FLY TIMES

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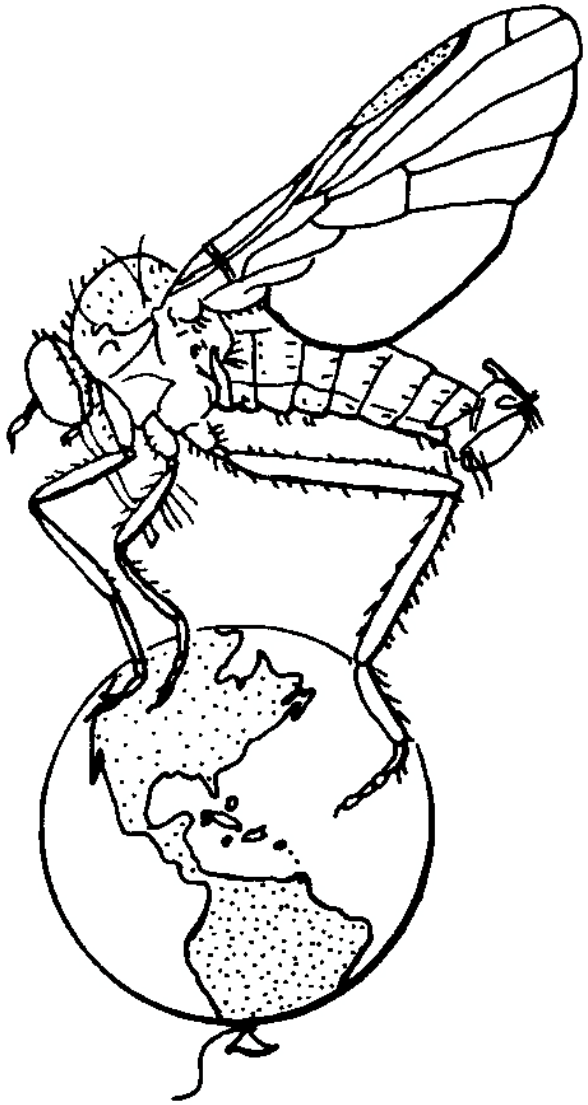

FALL 2022

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

EMAIL ADDRESS

sgaimari@dipterists.org

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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 official website https://dipterists.org and the longstanding website http://www.nadsdiptera.org. The official website is 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 (.png or .jpg preferred).

Following are some specific do's and don't's, 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 2MB 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.org

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The North American Dipterists Society is a 501(c)(3) nonprofit organization (EIN 84-3962057), 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 once again brought to you during the continuing Covid-19 pandemic, with hopes that things will soon enter some semblance of normalcy again (whatever that is). As usual, I am very 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 fact, it is already 21 December (winter) in most of the world, but what counts is when it is online where I am! And it is on-time (just barely) for a true fall issue in California! My intention is always to have it out earlier, but manuscripts seem to come in until the last minute, and it takes time for me to get all the last-minute editing done! Please consider writing an article or two for the next issue, which is slated for spring of 2023. And for larger works, please consider the *Fly Times Supplement* series, which can be found at https://dipterists.org/fly_times_supplement.html.

Also note, I am (still) hoping to improve the front and back covers of the *Fly Times*. Some of you clever dipterists might have good ideas for this – please consider submitting them! There are several options – to have different covers with each issue, or like most journals, to have a static cover from issue to issue. Or even to switch it up each year, or every once in a while. So please send your design ideas to me at sgaimari@gmail.com (cc sgaimari@dipterists.org).

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NEWS AND RESEARCH

Pollinia as "pseudopalpi" on *Archisepsis* in Costa Rica: accidental or opportunistic?

Stephen A. Marshall [1] & Franco Pupulin [2]

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

[2] Lankester Botanical Garden, University of Costa Rica, Cartago, Costa Rica

Many flies, including some Tachinidae, Drosophilidae, Tephritidae, Muscidae and others, are commonly seen carrying pollinia, often pollinia of a particular orchid species that are attached on a specific part of the fly's body. During the first author's recent (August 2022) field work in Parque Nacional Volcan Arenal, Costa Rica, several male *Archisepsis ecalcarata* (Thomson) (Sepsidae) were observed apparently using paired pollinia in agonistic interactions with other males. The pollinia effectively replaced the palps, which are greatly reduced in most sepsids, with the glandular viscidia (the sticky portion of the pollinarium) anchored symmetrically on the host mouthparts. The resultant appearance is of two long, thin "palps" (the viscidia of the pollinaria) ending in conspicuous yellow flags (the pollinia) suspended from the tapered apex of the viscidia.

