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

John F. Reinert[1]

Center for Medical, Agricultural and Veterinary Entomology (CMAVE),
United States Department of Agriculture, Agricultural Research Service,
1600/1700 S.W. 23rd Drive, Gainesville, Florida 32608-1067 USA,
e-mail: John.Reinert@ars.usda.gov

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

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[1]Also collaborator, Walter Reed Biosystematics Unit (WRBU), National Museum of Natural History, Smithsonian Institution, Washington, DC 20560-0165.

INTRODUCTION

This is the thirty-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 *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, 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, part XXX (Reinert 2009d) with genus *Gilesius* Reinert, Harbach and Kitching, part XXXI (Reinert 2010a) with genus *Sallumia* Reinert, Harbach and Kitching, part XXXII (Reinert 2010b) with genus *Jarnellius* Reinert, Harbach and Kitching, part XXXIII (Reinert 2010c) with genus *Lewnielsenius* Reinert, Harbach and Kitching, part XXXIV (Reinert 2010d) with genus *Catageiomyia* Theobald, part XXXV (Reinert 2010e) with genus *Elpeytonius* Reinert, Harbach and Kitching, part XXXVI (Reinert 2010f) with genus *Polyleptiomyia* Theobald, and part XXXVII (Reinert 2010g) with genus *Bifidistylus* 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 *Petermattinglyius* Reinert, Harbach and Kitching, which was described by Reinert et al. (2009).

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

MATERIALS AND METHODS

Female genitalia of genus *Petermattinglyius* 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 illustrations follows Reinert (2000a, 2008a) and the abbreviations used are found in the "List of Abbreviations Used in the Text and/or Figures" that precedes the figures. 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 *PETERMATTINGLYIUS* REINERT, HARBACH AND KITCHING

Genus description. ***Segments VII and VIII.*** Laterally compressed; intersegmental membrane between VII-Te and VIII-Te moderately long. ***Tergum VIII.*** Width greater than length; covered with minute spicules; moderately pigmented; base slightly concave mesally; apex broadly and gently rounded (rarely straight), with several relatively long and several short, relatively straight setae; setae on distal 0.17-0.32; basolateral seta normally absent (occasionally present); numerous broad scales on distal 0.31-0.78; VIII-Te index 0.50-0.73; VIII-Te/IX-Te index 2.25-3.32; length 0.21-0.25 mm; width 0.33-0.47 mm. ***Sternum VIII.*** Width greater than length; covered with minute spicules; moderately pigmented; intersegmental membrane on distal

area with proximal part darkly pigmented and when folded under sternum VIII presenting darkly pigmented apical band on sternum VIII; base gently concave on median area; apex sloping proximally from apicolateral corners to midline (*Pe. whartoni* (Mattingly) with moderate, median emargination separating broadly, rounded lobes), with numerous short, slightly curved setae and 2-4 slightly longer setae on lateral area; moderately long and short setae on distal 0.76-0.87; seta 1-S inserted relatively short distance from basal margin; seta 2-S inserted lateral and relatively close to seta 1-S, both setae long; basolateral seta very short, inserted very near base of sternum VIII; numerous broad scales on distal 0.76-0.86; VIII-S index 0.58-0.69; length 0.26-0.31 mm; width 0.38-0.45 mm. ***Tergum IX.*** Relatively short; moderately wide; covered with minute spicules; comprised of single moderately pigmented sclerite; apex with 2 rounded lobes each with 0-9 short, slender setae; 1-18 total setae; dorsal spheres present; IX-Te width/length ratio 1.38-2.32; length 0.07-0.10 mm; width 0.12-0.19 mm. ***Insula.*** Tonguelike; covered with minute to short spicules; setae absent; 2-4 tuberculi on distal area. ***Lower vaginal lip.*** Covered with minute to short spicules; moderately 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 curved outward, caudal part narrow with posterior margin slightly convex; upper vaginal sclerite moderately to darkly pigmented, relatively large. ***Spermathecal eminence.*** Membranous; more or less with distal part broadly rounded and proximal part narrower; with patch of short spicules on proximal part. ***Postgenital lobe.*** Covered with short spicules; moderately long; moderately wide; moderately pigmented; apex with very small, median emargination or broadly rounded; basal mesal apodeme short, somewhat oblong, lightly to moderately pigmented; setae on distal 0.24-0.41 of ventral surface; PGL ventral index 1.42-1.86; PGL ventral width/Ce dorsal width ratio 0.61-0.86. ***Proctiger.*** Membranous; with minute spicules in short rows. ***Cercus.*** Covered with minute to short spicules; moderately long; moderately wide; apex broadly rounded, with few short, curved setae and few moderately long, relatively straight setae; setae restricted to distal 0.23-0.33 of dorsal surface; dorsal surface without scales; cercus index 1.66-2.14; Ce/dorsal PGL index 2.30-3.75; length 0.15-0.18 mm; width 0.07-0.09 mm. ***Spermathecal capsules.*** One large and 2 slightly smaller ones; heavily pigmented; spherical; with few small, spermathecal capsule pores near orifice. ***Accessory gland duct.*** Basal area narrow, darkly pigmented, relatively long.

