

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

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Abstract. A morphological analysis of the female genitalia of species included in genus *Sallumia* Reinert, Harbach and Kitching was conducted. The genitalia of the type species of the genus, *Sl. hortator* (Dyar and Knab), are illustrated. Treatment of the genital morphology of the genus includes a description of the genus based on a detailed description of the type species, a list of the species examined, published descriptions of the type species with literature citations, and a discussion. The discussion section contains a list of the most distinctive female genital features of *Sallumia*, a comparison of these with other aedine genera, and other pertinent information.

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INTRODUCTION

This is the thirty-first 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, part XXVII (Reinert 2009a) with genus *Hopkinsius* Reinert, Harbach and Kitching, part XXVIII (Reinert 2009b) with genus *Luius* Reinert, Harbach and Kitching, part XXIX (Reinert 2009c) with genus *Jihlienius* Reinert, Harbach and Kitching, and part XXX (Reinert 2009d) with genus *Gilesius* Reinert, Harbach and Kitching. Reinert et al. (2004, 2006, 2008 and 2009) conducted phylogenetic analyses of tribe Aedini and revised the classification of generic-level taxa. This paper covers the female genitalia of genus *Sallumia* Reinert, Harbach and Kitching, which was described as a new subgenus of *Ochlerotatus* by Reinert et al. (2006) and raised to genus rank by Reinert et al. (2009).

A morphological analysis of the female genitalia of *Sallumia* was conducted, a characterization is given, and a discussion including a comparison with other aedine taxa is provided. The format used includes a description of the genus, a description and illustration of the type species, a list of the species examined, published descriptions of the type species with literature citations, and a discussion including the most distinctive features and other pertinent information.

MATERIALS AND METHODS

Female genitalia of genus *Sallumia* 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 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 visible at 400X magnification. Measurements were made 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 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, 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 *SALLUMIA* REINERT, HARBACH AND KITCHING

Genus description. *Segments VII and VIII.* Dorsoventrally flattened; intersegmental membrane between VII-Te and VIII-Te long. *Tergum VIII.* Length greater than width; covered with minute spicules; moderately pigmented; base moderately concave; apex straight, with few relatively short and 2 slightly longer, slightly curved setae; setae on distal 0.73-0.91; basolateral seta present; scales absent; VIII-Te index 1.05-1.19; VIII-Te/IX-Te index 1.70-2.05; length 0.21-0.24 mm; width 0.17-0.22 mm. *Sternum VIII.* Width slightly greater than length; covered with minute spicules; moderately pigmented, with intersegmental membrane appearing as darkly pigmented band on underside of posterior margin; base gently concave on median area; apex with relatively deep, median emargination separating moderately broad, rounded lobes, with several short, slightly curved setae and few slightly longer, slightly curved setae interspersed with short setae; few moderately long and several short setae on distal 0.89-0.95; setae 1-4-S present, 1-S longer than other setae, inserted relatively near basal margin, 2-S inserted posterior and lateral to 1-S; basolateral seta absent; scales absent (rarely with 1 adventitious scale); VIII-S index 0.85-0.94; length 0.26-0.30 mm; width 0.31-0.32 mm. *Tergum IX.* Moderately long; moderately wide; covered with minute spicules; comprised of single moderately pigmented sclerite; apex with 2 rounded lobes each with 3-5 short, slender setae; 6-10 total setae; IX-Te width/length ratio 0.85-1.11; length 0.10-0.12 mm; width 0.10-0.13 mm; dorsal spheres present, small. *Insula.* Liplike; covered with minute to short spicules; lightly pigmented; with 2 or 3 moderately long, slender setae laterally on each side; 4 or 5 total setae. *Lower vaginal lip.* Covered with minute to short spicules; lightly pigmented; narrow; hinge relatively narrow; without lower vaginal sclerite; ventral tuft present, small. *Upper vaginal lip.* Covered with minute to short spicules; heavily pigmented; narrow laterally and slightly curved outward, caudal part narrow and posterior margin relatively straight; without upper vaginal sclerite. *Spermathecal eminence.* Membranous; ill-defined. *Postgenital lobe.* Covered with short spicules; moderately long; relatively narrow; apex with moderately deep, posterior emargination; basal mesal apodeme elongate, moderately long, relatively narrow, moderately pigmented; few setae on distal 0.28-0.29 of ventral surface; PGL ventral index 2.37-2.49. *Proctiger.* Membranous; with minute spicules. *Cercus.* Covered with minute to short spicules; long; narrow throughout length; apex narrowly rounded, with few short

