

**COMPARATIVE ANATOMY OF THE FEMALE GENITALIA OF
GENERIC-LEVEL TAXA IN TRIBE AEDINI (DIPTERA: CULICIDAE).
PART XXVIII. GENUS *LUIUS* REINERT, HARBACH AND KITCHING**

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Abstract. A morphological analysis of the female genitalia of the species included in genus *Luius* Reinert, Harbach and Kitching was conducted. The genitalia of the type species of the genus, *Lu. fengi* (Edwards), are illustrated for the first time. Treatment of the genital morphology of the genus includes a detailed description of the type species of this monobasic genus, a list of published descriptions of the included species with their literature citations, and a discussion. The discussion section contains a list of the most distinctive female genital features of *Luius*, a comparison of these with other aedine genera, and other pertinent information.

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INTRODUCTION

This is the twenty-eighth in a series of papers by the author that describe the female genitalia of the generic-level taxa included in tribe Aedini of family Culicidae. Part I of the series (Reinert 2000a) included an introduction to the series, a brief historical background of published papers dealing with the subject, preparation techniques and anatomical terminology, part II (Reinert 2000b) dealt with genus *Psorophora* Robineau-Desvoidy, part III (Reinert 2000c) with genus *Udaya* Thurman, part IV (Reinert 2000d) with genus *Zeugomyia* Leicester, part V (Reinert 2000e) with genus *Aedes* Meigen, part VI (Reinert 2001a) with genus *Ayurakitia* Thurman, part VII (Reinert 2001b) with genus *Opifex* Hutton, part VIII (Reinert 2001c) with genus *Verrallina* Theobald, part IX (Reinert 2001d) with genus *Eretmapodites* Theobald, part X (Reinert 2002a) with genus *Heizmannia* Ludlow, part XI (Reinert 2002b) with genus *Haemagogus* Williston, part XII (Reinert 2002c) with genus *Armigeres* Theobald, part XIII (Reinert 2002d) with genus *Ochlerotatus* Lynch Arribalzaga, part XIV (Reinert 2002e) provided a key to genera recognized at that time, part XV (Reinert 2008a) with genus *Georgecraigius* Reinert, Harbach and Kitching, part XVI (Reinert 2008b) with genus *Phagomyia* Theobald, part XVII (Reinert 2008c) with genus *Dahlia* Reinert, Harbach and Kitching, part XVIII (Reinert 2008d) with genus *Hulecoeteomyia* Theobald, part XIX (Reinert 2008e) with genus *Danielsia* Theobald, part XX (Reinert 2008f) with genus *Rampamyia* Reinert, Harbach and Kitching, part XXI (Reinert 2008g) with genus *Patmarksia* Reinert, Harbach and Kitching, part XXII (Reinert 2008h) with genus *Downsiomyia* Vargas, part XXIII (Reinert 2008i) with genus *Tanakaius* Reinert, Harbach and Kitching, part XXIV (Reinert 2008j) with genus *Vansomerenis* Reinert, Harbach and Kitching, part XXV (Reinert 2008k) with genus *Dobroworskyius* Reinert, Harbach and Kitching, part XXVI (Reinert 2008l) with genus *Collessius* Reinert, Harbach and Kitching, and part XXVII (Reinert 2009) with genus *Hopkinsius* Reinert, Harbach and Kitching. Reinert et al. (2004, 2006 and 2008) conducted phylogenetic analyses of tribe Aedini and revised the classification of generic-level taxa. This paper covers the female genitalia of genus *Luius* Reinert, Harbach and Kitching, which was originally described by Reinert et al. (2008).

A morphological analysis of the female genitalia of *Luius* was conducted and a characterization is given for this monobasic genus. The format used includes a description, which is a detailed description and illustration of the type species, a list of published descriptions of the type species with their literature citations, and a discussion including the most distinctive features and other pertinent information.

MATERIALS AND METHODS

Female genitalia of genus *Luius* are considered here to include all structures caudad of abdominal segment VII. Segment VIII is included since its tergum and sternum are often modified in development and shape, and possess specialized setae.

Terminology used in the descriptions and illustration follows Reinert (2000a, 2008a) and the abbreviations used are found in the "List of Abbreviations Used in the Text and/or Figure" that precedes the figure. The morphological description is based on a slide-mounted genitalia that were dissected from a nonliving, dried female. Measurements and descriptions of female genital structures are based on a specimen that was cleared, dissected, arranged in a dorsoventrally flattened position, and mounted in Canada balsam under a glass cover slip on a microscope slide. Ranges of structures are based on the species (listed under "species examined" section) and the specimen I examined. A phase contrast microscope was used because this was necessary to

determine some structures, e.g., spermathecal eminence on the roof of the vagina. Measurements of structures (e.g., length and width of terga VIII and IX, sternum VIII, cercus, etc.) include only the pigmented and sclerotized areas and were made at 400X magnification using an ocular micrometer having a linear scale of 100 divisions that had been calibrated using a stage micrometer. The scale used in the illustration is in millimeters.

