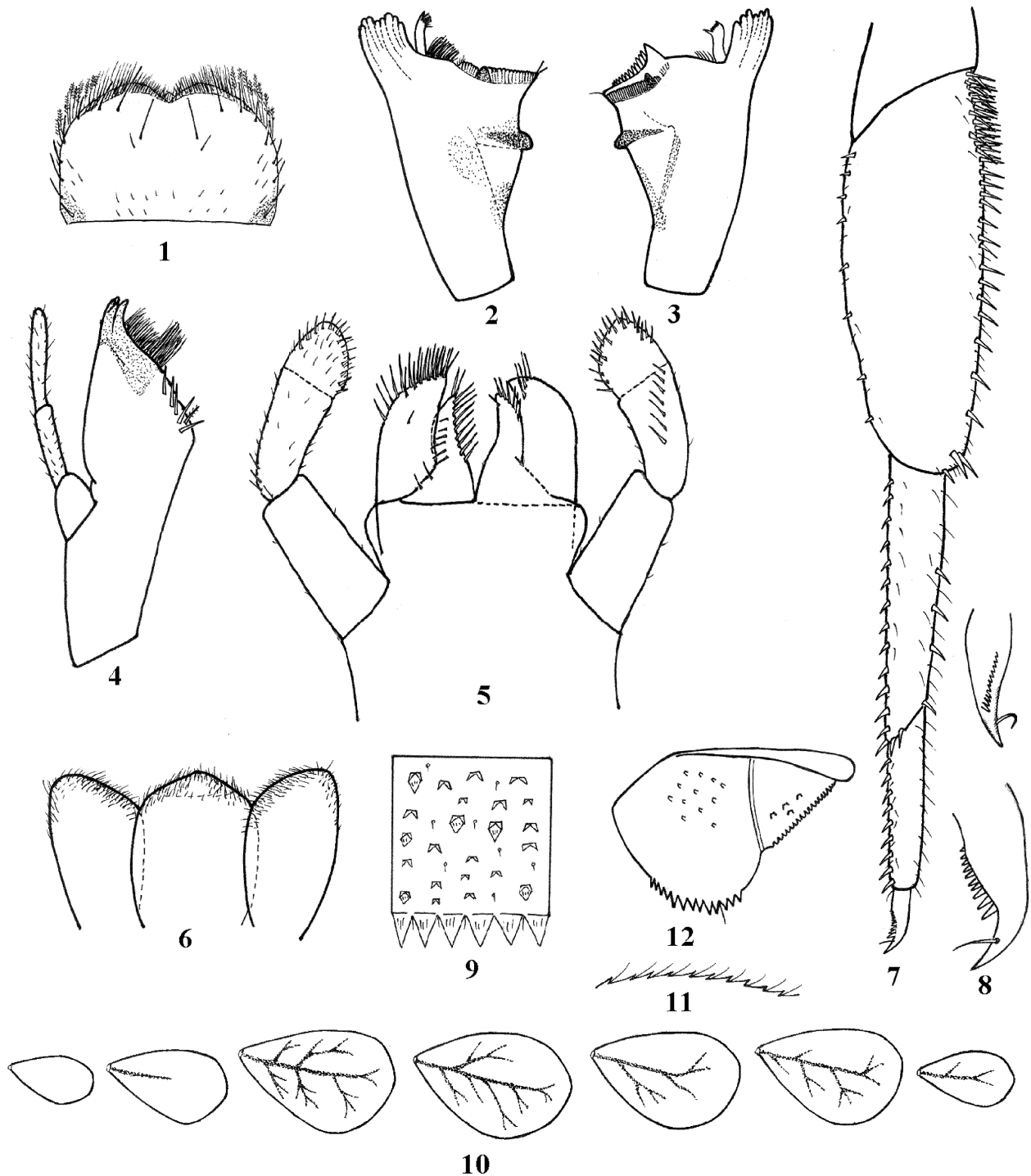
Male and female adults: Unknown

Material examined: Holotype. 1 mature larva: Cuba, río Yara, Granma, 06.1999, P. López col., - Paratype. 2 larvae, same data as holotype.

Distribution. Río Yara, Granma, Eastern Region of Cuba.

Etymology. The epithet of the species is in allusion to its large body size.

Discussion. *F. grandis* can be easily distinguished from all other species of *Fallceon* by the following combination of characters: (1) frontal keel absent; (2) maxillary palp subequal to galea-laciniae (Fig. 4); (3) dorsal margin of femora with greater number of setae (Fig. 7); (4) tarsal claws with one subapical seta (Fig. 8); (5) gills broad and richly tracheated (Fig. 10); (6) tergal surface with abundant angulate scales bases and posterior margin with sharp triangular spines (Fig. 9); (7) paraprocts with 13–14 irregular spines in posterior margin (Fig. 12).



