

Described from one female and two male specimens, the former fragmentary. All reared (from a cage in which undetermined grasshoppers were confined) Aug. 8, 1914 at Pasadena, N. J., by H. K. Plank of the U. S. Bureau of Entomology, in whose honor this interesting fly is named. Type, a male, deposited in the U. S. National Museum, Washington, D. C. This species bears superficially a close resemblance to *Acemyia tibialis* Coq. but is obviously generically distinct. Nature apparently takes delight in demonstrating how closely she can approximate two entirely distinct forms.

REVISION OF MYIOPHASIA.

BY CHARLES H. T. TOWNSEND.

In 1891 the writer erected the two new genera *Phasioclista*, genotype *P. metallica* new species; and *Ennyomma*, genotype *E. clistoides* new species (Trans. Am. Ent. Soc. XVIII, 369 and 371). In the same year Brauer & von Bergenstamm erected the new genus *Myiophasia*, genotype *Tachina aenea* Wiedemann (1830) from Montevideo, S. A. (Musc. Schiz. II, 362). The latter authors misidentified Georgia specimens of *Phasioclista metallica* with *Tachina aenea*, as indicated by Wiedemann's description,¹ and gave therefrom what they considered to be a redescription of the latter species. They explicitly state in their text that they had Wiedemann's badly preserved holotype of *Tachina aenea* before them at the time, from which it results that their *aenea* is a composite species; and, if this be not sufficient for the genotype fixation of *Myiophasia*, their use of the words "Type Montevideo" after the name *aenea* would seem to fix that species as the genotype despite the misidentification principle involved.²

In 1892 the writer described three new species of this group under the names *Læwia globosa* (Ent. News III, 129), *Læwia ruficornis*, *Læwia nigrifrons* (Can. Ent. XXIV, 77), and *Clista americana* (l.c. 78), the last two being in all probability male and female of one species.

¹ The combination (in male) of deeply golden-rayed wings, yellow wing-veins and deep golden tegulae, with strongly oblique crossveins, described by Wiedemann for *Tachina aenea*, does not occur in any of the North American forms seen by the writer.

² In order to place the genotype of *Myiophasia* beyond dispute, the composite species *Myiophasia aenea* Brauer & von Bergenstamm, 1891, Denkschr. Kaiserl. Akad. Wiss., Math.-Nat. Cl. LVIII (Musc. Schiz., II) 362, is hereby restricted to the species *Tachina aenea* Wiedemann, 1830, Aussereurop. Zweifl. Ins., II. 298, as represented by the Montevideo (South America) holotype.—C. H. T. T.

In 1897 the above five North American species, including the two new genera, were lumped by Coquillett under the name *Myiophasia aenea* Wiedemann, and not one of them belongs to that species (Rev. Tach. 50).

In 1905 Aldrich endorsed Coquillett's disposition of these five species, stating that he had examined the types and verified the synonymy in each case, and commented on what he considered the description of the same species "several times under different genera, or in the same genus," intimating the folly of attempting to draw descriptions too closely in these flies and pointing out this as the worst example of the kind committed by the present writer (Cat. Dipt. N. A. 420, 421 and 427). Such is the history in brief relating to the celebrated case of *Myiophasia aenea*.

The writer implied in 1908 that the last word had not yet been said on this case, stating that several well-marked forms have been confused here, and described a sixth new North American species of the group under the name *Myiophasia setigera* (Tax. Musc. Flies 56). He has now completed a study of the external adult characters of all the forms of the *Myiophasia* group represented by material in the U. S. National Museum collection, comprising 164 specimens. The results of this study are the selection of *Laewia globosa* and *Laewia nigrifrons* to serve as genotypes of the two new genera *Eulæwia* and *Ennyomnopsis* respectively, and the validation of both *Phasioclista* and *Ennyomma* and their genotypes. While the genus *Myiophasia* can not be positively determined in the absence of material from Montevideo, it appears probable that the above species *setigera* from western North America may belong to it, and the species is provisionally referred thereto.

The following synoptic table will serve to separate the five genera and various subgenera, species and subspecies of this group, which forms a natural tribe on the borderline between the Dexiinae and Megaprosopinae. Every one of the 164 specimens in the U. S. National Museum collection can be quite readily determined by it with the exercise of a little care.

SYNOPSIS OF NORTH AMERICAN MYIOPHASIINI.

