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REMARKS ON GENITALIC GENERA IN THE CULICIDÆ.

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In a recent publication¹ Dr. E. P. Felt has figured the genitalia of the ♂♂ of a number of species of Culicidæ, and in a brief

¹ Bull. 79, N. Y. State Mus., 1904.

appendix erects seven new genera, describing the venation and genitalic characters of each. The venational characters seem to be of an indefinite nature, and we might as well frankly regard the genera as founded on the genitalia alone. These certainly show well marked and distinctive characters. I have received from Dr. Felt photographs of many of his slides and have had others prepared by the kindness of Mr. H. S. Barber. It is of especial interest that the genitalic groups run largely parallel to those defined on larval characters, in some cases con-

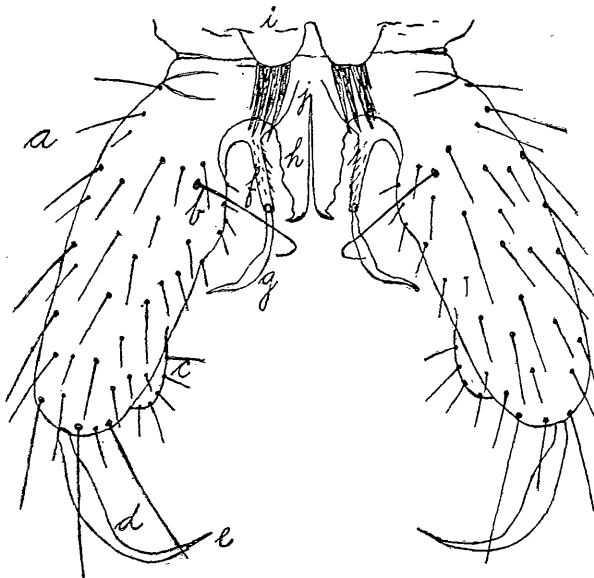


FIG. 9.—Male genitalia of *Grabhamia cantator* Coq.: *a*, side piece or basal segment of clasp; *b*, basal lobe of same, or claspette; *c*, sub-apical lobe of same; *d*, clasp filament or terminal segment of clasp; *e*, articulated apex of same; *f*, harpe, basal segment; *g*, harpe, terminal segment; *h*, harpago; *i*, appendage of 8th segment; *j*, position of the unci (they cannot be detected in the specimen before me).

firming larval affinities where it had been heretofore supposed that these were contradicted by the adults. A case in point is that of *Janthinosoma musicum*, *Culex jamaicensis* and *Tæniorrhynchus signipennis*. These larvæ are very peculiar and essentially alike. The adults have been considered unrelated; but the genitalia are in some respects very similar and place these forms close together. This leads me to conclude that the genitalic groupings, where reinforced by the larval ones, show natural divisions, and I am, therefore, in accord with Dr. Felt

in using them as the basis for genera. It is true that in general practice other characters than these are preferable, owing to the necessity of preparing the specimens and to the fact that the characters are shown by one sex only, and that the one not generally collected. I believe, however, that since the groups are natural ones it is probable that other recognition characters will be found. If they should not be, it might be better to reduce the genitalic genera to subgeneric rank, for practical reasons, without thereby losing sight of their value. It seems inevitable that the genus *Culex* shall be divided, and the genitalic divisions are more natural than those recently founded on scales and papal structure. As to the latter it is necessary to remove and mount the palpi, which is as practically objectionable a process as any connected with the study of the ♂ genitalia.

The sketch herewith of *Grabhamia cantator* Coq., shows the names applied to the different parts. They vary much in amount of development as well as in shape in the different species. *Anopheles* shows the simplest arrangement, scarcely distinguishable from the Corethrinæ. This is in accord with the larval characters, since *Anopheles* larvæ are very close to some Corethrid forms, as *Eucorethra* and *Dixa*. The Culiciniæ have a small articulated tip to the terminal segment of the clasper, which appears to be lacking in the Aëdinæ, although in *Uranotenia sapphirina* there is a small spine much resembling it and probably representing its rudiment. The species of *Culex* show the most differentiation, especially in the true *Culex* or *pipiens* group and these are the most specialized larvæ. We have thus a concordance in general as well as special characters between genitalic and larval structure.

