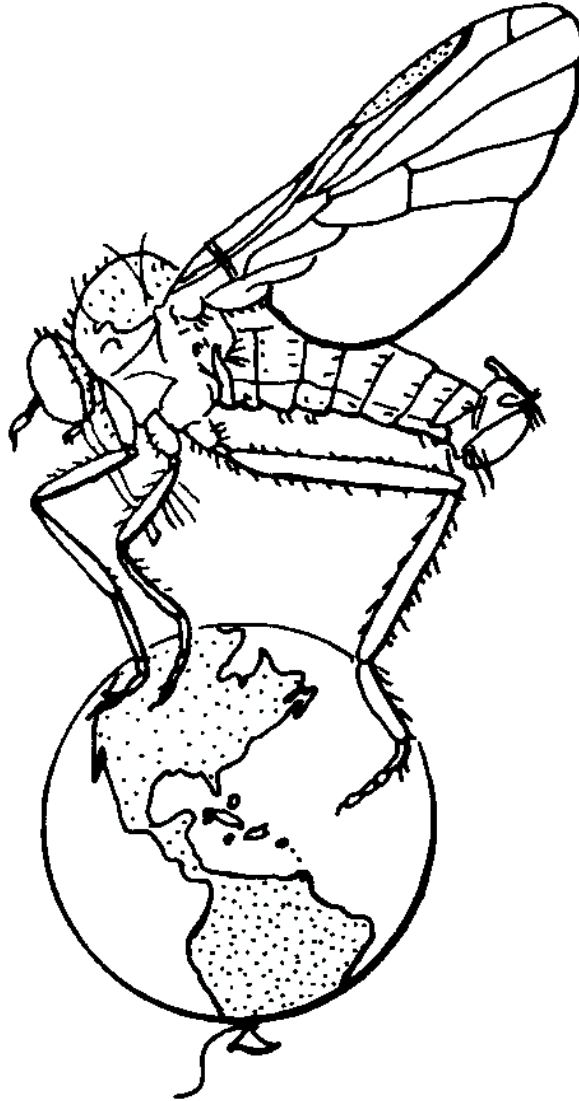


FLY TIMES

ISSUE 67



FALL 2021

FLY TIMES

Issue 67, Fall 2021



Editor-in-Chief Stephen D. Gaimari

OFFICE ADDRESS

North American Dipterists Society
P.O. Box 231113
Sacramento, California, 95823, USA

EMAIL ADDRESS

sgaimari@dipterists.org

WEBSITES

https://dipterists.org/fly_times.html
<http://www.nadsdiptera.org/News/FlyTimes/Flyhome.htm>

HOSTING

Fly Times is a publication of the North American Dipterists Society. All issues are hosted on the webpages of the Society, at both the new website <https://dipterists.org> and the longstanding website <http://nadsdiptera.org>. The new website is fully hosted by the Society, with webmaster Steve Gaimari. The latter website, with Jim O'Hara as webmaster, is kindly hosted by the University of Guelph through arrangement with Steve Marshall.

DISTRIBUTION

Fly Times is simultaneously distributed in PDF and printed format twice yearly, with spring and fall issues.

SCOPE

Fly Times accepts submissions on all aspects of dipterology, providing a forum to report on original research, ongoing projects, Diptera survey activities and collecting trips, interesting observations about flies, new and improved methods, to discuss the Diptera holdings in various institutions, to make specimen requests, to advertise opportunities for dipterists, to report on or announce meetings or events relevant to the community, to announce new publications and websites, to examine the historical aspects of dipterology and Diptera literature, to honor our recently deceased colleagues, and anything else fly-related that you can think of. And of course with all the images you wish to provide.

INSTRUCTIONS TO AUTHORS

Although not a peer-reviewed journal, all submissions are carefully considered by the editor before acceptance. We encourage submissions from dipterists worldwide on a wide variety of topics that will be of general interest to other dipterists, and hope that this will be an attractive medium for students through retirees to showcase their activities.

The requirements for submission are simple. Please send me a single-spaced text file (.rtf or .doc preferred) along with separate image files (.jpg or .png preferred).

Following are some specific do's and don'ts, bearing in mind that consistency among manuscripts is important:

- 1) *Do not* embed images into the text file (but *do* indicate in the text file approximately where each image should be placed).
- 2) *Do* submit image files of a reasonable size (no more than about 1MB per image file).
- 3) *Do not* use embedded styles (e.g., the various heading styles, small caps, paragraph spacing, etc.). *Do* limit styles to italics, bold, and (if you must) underline, and single-spaced.
- 4) *Do not* use different fonts, different font-sizes, or different colored fonts as headings. *Do* use Times New Roman, 11.5 point, black.

The approximate deadlines for submission are the middle of May and the middle of November, although this is flexible up to the time of publication (which will generally be early June (spring issue) and early December (fall issue). For larger manuscripts your submissions may be considered for inclusion in the *Fly Times Supplement* series.

Please submit manuscripts to the editor-in-chief, Stephen Gaimari, at:

sgaimari@gmail.com
and cc sgaimari@dipterists.com

ISSN 2769-6073 (Print)
ISSN 2769-6081 (Online)

Available online 20 December 2021

The North American Dipterists Society is a 501(c)(3) nonprofit organization, incorporated in the state of California on 27 November 2019. We are an international society of dipterists and Diptera-enthusiasts, serving the needs of the worldwide dipterist community.



Our Mission is to advance the scientific study, understanding and appreciation of the insect order Diptera, or true flies. To accomplish this, we aim to foster communication, cooperation, and collaboration among dipterists, and to promote the dissemination and exchange of scientific and popular knowledge concerning dipterology.

As an **international society**, there are no boundaries, and our core activities are geared towards all dipterists, not a subset. We aim to provide a common stage for all people interested in flies, a place where our community can closely interact. Among our core activities, we produce Society publications such as this one (as well as the *Fly Times Supplement* and *Myia*), facilitate or organize Society and other Diptera-related meetings and events, provide grants and awards in support of dipterological activities and achievements, perform outreach activities and provide educational resources to those who need them, and maintain an organizational website, an online Directory of World Dipterists, a dipterists mailing list server, and social media presence. In these efforts, we as a group can make our society as successful as we want!

A note about Society membership – To thrive as an organization and to provide all the resources we can for the dipterological community, we need your support through becoming a member (<https://dipterists.org/membership.html>) or making donations (<https://dipterists.org/support.html>). Please see our website to understand our vision for our society!

From the Editor – Welcome to the latest issue of *Fly Times*! This issue is yet again brought to you during the Covid-19 pandemic, and just after a turn for the worse with the new Omicron variant rearing its head. I am sure we are all hoping to return to some semblance of normality very soon, when we can visit and work in collections worldwide, have face-to-face interactions with our colleagues, attend meetings, and undertake expeditions to many interesting places and explore the diversity of flies. As usual, I am impressed with the variety of excellent submissions, and I hope they are enjoyable to the readers. And as seems to be typical, I am right at the edge of this being a true fall issue. In a few hours it will no longer be fall. (I do recognize that the season has already changed in some parts of the world, but it is still fall here in California!) Please consider writing an article or two for the next issue, which is slated for spring (not summer!) of 2022. And for larger works, please consider the *Fly Times Supplement* series, which can be found at https://dipterists.org/fly_times_supplement.html.

CONTENTS

NEWS

- Oosterbroek, P. & Lukashevich, E. — Flower-visiting by long-proboscid limoniid crane flies (Diptera, Limoniidae) 1–12
- Marshall, S. & Cerretti, P. — Oviposition site screening in a Neotropical dextine..... 13–14
- Hribar, L.J. — Do position and color of bottle traps affect collection of Drosophilidae?..... 15–16
- Tonguç, A. — Seasonal flight periods of species of long legged flies (Dolichopodidae) in the Inner West Anatolia Region of Turkey 17–20
- Evenhuis, N.L. & Pape, T. — *Systema Dipteroorum*, Version 3.5 update..... 21
- Gray, R. — Investigations of the Mycetophilidae of north-central Nevada during 2021 22–24
- Kung, G.-A. — Recent Acquisition at LACM 25
- Sherin, L.M. — A call for newly collected Sciomyzidae..... 26

HISTORICAL DIPTEROLOGY

- Evenhuis, N.L. — José Celestino Mutis and the little-known history of the discovery of the human bot fly, *Dermatobia hominis* (Linnaeus, 1781) (Diptera: Oestridae) 27–32

PHILAMYIANY

- Gaimari, S.D. — Introducing a new section of *Fly Times* – Philamyiany 33
- Stuke, J.-H. — Diptera on stamps: (2) Tephritoidea 34–38
- Gaimari, S.D. — Diptera Trading Cards and Trade Cards (I)..... 39–48

MEETING NEWS

- Gelhaus, J.K. — North American Dipterists Society Field Meeting in the Pinelands (aka Pine Barrens) of southern New Jersey June 13–17, 2022 49–58
- Nève, G. — 11th International Symposium on Syrphidae, Barcelonnette, France, 5–10 September 2022 59
- Winterton, S.L. & Gaimari, S.D. — 10th International Congress of Dipterology (ICDX) 16–21 July 2023 in Reno, Nevada, USA 60
- Dikow, T. & Bertone, M. — North American Dipterists Society Annual Meeting: Entomological Society of America 2021 61–62

- DIPTERA ARE AMAZING! 63

BOOKS AND PUBLICATIONS

- Announcement: *Manual of Afrotropical Diptera*, Volume 3 published..... 64
- Brodo, F. — Book review: *British Craneflies*. By Alan Stubbs, 2021 65–66
- Borkent, A. — Book review: *Super Fly: The Unexpected Lives of the World's Most Successful Insects*. By Jonathan Balcombe, 2021 67–68

SOCIETY BUSINESS

- [Preface]..... 69
- Approved minutes of the Directors annual meeting, held 2 June 2020 70–71
- Approved minutes of the Directors annual meeting, held 14 December 2020 72–74

NEWS

Flower-visiting by long-proboscid limoniid crane flies (Diptera, Limoniidae)

Pjotr Oosterbroek¹ & Elena Lukashevich²

¹ Naturalis Biodiversity Center, Leiden, The Netherlands, p.oosterbroek@chello.nl, <https://ccw.naturalis.nl/>

² A.A. Borissiak Paleontological Institute. Russian Academy of Sciences, Moscow, 117647 Russia

Numerous anthophilous species of Diptera consume nectar and pollen of angiosperms. In subtropical rainforests, for example, Diptera is one of the three major arthropod orders (along with Coleoptera and Hymenoptera) that are responsible for pollination of most flowering plants, be these trees of the canopy, or shrubs, vines and herbs in the understory (Williams 2020). The majority of anthophilous dipterans have a short siphonate proboscis with many of them visiting open or short-tubed flowers.

A short proboscis (defined here as less than the 1.5 times longer than head) is also found in the large majority of crane flies (Tipuloidea), including Limoniidae and Tipulidae. For these crane flies, many flower-visiting records can be found in the literature and on the web, especially for the Tipulidae and to a lesser extent for Limoniidae (Fig. 1), very often on plant species of the family Apiaceae [Umbelliferae]. Already Knab (1910) noticed: “The fact that a large number of records are from Umbelliferae is significant; in these flowers the honey is exposed and easily accessible, thus requiring no specialization of the insect visitor's mouthparts.”



Figure 1. *Gynoplistia* sp., male, Tasmania, on Woolly Teatree, *Leptospermum lanigerum* (Primulaceae), most likely *G. bella* (Walker, 1835), a very common and widespread species (Zac Bilingham pers. comm.). © Kristi Ellingsen (reproduced with permission).

Further specialization of the mouthparts can be found in Limoniidae, but it is rare; among 150 extant genera no more than a dozen with long proboscis are known, while only some of them have been associated with nectar feeding definitely. A good introduction to these genera can be found in Khramov et al. (2020) entitled “The fossil record of long-proboscid nectarivorous insects”. The paper “overviews the fossil record of insects with long mouthparts and rostra adapted to feeding on floral nectar and pollination drops of extinct gymnosperms” and one of the conclusions is that “long-proboscid nectar feeders were abundantly represented as early as the Jurassic, indicating wide occurrence of insect pollination among gymnosperms, long before the origin of angiosperms.” Truly, long-proboscid species of Limoniidae are known no earlier than the Early Cretaceous, when first angiosperm pollen is already found, but before the origin of flowers with corolla tubes (Khramov et al. 2020: fig.17).

In nematocerous Diptera, a long proboscis comes in two types (Fig. 2) and in all probability, the two types have evolved independently.

- 1) The clypeus (part of the head capsule) extends and merges with the gena and the associated cephalic sclerites into an immobile sclerotized tube termed the rostrum; the true mouthparts are positioned apically on the rostrum (Fig. 2A-B).
- 2) The clypeus remains relatively short while the mouthparts themselves extend: either more or less uniformly, or only the labella extends far beyond the tip of the labrum (Fig. 2C).

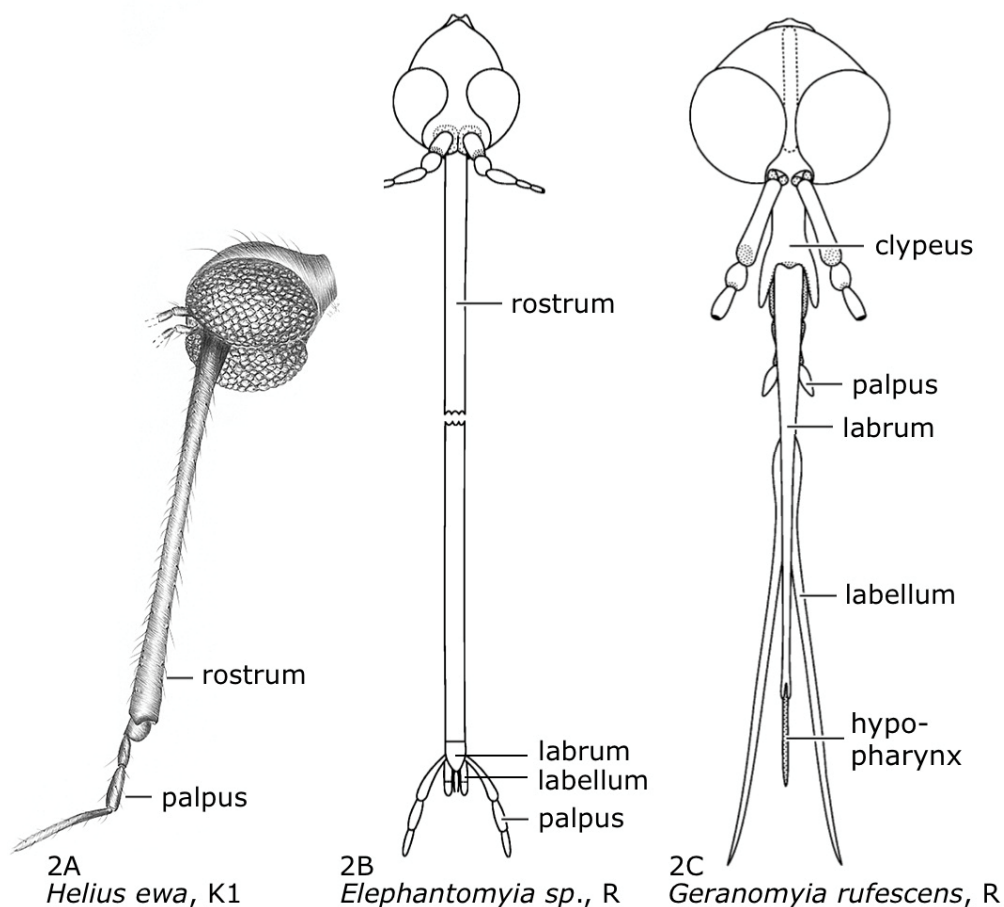


Figure 2. Examples of long proboscis in *Helius*, *Elephantomyia* and *Geranomyia*. 2A after Krzemiński et al. 2014, 2B and 2C after Crampton 1943, modified. K1: Early Cretaceous, R: Recent.

Sclerotized rostra among Diptera are known only in several families of Nematocera (e.g., the species-rich crane fly family Tipulidae), while long rostra (more than 1.5 times longer than head) are recorded only in few extant genera: at least six genera of Limoniidae and only three genera of other families, namely, *Peringueyomyia* Alexander, 1921 (Tanyderidae), *Gnoriste* Meigen, 1818 (Mycetophilidae) and *Rhynchoheterotricha* Freeman, 1960 (the *Heterotricha* group of Sciaroidea) (Khramov et al. 2020, Lukashevich 2021).

In Limoniidae, long sclerotized rostra are known for three widespread genera: *Elephantomyia* Osten Sacken, 1860, *Toxorhina* Loew, 1850 and *Helius* Lepeletier et Serville, 1828, discussed below, and at least for three genera from the southern temperate zone: *Amphineurus* Skuse, 1890 (*A. sanus* Alexander, 1929, Chile), *Tonnoirella* Alexander, 1928 (*T. gemella* Alexander, 1928 and *T. marmoripennis* Alexander, 1928, both Tasmania) and monotypic *Tinemyia* Hutton, 1900 (*T. margaritifera* Hutton, 1900, New Zealand). Although the southern temperate zone, especially such biomes as the *Nothofagus* forests, has retained a large number of relict taxa, none of the above-mentioned long-proboscid genera are found in the Mesozoic nor in the fossil record at all. In the long-proboscid species from the southern hemisphere the length of the rostra ranges from twice the head length (*A. sanus*, *T. gemella* and *T. marmoripennis*) to half the body length (*T. margaritifera*). In descriptions of three other southern genera of restricted distribution and low diversity, *Bergrothomyia* Alexander, 1928 (Australia), monotypic *Edwardsomyia* Alexander, 1929 (Chile) and *Rhamphophila* Edwards, 1923 (New Zealand), the rostra being longer than the remainder of the head was mentioned. With individual variability, specimens of these genera also can possess rostra more than 1.5 times longer than head. For example, the rostrum being “about one-third longer than remainder of head” was described for *E. chiloensis* Alexander, 1929; however on the figure in the same paper the rostrum seems to be 1.5 longer than head (Alexander 1929: fig.197), and in a photo in a recent paper (Ribeiro, 2008: fig. 13) it looks even longer relatively. Alexander (1929) considered *Tonnoirella*, *Tinemyia*, *Edwardsomyia*, and *Rhamphophila* as closely related to each other, and later Ribeiro (2008) included these genera in a “temperate Gondwanan clade” of Linnophilinae (visualized in Ribeiro & Eterovic 2011: fig. 4). However, even within southern genera the elongation of the rostrum could occur independently (Ribeiro 2008), e.g., isolated examples in the diverse genus *Amphineurus*, a member of Chioneinae.

Flower-visiting records for these southern hemisphere long-proboscid genera are largely absent, with the exception of *Tonnoirella*. The type-series of both species were collected on the Mount Field plateau at an altitude of 1066 m by Dr. Tonnoir, who reported abundance on the tube flowers of *Dracophyllum* (Ericaceae) (Alexander 1928). EL also collected abundant *T. gemella* of both sexes in December 2015 not far from the type locality, at Mount Field East, in subalpine heath at an altitude of 1270 m on flowering low shrubs, probably *Boronia citriodora* (Rutaceae).

Elongated mouthparts are much more common in Diptera than long rostra (Khramov et al. 2020: tab. 3), however as far as we know, such mouthparts occur in crane flies only among Limoniidae and in the modern fauna only in *Geranomyia* Haliday, 1833 and in six out of the 39 species of *Dicranomyia* (*Zelandoglochina*) Alexander, 1924, from Argentina, Chile and New Zealand. In these six species the length of the mouthparts ranges from twice the length of the head to half the length of the body. For *Zelandoglochina* no flower-visiting records are known. The cosmopolitan large genus *Dicranomyia* Stephens, 1829, with two dozen extant subgenera is well-represented in the Cenozoic fossil record, especially in Baltic amber but the subgeneric affinity of extinct species is usually unknown. One Eocene species was described by Scudder (1877) under the apparently self-explanatory name *D. rostrata*, but the mouthparts were not mentioned in the original description and their length is unclear on the figure, published later (Scudder 1890: Pl.V fig. 64); the proboscis seems to be only scarcely

longer than the head, as in *D. stigmosa* Scudder, 1877 (Scudder 1890: pl. V fig. 16), the second species is from the same locality of Green River Formation (53.5–48.5 Mya).

In the fossil record, an elongate proboscis, similar to *Geranomyia* and about twice as long as the head, is known from one Cenozoic limoniid species only, *Trentepohlia (Onutia) damzeni* Podenas, 2003 (Eocene, Baltic amber; Podenas 2003, 2005). An elongate proboscis is not present in other extinct or extant species of *Trentepohlia* Bigot, 1854 (Khranov et al. 2020) and flower visiting has not been recorded for this large cosmopolitan genus.

So, in Limoniidae, both prolongation variants occur. Among widespread genera associated with nectar feeding and having a long rostrum are *Helius* (Fig. 2A), *Toxorhina*, and *Elephantomyia* (Fig. 2B), whereas in *Geranomyia* the mouthparts themselves are elongate: in particular, the hypopharynx, labrum, and labium are rather long, and the labella extend far beyond the tips of all the other elements (Fig. 2C). In Oosterbroek (2021) the four genera are classified as belonging to the subfamily Limoniinae with the three genera of rostrum-bearing crane flies generally believed to be closely related. However, other authors unite them in differently ranked groups within different subfamilies (Savchenko 1983, Ribeiro & Amorim 2002, Ribeiro 2008), or with *Helius* and *Elephantomyia* even in a separate subfamily Elephantomyiinae (Petersen et al. 2010). In any case, it is obvious that elongation of the rostrum is a homoplastic character in the family.

In the review below we will discuss only the four widespread long-proboscid genera that have been associated with nectar feeding, starting with the apparently geologically youngest genus with a better known feeding mode, and finishing with the oldest one with unclear habits. All four genera are distributed worldwide with in total 874 species (*Geranomyia* 354, *Elephantomyia* 137, *Toxorhina* 152, *Helius* 231).

***Geranomyia* Haliday, 1833**

As one of the largest cosmopolitan genera of Limoniidae, the proboscis is short in some species but often reaches half the body length (Hancock 2011, Lantsov 2015). *Geranomyia* is the youngest long-proboscid genus of Limoniidae – it is known based on long-proboscid specimen since the Miocene (20-15 Mya, Dominican amber; Podenas & Poinar 2001).