The method of preparation of the specimen followed Reinert (2000a). During dissection of the genitalia extra care should be taken when separating the insula and lower vaginal lip from sternum VIII as the insula often breaks off and remains attached to the apical intersegmental membrane of the sternum. To avoid this condition the intersegmental membrane of sternum VIII can be separated from the apical margin of the sternum and mounted with the insula and lower vaginal lip.

FEMALE GENITALIA OF GENUS *LUIUS* REINERT, HARBACH AND KITCHING

Genus description. *Segments VII and VIII.* Laterally compressed; intersegmental membrane between VII-Te and VIII-Te relatively short. *Tergum VIII.* Width greater than length; covered with minute spicules; moderately pigmented; base gently concave, basolateral areas somewhat narrowed and projecting outward; apex relatively straight; apical margin with few moderately long and several short, slender setae; setae on distal 0.48; basal lateral seta present; numerous broad scales covering distal 0.64, scales dark on distal area and pale on remainder of area; VIII-Te index 0.68; VIII-Te/IX-Te index 2.25; length 0.35 mm; width 0.52 mm. *Sternum VIII.* Width greater than length; covered with minute spicules; moderately pigmented; base nearly straight; apex gently sloping from apicolateral corners to midline producing moderately deep, median emargination; apical margin with several straight setae, moderately long laterally and becoming shorter mesally, numerous short, slightly curved setae interspersed between longer, straight setae; numerous setae on distal 0.93; seta 1-S inserted relatively near basal margin, seta 2-S inserted lateral and near seta 1-S; basal lateral seta absent; without scales; VIII-S index 0.76; length 0.39 mm; width 0.51 mm. *Tergum IX.* Moderately long; moderately wide; moderately pigmented; comprised of single sclerite of 2 relatively narrow, lateral plates connected mesally on proximal approximately 0.70, each lateral plate with median, longitudinal, narrow, darker-pigmented strip, with pair of slender, pointed lobes on apical margin; 2 short, slender setae apically on each lobe; 4 total setae; IX-Te width/length ratio 0.88; length 0.16 mm; width 0.14 mm. *Insula.* Liplike; covered with short spicules; lightly pigmented; with 4 moderately long, slender setae laterally on each side; 8 total setae. *Lower vaginal lip.* Lightly pigmented; narrow; without lower vaginal sclerite. *Upper vaginal lip.* Heavily pigmented; narrow; lateral parts curved outward, small, median, caudal area somewhat flattened; upper vaginal sclerite moderately pigmented, small. *Spermathecal eminence.* Membranous; ill-defined. *Postgenital lobe.* Covered with short spicules, some on lateral margin longer; long; relatively narrow; apex with very small, median emargination; few to several setae on distal 0.43 of ventral surface; basal mesal apodeme darkly pigmented, narrowly elongate; PGL ventral index 2.96; PGL ventral width/Ce dorsal width ratio 0.62. *Proctiger.* With several minute spicules in more or less short rows; membranous. *Cercus.* Covered with minute to short spicules; moderately pigmented; moderately long; relatively wide; apical margin gently oblique with few short and 3 or 4 moderately long setae; setae on distal 0.59 of dorsal surface; without scales; cercus index 2.57; Ce/dorsal PGL index 2.50; length 0.25 mm; width 0.10 mm. *Spermathecal capsules.* One large and 2 medium-sized, spherical capsules; several small spermathecal capsule pores near orifice. *Accessory gland duct.* Basal area darkly pigmented, relatively short.

Type species description (*Lu. fengi*, Figure 1). The above description of this monobasic genus is that of the type species.

Species examined. *Luius fengi*.

Discussion. The following combination of features is most distinctive for the female genitalia of the species of genus *Luius*. Tergum IX is comprised of a single moderately long, moderately wide sclerite comprised of two relatively narrow, moderately pigmented, lateral plates which are connected mesally on most of the proximal approximately 0.70, each lateral plate has a median, longitudinal, narrow, darker-pigmented strip and the apex is developed as a slender, pointed lobe bearing two short, slender setae. Sternum VIII has the width greater than the length, the apex is gently sloping from the apicolateral corners to the midline and bears several straight setae which are moderately long laterally and become shorter mesally, several short, slightly curved setae are interspersed between the longer straight setae, and scales are absent. The cercus is moderately long, relatively wide, without scales on the dorsal surface, and the apex is gently oblique. The lightly pigmented liplike insula and lower vaginal lip contrast with the heavily pigmented upper vaginal lip. A small upper vaginal sclerite is present.

Female genitalia of *Luius*, when compared to other generic-level taxa of Aedini with a liplike insula bearing setae in lateral patches, are somewhat similar to those of *Vansomerensis* in the development of tergum IX and to those of *Jihlienius* Reinert, Harbach and Kitching, *Kenknightia* Reinert, *Phagomyia* and some species of '*Oc. (Protomacleaya)*' in the development of the cercus with a gently oblique, apical margin but differ in numerous other characters from these genera. See Reinert (1990, 2002d, 2008b, 2008j, 2009b) for illustrations and other information on the female genitalia of these genera.

Published descriptions of female genitalia. *Luius fengi*: Reinert et al. (2006), (2008). The following illustration is the first for *Lu. fengi*.