Type species description (*Petermattinglyius iyengari* (Edwards), Figure 1). ***Tergum VIII.*** Setae on distal 0.20-0.21; basolateral seta absent; VIII-Te index 0.61-0.64; VIII-Te/IX-Te index 2.53-3.12; length 0.21 mm; width 0.33-0.35 mm. ***Sternum VIII.*** Setae on distal 0.80-0.86; basolateral seta present; scales on distal 0.80-0.85; VIII-S index 0.58-0.68; length 0.26 mm; width 0.38-0.45 mm. ***Tergum IX.*** Each apical lobe with 0-4 setae; 1-7 total setae; IX-Te width/length ratio 1.47-1.73; length 0.07-0.08 mm; width 0.12 mm. ***Postgenital lobe.*** Setae on distal 0.33 of ventral surface; PGL ventral index 1.52-1.86. ***Cercus.*** Setae on distal 0.24-0.32 of dorsal surface; cercus index 1.66-1.74; Ce/dorsal PGL index 2.68-2.97; length 0.15 mm; width 0.09 mm.

Discussion. The following combination of features is most distinctive for the female genitalia of species belonging to genus *Petermattinglyius*. The insula is tonguelike with 2-4 tuberculi on the distal area, and setae are absent. The cercus is moderately long, moderately wide, the apex is broadly rounded, scales are absent, and the dorsal surface has setae restricted to the distal 0.23-0.33. Sternum VIII has numerous broad scales on the distal 0.76-0.86, the width is greater than the length, the apex slopes proximally from the apicolateral corners to the midline (*Pe. whartoni* with a moderately deep, median emargination separating broadly rounded lobes) and bears numerous short, slightly curved setae and 2-4 slightly longer setae on the lateral areas, and setae 1-S and 2-S are both long with seta 2-S inserted close to and lateral to seta 1-S. The intersegmental membrane between sternum VIII and the lower vaginal lip has the proximal part darkly pigmented and when normally folded under sternum VIII presents a darkly pigmented

apical band on the sternum. Tergum VIII has the width greater than the length, the apex is broadly and gently rounded (rarely straight) with several relatively long and several shorter setae, broad scales are present on the distal 0.31-0.78, and the base is slightly concave mesally.

Female genitalia of *Petermattinglyius* bear similarities with some other aedine genera with a tonguelike insula without setae, e.g., to *Indusius* Edwards, *Lorrainea* Belkin, *Skusea* Theobald and *Stegomyia w-albus* Theobald in the development and placement of setae 1-S and 2-S on sternum VIII, to *Diceromyia* Theobald in the shape of tergum IX, and to *Albuginosus* Reinert and *Diceromyia* in the shape of the cercus. *Petermattinglyius* species are easily distinguished from these taxa by several to numerous characters of the female genitalia mentioned above and from other aedine taxa with a liplike insula with setae.

Reinert et al. (2009) provided a brief description of the female genitalia of *Petermattinglyius* and a description of all known life stages of the genus.

