



## A new species of *Neomintho* Brauer & Bergenstamm and provisional reclassification of the tribe Euthelairini (Tachinidae, Exoristinae)

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### Abstract

The Euthelairini are a tribe of New World Tachinidae (Diptera) with fewer than 30 described species and dozens of undescribed species. Most species are Neotropical and range from Mexico to Brazil, with only two described species in the Nearctic Region. One new species, *Neomintho beckersi* **sp. nov.**, is described from Florida (United States) and Cayman Islands (Caribbean Sea). Several of the paratypes were reared from the katydid *Neoconocephalus triops* (L.) (Orthoptera: Tettigoniidae) by the researcher for whom the species is named, and this is the first host record for the Euthelairini. The tribal concept is well established but the number of genera has varied from one (*Neomintho* B. & B.) to 12 in recent decades. The tribe is reexamined on the basis of morphology and DNA barcoding to provide a basis for the generic assignments of the three Nearctic species. Results indicate that these species are each more closely related to other species in the Neotropical Region than to each other, and only the new species *N. beckersi* belongs to *Neomintho sensu stricto*. The classification of the Euthelairini is reviewed and provisionally revised, with seven genera and 27 described species recognized. The following taxonomic changes are proposed to the existing classification: *Eupelecotheca* Townsend, 1919 (including synonym *Pantagathus* Reinhard, 1935) is removed from synonymy with *Neomintho* Brauer & Bergenstamm, 1891 and recognized as a valid genus, **status revived**; synonymized with *Neomintho* are genus-group names *Euthelaira* Townsend, 1912, **syn. nov.**, *Iteuthelaira* Townsend, 1927, **syn. nov.** and *Neominthoidea* Thompson, 1968, **syn. nov.**; new or revived combinations are proposed as *Eupelecotheca celer* Townsend, 1919, **comb. revived**, *Neomintho chaetosa* (Townsend, 1929), **comb. nov.**, *Neomintho esuriens* (Fabricius, 1805), **comb. nov.**, *Neomintho inambarica* (Townsend, 1912), **comb. nov.**, *Neomintho rufilabris* (Wulp, 1890), **comb. nov.**, *Neomintho trinidadensis* (Thompson, 1968), **comb. nov.** and *Pelecotheca curulis* (Reinhard, 1943), **comb. revived**. As First Reviser, the species name “*flavipes*” is selected as the correct original spelling in the combination *Pelecotheca flavipes* Thompson, 1968 and “*flavipalpis*” becomes an incorrect original spelling. The distribution of *Neomintho macilentata* (Wiedemann, 1830) is revised to Brazil only (previously misidentified from Trinidad). The monotypic genus *Hypohoughia* Townsend, 1927 is removed from the Euthelairini and placed in the Voriini (Dexiinae) based on study of the holotype of type species *H. reclinata* Townsend, 1927 by Rodrigo de Vilhena Perez Dios. A revised checklist of the genera and species of Euthelairini is provided.

**Key words:** Diptera, taxonomy, key, checklist, synonymy, hosts

### Introduction

The Euthelairini are one of the more enigmatic tribes of New World Tachinidae and currently comprise 10 genera and 27 described species (O'Hara *et al.* 2020, Santis *et al.* 2020). Only two of the described species are known from the Nearctic Region (*sensu* O'Hara *et al.* 2020) and the rest are distributed in the Neotropical Region from Mexico and the Caribbean to Brazil, with one record of an unidentified species from Argentina (Gramajo *et al.* 2013). There are dozens of undescribed species in the Neotropics based on specimens examined by the author and reported in Malaise trap samples (Janzen *et al.* 2020 and pers. comm., Stireman 2021).

This study is primarily concerned with the description and naming of a euthelairine species reared from the katydid *Neoconocephalus triops* (L.) (Orthoptera: Tettigoniidae) in Florida that was called “undescribed *Neomintho* sp.” in Beckers (2022). This has necessitated a reevaluation of the generic placements of the two named Nearctic species that are currently assigned to *Neomintho* Brauer & Bergenstamm: *N. celeris* (Townsend) and *N. curulis* (Reinhard)

(O'Hara & Wood 2004, O'Hara *et al.* 2020). Classifying the three species among their closest relatives requires their assignment to three already existing genera, with only the new species from Florida belonging to *Neomintho sensu stricto*. The taxonomic history of the Euthelairini is reviewed below and a provisional reclassification of the described genera and species is proposed.

## Materials and methods

All examined specimens belong to the Canadian National Collection of Insects, Arachnids and Nematodes (CNC) in Ottawa, Canada. These include specimens of the two described and one new species of Euthelairini from America north of Mexico (here termed the Nearctic Region following O'Hara *et al.* 2020) and ca. 20 described and undescribed euthelairine species from America south of the United States (i.e., the Neotropical Region and comprising specimens from Bolivia, Brazil, Colombia, Costa Rica, Ecuador, Mexico, Peru and Trinidad & Tobago). A few other specimens cited but not examined belong to the National Museum of Natural History in Washington (USNM).

Specimens selected for CO1 DNA sequencing had a leg removed and sent to the Canadian Centre for DNA Barcoding in Guelph, Ontario, Canada. Sequencing followed the NGS-FT (i.e., Next-Generation Sequencing Failure Tracking) protocol for old specimens. The online BOLD Systems Workbench (<https://boldsystems.org/>) was used to examine the results of CO1 sequencing and to generate Taxon ID trees.

Terms used for morphological structures follow Cumming & Wood (2017). Terminalia were dissected according to the methods outlined in O'Hara (2002).

Specimens were imaged using a Canon EOS 70D Digital SLR camera body mounted on a Kaiser RS1 copy stand. A Canon EF 100 mm f/2.8 macro lens was used to image complete specimens and a Canon MP-E 65 mm 1–5X macro lens was used for smaller structures. Helicon Remote software was used to control camera functions through a computer. Lighting was provided by a ring light comprising 80 LEDs with a specimen holder in the middle. A reflective dome light overtop with a hole in the center permitted images to be taken of the specimen within. A series of images was captured using the Helicon Remote software paired with a Stackshot Macro Rail hardware package by Cognisys. Images were stacked using Zerene Stacker and final images and plates were prepared in Adobe Photoshop Creative Cloud 2024.

Label data are cited in full for the holotype and allotype of the new species as follows: data from each label enclosed in quotation marks, exact wording and punctuation given for each label, and data from each line separated by a diagonal slash and space (/). Additional information not on a label is given within square brackets. Paratype label data are not cited verbatim but as follows: country, state, locality, date, host, collector, CNC database number, CO1 label (if a leg sequenced), and number and sex of specimens.

## Historical review of the Euthelairini

The tribal name Euthelairini dates from its first mention in Townsend (1919b), with *Euthelaira* Townsend as its type genus and the single species *Euthelaira inambarica* Townsend from Peru as type species by original designation (Townsend 1912). Later, Townsend (1936) in Part IV of his *Manual of Myiology* treated *Euthelaira* as a genus within his tribe Neominthoini. He provided a description of the tribe and a key to the eight included genera, all previously described. Each genus was redescribed in Part X of *Manual of Myiology* (Townsend 1940). Reinhard (1935) described *Pantagathus alogus* Reinhard as a new genus and species and assigned it to the tribe Trypherini (now Eryciini), but the genus was later synonymized with the neominthoine genus *Eupelecotheca* Townsend by the same author (Reinhard 1953).