The great majority of extant species have been described from the southern hemisphere. One of the most interesting cases is recorded by Pansarin & Pansarin (2017). They present a detailed study on pollination biology of the Brazilian orchid *Epidendrum avicula* Lindl. This orchid species possesses osmophores that produce a citric fragrance at night. The flowers “attract crane flies and several families of microlepidoptera that drink the nectar produced in a tube formed by the adnation of the labellum and column. As is common in *Epidendrum*, after removing the pollinarium, both crane flies and micro-moths get trapped by the proboscis, which frightens the insects and inhibits any possible intent to immediately visit another flower” (Pansarin & Pansarin 2017). The crane flies were identified by Diptera experts in Brazil as belonging to the genus *Elephantomyia*.

Some 60 photos of crane flies collected on flowers of *E. avicula* were mailed by Emerson Pansarin to PO to see if they could be identified to the species level, given the revision of the Brazilian species of *Elephantomyia* by Ribeiro & Pansarin (2002). A detailed look at these photos showed that they depict at least four species of the genus *Geranomyia*, as shown by the mouthparts, antennae, wing venation and male and female genitalia. From these photos it is clear that *Geranomyia* specimens are involved in the pollination process, showing individuals carrying a pollinarium at the rostrum (Fig. 3). Identification to the species level is not possible; there are over 40 *Geranomyia* species known

from Brazil and there are no regional identification keys for this genus. Among the photos, none of the *Elephantomyia* was identified. The photos sent by E. Pansarin, although referring to specimens collected on *E. avicula* flowers, do not refer to the same individuals shown in the figures of the published paper (Pansarin & Pansarin 2017). The details of these photo's did not allow us to determine the crane flies as *Elephantomyia* or *Geranomyia*.



Fig. 3. *Geranomyia* sp., male, south-eastern Brazil, with pollinarium of *Epidendrum avicula* (Orchidaceae). © Emerson Pansarin (reproduced with permission).



Fig. 4. *Geranomyia rostrata*, female, Pennsylvania, USA, on flowers of Common Milkwood, *Asclepias syriaca* (Apocynaceae). © Pete Woods (reproduced with permission).

From the Palaearctic 34 species of *Geranomyia* are known, and as far as we know, none of them with published records of visiting flowers. Such records we can find in (mostly older) publications about Nearctic species, their behavior while approaching flowers and while feeding being described in detail by Knab (1910) and Rogers (1926). Other papers on this topic are Alexander (1916, 1920, 1948, 1967) and Alexander & McAtee (1920).

Members of *Geranomyia* commonly feed on nectar from tubed flowers and frequently occur on Asteraceae [Compositae], such as *Aster*, *Eupatorium*, *Helianthus*, *Solidago*, *Verbesina*, etc. This is also shown on the many photos on the web where specimens of *Geranomyia* are visiting flowers. Of the 258 *Geranomyia* records that we found on iNaturalist, no less than 78 are on flowers (30% !), most of them on Asteraceae but also on plants of the families Apocynaceae (Fig. 4), Boraginaceae, Rutaceae, Crassulaceae, etc. *Geranomyia* is also found on flowers with more exposed nectar, such as of Amaryllidaceae, Apiaceae, Lauraceae, Rosaceae, Salicaceae, etc., thus requiring no specialization of the insect mouthparts. For 66 “flower-records” the time is given, with 51 during daytime and 15 in the evening or at night, the latter most probably not a representative number.

***Elephantomyia* Osten Sacken, 1860**

Elephantomyia is characterized by having one of the longest rostra among all the crane flies: the rostrum of both extinct and extant species may be 6–10 times as long as the head and even longer than the body; the genus is known since the Eocene (~40 Mya, Baltic amber; Alexander 1931, Khramov et al. 2020: tab. 4).

The records we have found of flower-visiting adults, as summarized in Table 1, refer to five or six species, in two subgenera, from Russia, Japan, China and New Zealand. Six of the 12 records refer to the Asteraceae, the other plants visited belong to Rubiaceae, Lamiaceae, Caprifoliaceae, Fabaceae and Plantaginaceae, also having the nectar more or less hidden away in the flowers (Fig. 5).

A case of more open flowers is *Elephantomyia* (*Elephantomyodes*) *tianmushana* Zhang, Li & Yang, 2015, on *Lysimachia* (Primulaceae) (Fig. 6). Of three records we know that they are from during daytime, with one New Zealand record from the evening.



Figs. 5–6. *Elephantomyia* species. 5 (left). *Elephantomyia krivosheinae*, female, Moscow Region, Russia, on flowers of *Lonicera xylosteum* (Caprifoliaceae). © Dmitry Gavryushin (reproduced with permission). 6 (right). *Elephantomyia tianmushana*, female, Zhejiang, China, on flowers of *Lysimachia clethroides* (Primulaceae). After Zhang et al. 2015 (reproduced with permission).

***Toxorhina* Loew, 1850**

The genus is known since the Eocene (~40 Mya, Baltic amber) and has a rostrum often as long as the body (Alexander 1931). Species not only feed on nectar but participate in the intricate process of pollination of the orchid *Habenaria parviflora* Lindl. in Brazil, together with snout moths of the family Pyralidae (Singer 2001; *Toxorhina* being erroneously reported as *Leptotarsus*, see Khramov et al. 2020). As in the orchid *Epidendrum avicula* (Pansarin & Pansarin 2017), fragrance production and pollination activities take place during the night.

Another example of orchid pollination is illustrated in Fig. 7, showing a male of *Toxorhina* (*Ceratocheilus*) *seychellarum* (Edwards, 1912) from São Tomé Island, visiting flowers and carrying on its head a yellow pollinarium of the orchid *Rhipidoglossum brevifolium* Summerh., as recorded by João Farminhão from the Free University of Brussels, Belgium (unpublished, more photos in Oosterbroek 2021). The same species also visited flowers of *Tridactyle* orchids. Flowers of the epiphytic orchid *Earina mucronata* from New Zealand are visited by a species of the same subgenus (Lehnebach & Robertson 2004). Crane fly activities were during day and night time. It is worth to mention that long-rostrate species of the same subgenus *Ceratocheilus* from Baltic amber represent the oldest record of the genus.



Fig. 7. *Toxorhina seychellarum*, male, São Tomé, visiting flowers and with pollinarium of *Rhipidoglossum brevifolium* (Orchidaceae). © João Farminhão (reproduced with permission).

Additional *Toxorhina* records are listed in Table 1, for six or seven species in two subgenera. Most of the records refer to the two North American species *T. magna* Osten Sacken, 1865 (Fig. 8) and *T. muliebris* Osten Sacken, 1865. As in *Elephantomyia*, the plant family Asteraceae is well represented but also the family Orchidaceae, not listed for *Elephantomyia*. The other plant species mentioned, Lamiaceae, Apocynaceae and Rhamnaceae, have the nectar more or less hidden away in the flowers, Clethraceae having more open flowers. Six of the iNaturalist and Flickr photos referred to in Table 1 are taken during daytime and one in the evening.



Fig. 8. *Toxorhina magna*, female, Florida, USA, on flowers of Burrmarigold, *Bidens laevis* (Asteraceae). © Kurt Hasselman (reproduced with permission).

Table 1. Flower-visiting records traced for *Elephantomyia* and *Toxorhina*.

Crane fly species	Country	Flower species	Flower family	Source of data
<i>Elephantomyia (Elephantomyia) edwardsi</i>	Russia	<i>Asperula odorata</i>	Rubiaceae	Savchenko 1986
<i>Elephantomyia (Elephantomyia) edwardsi</i>	Russia		Asteraceae	Savchenko 1986
<i>Elephantomyia (Elephantomyia) hokkaidensis</i>	Japan		Asteraceae	Alexander 1924
<i>Elephantomyia (Elephantomyia) hokkaidensis</i>	Russia	<i>Solidago pacifica</i>	Asteraceae	Savchenko 1983
<i>Elephantomyia (Elephantomyia) hokkaidensis</i>	Russia	<i>Aster scaber</i>	Asteraceae	Savchenko 1983
<i>Elephantomyia (Elephantomyia) hokkaidensis</i>	Russia	<i>Senecio</i> sp.	Asteraceae	Savchenko 1983
<i>Elephantomyia (Elephantomyia) hokkaidensis</i>	Russia	<i>Plectranthus</i> sp.	Lamiaceae	Savchenko 1983
<i>Elephantomyia (Elephantomyia) krivosheinae</i>	Russia	<i>Lonicera xylosteum</i>	Caprifoliaceae	Dmitry Gavryushin (Diptera.info)
<i>Elephantomyia (Elephantomyia) sp.</i>	Japan	<i>Cirsium nipponicum</i>	Asteraceae	Kato 2017
<i>Elephantomyia (Elephantomyodes) zealandica</i>	New Zealand	<i>Carmichaelia odorata</i>	Fabaceae	chrise (iNat. A)
<i>Elephantomyia (Elephantomyodes) zealandica</i>	New Zealand	<i>Hebe</i> sp.	Plantaginaceae	Judi Lapsley Miller (iNat. B)
<i>Elephantomyia (Elephantomyodes) tianmushana</i>	China	<i>Lysimachia clethroides</i>	Primulaceae	Zhang et al. 2015
<i>Toxorhina (Toxorhina) cuthbertsoni</i>	Zimbabwe	<i>Mentha longifolia</i>	Lamiaceae	Alexander 1937
<i>Toxorhina (Toxorhina) magna</i>	USA	<i>Bidens laevis</i>	Asteraceae	Kurt Hasselman (Flicker)
<i>Toxorhina (Toxorhina) magna</i>	USA	<i>Bidens alba</i>	Asteraceae	joemdo (iNat. C)
<i>Toxorhina (Toxorhina) magna</i>	USA		Asteraceae	humbleearthgarden (iNat. D)
<i>Toxorhina (Toxorhina) muliebris</i>	USA	<i>Solidago canadensis</i>	Asteraceae	Alexander & McAtee 1920
<i>Toxorhina (Toxorhina) muliebris</i>	USA	<i>Apocynum medium</i>	Apocynaceae	Alexander & McAtee 1920
<i>Toxorhina (Toxorhina) muliebris</i>	USA	<i>Clethra alnifolia</i>	Clethraceae	Alexander & McAtee 1920
<i>Toxorhina (Toxorhina) muliebris</i>	USA	<i>Ceanothus americanus</i>	Rhamnaceae	Alexander & McAtee 1920
<i>Toxorhina magna or muliebris</i>	USA	<i>Tanacetum vulgare</i>	Asteraceae	Evan Dankowicz (iNat. E)
<i>Toxorhina magna or muliebris</i>	USA	<i>Leucanthenum vulgare</i>	Asteraceae	Judy (iNat. F)
<i>Toxorhina magna or muliebris</i>	USA		Asteraceae	bealeiderman (iNat. G)
<i>Toxorhina magna or muliebris</i>	USA	<i>Achillea millefolium</i>	Asteraceae	jenningssec (iNat. H)
<i>Toxorhina Ceratocheilus seychellarum</i>	Sao Tomé	<i>Rhipidoglossum brevifolium</i>	Orchidaceae	João Farminhão (unpublished)
<i>Toxorhina (Ceratocheilus) seychellarum</i>	Sao Tomé	<i>Tridactyle</i> sp.	Orchidaceae	João Farminhão (unpublished)
<i>Toxorhina (Ceratocheilus) sp.</i>	New Zealand	<i>Earina mucronata</i>	Orchidaceae	Lehnebach & Robertson 2004
<i>Toxorhina (subgenus ?) sp.</i>	Brazil	<i>Habenaria parviflora</i>	Orchidaceae	Singer 2001 (as Leptotarsus)
<i>Toxorhina (subgenus ?) sp.</i>	Mexico		Asteraceae	angelicabecerratt (iNat. I)
Diptera.info: https://diptera.info/forum/viewthread.php?forum_id=5&thread_id=22124&pid=428109#post_428109				
iNat. A: https://www.inaturalist.org/observations/37907481				
iNat. B: https://www.inaturalist.org/observations/5656087				
iNat. C: https://www.inaturalist.org/observations/10186634				
iNat. D: https://www.inaturalist.org/observations/14108004				
iNat. E: https://www.inaturalist.org/observations/19519548				
iNat. F: https://www.inaturalist.org/observations/35390963				
iNat. G: https://www.inaturalist.org/observations/53204617				
iNat. H: https://www.inaturalist.org/observations/2018635				
iNat. I: https://www.inaturalist.org/observations/1056648				
Flicker: https://www.flickr.com/photos/dah_professor/23941887761				

Helius Lepelletier and Serville, 1828

The fossil record of *Helius* may be among the richest of all the extant genera of crane flies. The genus is known since the Early Cretaceous and it is the only long-proboscid genus of crane flies that existed as early as the Mesozoic, by then being widely distributed already (Kania-Kłostok et al. 2021). Moreover, it is the only Mesozoic long-proboscid Nematocera for which blood-sucking and predation can be ruled out. These feeding modes are unknown in rostrum-bearing forms, and also because of the absence of mandibles in the extant species and in adult Limoniidae as a whole (Khramov et al. 2020).

All previously discussed long-proboscid limoniids are known since the Cenozoic, during the rise of angiosperms with their long-tubed flowers. *Helius* species with a long rostrum are known since the Early Cretaceous, its oldest representative being *Helius ewa* Krzemiński et al. 2014, from Lebanese amber (~ 128Mya, Fig. 2A). In this species the rostrum-head length ratio is 3.1. Other species of *Helius* can have a rostrum that is slightly shorter than the head but usually it is longer than the head, with a maximum ratio of 5.1 in *Helius mutus* Podenas, 2002, from Baltic amber (~ 40Mya). In the other two long-proboscid limoniid genera, the rostrum is most frequently much longer than in *Helius*, usually as long as or longer than the body. In spite of its name, the shortest ratio of 6.1 is found in *Elephantomyia longirostris* (Loew, 1851), also from Baltic amber.

Flowers of Early Cretaceous angiosperms had simple, small (on average 0.5–5 mm in diameter), flat or cup-shaped perianths or no perianths at all, while the reward for flower visitors was pollen and not nectar (Khramov et al. 2020). Obviously, the relatively long proboscis of Early Cretaceous species of *Helius*, as in *H. ewa* and species from Spanish amber (Kania et al. 2018), was no prerequisite for feeding on such flowers.



Fig. 9. *Helius liliputanus*, male, Ryukyu Is, Japan. After Kato 2020 (reproduced with permission).

Despite the many species described (e.g., Fig. 9), there seems to be not a single published record of a specimen of *Helius* feeding on flowers or of feeding in any other way. This is also true for the three more common European species *H. flavus* (Walker, 1856), *H. longirostris* (Meigen, 1818) and *H. pallirostris* Edwards, 1921. In his recent review of the British crane flies, Stubbs (2021) writes “though potentially designed for gaining nectar from flowers, observations of such behavior are lacking, possibly because such activity is at night.”

Images of flower-visiting specimen of *Helius* were also not found by us on the web. To illustrate this, on iNaturalist we found 70 records of *Helius*, none of them on flowers, this in strong contrast to what we found for *Geranomyia* (30% of the records are on flowers, see above).

Conclusion

As to our knowledge, “deep-boring” nectar feeding among the four genera of long-proboscid crane flies has not been observed in *Helius* but does occur in *Geranomyia*, *Elephantomyia* and *Toxorhina*, with *Geranomyia* and *Toxorhina* sometimes in association with specialized pollination of orchids. The purpose of the elongate proboscis of *Helius* remains “conjecture” (Stubbs 2021) and our review can confirm this is indeed the case.

Based on the time of origin, an association has been suggested between long-proboscid Mesozoic *Helius* and gymnosperms. This could be confirmed by finding pollen of gymnosperm in the stomach of compressions or on or near inclusions in ambers. Such finds are rare but are known already in Burmese amber for extinct brachyceran Zhagsolvidae (Peñalver et al. 2015) and scorpionflies Pseudopolycentropodidae (Lin et al. 2019). Given the preferred habitats, it seems unlikely to find *Helius* feeding on gymnosperms in the field. The larvae are aquatic to semi-aquatic; adults therefore are common in all types of wet habitats such as springs, fens, marshland, carr around pools and lakes, well vegetated water margins, wet woodlands and marshy meadows (Olsen et al. 2018, Stubbs 2021).

However, *Helius* could have changed the feeding mode after extinction of associated gymnosperms. The genus is supposed to have rapidly evolved during the Cretaceous period and might have adapted to the new food spectrum offered by angiosperms that became abundant at that time (Kania-Kłostok et al. 2021). One can suppose several “adapting” scenarios, with angiosperm nectar feeding at night being a likely possibility, in which case *Helius* can be considered “a long-proboscid nectar feeder” (Khramov et al. 2020). To follow this up further, it would be of interest to study if pollen is present on specimens of *Helius* that are preserved in collections or are collected in the field. Another way of finding out more is to investigate the content of the digestive tract of freshly collected specimens.

Acknowledgements

The authors would like to thank several persons for their generous help with the manuscript, information on flowers and crane flies, permission to use figures, etc., in alphabetic order: Zac Billingham, Fenja Brodo, Evan Dankowicz, Kristi Ellingsen, João Farminhão, Dmitry Gavryushin, John Gelhaus, Kurt Hasselman, Herman de Jong, Iwona Kania-Kłostok, Daichi Kato, Vladimir Lantsov, Judi Lapsley Miller, Emerson Pansarin, Pete Woods and Xiao Zhang.

References (nearly all available as pdf from <https://ccw.naturalis.nl>)

- Alexander, C.P. (1916) New or little-known crane-flies from the United States and Canada: Tipulidae, Ptychopteridae, Diptera. Part 3. *Proceedings of the Academy of Natural Sciences of Philadelphia* 68: 486-549.
- Alexander, C.P. (1920) The crane-flies of New York. Part II. Biology and phylogeny. *Memoirs, Cornell University Agricultural Experiment Station* 38: 691-1133.
- Alexander, C.P. (1928) New or little-known Tipulidae (Diptera) XXXVII. Australasian species. *Annals and Magazine of Natural History* (10) 1: 82-108.
- Alexander, C.P. (1929) Diptera of Patagonia and South Chile. Part I. Crane-flies (Tipulidae, Trichoceridae, Tanyderidae). *Diptera of Patagonia and South Chile* 1: 1-240.
- Alexander, C.P. (1931) Crane-flies of the Baltic amber (Diptera). *Bernstein-Forschungen* 2: 1-135.
- Alexander, C.P. (1948) Records and descriptions of North American crane-flies (Diptera). Part VII. The Tipuloidea of Utah. I. *American Midland Naturalist* 39: 1-82.
- Alexander, C.P. (1967) The crane flies of California. *Bulletin of the California Insect Survey* 8: 1-263.
- Alexander, C.P. & McAtee, W.L. (1920) Diptera of the superfamily Tipuloidea found in the District of Columbia. *Proceedings of the United States National Museum* 58: 385-435.

- Crampton, G.C. (1943) The external morphology of the Diptera. *Bulletin Connecticut State Geological and Natural History Survey* 64: 10-165.
- Hancock, E.G. (2011) Order Diptera, family Limoniidae. *Arthropod Fauna of the UAE* 4: 684-695. iNaturalist, available at <https://www.inaturalist.org/> (consulted 20 October 2021).
- Kania, I., Krzemiński, W. & Arillo, A. (2018) A new peculiar species of the genus *Helius* Lepeletier & Serville, 1828 (Diptera, Limoniidae) from Cretaceous Alava amber (Spain). *Earth and Environmental Science Transactions of the Royal Society of Edinburgh* 107 (2-3): 231-237.
- Kania-Kłostok, I., Krzemiński, W. & Arillo, A. (2021) Two new long-rostrum crane fly species from the Cretaceous Iberian amber (Diptera, Limoniidae, *Helius*). *Scientific Reports* 2021, 11, 12851: 1-10.
- Kato, D. (2020) New records of Japanese Limoniidae (Diptera: Limoniidae). *Makunagi / Acta Dipterologica* 31: 15-52.
- Kato, M. (2017) *History and natural history of plants and their associates*. In: Kato, M. & Kawakita, A. (eds), *Obligate Pollination Mutualism, Ecological Research Monographs*, Springer, Tokyo: 7-62.
- Khramov, A.V., Bashkuev, A.S. & Lukashovich, E.D. (2020) The fossil record of long-proboscid nectarivorous insects. *Entomological Review* 100: 881-968.
- Knab, F. (1910) The feeding habits of *Geranomyia*. *Proceedings of the Entomological Society of Washington* 12: 61-65.
- Krzemiński, W., Kania, I. & Azar, D. (2014) The Early Cretaceous evidence of rapid evolution of the genus *Helius* Lepeletier & Serville, 1828 (Limoniidae, Diptera). *Cretaceous Research* 48: 96-101.
- Lantsov, V.I. (2015) A new species of the genus *Geranomyia* Haliday, 1833 (Diptera: Limoniidae) from Transcaucasia. *Caucasian Entomological Bulletin* 11: 411-414.
- Lehnebach, C.A. & Robertson, A.W. (2004) Pollination ecology of four epiphytic orchids of New Zealand. *Annals of Botany* 93: 773-781.
- Lin, X., Labandeira, C.C., Shih, C., Hotton, C.L. & Ren, D. (2019) Life habits and evolutionary biology of new two-winged longproboscid scorpionflies from mid-Cretaceous Myanmar amber. *Nature Communications* 10: 1235.
- Lukashovich, E.D. (2021) Mouthparts of nectar-feeding Tanyderidae (Insecta: Diptera): lapping and siphoning. *Arthropod Structure & Development* 64: 101087.
- Olsen, K.M., Oosterbroek, P., Boumans, L. & Jong, H. de (2018) Forty species of limoniid crane flies new to Norway, with an annotated list of Nordic Pediciidae and Limoniidae, including distributional data (Diptera, Tipuloidea). *Norwegian Journal of Entomology* 65: 127-174.
- Oosterbroek, P. (2021) *Catalogue of the Craneflies of the World (CCW)*. Online available at ccw.naturalis.nl (consulted 20 October 2021).
- Pansarin, E.R. & Pansarin, L.M. (2017) Crane flies and microlepidoptera also function as pollinators in *Epidendrum* (Orchidaceae: Laeliinae): the reproductive biology of *E. avicula*. *Plant Species Biology* 32: 200-209.
- Peñalver, E., Arillo A., Pérez-de la Fuente, R., Riccio, M.L., Delclòs, X., Barrón, E. & Grimaldi, D.A. (2015) Long-proboscid flies as pollinators of Cretaceous gymnosperms. *Current Biology* 25: 1917-1923.
- Petersen, M.J., Bertone, M.A., Wiegmann, B.M. & Courtney, G.W. (2010) Phylogenetic synthesis of morphological and molecular data reveals new insights into the higher-level classification of Tipuloidea (Diptera). *Systematic Entomology* 35: 526-545.
- Podenas, S. (2002) New species of *Helius* crane flies (Diptera, Limoniidae) from Baltic amber (Eocene). *Mitteilungen aus dem Geologisch-Paläontologischen Institut der Universität Hamburg* 86: 229-238.

