

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

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Abstract. A comparative, morphological analysis of the female genitalia of species included in genus *Tanakaius* Reinert, Harbach and Kitching was conducted. The female genitalia of the genus are characterized and a comparison with other taxa is provided. The genitalia of the type species of the genus, *Ta. togoi* (Theobald), are illustrated. Treatment of the genital morphology of the genus includes a composite 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 of *Tanakaius*, a comparison of these with other aedine genera, and other pertinent information.

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INTRODUCTION

This is the twenty-third 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, and part XXII (Reinert 2008h) with genus *Downsiomyia* Vargas. 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 *Tanakaius* Reinert, Harbach and Kitching, which was described by Reinert et al. (2004).

A comparative, morphological analysis of the female genitalia of *Tanakaius* species was conducted, a characterization is given, and a discussion including a comparison with other aedine taxa is provided. The format used includes a composite description, a detailed description and illustration of the type species, *Ta. togoi* (Theobald), 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 *Tanakaius* 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. 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 *TANAKAIUS* 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 nearly straight to gently concave; apex broadly rounded; apical margin with few long stout and several short, curved, narrowly lanceolate setae; setae on distal 0.69-0.77; basal lateral seta present; moderate number to numerous broad scales on distal 0.37-0.65; VIII-Te index 0.57-0.76; VIII-Te/IX-Te index 2.47-2.95; length 0.30-0.38 mm; width 0.42-0.62 mm. *Sternum VIII.* Width greater than length; covered with minute spicules; moderately to heavily pigmented; base nearly straight to gently concave; apex with minute median, emargination separating pair of broadly rounded lobes; apical margin with numerous short, curved, narrowly lanceolate setae and 2-4 slightly longer, straight setae on each side interspersed with these on mesal area; numerous setae on distal 0.87-0.94; basal lateral seta absent; seta 1-S inserted relatively near basal margin; seta 2-S inserted posterior to seta 1-S; numerous broad scales forming moderately large patches on distal 0.64-0.79 of lateral areas; VIII-S index 0.70-0.78; length 0.40-0.49 mm; width 0.54-0.62 mm. *Tergum IX.* Relatively short to moderately long; moderately wide; moderately pigmented; comprised of single sclerite with pair of broadly rounded lobes on apical margin; 9-17 relatively short, slender setae on each lobe, setae often extending proximally to near midlength of sclerite; 19-30 total setae; IX-Te index 0.68-0.91; IX-Te width/length ratio 1.29-1.49; length 0.11-0.15 mm; width 0.14-0.20 mm. *Insula.* Liplike; covered with minute to short spicules; moderately pigmented; with 4 or 5 moderately long, slender setae on each side; 8-10 total setae. *Lower vaginal lip.* Covered with short spicules; moderately pigmented; narrow, without lower vaginal sclerite. *Upper vaginal lip.* Covered with minute to short spicules; heavily pigmented; narrow, median caudal area broadly rounded to somewhat flattened, without upper vaginal sclerite. *Spermathecal eminence.* Membranous; ill-defined; somewhat broadly ovoid. *Postgenital lobe.* Covered with short spicules, those on distal half somewhat longer; moderately long; moderately wide; apex sharply rounded or flattened; few to several setae on distal 0.35-0.54 of ventral surface; basal mesal apodeme not apparent; PGL ventral index 2.12-2.54; PGL ventral width/Ce dorsal width ratio 0.57-0.71; ventral length 0.14-0.17 mm. *Proctiger.* With few to several scattered minute spicules; membranous. *Cercus.* Covered with minute to short spicules; moderately pigmented; moderately long; moderately wide; apical margin broadly rounded with several long and moderately long, stout setae and few short, curved, normally narrowly lanceolate setae; basal margin notched; without scales; setae on distal 0.56-0.64 of dorsal surface; cercus index 1.94-2.35; Ce/dorsal PGL index 2.09-2.94; length 0.22-0.25 mm; width 0.10-0.12 mm. *Spermathecal capsules.* One large and 2 slightly smaller capsules; heavily pigmented; spherical; with several small spermathecal capsule pores near orifice. *Accessory gland duct.* Basal area lightly to moderately pigmented, relatively moderately long.

Type species description (*Ta. togoi*, Figure 1). *Tergum VIII.* Setae on distal 0.70-0.75; scales on distal 0.37-0.65; VIII-Te index 0.61-0.76; length 0.31-0.38 mm; width 0.43-0.62 mm. *Sternum VIII.* Setae on distal 0.87-0.89; broad scales in lateral patches on distal 0.66-0.79; VIII-S index 0.70-0.78; length 0.40-0.49 mm; width 0.56-0.62 mm. *Tergum IX.* With 9-17 setae on each lateral lobe, 19-30 total setae; IX-Te index 0.70-0.91; IX-Te width/length ratio 1.29-1.43; length 0.11-0.13 mm; width 0.14-0.20 mm. *Insula.* With 4 or 5 setae laterally on each side; 8-10 total setae. *Postgenital lobe.* Apex rounded; setae on distal 0.35-0.54 of ventral surface; PGL ventral index 2.24-2.54; PGL ventral width/Ce dorsal width ratio 0.57-0.67; ventral length 0.16-0.17 mm. *Cercus.* Dorsal surface with setae on distal 0.56-0.64; cercus index 1.94-2.27; length 0.23-0.25 mm; width 0.11-0.12 mm.

Species examined. *Tanakaius savoryi* (Bohart) and *Ta. togoi*.