and few moderately long setae; setae on distal 0.83-0.86 of dorsal surface; dorsal surface without scales (1 specimen with 1 scale on 1 cercus); cercus index 3.47-4.20; length 0.21-0.22 mm; width 0.05-0.07 mm. **Spermathecal capsules.** One large and 2 slightly smaller ones; heavily pigmented; spherical; with several small, spermathecal capsule pores near orifice. **Accessory gland duct.** Basal area narrow, lightly to moderately pigmented, relatively short.

Type species description (*Sl. hortator*, Figure 1). The above description is based on the type species.

Species examined. *Sallumia hortator*.

Discussion. The following combination of features is most distinctive for the female genitalia of genus *Sallumia*. Sternum VIII is moderately pigmented with the intersegmental membrane appearing as a darkly-pigmented band on the underside of the posterior margin, the width is slightly greater than the length, and the apex has a relatively deep, median emargination separating moderately broad, rounded lobes each bearing several short, curved setae and a few slightly longer, slightly curved setae interspersed with the short setae. The cercus is long, narrow throughout its length, the apex is narrowly rounded, and the dorsal surface is without scales (rarely 1 scale on 1 cercus). The postgenital lobe is moderately long, relatively narrow, and the apex has a moderately deep emargination on the posterior margin. Tergum VIII is without scales, the width is greater than the length, the apex is straight with a few relatively short and two longer, slender setae, and the base is slightly concave.

Female genitalia of *Sallumia* bear some similarity to those of some other aedine genera with a liplike insula bearing setae in lateral patches, i.e., the development of tergum VIII is somewhat like those of *Rhinoskusea* Edwards and some *Ochlerotatus*, and the long, narrow cercus with the apex narrowly rounded resembles *Rhinoskusea* and many *Ochlerotatus*; however, most of the *Ochlerotatus* have several to numerous scales on the cercus (see Reinert 2002d). The long, narrow cercus with the apex narrowly rounded also resembles the cercus of numerous species of *Aedimorphus* Theobald, *Edwardsaedes* Belkin and *Neomelaniconion* Newstead (see Reinert 2000e), but these taxa are easily separated from *Sallumia* by the tonguelike insula that lacks setae and other features. Female genitalia of *Sallumia* are easily distinguished from the above mentioned taxa and other aedine taxa by the unique development of sternum VIII.

Reinert et al. (2008) provided a brief description of the female genitalia of *Sallumia* and a description of all known life stages of the genus.

Published descriptions of female genitalia. *Sallumia hortator*: Reinert et al. (2008), (2009).