FIGURES 1–12. *Fallceon grandis* sp.n. Larva: 1, labrum, d.v.; 2, right mandible v.v.; 3, left mandible v.v.; 4, maxillae v.v.; 5, labium, left v.v., right d.v.; 6, hypopharynx v.v.; 7, fore leg; 8, fore tarsal claw; 9, posterior margin of tergum IV; 10, gills I–VII; 11, gill IV (detail of margin); 12, paraproct.

The absence of frontal keel, and specially, the tarsal claws with a subapical setae, indicate that *F. grandis* is similar to two other species of *Fallceon*, both of which were described as *Caribaetis* by Kluge (1992a), *F. alcarrazae* and *F. planifrons*. Despite these similarities, *F. grandis* can be differentiated from *F. planifrons* because of its larger body size, the greater number of setae along the dorsal margin of femora, and richly tra-cheated gills. *F. grandis* and *F. alcarrazae* can be differentiated based on abdominal coloration, number and

size of tergal scale and angulated scale bases (both of which are smaller and less abundant in *F. alcarrazae* than in *F. grandis*), and tracheation of gills.

Apparently *F. grandis* is a rare species, since only three larvae were collected in the Río Yara, in spite of the numerous samplings in this river.

***Fallceon longifolius* (Kluge)**

(Figs. 13 – 26)

Baetis (Fallceon) longifolius Kluge 1992b: 44 (egg, larvae, male and female adults)

Larva. Body length, 3.0–3.5 mm, cerci 2.5–3.5 mm, paracercus 2.0–3.5 mm.

Head. Coloration pale to pale yellow. Antennae pale yellow. Scape and pedicel without setae. Frontal keel present. Labrum (Fig. 13) with anterior margin rounded, and with median emargination; one submedian and 4–5 submarginal simple setae present on each side; marginal setae pectinate, fine simple setae scattered dorsally, very short submarginal-anterolateral simple setae present. Right mandible (Fig. 14) with eight denticles; 8–9 long, stout, simple setae between prostheca and molar; row of fine, simple setae at base of incisors; two simple setae distally on molar. Left mandible (Fig. 15) with seven denticles; reduced tuft of simple setae between prostheca and molar are present; blunt triangular process at base of molar; short, stout simple setae at base of triangular process and molar. Maxillae (Fig. 16) short, robust; maxillary palps extending beyond galea-laciniae; palp segment 1 0.7x length of segment 2, segments 1 and 2 with scattered fine, simple setae; 4–5 long, simple setae at base of galea-laciniae. Labium (Fig. 17) with palp segment 1 subequal to segment 2 and 3 combined, with scattered fine, simple setae; segment 2 with 5–6 simple setae dorsally and scattered fine, simple setae laterally; segment 3 basally broad and apically pointed, with many long robust and fine simple setae on surface; glossae with 8–10 simple setae in inner margin and 4–5 simple setae ventrally, outer margin with 8–9 simple setae; 0.9x length of paraglossae. Paraglossae broad, with 2 apical rows of long, robust simple setae. Hypopharynx as in Fig. 18

Thorax. Nota pale yellow to pale brown, without distinct pattern; sterna pale yellow to pale brown. Legs pale yellow, long and slender. Femora (Fig. 19) dorsally with 8 long, robust spurs, distal two spurs almost contiguous with very fine, simple setae between long robust spurs (Fig. 20); ventrally with 11–12 short spurs and very fine simple setae. Tibiae (Fig. 19) with 10 long, stout spurs, increasing in length distally, and fine, long, simple setae ventrally; dorsal margin with 3 stout spurs and many fine, long, simple setae. Tarsi (Fig. 19) with 13 long, stout spurs ventrally, those on distal end longer and more robust; dorsal margin with scattered fine, simple setae. Tarsal claws (Fig. 21) with 11–12 denticles increasing in length distally.