Neominthoini was the accepted name for the tribe for the next 60 years. The more notable contributions to the tribe during that time were those of Mesnil (1962 [as Neominthoina], discussion of relationships), Arnaud (1963, revision of neominthoine genera with “axe-like sternotheca” [i.e., laterally flattened female syntergosternite 7], transfer of *Cryptocladocera Bezzi* into this group, and description of new genera *Adercomyia* and *Cerotachina*), Reinhard (1943, one new species; 1953, see above), Sabrosky & Arnaud (1965, catalog with two genera recognized from America north of Mexico, *Eupelecotheca* and *Pelecotheca* Townsend), Thompson (1968, revision of Trinidad fauna and description of new genus *Neominthoidea*), Guimarães (1971, catalog with 12 genera recognized from

America south of United States), Tschorsnig (1985, characteristics of the male terminalia), and Wood (1987, key to Nearctic genera and synonymy of *Eupelecotheca* and *Pelecotheca* with *Neomintho*).

Sabrosky's (1999) *Family-group Names in Diptera* established the priority of the name Euthelairini over Neominthoini when both *Euthelaira* and *Neomintho* are placed together in the same higher taxon. The name Euthelairini has since been adopted as the valid name for the tribe, beginning with the *Catalogue of the Tachinidae (Diptera) of America North of Mexico* (O'Hara & Wood 2004). This catalog followed Wood (1987) in assigning the two North American euthelairine species to *Neomintho*: *N. celeris* (Townsend) and *N. curulis* (Reinhard). This was a placement in a broadly defined *Neomintho sensu lato*, although this was not clear until later when the expanded concept of *Neomintho* was explained as follows in Wood & Zumbado (2010: 1409): "This is a moderately large New World genus most diverse in Central and South America, with over 20 nominal species that could be assigned to the genus, but that are now dispersed among numerous monotypic genera." This was in part a preliminary reordering of all euthelairines into the genus *Neomintho* for the purposes of the key to the genera of Tachinidae of Central America in Wood & Zumbado (2010). The Euthelairini were later dispersed among ten genera in the world checklist of Tachinidae (O'Hara *et al.* 2020) based on the literature prior to Wood & Zumbado (2010), especially Guimarães (1971), but with the two Nearctic species kept in *Neomintho* following Wood (1987) and O'Hara & Wood (2004).

The subfamily placement of Euthelairini was not settled until recently. The tribe shares some morphological features with the Acemyini (e.g., apical scutellar setae well-developed and crossed), and the two tribes have generally been assigned to the same subfamily. The Exoristinae (as Neominthoina or Neominthoini) were the favored placement for the two tribes by Mesnil (1956, 1962), Sabrosky & Arnaud (1965), Guimarães (1971) and Tschorsnig (1985), but O'Hara & Wood (2004) placed them in the Tachininae. The molecular phylogeny of Stireman *et al.* (2019) clearly established the Euthelairini as a clade within the Exoristinae, and further suggested a close relationship with the Acemyiini, Masiphyini and Ethillini. Hosts of euthelairines were unknown but Stireman *et al.* (2019: 14) predicted they were "likely orthopteroid" based on the known hosts of Acemyini and Masiphyini. This prediction was recently confirmed when an undescribed *Neomintho* species was reported by Beckers (2022) as a parasitoid of the katydid *Neoconocephalus triops* (L.) (Orthoptera: Tettigoniidae) in Florida, USA. This species is the one described below.

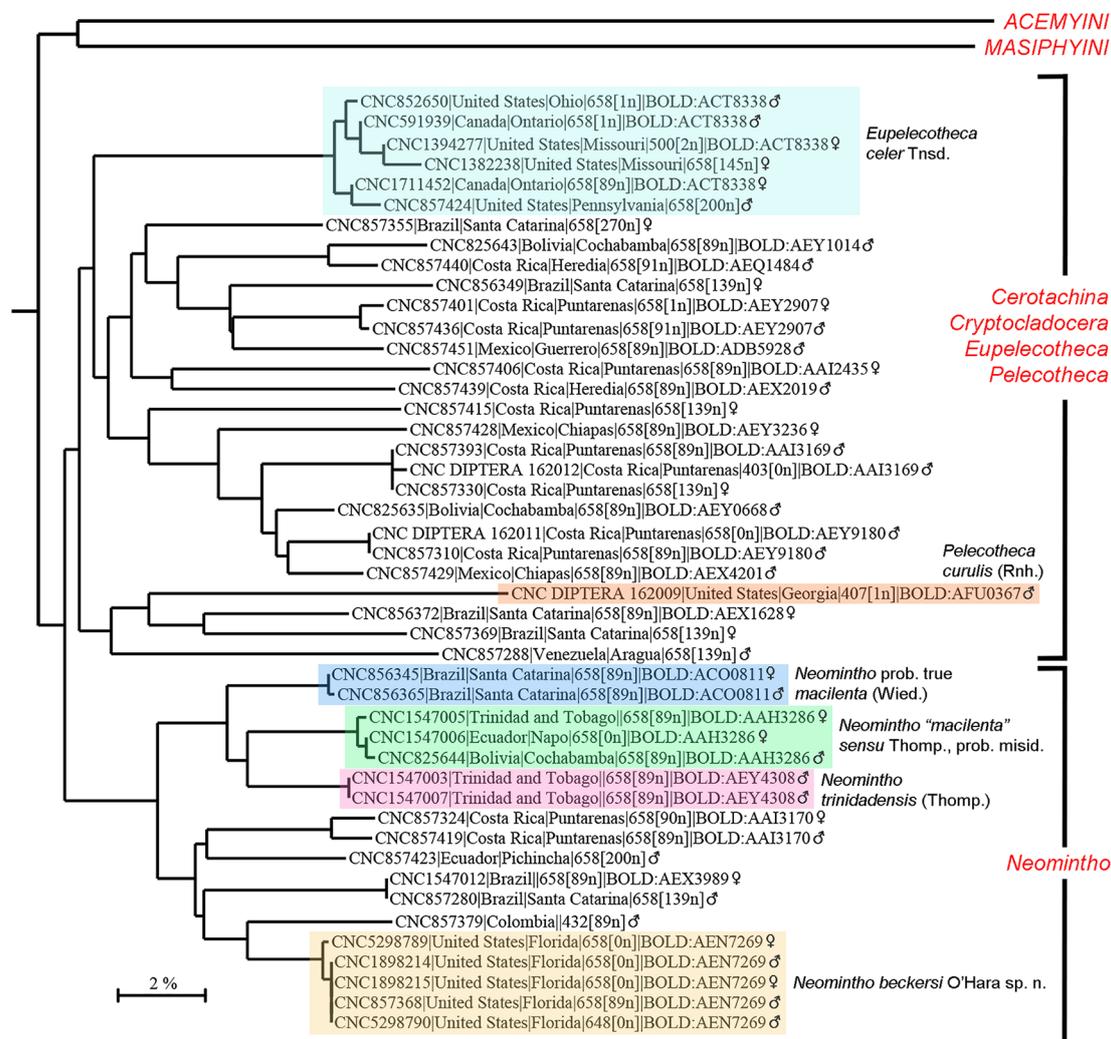
Most species of Euthelairini, including the three Nearctic ones, possess the following combination of characters and easily key out to "*Neomintho*" in the keys of Wood (1987) and Wood & Zumbado (2010): eye haired, facial ridge setose on at least lower half (except nearly bare in a few Neotropical species), prosternum haired, first postsutural supra-alar seta shorter than first postsutural dorsocentral seta, and scutellum with three pairs of strong marginal setae (consisting of basals, laterals and crossed apicals; subapicals absent). The arrangement of scutellar setae is shown in Wood (1987: 1238, Fig. 183) and Wood & Zumbado (2010: 1376, Fig. 129).

