

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

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Abstract. A comparative, morphological analysis of the female genitalia of species included in genus *Collessius* Reinert, Harbach and Kitching was conducted and a composite description is provided. The genitalia of the type species of the genus, *Co. macfarlanei* (Edwards), are illustrated. *Collessius* is divided into two subgenera, *Alloeomyia* and *Collessius*. Treatment of the genital morphology of each subgenus includes a description, detailed description of the type species, list of the species examined, list of published illustrations and/or descriptions of included species with their literature citations, and a discussion. The discussion section contains a list of the most distinctive female genital features and a comparison of these with other aedine genera, and other pertinent information.

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INTRODUCTION

This is the twenty-sixth 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, and part XXV (Reinert 2008k) with genus *Dobroworskyius* 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 *Collessius* Reinert, Harbach and Kitching, which was originally described by Reinert et al. (2006).

A comparative, morphological analysis of the female genitalia of *Collessius* species was conducted and a characterization is given for the genus and the two included subgenera, *Alloeomyia* Reinert, Harbach and Kitching and *Collessius*. The format used for each subgenus includes a composite description, a detailed description of the type species, a list of the species examined, a list of published illustrations and/or descriptions of species with their literature citations, and a discussion including the most distinctive features and other items of note.

MATERIALS AND METHODS

Female genitalia of genus *Collessius* 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 slide-mounted genitalia that were dissected from nonliving, dried females. Measurements and descriptions of female genital structures are based on specimens that were cleared, dissected, arranged in a dorsoventrally flattened position, and mounted in Canada balsam under glass cover slips on microscope slides. Ranges are based on the species (listed under “species examined” section) and the specimens that I have examined, therefore some variation may occur in species not seen. A phase contrast microscope was used because this was usually 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 specimens 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 *COLLESSIUS* 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 to heavily pigmented; base gently concave; apex broadly rounded; apical margin with few to several relatively short, slender setae; setae on distal 0.40-0.65; basal lateral seta absent or present; numerous broad dark and pale scales covering distal 0.65-0.79; VIII-Te index 0.57-0.76; VIII-Te/IX-Te index 2.04-5.44; length 0.31-0.43 mm; width 0.47-0.57 mm. **Sternum VIII.** Width greater than length; covered with minute spicules; moderately to heavily pigmented; base gently concave or nearly straight; apex nearly straight with minute, median, emargination or with moderate, median emargination separating pair of broadly rounded lobes; apical margin with numerous short, curved, narrowly lanceolate setae or with numerous short, curved setae and several short, but slightly longer, straight setae more or less evenly interspersed; numerous setae on distal 0.85-0.97; basal lateral seta absent; moderate to numerous broad scales forming moderately large patches on lateral areas or scales absent to few; VIII-S index 0.72-0.99; length 0.34-0.58 mm; width 0.47-0.61 mm. **Tergum IX.** Moderately long or short; moderately pigmented; comprised of single sclerite with pair of rounded lobes on apical margin; 1-9 short, slender setae apically on each lobe; 2-17 total setae; IX-Te width/length ratio 0.56-0.84 or 3.08-3.92; length 0.07-0.19 mm; width 0.09-0.28 mm. **Insula.** Liplike; covered with short spicules; lightly to moderately pigmented; with 3-8 short, slender setae laterally on each side; 7-15 total setae. **Lower vaginal lip.** Covered with short spicules; lightly pigmented; narrow, without lower vaginal sclerite. **Upper vaginal lip.** Covered with short spicules; moderately to heavily pigmented; narrow, median caudal area somewhat flattened, upper vaginal sclerite small to moderate in size. **Spermathecal eminence.** Membranous; ill-defined; more or less circular. **Postgenital lobe.** Covered with spicules; moderately long; relatively narrow to moderately broad; apex rounded, flattened or with small, median emargination; few to several setae on distal 0.34-0.53 of ventral surface; basal mesal apodeme present; PGL ventral index 1.41-3.39; PGL ventral

width/Ce dorsal width ratio 0.51-1.14; ventral length 0.12-0.18 mm **Proctiger**. With few to several scattered minute spicules; membranous. **Cercus**. Covered with minute to short spicules; moderately pigmented; relatively moderately long; moderately wide; apical margin broadly rounded with few short and 2 or 3 moderately long or long setae; with or without scales; setae on distal 0.55-0.69 of dorsal surface; cercus index 1.93-2.66; Ce/dorsal PGL index 2.06-2.45; length 0.17-0.24 mm; width 0.07-0.11 mm. **Spermathecal capsules**. One large and 2 medium-sized capsules; heavily pigmented; spherical; several small spermathecal capsule pores near orifice. **Accessory gland duct**. Basal area moderately to darkly pigmented, relatively short.

