

MOSQUITO STUDIES (Diptera, Culicidae)
 XXX. A NEW SUBGENUS AND SPECIES OF CULEX
 FROM COLOMBIA¹

by

Abdiel J. Adames and Pedro Galindo²

During biomedical studies conducted by the Office of Interoceanic Canal Studies, LTC Bruce F. Eldridge and his associates collected a new species of *Culex*, which Dr. John N. Belkin and ourselves consider to belong to a hitherto undescribed higher taxon of the genus *Culex* herewith described as a new subgenus. We take pleasure in naming this taxon after Dr. John N. Belkin, whose numerous and brilliant contributions to the morphology and systematics of the Culicidae of the World have led to a better understanding of this important group of insects. We are also pleased to designate the new species after LTC Bruce Eldridge whose well organized surveys along the proposed interoceanic canal routes 17 and 25 yielded material from which basic knowledge on the Culicidae of Middle America has been derived.

The presentation and description of the new taxa in general follow Belkin (1962). For the illustrations we are indebted to N. Kitamura and L.M. Kowalczyk, and for the text copy for lithoprinting to A. Demos.

BELKINOMYIA, new subgenus

TYPE SPECIES: *Culex (Belkinomyia) eldridgei*, n. sp.

FEMALE. *Head:* Eyes not distinctly separated above base of antennae. Decumbent scales on vertex narrow, with a group of linear scales toward sides and a patch of broad scales laterally. Erect scales numerous, forked, extending toward sides. Clypeus bare. Proboscis slightly longer than forefemur. Palpus very short, 3-segmented, segments 1 and 2 ankylosed. Antenna slightly longer than proboscis; flagellar whorls moderately long, decreasing in length distally; torus with a few short hairs in anterior mesal surface. *Thorax:* Mesonotum and scutellum with narrow, curved decumbent scales, except for long narrow inner dorsocentral bare lines. Acrostichal bristles absent on disc. Dorsocentrals and marginal scutellars strongly developed. Paratergite bare. Pleuron with scales on *ppn* and *stp*; bristles present on *apn*, *ppn*,

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²Gorgas Memorial Laboratory, Apartado 6991, Panama 5, Panama.

ppl, and *pra*; a single strong bristle on *lmp*. Base of haltere with a few microsetae. *Legs*: Claws simple. *Wing*: All scales squamous, moderately broad. *Abdomen*: Laterotergite with many short to moderately long bristles.

MALE. Essentially similar to female except for sexual characters. Sexual dimorphism of head appendages not marked. Palpus very short. Antenna distinctly longer than proboscis; flagellar whorls essentially as in female but slightly longer; segments 12 and 13 more elongate than others; torus swollen. Claws of foreleg and midleg unequal, simple. Hindclaws as in female.

MALE GENITALIA. *Segment IX*: Tergite with a pair of small hairy lobes. *Side-piece*: Subapical lobe somewhat as in the genus *Deinocerites*; with 4 differentiated setae, 3 of which are spiniform and the other foliiform. *Clasper*: Unique for the genus *Culex*, short and broad with an apical forked spiniform as in *Deinocerites*. *Phallosome*: Basal part of lateral plate (Belkin et al. 1970:78; "basal hook" of authors) mostly membranous, narrowly sclerotized along lateral margin; membranous areas bearing some spines. *Proctiger*: Crown of paraproct comblike, with a row of short and heavy teeth.

PUPA. *Cephalothorax*: All hairs present, variously developed. Hair 5-C subequal in length to 4-C and about 0.33 of trumpet. Hair 8-C multibranching, the longest hair on cephalothorax, inserted at a level caudad of base of trumpet. *Metanotum*: Hair 10-C longer than 11-C, with multiple weak branches. *Abdomen*: Hair 1-II,III with 20 or more branches, slightly resembling float hair. Hair 2-III-VI nearly marginal; hair 2-III laterad of 1-III; hair 5-IV-VI weakly developed, barely extending to middle of succeeding tergite; hair 9-VII shorter than 3-VII and less than 0.5 of tergite VIII; hair 1-IX small, single. *Paddle*: Hairs 1,2-P distinct, single.