I have thrown the forms known to me into a synoptic table of genera, which follows. A few new names are supplied to fill gaps left in Dr. Felt's groupings or as corrections. Nine generic names, out of a total of thirty-one credited to our fauna, are omitted, as I have had no material to dissect.

1. Harpes and harpagones absent or greatly reduced; clasp segment strong and longer than the basal segment. *Anopheles*
Harpes or harpagones developed; clasp segment usually shorter than the basal segment. 2
2. Terminal clasp without a terminal articulated spine, though often otherwise modified, branched or spinous. 3
Terminal clasp with an articulated spine which is usually apical; clasp usually simple, seldom modified. 6
3. Clasp transparent, membranous. 4
Clasp chitinous, solid. 5

4. Clasp inflated, lobed, irregular, apparently erectile.....*Wyeomyia*
Clasp broad, simple, with minute apical spine.....*Uranotaenia*
5. Clasp enlarged, clawed, hirsute on the outer aspect.....*Deinocerites*
Clasp slender, bifurcate, arising subapically.....*Aedes*
6. Harpes filamentous or papillose, slender, delicate..... 7
Harpes not filamentous, chitinous or spined..... 11
7. Harpes filamentous; unci reduced or invisible..... 8
Harpes papillose-capitate; unci an undivided basal cone, *Janthinosoma*
8. Harpes broadened at base, not jointed; outer lobe of side piece finger-shaped.....*Protoculex*
Harpes not broad at base, jointed centrally..... 9
9. Side piece with a heavy terminal brush; harpes hooked...*Pseudoculex*
Side pieces without terminal brush..... 10
10. Harpes hooked by a slender retrorse spine.....*Culiselsa*
Harpes not hooked.....*Grabhamia*
11. Clasp with an outward angle and spines; harpes touching to form a ring-shaped structure.....*Psorophora*
Without these characters; clasp simple..... 12
12. Terminal clasp expanded, narrow bladder-like..... 13
Terminal clasp filamentous..... 14
13. Basal lobe of side piece setose.....*Feltidia*
Basal lobe of side piece a thick chitinous rod.....*Coquillettidia*
14. Side piece with a subapical process within bearing setæ and filamentous or leaf-like appendages..... 20
Side piece without such a process..... 15
15. Clasp with the articulated tip subterminal.....*Ecculex*
Clasp with the articulated tip terminal..... 16
16. Side pieces short conical; harpes with long branch at base, *Stegomyia*
Side pieces long conical; harpes not so branched..... 17
17. Harpes with trifid apex; tip of clasp multiple divided....*Pneumaculex*
Harpes with simple or spinous apex..... 18
18. Appendicular tip of clasp long.....*Megarhinus*
Appendicular tip of clasp minute..... 19
19. Unci not forming a central projecting sac.....*Theobaldia*
Unci united into a large central projecting sac.....*Culicella*
20. Harpes nearly simple, dentate only..... 21
Harpes heavily spined, often recurved.....*Culex*
21. Leaf-like scale of apical lobe of side piece absent.....*Neoculex*
Leaf-like scale present; setæ arising from a second, basal lobe

*Melanoconion***Genus ANOPHELES Meigen.**

Type: bifurcatus Linn. The genitalic type has been figured by Theobald and Felt. Nine species are recorded from North America, viz: *maculipennis* Meig., *plumbeus* Hal., *bifurcatus* Linn., *punctipennis* Say, *pseudopunctipennis* Theob., *franciscanus* McC., *barberi* Coq., *crucians* Wied., *eiseni* Coq.

Genus **CELLIA** Theobald.

Type: pulcherrima Theob. The genitalia will probably prove similar to those of *Anopheles*. I have not seen them of either of the species recorded from North America, viz: *argyrotarsis* Desv., *albipes* Theob.

Genus **CYCLOLEPPTERON** Theobald.

Type: grabhamii Theob., the only species recorded from our region. The genitalia are unknown to me.

Genus **ARRIBALZAGIA** Theobald.

Type: maculipes Theob. This species is recorded from Trinidad and will doubtless be found in the southern portion of our region. The genitalia have not been examined.

Genus **PSOROPHORA** Desvoidy.

