

# Bethbilbeckia floridensis: a new genus and species of Macropelopiini from the South Eastern Nearctic

(Diptera: Chironomidae)

By E. J. Fittkau and D. A. Murray

## Abstract

The genus *Bethbilbeckia* is established for a species of Macropelopiini from the South Eastern United States. Generic diagnoses for the larva, pupa and adult male are given together with descriptions of all life stages of the single included new species *Bethbilbeckia floridensis* spec. nov.

## Introduction

While reviewing some types and material of tanypodine species in connection with the ongoing cooperative work on keys and diagnoses to genera of the holarctic Chironomidae (Wiederholm 1983, 1986 et seq.) some Macropelopiini specimens were kindly donated by Elizabeth and Bill Beck, Jacksonville, Florida. The material in question had been reared from the larval stage and thus larval and pupal exuviae and adult male imagines were available for study. Such significant differences in morphology exist, in all life stages, that the specimens cannot readily be associated with any currently recognised genera. A description of the pupal exuvia of these specimens was given as Tanypodinae "Genus I" in FITTKAU and MURRAY (1986). It gives us much pleasure to name the genus after Elizabeth and Bill Beck as a gesture of appreciation for their contribution to chironomid science. A complete generic diagnosis for the larva, pupa and male adult of *Bethbilbeckia* gen. nov. and descriptions of *Bethbilbeckia floridensis* spec. nov. are given in this paper.

The terminology and abbreviations used in the descriptions follow SAETHER (1980). The slide mounted holotype and one paratype is deposited in the collections of the Academy of Natural Sciences of Philadelphia; a second paratype is deposited in Zoologische Staatssammlung, Munich.

## Bethbilbeckia gen. nov.

Type species. *Bethbilbeckia floridensis* spec. nov., by present designation.

### Generic description

Imago ♂:

Medium sized species, winglength about 3.0 mm; Antennae with 14 flagellomeres, apical flagellomere indistinctly set off from preapical, A. R. about 2.9; eyes with dorsal extension; Temporal setae uniserial; anteprepronotum well developed, lobes well separated medially; scutal tubercle distinct; lateral anteprepronotal, anepisternal, preepisternal and postnotal setae present. Wings unmarked, membrane evenly covered with macrotrichia, MCu almost directly above FCu on  $M_{3+4}$ , costa strongly produced,

R<sub>2+3</sub> present and forked, R2 distinct, anal lobe well developed; tibia I without comb, tibia III with comb of 4–5 setae; tibial spurs with main tooth and 9–13 side teeth; pulvilli absent. Tergite IX with strong setae posteriorly; gonocoxite more or less cylindrical, evenly setose and with pocket-like longitudinal depression anteriorly on inner border; volsellae absent; gonostylus abruptly bent through 90° near base and tapering towards apex.

Imago ♀: Unknown.

Pupa:

Medium sized, approximately 7.0 mm long, brownish in colour; thoracic horn tubular, expanding gradually from base to apex, 4.0× as long as maximum apical width; horn sac thinwalled, not quite filling the horn lumen, plastron plate oval, slightly longer than broad, 0.25× horn length; thoracic comb and basal lobe absent; thoracic setae simple, pointed or round apically; scar on tergite I elongate and pigmented; shagreen spines short, blunt and partially serially arranged in groups of 2–4; abdominal setae D<sub>1</sub> on segments II–VII large, distinct and arising from very large and prominent tubercles; D<sub>2</sub>, D<sub>3</sub> on segments III–V arising from small tubercles; 4 short LS setae on segment VII, 0.25× segment length; segment VIII with 5 LS setae, 0.75× segment length; anal lobe longer than broad, with simple spine shagreen laterally, outer border fringed with long seta-like spinules and more or less convex, spinules reduced to indistinct decumbent spines at the distal end; inner borders divergent, without fringe but with 5–7 preapical decumbent spines; anal macrosetae arise from the basal 1/4.

Larva:

Antenna 5 segmented, 1.25× as long as mandible, basal segment 8× as long as basal width, ring organ at apical 1/3, AR about 9; ring organ at basal 1/3 of basal palp segment; mandible slender, curved, basal tooth distinct; ventrolateral setae 1 and 3 simple, 2 bifid; dorsomentum medially almost reaching the pseudoradula; ligula with 5 teeth; tooth row distinctly concave; inner teeth straight; paraligula bifid, pecten hypopharyngis with about 14 teeth; posterior parapods with normal and 3–4 wide claws.

*Bethbilbeckia floridensis*, spec. nov.