## Genera of the Euthelairini

The generic limits within the Euthelairini are unclear and the number of genera has ranged in the past from 12 (Guimarães 1971), to one (Wood & Zumbado 2010), to 10 (O'Hara *et al.* 2020). The present study is not a tribal revision but aims to realign generic limits, in particular to better accommodate the morphological diversity of the two described Nearctic species and the one new species below. To assist with this reordering within the tribe, a selection of specimens comprising the three Nearctic species, a few described Neotropical species, and ca. 20 undetermined Neotropical species were DNA barcoded. The results are shown in Fig. 1, extracted as one branch within a larger analysis of several thousand CNC Tachinidae.

The partial Maximum Likelihood tree (Fig. 1) is based only on DNA barcode data but the results are nonetheless broadly similar to what was suspected based on morphological comparisons. First and foremost, the three Nearctic species that morphologically do not appear to be sister species (*Eupelecotheca celer* Townsend, *Pelecotheca curulis* (Reinhard) and *Neomintho beckersi* sp. nov.) are widely dispersed among the Neotropical species. The cluster delineated as *Neomintho* consists of species in which females have an unmodified ovipositor (easily determined without dissection) and most other characters are unremarkable. In addition to specimens that are likely the type species of *Neomintho*, i.e., *N. macilenta* (Wied.) (Fig. 1, dark blue block), this cluster includes specimens of *N. beckersi* described below (Fig. 1, light tan block) and several other mostly undescribed species. Thompson (1968) followed Townsend (1936) in placing two of the described Neotropical species in separate genera, as *Euthelaira inambarica* Tnsd. (probably misidentified, see below) and *Neomintho macilenta* (Wied.). In the same paper,

Thompson described a new genus and species as *Neominthoidea trinidadensis*. The three genera were separated on the basis of minor differences and in particular the setation on wing veins  $R_1$  and  $R_{4+5}$  (i.e., vein  $R_1$  setose in *Neomintho* and bare in both *Euthelaira* and *Neominthoidea*, and vein  $R_{4+5}$  setose at base only in *Euthelaira* and halfway to crossvein  $r-m$  in *Neominthoidea*). The species of these three nominal genera are so similar in morphology and available DNA barcodes that they are here all assigned to *Neomintho*. The genus *Iteuthelaira* and its two species listed in O'Hara *et al.* (2020) are also provisionally placed in *Neomintho* based on the trivial differences attributed to the genus by Townsend (1936).



**FIGURE 1.** Maximum Likelihood tree of the three Nearctic species of Euthelairini (*Eupelecotheca celer* Townsend, *Pelecotheca curulis* (Reinhard) and *Neomintho beckersi* sp. nov.) and ca. 20 species of mostly unidentified or undescribed Neotropical euthelairines. Each data line represents a DNA barcoded specimen and includes CNC database number, country and state of origin, number of base pairs (max. of 658), number of nucleotide bases not deciphered correctly (in square brackets), BOLD BIN (i.e., the Barcode of Life Data Systems Barcode Index Number, if assigned), and sex. The barcode index number is generally unique to a species and has a divergence of at least 2% (see scale bar). Two groups are recognized: one representing the concept of *Neomintho* adopted here and the other comprising the other genera of Euthelairini. Species discussed in the text are indicated by colored blocks.

The DNA barcoding of CNC specimens from Trinidad and Brazil revealed a probable misidentification in Thompson (1968). The barcode of a specimen from Trinidad identified by Thompson as *Neomintho macilenta* (Wied.) (Fig. 1, CNC1547005 in green block) does not match the barcodes of two specimens from Brazil that are identified as that species in the CNC (Fig. 1, blue block). The Trinidad specimen, with matching barcodes from Bolivia and Ecuador, is likely one of the other described or undescribed species of *Neomintho*. The distribution of *N. macilenta* is revised here to only Brazil pending evidence to the contrary. Thompson's (1968) record of *Euthelaira*

*inambarica* (here as *Neomintho inambarica*) from Trinidad was likely a misidentification as well and the species is only known with certainty from Peru (see note in species checklist below).

Other species in the *Neomintho* cluster (Fig. 1, uncolored) from Brazil, Colombia, Costa Rica and Ecuador are probably undescribed species. Many additional species may exist that will barcode within this cluster as euthelairines become better known. One species within this cluster (represented by specimens CNC857280♂ and CNC1547012♀) is unusual in possessing an elongate and cylindrical abdomen that superficially resembles the “asilid-like” abdomen of *Asilidotachina elongata* Townsend, described from Peru. Both species appear to have dorso-ventrally (not laterally) flattened terminalia but abdominal tergite 5 is longer than tergite 4 in *A. elongata* and tergite 4 is longer than tergite 5 in the Brazil species. If these species are related then *Asilidotachina* would be expected to belong to the *Neomintho* cluster.

The cluster in the top portion of Fig. 1 includes the two named Nearctic species that Wood (1987) moved to *Neomintho sensu lato* as *N. celeris* and *N. curulis*. There is more morphological diversity among species in this cluster than in the “true” *Neomintho* cluster below it. This top cluster comprises the species with an “axe-like” female syntergosternite 7 (e.g., Fig. 11) that were revised by Arnaud (1963) (all females examined). In a few species the male antennae are fissicorn and in a few others the female terminalia are unmodified. Since most of the barcoded species were represented by either a male or a female rather than both sexes, the sex-associated character states of the female terminalia and male antennae cannot be superimposed on Fig. 1 to analyze their distribution. Had this been possible, then perhaps some synonymy among the named genera belonging to this cluster could have been proposed. Instead, Arnaud (1963) and Santis *et al.* (2020) are followed for the generic classification. Of particular note with respect to the two described Nearctic species is that they do not cluster together and their placements in separate genera appear warranted for the present, as *Eupelecotheca celer* (Fig. 1, light blue-green block) and *Pelecotheca curulis* (Fig. 1, orange block) following Arnaud (1963) and Sabrosky & Arnaud (1965).

## Hosts of Euthelairini

The *Neomintho* species described below was reared by Beckers (2022) from the katydid *Neoconocephalus triops* (L.) (Orthoptera: Tettigoniidae). Orthopteroid hosts were predicted for the Euthelairini by Stireman *et al.* (2019) as explained above in the historical review section. There is also a record of “*Neomintho* sp.” reared from a caterpillar of *Chloridea virescens* (Fabricius) (Noctuidae) in a soybean crop in Brazil (Weber *et al.* 2021), but this host is probably abnormal if the record is correct.

