COMPARATIVE ANATOMY OF THE FEMALE GENITALIA OF GENERA AND SUBGENERA IN TRIBE AEDINI (DIPTERA: CULICIDAE). Part VII. GENUS *OPIFEX* HUTTON

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Abstract. The female genitalia of genus *Opifex* Hutton are described. Treatment of this monotypic genus includes a detailed description and illustration of the type species *Opifex fuscus* Hutton, and a discussion that includes a list of the most distinctive features of the genus and other pertinent information.

INTRODUCTION

This is the seventh in a series of papers by the author that describes the female genitalia of the genera and subgenera included in tribe Aedini of family Culicidae. Part I of the series (Reinert 2000a) included a brief historical background of published papers dealing with the subject and provided an introduction to the series, 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, and part VI (Reinert 2001) with genus *Ayurakitia* Thurman. This paper covers genus *Opifex* Hutton.

MATERIALS AND METHODS

The format used for the monotypic genus *Opifex* includes a detailed description and illustration of the type species *Op. fuscus* Hutton, a list of published illustrations with their citations, and a discussion of the genus including a list of the most distinctive features, and any other items of note.

Female genitalia of genus *Opifex* are considered here to include all structures caudad of abdominal segment VII. Segment VIII is included since its tergum and sternum are modified in development and shape, and possess specialized setae.

Terminology used in the description and illustration follows Reinert (2000a) 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. The method of preparation of specimens of female genitalia follows Reinert (2000a). Ranges given

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in the description are based on the specimens that I have examined. A phase contrast microscope was used because this was usually necessary to determine structures of the spermathecal eminence. Measurements of structures (e.g., length and width of tergum VIII, 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.

FEMALE GENITALIA OF GENUS *OPIFEX* HUTTON

(Fig. 1)

Genus description. ***Segment VII.*** Dorsoventrally compressed. ***Tergum VIII.*** Completely extended from segment VII; covered with small spicules; relatively short and wide; heavily pigmented throughout except for narrow, lightly pigmented strip along median, basal margin; apical margin broadly and evenly rounded and extending to basolateral corners, with several long, stout and numerous short, curved setae; base broadly and evenly concave; few to several (4-14) moderately broad scales scattered over distal 0.44-0.60; numerous short and few moderately long setae densely covering distal 0.57-0.70; basolateral seta absent but replaced by short, stout spicule situated on small, clear bulla; VIII-Te index 0.47-0.60; VIII-Te/IX-Te index 2.47-2.98; length 0.33-0.38 mm; width 0.58-0.75 mm. ***Sternum VIII.*** Covered with short spicules but narrow, proximal area with spicules in more or less rows; moderately long and wide, length shorter than width; heavily pigmented throughout except for more lightly pigmented, distal, median, narrow area; apex with small (0.06-0.09 of dorsal VIII-S length), median emargination separating broadly and evenly rounded lobe on each side of midline, numerous short, curved setae along entire margin; lateral margins nearly straight and sloping from wider apex to slightly narrower base; base with small, slightly concave area on each side of small, convex, median area, lateral areas of base also slightly convex; without scales; numerous short, curved setae and very few moderately long setae densely covering entire surface except small, basolateral areas and occasionally basal 0.04; setae 1-6-S long and inserted in more or less diagonal line from near basomesal area to lateroapical corner; basolateral seta absent; apical, intersegmental membrane densely covered with small, pigmented islands with spicules and surrounded by membrane; intersegmental membrane between segments VII and VIII very short; VIII-S index 0.65-0.71; length 0.47-0.55 mm; width 0.73-0.78 mm. ***Tergum IX.*** Covered with short spicules; comprised of pair of egg-shaped, lateral sclerites connected by membrane mesally; moderately to heavily pigmented; 13-22 short, curved setae on distal area (primarily on apical and mesal margins), 27-40 total setae; IX-Te index 0.50-0.56; length 0.12-0.15 mm; width 0.23-0.30 mm. ***Insula.*** Covered with short spicules; liplike but very short and not extending outward very far from lower vaginal lip, not easily distinguishable from lip; heavily pigmented; with 2,3 short to moderately long setae laterally on each side of midline (Belkin (1968) reported 2-4 setae on each side), 4,5 total setae. ***Lower vaginal lip.*** Covered with short spicules; narrow; heavily pigmented; hinge wide; lower vaginal sclerite absent. ***Upper vaginal lip.*** Covered with short spicules; wide throughout; heavily pigmented; posterior margin straight; upper vaginal sclerite small, heavily pigmented, comprised of short, broad lobe extending inward and situated some distance caudally from hinge. ***Spermathecal eminence.*** Membranous; ill-defined, appearing as wrinkled, amorphous mass. ***Postgenital lobe.*** Covered with short spicules; ventral surface triangular, apex acute and base broad; moderately pigmented; numerous short setae covering ventral surface from apex to base, 31-49 setae on each side of midline of which 3,4 at apex are long, 63-97 total setae; ventral

