Three Hundred and Sixth Meeting, October 4, 1917.

A REVISION OF THE DIPTEROUS FAMILY CLUSIODIDAE (HETERONEURIDAE).

J. R. Malloch.

During the last three years I have collected a large amount of material in this small and interesting family, and finding some new or rare forms and the early stages of one species I consider that a short revision of the whole may be of value to students of Diptera.

I had purposed including the matter in the present paper in a comprehensive treatise of the Cyclorrhapha, but find that such course is not possible because of the limited facilities for publication that are at present available, and in order to limit the size of my subsequent paper I now present this revision.

The family name has recently been changed to comply with the rule of priority, Heteroneura, a preoccupied name, having been supplanted by Clusiodes.

Family **Clusiodidae.**

Family Characters.

Larva.—Musciform; the head rudimentary consisting of 2 small yellowish downwardly directed projections, and without a chitinized internal skeleton; thoracic segments tapered anteriorly; apical abdominal segment slightly rounded; each spiracle on a raised chitinized bifid plate.

Puparium.—Rather slender; rounded at both extremities; metathoracic spiracles not developed; posterior spiracles as in larva.

Imago.—Head broad, eyes widely separated; orbits with 3 pairs of strong bristles; vibrissae well developed; antennae of moderate size, third joint not much elongated, generally little longer than broad; arista pubescent or densely hairy; frons often with a pair of cruciate frontal bristles. Tibiae usually with distinct preapical dorsal bristle. Cross veins of wings closely approximated except in *Clusia,*[9] auxiliary vein complete; first vein falling much short of wing-middle; basal cells complete; sixth vein not extending to margin of wing.

Habits of Larvae.

The larvae live in decaying wood and are very sluggish in habit. Some European species have been recorded as leaping, but I saw no indication of such activity upon the part of the larvae I had

Habits of Imagines.

The imagines are rarely met with, but when they are it is usually upon tree-trunks, particularly on dead or dying specimens. Not uncommonly examples are found on windows in houses. They feed upon nectar, decaying vegetable matter, or sap exuding from trees.

Key to Genera

1. Eyes with short, upright hairs.....*Acartophthalmus*
— Eyes bare..... 2
2. Cross veins of wings not closely approximated, the length of penultimate section of fourth vein about one third that of ultimate *Clusia.*
— Cross veins closely approximated, the length of penultimate section of fourth vein less than one fourth that of ultimate..... 3
3. Postvertical and cruciate bristles absent; ocellar bristles very small.....*Chaetoclusia*
— Postvertical bristles present; ocellar bristles distinct..... 4
4. Cruciate frontal bristles present.....*Clusiodes*
— Cruciate frontal bristles absent.....*Heteromeringia*

Genus **Acartophthalmus** Czerny

This genus has not been recorded from North America. The presence of very short, stiff upright hairs on the eyes sufficiently distinguishes the genus from its allies.

Acartophthalmus nigrinus Zetterstedt

Anthophilina nigrina Zetterstedt, Dipt. Scand., vol. 7, p. 2697, 1848.

This is the only species of the genus. It occurs in continental Europe, and is readily distinguished from its allies by its small size, entirely black color, and waivy eyes.

One specimen from the collection of Professor J. M. Aldrich, taken May 17, 1910, on Mt. Constitution, Washington.

Genus **Clusia** Haliday.

Key to Species.

1. Abdomen without conspicuous black spots on lateral margins of segments.....*occidentalis.*
— Abdomen with conspicuous shining black spots on lateral margins of segments..... 2
2. Wing with 2 brown or blackish bands, one slightly beyond middle and the other at apex; male with bristles of antero- and postero-ventral surfaces of fore femora subequal in length.....*czernyi*

— Wing with only 1 brown band, the aptical one; male with bristles of postero-ventral series on fore femora much stronger than those of antero-ventral..... *lateralis*

Clusia occidentalis n. sp.

Male.—Yellow, distinctly shining. Frons golden yellow, upper half of orbits and ocellar triangle shining, the remainder opaque; bristles black; antennae and palpi pale yellow; face and cheeks whitish. Thorax, abdomen, and legs yellow. Wings slightly grayish, with a brown costal mark extending from apex of first vein round apex of wing to a point posterior to fourth vein; outer cross-vein with a large brown spot, the latter extending into first posterior cell.

Cruciate frontal bristles strong; ocellar bristles extending to base of cruciate pair. Abdomen stouter than in *lateralis* and with stronger bristles. Fore and mid femora with strong black bristles on the posterior ventral surfaces. Last section of fourth vein about two and one-half times as long as preceding section.

Female.—Similar to male.

Length, 5.5 mm.

Type locality, Washington State (Kincaid).