Type species description (Co. macfarlainei, Figure 1). **Tergum VIII**. Setae on distal 0.40-0.59; numerous broad scales covering distal 0.67-0.72; VIII-Te index 0.70-0.76; length 0.33-0.43 mm; width 0.47-0.57 mm. **Sternum VIII**. Apex with moderate, median emargination separating pair of broadly rounded lobes; setae on distal 0.90-0.97; scales absent (rarely with 1 or 2 broad scales); VIII-S index 0.88-0.97; length 0.48-0.58 mm; width 0.52-0.61 mm. **Tergum IX**. Moderately long; moderately wide; with 2-7 setae on each lateral lobe apically; 5-13 total setae; IX-Te width/length ratio 0.56-0.70; length 0.13-0.19 mm; width 0.09-0.12 mm. **Insula**. With 5-8 setae laterally on each side; 10-15 total setae. **Postgenital lobe**. Relatively narrow; apex with small, median emargination or flat; setae on distal 0.37-0.41 of ventral surface; PGL ventral index 2.95-3.28; PGL ventral width/Ce dorsal width ratio 0.51-0.58; ventral length 0.15-0.18 mm. **Cercus**. Apical margin with 1 long, stout and 2 moderately long, moderately stout setae; dorsal surface with setae on distal 0.62-0.69; without scales; cercus index 1.93-2.66; length 0.21-0.24 mm; width 0.08-0.11 mm.

Discussion. *Collessius* is divided into two subgenera, *Alloeomyia* and *Collessius*, based on the characters listed below.

SUBGENUS ALLOEOMYIA REINERT, HARBACH AND KITCHING

Subgenus description. **Tergum VIII**. Setae on distal 0.61-0.65; basolateral seta present; scales on distal 0.74-0.79; VIII-Te/IX-Te index 4.86-5.44. **Sternum VIII**. Base nearly straight; apex nearly straight with minute, median emargination; apical margin with numerous short, curved, slender setae and several short, slightly longer, straight setae more or less evenly interspersed; seta 2-S inserted more or less lateral to seta 1-S; numerous broad scales in lateral patches on distal 0.82-0.85; length 0.34-0.40; VIII-S index 0.72-0.74. **Tergum IX**. Short; wide; 5-9 setae on each apical lobe; IX-Te width/length ratio 3.08-3.92; length 0.07 mm; width 0.20-0.28 mm. **Insula**. With 3-5 setae laterally on each side. **Postgenital lobe**. Moderately broad; apex with small, median emargination; PGL ventral index 1.41-1.53; PGL ventral width/Ce dorsal width ratio 0.89-1.14; ventral length 0.12-0.13 mm. **Cercus**. With several broad scales; length 0.17-0.18 mm.

Type species description (Co. pseudotaeniatus (Giles)). **Tergum VIII**. Setae on distal 0.65; numerous broad scales covering distal 0.74; VIII-Te index 0.68; length 0.38 mm; width 0.56 mm. **Sternum VIII**. Setae on distal 0.86; numerous broad scales in lateral patches on distal 0.82; VIII-S index 0.74; length 0.40 mm; width 0.53 mm. **Tergum IX**. Short; wide; comprised of 2 ovoid, lateral areas separated by narrow, median strip; with 8 or 9 setae on each lateral lobe apically; 17 total setae; IX-Te width/length ratio 3.92; length 0.07 mm; width 0.28 mm. **Insula**. With 5 setae laterally on each side; 10 total setae. **Postgenital lobe**. Moderately wide; apex with small, median emargination; setae on distal 0.53 of ventral surface; PGL ventral index 1.53; PGL ventral width/Ce dorsal width ratio 0.89; ventral length 0.13 mm. **Cercus**. Apical margin with 1 or 2 stout setae; dorsal surface with setae on distal 0.57; cercus index 1.94; length 0.18 mm; width 0.09 mm.