PGL/Ce index 0.57-0.69; dorsal PGL index 1.13-1.53; ventral PGL index 1.88-3.00; ventral length 0.16-0.21 mm. ***Proctiger.*** With spicules (in small clusters) scattered over entire surface; membranous. ***Cercus.*** Covered with short spicules; moderately long and moderately wide; moderately pigmented; apex bluntly rounded; without scales; dorsal surface with numerous short setae on distal 0.53-0.59 and 1,2 long, stout and several moderately long, stout setae on apical margin and about distal 0.20; ventral surface with very few short setae on distal area; cercus index 2.00-2.16; Ce/dorsal PGL index 2.94-2.95; length 0.28-0.31 mm; width 0.13-0.14 mm. ***Spermathecal capsules.*** One large and 2 slightly smaller; each with narrow, short, pigmented neck; heavily pigmented; spherical; with several small, spermathecal capsule pores, most near orifice. ***Accessory gland duct.*** Basal area moderately pigmented.

Type species description (Fig. 1). The above description of this monotypic genus is that of the type species, *Opifex fuscus*.

Species examined. *Opifex fuscus*.

Discussion. The following combination of features is most distinctive for genus *Opifex* (unique features noted): postgenital lobe has the ventral surface triangular in outline and has numerous (63-97) setae extending over the entire surface from the acute apex to the broad base (unique); tergum IX is comprised of two egg-shaped, moderately to heavily pigmented, lateral sclerites that are connected mesally by a membrane and each sclerite has 13-22 short, curved setae on the apical and mesal areas (unique); insula is liplike, very short, heavily pigmented, and has 2-4 short to moderately long setae laterally on each side of the midline, and it is difficult to distinguish from the lower vaginal lip (unique); sternum VIII is heavily pigmented and it is densely covered with short, curved setae that essentially cover the entire surface; and upper vaginal lip is heavily pigmented and wide throughout but it is wider at the hinge, and the upper vaginal sclerite is small, heavily pigmented, and situated some distance caudally from the hinge.

Prior to dissection of the female genitalia of dried specimens, the large sternum VIII was observed to be folded together so that the two halves extend over and cover the entire remaining parts of the genitalia. Figure 10 of Miller (1922) illustrates this condition.

The highly unusual mating behavior of *Op. fuscus* is reported by Miller (1922), Kirk (1923), Edwards (1926, 1932), Haeger and Provost (1965), Belkin (1968), and others. Only *Deinocerites cancer* Theobald (Provost and Haeger 1967) is reported to have a similar mating behavior. The male adult seeks out a female pupa and inserts his abdomen inside the pupal exuviae thus initiating mating during female emergence. This may be facilitated by the female genitalia being enclosed inside the large sternum VIII described above.

Published illustrations of female genitalia. Miller (1922), *Op. fuscus*; and Belkin (1968), *Op. fuscus*.