Adding to the likelihood that euthelairines are not usually parasitoids of Lepidoptera are the DNA barcode results of D.H. Janzen and W. Hallwachs and their team of parataxonomists that revealed about a dozen species of “*Neomintho*” and “*Pelecotheca*” from Area de Conservación Guanacaste in northwestern Costa Rica. The specimens of these species were all caught in Malaise traps, with none reared from ACG caterpillars (based on data from 800,000+ wild-caught caterpillars and 2800+ species of Tachinidae, D.H. Janzen, pers. comm.).

## Key to the three Nearctic genera and species of Euthelairini

The following three genera and species key to a broadly defined *Neomintho* in the Tachinidae chapter of *Manual of Nearctic Diptera* (Wood 1987). The characters used in that key to distinguish the genus from other genera of Nearctic Tachinidae are given above in the last paragraph of the historical review section. Arnaud (1963) had earlier provided a key to the five New World genera of the tribe with an “axe-like” female syntergosternite 7 (including *Eupelecotheca* and *Pelecotheca* below), but these genera were not recognized as distinct from *Neomintho* by Wood (1987) and Wood & Zumbado (2010).

1. Legs yellow; ocellar setae crossed; abdominal tergites 3 and 4 without median discal setae; female ovipositor with syntergosternite 7 unmodified, not “axe-like” (Fig. 6) . . . . . *Neomintho beckersi* sp. nov., Figs 2–9.
- Legs black; ocellar setae parallel or slightly convergent; abdominal tergites 3 and 4 with or without median discal setae; female ovipositor with syntergosternite 7 laterally flattened and sclerotized into an “axe-like” structure (Fig. 11) . . . . . 2
2. Abdominal tergites 3 and 4 without median discal setae, syntergite 1+2 with only one pair of median marginal setae . . . . .  
. . . . . *Pelecotheca curulis* (Reinhard), Fig. 12.

- Abdominal tergites 3 and 4 with median discal setae (Fig. 10), syntergite 1+2 often with a weaker second pair of median marginal setae . . . . . *Eupelecotheca celer* Townsend, Figs 10, 11.

***Neomintho beckersi* sp. nov.**

Figs 2–9, 13 (map)

**Type material.** *Holotype male.* USA, Florida, labelled: “FL [United States, Florida] Highlands Co. [County]/ Archbold Biological/ Station 21.II [February].1998/ D.M. Wood”, “CNC/ 857347 [blue bordered label]”; “HOLOTYPE ♂/ Neomintho/ beckersi O’Hara [red label]” (CNC).

*Allotype female.* USA, Florida, same first label as holotype. Additional labels: “CNC/ 857346 [blue bordered label]”; “ALLOTYPE ♀/ Neomintho/ beckersi O’Hara [red label]” (CNC).

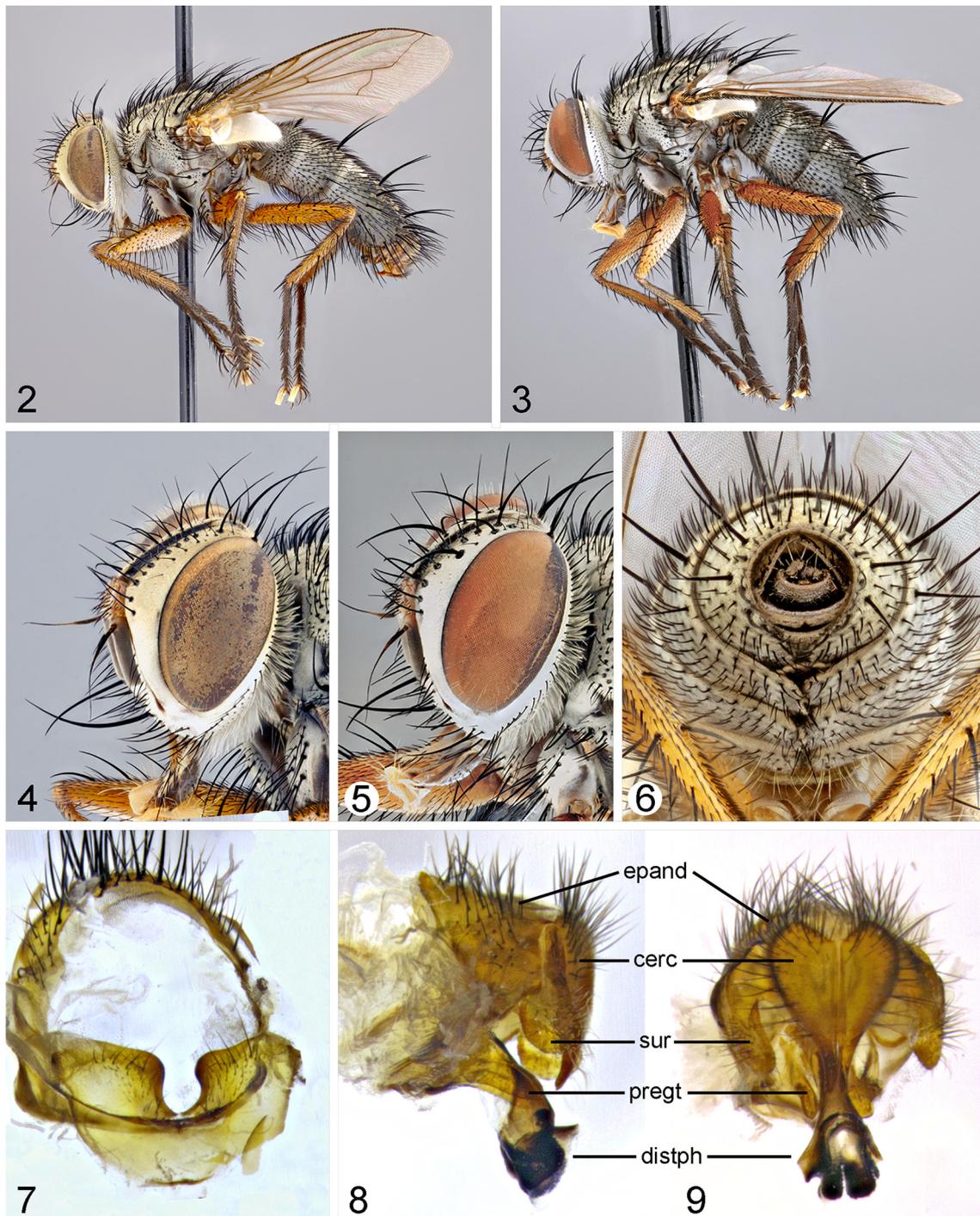
*Paratypes.* 6♂♂, 5♀♀ (all CNC). USA, Florida, Alachua County, west of Gainesville, 19–21.vii.2021 [date when live host was collected], ex. *Neoconocephalus triops*, O.M. Beckers, 1♂ (CNC1898214, CO1 sequenced) and 1♀ (CNC1898215, CO1 sequenced). Same locality and host species, vii.2022 [date when live host was collected], 4–15.viii.2022 [date tachinid larvae emerged from host], O.M. Beckers, 2♂♂ (CNC5298789, CO1 sequenced; CNC1547013) and 1♀ (CNC5298790, CO1 sequenced). Florida, Highlands County, Archbold Biological Station, 24.iv.1967, B.V. Peterson, 1♂ (CNC1547014), 1♀ (CNC1547015). Florida, Lee County, Sanibel, 28.xii.1997, D.M. Wood, 1♂ (CNC857367), 1♂ (CNC857368, CO1 sequenced). Florida, Monroe County, Key Largo, 31.iii.1952, J.R. Vockeroth, 1♀ (CNC1547016). **Cayman Islands**, Grand Cayman, Georgetown, 15–30.iii.1965, J.R. McLintock, Malaise trap, mounted from alcohol, 1♀ (CNC1547017).