Male sepsids carrying pollinia as pseudopalpi were observed at three separate bait stations (small dung baits set out to attract other flies) about 500m apart along a side trail in the Peninsula Sector of Parque Nacional Volcan Arenal. Several pollinia-laden males were seen engaged in agonistic interactions and some pollinia-bearing males were seen alone; one individual was seen bubbling (egesting a bubble of fluid) with the paired pollinia flanking the bubble. No flies were seen with pollinia adhering to any structure other than the mouthparts and the bubbling individual was the only apparent female observed with pollinial "pseudopalpi".

The pollinia in the photographs included here are unusually small for orchid pollinaria but could be those of a small-flowered pleurothallid species, a group of orchids that is prevalently pollinated by flies. If, as it seems, the pollinia are individually attached to the mouthparts by separate hemi-viscidia then they might be the pollinaria of *Lepanthes* species in the *L. guatemalensis* complex, perhaps *Lepanthes guanacastensis*.

These brief observations are not adequate to distinguish between coincidental, opportunistic or obligate use of pollinia as pseudopalpi, nor are they adequate to document a specific relationship between the orchid and a specialized pollinator. They do, however, offer an intriguing starting point for testing alternate hypotheses through more focused and sustained study.

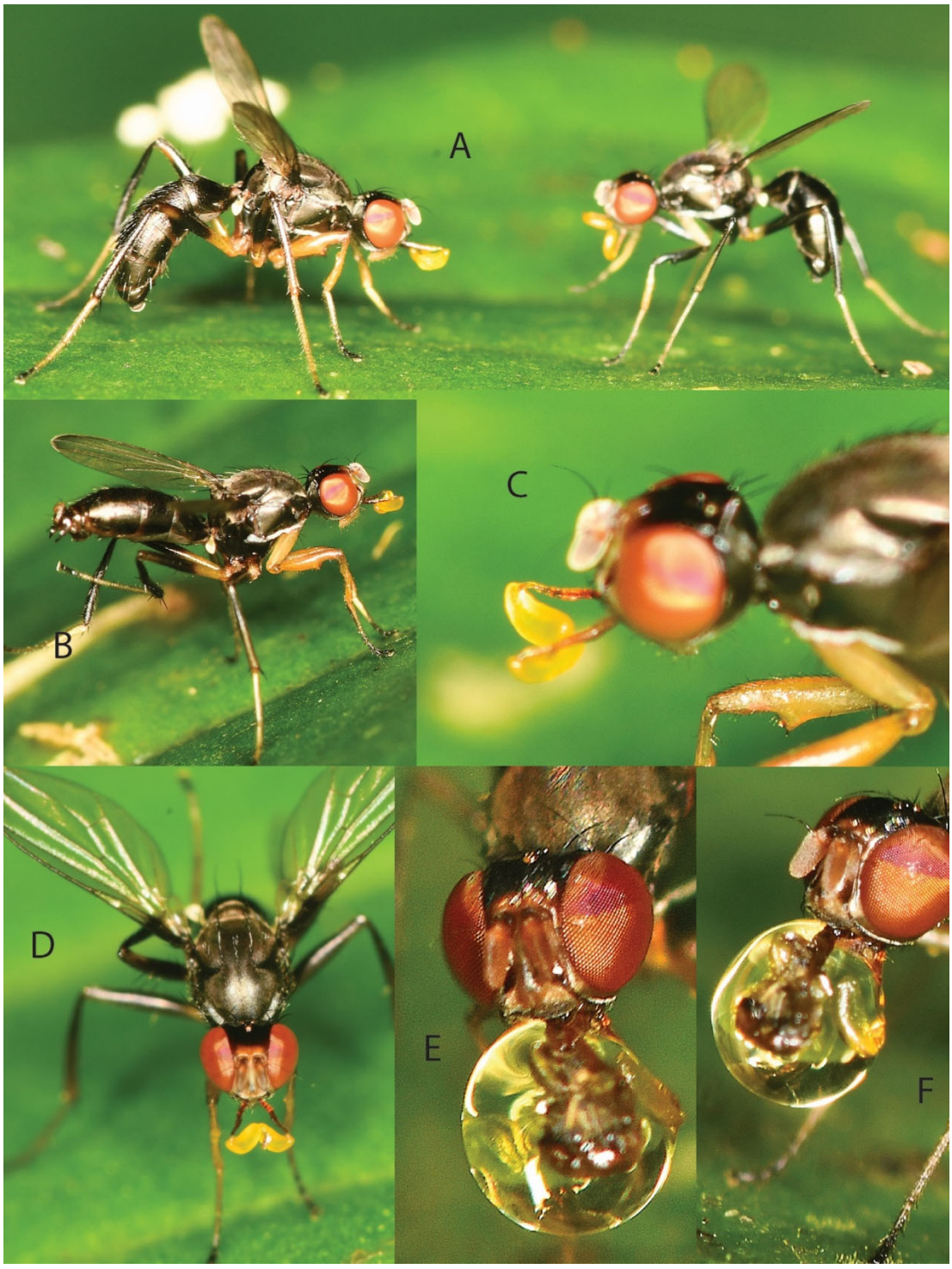

Fig. A. Two male *Archisepsis* facing off with the apparent aid of "pollinial pseudopalpi"
Figs B, C, D. Lateral, dorsolateral and anterodorsal views of male *Archisepsis* with "pollinial pseudopalpi"
Figs E, F. "Pollinial pseudopalpi" straddling bubbles of regurgitated fluid, showing attachment of the pollinia to the palpi by separate viscidia. The fly appears to be a female, but it was not captured, and the sex is not clear from the photo.

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Unfurling delicate crane fly wings

Fenja Brodo

Research Associate, Canadian Museum of Nature, Ottawa, Ontario, Canada

Crane fly specimens that have been pulled out of alcohol and then mounted on a card or even pinned through the thorax, are not the easiest specimens to identify. The same is true of specimens that are not neatly mounted. Crucial characters are often obscured or missing making determinations difficult, and sometimes impossible, as in Fig. 1.

Fig. 1. Unidentifiable crane fly with folded up wings (wings: 5.8 mm)

I was pleased to be asked to study the crane flies collected as part of two very interesting biodiversity projects, one involving the biota of the Far North of Ontario and the other the biota of The Town of Kent, Putnam County, NY, USA. It was no surprise that many of the specimens that I received were less than perfect. Various body parts such as wings, legs, antennae, and even heads and abdomens, were often missing or distorted. Regardless of the state of these specimens, each one is an important element of its respective inventory. If one is interested in the variety of species at a given time and place, and also concerned with the relative abundance of each species, then every specimen counts. Whereas leg characteristics may be of less importance in the smaller crane fly species, wing venation is often crucial for at least placing a specimen within the correct genus, especially if all that one has is a female. Male genitalia are usually quite distinctive to species, but the ovipositors of females have not been well described and are not usually mentioned in keys. A clear view of the wing venation can help enormously with identification.