Type—Collection State Natural History Survey of Illinois.

Paratypes and *Allotype*, Portola, Cal., April 13, 1906 (coll. Aldrich).

Clusia czernyi Johnson.

Clusia czernyi Johnson, Psyche, Vol. 20, 1913, p. 100.

Originally described from specimens obtained from the following states: Maine, Vermont, Massachusetts, New Hampshire, Pennsylvania, New York.

Represented in our Laboratory collection by one female from Algonquin, Ill. (Nason), and one male from Alto Pass, Ill., May 3, 1917 (Hart and Malloch).

Clusia lateralis Walker.

Heteromyza ? lateralis Walker, List of Insects in British Museum, Vol. 4, p. 1095. 1869.

Heteroneura spectabilis Loew, Wien Ent. Monatschr., Vol. 4, p. 82. 1860.

Clusia lateralis (Walker) Czerny, Wien Ent. Zeit., Vol. 22, p. 89. 1903.

Originally described from a female specimen from North America. Recorded from the following states by Johnson: Maine, Vermont, Massachusetts, Connecticut, New Jersey, and Pennsylvania; and also from Canada. Loew's specimens came from Washington, D. C.

Represented in our Laboratory collection by one male specimen from Algonquin, Ill. (Nason), and another from Dongola, Ill., May 11, 1916 (Hart).

Genus **Chaetoclusia** Coquillett.

There are two American species of this genus, neither of which I have before me at present. The first vein of the wings is bristly on the apical portion in this genus.

The species may be separated as follows:

Thorax entirely yellow; anterior tibiae and tarsi brown, mid and hind legs yellow; wings yellowish hyaline (New Jersey)....*affinis* Johnson

Thorax with a black stripe on each side of mesonotum and otherwise marked with black; fore legs yellow, basal half of mid and hind tibiae usual brownish; wings with apices and cross veins more or less clouded with brown (Nicaragua).....*bakeri* Coquillett

Genus **Clusiodes** Coquillett.

There are five North American species of this genus, which may be separated by means of the following key.

Key to Species.

1. Thorax largely yellowish on disc; legs entirely yellow; face of male black.....*melanostoma*
— Thorax largely black on disc, always so in front; legs not entirely yellow except in flavipes..... 2
2. Wing with 2 dark marks, a narrow one below apex of first vein, and another, much larger, at apex; legs entirely pale yellow...*flavipes*
— Wing with one dark cloud covering the apex of wing and sometimes continued along costal margin; legs partly black or brown..... 3
3. Infuscation of wings extending from apex of first vein round tip of wing.....*geomyzina*
— Infuscation of wings confined to apical third, falling far short of apex of first vein..... 4
4. Fore tarsi entirely yellow.....*apicalis*
— Fore tarsi in part black..... 5
5. All fore tarsal joints of female and the apical 3 or 4 in male black *pictipes*
— Basal or basal and second fore tarsal joints black, the others conspicuously white .....*albimana*

Clusiodes melanostoma Loew.

Heteroneura melanostoma Loew, Berl. Ent. Zeitschr., 1864, p. 98.

Originally described from specimens obtained in New York State, and subsequently recorded by Johnson from the following

states: Maine, New Hampshire, Vermont, Massachusetts; and also from Montreal, Canada.

There are female species in our Laboratory collection from Algonquin (Nason) and Urbana, Ill. (Malloch). The dates range from May 9 to August 12. Three of the Urbana specimens were taken on the inner side of windows in the basement of the Natural History Building of the University of Illinois, the other on a tree-trunk on the campus.

Clusiodes flavipes Williston.

Heteroneura flavipes Williston, Trans. Ent. Soc. London, 1896, p. 376.

This species, which was originally described from examples obtained on the Island of St. Vincent, West Indies, has been recorded by Johnson as occurring in Florida.

I have seen one specimen of this species from the collection of Professor J. M. Aldrich, taken in the type locality.

Clusiodes geomyzina Fallen.

Heteroneura geomyzina Fallen, Agromyz., 1823, 2, sp. 2.

I have not seen this species. It occurs in Europe and has been recorded by Johnson from Maine.

Clusiodes apicalis Zetterstedt.

Heteroneura geomyzina var. *apicalis* Zetterstedt, Dipt. Scand., Vol. 7, p. 2789. 1848.

This species is rather doubtfully distinct from the foregoing one, but always has the apical third of the wing infuscated, whereas *geomyzinae* has the infuscation extending to the apex of first vein.

In our collection here there is one female example that is referable to *apicalis*.

Locality, Algonquin, Ill., May 20, 1897 (Nason).

There is no previous record of the occurrence of the species in America.

Clusiodes albimana Meigen.