- Podenas, S. (2003) A new subgenus for *Trentepohlia* crane flies (Diptera: Limoniidae) with elongated mouth parts, from Baltic amber (Eocene). *Proceedings of the Academy of Natural Sciences of Philadelphia* 153: 67-71.
- Podenas, S. (2005) *Trentepohlia* Bigot, 1854, crane flies (Diptera: Limoniidae) from Baltic amber (Eocene). *Bulletin de la Société Neuchâtoise des Sciences Naturelles* 128: 145-154.
- Podenas, S. & Poinar, G.O. (2001) New crane flies (Diptera: Tipulidae, Limoniidae) from Dominican and Mexican ambers. *Proceedings of the Entomological Society of Washington* 103: 863-878.
- Ribeiro, G.C. (2008) Phylogeny of the Limnophilinae (Limoniidae) and early evolution of the Tipulomorpha (Diptera). *Invertebrate Systematics* 22: 627-694.
- Ribeiro, G.C. & Amorim, D.S. (2002) A review of the genus *Elephantomyia* Osten Sacken in Brazil, with description of two new species (Diptera: Tipulomorpha, Limoniidae). *Zootaxa* 46: 1-16.
- Ribeiro, G.C. & Eterovic, A. (2011). Neat and clear: 700 species of crane flies (Diptera: Tipulomorpha) link southern America and Australasia. *Systematic Entomology* 36: 754-767.
- Rogers, J.S. (1926) Some notes on the feeding habits of adult crane-flies. *Florida Entomologist* 10: 5-8.
- Savchenko, E.N. (1983) Crane-flies (Fam. Tipulidae), Introduction, Subfam. Dolichopezinae, subfam. Tipulinae (start). *Fauna USSR, N.S. 127, Nasekomye Dvukrylye [Diptera]*, 2(1-2): 1-585 (in Russian).
- Savchenko, E.N. (1986) Komary-limoniidy [limoniid-flies]. (General description, subfamilies Pediciinae and Hexatominiae). *Fauna Ukrainy* 14(2): 1-380 (in Russian).
- Scudder, S.H. (1877) The first discovered traces of fossil insects in the American tertiaries. *Bulletin of the United States Geological and Geographical Survey of the Territories* 3: 741-762.
- Scudder, S.H. (1890) The Tertiary insects of North America. *Report of the United States Geological Survey of the Territories* 13: 1-734.
- Singer, R.B. (2001) Pollination biology of *Habenaria parviflora* (Orchidaceae: Habenariinae) in southeastern Brazil. *Darwiniana* (San Isidoro) 39: 201-207.
- Stubbs, A.E. (2021) *British Craneflies*. British Entomological and Natural History Society, Reading: i-vi, 1-343, 63 plates, i-xvi.
- Williams, G. (2020) *The invertebrate world of Australia's subtropical rainforests*. Csiro Publishing, Melbourne: i-v, 385.
- Zhang, X., Li, Y. & Yang, D. (2015) A review of the genus *Toxorhina* Loew from China, with descriptions of three new species (Diptera, Limoniidae). *ZooKeys* 480: 59-80.

Oviposition site screening in a Neotropical dexiine

Stephen Marshall¹ and Pierfilippo Cerretti²

¹School of Environmental Sciences, University of Guelph, Guelph, Ontario, Canada

²Department of Biology and Biotechnology 'Charles Darwin', University of Rome 'Sapienza', Rome, Italy

Ready to hatch eggs (or larvae) of Dexiini are normally deposited on substrates such as wood or soil in which the first instar larvae search out hosts, usually Coleoptera larvae. First instar *Zelia vertebrata* (Say), for example, pursue larval xylophagous beetle hosts in several families (Mangrum, 1948), while *Z. tricolor* (Coquillett) parasitizes stem-boring beetles in the families Cerambycidae, Curculionidae and Erotylidae (Fothergill & Woodley, 2011). Since there have been relatively few observations of host searching by adult dexiines, we here draw attention to photographs of an unidentified species actively searching circular emergence burrows on a recently felled tree in Amazonian Brazil. Female flies went from burrow to burrow, inserting their forelegs in each burrow (Figs. 1-4), before selecting one in which to ovi(larvi)posit (Fig. 5). Micropezidae (*Scipopus diversus* (Schiner), Fig. 6) were seen to search burrows on the same tree, ovipositing in different ones than those chosen by the tachinids.

The photos on the following page represent an opportunistic and casual observation, of interest despite the lack of specific information about the species of tachinid or the host. The fly is possibly a species of *Zelia* Robineau-Desvoidy or a close relative, but no specimens are available to confirm the identification because of restrictions on collecting specimens in Brazil. The burrows look like emergence burrows of scolytine weevils, but this was not confirmed. Multiple females of the same tachinid species were observed while the photographer (Marshall) was looking for Micropezidae on the same fallen tree. *Scipopus* Enderlein species have been previously observed to insert their head and forelegs into multiple burrows prior to oviposition (Marshall 2012 and subsequent observations). Several genera of Micropezidae oviposit in beetle burrows, presumably to develop as scavengers on frass in abandoned burrows, but only *Scipopus* species have been observed to peer into burrows prior to oviposition. We suspect that the dexiine illustrated here is selecting for burrows leading to active host larvae, even though the size and circular shape of the burrows suggest that they are adult beetle emergence holes rather than primary oviposition holes.

Opportunistic natural history observations such as this often offer more questions than answers, but the observations crystalized in these photos do seem to offer clues to interesting life histories worth following up on. In this case we raise the possibility that dexiines deliberately choose adult emergence burrows that link to interior networks of burrows still containing host larvae; this contrasts with the widely accepted idea that larval Dexiini normally access hosts through host oviposition sites.

References

- Fothergill, K. & Woodley, N. (2011). *Zelia tricolor* (Diptera: Tachinidae): new host records. Florida Entomologist 97. 637-638. 10.1653/024.093.0423.
- Mangrum, J.F. (1942). The parasitic fly, *Zelia vertebrata* Say (Diptera, Dexiidae). Annals of the Entomological Society of America 35 (1): 73–75.
- Marshall, S.A. (2012) Flies. The Natural History and Diversity of Diptera. Firefly books, Buffalo, New York.



Figures 1-4, female dextine exploring beetle emergence holes in a recently fallen tree in Novo Airão, Brazil, January 2020; 5, oviposition in a previously investigated burrow; 6, *Scipopus diversus* (Schiner) on the same tree; 7, *Scipopus souzalopesi* Albuquerque investigating a burrow in Tiputini, Ecuador, May 2011.

Do position and color of bottle traps affect collection of *Drosophilidae*?

Lawrence J. Hribar

Florida Keys Mosquito Control District, 503 107th Street, Marathon, Florida 33050, USA

The short answer is, “Not in my backyard.”

Last year I used red wine to trap *Drosophilidae* in my back yard on Vaca Key, Florida (Hribar 2020a, b). All of those traps were constructed from empty plastic soft drink bottles according to the instructions given by Hwang & Turner (2005). All the traps I used were made from clear plastic bottles. A few weeks ago I started to wonder whether the color of the trap might affect how many flies were caught within the trap. Two popular soft drinks were consumed until I had enough bottles to make traps. One drink comes in a green bottle and the other in a clear bottle. I made four different color combinations: one each, green over green, clear over clear, clear over green, and green over clear (Figure 1).



Figure 1. Bottle traps used to collect *Drosophilidae*.

On four consecutive days, October 8 to October 12, I collected flies. Traps were hung on string stretched across my backyard, about 30 feet from a composter that is home to large numbers of *Drosophilidae*. Bottle traps were hung about 2 feet apart and their position changed each day. The four

positions of the traps were designated left, left center, right center, and right. Traps were placed in the late afternoon and retrieved about 24 hours later. I baited each bottle trap with approximately 2 tablespoons of Merlot wine. I purchased a four pack of mini bottles so each afternoon a new bottle was opened and fresh wine was used as bait.

Each afternoon, bottle traps were placed into my home freezer until flies were dead, then flies were strained out of the wine or otherwise removed from the traps, placed into plastic bags pre-labeled with day, position, and color scheme of bottles, and taken to the laboratory for identification and enumeration. I only identified flies to the species-group level for reasons I explained previously (Hribar 2020a).

A total of 82 drosophilids was collected, 79 of the *D. repleta* group and 3 other drosophilids. I attempted to analyze my data by using an online calculator for a 4x4 Orthogonal Latin Square analysis (Lowry 1998-2021). Sadly, there were no statistically significant differences among positions or bottle colors.

Not many other taxa were collected: 3 parasitic wasps, 2 bark beetles, 1 sarcophagid fly, 1 phorid fly, 1 ulidiid fly, and 2 Hemiptera. Several times ghost ants were seen in the traps – I do not know whether they removed and ate any of the catch. Some of the ants had drowned in the wine.

References

- Hribar, L.J. 2020a. Macrochelid mites collected from *Drosophila repleta* group flies on Vaca Key, Florida. *Fly Times*, 64: 26-31.
- Hribar, L.J. 2020b. The unresolved question of whether red wine or Vienna lager-style beer is the better bait for *Drosophila repleta* group flies. *Fly Times*, 64: 41.
- Hwang, C. & B.D. Turner. 2005. Spatial and temporal variability of necrophagous Diptera from urban to rural areas. *Medical and Veterinary Entomology* 19: 379-391.
- Lowry, R. 1998-2021. 4x4 Orthogonal Latin Square. <http://vassarstats.net/latin4x4.html>

**Seasonal flight periods of species of long legged flies (Dolichopodidae)
in the Inner West Anatolia Region of Turkey**

Alper Tongu

Molecular Biology and Genetics Department, Faculty of Science, Muęla Sıtkı Koman University,
48000, Muęla, Turkey; alpertonguc@mu.edu.tr

Abstract – In this study, the seasonal phenology of species of long legged flies (Dolichopodidae) was investigated. This study was carried out in the inner western Anatolia Region, consisting of the Afyonkarahisar, Kütahya and Uşak provinces. Seventy five of Dolichopodidae species were collected by hand net from 763 localities from April through September, over three years (2009–2011). A great majority of species fly from May through July in the research area. It was determined that the maximum species number of long legged flies in May (47) while the minimum species number of long legged flies in September (3). In the other months, the number of species ranged from 21–43.

The family Dolichopodidae belongs to the dipteran suborder Brachycera, one of the largest families by number of known species. Dolichopodids, known also as “long-legged flies”, are small- or medium-sized insects whose body length varies from 1–9 mm. Adult dolichopodids occur in aquatic habitats like banks of rivers, lakes, ponds, or streams, being easily distinguished by their long legs, a usually metallic green body, and an often large male hypopygium (Lundbeck, 1912; Parent, 1938; d’Assis Fonseca, 1978; Yang et al., 2006). Some species are found above water (*Hydrophorus* Fallén), whereas others are found on tree trunks (*Medetera* Fischer von Waldheim, *Neurigona* Rondani, *Systemus* Loew). Both larval and adult dolichopodids are predators on various invertebrates, carrying out an important regulatory role in some agricultural, aquatic, semiaquatic, and forest ecosystems. Adult dolichopodids mainly feed on soft-bodied invertebrates like Oligochaeta; adult Aphidae, Psyllidae, Culicidae, Chironomidae, etc.; and larvae and eggs of Tabanidae and Scolytidae (Lundbeck, 1912; Brooks, 2005; Grichanov, 2007).

This study was carried out in provinces of inner western Anatolian part of Turkey (Afyonkarahisar, Kütahya and Uşak). Inner West Anatolia is located in the east of the Aegean Region and contains three provinces, 37 districts, and 1145 villages. The material for the present work was collected by sweeping in aquatic and semi aquatic habitats in the period from April through September from 2009 through 2011. Adults collected in the field were put in vials containing 75% ethanol or insect envelopes. The specimens were sorted and identified in the laboratory with a binocular microscope. All specimens are deposited in the Muęla Sıtkı Koman University, Science Faculty, Department of Biology, Zoology Laboratory, Muęla, Turkey (MUZL). In total, 78 dolichopodid species were identified in the research area. Each monthly period was divided into three parts, to determine flight period of long legged flies in a table.

As a result of this study, a major part of species were determined to fly from May through July in the research area. It was determined that the maximum species number flies was in May (47) while the minimum species number was in September (3). In the other months, the number of species ranged from 21–43 (22 species in April, 30 species in June, 43 species in July, 21 species in August).

While the samples of three species flying all the months in the region, it was determined that the flight period for adults of thirty four species were limited to a particular month only (Table 1).

Table 1. Seasonal flight period of long legged flies (Dolichopodidae) species in the research area

Species	April	May	June	July	August	September
<i>Agyra vestita</i> (Wiedemann, 1817)						
<i>Argyra argyria</i> (Meigen, 1824)						
<i>Campsicnemus barbitibia</i> Stackelberg, 1947						
<i>Campsicnemus crinitarsis</i> Strobl, 1906						
<i>Campsicnemus curvipes</i> (Fallén, 1823)						
<i>Campsicnemus filipes</i> Loew, 1859						
<i>Campsicnemus magius</i> (Loew, 1845)						
<i>Campsicnemus simplicissimus</i> Strobl, 1906						
<i>Campsicnemus umbripennis</i> Loew, 1856						
<i>Chrysotus pennatus</i> Lichwardt, 1902						
<i>Chrysotus pulchellus</i> Kowarz, 1874						
<i>Chrysotus suavis</i> Loew, 1857						
<i>Diaphorus hoffmannseggi</i> Meigen, 1830						
<i>Dolichopus austriacus</i> Parent, 1927						
<i>Dolichopus calinotus</i> Loew, 1871						
<i>Dolichopus excisus</i> Loew, 1859						
<i>Dolichopus griseipennis</i> Stannius, 1831						
<i>Dolichopus latilimbatus</i> Macquart, 1827						
<i>Dolichopus nubilus</i> Meigen, 1824						
<i>Dolichopus perversus</i> Haliday, 1838						
<i>Dolichopus sabinus</i> Haliday, 1838						
<i>Dolichopus signifier</i> Haliday, 1832						
<i>Hercostomus anatoliensis</i> Tonguç & Grootaert. 2016						
<i>Hercostomus apollo</i> (Loew, 1869)						
<i>Hercostomus chetifer</i> (Walker, 1849)						
<i>Hercostomus convergens</i> (Loew, 1857)						
<i>Hercostomus fulvicaudis</i> (Haliday, 1851)						
<i>Hercostomus gracilis</i> (Stannius, 1831)						
<i>Hercostomus griseifrons</i> Becker, 1910						
<i>Hercostomus longiventris</i> (Loew, 1857)						
<i>Hercostomus phoebus</i> Parent, 1927						
<i>Hydrophorus balticus</i> (Meigen, 1824)						
<i>Hydrophorus praecox</i> (Lehmann, 1822)						
<i>Liancalus virens</i> (Scopoli, 1763)						
<i>Medetera muralis</i> Meigen, 1824						
<i>Medetera perfida</i> Parent, 1932						
<i>Neurigona abdominalis</i> (Fallén, 1823)						
<i>Neurigona erichsoni</i> (Zetterstedt, 1843)						
<i>Neurigona suturalis</i> (Fallén, 1823)						
<i>Orthoceratium lacustre</i> (Scopoli, 1763)						
<i>Ortochile nigrocoerulea</i> Latreille, 1809						

Species	April	May	June	July	August	September
<i>Peloropodes acuticornis</i> (Oldenberg, 1916)						
<i>Poecilobothrus chrysozygos</i> (Wiedemann, 1817)						
<i>Poecilobothrus principalis</i> (Loew, 1861)						
<i>Poecilobothrus regalis</i> (Meigen, 1824)						
<i>Rhaphium albifrons</i> Zetterstedt, 1843						
<i>Rhaphium appendiculatum</i> Zetterstedt, 1849						
<i>Rhaphium brevicorne</i> Curtis, 1835						
<i>Rhaphium caliginosum</i> Meigen, 1824						
<i>Rhaphium fascipes</i> (Meigen, 1824)						
<i>Rhaphium laticorne</i> (Fallén, 1823)						
<i>Rhaphium micans</i> (Meigen, 1824)						
<i>Scellus notatus</i> (Fabricius, 1781)						
<i>Sciapus flavicinctus</i> (Loew, 1857)						
<i>Sciapus heteropygus</i> Parent, 1926						
<i>Sciapus maurus</i> Parent, 1930						
<i>Sybistroma crinipes</i> Staeger, 1842						
<i>Sybistroma impar</i> (Rondani, 1843)						
<i>Sybistroma lorifera</i> (Mik, 1878)						
<i>Sybistroma nodicornis</i> Meigen, 1824						
<i>Sybistroma sphenoptera</i> Loew, 1859						
<i>Sympycnus pulicarius</i> (Fallén, 1823)						
<i>Sympycnus simplicipes</i> Becker, 1908						
<i>Syntormon aulicus</i> (Meigen, 1824)						
<i>Syntormon denticulatus</i> (Zetterstedt, 1843)						
<i>Syntormon fuscipes</i> (von Roser, 1840)						
<i>Syntormon metathesis</i> (Loew, 1850)						
<i>Syntormon monilis</i> (Haliday, 1851)						
<i>Syntormon pallipes</i> (Fabricius, 1794)						
<i>Syntormon pumilis</i> (Meigen, 1824)						
<i>Syntormon subinermis</i> (Loew, 1869)						
<i>Syntormon zelleri</i> (Loew, 1850)						
<i>Tachytrectus notatus</i> (Stannius, 1831)						
<i>Telmaturdus tumidulus</i> (Raddatz, 1873)						
<i>Teuchophorus bisetus</i> Loew, 1871						
<i>Teuchophorus chaetifemoratus</i> Pollet & Kechev, 2007						
<i>Thinophilus (Schoenophilus) versutus</i> Haliday, 1851						
<i>Xanthochlorus tenellus</i> (Wiedemann, 1817)						

Acknowledgements

The author would like to thank Mugla Sıtkı Koçman University, Scientific Research Projects Coordination Unit (Research Project Number: 09/04) for financial support.

References

- Brooks, S.E., 2005. Systematics and phylogeny of Dolichopodinae (Diptera:Dolichopodidae). *Zootaxa*, 857 : 1-158
- d'Assis Fonseca, E.C.M., 1978. *Diptera, Orthorrhapha, Brachycera, Dolichopodidae*. Handbooks for the Identification of British Insects, Royal Entomological Society of London, London, 9, (5), 90p
- Gričanov, I. Ya., 2007, *A checklist and keys to Dolichopodidae (Diptera) of the Caucasus and East Mediterranean*. St. Petersburg, VIZR RAAS (Plant Protection News Suppl.), 160.
- Lundbeck, W., 1912. *Diptera Danica, genera and species of flies hitherto found in Denmark, part IV, Dolichopodidae*. G.E.C. Gad., Copenhagen, 414p
- Parent, O., 1938. *Diptères Dolichopodides*. Faune de France, P. Lechevalier et fils, impr., Paris, 35, 720p
- Yang, D., Zhu, Y., Wang, M., Zhang, L., 2006. *World Catalog of Dolichopodidae (Insecta: Diptera)*. China Agricultural University Press, China, 704 pp.

Systema Dipteroorum

The BioSystematic Database of World Diptera



Systema Dipteroorum, Version 3.5 update

Neal L. Evenhuis¹ & Thomas Pape²

¹ Bernice Pauahi Bishop Museum, 1525 Bernice Street,
Honolulu, Hawai'i 96817, USA; neale@bishopmuseum.org

² Natural History Museum of Denmark, Zoological Museum, Universitetsparken 15,
2100 Copenhagen, Denmark; TPape@snm.ku.dk

Significant progress has been made with *Systema Dipteroorum* (SD) since the last *Fly Times* issue. We have now crossed the 165,000 living species-mark as we continue to enter data from taxonomic papers. We have made a concerted effort in the last six months to do catch-up on the large backlog of works that had not yet been entered into SD. We have entered data from papers on hand from 2008 through 2019 and are now in the middle of entering data from some 300+ papers in 2020 and have also added a few significant works from 2021. We estimate that by the next issue of *Fly Times*, SD will be up-to-date on virtually all papers, with the realization that there will always be a few papers we missed. We therefore encourage all authors to send pdfs (or links to them) to us so that the data can be assured of being entered accurately. Last but not least, we could not have gotten to where we are without the help of our-sharp-eyed users who have assisted by pointing out errors needing correction and those who have helped by providing pdfs requested and information on dating, nomenclature, taxonomy, etc., etc. Shout-outs to (not in any particular order): Derek Sikes, Lorenzo Munari, Ximo Mengual, Jeff Skevington, Chris Angeli, Arthur Frost, Carlo Monari, Jean-Sébastien Girard, Yury Roskov, Geoff Ower, Paul Beuk, Stephen Smith, Chris Cohen, Stephen Downes, Torbjørn Ekrem, Elisabeth Stur, María Cano, Elisabeth Harris, Art Borkent, Holden Appler, Jere Kahanpää.

Current numbers (for version 3.5):

Extant valid species-group names: 165,268
Valid genus-group names: 12,596
References Databased: 37,548

Systema Dipteroorum Nomenclatural Notes

In related news, we have begun the new series “Systema Dipteroorum Nomenclatural Notes” that will provide a medium for short notes relating to nomenclatural “cleaning-up”. There are many instances when a novel nomenclatural act is needed for proper treatment of names (e.g., multiple original spellings requiring First Reviser action, preoccupied names, genus-group names lacking a type species designation, genus-group names lacking included species, etc.). Any worker wishing to submit articles should contact the editors for further information. All submitted manuscripts undergo peer-review. All publications in this series and new nominal taxa proposed therein are registered with ZooBank and are Open Access.