If the wings are inconveniently folded, obscuring important details, as in Fig. 1, all is not lost. I have managed to unfurl several tiny wings and so could identify the specimens at least to genus. Initially I used a microscope slide for this but then discovered that a piece of high-quality photographic paper would work just as well because it is thick, does not absorb water, and its smooth surface allows for easy manipulation.

A drop of water is placed in the middle of a small piece of photographic paper. For the example described and pictured, I used a piece about 3 cm^2. The clipped wing was placed gently on top of the water. With the help of rounded heads of insect pins, one in each hand, I gently pushed the wing down under the water and nudged out the resulting air bubbles. Using smaller pin heads (numbers 0 or 1) I carefully pushed a pin head into the top fold of the wing. Water tends to seep into the fold as one does this, helping to open up the wing. Sometimes the wing needs to be turned over to release another fold on the back; special care needs to be taken if there are nicks or tears in the wing. When the wing is fully extended and lying flat (Fig. 2), one can speed up the drying process by introducing an edge of paper towel to soak up the water. Occasionally as the wing dries it might start to lift off the paper. A tiny spot of glue at the end of the wing stalk, or wherever else seems convenient, will hold the wing in place. The photographic paper holding the wing dries well and remains stiff and strong enough so that it can be nicely trimmed and pinned with the specimen (Fig. 3). Your work is not lost.

In the example featured, I had not recognized that it was a species of the genus *Ula* Haliday because the macrotrichia on the wings were not noticed until the wing was unfolded.

Fig. 2. The unfurled right wing of *Ula sylvatica* Meigen, the crane fly pictured in Fig. 1.

Fig. 3. Specimen with wing mounted on photographic paper.

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Dancing in the dark. Rediscovery of the twilight *Chrysomya megacephala* (Fabricius) (Calliphoridae) male mating swarm

Jeffrey D. Wells [1] & Carlos Ruiz [2]

[1] Department of Biological Sciences, Florida International University, Miami, Florida, USA

[2] Department of Biology, University of Washington, Seattle, Washington, USA

Although a feature of many insects, the sexually dimorphic compound eye of the blow fly *Chrysomya megacephala* (Fabricius), and some close relatives (Wells *et al*. 1994, 1996), is unusual for a muscomorph. A male has distinctly larger upper ommatidia (Fig. 1). We briefly report here observations demonstrating the function of this eye, although not for the first time as we learned once we had the right literature search terms. This is also an example of how being forced to stay home during the pandemic can lead one to notice and appreciate the wonder of nature in one's own backyard.