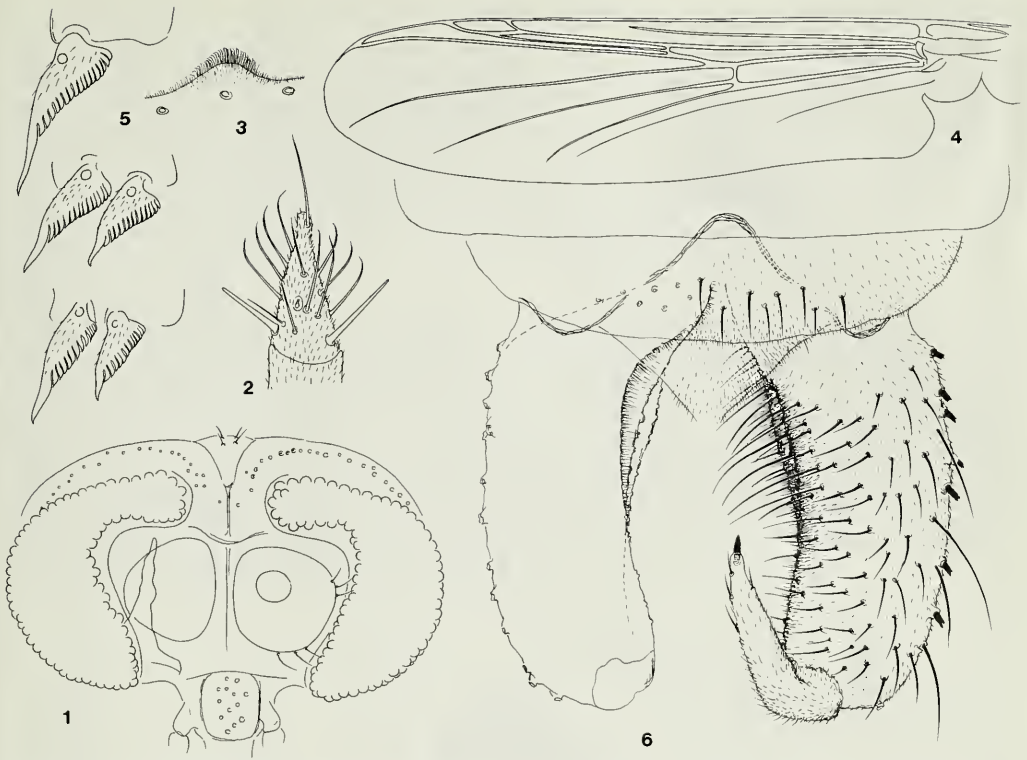
Imago ♂ (Figs. 1–6.)

Head: Pale brown, pedicel darker; eyes with dorsal extension. Frontal setae present, inner verticals 6–7, outer verticals 7–8, post orbitals 5–6. Antennal ratio 2.9; pedicel with three anteroventral and two lateroventral setae; flagellum with 14 flagellomeres, terminal flagellomere more or less conical, 1.5× as long as basal width.

Thorax: Brownish with vittae slightly darker; anteprenotum well developed, lobes separated, with 9 lateral anteprenotal setae; humerals XX; dorsocentrals irregularly biserial; supraalars 22, prealars 20–22; acrostichals biserial; preepisternals 4–6; anepisternals 2–4; scutellum with about 30 setae; postnotals 10 on either side; scutal tubercle distinct.

Table 1. Leg measurements (μ) and ratios for the holotype (a) and paratype (b) of *B. floridensis* spec. nov.

Leg	Fe	Ti	Ta 1	Ta 2	Ta 3	Ta 4	Ta 5	LR	BV
Ia	947	1026	774	379	205	190	142	0.75	2.99
b	1010	1184	900	442	300	190	142	0.76	2.88
IIa	916	1011	490	268	221	142	110	0.48	3.26
b	1105	1200	663	315	245	186	142	0.55	3.24
IIIa	868	1176	781	418	300	201	142	0.66	3.57
b	1026	1374	908	–	–	–	–	0.66	–



Figs. 1–6. *Betbbilbeckia floridensis* gen. nov., spec. nov., adult male: 1. head; 2. terminal antennal flagellomere; 3. scutal tubercle; 4. wing; 5. tibial spurs; 6. hypopygium.

Wing: About 3.0 mm long, with macrotrichiae; MCu on  $M_{3+4}$  close to FCu; RM removed from MCu by length of MCu;  $R_{2+3}$  present and forked,  $R_2$  distinct; costa distinctly produced beyond  $R_{4+5}$ .