Go here for more information and current articles: <http://hbs.bishopmuseum.org/sd/>

Investigations of the Mycetophilidae of north-central Nevada during 2021

Robin Gray

Seven Valleys LLC, Winnemucca, Nevada, USA; sevenvalleysent@gmail.com

Since 2017 I have been studying the Mycetophilidae of north-central Nevada, trying to discover what species live here, and as many aspects of their biology and natural history that I can. This study continued during 2021. This year I focused on running Malaise traps in different plant communities in the mountains of this section of Nevada. I ran six traps in three different ranges, all in different plant communities, ranging in elevation from 5200 to 6150 feet. I kept these traps up from March through December, checking each of them every two weeks. By doing this I hoped to discover what species occurred in each habitat, their ebb and flow during the course of the season, and the character of the mycetophilid fauna in each location. Now at the end of the season I have nearly a hundred vials of adult mycetophilids that I have gleaned with these traps. I have not sat down yet to identify these specimens, that awaits me this winter. Following identification I will be able to analyze what I have and learn about how the species are distributed in both time and place. I can say that there is some overlap in species between plant communities, and little or none with others. September was the month that I caught the fewest mycetophilids, across the board. In late October there were three days of rain, this brought about a surge in mycetophilid production that has continued right up to the present. I began taking traps down after the first week in December as winter storms and greatly reduced temperatures began to move in. I am counting on using all these traps in different places, so down they came even though there were mycetophilids in the killing jars in some of the locations.

2021 was a very dry year, almost without mushrooms. I saw one puffball in April, then nothing until October after the rains mentioned above. I collected these mushrooms when I saw them. I inspected the gills for eggs - saw none on any of them - then put them in rearing chambers. Nothing emerged from any of these.

On October 27, a day after the rains ended, I gathered some leaf litter that had collected around the base of one Chinese elm in Winnemucca. I had seen larvae, pupae and adults of a *Boletina* sp. emerge from this site in the past, and I wanted to see what effect the rain had had on the leaf litter in relation to these insects. From the end of March through October there was no trace of them. I went through the leaf litter collected on October 27, under a dissecting scope and saw larvae and pupae of this species. The larvae were 4–5 mm long, so they had not just hatched out. I began checking this site every couple of days and on November 15 I saw numerous adults out and flying around. I collected 13 of them, all were males. I made subsequent smaller collections every few days, and saw no females until December 1.

On November 15 when I first saw adult *Boletina* at the Winnemucca site, I took another sample of leaf litter and sorted through it under a dissecting scope. The larval population had increased over what was there October 27. I observed larval behavior, and made three videos of this. The larvae move around with vigorous probing motions of the anterior portion of the body. As they moved around they attached themselves to the substrate with silken threads from their mouthparts. At first I thought that when they contacted something with their head they were eating it, but after watching for a while I think the probing behavior was more about moving forward. They would move for a while, then they just stopped. I could see their mouthparts moving, and contractions behind the head capsule. Sometimes the head capsule was retracted partially into the body. The gut was filled with dark material the color of the dead leaves, or maybe soil, but I found no larvae in the soil, only in the

leaves. On December 1 I took another leaf litter sample from the Winnemucca site – part of it I examined under the scope, the rest I ran through a Berlese funnel. No larvae, pupae or adults were found in this sample either in the Berlese or direct sorting. The leaf litter this time was much drier than in the earlier two samples.

In March when I set up the Malaise trap in the aspen forest in the Bloody Run Mountains it captured a great many *Boletina* adults. Since the beginning of April to the present there have been no more of this mycetophilid caught at that location. On November 11 I took a leaf litter sample from this location back with me – I examined it under the scope and found no mycetophilid larvae at all. This leaf litter sample was wet down to the soil. On November 24 I collected another leaf litter sample from the aspen forest - I examined part of this under the scope, the rest I ran through the Berlese. I saw no mycetophilid larvae under direct observation, with the Berlese I found one tiny larva, about 1 mm long, that could be a *Boletina* larva. This leaf sample was also wet.



Aspen forest (left), and leaf litter (right).

On December 5 I caught one adult male *Boletina* in each of the traps in the east range, one in a juniper forest, the other in a desert peach thicket. I had not caught a single mycetophilid in the juniper forest since spring, and not even one the whole season at the desert peach site. I took leaf litter from both of these sites and examined them manually under the scope, and also through the Berlese funnel. No mycetophilid larvae were seen in either sample, in fact, almost no arthropod life was found in the leaf litter at either site.

All the *Boletina* collected from these four sites appear to be the same species, but seem to be following different approaches to living in the various habitats they are in. In Winnemucca I have now collected the adults more or less continuously from November through April. If the leaf litter they develop in is moist the immatures are there, if it is dry they are not. In the aspen forest I have seen not one of the immatures or adults so far this winter. In the very dry east range sites, the adults are present in small numbers in December at least. The other curious observation about these insects is that there are only males around for at least two weeks before the females emerge. What is that about? There is obviously more to discover about this mycetophilid before I can come to some kind of understanding of it.

My main task this winter is to identify the specimens I have down to species if possible, and then see what they have to tell me about their lives. I have been doing literature searches online for papers that have keys that will allow me to identify these insects to species. Most of the material I have found is very old, and largely focuses on the eastern part of North America. I have seen a few papers covering parts of California and British Columbia, but nothing for the Great Basin. I am going to Washington State University in the near future to continue the search in their bound volumes of Zoological Record and various journals. I've been told by the library there that I won't be allowed to access their online sources as I am not connected with any institution, most particularly not one that has some kind of agreement with them. But I am hopeful that I can look through their bound volumes. This may be the most difficult part of this study.

The other question is whether I keep the Malaise trap up in the aspen forest in the Bloody Run Mountains over winter, to see if I can learn something more about *Boletina*, or do I take it down so I will be sure of having it to use next year? I have some big plans for 2022, so I need all the traps I currently have, and some more beyond that.

Recent Acquisition at LACM

Giar-Ann Kung

Natural History Museum of Los Angeles County, Entomology Section, 900 Exposition Blvd.,
Los Angeles, CA 90007, USA; gkung@nhm.org

The American Entomological Institute (Henry and Marjorie Townes) Diptera collection, excluding Chironomidae, was donated to the Natural History Museum of Los Angeles County (LACM). The AEI collection had been relocated to the University of Utah in 2016 and became part of the university collection (EMUS). In December 2020, after re-evaluating their recently refurbished collection space, EMUS decided to offer the Diptera collection to LACM. Due to the pandemic, we were unable to retrieve the collection until this past summer, when we drove up to Logan to pick it up. The collection has been transferred from cigar boxes, Schmitt and other insect boxes into drawers, and will be integrated into the collection beginning next year. This collection adds an estimated 10,000 specimens to our nearly 1 million Diptera specimens.

A call for newly collected Sciomyzidae

Linley M. Sherin

Lyman Entomological Museum, McGill University, 21111 Lakeshore Dr,
Sainte-Anne-de-Bellevue, Quebec H9X 3V9, Canada; linley.sherin@mail.mcgill.ca

My fellow scientists and I at the Lyman Entomological Museum (<http://www.lymanlab.ca/>) are looking for fresh specimens of Sciomyzidae for a new project investigating their evolutionary history.

Our hope in putting out this call is to reach **active collectors who may be able to collect for us this coming Spring/Summer**, though we are also interested in previously collected material that has been preserved in ethanol.

The Project:

The goal of this project is to investigate life-history transitions and host-associations in Sciomyzidae. The plan is to acquire genomic data (using sequencing of UCEs) from ~96 species to generate a phylogeny, and then use this phylogeny to investigate macroevolutionary patterns in Sciomyzidae.

We aim to use a taxon sampling that is representative both in terms of taxonomy and geographic distribution to maximize our ability to ask relevant biological and evolutionary questions. We have already secured funding for the sequencing, but we need access to specimens preserved in ethanol or freshly pinned. If possible, we would like to remove ~3 legs for DNA extraction and preserve the remainder as vouchers. DNA extractions and sequencing will be carried out at the Lyman Entomological Museum.

The Need:

Currently, we have collected representatives from 13 genera in the northeastern Nearctic thanks to contributions made by collaborators this past summer. However, as stated above, we are hoping to expand our sampling effort to other geographical regions, as well as continue to increase the number of genera we have represented within the Nearctic.

Within the Nearctic, we are still looking for the following genera: *Anticheta*, *Colobaea*, *Dictyacium*, *Euthycera*, *Hedria*, *Hoplodictya*, *Oidematops*, *Pherbecta*. Outside of the Nearctic, we are happy to accept any specimens made available to us.

We greatly value taxonomic contributions and provision of specimens, because we understand that acquiring taxonomic expertise and collecting specimens in the field is not just a simple matter of donating a few specimens. For this reason, we are happy to involve all contributors as collaborators in the project. Collaborators will have the opportunity to determine the degree of involvement they would like to have following identifications or provision of specimens.

For more information, feel free to get in touch with me (Linley Sherin, linley.sherin@mail.mcgill.ca) or my advisor Dr. Jessica Gillung (jessica.gillung@mcgill.ca). We are more than happy to discuss the project in more detail.

HISTORICAL DIPTEROLOGY

José Celestino Mutis and the little-known history of the discovery of the human bot fly, *Dermatobia hominis* (Linnaeus, 1781) (Diptera: Oestridae)

Neal L. Evenhuis

Bernice Pauahi Bishop Museum, 1525 Bernice Street,
Honolulu, Hawai'i 96817, USA; neale@bishopmuseum.org

The human bot fly, *Dermatobia hominis* (Linnaeus, 1781) is fairly well-known worldwide for its penchant to use humans (it hits a number of other animals as well) in order to complete its life cycle, where the larva lives out its life beneath the skin of its host. Some entomologists consider it a badge of honor to have purposefully endured the discomfort and pain to be able to boast that they let the fly use their body as a host. However, more often than not, the volunteering hosts abandon the effort when the discomfort gets to be too overwhelming to endure the “experiment” any further. The fly occurs naturally in the tropics of America from Mexico in Central America south to southern South America. Records of people from other parts of the world inadvertently hosting larvae show they all had recently traveled to the tropical Americas. Much has been written about the biology of the fly, but little has been written about who had discovered it and how it got its scientific name published.

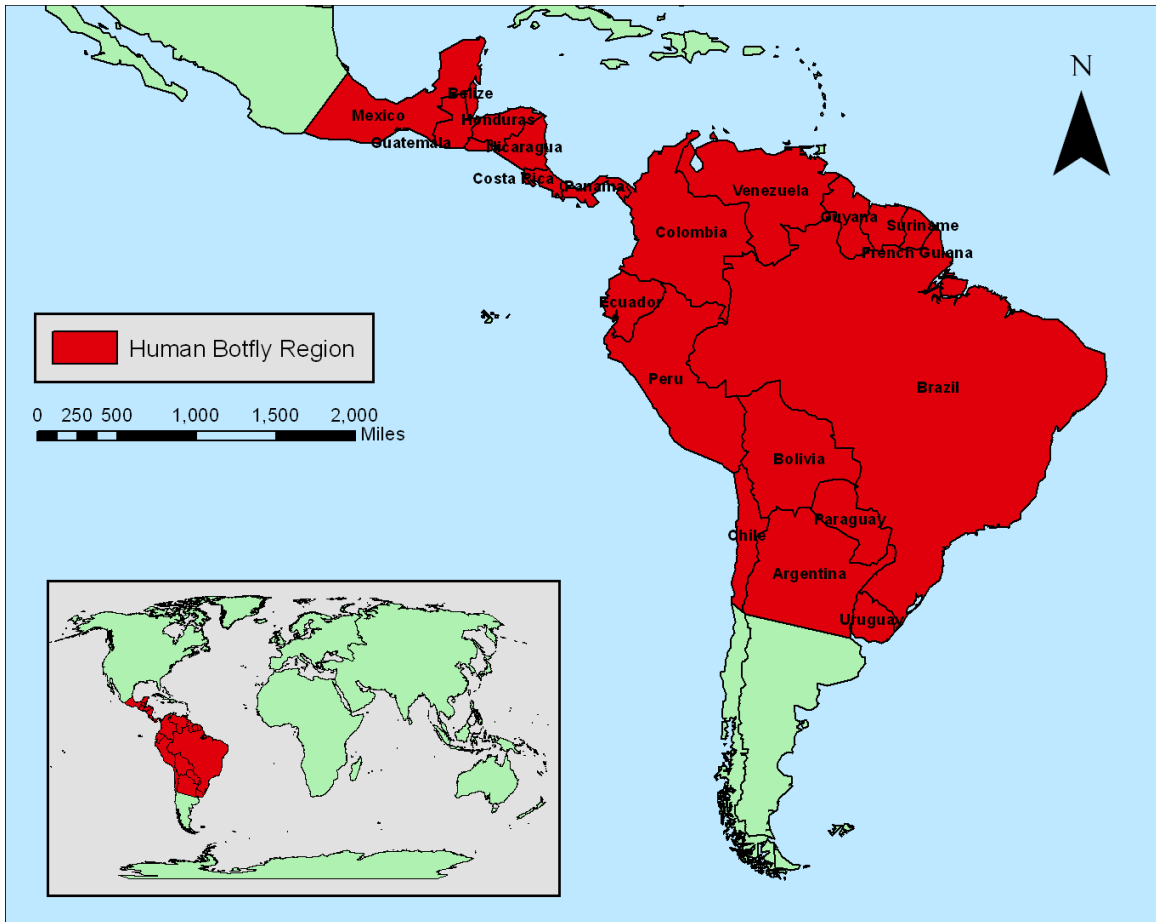
The story does not begin with Linnaeus (actually Linnaeus’s son, Carl Jr.) (not of hamburger fame), who described the fly in a letter to Pallas. Instead, it involves the Spanish doctor-priest, José Celestino Bruno Mutis (1732–1808). Mutis is little known outside of South America, but he is highly regarded in Colombia for having brought science to the country, for his early interest and inventorying of its fauna and flora, and for leading the first botanical expedition of the Colombian area.

Mutis was born in Cádiz, Spain, attended grammar school in the local Jesuits school, and studied medicine at the Royal College of Surgery at Cadíz and the University of Seville. After getting his diploma in medicine, he taught anatomy in Madrid for two years, while also studying botany and other natural sciences under botanist Miguel Barondes; and astronomy, and mathematics under the mentorship of other scientists.

In 1760, Mutis was appointed as personal physician to the newly elected Viceroy of New Granada, Pedro Messía de la Cerda. This happened no doubt because of the close association with Mutis as a physician in the court of Pedro Virgili, who founded the College



Statue of José Celestino Mutis at the Botanical Gardens in Bogotá. Photo: Wikimedia.



Distribution of *Dermatobia hominis*. Source: Wikimedia.

of Surgery in Cadíz in 1748. In late 1760, Mutis left Cadíz and traveled with the new Viceroy to South America. After landing in Cartagena and traveling overland, Mutis arrived in Bogotá in February 1761 to a virtual scientific vacuum. Mutis immediately filled that gap by forming a department of Mathematics and teaching physical sciences at the Universidad del Rosario in Santa Fe de Bogotá, which allowed him to explain Newtonian and Copernican theories. During these years at the university, he established a large scientific library and also the first astronomical observatory in the Western Hemisphere. However, his teachings about Copernican heliocentric astronomy upset the Dominican teachers at the Universidad Santo Tomás who protested to the Spanish Inquisition whereupon, in 1774, Mutis was forced to defend his Newtonian and Copernican teachings. Mutis wrote to the Viceroy Manuel de Guirior explaining his predicament, and the Viceroy backed Mutis's teachings. Also, it was a shock to the Inquisition to find out that the King of Spain had actually ordered Newtonian physics to be taught at Spanish universities. Seeing a possible conflict with the King, the case was deferred to the Suprema in Spain, who filed it away and nothing further was done. Ironically (or coincidentally), it was at this same time that Mutis was ordained by the Church as a secular priest.

Although teaching physics, mathematics, and astronomy, it was the natural sciences that held the interest of Mutis. While studying in Cadíz, the presence there of some of Linnaeus's "apostles" including Pehr Löfling, Frédéric Logié and Clas Alströmer (some of whom had botanized the area around Cadíz with Mutis), had a great influence on Mutis. Through the introduction to and collaboration with these apostles, Mutis sent Linnaeus some of his Cadíz collections. One of the

apostles, Clas Alströmer, wrote to Linnaeus about Mutis saying he would be going to America with Viceroy de la Cerda. When Linnaeus heard this he wrote Mutis (the letter waiting for Mutis in Bogotá), requesting that the young scientist-doctor collect plants and animals for him and make observations on the ants there, and send consignments of specimens back to Sweden via couriers. The interest Linnaeus had in the resulting collections Mutis made for him are evident in the extremely cordial correspondence that survives between the two (some letters from Colombia to Europe or vice versa became lost in transit due to war as the English fleet attacked Havana and blockaded shipments). In addition, Linnaeus promised to name a new genus of plants for him, ensure his election to the Swedish Academy of Sciences, and, if and when he returned to Spain, to personally meet him.

With this encouragement from Linnaeus, Mutis focused on his interest in botany and made extensive collections throughout the forty-two years he lived in South America, successfully sending many specimens back to Sweden (although many other shipments were lost or destroyed by insects during transit). Mutis had hoped for a Spanish-led natural history expedition of New Granada from early after his arrival and submitted two proposals (the first in 1763) to the King of Spain for a royal expedition and to establish a botanical garden in Bogotá, both of which were rejected. Twenty years after his first proposal, his aspirations were rewarded by the new King Charles III, who had training in botany. In 1783, he accepted an appointment from the King as the director of the Royal Botanical Expedition to the New Kingdom of Granada.

During the 20-year long wait, Mutis had been assigned by the Viceroy to be the local physician and to supervise the silver mining in Colombia: first in San Antonio del Real de Montuosa Baja near Pamplona (ca. 500 km northeast of Bogotá), where he lived from 1766 to 1770; then the Ibagué mines (ca. 200 km west of Bogota, where he lived from 1774 to 1793. It was at the latter location that Mutis made many collections of plants and animals of the area, and made extensive natural history observations, many with the assistance of local naturalists.

As the doctor to the mine workers and other locals, Mutis saw many people complaining of worms that infected humans. Some, including small infants, had dozens at one time. The insistence of the locals that they were mosquitoes puzzled Mutis. With one of his local assistants, amateur naturalist, André Ribero, Mutis studied the flies that attacked humans and burrowed into the skin. Mutis kept detailed diaries and in October 1777 Mutis said it was his greatest desire to understand the biology of what the locals called the “*gusanos zancudos*” (mosquito worm).

After a year of studying the habits of the flies by Mutis and Ribero and others, the mystery was partially solved the following summer. In July 1778, Mutis noticed that eggs were attached to an unsuspecting fly, and when it landed, the eggs hatched and the larvae burrowed into the skin. The larva formed a “tumor” where it fed until it completed its larval stage, whereupon it dropped to the ground and pupated. Volunteers for Mutis collected the hardened cocoons and gave them to Mutis to rear. After the adults emerged, he saw that they were large flies looking like house flies. He had already seen the bot flies of cows and horses, called “*nuche*” by the locals, and knew them as being of the genus *Oestrus*. Noticing also that these were similar to but different from the bot flies that attacked cattle and horses, he called them “*Oestrus humanus*” in his diaries. Mutis got part of the biology correct but was still confusing the housefly with the attached eggs to be the botfly. In actuality, the botfly captures a mosquito, or fly, or tick and lays eggs on them. When that fly or tick lands on a warm-blooded animal, e.g. a human, the temperature change triggers the eggs to hatch and burrow into a wound or hair follicles.



Adult *Dermatobia hominis*. Photo © Alex Wild Photography.

Shortly after Linnaeus passed away in 1778, his son Carolus Linnaeus, Jr., wrote to Mutis to inform him of his father's death and to let him know he appreciated the collaboration between he and his father and wished to continue it. On 12 September 1778, Mutis responded with a long letter of appreciation of the continued collaboration. In it, he made apologies for not being able to attend to his duties as superintendent of the mines because of an illness suffered because of an insect that had attacked his leg. He followed with a somewhat detailed account of the biology of this new fly:

“As far as I can discover from the records of travellers, the species is entirely new. It may be named *Oestrus hominis*, very widely differing from all others of this genus, especially from the *Oestrus bovis*, likewise very frequent here, which is so fully described by Reaumur. I find no account in any scientific traveller, nor in any descriptive work, answering to our insect ; which is about the size of a common house-fly, *Musca domestica*. The body of the female is covered with a number of little imbricated tubes, formed like a wasp's nest, lodging above fifty minute larvae, or maggots. Her resemblance to a common fly causes her approach to be viewed without apprehension, by those who have never experienced the dreadful mischief she brings. Her pernicious progeny readily quit their retreat, and she confides them to our unsuspecting care for food, education, and even transformation, if our patience should so far endure, and with scarcely any compunction for what she has inflicted upon us, she takes her leave, speedily to perish herself. On the 24th of May last I was fortunate enough to dislodge one of these pernicious intruders from my arm, just in time to prevent the greater part of its mischief, and without much difficulty.” [letter of 12 September 1778 from Mutis to Linnaeus, Jr.; translated to English in Smith (1821)].