Fig. 1. A male *Chrysomya megacephala* showing the compound eye with enlarged upper ommatidia. (Image by C. Ruiz)

Starting in July 2020, male *C. megacephala* were regularly observed to hover in an obvious mating swarm between dawn and sunrise at a suburban location near the city of Homestead, Florida, USA (Figs 2–3). This occurred throughout the year if it was not raining, and the temperature was greater than about 22°C (threshold not precisely determined). Obviously, visibility is poor under these circumstances, so we could not know the identity of every insect, however more than 70 hovering individuals were captured with a hand net, and all were *C. megacephala* males. Hovering individuals were observed to chase lone insects passing through the swarm, after which buzzing at ground level would reveal a scene of copulation (Fig. 4). This behavior was never seen around sunset.

Olsen & Sidebottom (1990) were the first to report this behavior, which they observed at one location in the Palau Archipelago, although they did not report seeing copulation. According to Olsen and Sidebottom the residents were familiar with this phenomenon. To our knowledge no scientist has seen it since. Perhaps this is because, in our experience, no one who studies blow flies would think it worthwhile to collect data so early in the morning.

We have omitted many details that will be included in a more formal report.

Fig. 2. A pre-sunrise *Chrysomya megacephala* swarm during August 2020 in south Florida. Each bright spot in the sky is a fly reflecting the camera flash. (Image by J.D. Wells)

Fig. 3. Close up of a hovering male. (Image by J.D. Wells)

Fig. 4. A copulating pair on the first author's shoe. (Image by J.D. Wells)

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Studies on the Mycetophilidae of North Central Nevada during 2022

Robin Gray

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

Since 2017 I have been studying the mycetophilids of North Central Nevada. I became interested in this group of flies because they often turned up in EVS dry ice baited traps used for sampling adult mosquitoes as part of a mosquito abatement program. Once I started studying this group of insects the original question receded into the background in favor of many questions about their biology and the lives they led. Initially I put Malaise traps out in many different areas to discover what species might occur around here. At the same time I began looking to rear these insects out of mushrooms, moss, leaf litter and other possible sources. I learned a lot through these efforts, which caused me to realize that putting up a trap in a location for a few days or a week was not going to show me what was really in a given locality. So in 2021 I began putting traps up in different plant communities and leaving them there for the entire insect season. Depending on elevation this might run from March through December. The study sites I chose were in different mountain ranges here in Northern Nevada, and most of the plant communities were islands in a sea of sagebrush, often for miles around. In 2021 I put up six Malaise traps in six different plant communities and locations, in three mountain ranges. The insect season began in March and went through the second week in December, when I took all of them down. It was a dry year, and I saw almost no mushrooms. I collected 18 different genera of Mycetophilidae in these island habitats during 2021.

In 2022 I continued with this approach, at different sites than during 2021. I put five Malaise traps out, three in the Bloody Run Mountains, and two in the Santa Rosa Mountains. I put one emergence trap up as well at one of the Bloody Run sites. In the Bloody Run Mountains I put each of the traps near springs, two in Aspen forest, one at the edge of a dense thicket made of willows, wild rose and currants. In the Santa Rosa Mountains I put one trap up in an extensive Aspen forest that covered a much greater area than any in the Bloody Runs; the other one I put up in a forest of Mountain Mahogany that ran along a rocky mountain ridge. The traps in the Bloody Runs were all at an elevation of about 5500 feet, those in the Santa Rosa's were at about 7050 feet. I had to give names to each of these locations as they had none, I recorded the longitude and latitude for each. I visited each of these locations every other week to change out the trap heads and repair any damage done to the traps by animals.

Three of the five locations were in Aspen forests. I have found through experience that each Aspen forest has its own characteristics distinguishing it from others. Some of the reasons for this may involve altitude, water and hydrology, fire history, soil, aspect and exposure to sun, and insect pests. One of these forests was heavily infested with cerambycid and buprestid beetles which damaged many trees, another was infested with gall-making flies, and a third seemed free from any of these. All of the sites in the Bloody Run Mountains were burned over by wildfires during the 1990's, and the Aspen forest in the Santa Rosa's about ten years later; the Mountain Mahogany site was less affected by fire, maybe because it occupies a rocky ridge. None of the Aspen forests have returned to what they were before the fires; downed, charred trees with trunks over two feet in diameter, remnants of what was there before the burn, litter the forest floors. Even the biggest trees now in the Bloody Run sites are no more than eight inches in diameter.