FOURTH INSTAR LARVA. *Head*: Head capsule without spicules or lateral expansion on each side caudad of antenna. Labrum well differentiated dorsally. Hairs 2,3-C apparently not developed; hairs 4-6-C closely grouped together and caudad of level of 7-C; hair 6-C single. *Thorax*: Hairs 1-3-P on a distinct tubercle; 1,2-P long, single; 3-P with 4-6 weak branches. *Abdomen*: Comb in a patch of 4 irregular rows. *Siphon*: Pecten teeth simple. One short dorsolateral tuft distad of ventrolateral tufts. Hair 2-S distinct, slightly curved, without a recurved tooth on shaft. *Anal Segment*: Ventral brush (4-X) with 6 pairs of hairs on grid.

Culex (Belkinomyia) eldridgei, n. sp.

Figs. 1,2

TYPES: *Holotype* male with slides of associated larval and pupal skins and genitalia (OICS-0197-2), Curiche, El Choco, Colombia, larva from crabhole, 6 August 1967, B.F. Eldridge [USNM]. *Allotype* female with slide of associated larval and pupal skins (OICS-0197-3), same data as holotype [USNM]. *Paratypes*: 7 1pM (OICS-0197-6,7,8,15,16,17,18), 3 1pF (OICS-0197-9-11), 3 M (OICS-0197-1,4,14), 1 F (OICS-0197-5), same data as holotype [GML, UCLA].

FEMALE. *Wing*: 2.28 mm. *Proboscis*: 1.54 mm. *Forefemur*: 1.16 mm. *Abdomen*: about 1.60 mm. Small; mesonotum dark brown to black, contrasting with lighter portions of pleuron; abdomen and legs without distinct ornamentation. *Head*: Decumbent and erect scales of vertex brown. Orbitals and interorbitals strongly developed, 6 pairs of upper orbitals, heavier, longer and more widely spaced than lower. Clypeus dark brown. *Proboscis* about 1.20 of forefemur, dark scaled, with numerous bristles. *Palpus* short, about 0.2 of proboscis; segment 2 about 0.40 of segment 3,

both dark scaled. Antenna about 1.20 of proboscis. Torus dark brown; flagellar whorls of segments 2-13 moderately long, progressively slightly shortened distad, last whorl distinctly shorter than segment. *Thorax*: Integument dark brown. Mesonotum and scutellum with auburn to dark scales; inner dorsocentral bare lines extending from anterior margin to 0.75. Acrostichal bristles absent on disc, slightly developed on anterior promontory; 3 posterior fossals and 1 parascutellar. Pleuron pale brown to brown. *Apn*, *ppn*, *ppl*, *psp*, upper *stp*, *pra* and upper 0.67 of *mep* darker than lower *stp* and basal 0.33 of *mep* and meron; *ppn* with a few bristles on dorsocaudal angle and with narrow curved scales on upper part; *ppl* with a few (6) bristles, *stp* with bristles arranged in a single continuous curved row along dorsal and caudal margins and with a few scattered broad scales among bristles; *umep* with a few small and poorly developed bristles. *Legs*: Coxae with scales and setae; anterior surface of forecoxa largely covered with scales and bristles, basolateral area with a few bristles; midcoxa with scales anterolaterally and with 2 rows of setae laterally, the posterior stronger; hindcoxa with a few strong bristles on anterobasal area. Trochanter with scales and bristles. Forefemur and midfemur predominantly dark scaled; antero and posterolateral surfaces of hindfemur whitish. All tibiae and tarsi dark scaled. *Wing*: Veins entirely dark scaled. *Haltere*: Stem pale brown, knob entirely dark scaled. *Abdomen*: Tergites II-VII completely dark scaled. Sternites with creamy scales.