After receiving the letter (assumed to be in early 1780), Linnaeus Jr. was so fascinated about this observation, he wrote to Dru Drury on 10 March 1780 (Papavero 1971) and again to Peter Simon Pallas on 24 March 1780 (the latter who published the letter in 1781) with the following details:

“Ich hoffe diesen Sommer aus Südamerika die Art *Oestrus*, welche die Menschen in Peru plagt, und wovon man in Europa noch nichts gewutzt hat, zu erhalten. Diese Fliege legt ihrer Eier oder vielmehr schon lebendige Maden, deren sie den fünfzig am Hinterleibe herumträgt, eine nach andern auf die Haut des Menschen; der Wurm bohrt sich sogleich ein, und wächst ein halbes Jahr lang. Sucht man durch äusserliche Salben oder andre Mittel den Gast wegzubringen, so wühlt er sich tiefer in den Muskeln hinein, und verursacht tödliche und schreckliche Schmerzen. Ueberlässt man ihn aber sich selbst, wie man es weislich zu thun pflegt, so kommt er gegen die Verwandlungszeit selbst hervor, und wird zu einer schwärzlichen (sulcus) Fliege, nicht viel grösser als die gemeine hausfliege; *Oestrus hominis*.” [This summer I hope to honor the species *Oestrus* from South America, which plagues the people in Peru and which has not yet been used in Europe. This fly lays its eggs, or rather already living maggots, which she carries around fifty on her abdomen, one after another on the skin of the human being; the worm bores itself immediately and grows for half a year. If one tries to take the guest away by external ointments or other means, he digs his way deeper into the muscles and causes fatal and terrible pain. If, however, it is left to its own devices, as is wisely done, it emerges towards the time of metamorphosis itself and becomes a blackish (sulcus) fly, not much larger than the common house fly; *Oestrus hominis*.] (Pallas, 1781: 157–158).

The juxtaposition of both letters makes for an interesting exercise to see how the description by Linnaeus, Jr. differs from that given to him by Mutis, including the addition by Linnaeus, Jr. of some characters not mentioned by Mutis, namely that the larva grow for half a year (the usual time of the larvae within the host is from four to ten weeks, with the average about eight).

No specimens were ever sent by Mutis to Linnaeus (if so, they did not survive the transit from Colombia to Europe). So, we have a new fly species based only on a letter that was also based on a letter. The fact that Pallas quoted the words of Linnaeus, Jr. (translated from Latin to German) makes Linnaeus, Jr. the author of the species in Pallas’s 1781 publication; and to most biologists, the person who first observed, studied, collected, reared, described, and named the species (José Celestino Mutis) had been lost to science — until now.

NB: The location Linnaeus, Jr. gave for the fly in his letter to Pallas is “Peru”. The term “Peru” in the late 1700s referred to the Spanish administration of Peru, which included Peru, Colombia, and Venezuela. As determined from his diaries, the actual type locality of *Oestrus hominis* is the Ibagué Sapo mines of Colombia (southwest of Bogotá), where Mutis resided and made his observations.

References

- Pallas, P.S. 1781. 8. Aus einem lateinischen Schreiben des jüngern Herrn Carl von Linné vom 24 März 1780, pp. 157–158. In: Kurze Nachrichten und Auszüge aus Briefen. *Neue Nordische Beyträge Physikalischen und Geographischen Erd- und Völkerbeschreibung, Naturgeschichte und Oekonomie* 1: 151-168.
- Papavero, N. 1971. *Essays on the history of Neotropical dipterology, with special reference to collectors (1750–1905)*. Vol. I. Museu de Zoologia, Universidade de São Paulo, São Paulo. 216 pp.
- Smith, J.E. 1821. *A selection of the correspondence of Linnaeus, and other naturalists, from the original manuscripts*. In two volumes. Vol. II. Longman, Hurst, Rees, Orme, and Brown, London. 580 + [26] pp.

Bibliography

Sources consulted for much of the biographical material used here include the following:

- González de Posada, F. & Ozonas, B.R. 2009. Cronobiografía sincronizada de José Celestino Mutis, pp. 17–42. In: Ozonas, B.R. (ed.), *José Celestino Mutis en el bicentenario de su fallecimiento (1808–2008)*. Real Academia Nacional de Farmacia, Madrid.
- Gredilla, A.F. 1911. *Biografía de José Celestino Mutis con la relación de su viaje y estudios practicados en el Nuevo Reino de Granada*. Portanet, Madrid. 712 pp.
- Lea, H.C. 1908. *The Inquisition in the Spanish dependencies. Sicily–Naples–Sardinia–Milan–The Canaries–Mexico–Peru–New Granada*. MacMillan, New York. 564 pp.
- Mutis, J.C. 1957. *Diario de observaciones de José Celestino Mutis, 1760–1790. Transcripción, prólogo y notas de Guillermo Hernández de Alba*. Tomo I. Editorial Minerva, Bogotá. 492 pp.
- Mutis, J.C. 1958. *Diario de observaciones de José Celestino Mutis, 1760–1790. Transcripción, prólogo y notas de Guillermo Hernández de Alba*. Tomo II. Editorial Minerva, Bogotá. 691 pp.
- Ozonas, B.R. 2009. José Celestino Mutis, amistad y colaboración con Carlos Linneo, pp. 123–149. In: Ozonas, B.R. (ed.), *José Celestino Mutis en el bicentenario de su fallecimiento (1808–2008)*. Real Academia Nacional de Farmacia, Madrid.
- Wilson, E.O. & Gómez Duran, J.M. 2010. *Kingdom of ants. José Celestino Mutis and the dawn of natural history in the New World*. Johns Hopkins University Press, Baltimore. 95 pp.

PHILAMYIANY

Introducing a new section of *Fly Times* – Philamyiany

Stephen D. Gaimari

Plant Pest Diagnostics Branch, California Department of Food & Agriculture,
3294 Meadowview Road, Sacramento, California 95832, USA; sgaimari@dipterists.org

This new section, which will appear whenever suitable articles are submitted, is about the “things” we collect that display our love of Diptera. That is, to convey that we are myiaphiles (sure, dipterophiles works too). The diversity of dipterological “collectibles” is quite high, which is what I hope to have highlighted in this new section. This idea was sparked in the last issue (*Fly Times* 66), with Jens-Hermann Stuke contributing an article about Diptera on stamps, being the first in his series on this topic. Of course stamp collecting (philately) is a very popular hobby worldwide, and in general insects are certainly a popular theme for philatelists. So, it is no surprise that a topic such as Diptera can be focal area, and there are likely others among us who also collect Diptera-related stamps. In the last issue, Jens-Hermann’s article covered Asilidae on stamps; the article in the present issue covers Tephritoidea, and there is at least one more coming for 2022, and hopefully more!

These kinds of collections have always been of interest to me, as I am sure is the case for many of the “collector” types here (or should I say “obsessive collector” types). For my part, collecting *stuff* has always been an important aspect of my life, some subjects with more passion than others, and some that have come and gone. I also collect stamps, although not with such a tight focus in my modest efforts at philately. One of my larger (and longest-lived) collections is matchcovers and matchboxes (phillumeny), but I will say that the number of dipterocentric matchcovers that I have found is pretty slim. Insects for a phillumunist are not very common, although those that do exist are dominated by Lepidoptera of course, with a fair number featuring beetles and bees. But flies, not so much, except for the occasional ads for pest control! I have not really explored matchbox labels (another area of phillumeny), so maybe there is hope there! I am also sure there are many bibliophiles here – I am among those who love and collect antiquarian books about flies. There are a lot more of those than matchcovers, for sure. And of course, there are many, many more things that we collect, which hopefully will be presented here for all of us to see!

So to start off this new section, we first have another entry from Jens Hermann on stamps, and following that I have a contribution introducing one of my own larger collections. Of course there are innumerable possibilities here, so hopefully some of you will be inspired to share some of the collections you make (outside of the flies themselves!).

Diptera on stamps: (2) Tephritoidea

Jens-Hermann Stuke

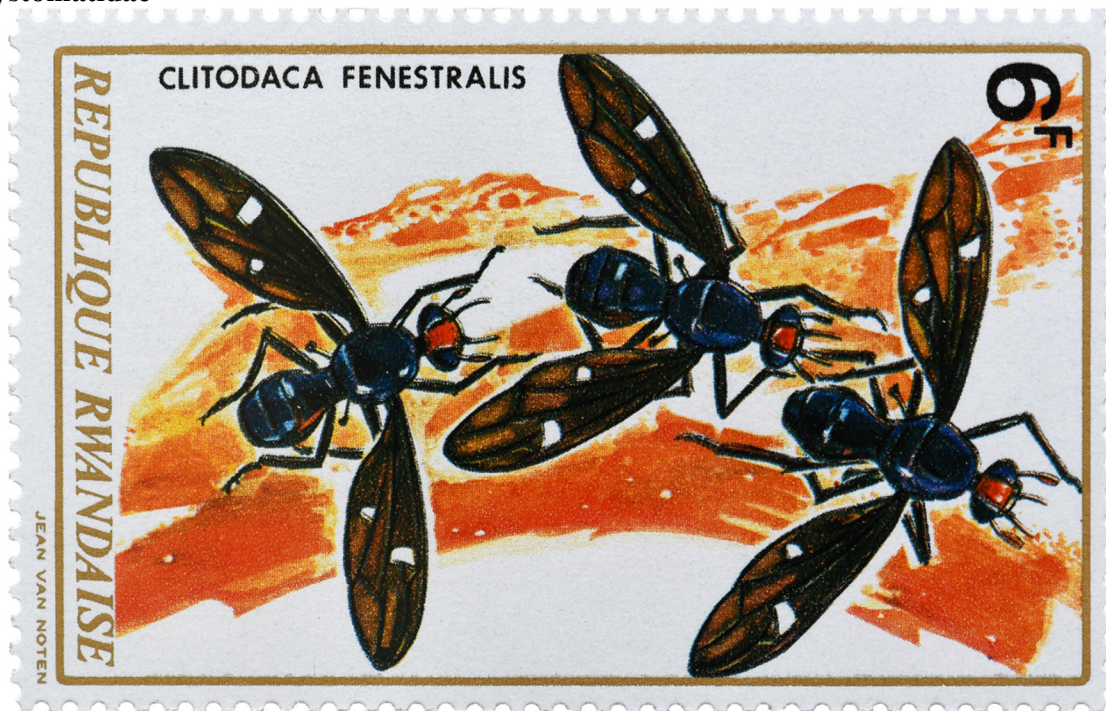
Roter Weg 22, 26789 Leer, Germany, jstuke@zfn.uni-bremen.de

This is the second contribution to my series discussing Diptera on postage stamps. This deals with the Tephritoidea, mainly comprising the fruit flies (Tephritidae) together with the only known stamp bearing a signal fly (Platystomatidae): in 1973 *Clitodoca fenestralis* was depicted on a stamp as being one of the most spectacular flies in Rwanda.

Tephritidae are, perhaps unsurprisingly, illustrated on stamps mainly as pests of economically important fruit crops such as oranges (PT 4674), olives (TR 2612, SI 551), cherries (SI 314) or melons (SB 744). The larva of *Ceratitis capitata* on PT 4674 is one of the very few Diptera larvae to be shown on a stamp. Beside the five stamps of Tephritidae presented here, there exists a beautiful sheet of some 24 stamps illustrated with different fruit fly species issued by the ICIPE in Kenya in 2011. These stamps were probably privately issued, however, and are therefore not included in detail in this review (see my first stamps article in the last *Fly Times* for the basis of inclusion). The main reason for this Kenya issue, however, is the beauty and diversity of fruit flies, which makes them ideal subjects for postage stamps. An example from this sheet bearing the image of *Ceratitis copelandi* is therefore shown below for interest.

For each stamp I have provided the country and year of issue, title of stamp, title of stamp series (where available/relevant), face value, Michel number and stamp number (the latter both taken from <https://colnect.com/>).

Platystomatidae

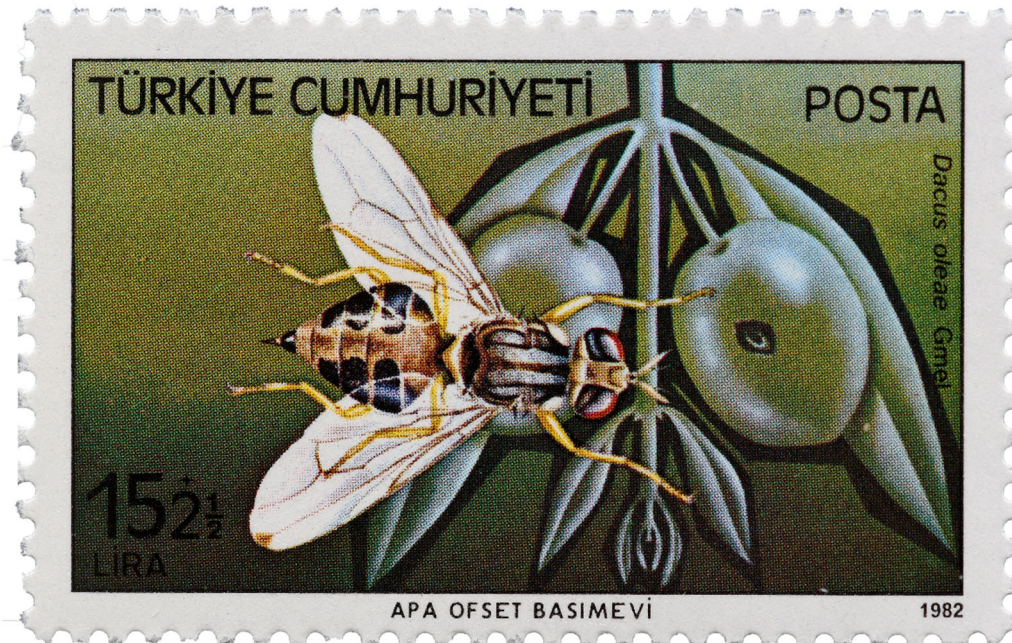


Clitodoca fenestralis (MACQUART,1843) – Rwanda 1973: *Clitodoca fenestralis*, 6 Rwanda franc. – Michel number: RW 543A; stamp number: RW 500.

Tephritidae



Bactrocera oleae (Rossi, 1790) – Slovenia 2003: Oljčna muha, B, no face value. – Michel number: SI 433; stamp number: SI 529.



Bactrocera oleae (Rossi, 1790) – Turkey 1982: *Dacus oleae* Gmel, 15+2½ Turkish lira. – Michel number: TR 2612; stamp number: TR B191.



Ceratitis copelandi DE MEYER & FREIDBERG, 2006 – Kenya 2011: *Ceratitis copelandi* [2011 Insects - The 40th Anniversary of ICIPE - International Centre of Insect Physiology and Ecology], 95 Kenyan shilling. – probably privately-issued stamp.



Ceratitis capitata (WIEDEMANN, 1824) – Portugal 2020: Mosca-da-fruta, *Ceratitis capitata* [Ano internacional da sandidade vegetal], 0.91 Euro. – Michel number: PT 4674; stamp number: PT 4275.



Rhagoletis cerasi (LINNAEUS, 1758) – Slovenia 2000: Češnjeva muha, 5 Slovenian tolar. – Michel number: SI 314; stamp number: SI 427.



Zeugodacus cucurbitae (COQUILLET, 1849) – Solomon Islands 1991: Melon fly, *Dacus cucurbitae* [Crop pests], 25 Solomon Islands cent. – Michel number: SB 744; stamp number: SB 684.

Acknowledgement

Thanks to David Clements who checked the manuscript! Any comments concerning either the identification of the Diptera shown or references to overlooked stamps would be very welcome!

Diptera Trading Cards and Trade Cards (I)

Stephen D. Gaimari

Plant Pest Diagnostics Branch, California Department of Food & Agriculture,
3294 Meadowview Road, Sacramento, California 95832, USA; sgaimari@dipterists.org

Most of us probably know what trading cards are. At least in the US, the best-known trading cards are of the baseball variety. But there is a long history well outside of sports cards for these collectibles, covering topics as broad as you can imagine. These kinds of cards started as “trade cards”, which as the name implies, were based on advertising someone’s trade, or a business, or a product. Later, some were released by publishing houses, being educational or informational. They were for spreading the word. And yes, there are a lot of insect-focused cards, including those focused on (or at least peripherally including) Diptera. That is what I collect – cards that are specifically focused on flies, or at least surreptitiously including them (like a card focused on a spider, but with a fly as prey). That focus rarely had much of anything to do with the product itself (except in the cases advertising insect control products, of which there are a good number), but rather the interesting image and information provided was the hook to get you to read the back of the card and see who issued the card, the advertiser. Trade cards were an important advertising tool as early as the late 17th century in places like Paris and London, and became a major form of advertising with engraving techniques, and by the early 19th century lithography had taken over this market allowing more substantial, and less expensive, print runs. By the mid to late 19th century, chromolithography and multi-color offset printing made such cards even more widespread and interesting. This time period was the heyday for such trade cards.

I collect a variety of different kinds of cards, but a main focus is on Victorian era, antique, and vintage cards. Although I also collect some contemporary cards (like game cards), I more or less avoid the photograph-based cards, with some exceptions (and yes, I also collect sports cards...). My favorite cards are those from the Victorian era. As there are various types of trade cards, each type could have an article of its own. For this first article, I present some examples of oversized Victorian advertising cards. That is, they are larger than wallet-sized and are from the late 19th century. This leaves out a number of types of cards, including the massive run of trade cards from “Liebig”, which is one of the more famous businesses to publish advertising cards, issuing more than 11,000 different cards in nearly 2000 sets over more than 100 years, between 1870 and 1975. This also excludes the smaller cards, which are more numerous and include things like cigarette cards, tea cards, confectionary cards, etc. These types of cards, and others, will be featured in future articles.

On the following pages are 10 of my Victorian era cards featuring flies. All of these are American cards, but there is also a vast array of cards particularly from Europe which will be featured in future articles. When the card has text on the reverse side, an image of the back is also provided, while the backs are not shown for blanks. Cards are presented in their actual sizes unless otherwise noted.



This advertising trade card from 1889 was for Clark's Spool Cotton, O.N.T. (= Our New Thread). George Clark, based in Newark, New Jersey, was famous for inventing the first thread that worked reliably in sewing machines. Clark's produced many trade cards throughout the 19th century. The image of a baby contemplating a dipteran bore the title "Born to be a philosopher". The image here for this trade card is reduced from the original, which was 9.5 cm X 9.5 cm, and which had clearly been hung on up using a thumb tack, judging by the hole at the top. It was common at the time to hang up such decorative cards, so thumb tack holes are not uncommon, but another method of display was to put the cards in scrapbooks.



This oversized advertising trade card from 1894 was from the Woolson Spice Company in Toledo, Ohio, specifically advertising their Lion Coffee, with a mail-in offer for a 14 X 28 inch water color panel. In 1864 Lion Coffee became the first company to fine roast coffee beans for sale, replacing the previous practice of selling raw coffee beans for home preparation. Woolson Spice purchased Lion in 1882, and produced many such trade cards in an attempt to make Lion the major coffee brand in the world (it did become the second largest!). Their program of mail-in offers was at least partly responsible for having the US Postal Service initiate its bulk mail program. These are among the larger cards – the image for this trade card is reduced from the original, which is nearly 13 cm X 16 cm.

THIS BEAUTIFUL PICTURE FREE
TO DRINKERS OF LION COFFEE.

“MEDITATION,”
BEAUTIFUL
WATER COLOR PANEL,
14 x 28 inches.

This charming picture is colored in delicate water-color tints, the prevailing color being brown. Its artistic beauty is beyond description. The subject is unique, and suitable for either dining-room or parlor.

Mailed, postpaid for only 18 large Lion Heads cut from Lion Coffee wrappers, and a 2-cent stamp to pay postage. Two cents extra (total 4 cents) if tinned at top and bottom ready for hanging.

DIRECTIONS FOR MAILING.
Enclose your name and address in same envelope with the Lion Heads and stamp, state that you want “Meditation,” and whether you want it tinned ready for hanging. Address letters to

{ This offer
EXPIRES
Jan. 1st, 1895. }

WOOLSON SPICE CO.,
HURON & OAK STS.,
TOLEDO, O.

A Beautiful Picture Card like this in every package of Lion Coffee during the summer season, after which handsome Picture Cards will still be found in the packages, those for the Christmas season being particularly fine.



TOLL GATE No. 4.—SHOO! FLY! This picture contains an Elk, Peacock, Shark, Butterfly, Lion, Tiger, Rabbit, Book, Coat, Boot, Hair, Kake, Barrel, Caterpillar, Pigeon, Yard Stick, Snail, Match, Turtle, Owl, Rhinoceros, Antelope, Watch, Skull, Cat, Cow, Giraffe, Priest, Mummy, Humpty Dumpty, Squirrel, 5 Fishes, 2 Indians, 12 Faces, 3 Mice, 11 Dogs, 3 Eagles, 5 Letters, 5 Ducks, 2 Camels, 3 Elephants, 7 Men, 2 Monkeys, 2 Cymbals, 4 Birds, 4 Bears, 4 Goats, 8 Frogs, 2 Seals, 3 Beavers, 9 Sheep, 3 Ladies, 5 Horses, 5 Pigs, 2 Chickens, 4 Alligators, 2 Boys, 2 Babies, 2 Combs. Send postage if wanting the series of four Toll Gates, or pictures to distribute.

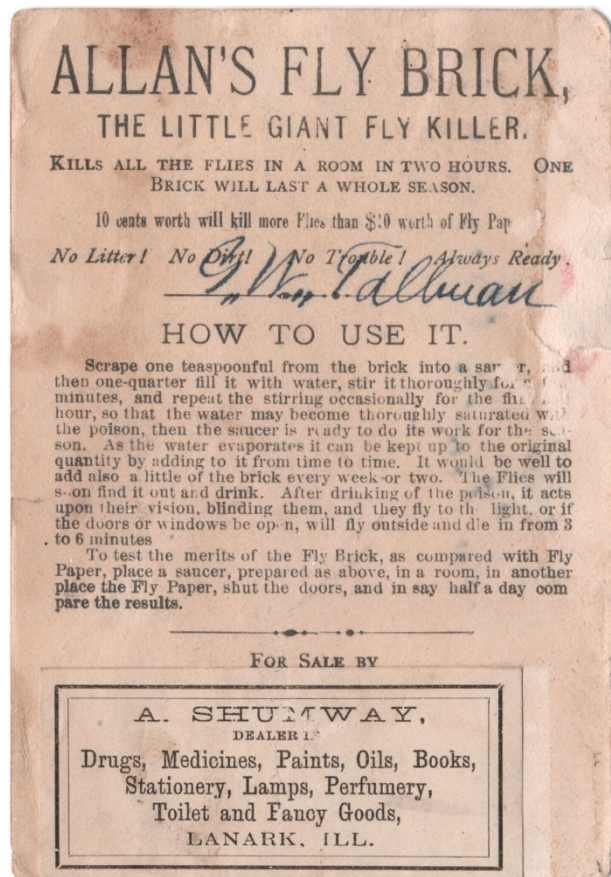
THE SEXUAL SYSTEM AND ITS DERANGEMENTS, greatly enlarged and improved, is the most condensed, yet most complete volume ever published. It is a moral book, for both sexes, clothed in plain and proper language, contains 19 illustrations, with portrait of author, and embraces the latest facts in Physiology, many never before in print, besides a vast amount of information not to be had elsewhere. 500,000 copies sold. Everyone should be fully informed upon these subjects, which involve the well-being of mankind. It is a false modesty and a wrong principle to keep the youth from becoming enlightened and perfect men and women. This book advocates such education openly, that evils may be averted, health preserved and lives saved. Manhood, Womanhood, Boyhood, Girlhood, Childhood, Sex, Beauty, Marriage, Anatomy, Physiology, Maternity, Diseases, etc., are among the topics. It explains the cause of nervous and sexual debility, languor, tiresome feelings, unsociability, bashfulness, cowardice, irritable temper, lack of confidence, forgetfulness, gloomy forebodings, lack of energy, despondency, unfitness for business, inability to reason or concentrate the mind or meet the gaze of others, confused understanding, thoughts of suicide, unfixedness of purpose, broken sleep, trembling, dizziness, staggering, soft muscles, weak back, pasty skin, hollow eyes, blunted senses, eruptions, scanty beard, and a thousand symptoms which make life miserable and a failure, and usher in Epilepsy, Palsy, Idiocy, Insanity, Nervous and all kinds of diseases, also how prevented and remedied. It also tells about "Dr. Smartweed Pierce, the King Humbug and Swindler." Sent secure, postpaid, for 10 cents; 3 for 25 cents. Agents sell it largely and get all the profit.