Legs: Pale, with faint indication of bands on apices of femora and bases of tibiae; spur Ti I with 13 side teeth, comb absent; spurs Ti II, Ti III with 9–10 side teeth; apex Ti III with comb of 4–5 setae; pulvilli absent; claws terminally pointed; leg ratios in Table 1.

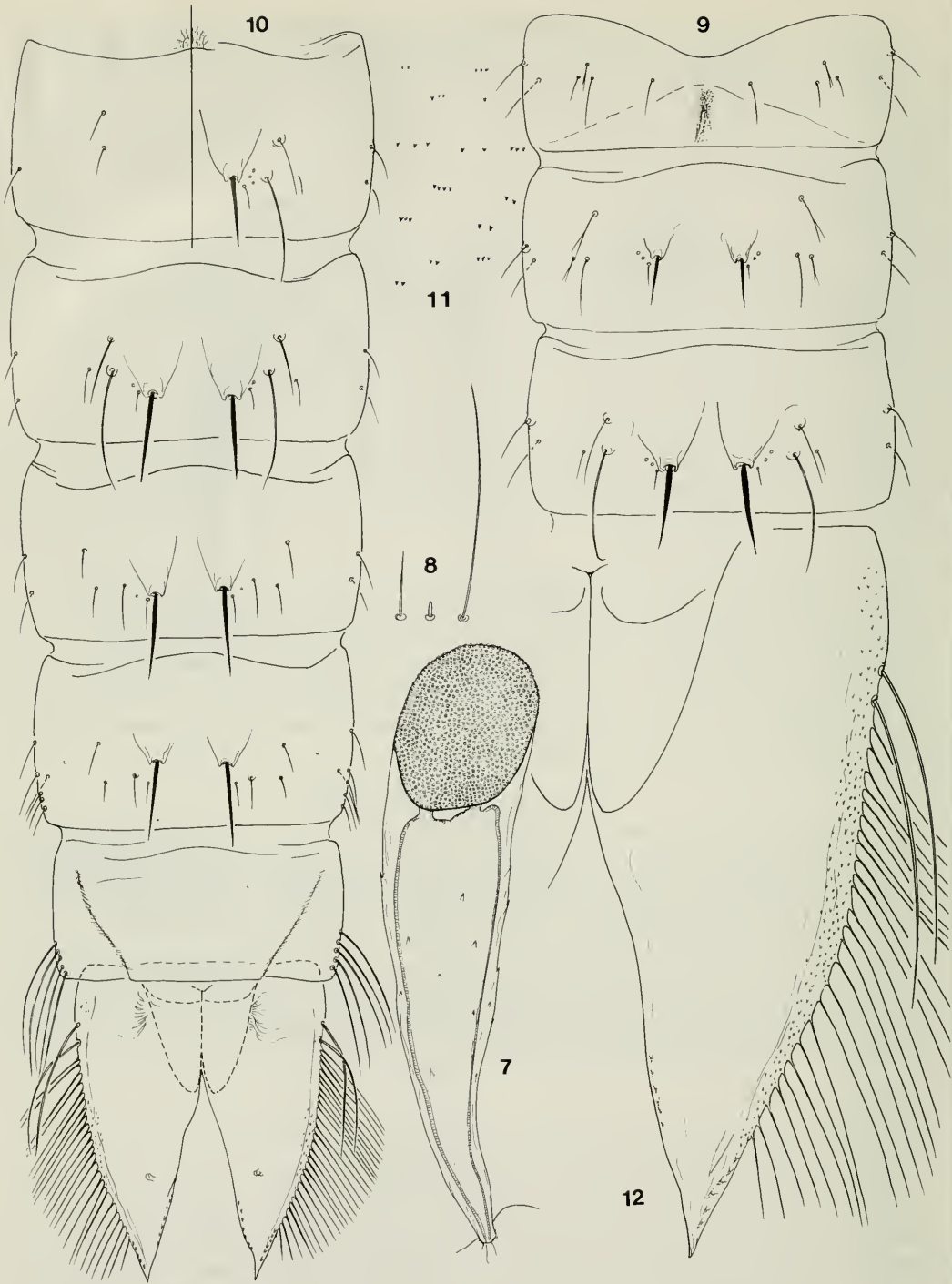
Abdomen: Uniformly brown, densely setose; ninth tergite with posterior multiserial row of 22–27 setae. Hypopygium (Fig. 6.) anal point triangular; gonocoxite more or less cylindrical, evenly setose and with pocket-like longitudinal depression anteriorly on inner borders; gonostylus setose, swollen basally and bent anteriorly through  $90^\circ$  near base.

Female. Unknown.

Pupa (Figs. 7–11.)

Medium sized, approximately 7.0 mm long, brownish in colour.