MALE. Wing: 1.98 mm. Proboscis: 1.35 mm. Forefemur: 1.04 mm. Abdomen: (not including genitalia) 1.54 mm. Palpus, about 0.2 of proboscis, apparently 3-segmented, segment 1 without scales, partly ankylosed with 2; segment 3 about 2.0 of 2, both dark scaled. Antenna about 1.40 of proboscis.

MALE GENITALIA (fig. 1). *Segment IX*: Forming a complete ring. Lobes of tergite round, well separated, each lobe articulated ventrally with a lobe of the basolateral sclerotization of proctiger; sternite small, bare. *Sidepiece*: Conical, with a few strong and numerous small bristles. Subapical lobe at about 0.67 from base, projecting dorsad; with 4 differentiated setae, 3 of which are spiniform (*a* basad of *b* and *c* laterad of *b*), the other longer, foliiform and at base of distal margin of lobe; tergal surface with a large patch of hairs slightly shorter than the longest hair of subapical lobe. *Clasper*: Short and broad; inner margin convex and with broad distal expansion; outer margin convex. Apex with a heavy forked spiniform; 2 subapical setae, one ventral, the other subdorsal and longer. *Phallosome*: Lateral plate, in side view, with basal part consisting of a very strongly sclerotized hook with apex projecting sternad (basal hook of authors); a moderately sclerotized area with a few spines basad of marginal sclerotization of hook; a large moderately sclerotized area bearing lateral spines extending dorsad of hook and joined to distal part by a poorly sclerotized band; distal part very strongly sclerotized, much shorter than basal part, with a sinuous apical border projecting dorsad into a short rounded horn. *Proctiger*: Strongly developed; paraproct strongly sclerotized; basolateral sclerotization with conspicuous tergal lobe and without free sternal process. Cercal setae 2,3.

PUPA (fig. 1). Abdomen: 2.31 mm. Trumpet: 0.38 mm. Paddle: 0.49 mm. *Cephalothorax*: Integument light brown; hair 6-C markedly shorter than 7-C; hairs 6,7-C very close together, hair 8-C at least 5-branched (5-8). *Trumpet*: Not placed on distinct tubercle; moderately long; index about 6.0-7.0; integument light brown, darker on tracheoid; pinna about 0.25-0.28 of total length. *Metanotum*: Hairs 10, 11-C removed from 12-C but moderately close together. *Abdomen*: Integument lightly pigmented. Hair 3-I double or triple; hair 6-II-VI usually single; hair 9-II-VI caudolaterad of 6; hair 9-VII usually with more than 3 branches (3-6); hair 9-VIII

at least 4-branched (4,5), weakly developed, distinctly shorter than length of tergite VIII; hair 4-VIII usually single (1,2). *Paddle*: Longer than wide; without any pigmented spot. Midrib well developed; external buttress slightly developed; apex smoothly rounded, margins without spicules.

FOURTH INSTAR LARVA (fig. 2). Head: 0.66 mm. Siphon: 1.06 mm. *Head*: Integument yellowish. Head capsule width about 1.2 of length. Mental plate well developed, with 10 lateral teeth, median tooth not shouldered. Collar moderately developed, narrow. Maxillary suture complete, extending caudolaterad to collar. Posterior tentorial pit a short distance from caudal border. Hair 1-C strong, straight; 4-C moderately long, weak, single or double, cephalomesad of 5 and mesad of 6; hairs 5,6-C strongly developed, 5-C usually with 3 branches (3,4), 6-C slightly longer than 5-C (1.14); hair 7-C moderately long, with 3-5 barbed branches; 11-C with 3-5 moderately long, weak branches; 13-C closer to 11-C than 12-C; basal maxillary hair (*bmh*) small, single or double; 16,17-C not developed. *Antenna*: with numerous spicules in basal part. Hair 1-A inserted about 0.75 from base, with 12-16 barbed branches. *Thorax*: Without any apparent outstanding features; integument glabrous. Hair 14-P usually double (1,2); O-P, 1,13,14-M, 1,3,13-T with short weak branches, not stellate. *Abdomen*: Integument glabrous. Hairs 1,2,4,11,13-I, 1,2,4,9,13-II, 1,2,5,7,9,13-III-VI, 1,2,5,8,10,13-VI unbranched or with branches of varied length and thickness, never stellate; 6-I,II long, double, branches unequal; 7-I long, single; 7-II short, with 4-6 branches; 6-III-V moderately long, double, branches unequal; 6-VI single or double. *Segment VIII*: Comb scales spatulate, apex fringed. Hair 1-III with 3,4 branches; 5-VIII double or triple; 1,2-VIII not on tubercle or sclerotized plate. *Siphon*: Integument yellowish. Moderately long; index about 6.0-6.5. Acus distinct, attached. Pecten extending to 0.33. Hair 1-S distinctly caudad of last pecten tooth; 4 pairs of moderately long subventral hairs (1,1a-S), the apical shortest. *Anal Segment*: Integument yellowish. Saddle complete. Acus not developed. Caudal margin without spines. Hair 1-X short, weak, double or triple; hair 4f-X short, shorter than 1-X, usually single.