CUTAVACO! DR. ABBEY'S GREAT SPECIFIC FOR SKIN DISEASES. A new and positive cure for Blotched Face, Barber's Itch, Scall-head, Black-heads or Grubs, Salt Rheum, Papules, Erythema, Nettle Rash, Prurigo, Eczema, Prairie, Seven-Year, Camp or Army Itch, Branny Tetter, Ringworm, Liver Spots, Bald Spots, Dandruff, Tetter, Itch, Grog Blossom, Prickly Heat, Shingles, Scald Diseases, etc. From two to ten applications cure. It destroys Lice, stops Pain and Itching, prevents Inflammation, arrests Felons, Carbuncles and Swellings, cures Erysipelas, Frost Bites, Chilblains, neutralizes the Poison in Bites, Stings, and from Ivy, instantly stopping all Pain and Swelling, makes a specific gargle for Sore Throat, Quinsy, Catarrh, Spongy Gums, Foul Breath, cures offensive Ear Discharges, Leucorrhoea, stops hair from falling, and cures B... Most Skin Diseases are caused by a microscopic plant or animal growth in the skin. Cutavaco speedily and painlessly destroys this life without injuring the skin. The circular with each bottle and above book tell all about these diseases, giving new truths, and how a little specific medicine cures. Price, \$1.00 per bottle, 6 bottles for \$5. Sent by Express upon receipt of money.

This advertising trade card from 1884 was part of a series from Dr. Emery C. Abbey of Buffalo, New York, in which there are many hidden images within the engraving, making this particularly detailed. The list of images to find is the first paragraph, and although the fly is not listed, it is prominently displayed as standing on the card itself, and is the topic of the card's title "Shoo! Fly!". The back of the card advertises two products from Dr. Abbey, which you could get directly from him. First is his book "The Sexual System and its Derangements," being a moral book for both sexes, providing remedies and prevention for all manner of sexual issues and problems one could have! Second is his patent medicine "Cutavaco" which is his treatment for numerous skin diseases and other ailments. Interestingly, his book takes a shot at a "Dr. Smartweed Pierce (the King Humbug and Swindler)," who is actually a contemporary druggist listed in the directory of druggists at that time.



This advertising trade card from the 1880s is more straightforward in its use of flies, in that the advertisement is for a pesticide that specifically is meant to kill flies. Although the pictured insects are certainly flies (house flies and relatives), they are portrayed incorrectly, with two pairs of wings each. Allan's Fly Brick was one of many rat and fly poisons at the time with the active ingredient arsenic trioxide (As_2O_3), specifically 2.34% as a mixture with dolomite (quite low for many of these products). Besides pesticides, there are a fair number of cards depicting flies as advertisements for sticky fly paper. For this card, the bottom of the back side has a blank space under "For Sale By", where the store selling the product prints or puts a sticker for their company, in this case A. Shumway in Lanark, Illinois. Alvaro Shumway was a prominent druggist in Illinois at the time, who was also a Justice of the Peace for his county! Also, it is likely that the particular salesperson, G.W. Tallman, has also written his name on both sides of the card.



This late 19th century advertising card is an example where the card itself is available for multiple advertisers. On the right is a “blank” which gives the basic card with no advertising information, to be used by the advertiser to apply their own text and information to the front and back. So as a collector, you might find this card with any number of different advertisers, unlike those above where the card is solely produced for and used by the single advertiser. This blank is 7.5 cm X 11 cm.



In this card, the same design is used but is customized and produced using color lithography. The card is for Muzzy's Starch (a product of the Elkhart Starch Co. in Elkhart, Indiana), and bears a series of recipes using this product on the reverse side. The theme of the picture on the card is a more or less common kind, with children miniaturized and interacting with small animals. In this case, we are fortunate to have

them hunting a fly! This card was also available with a blank back side, for custom use by grocers who carry the product. For example, another exemplar has full details for a grocery store on the back side, and a stamp with the name of the grocer in the upper left corner of the front side.

Muzzy's Corn Starch is the whitest made

Lemon Pie.—The juice and grated rind of one lemon, one cup of water, one tablespoon Muzzy's corn starch, one cup sugar, one egg, a piece of butter size of a small egg. Boil the water, wet the corn starch with a little cold water and stir it in; when it boils up pour it on the sugar and butter; after it cools add the egg and lemon. Bake with an under and upper crust.

Custard Pie.—Beat the yolks of four eggs and the white of one with three spoonfuls of sugar, and milk enough to fill the tin. Beat the whites of three eggs to a froth and add one spoonful of sugar; spread over the top when done.

Mince Pie.—Chop the meat, apples and suet separately, and then measure the ingredients thus: Three hawks meat, three of apples, one of suet, one of citron cut in fine pieces, two of raisins, four of sugar, one of molasses, one of vinegar, nine of whisky or brandy; add powdered cloves, nutmeg and cinnamon.

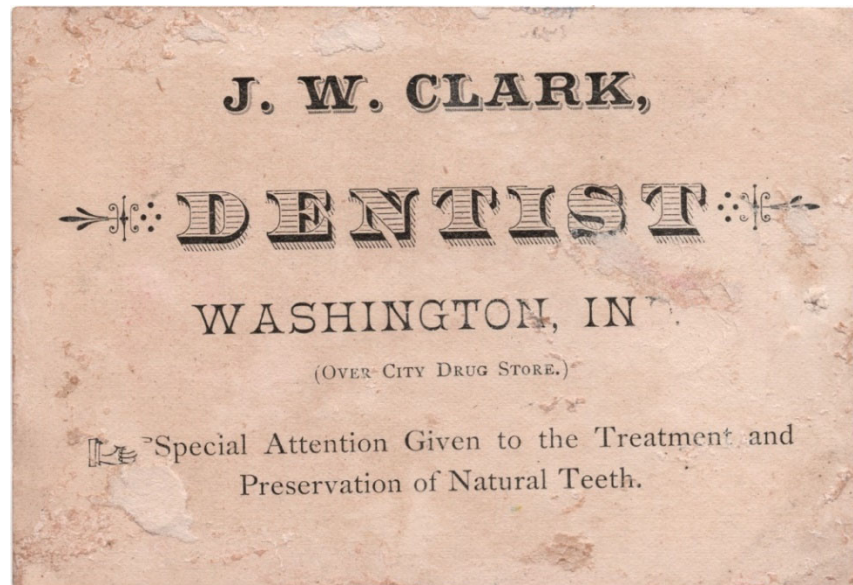
Cream Pie.—One pint of milk, scalded, two tablespoons of Muzzy's corn starch, three tablespoons of sugar, yolks of two eggs. Wet the starch with a little cold milk, beat the eggs and sugar until light, and stir the whole into the scalding milk. Flavor with lemon or vanilla and set aside to cool. Line a plate with pie crust and bake; fill it with cream and cover it with frosting made of the whites of the eggs, beaten dry, with two tablespoons of sugar. Bake a delicate brown.

A Very Rich Lemon Pie.—One large lemon, one teaspoon of butter (heaping), one and one-half cups of sugar, three eggs, one heaping teaspoon of flour, one-half glass of brandy. Grate the yellow part of the rind and squeeze the juice of the lemon; beat the butter and sugar to a cream with the yolks of the eggs; then stir in the grated rind and juice, flour and brandy; lastly, whip and stir in the whites. Bake with an under crust.

Cocoanut Pie.—One small cup of prepared cocoanut soaked in a pint of sweet milk, two powdered crackers, yolks of two eggs, four tablespoonfuls of sugar and a small lump of butter; mix all thoroughly and bake without upper crust. Beat the whites of two eggs well, and when the pie is done spread them evenly over the top, sprinkle over it a little sugar and set back in the oven until it is of a light brown.

Ice Cream.—Two tablespoonfuls of Muzzy's corn starch to one quart of milk; mix the corn with a small quantity of the milk, and flavor it; beat up two eggs. Heat the remainder of the milk to near boiling—then add the mixed corn, the eggs, four tablespoonfuls of sugar. Boil it two minutes, stirring it briskly. Freeze.

Soft Cookies.—Two cups thin cream, two cups sugar, three eggs, caraway (or not, as you like), flour sufficient to make it as thick as pancakes, two even teaspoonfuls of soda, drop with a spoon on buttered tins, and bake fifteen or twenty minutes.

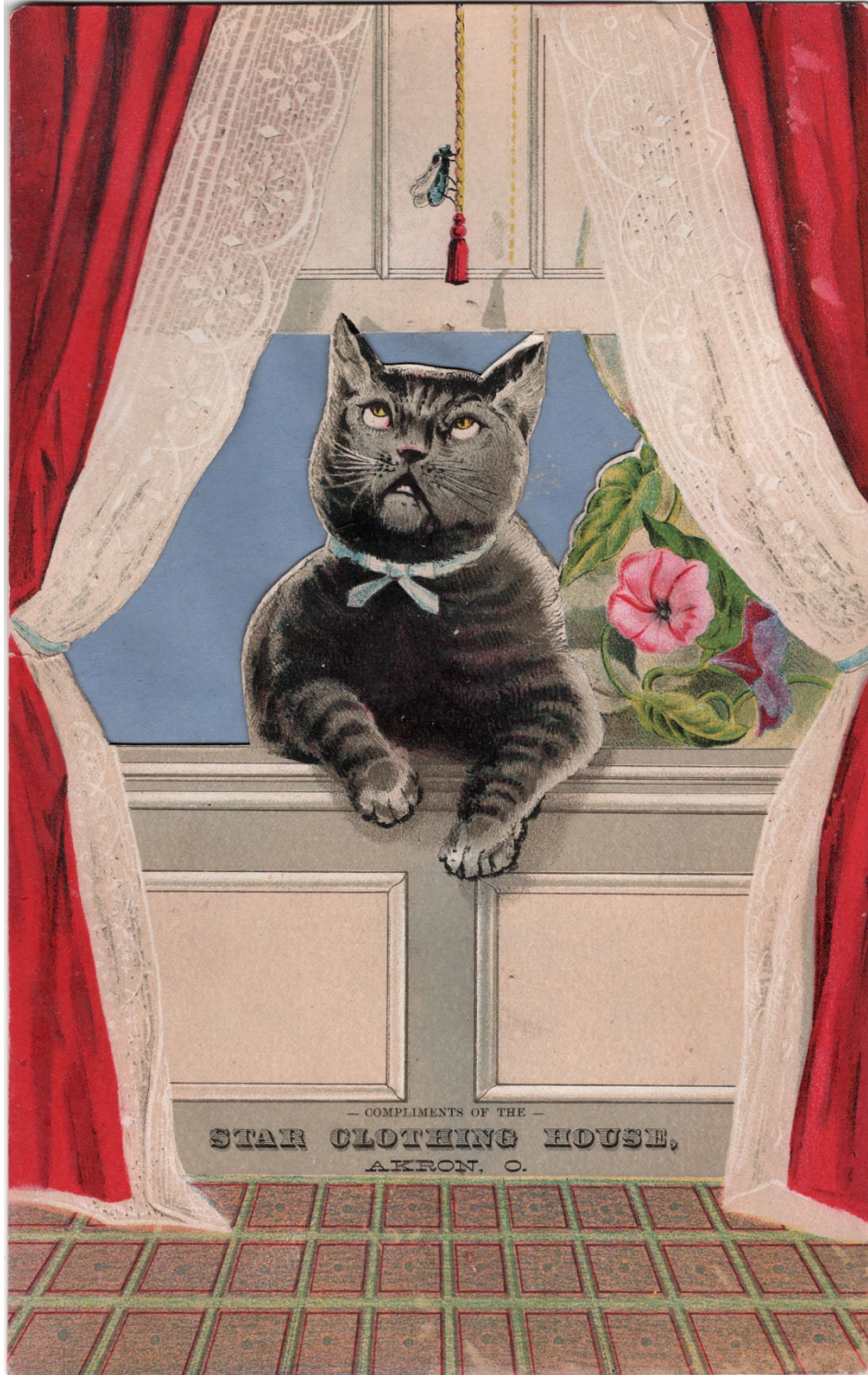


This late 19th century advertising trade card was a straightforward advertisement for the dental practice of J.W. Clark in Washington, Indiana, USA, with the card showing a bird (oddly with its head poked through a hole in a leaf) about to try to catch what appears to be a calliphorid fly.



THOMAS EARLS,
Dealer in
DRY GOODS, GROCERIES,
GLASS, QUEENSWARE, &c.,
DANVILLE, N. Y

This advertising trade card from the 1890s was part of a series of oversize cards displaying still life fruit displays to promote Alden Fruit Vinegar, a product of Alden & Bro., out of St. Louis, Missouri and New York, New York, that sold its product at this time in every state and territory of the United States except two. These cards were distributed to the grocers who sold their products, and they would have them stamped or printed with their individual grocery store information, in this case Thomas Earl's in Dansville, New York. This is the only one in the series with a fly, this one apparently interested in the cut orange. This is among the larger cards – the image for this trade card is reduced from the original, which is 13.5 cm high X 18 cm wide.



This oversized advertising trade card from the late 19th century is blank on the back side, with the advertisement solely on the front, being for the Star Clothing House in Akron, Ohio, a part of L. Schloss & Co. The card is actually die cut, with the blue outdoors behind the cat being a piece of blue paper glued to the back and visible through the cut out. This is my largest card – the image for this trade card is reduced from the original, which is 24.5 cm high X 15.5 cm wide.



And finally, this unmarked Victorian trade card wishes everyone a joyful season, complete with a fly! Usually, these kinds of cards would have a back side with an advertisement or something like “Compliments of” some business or tradesman, but mine is a blank.

MEETING NEWS

North American Dipterists Society Field Meeting in the Pinelands (aka Pine Barrens) of southern New Jersey June 13–17, 2022

Jon K. Gelhaus

The Academy of Natural Sciences of Drexel University, 1900 Ben Franklin Parkway
Philadelphia, Pennsylvania 19103-1195, USA; jkg78@drexel.edu; gelhaus@gmail.com

The next field meeting of the North American Dipterists Society will be held June 13-17, 2022 in southern New Jersey, in the heart of the New Jersey Pinelands, also known as the Pine Barrens. The New Jersey Pinelands includes “1.1 million acres and occupies 22% of New Jersey's land area and is the largest body of open space on the Mid-Atlantic seaboard between Richmond and Boston” (<https://www.nj.gov/pinelands/reserve/>). Located on the Outer Coastal Plain, it is an area of pine and oak dominated forest, sandy soils and naturally acidic bogs, marshes and rivers. The forest is maintained through fires (wild and prescribed) and the area includes natural open barrens. There is an impressive diversity of insect groups associated with arid habitats. The wetlands offer a rich diversity of aquatic and semi-aquatic Diptera groups including Tipuloidea, Ceratopogonidae, Chironomidae, Empidoidea and others. The Atlantic Coastal Plain, in which the New Jersey Pinelands encompasses the most northern extent, was recently designated a global Biodiversity Hotspot due to its high diversity of endemic plants and animals, and the conservation threats to this biota. Elevation is close to sea level.

THE MEETING VENUE

The host venue will be the Lighthouse Center for Natural Resource Education (<https://www.lighthousecenternj.org/>) in Waretown, New Jersey on Barnegat Bay. Lighthouse Center offers lodging with 48 rooms total, set up with each 2 rooms (each with 2 beds) sharing a bathroom (toilet, sink and shower). We have use of a large commercial and a smaller kitchen, a large dining area, conference room for presentations, and two areas we can use for specimen prep and study, including one with a wet lab. We will have multiple areas to explore in the nearby Pine Barrens, just a short distance from the Lighthouse Center. It is also close to airports and major highways, and only 1–3 hours drive from major cities of Washington DC, Philadelphia and New York City.

The meeting will be formatted similar to preceding Society field meetings, with arrival on Monday, an opening evening of welcome and information about the area, an evening of presentations (Tuesday), four days and nights of field exploration, and opportunity to visit the Academy's Diptera collection. I expect one or two dinners to be provided, allowing us additional chances to visit. The Biodiversity, Earth and Environmental Science department at Drexel University, where I am faculty, will provide vehicles to transport those who need it, and microscopes, and other supplies. The Entomology Department at the Academy will also provide supplies, including 100% ethanol, 75% ethanol, ethyl acetate, etc. The James Bossert and Chen Young Diptera Research Fund will also provide support.

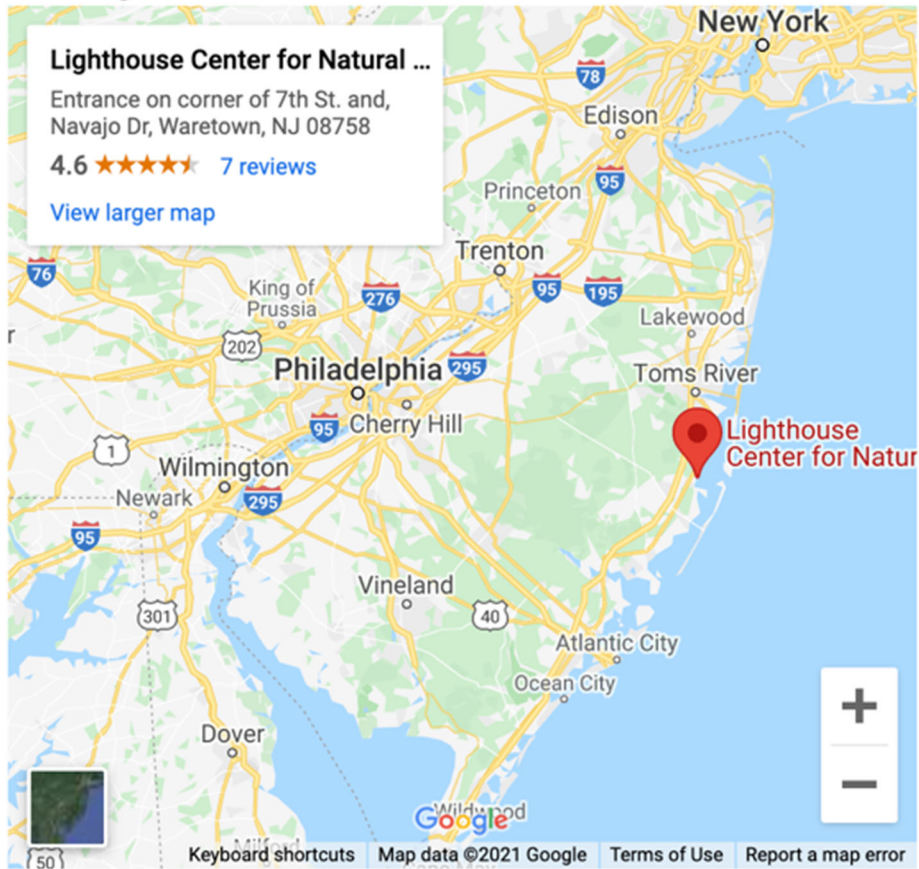


Figure 1. Map of the Lighthouse Center for Natural Resource Education showing its location in New Jersey (top) and the detailed map of the Lighthouse Center grounds and building (bottom). The address for directions to the Center is: 7th Street & Navajo Drive, Waretown, New Jersey 08758.



Figure 2. The area surrounding the various rustic buildings of the Lighthouse Center. The site was homesteaded in the 1800s, and served many decades as a summer camp for the blind. The mowed area allows for limited tent camping and is a great spot to light trap facing the woods.



Figure 3. Meeting room for presentations (upper left). Dining area at the Lighthouse Center (bottom left). Areas for prepping and studying specimens (upper and bottom right).