1. Apical cell ending in or very close to exact wingtip, normally closed; axis of hind crossvein strongly oblique to that of apical crossvein, in middle between small crossvein and bend of fourth vein or nearer to former; eyes of male normally thickly pubescent, those of female very thinly and inconspicuously so but the hairs always visible... 2
- Apical cell ending conspicuously before exact wingtip, usually open; axis of hind crossvein nearly or quite parallel with that of apical crossvein..... 4

2. Abdomen much longer than broad, both sexes with a median marginal pair of macrochætæ on second segment, usually marginal row of evenly-placed macrochætæ on third segment, all macrochætæ decidedly strong; cheeks nearly one-half eye-height in both sexes; front prominent in both sexes, the parafacials broad and usually polished in male; eyes of male usually not contiguous, the frontalia normally visible between them; female front at vertex little less than one eye; wings of male normally strongly tinged throughout with deep fuscous-golden, those of female for most part clear; apical cell normally ending in exact wingtip, never petiolate, practically always closed in male, often narrowly open in female; insertion of hind crossvein nearly in middle in both sexes; claws of male normally very elongate and lower border of head usually bulged behind eyes; parafacial hairs outside marginal row usually vestigial in female, well developed in male; male with soft blue-black coat over parafrontals, mesoscutum, scutellum and first two abdominal segments, leaving rest of abdomen and broad median vitta of first and second segments metallic dark green, female without such coat. . . . ENNYOMOPSIS (new genus)

nigrifrons

Abdomen scarcely longer than broad, female without median marginal pair of macrochætæ on second segment; third segment never with an evenly-placed row but only with a median and two lateral marginal pairs, all macrochætæ decidedly delicate; cheeks hardly one-third eye-height in both sexes; parafacials never polished and always comparatively narrow, the front normally not prominent but very sloping in both sexes; eyes of male normally contiguous, the frontalia not showing between them; front of female at vertex much less than one eye; wings nearly clear in both sexes, apical cell normally ending slightly before exact tip and often short-petiolate especially in male; lower border of head not bulged behind eyes, parafacial hairs usually marked in both sexes. 3

3. Insertion of hind crossvein in male normally conspicuously nearer to small crossvein than to bend of fourth vein, in female usually more nearly in middle; parafacials comparatively very narrow; claws of both sexes nearly equal; soft blue-black coat of thorax showing on first two abdominal segments in male, not in female.

EULÆWIA (new genus) *globosa* (Subgenus A)

Insertion of hind crossvein nearly in middle in both sexes; front in both sexes sloping but subprominent, the parafacials considerably broader than in preceding; claws of male rather elongate; soft blue-black coat of thorax scarcely showing any tinge on first two abdominal segments in either sex.

Eulæwia madrensis new species (Subgenus B)

4. Eyes of both sexes absolutely bare of hairs; apical cell well open; eyes not contiguous in male, the frontalia visible between them; female front at vertex conspicuously less than one-third head-width. 11

- Eyes of male normally thickly pubescent, those of female less thickly so, but hairs always easily visible in both sexes; eyes practically contiguous in male, usually obliterating the frontalia at point of contact; female front at vertex fully one-third head-width or considerably more..... 5
5. Abdomen pollinose in whole or part..... 6
 Abdomen without pollen, wholly glabrous; both sexes normally with median marginal pair of macrochætæ on second segment..... 8
6. Female without and male with median marginal pair of macrochætæ on second segment..... 7
 Both sexes with such pair; parafacial hair rows well developed in both sexes....*Ennyomma robusta* subsp. *madera* new subspecies (Subg. A)
7. Apical cell normally closed; front in both sexes very prominent, antennæ inserted high; parafacial hairs normally vestigial in female; frontalia, antennæ and palpi dark.
Ennyomma robusta ucomexicana new name for *Myiophasia robusta* Walton, 1914, Proc. U. S. N. M. XLVIII. 179 (nec Coquillett, holotype, 1897, Rev. Taeh. 51)—(Subg. A)
- Apical cell narrowly open; front of male not prominent; parafacial hair rows well developed; frontalia, antennæ and palpi light reddish or yellowish.....*Ennyomma robusta* (Subg. A)
8. Front of male not prominent; head not bulged behind below eyes; marginal row of macrochætæ of third abdominal segment closely placed..... 9
 Front of male prominent, the parafacials much widened; head bulged behind below eyes; marginal row of third segment not closely placed..... 10
9. Insertion of hind crossvein nearer bend of fourth in both sexes; palpi and third antennal joint black or blackish.....
Ennyomma clistoides (Subg. A)
- Insertion of hind crossvein in middle in male, nearer bend in female; antennæ wholly rufous..... *Ennyomma ruficornis* (Subg. B)
10. Parafacials, parafrontals and mesoseutum cinereous pollinose; median marginal pair of macrochætæ of second segment weak in male, varying in female from absent through weak to well developed; palpi black or blackish.
Ennyomma clistoides subsp. *mesensis* new name for *Myiophasia setigera* Walton, 1914, Proc. U. S. N. M. XLVIII. 179 (nec Townsend, 1908, Tax. Mus. Flies—Smiths. Misc. Coll. LI. 56)
- Parafacials parafrontals and mesoseutum silvery-white pollinose; median marginal pair of macrochætæ of second segment strong in

both sexes; palpi rufous; front usually still more prominent than in preceding... *Ennyomma clistoides* subsp. *sierricola* new subspecies

11. No strong median marginal macrochætæ on second segment in either sex; hind crossvein of male in middle between small crossvein and bend of fourth vein, that of female a little nearer bend; hairs of parafacials outside marginal row normally vestigial, and marginal row weakly developed; third and fourth abdominal segments with marginal row of equally strong macrochætæ.

