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

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Abstract. A comparative, morphological analysis of the female genitalia of species included in genus *Dobrotworskyius* 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, *Db. tubbutiensis* (Dobrotworsky), 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 *Dobrotworskyius*, a comparison of these with other aedine genera, and other pertinent information.

TABLE OF CONTENTS

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INTRODUCTION

This is the twenty-fifth 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 *Zeugnomyia* 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 *Dahliana* 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, and part XXIV (Reinert 2008j) with genus *Vansomerenis* 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 *Dobrotworskyius* Reinert, Harbach and Kitching, which was described by Reinert et al. (2006).

A comparative, morphological analysis of the female genitalia of *Dobrotworskyius* 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, *Db. tubbutiensis* (Dobrotworsky), 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 *Dobrotworskyius* 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 dead, 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 specimens followed Reinert (2000a). During dissection of the genitalia, extra care was 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 *DOBROTWORSKYIUS* REINERT, HARBACH AND KITCHING

Genus description. ***Segments VII and VIII.*** Laterally compressed; intersegmental membrane between VII-Te and VIII-Te short to intermediate in length. ***Tergum VIII.*** Width greater than length; covered with minute spicules; moderately pigmented; base nearly straight; apex broadly rounded, with several moderately long and few short setae; setae on distal 0.49-0.89; basolateral seta very short; numerous broad scales densely covering distal 0.51-0.90; VIII-Te index 0.55-0.84; VIII-Te/IX-Te index 1.79-2.74; length 0.28-0.45 mm; width 0.44-0.64 mm. ***Sternum VIII.*** Width greater than or approximately equal to length; covered with minute spicules; moderately pigmented; base slightly concave on median area; apex with moderate, median emargination separating sublateral, moderately broad lobes, with numerous short, curved setae and 1 or 2 moderately long setae on lateral area; several moderately long and short setae on distal 0.86-0.96; setae 1-5-S long, in more or less diagonal line extending from basomesal area to apicolateral area, seta 1-S inserted some distance caudally from basal margin; seta 2-S inserted posterior to seta 1-S; basolateral seta absent; moderate number of broad scales in lateral patches on distal 0.67-0.89; VIII-S index 0.76-0.92; length 0.40-0.54 mm; width 0.51-0.66 mm. ***Tergum IX.*** Moderately long; moderately wide; comprised of single, moderately pigmented sclerite with mesal area somewhat lighter pigmented; apex with 2 relatively narrow, rounded lobes with mesal margins heavily pigmented and sclerotized; covered with minute spicules; setae absent (rarely with 1 short seta on one lobe in *Db. milsoni* (Taylor), *Db. rubrithorax* (Macquart) and *Db. rupestris* (Dobrotworsky)); IX-Te width/length ratio 0.83-1.16; length 0.14-0.19 mm; width 0.14-0.20 mm. ***Insula.*** Liplike; somewhat depressed mesally; covered with minute to short spicules; with 4-8 short setae laterally on each side; 8-19 total setae. ***Lower vaginal lip.*** Covered with minute to short spicules; lightly pigmented; narrow; hinge moderately wide; without lower vaginal sclerite; ventral tuft present, small. ***Upper vaginal lip.*** Covered with minute to short spicules; heavily pigmented; narrow laterally and curved outward, caudal part somewhat broader and gently convex; upper vaginal sclerite moderately pigmented, small. ***Spermathecal eminence.*** Membranous; ill-defined; with few minute spicules on lateral area. ***Postgenital lobe.*** Covered with short spicules; distal part relatively narrow and proximal part moderately wide, with basolateral areas developed into lobes; apex straight or with shallow, median emargination; basal mesal apodeme elongate, moderately long, narrow, darkly pigmented; setae on distal 0.32-0.52 of ventral surface; PGL ventral index 2.31-3.81; PGL ventral width/Ce dorsal width ratio 0.47-0.70. ***Proctiger.*** Membranous; with scattered minute spicules. ***Cercus.*** Covered with minute to short spicules; moderately long; distal half moderately wide, proximal half with outer area wider and inner area more or less straight; apex broadly rounded, with several short and few moderately long setae; base more or less notched; setae on distal 0.52-0.71 of dorsal surface; dorsal surface without scales; cercus index 2.35-2.73; Ce/dorsal PGL index 2.11-2.87; length 0.23-0.29 mm; width

0.09-0.12 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, darkly pigmented, relatively short.