Heteroneura albimana Meigen, Syst. Beschr. Eur. Zweifl. Ins., Vol. 6, p. 128. 1830.

Recorded by Johnson from the following states: Maine, New Hampshire, Vermont, Massachusetts, New Jersey; and also from Quebec, Canada.

Probably occurs in Illinois, but not yet taken here so far as I am aware. I have seen two specimens from Waubamic, Parry Sound, Ont. (coll. Aldrich).

Clusiodes pictipes Zetterstedt.

Heteroneura pictipes Zetterstedt, Dipt. Scand., Vol. 12, p. 4816. 1855.

This species has been recorded from Mount Washington, N. H., but there is some doubt about the correctness of the identification.

Genus **Heteromeringia** Czerny.

There are four species of this genus recorded as occurring in North America, three of which are in the collection here, one of them being represented by larvae, puparia, and imagines.

Key to Species

1. Species almost entirely yellow..... 2
— Species almost entirely black..... 3
2. Bristles on head yellow; thorax without blackish spots on posterior portion of disc.....*flaviseta*
— Bristles on head black; thorax with a large black spot on each side of disc posteriorly.....*latifrons*
3. Fore legs entirely yellow; hind femora and tibiae yellow, annulated with brown.....*annulipes*
— Fore legs with the exception of the basal half of femora black; hind legs yellow, sometimes slightly brownish on bases of tibiae *nitida*

Heteromeringia flaviseta Johnson.

Heteromeringia flaviseta Johnson, Psyche, Vol. 20, 1913, p. 99.

Larva.—Length, 4–6 mm. Milk-white, slightly shining.

Cephalic papillae small but distinct; cephalopharyngeal skeleton not chitinized internally, the only chitinized portions consisting of 2 small, yellowish, almost straight, downwardly directed processes which function as mandibles; anterior respiratory organ 6-lobed; body segments distinct; postsutural locomotor spinules very small, arranged in short transverse series on a moderately broad band on middle of ventral segments and anterior margins of dorsal segments; posterior spiracles much elevated, located on a pair of flat chitinized plates, the outer upper angles of each of which are produced conically upward.

Puparium.—Length, 3–4.5 mm. Brownish red, subopaque.

Cephalic extremity depressed dorsoventrally; anterior respiratory organs slightly protruded; first segment coarsely rugose, dorsum of thoracic segments smooth, remaining segments with rather sharp, coarse, regular transverse rugae; metathoracic respiratory organs undeveloped; apical abdominal segment with a sharp marginal ridge which is most distinct ventrally; apex truncated, the spiracular plates more distinctly elevated than in the larva; anus with a large dark plate which is transversely oblong and covers the greater portion of the last segment.

The specimens from which the foregoing descriptions were drawn, were obtained by the writer from a decayed tree-stump in Crystal Lake Park, Urbana, Ill., June 10, 1916. The imagines emerged on various dates in the last week of June. The species occurs commonly at Lafayette, Ind. (coll. Aldrich).

No parasites were obtained.

The larvae occurred in groups of three or more in the slightly moist wood and were evidently associated with the burrows of coleopterous insects. They are very sluggish in their movements.

Heteromeringia latifrons Loew.

Heteroneura latifrons Loew, Wien Ent. Monatschr., Vol. 4, p. 82. 1860.

Originally described from specimens obtained in the District of Columbia.

Johnson records it from the following states: Massachusetts, New Jersey, Pennsylvania. Our collection here contains examples from Centerville, Urbana, and Mt. Carmel—all in Illinois. The dates of capture are June 1 and 18, July 3 and August 16. One Urbana specimen was taken on the inner side of a window in the basement of the Natural History Building of the University of Illinois. I have seen specimens from Lafayette, Ind. (coll. Aldrich).

This and the preceding species are doubtfully distinct. Williston's species *valida* differs from *latifrons* in having the wings narrower, the inner cross vein before middle of discal cell, and the dorsum of thorax and abdomen dark brown. His other West Indian species of this genus, *lumbalis*, may be a synonym of *latifrons*. I have seen specimens of both these species from the collection of Professor J. M. Aldrich. They were taken in the island of Grenada, W. I.

Heteromeringia annulipes Johnson.

Heteromeringia annulipes Johnson, Psyche, Vol. 20, 1913, p. 99.

Described from one specimen taken at Murfreesboro, Hartford Co., N. C. No other published record.

Heteromeringia nitida Johnson.

Heteromeringia nitida Johnson, Psyche, Vol. 20, 1913, p. 99.

Originally described from three specimens obtained near Long Branch, New Jersey, and not since recorded.

There are two females, obtained in Illinois, in the Laboratory collection, with the following data: Plainview, July 16, 1915, on appletree (Flint), and Algonquin, July 12, 1897 (Nason).