Discussion. The following combination of features is most distinctive for the female genitalia of subgenus *Alloeomyia*. Tergum IX is comprised of a single short, wide sclerite with a pair of lateral ovoid areas bearing setae apically and separated by a narrow median strip. Sternum VIII has the apex nearly straight with a minute, median emargination, the apical margin bears numerous short, curved, slender setae and several short, slightly longer, straight setae that are more or less evenly interspersed, and with numerous broad scales forming lateral patches. Cercus is moderately long, moderately wide, with several broad scales on the dorsal surface, and the apex is broadly rounded. An upper vaginal sclerite is present.

When compared to other generic-level taxa of Aedini with a liplike insula with setae in lateral patches the female genitalia of subgenus *Alloeomyia* are somewhat similar to those of some *Howardina* Theobald in the development of the apex and setae on the apical margin of sternum VIII, but are easily distinguished from these characters in *Alloeomyia* by the development of tergum IX and other features.

Reinert et al. (2008) provided a brief description of the female genitalia and a description of all stages of this subgenus and subgenus *Collessius*.

Species examined. *Collessius banksi* (Edwards) and *Co. pseudotaeniatius*.

Published illustrations (1) and/or descriptions (2) of female genitalia. *Collessius banksi*: Reinert et al. (2006) (2), (2008) (2); *Co. pseudotaeniatius*: Reinert et al. (2006) (2), (2008) (2).

SUBGENUS COLLESSIUS REINERT, HARBACH AND KITCHING

Subgenus description. *Tergum VIII.* Setae on distal 0.40-0.59; without basolateral seta; scales on distal 0.65-0.73; VIII-Te/IX-Te index 2.04-2.76. *Sternum VIII.* Base gently concave; apex with moderate, median emargination separating pair of broadly rounded lobes; apical margin with numerous short, curved, narrowly lanceolate setae; numerous short, lanceolate setae on much of surface; seta 2-S inserted posterior to seta 1-S; without or with few broad scales; VIII-S index 0.88-0.99; length 0.48-0.58 mm. *Tergum IX.* Moderately long; moderately wide; 1-7 setae on each apical lobe; IX-Te width/length ratio 0.56-0.84; length 0.13-0.19 mm; width 0.09-0.12 mm. *Insula.* With 5-8 setae laterally on each side. *Postgenital lobe.* Relatively narrow; apex rounded, flat or with small, median emargination; PGL ventral index 2.95-3.39; PGL ventral width/Ce dorsal width ratio 0.51-0.59; ventral length 0.150.18 mm. *Cercus.* Without scales; length 0.20-0.24 mm.

Type species description (*Co. macfarlanei*). See above under genus.

Discussion. The following combination of features is most distinctive for the female genitalia of subgenus *Collessius*. Sternum VIII has the apex with a moderate, median emargination separating a pair of broadly rounded lobes, much of the surface and including the apical margin has numerous short, curved, narrowly lanceolate setae, and scales are absent or few in number. The cercus is moderately long, moderately wide, scales are absent, and the apex is broadly rounded. An upper vaginal sclerite is present. Tergum IX is comprised of a single, moderately long, moderately wide sclerite with 1-7 short setae on each apical lobe.

When compared to other generic-level taxa of Aedini with a liplike insula with setae in lateral patches the female genitalia of subgenus *Collessius* are somewhat similar to those of *Kenknightsia* Reinert and *Phagomyia* in the development of short, curved, narrowly lanceolate setae on the apical margin of sternum VIII but are easily distinguished from these by the shape of sternum VIII (especially the apical margin) and tergum IX and other features.

Species examined. *Collessius elsiae* (Barraud), *Co. macdougalli* (Edwards), *Co. macfarlanei* and *Co. shorti* (Barraud).

Published illustrations (1) and/or descriptions (2) of female genitalia. *Collessius elsiae*: Reinert et al. (2006) (2), (2008) (2); *Co. hatorii*: LaCasse and Yamaguti (1950) (1), Hara (1957) (1, 2), Reinert et al. (2006) (2); and *Co. macfarlanei*: Reinert et al. (2004) (2), (2006) (2), (2008) (2).