Phasioclista metallica

Strong median marginal pair on second segment in both sexes; hind crossvein much nearer bend of fourth in both sexes.....12

12. Hairs of parafacials normally well developed, especially marginal row; marginal row of macrochætæ of third segment often not of equal strength, due to partial development of extra bristles; face, third antennal joint and palpi except tips black..... *Myiophasia setigera*
Bristles and hairs less developed on parafacials and abdomen; antennæ, palpi and face wholly rufous.

Myiophasia setigera subsp. *oregonensis* new subspecies

It is highly important to separate and recognize the above forms by reason of their value in geographic ecology. Those who lump them ignore their true significance and are blind to the import of ecologic and evolutionary principles. The impress of the environment is upon each of them. When, in the course of time, a series of some thousands of specimens shall have been secured, representing all the forms of this group occurring in the principal ecologic centers of North America, the variation in the environmental stamp exhibited by the series will furnish us a most instructive lesson in muscoid ecology. As large series as possible should be gathered from every variety of habitat. Such plastic forms as the present, by virtue of the very conditions which make them so difficult to classify, are of far greater biologic importance than those which show little change over wide ranges of territory or throughout continental areas. It therefore goes without saying that we should miss the kernel of biological investigation, and secure only the chaff, were we to yield to the easier alternative of lumping them.

The following is the distribution of the 164 specimens studied, to which are added published records of material not in the U. S. National Museum collection, with character of biogeographic environment for each form:

ENVIRONMENTAL AND GEOGRAPHICAL DISTRIBUTION.

Myiophasia setigera—2 males, Beulah (8,000 ft.) and Pecos, New Mexico (Cockerell); 2 females, Rociada and Santa Fe,

New Mexico (Cockerell)—Transition of the southern Rocky Mt. region, invading the edge of the boreal and also the edge of the arid upper austral; holotype from Beulah, which is in the edge of the boreal.

Myiophasia setigera oregonensis—2 females, Corvallis, Oregon (Cordley) and Ormsby County, Nevada (Baker)—Transition of the Sierra Nevada region on the borders of the boreal; holotype from Corvallis, Oregon.

Type: Cat. No. 19574 U. S. N. M.

Phasioclista metallica—2 females, Georgia (Morrison); 3 males and 1 female, South Carolina (Conradi and Townsend); 1 male and 1 female, Maryland (Shannon)—Described from 2 males. Carlinville, Ills., and Inverness, Florida—2 specimens recorded as reared by Forbes in Illinois (Psyche, VI. 467)—Humid lower austral, reaching Chesapeake Beach, Md., and middle austral of Illinois on north, and invading the semitropical of Florida on south; distinctively lower austral.

Ennyomma clistoides—2 males, Onaga, Kansas and Denton, Texas (C. R. Jones)—Described from 1 male, Carlinville, Ills.—Humid middle to lower austral prairie region. The Kansas and Texas localities are on the 96th and 97th meridians respectively. Also a male recorded from Brookings, So. Dakota, in same region (Can. Ent. XXIV. 78).

Ennyomma clistoides mesensis—29 males and 9 females, Koehler, New Mexico (Walton)—Arid upper austral.

Type: Cat. No. 19615 U. S. N. M. (Male).

Ennyomma clistoides sierricola—9 males and 17 females, Las Visayas and San Pedro de Madera in the Sierra Madre of Chihuahua, 7,000 to 8,000 ft. (Townsend)—Transition of the northern Sierra Madre region.

Type: Cat. No. 19617 U. S. N. M. (Male).

Ennyomma robusta—1 male, Los Angeles County, California (Koebele)—Humid patches in arid semitropical lowlands of the Pacific coast.

Ennyomma robusta madera—2 females, San Pedro de Madera in the Sierra Madre of Chihuahua, 8,000 ft. (Townsend) and Mexico City (O. W. Barrett)—Transition of the northern to central Sierra Madre region.

Type: Cat. No. 19668 U. S. N. M. (S. Pedro de Madera).

Ennyomma robusta neomexicana—4 males and 5 females, Koehler, New Mexico (Walton); 1 male and 1 female, Mexico City (O. W. Barrett)—Arid upper austral plains and high plateau south.