Type species description (*Db. tubbutiensis*, Figure 1). ***Tergum VIII.*** Several moderately long and few short setae on distal 0.61; numerous broad scales densely covering distal 0.65; VIII-Te index 0.59; VIII-Te/IX-Te index 2.14; length 0.37 mm; width 0.63 mm. ***Sternum VIII.*** Several moderately long and short setae on distal 0.91; number of broad scales in lateral patches on distal 0.83; VIII-S index 0.76; length 0.50 mm; width 0.66 mm. ***Tergum IX.*** Setae absent; IX-Te width/length ratio 1.09; length 0.17 mm; width 0.19 mm. ***Insula.*** With 8 short setae laterally on each side; 16 total setae. ***Postgenital lobe.*** Apex with very shallow, median emargination; setae on distal 0.44 of ventral surface; PGL ventral index 2.77; PGL ventral width/Ce dorsal width ratio 0.62. ***Cercus.*** Setae on distal 0.59 of dorsal surface; cercus index 2.67; Ce/dorsal PGL index 2.73; length 0.29 mm; width 0.11 mm.

Species examined. *Dobrotworskyius alboannulatus* (Macquart), *Db. milsoni*, *Db. occidentalis* (Skuse), *Db. rubrithorax*, *Db. rupestris*, *Db. subbasalis* (Dobrotworsky), and *Db. tubbutiensis*.

Discussion. The following combination of features is most distinctive for the female genitalia of species belonging to genus *Dobrotworskyius*. The cercus is moderately long with the distal half moderately wide, the proximal half has the outer area wider and the inner margin more or less straight, the apex is broadly rounded and the base is more or less notched. Tergum IX is moderately long, moderately wide and comprised of a single sclerite with the apex developed as two moderately long, relatively narrow, rounded lobes with the mesal margins heavily pigmented and sclerotized and setae are absent (rarely with one short seta on one lobe in a few species). Sternum VIII has the apical margin with a moderately deep, median emargination separating sublateral, moderately broad lobes. Tergum VIII has the width greater than the length, the apex is broadly rounded with several long setae and the base is nearly straight. The insula is liplike, depressed mesally, and bears 4-8 short setae laterally on each side. Postgenital lobe has the distal part relatively narrow, the proximal part is moderately wide with the basolateral areas developed into lobes and the apex is straight or usually with a shallow, median emargination.

Female genitalia of *Dobrotworskyius* are somewhat similar to those of *Patmarksia*. Female genitalia of the latter genus are easily separated from *Dobrotworskyius* by the shape of the proximal half of the cercus, which is emarginated on the mesal margin and narrow laterally, the development of the apical margin of sternum VIII with well-developed sublateral lobes, development of tergum VIII with only a few long setae apically and the basal margin is concave, and development of the apical lobes of tergum IX, which are sharply pointed. See Reinert (2008g) for a description and illustration of the female genitalia of *Patmarksia*.

Reinert et al. (2006) provided a brief description of the female genitalia of *Dobrotworskyius* and a description of all known life stages of the genus.

Published illustrations (1) and/or descriptions (2) of female genitalia. *Dobrotworskyius alboannulatus*: Reinert et al. 2006 (2), 2008 (2); *Db. rubrithorax*: Klein and Marks 1960 (1, 2); Reinert et al. 2006 (2); and *Db. tubbutiensis*: Reinert et al. 2006 (2), 2008 (2).

ACKNOWLEDGMENTS

Appreciation is expressed to Kenneth J. Linthicum and Gary G. Clark (CMAVE) for providing facilities to complete this study; to Ralph E. Harbach (The Natural History Museum (NHM), London, United Kingdom) and Graham B. White (Department of Entomology and Nematology, University of Florida, Gainesville, FL) for reviewing the manuscript; to Taina R.

Litwak (Litwak Illustration Studio, Rockville, MD) for preparing the illustration; and to James E. Pecor and Thomas V. Gaffigan (WRBU) and Theresa M. Howard (NHM) for the loan of specimens.