All of these sites are remote, with no road access and no trails leading to them. I have seen no sign of human activity at any of them. Animals are a different story; all the traps I put up in 2022 were

damaged by wild animals during the course of the year. A local quilter gave me some useful tips to deal with these problems. For large tears or damage I used a combination of needle and thread, and patching with fabric and fabric glue. For smaller damage I used Stop Tear. I covered the collecting heads of the traps with white Gorilla tape to help reduce sun damage which can cause disintegration of the plastic making up the head. I carry these items with me when I hike up into the mountains to visit the traps.

Each time I visit the traps I make notes of what the weather has been in the last two weeks, the condition of the trap and whatever repairs I had to make, if any, and the presence of mushrooms. If I saw mushrooms anywhere on the hike up or at the trap sites I collected them, or a sample of them, and put them in rearing chambers when I got down. Occasionally I collected leaf litter from each site and ran it through a Berlese to see what was present. I also went through some of these samples by hand under the microscope. I sometimes collected moss and ran it through the Berlese as well.

The 2022 season was drier than the previous year, and shorter. In 2021 the insect season ran from March through December. This year winter came in November, and the traps came down a month earlier than in 2021. In 2021 there was a lot of rain in late October, which led to a surge in mycetophilids in November and early December. There were rains in October 2022, but snow and temperatures of twenty degrees below freezing prevented the surge of the previous year. The final catches when I took the traps down were very small. I didn't want snow to strand the traps in the mountains over winter, so the first week in November I took all of them down.

Bloody Run Mountains

Willow Thicket Spring, elevation 5400 feet (Fig 1). This site consisted of a dense thicket of willows, wild rose and currants growing on a seep spring on a steep mountain slope. I could not penetrate this thicket so I set a trap up on the edge. The dimensions of this site were about 110 feet by 125 feet.

Dark Sister Forest, elevation 5540 feet (Fig. 2). This site was in a dense aspen forest on a steep slope, and centered around a spring which flowed out of the ground and was the source for a tiny stream which ran down through a deep forested gorge. The stream never dried up, or really diminished its flow during the entire insect collecting season. I set a Malaise trap up about twenty feet from the stream, and an emergence trap over a bed of aspen leaf litter twenty feet from there. Originally, I was not going to set up a trap here, as I had one in another aspen forest over a ridge from this one. But when I ran leaf litter samples from both through a Berlese funnel, and compared them, I saw a lot of difference in the insects and other arthropods between them, so I decided to look at this site as well. The aspens at this site look healthy, not attacked in any way I could see by wood-boring beetles or gall-producing flies. The forest was about 325 feet by 160 feet in dimension.

Aspen Forest Spring, elevation 5550 feet (Fig. 3). This site is in the same aspen forest that I sampled in 2021, but is higher up at the main spring feeding this area. At the trap site there is aspen forest, very large willow trees, open grassy areas and shallow ponds formed by the spring. The trap was set up under a big spreading willow near the edge of the spring-fed pond, the dampest of all sites I sampled in 2022. The aspen forest above this site is heavily infested with beetles and many trees are damaged, while below the spring there is less damage than that. The forest runs along a gorge with a small stream running out of the spring mentioned above. The forest is about 150 feet wide and 1000 feet long, it is both open and densely forested at various points, the trees are not as large and dense as in the Dark Sister Forest.

Figs 1–3. Bloody Run Mountains sites. Fig. 1 (upper left). Willow Thicket Spring. Fig. 2 (upper right) Dark Sister Forest. Fig. 3 (bottom). Aspen Forest Spring.

All of the sites in the Bloody Run Mountains are very much islands, surrounded by extensive stretches of sagebrush desert. The following sites in the Santa Rosa mountains are not really islands in the same sense, but are part of a complicated mosaic of vegetation in a large drainage/source basin for a large creek in the mountains.

Santa Rosa Mountains

Upper Singas Aspen Forest, elevation 7040 feet (Fig. 4). This site is part of an extensive aspen forest, with no water present at the site, although a year-round creek runs about a quarter mile distant. This particular section is a mix of larger and smaller trees. It appears that all the smaller trees are infested with gall-making flies. I set a trap up here in April, but heavy snow returned and I was not able to visit the site again for six weeks. This site was about a month behind the Bloody Run sites in terms of the vegetation leafing out, probably because of the higher elevation. The site seemed dry but produced more genera of mycetophilids than any other site.