Discussion. The following combination of features is most distinctive for the female genitalia of species belonging to genus *Tanakaius*. Tergum IX is relatively short to moderately long, the apical margin has two broadly rounded lobes, and each lobe bears 9-17 relatively short, slender setae which often extend proximally to near midlength of the sclerite. The cercus is moderately long, moderately wide, the apical margin is broadly rounded, the basal margin is notched, and scales are absent. The upper vaginal lip is without a sclerite.

Female genitalia of *Tanakaius*, when compared to other generic-level taxa of Aedini with a liplike insula bearing setae in lateral patches, are easily distinguished by the features mentioned above. Species of *Tanakaius*, however have tergum VIII somewhat similar to some species of *Downsiomyia* and *Patmarksia*, but species of these two genera do not have short, curved, narrowly lanceolate setae on the apical margin and possess numerous other differences in the female genitalia.

Additional female genitalia specimens of *Tanakaius* species were examined during the present study and ranges of some characters are slightly increased from those reported earlier by Reinert et al. (2004).

Published illustrations (1) and/or descriptions (2) of female genitalia. *Ta. savoryi*: Reinert et al. (2006) (2), (2008) (2) and *Ta. togoi*: LaCasse and Yamaguti (1950) (1); Hara (1957a) (1, 2), (1957b) (1); Mohrig (1967) (1, 2); Reinert et al. (2004) (2), 2006) (2), (2008) (2).

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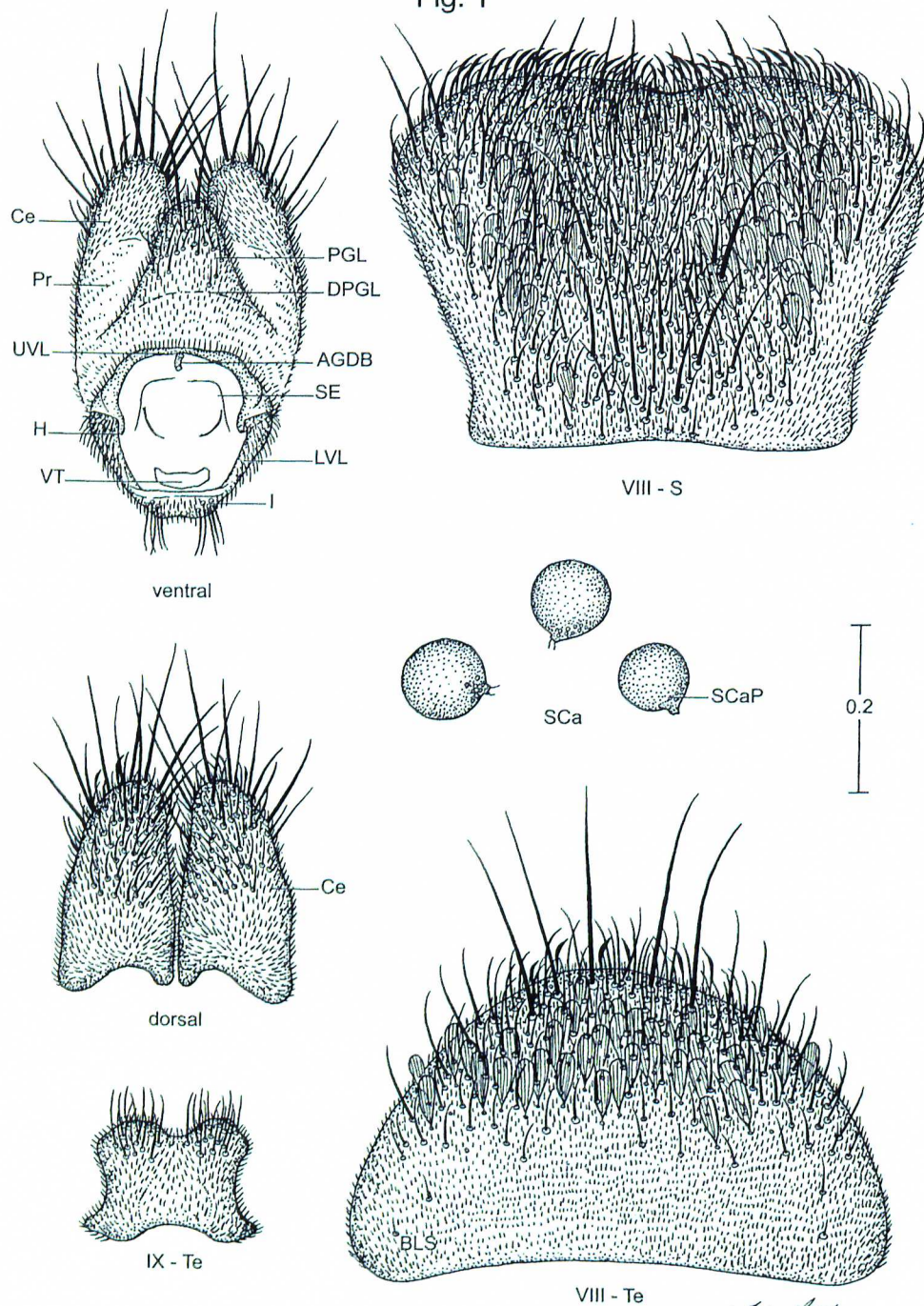
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FIGURE 1. FEMALE GENITALIA OF *TANAKAIUS TOGOI*.

LIST OF ABBREVIATIONS USED IN THE TEXT AND/OR FIGURE

AGDB	= accessory gland duct base
BLS	= basal lateral seta
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
VIII-S	= sternum VIII
VIII-Te	= tergum VIII
VT	= ventral tuft

Fig. 1

*Tanakiaius togoi*

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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