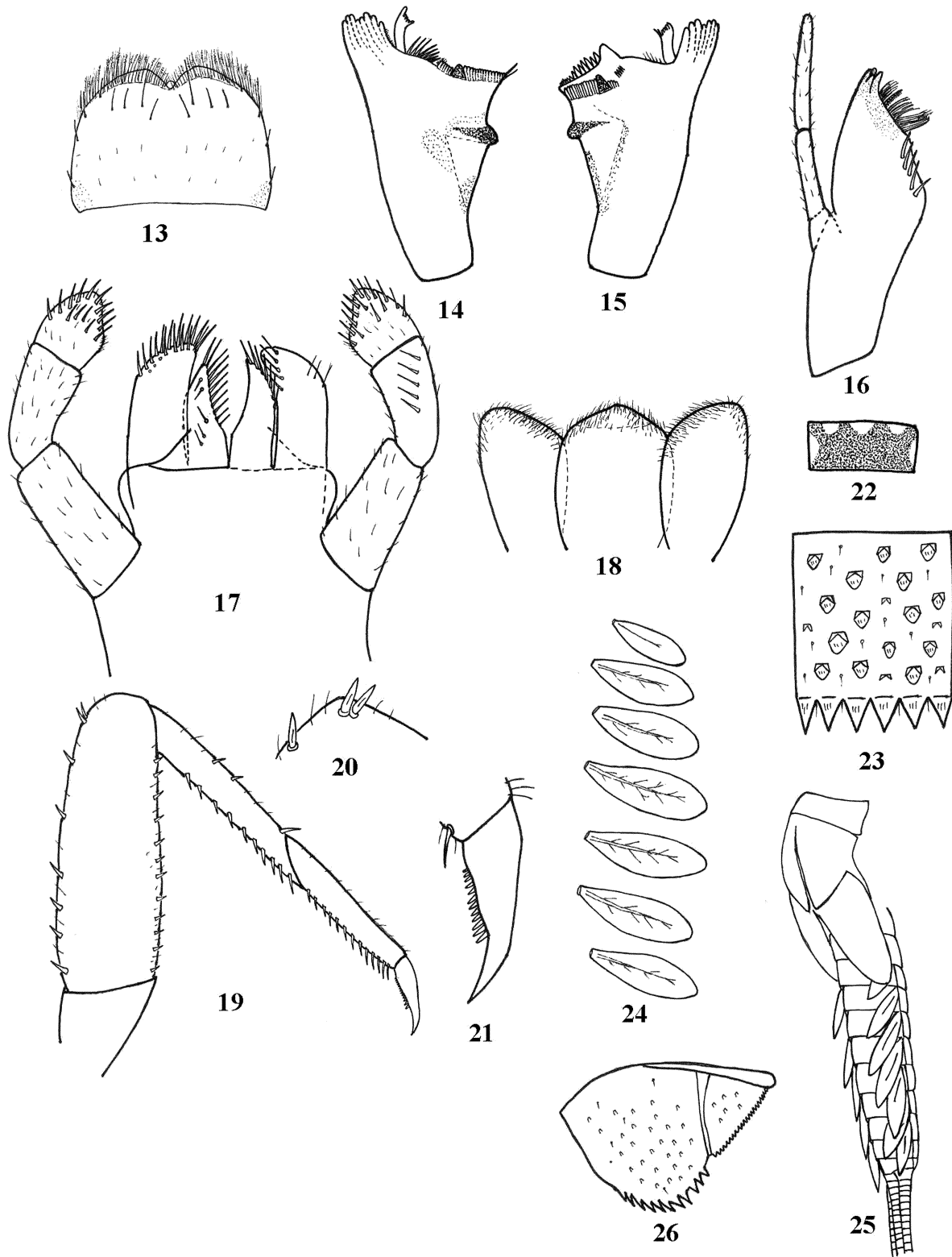
Abdomen. Color pale yellow to pale brown. Terga with color pattern as in Fig. 22. Sterna pale yellow. Tergal surface (Fig. 23) with abundant angulate scales bases and scattered, fine simple setae; posterior margin with sharp triangular spines. Gills (Fig. 24) narrow, elongate; gills 3–7 as long as two abdominal segments or longer (Fig. 25); margin serrated, with fine, simple setae between serrations. Paraprocts (Fig. 26) with numerous, angulate scale bases and fine simple setae over surface, 10–11 relatively large marginal spines. Caudal filaments pale yellow.

Material examined. Cuba: río Guaso, Guantánamo, 21.i.2004, Y. Rodríguez col. (1 larva); río El Muerto, Guantánamo, 20.iv.2006, S. Muñoz col. (4 larvae); río Sevilla, Amancio, Las Tunas, 7.ii.2007Y. Benítez col. (2 larvae); río Guantánamo, Guantánamo, 13.iii.2006, G. Álvarez col (1 larva).

Distribution. Eastern Cuba.

Discussion. Larvae of *F. longifolius* can be easily distinguished from all other larvae of *Fallceon* by the following combination of characters: (1) frontal keel present; (2) anterior margin of labrum rounded (Fig. 13); (2) maxillary palps extending beyond galea-laciniae (Fig. 16); (3) tarsal claws without subapical seta (Fig.