FEMALE GENITALIA OF *PETERMATTINGLYIUS* SUBGENERA

SUBGENUS *PETERMATTINGLYIUS* REINERT, HARBACH AND KITCHING

Subgenus description. ***Tergum VIII.*** Scales on distal 0.31-0.55; VIII-Te index 0.60-0.73; VIII-Te/IX-Te index 2.53-3.32; length 0.21-0.24 mm; width 0.33-0.39 mm. ***Sternum VIII.*** Apex sloping proximally from apicolateral corners to midline forming moderately deep, median emargination; setae on distal 0.81-0.87; scales on distal 0.80-0.86; length 0.26-0.27 mm. ***Tergum IX.*** With 0-6 setae on each distal lobe; 1-13 total setae. ***Cercus.*** Ce/dorsal PGL index 2.73-3.75; dorsal length 0.15-0.16 mm.

Type species description (*Pe. iyengari*, Figure 1). See above under genus.

Discussion. Species of subgenus *Petermattinglyius* are easily distinguished from those of subgenus *Aglaonotus* by the development of the apical margin of sternum VIII. The area covered by broad scales on tergum VIII and the length of sternum VIII are also useful in separating species of the two subgenera. Some other characters mentioned in the subgeneric descriptions show minor overlap but can be used to separate specimens of most subgenera.

Species examined. *Petermattinglyius franciscoi* (Mattingly), *Pe. iyengari* and *Pe. scanloni* (Reinert).

Published illustrations (1) and/or descriptions (2) of female genitalia. *Petermattinglyius franciscoi*: Mattingly (1959) (1, 2); Reinert et al. (2009) (2); *Pe. iyengari*: Mattingly (1959) (1, 2); Reinert et al. (2009) (2); *Pe. scanloni*: Reinert et al. (2009) (2).

SUBGENUS *AGLAONOTUS* REINERT, HARBACH AND KITCHING

Subgenus description. ***Tergum VIII.*** Scales on distal 0.62-0.78; VIII-Te index 0.50-0.63; VIII-Te/IX-Te index 2.25-2.44; length 0.23-0.25 mm; width 0.39-0.47 mm. ***Sternum VIII.*** Apex with moderate, median emargination separating broadly rounded lobes; setae on distal 0.76-0.81; scales on distal 0. 76-0.81; length 0.29-0.31 mm. ***Tergum IX.*** With 5-9 setae on each distal lobe; 12-18 total setae. ***Cercus.*** Ce/dorsal PGL index 2.30-2.64; dorsal length 0.17-0.18 mm.

Type species description (*Pe. whartoni*, Figure 2). ***Tergum VIII.*** Setae on distal 0.19-0.21; basolateral seta normally present; VIII-Te index 0.50-0.63; VIII-Te/IX-Te index 2.25-2.44; length 0.23-0.25 mm; width 0.39-0.47 mm. ***Sternum VIII.*** Setae on distal 0.76-0.81; basolateral seta present; scales on distal 0.76-0.81; VIII-S index 0.65-0.69; length 0.29-0.31 mm; width 0.42-

0.44 mm. ***Tergum IX.*** Each apical lobe with 5-9 setae; 12-18 total setae; IX-Te width/length ratio 1.38-1.79; length 0.09-0.10 mm; width 0.13-0.18 mm. ***Postgenital lobe.*** Setae on distal 0.24-0.36 of ventral surface; PGL ventral index 1.64-1.70. ***Cercus.*** Setae on distal 0.23-0.29 of dorsal surface; cercus index 1.91-2.06; Ce/dorsal PGL index 2.30-2.64; length 0.17-0.18 mm; width 0.09 mm.

Discussion. See discussion section under subgenus *Petermattinglyius*.

Species examined. *Petermattinglyius whartoni.*

Published description of female genitalia. *Petermattinglyius whartoni*: Reinert et al. (2009).