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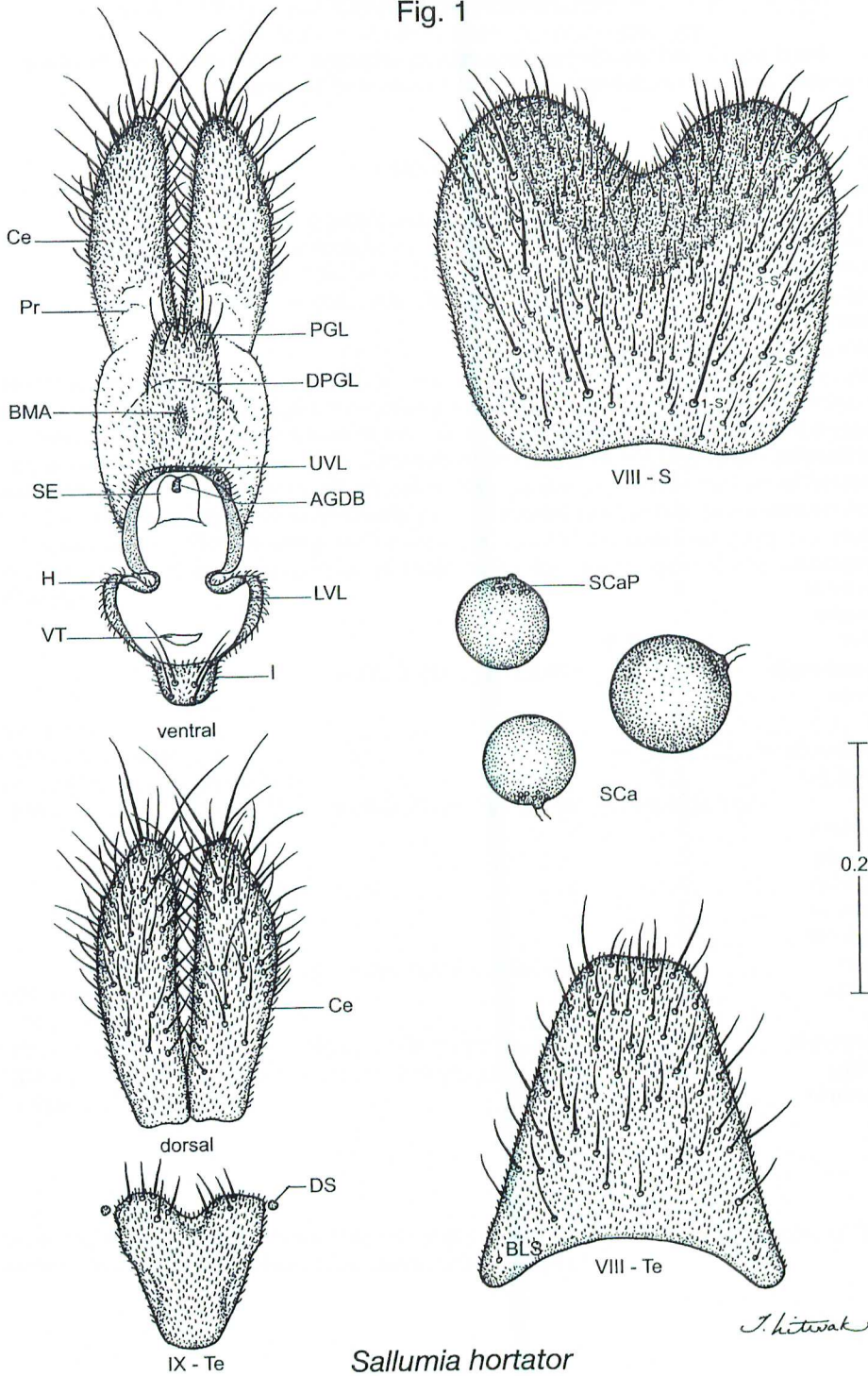
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FIGURE 1. FEMALE GENITALIA OF *SALLUMIA HORTATOR***LIST OF ABBREVIATIONS USED IN THE TEXT AND/OR FIGURE**

AGDB	= accessory gland duct base
BLS	= basolateral seta
BMA	= basal mesal apodeme
Ce	= cercus
DPGL	= line of attachment of Pr to dorsal surface of PGL
DS	= dorsal sphere
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
VIII-S	= sternum VIII
VIII-Te	= tergum VIII
VT	= ventral tuft
1-4-S	= setae 1-4-S

Fig. 1



Sallumia hortator

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.

<i>Aedes</i>	2
<i>Aedimorphus</i>	4
Aedini	1, 2
<i>Armigeres</i>	2
<i>Ayurakitia</i>	2
<i>Collessius</i>	2
Culicidae	1, 2
<i>Dahliana</i>	2
<i>Danielsia</i>	2
Diptera	1
<i>Dobrotworskyius</i>	2
<i>Downsiomyia</i>	2
<i>Edwardsaedes</i>	4
<i>Eretmapodites</i>	2
<i>Georgecraigius</i>	2
<i>Gilesius</i>	2
<i>Haemagogus</i>	2
<i>Heizmannia</i>	2
<i>Hopkinsius</i>	2
<i>hortator</i>	1, 4, 8, 9
<i>Hulecoeteomyia</i>	2
<i>Jihlienius</i>	2
<i>Luius</i>	2
<i>Neomelaniconion</i>	4
<i>Ochlerotatus</i>	2, 4
<i>Opifex</i>	2
<i>Patmarksia</i>	2
<i>Phagomyia</i>	2
<i>Psorophora</i>	2
<i>Rampamyia</i>	2
<i>Rhinoskusea</i>	4
<i>Sallumia</i>	1, 2, 3, 4, 8, 9
<i>Tanakaius</i>	2
<i>Udaya</i>	2
<i>Vansomerenis</i>	2
<i>Verrallina</i>	2
<i>Zeugnomyia</i>	2