Type: ciliata Fab. We are credited with three species, viz: *ciliata* Fab., *howardii* Coq., *scintillans* Walk. The genitalia of *ciliata* have been figured by Dr. Felt.

Genus **MEGARHINUS** Desvoidy.

Type: hæmorrhoidalis Fab. We are credited with seven species, viz: *rutilus* Coq., *portoricensis* Von Röd., *ferox* Wied., *grandiosus* Will., *hæmorrhoidalis* Fab., *longipes* Theob., *separatus* Arrib. Mr. Barber has made me a nice mount of the genitalia of *portoricensis*, from which the characters given in the table were taken.

Genus **STEGOMYIA** Theobald.

Type: fasciata Fab. Besides this species, *sexlineata* Theob. may occur with us. The genitalia of *fasciata* are distinctive as may be inferred from the preceding table.

Genus **PNEUMACULEX**, new genus.

Type: signifer Coq. This species is peculiar in many ways and deserves a distinct generic appellation. The larva has besides the peculiar dorsal plate an enlargement of the tracheal tubes into a sort of bladder in the thorax, suggesting *Corethra*. In the ♂ genitalia the side pieces are conic, without apical lobe; basal lobe small but bearing two stout setæ; terminal clasp slender, enlarged a little outwardly with a multiple articulated tip. Harpes short, chitinous, concave, with trifid apex; harpagones small, slender, chitinous, acute; another pair of appendages more basally placed, shorter than the harpagones, with a terminal hook; a median, divided, double-tipped membrane (unci?).

Genus TÆNIORHYNCHUS Arribalzaga.

Type: titillans Walk. Theobald takes *jasciolatus* Arrib. as the type of *Tæniorhynchus*, but the first species is *tæniorhynchus* Arrib. (nec Walker) = *titillans* Walk., and should be the type. This species is also the type of *Mansonia* Blanchard, which will become a synonym of *Tæniorhynchus*. The species has been recorded from Trinidad and will doubtless be found in the southernmost part of our territory. I do not know the genitalia.

Genus COQUILLETTIDIA, new genus.

Type: perturbans Walk. Theobald places this species in *Tæniorhynchus* Arrib., but not correctly, I believe. The genitalia are peculiar. Dr. Felt has prepared them from a specimen which I sent him, but the figure is not reproduced in his bulletin. The characters may be gathered from the table. Four species are referred here, viz: *richardii* Fic., *perturbans* Walk., *confinis* Arrib., *nigricans* Coq.

Genus FELTIDIA, new genus.

Type: jamaicensis Theob. Dr. Felt has taken *jamaicensis* as the type of *Grabhamia*, but Theobald mentions first *dorsalis* Meig. Of *jamaicensis*, Theobald gives a rough figure and Felt a good photograph. We have three species at present referable here, *jamaicensis* Theob., *cyanescens* Coq., *signipennis* Coq.

Genus JANTHINOSOMA Arribalzaga.

Type: discruciens Walk. We have five species, viz: *musicum* Say, *posticatum* Wied., *lutzii* Theob., *discruciens* Walk., *varipes* Coq. Dr. Felt has prepared the genitalia of *musicum* and *lutzii* which are much alike. He has figured the former.

Genus JOBLOTIA Blanchard.

Type: niveipes Theob. The name is a substitute for Theobald's *Trichosporon* (nec *Trichosporus* Macq.) The single species is recorded from Trinidad, but probably occurs with us. I have not seen the genitalia.

Genus ECCULEX Felt.

Type: sylvestris Theob., the only species. It has most remarkably distinct genitalia and is apparently not at all allied to *Grabhamia* as one would have supposed. Dr. Felt has published a photograph.

Genus PSEUDOCULEX, new genus.

Type: aurifer Coq. As noted below, I think this is a distinct generic type. The characters are given in the preceding table and in Dr. Felt's figure.¹

¹ Pl. 33, fig. 2.

Genus **CULICELSA** Felt.

Type: tæniorhynchus Wied., the only species properly referred here. Dr. Felt adds *aurifer* Coq., but I consider this to represent a distinct generic type. I am doubtful, moreover, whether the hook on the harpes is to be considered a generic character. If not, *Culiselsa* falls in with the following.

Genus **GRABHAMIA** Theobald.