Mountain Mahogany forest, elevation 7100 feet (Fig. 5). This forest occupies a long rocky ridge that separates two mountain valleys. The south of the ridge is an open grassy slope dropping down to a year-round creek. The north slope drops quickly into aspen forest made up of large trees. I had planned to put up a trap in a much larger Mountain Mahogany forest on a mountain thirty miles to the north at 8600 feet elevation, but by the time the snow cleared at that site I realized I did not have the time in my schedule to tend a trap there. So I put the trap up at this site, although it was near the end of June, very late. It was dry and I caught no mycetophilids here. On May 17 I was up in this forest, I saw mushrooms which I collected and put in a rearing chamber – no mycetophilids emerged from them. The dimensions of this forest were about 1000 feet by 160 feet.

Figs. 4–5. Santa Rosa Mountains. Fig. 4 (left) Upper Singas Aspen Forest. Fig. 5 (right). Mountain Mahogany Forest.

Biological notes, 2022

During the 2022 season, in addition to running the traps described above, I also made note of everything I saw related to the biology of mycetophilids. There was an element of serendipity in this, but I was always watching for anything that might add to this aspect of my learning about these insects.

Mushrooms/Fungi

I collected a lot of mushrooms during 2022, and like all the previous years I have been working on this project, adult mycetophilids have emerged from only a small percentage of these. At this time I don't have the knowledge to identify mushrooms myself, so the identifications I have come from submitting photos and information on both the California Mushroom Forum, and the Arizona Mushroom Forum on Facebook. I have tried *iNaturalist* for this, but have never gotten a response to anything I have submitted there.

The following are the mushrooms I have reared Mycetophilidae from during 2022:

Inocybe or *Cortinarius* sp., identified by Colin Knotter, California Mushroom Forum (Fig. 6). These mushrooms were growing in a grassy area near the spring at the Aspen Forest Spring site, Bloody Run Mountains, at 5550 feet elevation. I collected the mushrooms on May 12, and on May 21 I saw adults flying in the chamber, which I put in the refrigerator on May 22. When I opened it one flew away, but I caught the other, a female *Rymosia*.

Agrocybe sp., identified by Mike Dechter, Arizona Mushroom Forum (Fig. 7). The mushroom was growing on a grassy south facing slope at 6600 feet in the Santa Rosa Mountains. The date of emergence from this mushroom is unknown, with 13 female *Rymosia* reared from it.

Morchella elata, a morel, was identified by Jeff Sadler and Mitchell Pittsley (Fig. 8). Pittsley said *Morchella elata* is a European

Figs 6–7. Mushrooms. Fig. 6 (upper) *Inocybe* or *Cortinarius* sp. Fig. 7 (lower) *Agrocybe* sp.

species, and Sadler replied that the species was *Morchella elata* but was now called *Morchella augusticeps*. Manuela Patz stated that in Europe this morel is *Morchella semilibibera*. All these people were on the Facebook Mushroom Identification Forum. The morels were collected at the Upper Singas Aspen Forest site on June 16, and on June 18 four female *Rymosia* and five male *Sciophila* emerged. Elevation 7040 feet.

Fig. 8. *Morchella elata*.

EVS dry iced baited traps

Nevada, Humboldt River, Stahl Dam marsh, 4350 feet elevation, May 16–17, 2022, one female *Rymosia*. This area was totally burned over on April 27, reduced to a blackened moonscape; the fire also burned the adjoining desert.

Nevada, Orovada, Orovada School, 4315 feet elevation, September 13–14, 2022, five female *Mycetophila*.

Nevada, Orovada, Orovada School, 4315 feet elevation, September 21–22, 2022 – one female *Rymosia*.

Nevada, Winnemucca, Humboldt River riparian area, 4275 feet elevation, June 1–2, 2022, one *Macrocera* female.

Leaf Litter

Nevada, Bloody Run Mountains, Dark Sister Forest, 5530 feet elevation, Emergence trap over aspen leaf litter, May 26 to June 9, 2022 – one female *Rymosia*.

Nevada, Winnemucca, Sage Heights – Adult *Boletina* were seen flying around and near leaf litter from a single Chinese Elm from November 15, 2021 to April 18, 2022. They were active even when it was snowing and the temperature was 36°F. Larvae, pupae and adults were found in the leaf litter during November 2021. Examination of leaf litter from other locations where adult *Boletina* have been collected has yielded no immatures or adults.

Rain Barrel

Nevada, Paradise Hill, 19 miles north of Winnemucca, elevation 4350 feet – Adult *Docosia*, both male and female, collected from a rain barrel, April through June, 2022.

Apparent Light Attraction

Nevada, Paradise Hill, 19 miles north of Winnemucca, 4350 feet elevation, June 27, 2022 – one female *Brevicornu* collected when it landed on me at night, indoors. It was about 2 mm long, orange, the same color as nocturnal mutillid wasps.