Thoracic horn tubular, relatively narrow, expanding gradually from base to apex,  $4.0\times$  as long as maximum apical width; external membrane smooth, with few spinules; horn sac thin-walled, not quite filling the horn lumen, evenly expanded towards the apex and connected to a more or less oval shaped plastron by two short necks; plastron plate slightly longer than broad,  $0.25\times$  horn length. Thoracic comb and basal lobe absent, thoracic membrane with transverse ridges extending to the median suture. Thoracic setae  $Dc_1$  simple, pointed;  $Dc_2$  extremely small, rounded, approximately  $0.25$  as long as  $Dc_1$ ; Sa simple, long and pointed,  $3.5\times$  as long as  $Dc_1$ .

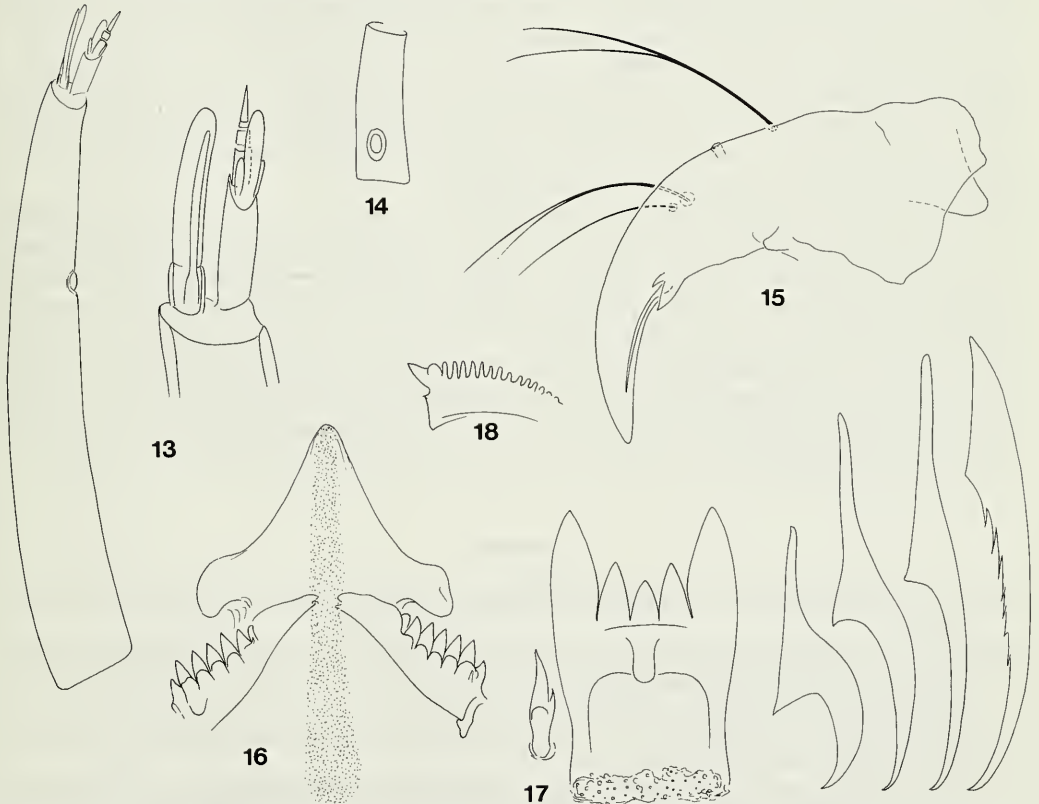


Figs. 7-12. *Bethbilbeckia floridensis* gen. nov., spec. nov., pupa: 7. thoracic horn; 8. thoracic setae; 9. tergites I-III; 10. segments IV-VIII and anal lobe; 11. shagreen; 12. anal lobe and ♂ genital sacs.

Abdomen: Scar on tergite I elongate and pigmented; shagreen spines short, blunt and partially serially arranged in groups of 2–4. Abdominal setae  $D_1$  on segments II–VII large, distinct and arising from very large and prominent tubercles; remaining D and V setae of varying sizes,  $D_2$ ,  $D_3$  on segments III–V arising from small tubercles; segments I–VII with 2 L setae; 4 short LS setae on segment VII,  $0.25\times$  segment length; segment VIII with 5 LS setae,  $0.75\times$  segment length. Anal lobe longer than broad, with simple spine shagreen laterally, outer border fringed with long seta-like spinules and more or less convex, spinules reduced to indistinct decumbent spines at the distal end; inner borders divergent, without fringe but with 5–7 pre-apical decumbent spines. Anal macrosetae  $0.5\times$  segment length, arise from the basal  $1/4$ .