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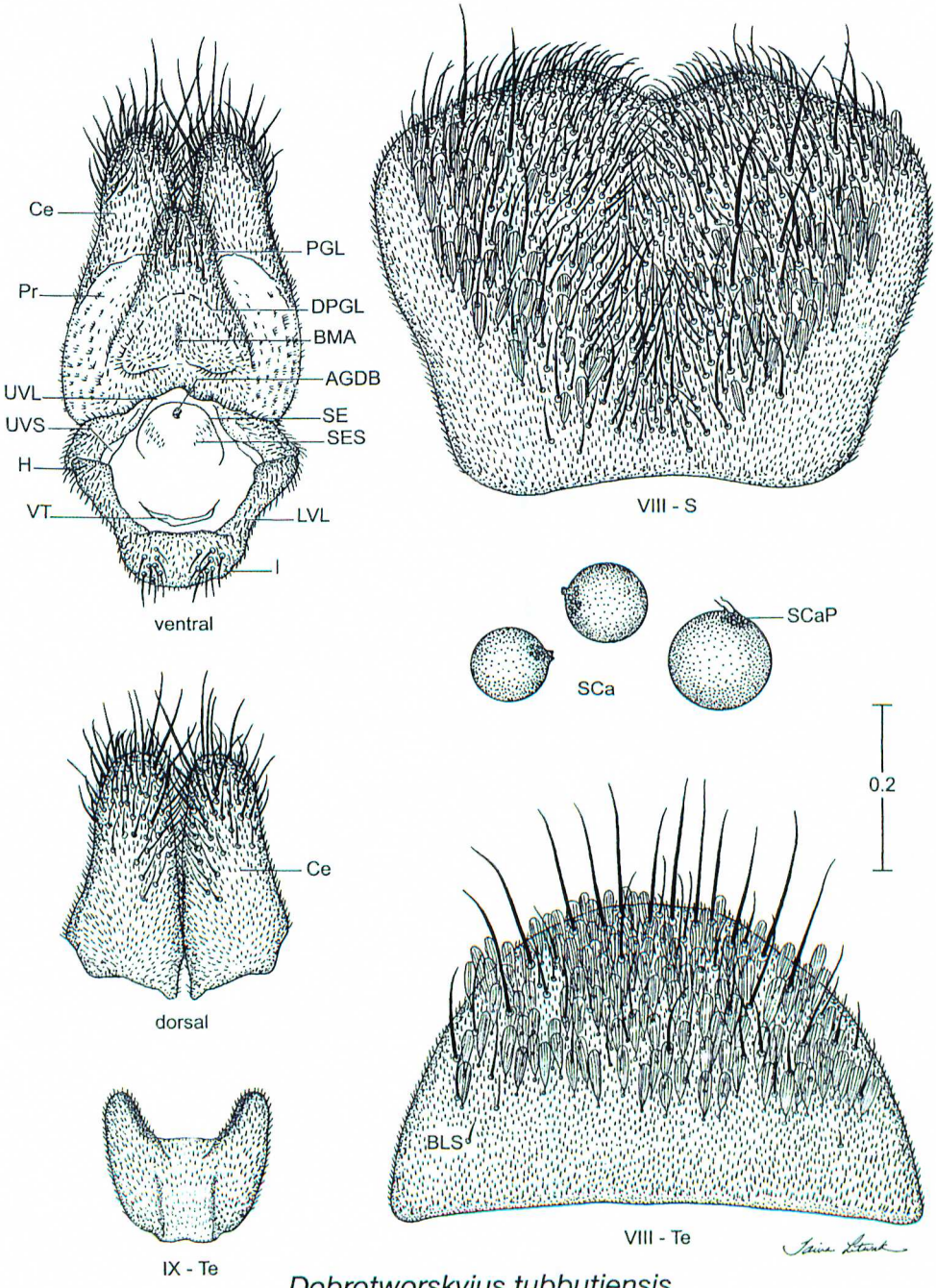
FIGURE 1. FEMALE GENITALIA OF *DOBROTWORSKYIUS TUBBUTIENSIS*.

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
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
SES	= spermathecal eminence spicules
UVL	= upper vaginal lip
UVS	= upper vaginal sclerite
VIII-S	= sternum VIII
VIII-Te	= tergum VIII
VT	= ventral tuft

Fig. 1



Dobrotworskyius tubbutiensis

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.