**Recognition.** *Neomintho beckersi* has the typical euthehairine characters of eye haired, facial ridge setose on at least lower half, prosternum haired, and scutellum with three pairs of strong marginal setae (i.e., basals, laterals and crossed apicals). It can be distinguished from other *Neomintho* species and nearly all other euthehairines by its yellow legs (i.e., femora and tibiae, Figs 2, 3).

**Description.** Male habitus, Fig. 2. Female habitus, Fig. 3. Length 7.5–9.8 mm (holotype ♂, 8.9 mm, allotype ♀, 7.9 mm).

*Head* (Figs 4, 5). Not significantly sexually dimorphic. Parafacial, fronto-orbital plate and gena with light yellow to silvery white pruinescence. Antenna with scape and pedicel yellow, postpedicel and arista testaceous. Eye moderately to densely haired, 0.82–0.86 (m=0.84, n=5) head height in male, 0.83–0.85 (m=0.84, n=5) in female. Gena 0.14–0.17 (m=0.15, n=5) head height in male, 0.13–0.16 (m=0.14, n=5) in female. Postpedicel slender along length, slightly longer in male, length 0.37–0.39 (m=0.38, n=5) head height in male, 0.31–0.34 (m=0.32, n=5) head height in female. Aristomeres 1 and 2 not longer than wide, aristomere 3 long and tapered to fine tip, almost as long as vibrissa. Vertex at narrowest point 0.20–0.24 (m=0.22, n=5) head width in male, 0.22–0.25 (m=0.23, n=5) head width in female. Fronto-orbital plate with 8–10 frontal setae in male, 6–8 frontal setae in female; 1 reclinate orbital seta in male, 1 reclinate and 1 laterocline orbital seta in female; procline outer orbital setae absent in male, 2 in female; row of 4–7 weak setulae outside frontal row in male, often 1 weak setula in front of each procline outer orbital and behind second procline outer orbital in female. Ocellar setae moderate to strong in male, weak to moderate in female, laterocline to procline in both sexes. Outer vertical setae weak or not differentiated in both sexes. Inner vertical setae strong in both sexes, crossed before or at upper one-third of length. Parafacial bare, width at narrowest point slightly less than width of postpedicel. Facial ridge, as measured from upper side of vibrissa to lower margin of scape, setose on lower half with upper setae decreasing in size and hair-like. Lower facial margin not protruding beyond vibrissal angle when viewed in profile. Proboscis short. Palpus yellow, cylindrical to tip, similar in length to proboscis. Postcranium with white hairs.

*Thorax.* Black in ground color with white pruinescence laterally, white to faintly brownish pruinescence dorsally. Prescutum and scutum when viewed from behind with 4 black vittae, inner pair further forward than outer pair, a fifth median vitta on scutum visible in some specimens. Legs with femora and tibiae yellow, tarsi testaceous to dark brown. Prosternum haired. Postpronotum with three posterior setae forming an acute-angled triangle, a fourth seta usually present antero-medially. Two presutural and three postsutural acrostichal setae. Three presutural and three postsutural dorsocentral setae. Supra-alar row with first seta hair-like, followed by two strong setae. Proepisternum bare. Katepisternum with three strong setae close together and forming a triangle, lower seta slightly closer to upper anterior seta than to upper posterior seta. Anepimeral seta weak. Metathoracic spiracle with posterior flap covering spiracular opening. Scutellum with three pairs of strong marginal setae, lateral pair strongest and divergent, basal



**FIGURES 2–9.** *Neomintho beckersi* sp. nov. **2.** Left lateral view of male holotype. Body length = 8.9 mm. **3.** Left lateral view of female allotype. Body length = 7.9 mm. **4.** Head of male holotype. **5.** Head of female allotype. **6.** Posterior view of abdomen of female allotype showing unmodified terminalia. **7–9.** Terminalia of male paratype CNC1898214. **7.** Sternite 5 and segments 6–8. **8.** Lateral view of terminalia. **9.** Posterior view of terminalia. Abbreviations: cerc = cerci, distph = distiphallus, epand = epandrium, pregt = pregonite, sur = surstylus.

and apical pairs subequal in size and latter crossed (as shown in Wood 1987: 1238, Fig. 183). Legs. Fore femur with sparse rows of several setae dorsally and posteroventrally, a denser row of setae posterodorsally. Fore tibia with row of short setae anterodorsally and 2 setae on posterior surface. Mid femur with vertical row of three strong setae (i.e., anterodorsal, anterior and anteroventral) at midlength on anterior surface, cluster of three setae posterodorsally near

distal end. Mid tibia with one strong anterodorsal seta at midlength and a short seta in front and behind, two weak setae posterodorsally, and a seta (absent to strong) ventrally near midlength. Hind femur with rows of medium to strong setae on anterodorsal, anterior, anteroventral and posteroventral surfaces. Hind tibia with several setae on each of anterodorsal, posterodorsal and anteroventral surfaces. Tarsal claws longer than 5th tarsomere in male, not longer than 5th tarsomere in female. Upper and lower calypters white to faintly yellow, lower calypter semi-circular and about 3 times longer than upper calypter. Wing faintly brownish. Wing vein  $R_{4+5}$  dorsally with 2–4 setae, varied from close to base to halfway to crossvein  $r-m$ ;  $R_{4+5}$  ventrally with a few setae at base. Other veins bare. Vein  $M$  obtusely-angled at bend, straight after bend and reaching wing margin anterior to wing tip and separate from vein  $R_{4+5}$ .

**Abdomen.** Slender and slightly elongate, segments 1–5 black in ground color, uniformly covered with a white pruinescence that gives abdomen a grayish appearance. Male sternite 5 and terminalia yellow to testaceous, female terminalia mostly dark. Middorsal depression on syntergite 1+2 reaching median marginal setae. Syntergite 1+2 and tergite 3 each with 1 pair of strong median marginal and strong lateral marginal setae. Tergite 4 with row of strong marginal setae. Tergite 5 in male with row of strong marginal setae, median pair displaced forward, posterior margin of tergite bearing a mix of setae and hairs; similar in female except marginal setae and hairs less robust. Abdominal tergites without discal setae, abdominal sternites overlapped by tergites.