Larva. (Figs. 13–18.)

Head capsule yellowish; antenna 5 segmented,  $1.25\times$  as long as mandible, basal segment  $8\times$  as long as basal width, ring organ at apical  $1/3$ , AR about 9; basal segment of maxillary palp about  $3\times$  as long as wide, ring organ at basal  $1/3$ . Mandible slender, curved, basal tooth distinct with apically directed crest extending over inner margin and smaller inner tooth; ventrolateral setae 1 and 3 simple, 2 bifid. Dorsosentum on each side with 5–6 side teeth, inner part extending medially and almost reaching the pseudoradula. Ligula about  $1/3$  longer than apical width, with 5 teeth; tooth row distinctly concave, outer tooth  $2.5\times$  middle tooth; inner teeth straight. Paraligula bifid,  $0.5\times$  as long as ligula. Pecten hypopharyngis with 14 teeth, inner tooth large, medially directed and with a low rounded protuberance on outer border. Posterior parapods with normal and 3–4 wide claws.



Figs. 13.–18. *Bethbilbeckia floridensis* gen. nov., spec. nov., larva: 13. antenna; 14. maxillary palp; 15. mandible; 16. mentum; 17. ligula and paraligula; 18. pecten hypopharyngis; 19. Claws of posterior parapod.

Material studied: Holotype; Larval and pupal exuviae and adult male (reared) slide mounted in Euparal in the collections of the Academy of Natural Sciences of Philadelphia (ANSP). Coll. E. & W. Beck, Peter's Creek, Clay County, Florida 6.7.68.

Paratypes: 1 associated larva-pupal-adult male, slide mounted, in coll. ANSP; 1 associated larva-pupa-adult male, slide mounted in coll. Zoologische Staatssammlung, Munich, West Germany. Both paratypes were collected at the same site as the holotype.

### Systematic position

The new genus clearly belongs to the tribe Macropelopiini which was recently enlarged to include the genus *Radotanypus* (FITTKAU and MURRAY 1985) and is now considered to be composed of the genera *Psectrotanypus* Kieffer, *Derotanypus* Roback, *Alotanypus* Roback, *Brundiniella* Roback, *Macropelopia* Thienemann, *Radotanypus* Fittkau and Murray, *Apsectrotanypus* Fittkau, *Fittkauimyia* Karunakaran and *Bethbilbeckia*. The larva of *Derotanypus* and *Psectrotanypus* differ from those of all other genera in the tribe by having only 4 teeth in the ligula in contrast to the more usual arrangement of 5. It is thus not necessary to consider these two genera further in the present context. In FITTKAU and ROBACK (1983) the larva keys easily to couplet 12 which leads to the genera *Alotanypus*, *Brundiniella*, *Apsectrotanypus* and *Macropelopia*. *Alotanypus* differs from these and the recently described larva of *Radotanypus* (EPLER 1986) in having all ventrolateral mandibular setae simple while in the remaining above mentioned genera ventrolateral setae 1 and 3 are multibranching. In *Bethbilbeckia* setae 1 and 3 are simple and seta 2 is clearly bifid only. The pupa of *Bethbilbeckia* is readily separable from all other members of the Macropelopiini. Although superficially similar to *Macropelopia* it is easily distinguished by the prominent, straight  $D_1$  setae which arise from distinct tubercles - larger than those present in other Macropelopiini. The very short, weak, LS setae on segment VII are also diagnostic for the genus. In the key to genera of holarctic tanypodine pupae *Bethbilbeckia* has been included as "Tanypodinae Genus I" (FITTKAU and MURRAY 1986 p. 64, Fig. 5.46).

In ROBACK (1972) the adult male keys to couplet 9 which includes *Macropelopia decedens* (Walk.) and *Parapelopia sarta* Roback. The former is "a large northern species" in the U.S.A. while the latter is a "small Florida species" (ROBACK op. cit p. 87). ROBACK (1982) has already drawn attention to the possible synonymy between *Parapelopia* Roback and *Fittkauimyia* Karunakaran. The adult male of *Bethbilbeckia* differs from all other Macropelopiini, with the exception of *Fittkauimyia* in the uniserial arrangement of the temporal (inner and outer vertical and postorbital) setae. However *Bethbilbeckia* may be easily separated from *Fittkauimyia* in having preepisternal setae and a posterior multi-serial row of setae on tergite IX of the abdomen. An additional differential character is seen in the tibial spurs where *Bethbilbeckia* has a maximum of 13 side teeth compared with 13-20 in *Fittkauimyia*.

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