SYSTEMATICS. *Belkinomyia* can best be separated from other subgenera of *Culex* in the male. The very short palpus, the sparsely plumose antenna and the morphology of the clasper and of the subapical lobe of the sidepiece separate this new subgenus from all other *Culex*. The nonplumose antenna, the appendages of the subapical lobe of the sidepiece and the bifid terminal spine of the clasper appear to indicate a relationship between *Belkinomyia* and the genus *Deinocerites*. In the female, the following combination of characters separates *Belkinomyia* from most other subgenera of *Culex*: (1) lack of acrostichal bristles, (2) presence of dorso-central bare lines, (3) poorly developed propleural bristles, and (4) moderately broad scales on veins R2 and R3. In the pupa, the position of hair 2-III, which in *Belkinomyia* is laterad of 1-III, separates it from most other *Culex*. The short hair 9-VII also serves to distinguish *Belkinomyia*, as it is shorter than 3-VII and less than 0.5 the length of segment VIII, while in most other *Culex* the reverse is true.

The larva apparently does not show any particular character which can by itself separate *Belkinomyia* from most other subgenera of *Culex*. However, it can be separated from other individual American subgenera as follows: (1) from *Culex* by prothoracic hair 3-P being weaker and shorter than 1-P, less than 0.5 of its length, (2) from *Neoculex* by the presence of a pair of short dorsolateral tufts above the ventrolateral tufts on the siphon, (3) from *Lutzia* by the mouthbrushes being normal in position, numerous and filamentous, (4) from *Carrollia* by the absence of hair

2-C, (5) from *Melanoconion* and *Mochlostyrax* by siphonal hair 2-S being slightly curved and simple, (6) from *Microculex* and *Anoediopora* by the ventral brush with 6 pairs of hairs, (7) from *Aedinus* by the simple pecten teeth, (8) from *Micraedes* by the anal saddle without long caudal marginal spicules, and (9) from *Tinolestes* by the absence of spicules on the head capsule and the presence of only 1 pair of dorsolateral hairs on the siphon.

BIONOMICS. The immature stages occur in crabholes with water of low salinity in association with *Culex latisquama* (Coquillett, 1906) and *Deinocerites curiche* Adames, 1971. The adults rest in crabholes.

DISTRIBUTION. *C. eldridgei* is known by the authors to occur only at the type locality, in Curiche and nearby Coredo, in the Department of El Choco, along the Pacific coast of Colombia. Its distribution may possible extend farther south to Buenaventura. Material examined: 32 specimens; 24 males, 8 females; 12 larval rearings.

COLOMBIA. El Choco, Curiche, B.F. Eldridge (OICS-0197), (GML-03827-33) [USNM, GML, UCLA]. El Choco, Curiche, Coredo, A.J. Adames and A. Quinonez (COA-5) [UCLA].