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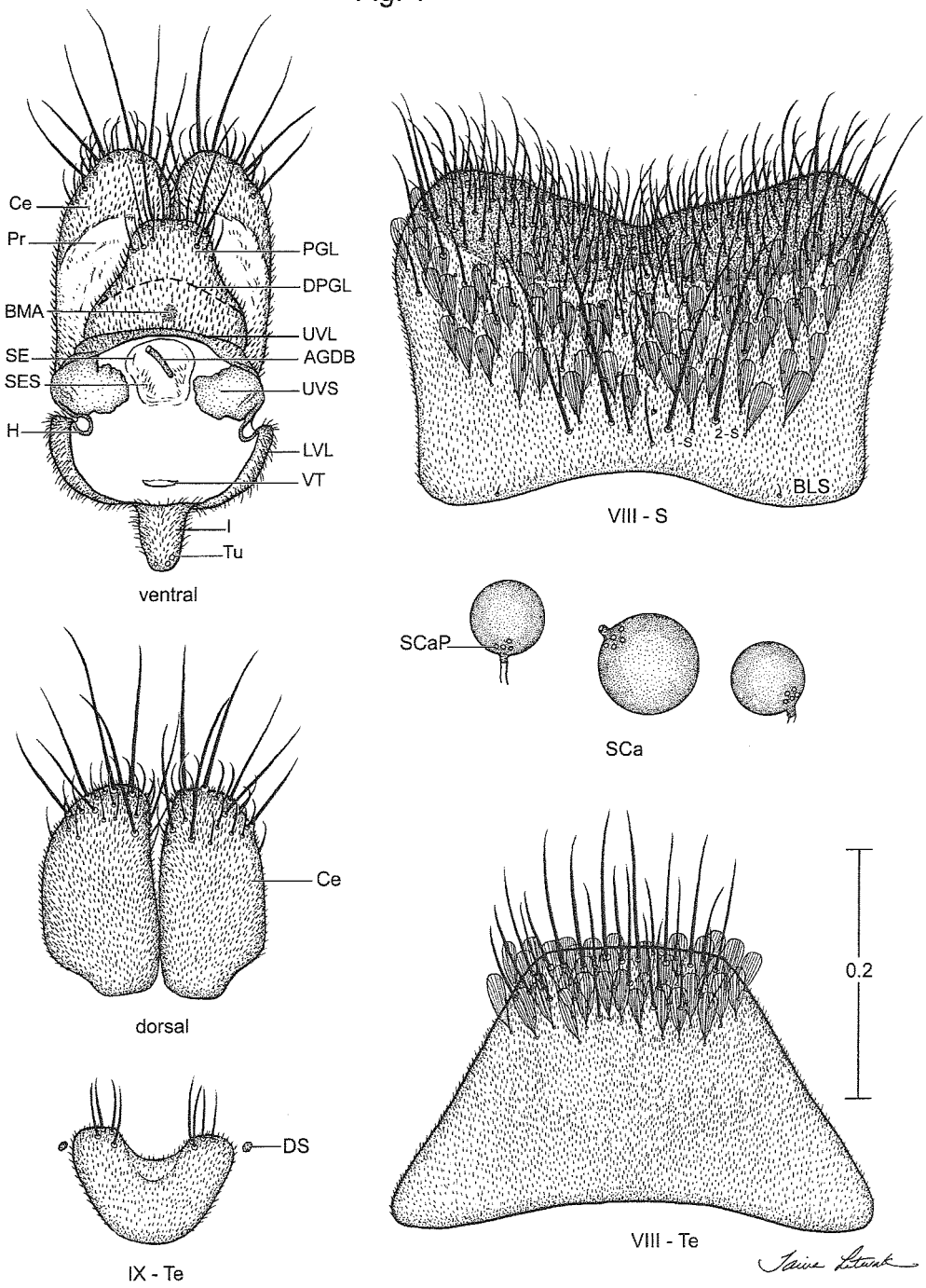
FIGURE 1. FEMALE GENITALIA OF *PETERMATTINGLYIUS IYENGARI*