21); (4) gills narrow, elongate, as long as two abdominal segments or longer (Fig. 25); (5) tergal surface with abundant angulate scales bases and posterior margin with sharp triangular spines (Fig. 23); (6) paraprocts with 10–11 relatively large marginal spines (Fig. 26).



FIGURES 13–26. *Fallceon longifolius*. Larva: 13, labrum, d.v.; 14, right mandible v.v.; 15, left mandible v.v.; 16, maxillae v.v.; 17, labium, left v.v., right d.v.; 18, hypopharynx v.v.; 19, fore leg; 20, distal end of femora; 21, fore tarsal claw; 22, abdominal tergum VI ; 23, posterior margin of tergum IV; 24, gills I–VII; 25, thorax and abdomen l.v. ; 26, paraproct.

F. longifolius shares some characters with *F. sp.* (see below) and it shows very minor differences with that species. These species differs in the size, shape of anterior margin of labrum, the number of denticles on each mandible, the orientation of the molar of the left mandible, the shape of the right prostheca, the shape of the maxillae and the size, shape, and number of spines of the paraprocts.

***Fallceon* sp.**

Fallceon longifolius, Lugo-Ortiz *et al.* 1994: 465 (misidentification; larvae)

Lugo-Ortiz *et al.* (1994) redescribed Mexican larvae of what they thought to be *F. longifolius* based on four larvae collected in Zacualtipán, Mexico. Although the species redescribed by them belongs to *Fallceon*, it is clear that this material is not *F. longifolius* (see discussion of *F. longifolius* above). We considered that the material previously described and illustrated as *F. longifolius* by Lugo-Ortiz *et al.* (1994: 465) represents a new species, but as we haven't seen the material, we decided not to name this species.

According to Lugo-Ortiz *et al.* (1994) *F. sp.* can be easily differentiated from other members of the genus in the larval stage by the following combination of characters: (1) frontal keel present; (2) anterior margin of labrum subparallel, (3) number of denticles of each mandible; (4) shape and orientation of the molar of the left mandible; (5) shape of the right prostheca; (6) maxillae elongate with maxillary palps extending beyond galea-laciniae; (7) tarsal claws without subapical seta; (8) gills narrow, elongate and as long as two abdominal segment or longer; (9) tergal surface with abundant angulate scales bases and posterior margin with sharp triangular spines; (10) small size, shape, and number of spines of paraprocts (see Lugo-Ortiz *et al.* 1994: Figs. 10–14).

As the species described by Lugo-Ortiz and McCafferty (1994) does not belong to *F. longifolius*, no species of this genus is found from both mainland of North America and a Caribbean island, as pointed out by these authors.

Key to the larvae of *Fallceon* from Cuba*

- | | | |
|---|---|---|
| 1 | Frontal keel present..... | 2 |
| - | Frontal keel absent..... | 5 |
| 2 | Abdominal gills 3-6 at least as long as two abdominal segments | <i>F. longifolius</i> Kluge |
| - | Abdominal gills 3-6 at most as long one and a half abdominal segments..... | 3 |
| 3 | Paraglossae narrow and pointed apically..... | <i>F. testudineus</i> Kluge |
| - | Paraglossae broad and rounded apically..... | 4 |
| 4 | Abdominal gills widest distally | <i>F. sextus</i> Kluge |
| - | Abdominal gills widest medially | <i>F. nikitai</i> McCafferty and Lugo-Ortiz |
| 5 | Scales on terga small and sparse..... | <i>F. alcarrazae</i> Kluge |
| - | Scales on terga large and dense (Fig. 9) | 6 |
| 6 | Dorsal margin of femora with few setae; body size between 3.0–4.0 mm..... | <i>F. planifrons</i> Kluge |
| - | Dorsal margin of femora with greater number of setae (Fig. 7); body size between 7.5–8.0 mm | <i>F. grandis</i> sp. n. |

*The species *F. poeyi* is not included in this key because the larva is unknown.

Acknowledgments

We wish to express our special thanks to Lic. Pedro López del Castillo (BIOECO, Santiago de Cuba) for col-

lecting the material described in this paper, as well as Lic. Senen Muñoz (CITMA, Guantánamo), Yamil Benítez and George Álvarez (Universidad de Oriente) for collecting some of the material used in this work. We also thank Dr. Nikita Kluge (Department of Entomology, Biological Faculty, St. Petersburg, Rusia) and Dr. Carlos Naranjo (Departamento de Biología de la Universidad de Oriente) for their accurate suggestions related with this work. The suggestions of an anonymous referee and of Dr. Carolina Nieto (Tucuman, Argentina) are also greatly acknowledged.

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