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FIGURES

1. *Culex (Belk.) eldridgei*; male genitalia and pupa
2. *Culex (Belk.) eldridgei*; larva

Fig. 1

BELKINOMYIA

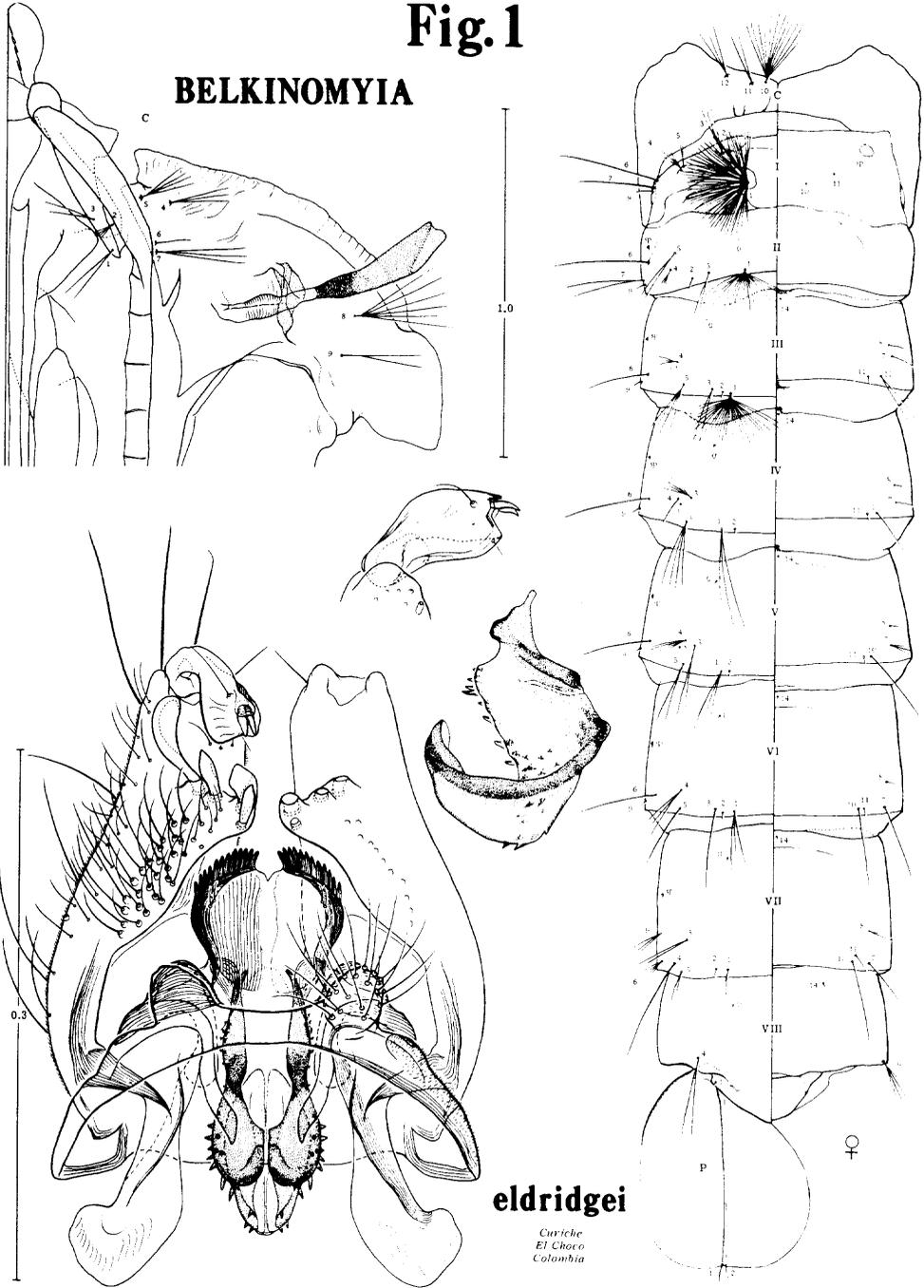


Fig. 2