Type: dorsalis Meig. Synonym, *Culicada* Felt, type *canadensis* Theob. I have not seen the genitalia of *dorsalis*, but Theobald figures the larva of it and the genitalia of a closely allied species. This is our largest genus. Sixteen species are referred here with certainty, viz: *canadensis* Theob., *dupreei* Coq., *sollicitans* Walk., *cantans* Meig., *atropalpus* Coq., *cantator* Coq., *varipalpus* Coq., *curriei* Coq., *impiger* Walk., *lazarensis* F. and Y., *pullatus* Coq., *trichurus* Dyar, *triseriatus* Say, *punctator* Kirb., *æstivalis* Dyar, *onondagensis* Felt, and twenty-five others more or less probably, viz: *trivittatus* Coq., *fitchii* F. and Y., *squamiger* Coq., *abfitchii* Felt, *testaceus* Wulp, *bigotii* Bell, *excrucians* Walk., *impatiens* Walk., *annulatus* Schv., *confirmatus* Arrib., *scholasticus* Theob., *inflictus* Theob., *hirsuteron* Theob., *rubidus* Desv., *nigripalpus* Theob., *janitor* Theob., *palus* Theob., *similis* Theob., *bimaculatus* Coq., *discolor* Coq., *fletcheri* Coq., *nanus* Coq., *niveitarsis* Coq., *vittata* Theob., *spenceri* Theob. The genitalia of several have been figured.

Genus **PROTOCULEX** Felt.

Type: serratus Theob., the only species so far represented. Dr. Felt has briefly described the genitalia, though he has not figured them. I have a fine photograph of the parts from him, and a figure may be expected later, I presume.

Genus **THEOBALDIA** Nevean-Lemaire.

Type: annulata Meig. *Culiseta* Felt is a synonym, with type *absobrinus* Felt. Five species will be referred here, though their synonymy is not settled. They are *annulata* Meig., *incidens* Thom., *consobrinus* Desv., *absobrinus* Felt, *magnipennis* Felt.

Genus **CULICELLA** Felt.

Type: dyari Coq., well figured by Dr. Felt. *Melanurus* Coq. also falls here, having essentially the same structure, though the basal plate is less developed. Dr. Felt referred it to *Ecculex*, but I cannot see that it has any affinity therewith.

Genus **NEOCULEX**, new genus.

Type: territans Walk. This species may be separated from *Culex* proper on the characters given above. Dr. Felt figures

a portion of the genitalia, but his figure does not show the peculiar basal organs.

Genus *CULEX* Linnæus.

Type: pipiens Linn. As now restricted, the genus is a small one. But five species are certainly referred to it, viz: *pipiens* Linn., *tarsalis* Coq., *restuans* Theob., *jatigans* Wied., *salinarius* Coq.; to which should probably be added *secutor* Theob.

Genus *MELANOCONION* Theobald.

Type: atratus Theob. Though belonging near *Culex* the male genitalia show a distinct type. A second species, *spisipes* Theob., is recorded from Trinidad.

Genus *DEINOCERITES* Theobald.

Type: cancer Theob. The genitalia have been figured by Theobald and are very peculiar. The same may be said of most of the *Aëdinæ*.

Genus *AEDES* Meigen.

Type: cinereus Wied. Two species are credited to our fauna, viz: *juscus* O.-S. and *perturbans* Will. The genitalia of *juscus* have been figured by Dr. Felt.

Genus *HOWARDINA* Theobald.

Type: walkeri Theob. The genitalia are unknown to me.

Genus *WYEOMYIA* Theobald.

Type: grayii Theob. We have four species, viz: *grayii* Theob., *pertinans* Will., *trinidadensis* Theob., *smithii* Coq. The peculiar genitalia of *smithii* have been briefly described by Dr. Felt.

Genus *PHONIOMYIA* Theobald.

Type: longirostris Theob. Not studied.

Genus *URANOTÆNIA* Arribalzaga.

Type: nataliæ Arrib. We have three species, viz: *sapphirina* O.-S., *lowii* Theob., *socialis* Theob. Dr. Felt gives the genitalia of *sapphirina*.

Genus *AEDOMYIA* Theobald.

Type: squammipenna Arrib., is recorded from Trinidad.

Genus *HÆMAGOGUS* Williston.

Type: cyaneus Fab., not studied.