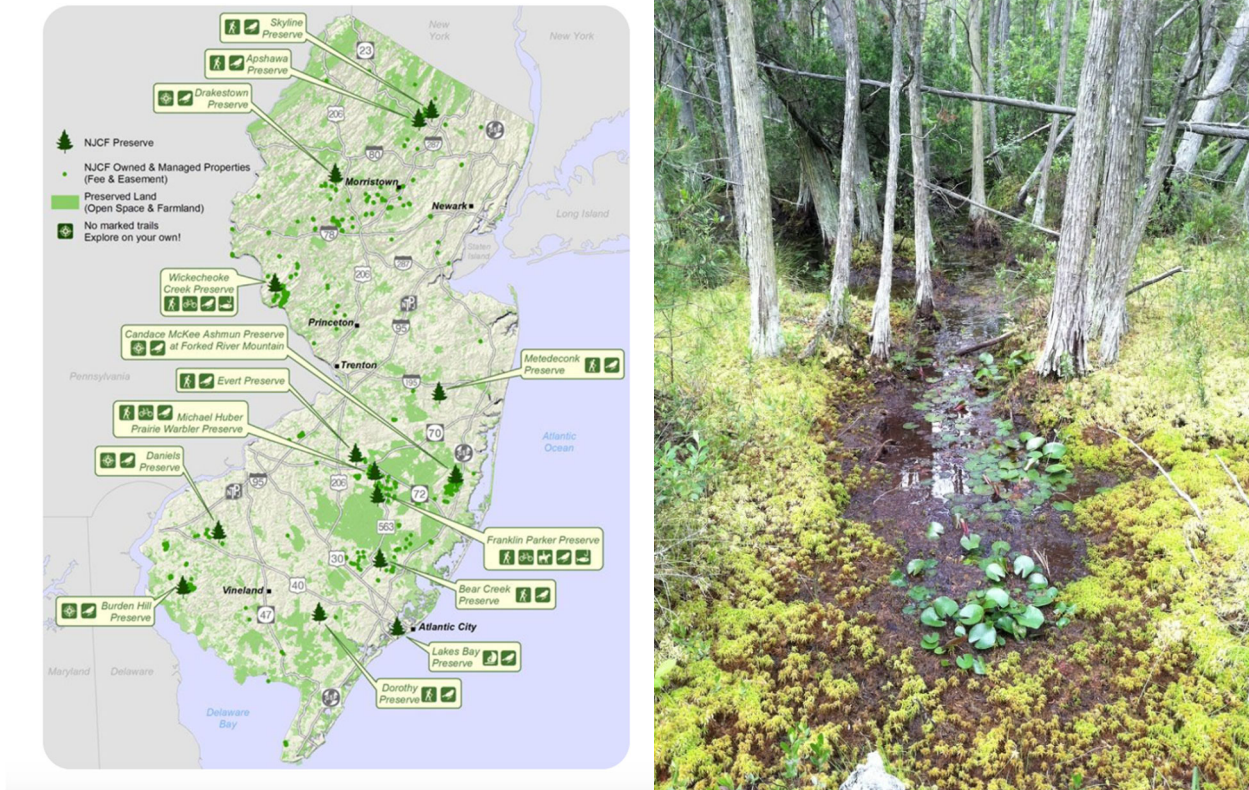


Figure 4. Map of current preserves managed by the New Jersey Conservation Foundation (left). Areas of focus for the Society field meeting will be the Franklin Parker Preserve, Huber Preserve, Evert Preserve and Ashmun Preserve. Typical Atlantic White Cedar and Sphagnum moss bog (right).

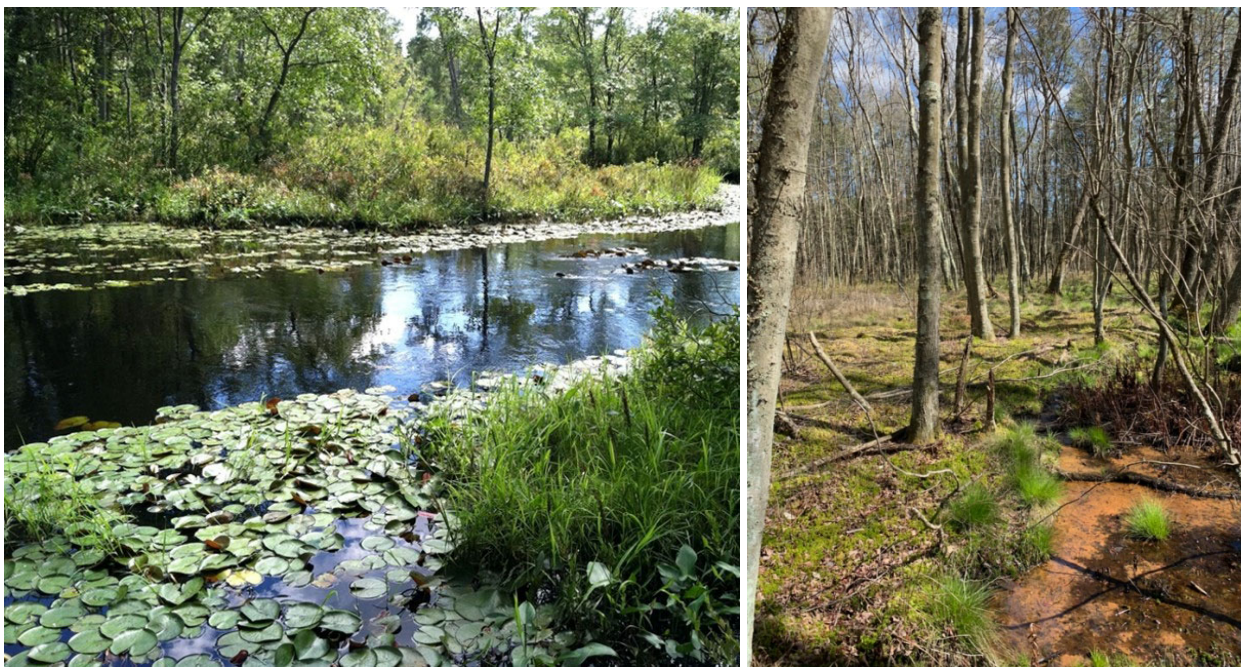


Figure 5. A bend in the Wading River running through the Parker Preserve (left) and a Red maple bog in Parker Preserve with extensive sphagnum cover, pH around 6. Cedar bogs can have pH of around 5.



Figure 6. A view across one of the converted cranberry bogs reverting to natural wetland (left) and a typical view of the upland pine-oak woodland and sand trails through Parker Preserve (right).

FIELD SITES: The Lighthouse Center property (where we are staying) encompasses nearly 200 acres of coastal forest, salt marsh and bay access giving a diversity of habitat right where the meeting is being held. The forests include upland oak/pine/hickory, with vernal wetland forest of holly, sweetgum, ash, with the oldest tree dated at 160 years. Other habitats include freshwater seepage channel, brackish pond, and extensive salt marsh.

The New Jersey Conservation Foundation (<https://www.njconservation.org/>), which has preserved over 125,000 acres in New Jersey, has offered the North American Dipterists Society members access to its multiple sites in the Pinelands. The most important will be the Franklin Parker Preserve (<https://www.njconservation.org/preserve/franklin-parker-preserve/>) located in the heart of the Pinelands at Chatsworth, and including approximately 5,000 acres of wetlands habitat and 4,400 acres of contiguous upland pine oak forest, as well as Chatsworth Lake, and 14 tributaries that cross the preserve and eventually unite in the Wading River, one of the most popular sites for canoeing in the Pine Barrens.

In recent years NJCF has had an active prescribed burning program so that the woodlands have a mix of fire history (some in the last few years, some not burned in decades). The property was a former cranberry farm, and the bogs were reworked about 15 years ago to allow for return to natural flow; some century old cranberry bogs remain as is. We can access the property through gates, but there is an extensive trail system. The Academy staff conducted insect sampling at the Parker Preserve from 2006-2012 and pinned and ethanol material, from sweeps, pitfall, light and Malaise traps are available for study. Also, my recently graduated PhD student, Stephen Mason Jr, carried out a study on the impact of fire on litter insect communities. To see what light trapping at Parker Preserve can be like (in late July), you can view this video we produced in summer 2020. (<https://www.facebook.com/AcademyofNaturalSciences/videos/pine-barrens-light-trapping/1216696282000969/>)



Figure 7. A prescribed burn in March 2016 at Parker Preserve (left) and the recovery of understory vegetation in August after a late winter prescribed burn. The pitch pines resprout along their branches after the canopy is burned, as you can see in the upper area of the trees.

The Franklin Parker Preserve is adjacent to approximately 250,000 acres of public conservation land in the form of five state-owned properties: Brendan Byrne State Forest, Wharton State Forest, Bass River State Forest, Greenwood Wildlife Management Area and Penn State Forest. Adjacent to the Parker Preserve is Apple Pie Hill with a fire tower which might be worth looking at for hilltopping species (60 ft tower at 200 ft elevation). The Parker Preserve is about 20-30 min drive from the Lighthouse Center.

Other areas to explore are nearby including Michael Huber Prairie Warbler Preserve, Candace McKee Ashmun Preserve, and Evert Trail Preserve. The Huber Preserve (<https://www.njconservation.org/preserve/michael-huber-prairie-warbler-preserve/>) includes pitch pine/scrub oak forests that are prime breeding habitat for the Prairie Warbler, a migratory songbird that winters in the islands of the West Indies. The preserve contains the Four Mile Spring, one of several tributaries of the Rancocas Creek that spring from the headwaters swamps of this 1,227-acre forested preserve. Approximately five miles of footpaths and sand roads wind through the preserve's pitch pine forests and along ancient Atlantic White Cedar forests. One of the preserve's most interesting features is a spung located on the red trail. A spung is a hydrologically isolated wetland that relies entirely on rain and snowfall to maintain its water level. In this case, the spung at the Michael Huber Preserve is located on top of a layer of dense clay that prevents exchange with the groundwater. Because of this isolation, the spung conditions are very dependent on varying precipitation throughout the year.

The Evert Trail preserve (<https://www.njconservation.org/preserve/evert-trail-preserve/>) lies on the boundary of the inner and outer coastal plains, and has the highest diversity of breeding Neotropical warblers, vireos, and other songbirds anywhere on the coastal plain of New Jersey, even though it is

only 170 acres. The area is dense wetlands forest, accessible along a 1.5 mile trail and visitors should be prepared for wet and muddy trails at most times of the year. Portions of the trail follow the along the Stop-the-Jade Run, a tributary steam of the Rancocas River.

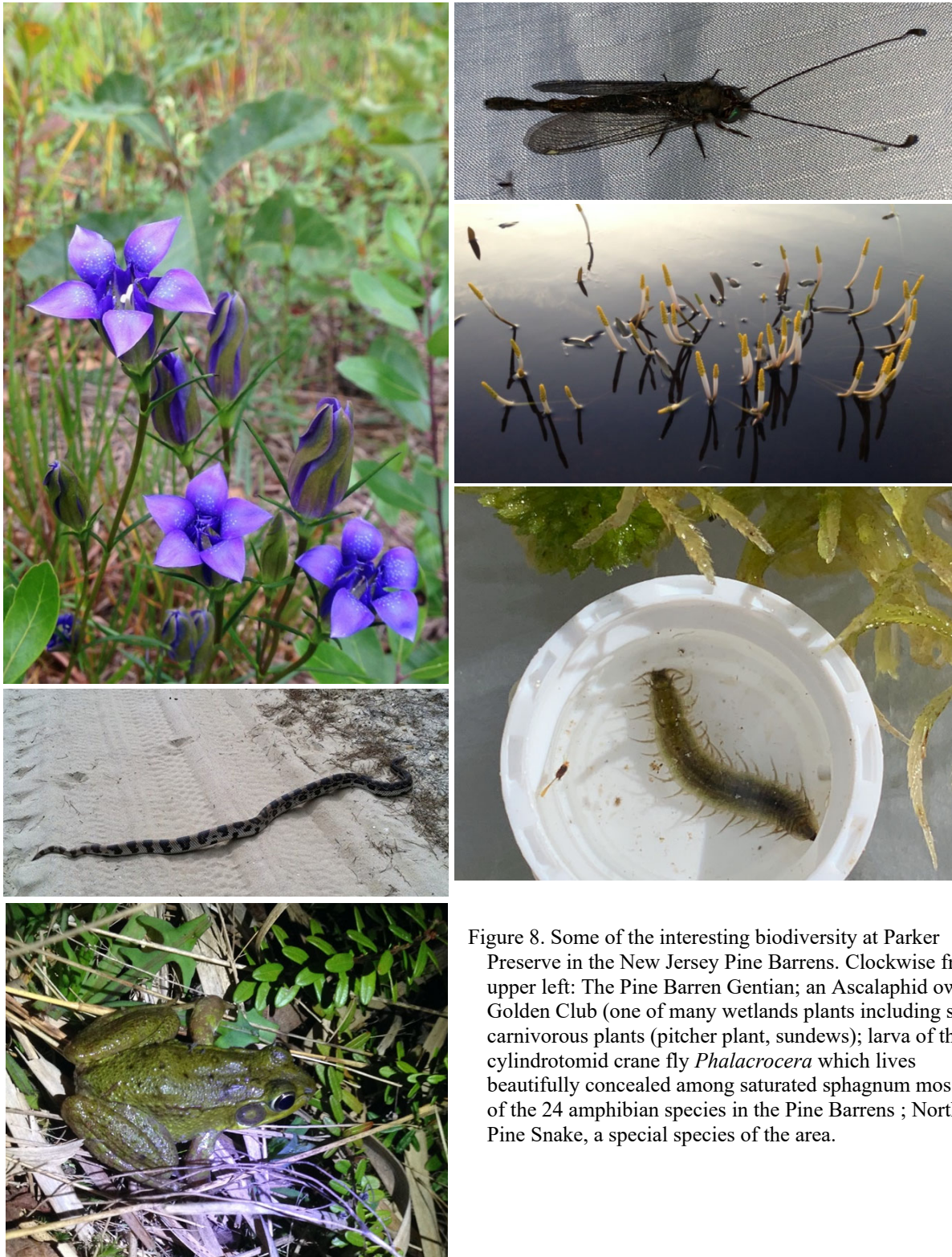


Figure 8. Some of the interesting biodiversity at Parker Preserve in the New Jersey Pine Barrens. Clockwise from upper left: The Pine Barren Gentian; an Ascalaphid owlfly; Golden Club (one of many wetlands plants including several carnivorous plants (pitcher plant, sundews); larva of the cylindrotomid crane fly *Phalacrocera* which lives beautifully concealed among saturated sphagnum moss; one of the 24 amphibian species in the Pine Barrens ; Northern Pine Snake, a special species of the area.

The closest to the Lighthouse Center, only about a 10-15 min drive, is the Candace McKee Ashmun Preserve (<https://www.njconservation.org/preserve/candace-mckee-ashmun-preserve/>). This preserve encompasses more than 4,000 acres of semi-wilderness on the eastern edge of the New Jersey Pine Barrens and is across from Ocean County's 900 acres Wells Mill Park. The Ashmun Preserve consists largely of pitch pine upland forest interwoven with large stands of Atlantic white cedar. The unfragmented forest and wetlands of this area serve as protection for the headwaters of Oyster Creek and the North, Middle and South Branches of the Forked River. All of these relatively pristine streams feed into the southern end of Barnegat Bay.

RELATED ACTIVITIES: Other activities might include hearing traditional pine barrens music at Albert Hall in Waretown or taking a canoe trip down the Wading River (best way to access the edges of the river for collecting). Atlantic City is nearby, as are the beaches along Island Beach barrier island, the beach resorts of Wildwood, Ocean City, and at the southern tip of New Jersey is historic Cape May with its Victorian hotels and homes. Unfortunately, the meeting time is likely a bit late to catch the spectacular arrival of Red Knots from southern South America to feed on the eggs of the spawning Horseshoe Crabs along New Jersey's Delaware Bay but they may still be present and worth the drive to view.

The collection at the Academy of Natural Sciences, in Philadelphia, is a little over an hour away from the Lighthouse Center and offers a chance to use the collection either during an evening, or in the event of an extended rain event we could spend the day there. We will have vehicles to transport those interested to spend some time in The Academy's collection. The Diptera collection is strong in Ephydriidae (Cresson Jr.), Chironomidae (Roback), Syrphidae, Tachinidae and Tipuloidea. The Academy also has strong Diptera collections from two decades of sampling in Mongolia during the Mongolian Aquatic Insect Survey project. We have fully inventoried all the 100,000 identified species integrated in the Academy's collection and the holdings are searchable at <http://symbiont.ansp.org/entomology/> A limited listing of species at the Parker Preserve is here: http://symbiont.ansp.org/ent_symbiota/collections/misc/collprofiles.php?collid=1. Recent accessions are not inventoried and integrated and include the 90,000 specimen Fee Collection (primarily Syrphidae) and a large collection from a West Virginia research study with strong collections of Tachinidae (many reared), Sarcophagidae and Syrphidae.

LOGISTICS:

Total cost for the meeting is \$200 per person, including registration and lodging. Lodging is \$35/night (\$140 for 4 nights) although that rate does require you to bring your own linens and towels (linens available at an added fee). Registration alone is \$60 and covers use of the venue, lodging for two student assistants to help, vehicle gas and some meals. If you wish to camp onsite, I will provide that rate. For students who need help covering the registration and lodging, I can support a limited number of students from the Bossert Young Diptera Research Fund; if interested, contact me. The North American Dipterists Society will also likely support one or more students through its grants program (https://dipterists.org/grants_awards.html).

There are several airports nearby the Lighthouse Center – the larger Philadelphia airport (about 1.5 hours drive) or Newark NJ airport (about 1.5 hours) and smaller Atlantic City and Trenton airports (less than an hour drive from venue).

Caveats to work in the Pine Barrens include numerous ticks, chiggers, mosquitoes and tabanids. Poison ivy is almost non-existent but *Smilax* Greenbrier near wetter areas has a fun time grabbing your net.



Figure 9. Current staff and students in the Entomology Department at the Academy of Natural Sciences (left). Bolortsetseg Erdene, PhD student, Jason Weintraub, collection Manager, Isabelle Betancourt, Curatorial Assistant, Greg Cowper, Curatorial Assistant, Steve Mason Jr. Ph.D student (now Assistant Professor, Immaculata College. Not pictured: Bob Conrow, Ph.D. student. Jason Weintraub (right) showing science journalist Phil Torres (and former Academy summer intern) the historic Titian Peale Butterfly and Moth Collection, with specimens dating from the 1820's from Philadelphia, and one of the oldest insect collections in North America.

Since the Lighthouse Center does not allow alcohol imbibing, there are bars nearby (including one within a 20 min walk from the Lighthouse Center). Also nearby are some restaurants, but few close motels.

COVID protocols will be set by the venue and the State of New Jersey – but right now masks are required indoors. At this time, working in the Academy's collection requires proof of vaccination, since this is a requirement for all staff and students of Drexel University. As of this writing (December 2021) we do not know how the pandemic will further affect operations in June, particularly with the surge of the Omicron variant.

NEXT STEPS

If you are interested in the meeting, and want to be kept informed, please fill out the form here: https://dipterists.org/field_meetings.html. That will allow me to know who will likely come and I can give updates as the meeting planning progresses. This is particularly important as we watch how the pandemic continues to develop. For any questions, feel free to reach out to me directly (best is email).

Search the Entomology Collection at: <http://symbiont.ansp.org/entomology/>

Biodiversity, Earth & Environmental Science Faculty website:
<https://drexel.edu/coas/academics/departments-centers/bees/faculty/>

As an added note

If you are traveling through Pennsylvania in 2022 and want to be included on a group permit for sampling in any of the State Parks or State Forests, then join the Entomological Society of Pennsylvania by January 2022 and ask to be included in the ESP group permits. I handle the State Park permit for ESP. The dues for ESP are only \$8 and you can sign up to be a member here: <https://entsocpa.org/membership>.



Figure 10. The extinct Rocky Mountain Locust, *Melanoplus spretus*, in the Academy's collection (left). The Academy has one of the largest and most comprehensive collections of Orthoptera in the world. Undetermined Dolichopodidae (upper right) and Empidoidea (lower right) from Mongolia in the Academy's collection. The Academy holds the largest collection of Mongolian insects in North America.

**11th International Symposium on Syrphidae,
Barcelonnette, France, 5–10 September 2022**

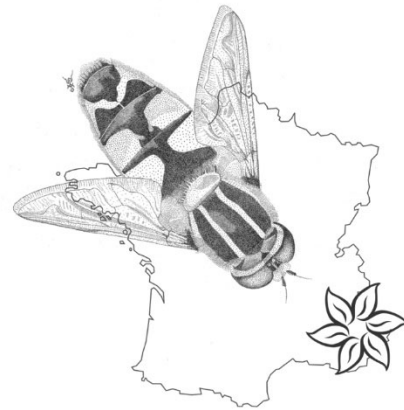
Gabriel Nève

Institut Méditerranéen de Biodiversité et d'Ecologie (IMBE), IMBE, Case 421,
UMR AMU-CNRS-IRD-Avignon Université, Facultés St Jérôme, 13397 Marseille cedex 20, France

The Mediterranean Institute for Biodiversity and Ecology (IMBE, Marseille) is happy to invite you to the 11th International Symposium on Syrphidae, which will take place in Barcelonnette (Alpes de Haute Provence, France) from Monday the 5th to Saturday the 10th of September 2022.

The schedule is as follows :

- Monday 5 September 2022: **Welcoming** of delegates at Marseille or directly in Barcelonnette. Transport by bus from Marseille (departure 15:30) to Barcelonnette
- Tuesday 6 September 2022: **Start** of the Symposium
- Thursday 8 September 2022: **Closure** of the Symposium
- Friday 9 September 2022: **Excursion** to Mercantour National Park or Ubaye valley
- Saturday 10 September 2022: **Dispersal** of delegates. Bus from Barcelonnette (departure 09:00) to Marseille



11th International Symposium on Syrphidae

The talks and poster presentations will be organized in the following themes:

- 1) Taxonomy and systematics
- 2) Phylogeny and DNA barcoding
- 3) Conservation and monitoring
- 4) Faunistics and biogeography
- 5) Functional and applied ecology
- 6) Open topics on Syrphidae

A separate room equipped with stereo microscopes will be available for workshops or expert advice.

The Symposium web site <https://syrphidae11.sciencesconf.org/> will soon be open for formal registration and submission of abstracts. In the meantime, you can soon pre-register at: <https://syrphidae11.sciencesconf.org/registration>.

If you have any question or suggestion regarding the Symposium, feel free to contact us at syrphidae11@sciencconf.org



**10th INTERNATIONAL
CONGRESS OF DIPTEROLOGY**

**RENO, USA
16-21
JULY, 2023**

**10th International Congress of Dipterology (ICDX)
16–21 July 2023 in Reno, Nevada, USA**

Shaun L. Winterton & Stephen D. Gaimari

Plant Pest Diagnostics Branch, California Department of Food & Agriculture
3294 Meadowview Road, Sacramento, California 95832, USA;
shaun.winterton@cdfa.ca.gov, sgaimari@dipterists.org

Preparations continue for ICDX, which is scheduled for the week of 16–21 July 2023 at the Silver Legacy Resort in Reno, Nevada, USA. Details of the meeting can be found on the Congress website (<https://dipterists.org/icdx/>), which will be updated frequently. Please join the Dipterists mailing list (<https://lists.dipterists.org/mailman/listinfo/dipterists>) for all of the latest updates on congress preparations.