**Male terminalia** (Figs 7–9). Sternite 5 wider than long, posterior edge slightly concave and bearing short setae and hairs, median cleft small and rounded. Epandrium higher than long anteriorly, evenly setose dorsally, largest setae not much longer and thicker than those on upper portion of cerci. Pregonite triangular, tapered to rounded tip, with one or more minute hairs near apex. Distiphallus almost cube-shaped with short lateral arms anteriorly and a basal sclerotized flange posteriorly. Surstylus shorter than cerci, apical half in lateral view as wide as long and distally broadly rounded. Cerci in lateral view gently curved, in posterior view heart-shaped, moderately haired dorsally and laterally, apex incised medially forming two narrowly separated tips.

**Female terminalia** (Fig. 6). Tubular and relatively unmodified, without the laterally flattened and “axe-like” syntergosternite 7 (Fig. 11) that characterizes the group of euthelairines revised by Arnaud (1963), including the two other Nearctic species (see key).

**Etymology.** Named for Oliver M. Beckers, who reared six of the paratypes and published the first host record for both the species and the tribe Euthelairini (Beckers 2022).

**Host.** Five of the paratypes were reared from the katydid *Neoconocephalus triops* (L.) (Orthoptera: Tettigoniidae) in Florida, as reported by Beckers (2022, as *Neomintho* sp.). This is the first host record for the Euthelairini.

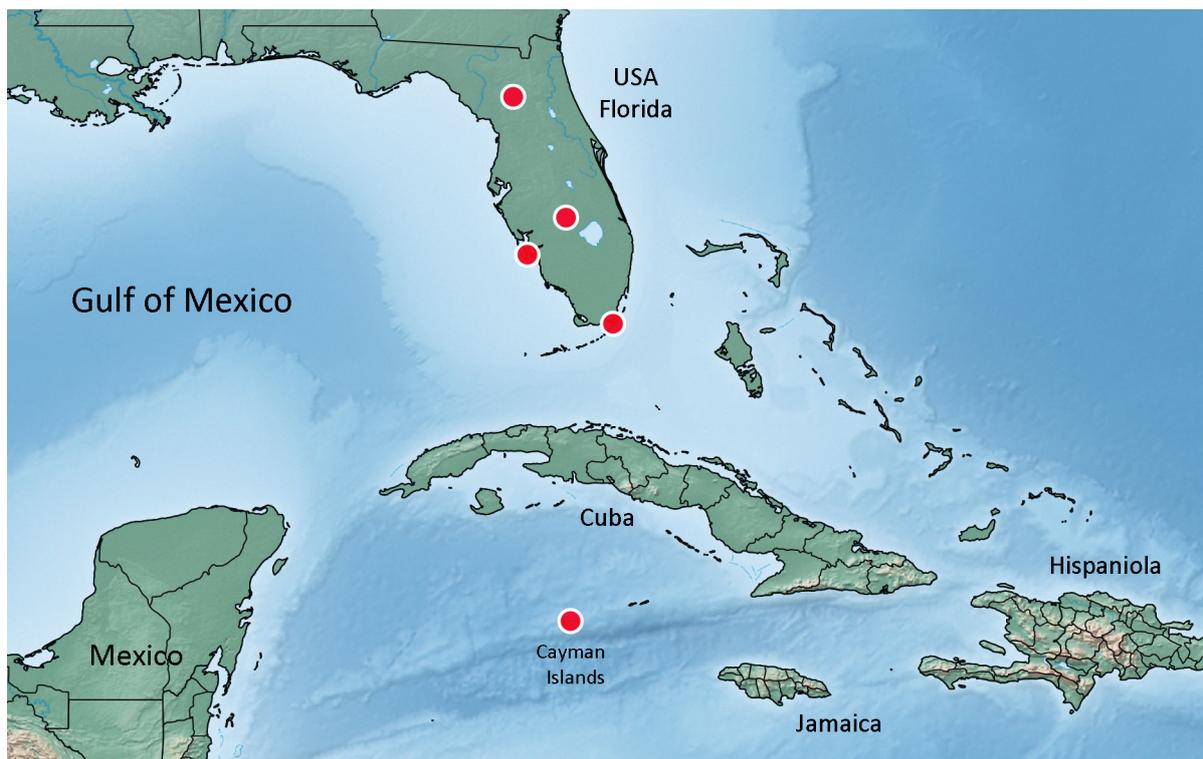
## Provisional reclassification of the Euthelairini

The classification of the Euthelairini given in O’Hara *et al.* (2020) is revised below to reflect the taxonomic changes given above and in this section. Additionally, the classification of *Cryptocladocera* Bezzi has been updated to follow Santis *et al.* (2020), a paper published after the checklist of O’Hara *et al.* (2020). This is a provisional reclassification until such time as a revision of this speciose and little-known tribe is undertaken.

The genus *Hypohoughia* Townsend and single species *Hypohoughia reclinata* Townsend (Townsend 1927) are removed from the Euthelairini *sensu* O’Hara *et al.* (2020). It was placed in Blondeliini by Guimarães (1971) and moved to Euthelairini by O’Hara *et al.* (2020). At the request of the author, the female holotype of *H. reclinata* was examined in the USNM by visiting tachinidologist Dr. Rodrigo de Vilhena Perez Dios. He noted that it has the same three pairs of marginal setae on the scutellum as in euthelairines, but with weaker lateral setae. However, its short, curved, piercing ovipositor suggests a placement in the Voriini (Dexiinae) and likely near the genus *Spathidexia* Townsend, which has a long blade-like ovipositor. *Hypohoughia* differs from *Spathidexia* in having a single seta at the base of vein  $R_{4+5}$  (at least 2 or 3 and usually a row to crossvein  $r-m$  in *Spathidexia*) (Arnaud 1960). This placement of *Hypohoughia* in Voriini by Dios (pers. comm.) is followed here.



**FIGURES 10–12.** 10. *Euplecotheca celer* Townsend, male (CNC857454, Canada, Quebec, Mt. Rigaud, D.M. Wood). 11. Terminal segments of female *Euplecotheca celer* showing “axe-like” syntergosternite 7 (CNC857425, USA, Pennsylvania, 2 kms west of Suedberg, D.M. Wood). 12. *Pelecotheca curulis* (Reinhard), female (CNC1654528), USA, Florida, Torreya State Park, H.V. Weems, Jr.). Abbreviations: ds s = discal setae, syntgst7 = syntergosternite 7.



**FIGURE 13.** Known distribution of *Neomintho beckeri* sp. nov. in the Nearctic (USA, Florida) and Neotropical (Grand Cayman Islands) regions. Red dots indicate locality records of type series.