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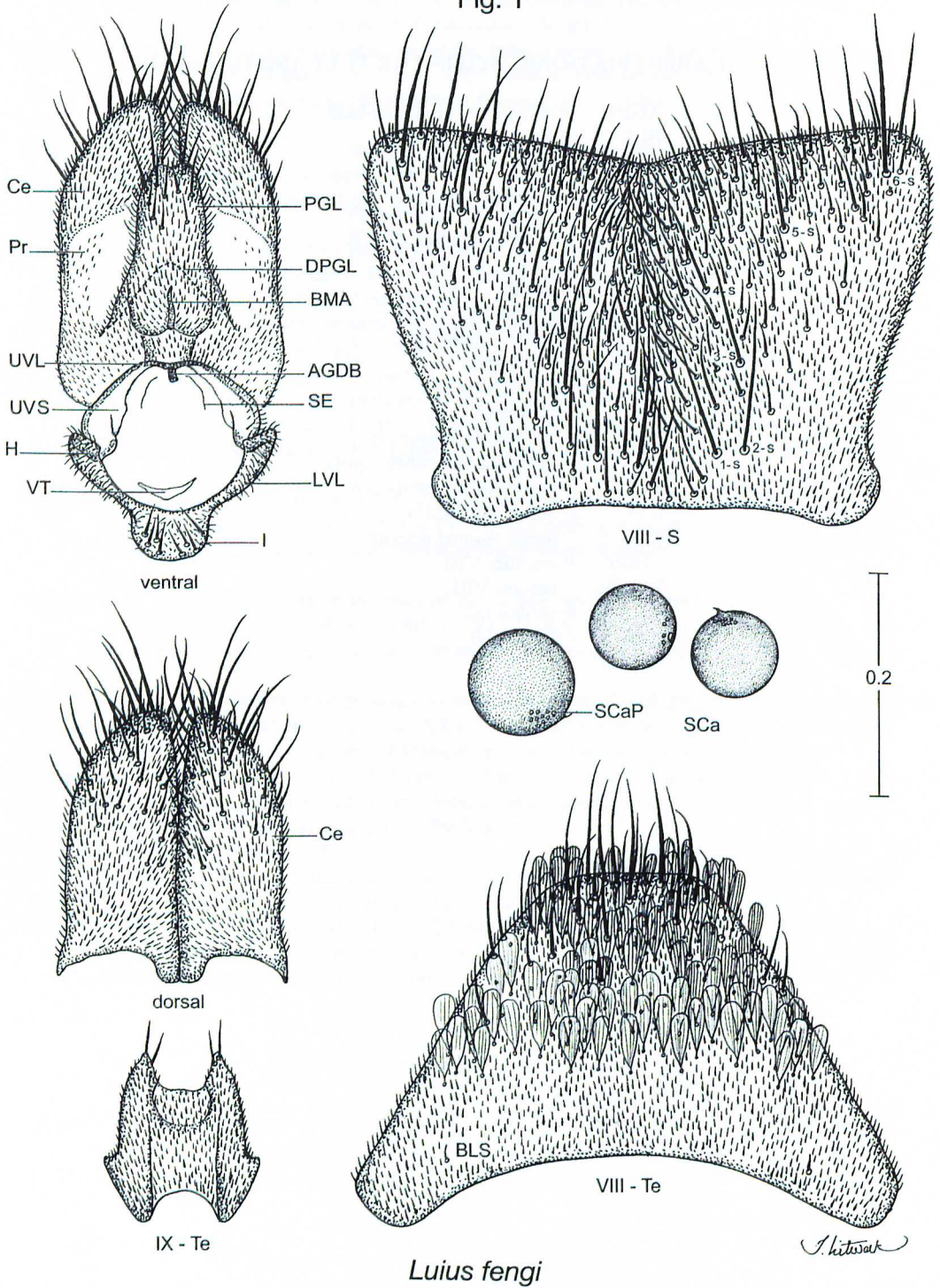
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FIGURE 1. FEMALE GENITALIA OF *LUIUS FENGI***LIST OF ABBREVIATIONS USED IN THE TEXT AND/OR FIGURE**

AGDB	= accessory gland duct base
BLS	= basal lateral seta
BMA	= basal mesal apodeme
Ce	= cercus
DPGL	= line of attachment of Pr to dorsal surface of PGL
H	= hinge
I	= insula
IX-Te	= tergum IX
LVL	= lower vaginal lip
mm	= millimeter
PGL	= postgenital lobe
Pr	= proctiger
SCa	= spermathecal capsule
SCaP	= spermathecal capsule pore
SE	= spermathecal eminence
UVL	= upper vaginal lip
UVS	= upper vaginal sclerite
VIII-S	= sternum VIII
VIII-Te	= tergum VIII
VT	= ventral tuft
1-6-S	= Seta 1-6-S

Fig. 1



Lulus fengi

SYSTEMATIC INDEX

Valid generic and specific taxa are italicized, other taxa are in Roman type. Boldface page numbers are those which began the primary treatment of the taxon.

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