Summaries of Genus information for 2022

It is difficult to compare 2021 with 2022 in terms of the genera taken. Both were dry years, but 2022 was drier. On the other hand, there were more mushrooms in 2022 than 2021. There was no overlap in sites between the two years – if I had kept a trap at one site for both seasons that might have shed some light on the differences between the two years. Only one of the sites in 2021 had water for the whole season. In 2022 three sites had water for the whole season. The plant communities where I placed traps were quite different between the two years. This year's collecting season was a month shorter than last year's. Because of these factors, and probably others I am not aware of, in 2021 I captured 18 genera of mycetophilids, while on 13 genera in 2022, , as presented in the table to the right.

Genera caught in 2021	Genera caught in 2022
	Acnemia
Anatella Winnertz	
Boletina Staeger	*Boletina*
Brevicornu Marshall	*Brevicornu*
Coelosia Winnertz	
Cordyla Meigen	*Cordyla*
Docosia Winnertz	*Docosia*
Epicypta Winnertz	
Exechia Winnertz	*Exechia*
Garrettella Vockeroth	*Garrettella*
	Greenomyia Brunetti
Hadroneura Lundström	*Hadroneura*
Leia Meigen	
Megalopelma Enderlein	
Mycetophila Meigen	*Mycetophila*
Orfelia Costa	
Phronia Winnertz	
Rymosia Winnertz	*Rymosia*
Sciophila Meigen	*Sciophila*
Zygomyia Winnertz	*Zygomyia*
	Unknown genus

There is only an overlap of 11 genera between the two years. Seven genera seen in 2021 were not captured in 2022. In 2022, however, there were two genera captured that were not seen in 2021, plus three specimens of a genus that I could not identify using the key in the Manual of Nearctic Diptera. I am sure all these genera are still present, but whether the differences are due to sampling in different habitats, the effects of drought, or a complex of factors is unknown to me.

The table summarizes where the genera collected were found among the various trap sites during 2022. Consistently between both years is that the traps in the Singas Creek basin of the Santa Rosas had a much richer mycetophilid fauna than anything in the Bloody Runs or in drier valleys of the Santa Rosas. The forest in the Santa Rosa Mountains where the trap was located this year is hundreds of acres in extent, much larger than the little islands in the bloody Runs. Last year, a trap was run along Singas Creek in a narrow riparian band, which was by far the most productive spot for mycetophilids in both years. The creek never dried up and had good flow the whole time.

Generic distribution of Mycetophilidae caught in Malaise trap sites during 2022

Genus	Willow Thicket Spring	Dark Sister Forest	Aspen Forest Spring	Upper Singas Aspen Forest	Mountain Mahogany
Acnemia				X	
Boletina			X	X	
Brevicornu	X		X	X	
Cordyla		X	X	X	
Docosia	X				
Exechia	X		X		
Garrettella				X	
Greenomyia		X		X	
Hadroneura				X	
Mycetophila		X	X	X	
Rymosia		X		X	
Sciophila			X	X	
Zygomyia				X	
Unknown genus		X			
Totals	3	5	6	11	0

The following tables summarize where and when the various genera were captured during the 2022 collecting season.

Acnemia Winnertz

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Upper Singas Aspen Forest						X	X		

Boletina Staeger

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Aspen Forest Spring	X								
Upper Singas Aspen Forest		X	X	X					

Brevicornu Marshall

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Aspen Forest Spring			X	X					
Upper Singas Aspen Forest				X					
Willow Thicket Spring		X							

Cordyla Meigen

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Aspen Forest Spring		X	X	X	X	X	X		
Dark Sister Forest								X	X
Upper Singas Aspen Forest				X	X	X	X		

Docosia Winnertz

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Willow Thicket Spring		X	X						

Exechia Winnertz

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Aspen Forest Spring						X			
Willow Thicket Spring					X	X			

Garrettella Vockeroth

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Upper Singas Aspen Forest		X	X	X					

Greenomyia Brunetti

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Dark Sister Forest				X					
Upper Singas Aspen Forest				X	X				

Hadroneura Lundström

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Upper Singas Aspen Forest			X	X					

Mycetophila Meigen

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Aspen Forest Spring		X	X						
Dark Sister Forest		X	X						
Upper Singas Aspen Forest			X	X			X		

Rymosia Winnertz

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Aspen Forest Spring			X						
Dark Sister Forest			X	X					
Upper Singas Aspen Forest				X					

Sciophila Meigen

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Aspen Forest Spring		X	X						
Upper Singas Aspen Forest				X	X				

Zygomyia Winnertz

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Upper Singas Aspen Forest			X	X					