The genus *Minthotachina* Townsend has only appeared in the literature a few times. It was proposed by Townsend (1935) as a monotypic genus for *M. miscella* from Trinidad and was placed near *Phrynotachina minor* Townsend from Peru. The two genera key out in the same couplet in Townsend’s (1936) key to the genera of

“Compsilurini” (a mixture of Blondeliini and other tribes). *Minthotachina miscella* is missing from Thompson’s series *The Tachinids of Trinidad* but *Phrynotachina minor* was included in Volume VII (Thompson 1966) among the “larviparous Goniines with broad cheeks” (i.e., a mixture of tribes of Exoristinae). The two specimens from Trinidad (a male and female) that Thompson examined and assigned to *Phrynotachina minor* are currently under the genus *Patelloa* Townsend (Goniini) in the CNC, moved there by former curator D.M. Wood. The holotype male of this species in USNM also resembles *Patelloa* (examined by Dios, pers. comm.). The identity of *P. minor* has not been investigated further here, except to note that there is no convincing evidence that *Minthotachina* and *Phrynotachina* are related. Guimarães (1971) separated the two, placing the former in Blondeliini and latter in Eryciini. O’Hara *et al.* (2020) included the former in Euthelairini and the latter in Goniini based on the opinion of coauthor D.M. Wood. The holotype male of *Minthotachina miscella* is in the Natural History Museum (London) and has not been examined during this study. This genus is provisionally retained here in the Euthelairini.

The genera and species of Euthelairini are listed below with their synonyms and distributions, and reflect the changes to the classification noted herein. The genera in which females possess a laterally flattened syntergosternite 7 (Fig. 11) are indicated with a dagger symbol (†) and were keyed and revised by Arnaud (1963).

Images of some type specimens in the CNC and USNM are available online at <https://www.cnc.agr.gc.ca/taxonomy/SpecSearchD15.php> (CNC) and <https://collections.nmnh.si.edu/search/ento/> (USNM). To view an image, enter the specimen number (CNC) or catalog number (USNM, under “Types Search”) that is given below, if available, into the appropriate database to access type data and images.

## Subfamily EXORISTINAE, Tribe EUTHELAIRINI

Most euthelairines can be distinguished from other tachinids by the characters given at the end of the historical review section above. Additionally, the nine genera listed here can be morphologically categorized into four groups: 1) *Asilidotachina* (see note below under *A. elongata* Townsend), 2) *Minthotachina* (see previous section), 3) *Neomintho* (females possessing unmodified terminalia), and 4) *Cerotachina*, *Cryptocladocera*, *Eupelecotheca* and *Pelecotheca* (females with “axe-like” syntergosternite 7 [assumed for *Cryptocladocera*, females unknown]; genera revised in Arnaud 1963, see also Santis *et al.* 2020). These nine genera consist of 27 described species.

### Genus ASILIDOTACHINA Townsend, 1931

*ASILIDOTACHINA* Townsend, 1931: 461. Type species: *Asilidotachina elongata* Townsend, 1931, by original designation.

*elongata* Townsend, 1931.—Neotropical: South America (Peru).

*Asilidotachina elongata* Townsend, 1931: 462.

Images of the holotype female in USNM (catalog no. USNMENT01518419) are available online, see link above. The male is unknown; the female holotype has an elongate, cylindrical (“asilid-like”) abdomen without “axe-like” terminalia, instead ending in “a pair of hairy papillae” (Townsend 1931: 462). This species might belong to the *Neomintho* lineage as discussed above, possibly near specimens CNC857280♂ and CNC1547012♀ in Fig. 1.

### Genus CEROTACHINA Arnaud, 1963†

*CEROTACHINA* Arnaud, 1963: 20. Type species: *Cerotachina elegantula* Arnaud, 1963, by original designation.

*albula* Arnaud, 1963.—Neotropical: South America (Brazil).

*Cerotachina albula* Arnaud, 1963: 30.

*elegantula* Arnaud, 1963.—Neotropical: South America (Brazil).

*Cerotachina elegantula* Arnaud, 1963: 22.

### Genus CRYPTOCLADOCERA Bezzi, 1923†

*CRYPTOCLADOCERA* Bezzi, 1923: 653. Type species: *Cryptocladocera prodigiosa* Bezzi, 1923, by original designation.

*arnaudi* Santis & Alvarez-Garcia, 2020.—Neotropical: South America (Brazil).

*Cryptocladocera arnaudi* Santis & Alvarez-Garcia in Santis *et al.*, 2020: 535.

*pichilinguensis* Arnaud, 1963.—Neotropical: South America (Ecuador).

*Cryptocladocera pichilinguensis* Arnaud, 1963: 17.

*prodigiosa* Bezzi, 1923.—Middle America (Panama), South America (Brazil, French Guiana, Suriname).

*Cryptocladocera prodigiosa* Bezzi, 1923: 655.

*Cryptocladocera bezzii* Arnaud, 1963: 9. Synonymy by Santis *et al.* (2020).

*Cryptocladocera mojingensis* Arnaud, 1963: 13. Synonymy by Santis *et al.* (2020).

Holotype male in USNM but no catalog number or images currently available online.

#### Genus EUPELECOTHECA Townsend, 1919†

*EUPELECOTHECA* Townsend, 1919a: 169. Type species: *Eupelecothea celer* Townsend, 1919, by original designation. **Status revived** (following Arnaud 1963, not O'Hara *et al.* 2020).

*PANTAGATHUS* Reinhard, 1935: 168. Type species: *Pantagathus alogus* Reinhard, 1935 (= *Eupelecothea celer* Townsend, 1919), by original designation.

*celer* Townsend, 1919.—Nearctic: Canada (East, Ontario, Prairies), USA (Florida, Great Plains, Northeast, Southeast). **Comb. revived**, following Arnaud (1963) and Sabrosky & Arnaud (1965); not Wood (1987), O'Hara & Wood (2004) and O'Hara *et al.* (2020).

*Eupelecothea celer* Townsend, 1919a: 169.

Images of the holotype female in USNM (catalog no. USNMMENT01519957) are available online, see link above.

*Pantagathus alogus* Reinhard, 1935: 169.

Holotype female is in USNM but no catalog number or images currently available online.

*cylindrata* (Wulp, 1890).—Neotropical: Middle America (Mexico).

*Phorocera cylindrata* Wulp, 1890a: 82.

Female unknown, placement here follows Guimarães (1971: 156).

#### Genus MINTHOTACHINA Townsend, 1935

*MINTHOTACHINA* Townsend, 1935: 227. Type species: *Minthotachina miscella* Townsend, 1935, by original designation.

*miscella* Townsend, 1935.—Neotropical: southern Lesser Antilles (Trinidad & Tobago).

*Minthotachina miscella* Townsend, 1935: 227.

#### Genus NEOMINTHO Brauer & Bergenstamm, 1891

*NEOMINTHO* Brauer & Bergenstamm, 1891a: 339 [also 1891b: 35]. Type species: *Tachina macilenta* Wiedemann, 1830, by subsequent designation of Townsend (1916: 8).

*EUTHELAIIRA* Townsend, 1912: 305. Type species: *Euthelaira inambarica* Townsend, 1912, by original designation.

**Syn. nov.**

*EUTHELAIROPSIS* Townsend, 1927: 258. Type species: *Euthelairopsis brasiliensis* Townsend, 1927 (= *Tachina macilenta* Wiedemann, 1830), by original designation.

*ITEUTHELAIIRA* Townsend, 1927: 264. Type species: *Iteuthelaira intermedia* Townsend, 1927 (= *Musca esuriens* Fabricius, 1805), by original designation. **Syn. nov.**

*NEOMINTHOIDEA* Thompson, 1968: 30. Type species: *Neominthoidea trinidadensis* Thompson, 1968, by original designation. **Syn. nov.**

*albocingulata* (Wulp, 1890).—Neotropical: Middle America (Costa Rica).