The Organizing Committee is pleased to announce our list of plenary speakers, scheduled for each day of the congress:

- Dr. May Berenbaum
- Dr. David Grimaldi
- Dr. Rudolf Meier
- Mr. Charley Eiseman
- Dr. Fiona Hunter

Our Congress Banquet speaker will be Dr. Erica McAlister (Natural History Museum, London).

Organized symposia for each day include the following, so far, with many more to come:

- Agricultural Dipterology
- Phylogeny
- Paleontology & Biogeography
- Medical, Veterinary & Forensic Dipterology
- Ecology & Inventory

We wish to invite anyone who wishes to propose to organize a symposium to visit https://dipterists.org/icdx/symposium_guidelines.html to read the general guidelines and to submit your interest. Please direct any questions or follow up with Martin Hauser (phycus@gmail.com). Symposia can be focused on a particular aspect of dipterology or can be focused on a particular taxon. We are hopeful for a rich diversity of topics!

**North American Dipterists Society Annual Meeting:
Entomological Society of America 2021**

Torsten Dikow¹ & Matthew Bertone²

¹ Department of Entomology, National Museum of Natural History,
Smithsonian Institution, Washington, DC, USA; dikowt@si.edu

² Department of Entomology and Plant Pathology, North Carolina State University,
Raleigh, North Carolina, USA; matt_bertone@ncsu.edu

This year, due to the hybrid virtual/in-person Entomological Society of America Annual Meeting, the organized meeting of the North American Dipterists Society was not held officially. However, the society organized a selection of talks that were available virtually to those who attended the meeting. The following is a list of talks, noting that some or all of these talks will likely be available through the yet-to-be-set-up Youtube channel of the North American Dipterists Society.

A Neotropical collection of flies as a keystone for research and educational processes

Presenting Author: Luz M. Gomez – Tecnológico de Antioquia;

Co-Author: Eduardo Amat – Tecnológico de Antioquia

Luz described the Diptera collection at the Colección Entomológica Tecnológico de Antioquia (CETdeA) based in Medellín, Colombia. She highlighted their collection of flies of forensic importance in the tropics and the people who are studying them. Activities include taxonomic, molecular and morphometric analyses, as well as training graduate and undergraduate students.

Diptera in the Australian National Insect Collection: Flying to a new home in the very near future

Presenting Author: David Yeates – CSIRO;

Co-Authors: Bryan Lessard, Keith Bayless – CSIRO

David presented on the Australian National Insect Collection, which holds about 1.5-2 million Diptera specimens. He highlighted a number of workers in the museum and their projects. Researchers have been using Malaise traps across the country to collect flies; there have been several papers published advancing the systematics of flies by members of the collection, including new and interesting species descriptions; and a phone app for identifying Australian Diptera is in development. David also discussed a new building for the collection, scheduled for move-in 2024.

*Revising the tachinid genus *Xanthophyto* Townsend (Tachinidae): Only three described species? That should be easy!*

Presenting Author: John O. Stireman – Wright State University;

Co-Author: James O'Hara – Canadian National Collection of Insects

John presented on a genus of Tachinidae, *Xanthophyto*. He used a number of lines of evidence to delimit species, from morphology, to CO1 barcoding, to ecology. The genus appeared to be small and manageable, but after looking at data there was some conflicting evidence for species. For example, some species that were similar based on barcodes did not share similar morphology, and vice versa. Ecological and geographic evidence also came into play. Suspected diversity is about 10x the existing diversity (~18 species in North America and >20 species in the Neotropics).

The North American Dipterists Society and the 10th International Congress of Dipterology (ICDX)

Presenting Author: Christopher Borkent – California Department of Food and Agriculture & North American Dipterists Society;

Co-Authors: Stephen Gaimari, Martin Hauser, Shaun Winterton – California Department of Food and Agriculture & North American Dipterists Society

Chris discussed the history of the North American Dipterists Society. Beginning as an informal society, it has now become an official non-profit organization thanks to the dedication and work of Steve Gaimari and others. An official society website (<https://dipterists.org>) was created as a public face, and there are numerous links and resources for fly specialists. The 10th International Congress of Dipterology (ICDX) will be held in Reno, Nevada, USA in 2023 and information about the congress was presented.

The USNM Diptera collection: Overview and digitization progress

Presenting Author: Torsten Dikow – Smithsonian Institution, National Museum of Natural History

Torsten spoke about the Diptera collection at the National Museum of Natural History, Smithsonian Institution (Washington, DC). He reviewed the historic and current personnel, collections, specimens/family holdings (~3.3 million specimens; ~56,000 species), online database of records and photos (all photos generated are open access, with credit), etc. Efforts to digitize and photograph specimens from smaller families are underway. Funding through the museum is available (e.g. Williston Diptera Research Fund).

Through the camera lens: Delightful Diptera encounters during the pandemic

Presenting Author: Matthew Bertone – North Carolina State University

Matt presented photographs of various flies taken during the pandemic, from several regions of North Carolina, USA. His photos can be seen on his Flickr page as well: <https://www.flickr.com/photos/76790273@N07/>

DIPTERA ARE AMAZING!

Mycetobia divergens (Anisopodidae). Photos taken by Zachary Dankowicz, Bethesda, Maryland, in October 2021. The fly was spotted in a bark crevice by Even Dankowicz, who noted that it resembled a mycetophilid but held itself differently enough to catch his attention.



BOOKS AND PUBLICATIONS

Announcement:

Manual of Afrotropical Diptera, Volume 3 published

Kirk-Spriggs, A.H. & Sinclair, B.J. (Editors). 2021. *Manual of Afrotropical Diptera. Volume 3. Brachycera—Cyclorrhapha, excluding Calypttratae*. Suricata 8. South African National Biodiversity Institute, Pretoria, xv + 1365–2379.

Volume 3 is published in full color and comprises 1,032 printed pages. The volume includes family chapters by the world's leading experts, dealing with 51 of the 108 families of flies that occur in the region and covers the Brachycera through Cyclorrhapha, excluding Calypttratae (sometimes termed the higher Diptera, and which will be the subject of Volume 4). Each chapter includes a diagnosis of the family, sections dealing with biology and immature stages, economic significance, classification and identification, an identification key to genera (if two or more) and a synopsis of the fauna arranged alphabetically genus by genus. The text is richly illustrated with over 3,440 illustrations, including 1,746 color and 101 black and white images and 1,600 line drawings of flies.



All three volumes published so far can be downloaded from:

<https://www.nhm.ac.uk/our-science/our-work/biodiversity/manual-afrotropical-diptera.html>, which also has further information such as how to order hard copies. Volumes 1 and 2 were published in 2017, with the former including the introductory chapters and keys to Diptera families, while the latter included the family chapters for the nematoceros and lower brachyceran Diptera.

Book review:
***British Craneflies*. By Alan Stubbs, 2021**

Fenja Brodo

Research Associate, Canadian Museum of Nature
Ottawa, Ontario, Canada; fbrodo@sympatico.ca

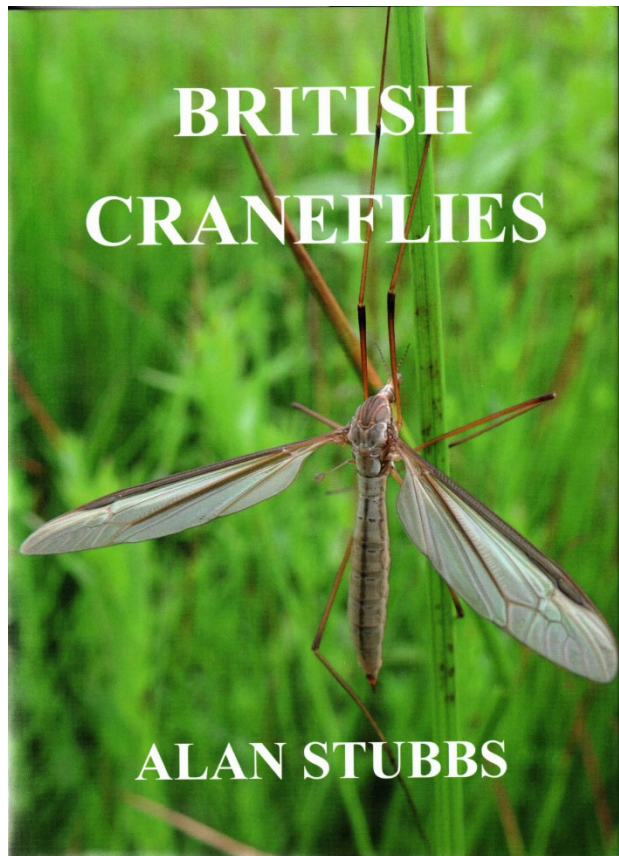
Stubbs, Alan. 2021. *British Craneflies*. British Entomological and Natural History Society, Reading, UK. vi + 434 + 32 plates + xvi pp. ISBN: 978-1-899935-09-3. Hardcover £35.99 + £12.50 shipping.

This is quite a book. It covers all conceivable aspects of crane flies in general, and British crane flies in particular. Included are keys, descriptions, illustrations, biological and taxonomic notes, as well as common names, for all 446 British species of Tipuloidea as well as 13 species of Trichoceridae and seven species of Ptychopteridae that occur in the United Kingdom. (Curiously, the latter name for this geographic area is never mentioned.)

The author, Alan Stubbs, has not only drawn on his over 40 years of personal collecting and recording of crane flies in the UK, but also reaped the benefits of his important initiatives – the Cranefly Recording Scheme, the Cranefly Newsletter, and the many field meetings and workshops held over the years that taught and encouraged hundreds of amateurs as well as professionals to focus on crane fly studies, and, most importantly, to submit their findings. This book beautifully synthesizes all that work.

The first few chapters cover general information such as biology of all stages, behavior, habitats, enemies, as well as tips for observing and collecting, and recording techniques. Keys to families, subfamilies, various genera, or groups of genera, and even groups of species within genera follow. Females are not neglected; sometimes they are keyed out separately as in an “experimental” key to females of *Ormosia* (Chioneinae). There is even a key to “remnants and some repeats” rounding out the keys to the various groups of *Dicranomyia* species, and the last key is also a bit of a repeat, a key to Pediciidae and Limoniidae lacking a discal cell. Each key is beautifully illustrated with line drawings placed next to the appropriate couplet, making identification that much easier.

The next and largest section comprises short diagnostic descriptions of each of the 446 species in the British fauna, as well as comparable descriptions for the families, subfamilies and genera. Emphasis is on field characters. Whatever is known of the biology, habitats, and distribution of each taxon is also mentioned as well as taxonomic notes where pertinent. Most species are further illustrated in one



or more of the plates at the back of this book. A series of detailed line drawings illustrate the male genitalia of all the Tipulidae species covered (Plates A-W) and Plates AA-AH illustrate male genitalia of selected species of the other families. This is followed by color plates of which Plates 1–13 are of wings, and 14–32 feature portraits of live crane flies.

In addition to a complete reference section there is a checklist to all the taxa mentioned and a list of plant names mentioned. An index to English (common) names and an index to the Latin names rounds out this book.

British Craneflies is nicely bound, and is printed on good quality, thin, shiny paper for the benefit of the beautiful plates. This, however, is not so good for my old eyes because the paper is very reflective. *Tipula oleracea* (a European species that has emigrated to North America) graces the front cover.

Anybody with an interest in crane flies anywhere in the world, would be interested in this book. Indeed, ecologists, birders, naturalists of all stripes, might also be interested. Crane flies are important but overlooked denizens of terrestrial environments, and Alan Stubbs has brilliantly succeeded in making the study of crane flies far more accessible and much more interesting to all naturalists.

Book review:
Super Fly: The Unexpected Lives of the World's Most Successful Insects.
By Jonathan Balcombe, 2021

Art Borkent

691-8th Ave. SE, Salmon Arm, British Columbia, V1E 2C2, Canada; artborkent@telus.net

Balcombe, Jonathan. 2021. *Super Fly: The Unexpected Lives of the World's Most Successful Insects.* Penguin Books, ISBN 9780143134275 (paperback) \$18.00 US, ISBN 9780525506041 (ebook) \$13.99.

One of the risks of specialization on our various research groups is that we lose some broader perspectives on the Diptera as a whole. For those wanting to refresh and expand their view of Diptera, this very readable book is an excellent antidote. Combining intriguing stories and reports of current research with practical applications and humor, Balcombe brings a fresh and delightful overview of our sweet two-winged flies.

The book, dedicated to flies themselves, is divided into three major sections. The first covers their diversity and abundance, their basic operating systems (anatomy and function) and how sophisticated their brains are (including cognition and personality!). The second section is an overview of their life histories including parasitism, predation, blood feeding (my favorite chapter because it includes Ceratopogonidae and Corethrellidae ☺), Diptera as recyclers of just about everything decaying, as pollinators, and their diverse sex lives. The third and final section portrays the interaction of Diptera with humans, with chapters on their genetics (and their role in understanding much in this field – there are seven Nobel Prizes awarded for work on fruit flies), as vectors and pests and their role in forensics and medicine. Finally, a discussion of whether we should care about flies, not only in terms of saving species from extinction and appreciating their importance in the web of life, but also promoting a respect for the lives of these other organisms that share our planet.

This book is laced with poignant descriptions of observations and research that support the various themes. It also includes some laugh-out-load stories of the lives and experiences of Dipterists and how others have been impacted by Diptera – indeed, Balcombe starts his book with a description of the African skin maggots that had burrowed into his chest on a trip to Africa. Refreshingly, he



portrays the lives of the researchers as people who are immersed in the wonder and beauty of their work and often captures their passion for their work. Those who read the *Fly Times* will recognize various names of colleagues who were interviewed for this book – in the interests of full disclosure, I was one of them – and it is clear that Balcombe solicited much of his information by talking to experts in each of their fields.

Many of us are familiar with a general public (and some administrators) who are, at best, puzzled by the work we do on Diptera and have trouble seeing how our research might have value in the broader world. *Super Fly* is a lovely overview of our group, an easy read, and loaded with interesting observations and perspectives. It is an excellent portrayal of why Diptera are so interesting, why they are so important in the web of life, and why they deserve our respect. My wife Annette (not a scientist) enjoyed it and also concluded that this would be a good book to pass on to any and all interested in nature and our dependence on it. And even though I try to keep up some breadth in my science, I found myself learning a goodly variety of points about Diptera I didn't know before.

So, all in all, an interesting and engaging book that I would highly recommend to all dipterists and to the general public as well. It is little wonder to me that this book was winner of the National Outdoor Book Award (USA) and a New York Times Editor's Choice Pick. Perhaps you're reading this in time to make it a Christmas gift to your chief administrator or department head? Or a skeptical family member? Or a young person interested in biology? Or

SOCIETY BUSINESS

On the back pages of *Fly Times*, any North American Dipterists Society business to be published will be given, as is desired for Society transparency.

Two documents are here provided for the record. They are:

- 1) The approved minutes of the Directors annual meeting, held 2 June 2020 (2 pages)
- 2) The approved minutes of the Directors annual meeting, held 14 December 2020 (3 pages)

North American Dipterists Society
DIRECTORS MEMO



2nd June 2020

Saturday, 30th May, 2020
Corporate office, Davis, California, 15:00 PST
Prepared and Filed By Shaun L. Winterton, Secretary

Minutes of NADS Directors meeting

Present: Stephen Gaimari (Director/President),
Martin Hauser (Director/Vice President),
Christopher Borkent (Director/Treasurer),
Shaun Winterton (Director/Secretary).

Item 1. Apologies.

None.

Item 2. Banking.

SG discussed the items that needed to be considered when setting up an account for NADS. These included account fees, overdraft and balance requirements. CB and SG set up an account with California Bank and Trust, having concluded it best fit our needs among the banks and credit unions considered.

Item 3. Unanimous written consents without meeting.

A series of copies of Unanimous written consents without meeting were filed with SW. The originals were and are held at the corporate office

Item 4. Society seal, letterhead, stationary and website.

SG tabled proposal for future society letterhead indicating non-profit status, and instead presented templates to use the meantime carrying the Society logo. The motion was moved that it be accepted by CB and seconded by MH. Unanimously carried.

SG described his work on the NADS website. Proposed that the domain "dipterists.org" should be purchased from dreamhost.com. Pricing is expected to be \$13.95 in year one and \$15.99 per year thereafter. The motion to accept this proposal was forwarded by SG and seconded by MH. Unanimously carried.

SG proposed that NADS use a virtual private server to host the website, and that this be provided by OVHcloud. SG described comparisons to vps.net as far as cost effectiveness and operability based on host site performance. OVHcloud cost is expected to be around \$200 per year, with a 24 month duration. The motion to use a VPS from OVHcloud was forwarded by SG and seconded CB. Unanimously carried.

SG proposed that NADS directors and officers use NADS specific email accounts for officers. The motion was forwarded by SG and seconded by CB. No objections were noted and the motion was unanimously carried.

SG suggested that NADS developed a robust social media presence which was agreed upon and unanimously carried.

Item 5. Document security.

SG proposed maintaining all society related documents and relevant correspondence at the corporate office. Copies of all documents would be filed with the Secretary, and copies of all financial documents would be filed with the Treasurer. No conflicts were raised by directors.

Item 6.

Date of next meeting was not decided but is expected to be on or before regularly scheduled annual Director's meeting.

Meeting was closed at 16:31 on 30th May 2020.

North American Dipterists Society
DIRECTOR'S MEMO



Monday, 14 December 2020, 1:00pm via Zoom
Prepared and Filed By Shaun L. Winterton, Secretary

Minutes of Directors Meeting

Presiding: Steve Gaimari
Secretary: Shaun Winterton

Attendance: Martin Hauser (MH), Steve Gaimari (SDG), Chris Borkent (CB), Shaun Winterton (SLW)

Item 1. Call for corrections/emendation of previous meeting (30th May, 2020). After discussion, acceptance as written moved by CB, seconded by MH. Carried unanimously.

Item 2. Treasurers report: provided by CB (filed in the main office and Secretary's record).

- CB and SDG proposed using "iATS Payments" (iatspayments.com) for all incoming Society online financial transactions. After discussion, SDG called for a motion to use iATS Payments as our provider for online financial transaction. Moved by SLW, seconded by MH. Approved.
- Tax preparation for 2020: SDG proposed that Society hire Mark Zivkovic (Pasquesi-Sheppard LLC, 585 Bank Lane, Lake Forest IL, 60045) for tax preparation. After discussion, call for motion to approach Mr. Zivkovic for details, with final decision deferred to later date. Moved by CB, second by SLW. Approved.

Item 3. Citing the bylaws Article 4, Section 7 (regarding use of electronic means for communication), SDG called for motion that the Secretary set up a Zoom account for Society business. After discussion, call for motion for Secretary to set up an account to be paid month to month at \$14.99/mo. Moved by MH, seconded by CB, approved.

Item 4. SDG stated that on 17 September, 2020 he submitted the "Corporation Statement of Information", along with the \$25 fee, on behalf of the Society on request from the California Secretary of State. He then received an electronic certified copy of the record (Verification number P5W2QM6; File Number C4534566), which was filed in the Society's main office records, and by PDF to the Secretary.

Dr. Shaun L. Winterton • Director & Secretary
North American Dipterists Society • P.O. Box 231113 • Sacramento, California 95823, USA
Telephone: (916) 599-0810 • Email: swinterton@dipterists.org
A 501(c)(3) non-profit organization • <https://dipterists.org>

Item 5. SDG stated that in late July 2020, he submitted the necessary IRS paperwork for recognition of the Society as a 501(c)(3) non-profit entity. This is being processed presently and non-profit status should be conferred in early 2021.

Item 6. SDG presented details of new version of the Society website which is much improved on the previous version.

- Including various resources, such as, International Congress of Dipterology pages, a world dipterists directory, news, etc.
- SDG suggested we should consider posting meeting minutes to the website. After discussion, SDG called for a motion to include the meeting minutes on the Society website. Moved by CB, seconded by SLW. Approved.

Item 7. Establishment of a Society email list server was previous approved by directors through Unanimous Written Consent. SDG suggested that we avoid using an open forum and instead use a closed email list server to communicate with dipterists to receive Society and other Diptera-related information. SDG has a large database of updated email addresses to populate the email list server, derived from the ICD9 email distribution list and the master list of dipterists provided by Neal Evenhuis. After research, SDG determined that the Society should set up an account with "MailmanLists" (mailmanlists.net) for this purpose. Following discussion of costs, SDG called for a motion to make a three year commitment in setting up an account with MailmanLists, incurring a 15% discount over the standard monthly rate. Moved by CB, seconded by MH. Approved.

Item 8. SDG opened discussion of PO Box renewal, requesting that we set up an automated payment (currently \$106 per year) for this purpose. After discussion, SDG asked for a motion to accept this plan. Motion forwarded by CB, seconded by MH. Carried.

Item 9. Discussion of social media, including Twitter, a Facebook page (for posting Society information) and Facebook group (for open discussion among group members) for the Society with links to the "page" on the Society website. Social media presence to be developed by CB and SDG, and to include all Directors as administrators.

Item 10. From tabled items from last meeting. Society logo and templates. SDG vectorized the logo and the vectorized and original versions were considered by the Directors. Following discussion, it was determined that the vectorized version should be cleaned up a bit. SLW moved to accept the vectorized version of the logo after cleanup for all Society purposes, including social media and various templates. Seconded by CB, Carried.

Item 11. SDG suggested that the Society apply for an ISSN for the journals *Fly Times* and *Fly Times Supplement*, and that MYIA should continue to have an ISBN issued for each volume. After discussion, SDG called for motion to proceed as outlined. Motion by CB, seconded by MH. Carried.

Item 12. SDG called for re-election of Directors. As there was no change in the number of directors, that number remains at four. SDG suggested, and the Directors verbally agreed, that the present four directors stand for re-election. An up or down vote was held and all directors were unanimously re-elected.

Item 13. Next meeting proposed to be held on December 13, 2021, at 1:00pm (second Monday of December at 1:00pm, per the bylaws). Proposed by CB, seconded by MH. Carried.

Item 14. SDG called for a motion to adjourn. Proposed by CB, seconded by MH. Carried. Meeting adjourned at 2:20pm.

Submitted by:
Shaun L. Winterton, Secretary
Version: March 18th 2021