FIGURE 2. FEMALE GENITALIA OF *PETERMATTINGLYIUS WHARTONI*

LIST OF ABBREVIATIONS USED IN THE TEXT AND/OR FIGURES

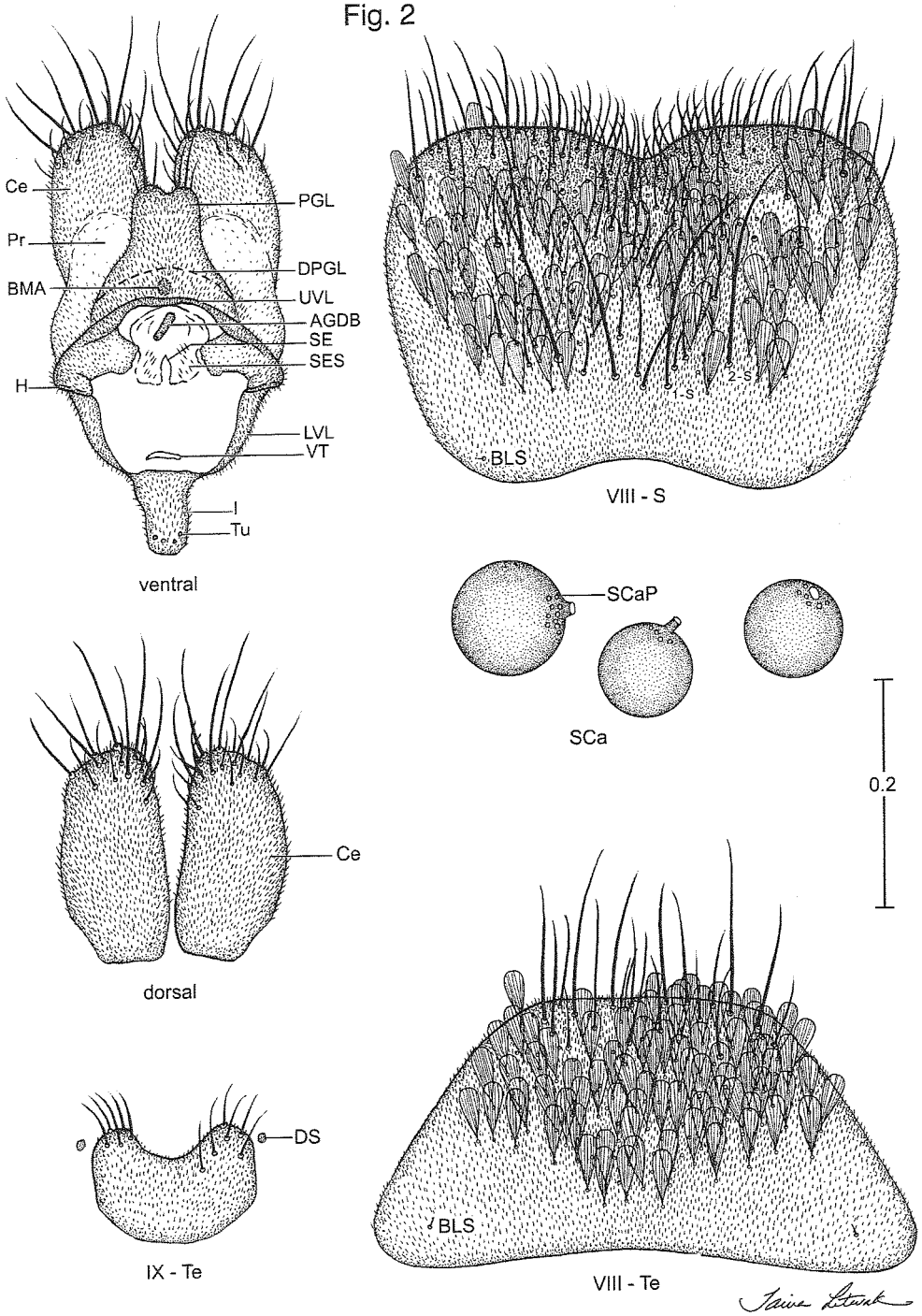
AGDB	= accessory gland duct base
BLS	= basolateral seta
BMA	= basal mesal apodeme
Ce	= cercus
DPGL	= line of attachment of Pr to dorsal surface of PGL
H	= hinge
I	= insula
IX-Te	= tergum IX
LVL	= lower vaginal lip
mm	= millimeter
PGL	= postgenital lobe
Pr	= proctiger
SCa	= spermathecal capsule
SCaP	= spermathecal capsule pore
SE	= spermathecal eminence
SES	= spermathecal eminence spicule
Tu	= tuberculus
UVL	= upper vaginal lip
UVS	= upper vaginal sclerite
VIII-S	= sternum VIII
VIII-Te	= tergum VIII
VT	= ventral tuft
1-2-S	= setae 1-2-S

Fig. 1



Petermattinglyius iyengari

Fig. 2



Petermattinglyius whartoni

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.