*Hypostena albocingulata* Wulp, 1890b: 141, in key [1890c: 148, description].

*beckersi* O'Hara, **sp. nov.**—Nearctic: USA (Florida). Neotropical: Greater Antilles (Cayman Islands).

*chaetosa* (Townsend, 1929).—Neotropical: South America (Brazil). **Comb. nov.**

*Iteuthelaira chaetosa* Townsend, 1929: 369.

Images of the holotype female in USNM (catalog no. USNMMENT01519965) are available online, see link above.

*esuriens* (Fabricius, 1805).—Neotropical: South America (Brazil, Guyana). **Comb. nov.**

*Musca esuriens* Fabricius, 1805: 301.

*Iteuthelaira intermedia* Townsend, 1927: 323.

*inambarica* (Townsend, 1912).—Neotropical: South America (Peru). **Comb. nov.**

*Euthelaira inambarica* Townsend, 1912: 306.

Note: O'Hara *et al.* (2020: 376) recorded the distribution of *E. inambarica* as "Neotropical: southern Lesser Antilles (Trinidad & Tobago), South America (Guyana, Peru)." The record from Guyana published in Curran (1934: 296) was considered a misidentification by Townsend (1940: 105), who noted that *E. inambarica* is "Recorded only from the low Peruvian montana. For *E. inambarica* Cn nec TT, see *Neomintho*". Townsend is followed here and the record from Trinidad in Thompson (1968: 34) is also assumed to be a misidentification.

Images of the holotype female in USNM (catalog no. USNMENT01518503) are available online, see link above.

**macilenta** (Wiedemann, 1830).—Neotropical: South America (Brazil).

*Tachina macilenta* Wiedemann, 1830: 305.

*Euthelairopsis brasiliensis* Townsend, 1927: 309.

Note: The record from Trinidad in Thompson (1968, as *Neomintho macilenta*) is considered a misidentification (see text).

Images of a syntype male in USNM (catalog no. USNMENT01519930) are available online, see link above.

**nobilis** (Williston, 1896).—Neotropical: eastern Lesser Antilles (Saint Vincent).

*Exorista nobilis* Williston, 1896: 355.

**rufilabris** (Wulp, 1890).—Neotropical: Middle America (Mexico). **Comb. nov.**

*Phorocera rufilabris* Wulp, 1890a: 79.

Note: Coquillett's (1897: 103) record of *Phorocera rufilabris* from New Jersey was considered a misidentification of *Eupelecothea celer* by Johnson (1925: 199), Arnaud (1963: 43) and others. Guimarães (1971: 156) and O'Hara *et al.* (2020: 377) listed this species as *Euthelaira rufilabris*. The species is provisionally moved here to *Neomintho* to follow the new combination of the type species of *Euthelaira*, *E. inambarica*. Wulp did not describe the terminalia of the female syntype, which if "axe-like" would place this species within the group treated by Arnaud (1963).

**trinidadensis** (Thompson, 1968).—Neotropical: southern Lesser Antilles (Trinidad & Tobago). **Comb. nov.**

*Neominthoidea trinidadensis* Thompson, 1968: 30.

Images of the holotype male in CNC (specimen no. CNC1176066) are available online, see link above.

#### **Genus PELECOTHECA Townsend, 1919†**

**PELECOTHECA** Townsend, 1919a: 168. Type species: *Pelecothea panamensis* Townsend, 1919, by original designation.

**ADERCOMYIA** Arnaud, 1963: 32. Type species: *Adercomyia sabroskyi* Arnaud, 1963, by original designation.

*Adercomyia* was synonymized with *Pelecothea* by Guimarães (1971: 156), including the transfer of *A. biseta* Arnaud and *A. sabroskyi* Arnaud to *Pelecothea*.

**biseta** (Arnaud, 1963).—Neotropical: South America (Brazil).

*Adercomyia biseta* Arnaud, 1963: 40.

**curulis** (Reinhard, 1943).—Nearctic: USA (Florida, Southeast, Texas). Neotropical: Middle America (Mexico).

**Comb. revived**, following Arnaud (1963) and Sabrosky & Arnaud (1965); not Wood (1987), O'Hara & Wood (2004) and O'Hara *et al.* (2020).

*Pantagathus curulis* Reinhard, 1943: 18.

Images of the holotype female in CNC (specimen no. CNC1176108) are available online, see link above.

**flavipes** Thompson, 1968. —Neotropical: southern Lesser Antilles (Trinidad & Tobago).

*Pelecothea flavipes* Thompson, 1968: 46.

Note: There are two original spellings for *Pelecothea flavipes* in Thompson (1968): *flavipes* (pp. 1, 46) and *flavipalpis* (p. 47). The spelling *flavipes* is here selected as the correct original spelling, as the First Reviser (Article 24.2.3 of ICZN 1999).

Images of the holotype female in CNC (specimen no. CNC1176130) are available online, see link above.

**macilenta** (Wulp, 1890).—Neotropical: Middle America (Mexico).

*Prospheysa macilenta* Wulp, 1890b: 122.

**macra** (Wulp, 1890).—Neotropical: Middle America (Mexico).

*Phorocera macra* Wulp, 1890a: 84.

**panamensis** Townsend, 1919. —Neotropical: Middle America (Panama).

*Pelecothea panamensis* Townsend, 1919a: 169.

Images of the lectotype female (by designation of Arnaud 1963: 50) in USNM (catalog no. USNMENT01518639) are available online, see link above.

*paulensis* Townsend, 1929.—Neotropical: South America (Brazil).

*Pelecotheca paulensis* Townsend, 1929: 369.

Images of the holotype male in USNM (catalog no. USNMENT01518650) are available online, see link above.

*sabroskyi* (Arnaud, 1963).—Neotropical: South America (Brazil).

*Adercomyia sabroskyi* Arnaud, 1963: 34.

*trinidadensis* Thompson, 1968.—Neotropical: southern Lesser Antilles (Trinidad & Tobago).

*Pelecotheca trinidadensis* Thompson, 1968: 44.

Images of the holotype female in CNC (specimen no. CNC1176131) are available online, see link above.

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The new species described herein came to my attention when I was asked by Oliver M. Beckers of Murray State University in Murray, Kentucky, to identify tachinids he had reared from katydids in Florida. These included specimens of the new *Neomintho* species described here that I am pleased to name in his honor. Rodrigo de Vilhena Perez Dios kindly examined a holotype in the National Museum of Natural History in Washington while there as a Postdoctoral Researcher, and commented on its possible affinities. His detailed review of the manuscript for *Zootaxa* is much appreciated. Dan H. Janzen and Winnie Hallwachs kindly allowed me to cite data that they and their parataxonomists have accumulated on the Euthelairini from Area de Conservación Guanacaste in northwestern Costa Rica. Thanks also to Shannon Henderson of the CNC Diptera Unit for sending legs of euthelairines and other tachinids to the Canadian Centre for DNA Barcoding in Guelph for processing, and for imaging the specimens shown in the figures. Scott Brooks, also of the CNC Diptera Unit, kindly reviewed the manuscript and offered helpful suggestions for its improvement.

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