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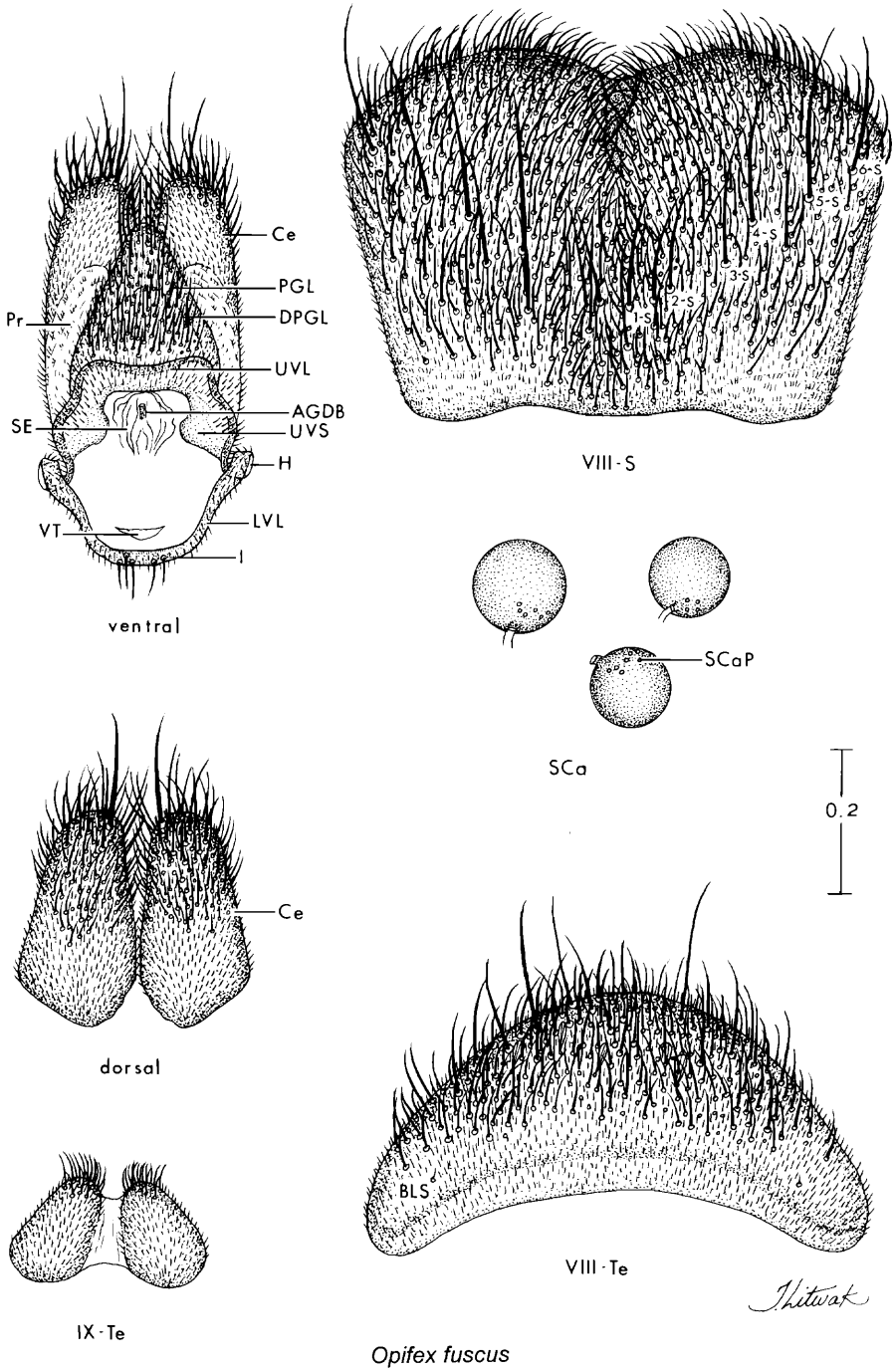
LIST OF ABBREVIATION USED IN THE TEXT AND/OR FIGURE

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
UVS	= upper vaginal sclerite
VIII-S	= sternum VIII
VIII-Te	= tergum VIII
1-6-S	= setae 1-6 of sternum VIII

Fig. 1



Opifex fuscus

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. Figure number is in parentheses.