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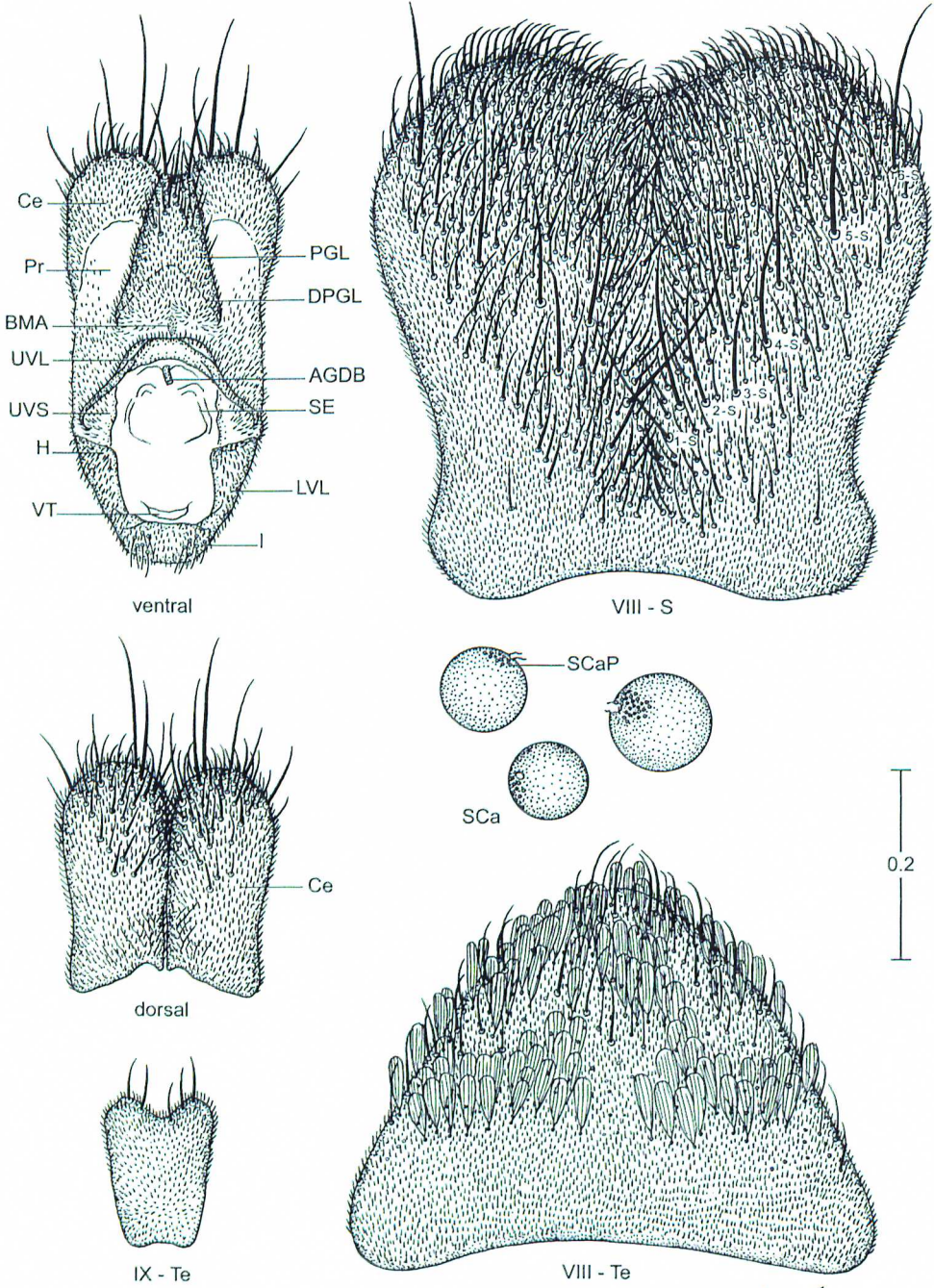
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FIGURE 1. FEMALE GENITALIA OF *COLLESSIUS MACFARLANEI*.**LIST OF ABBREVIATIONS USED IN THE TEXT AND/OR FIGURE**

AGDB	= accessory gland duct base
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



Collessius macfarlanei

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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<i>Ochlerotatus</i>	32
<i>Opifex</i>	32
<i>Patmarksia</i>	32
<i>Phagomyia</i>	32, 35
<i>pseudotaeniatus</i>	34 , 35
<i>Psorophora</i>	32
<i>Rampamyia</i>	32
<i>shortti</i>	35
<i>Tanakaius</i>	32
<i>Udaya</i>	32
<i>Vansomerensis</i>	32
<i>Verrallina</i>	32
<i>Zeugnomia</i>	32