Type: Cat. No. 19669 U. S. N. M. (Male, Koehler N. M.).

Ennyomma ruficornis—4 males and 1 female, White Mts., N. H. (Morrison)—Described from 1 male, Southern Michigan.

—Boreal of the northern Appalachian region extending through the transition to the dilute edge of the upper austral prairie—2 subspecies indicated.

Ennyomnopsis nigrifrons (Syn. *Clista americana* T. female)—1 male, Miami, Florida (Mrs. C. H. T. Townsend); 2 males, South Carolina (Townsend); 5 males, Maryland and Virginia (Crawford and Shannon); 1 male (TD4394) Holyoke Gap, Massachusetts (Townsend); 2 females, Florida and Missouri (Riley); 1 female, Missouri (Bureau Entomology) labeled "Par. on hickory nut Curculio, 7.22.95;" 1 female, Ruston, Louisiana (Hunter No. 1456)—Described from 1 male and 1 female, Carlinville, Ills.—Humid semitropical to austral and sparingly transition lowlands; lower austral in the main.

Eulæwia globosa—1 male, Inverness, Florida (Robertson No. 12417), 4 males, Missouri (Riley), 2 labeled "3090. x" and 1 "3090. o;" 1 male and 1 female, Opelousas, Louisiana; 1 female, Louisiana (H. A. Morgan) labeled "From Chalcodermus;" 11 males and 5 females, Clemson, South Carolina (G. G. Ainslie) reared from *Chalcodermus æneus* (TD511 female, 1710 puparia); 9 males and 9 females, Louisiana, Arkansas and Ada, Oklahoma (Hunter Nos. 1326, 1331, 1390, and 1934), mostly reared from *Anthonomus grandis* but also from other weevils; 2 males, Rio Piedras Verdes in the Sierra Madre of Chihuahua (Townsend) and Chinandega, Nicaragua (Baker); 2 females, Tifton, Georgia (Morrison) and Maryland (Coquillett); 1 female (TD4291), Oak Grove, Virginia (Townsend)—Described from 1 male, Florida; also 1 female (TD509) recorded, White Springs, Fla. (Townsend)—Humid semitropical to middle austral, reaching edge of transition of Sierra Madre region north and south.

Eulæwia madreusis—3 males, Colonia Garcia, Rio Piedras Verdes and San Pedro de Madera in the Sierra Madre of Chihuahua, 7,000 to 8,000 ft. (Townsend); 2 females, Las Visayas in the Sierra Madre of Chihuahua, 7,000 ft. (Townsend) and Mexico City (O. W. Barrett)—Transition of the northern to central Sierra Madre region.

Type: Cat. No. 19670 U. S. N. M. (Male, S. Pedro de Madera.)

NOTE ON BIOGEOGRAPHIC ZONES.

For purposes of geographic ecology, the following main life zones will be found most convenient and have been used in the present paper:

1. BOREAL—Humid mountain areas of cool coniferous forest, mainly spruce, fir, aspen, etc.

2. TRANSITION—Humid mountain areas of open pine forest.

3. UPPER AUSTRAL—Humid lowlands and prairies east of the 100th meridian in North America, and arid plains and mesas west of the same meridian terminating in the plateau of south-central Mexico.

4. MIDDLE AUSTRAL—Same classification as preceding and just south of it or below.

5. LOWER AUSTRAL—Classified same and south of preceding or below it in altitude.

6. SEMITROPICAL—Practically all humid lowlands in the east and arid lowlands in the west, but rising on the humid eastern mountain slopes and arid western mountain slopes within the tropics of North America. Includes all of the Florida mainland and what has been known as the Gulf strip of the lower austral. Preëminently a citrus-fruit region, severe frosts being rare but not unknown.

7. TROPICAL—Humid to arid lowlands and hills where frost is absolutely unknown. Distinctively a cocoanut and royal palm region.

The above definitions are given because they involve some modification of the usually accepted classification.

The main mountain regions of North America are classified in 4 groups: I—Appalachian (the whole eastern system); II—Rocky Mts. (West Texas to Athabasca and Alaska); III—Sierra Nevada (South California to British Columbia including Coast ranges); IV—Sierra Madre (Chihuahua to Central America).

A REMARKABLE NEW GENUS OF CEPHIDÆ.

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The new genus described below is very remarkable because it possesses family characters of two families—Cephidæ and Xiphydriidæ.

The following important group characters of this genus are listed under the family with which they would ally it.

| CEPHIDÆ. | XIPHYDRIIDÆ. |
|-----------------------|--|
| Adult. | Adult. |
| Thorax | Palpi |
| Basal part of abdomen | Antennæ |
| | Long malar space and ventral elongation of cheek |
| | Wings |
| | Lengthened 8th tergite |
| | Ovipositor |
| | Larva (?) |