Unknown genus

Location	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.
Dark Sister Forest				X	X				

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Invasive mosquitoes and mosquito-borne diseases: Surveillance efforts using community science in Hungary

Tamara Szentiványi[1], Zoltán Soltész[1], Kornélia Kurucz[2,3], László Z. Garamszegi[1]

[1] Centre for Ecological Research, Institute of Ecology and Botany, Vácrátót, Hungary

[2] Institute of Biology, Faculty of Sciences, University of Pécs, Pécs, Hungary

[3] National Laboratory of Virology, Szentágothai Research Centre, University of Pécs, Pécs, Hungary

Invasive mosquitoes are an emerging public health problem worldwide. In Hungary there are three invasive *Aedes* spp. present, including the Asia tiger mosquito (*Ae. albopictus* (Skuse)), the Asian bush mosquito (*Ae. japonicus* (Theobald)) and the Korean mosquito (*Ae. koreicus* Edwards). These species can transmit a wide variety of native and emerging pathogens, such as viruses, like West Nile Virus, dengue and chikungunya, or filarial nematodes like *Dirofilaria* spp., the causative agents of skin and heartworm diseases, particularly in canids.

In Hungary the first occurrence of invasive mosquito species was observed in 2012, 2014 and 2016, in the cases of *Ae. japonicus*, *Ae. albopictus* and *Ae. koreicus*, respectively (Kurucz *et al*. 2016; Seidel *et al*. 2016; Sáringer-Kenyeres *et al*. 2018). Since their first occurrence all three species have established themselves throughout the country. Our team started a nationwide mosquito surveillance program in 2019, using the help of the public. Community science observations can be reported through the Mosquito Alert app, which is a user-friendly mobile application used in multiple countries on their own, and multiple, languages (http://www.mosquitoalert.com/en/). Each report is validated by mosquito experts who can identify if an invasive mosquito species was observed or another native species, or even other insects. Furthermore, our team receives observations through emails, and caught individuals can also be sent to the research institution, where our colleagues identify these samples. All data are publicly available both in Hungarian and in English through our regularly updated mosquito-surveillance website: https://szunyogmonitor.hu/index.php/szunyogmonitor-english/.

Since the beginning of the community science-based mosquito surveillance efforts, a total of 3,917 observations have been uploaded (as of November 2022). In 2022, there were 283 reports of *Ae. albopictus*, 79 of *Ae. koreicus*, and 68 of *Ae. japonicus*. In the last four years, we are experiencing an increasing trend of invasive *Aedes* observations, which likely is the result of our media campaign and perhaps the increasing occurrence of these species nationwide, however long-term data are still needed to confirm this. Generally, our team receives most reports in and around the capital (Budapest), however several observations have been reported from large cities and touristic areas, as well (Fig. 1).

This year our goal was to widen our mosquito monitoring efforts with the surveillance of mosquito-borne pathogens, as well. We are actively testing for zoonotic viruses and filarial nematodes in our samples to get a better understanding of their nationwide distribution. Additionally, we aim to explore the potential effects of urbanization and insecticide use on the occurrence of invasive mosquitoes and mosquito-borne diseases. Lastly, our goal is to reach a wider audience using social media and to promote the mosquito surveillance events with new tools, like distributing mosquito themed beers at our events (Fig. 2).

Fig. 1 (left). Spatial distribution of invasive mosquitoes based on community species observations in 2022. Source: https://szunyogmonitor.hu/index.php/szunyogmonitor-english/. A: *Aedes japonicus*, B: *Ae. albopictus*, C: *Ae. koreicus*. Fig. 2 (right). Our mosquito themed beer to popularize and inform the public about their opportunity to contribute to our mosquito surveillance efforts.

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Supplementary information

Distribution maps of invasive *Aedes* mosquitoes by the ECDC:
https://www.ecdc.europa.eu/en/disease-vectors/surveillance-and-disease-data/mosquito-maps

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Observations on dipterans in a botanical garden in Bengaluru, India

Abhishek Mishra & M. Jayashankar[1]

Department of Zoology, School of Life Sciences,
St. Joseph's University, Bengaluru – 560 027, Karnataka, India
[1] jayashankar.m@sju.edu.in

Dipterans with sponging-sucking mouthparts can feed on plant juices or on decaying organic matter. They are an important component of urban and peri-urban ecosystems, and are known to perform ecosystem services including pollination (Ssymank *et al.* 2008; Rajan & Reddy 2019; Arteaga *et al.* 2020; Cook *et al.* 2020). During the month of April 2021, random observations on dipterans were undertaken at Lalbagh (meaning "red garden" in Hindi) botanical garden situated in South Bengaluru (12.9507432, 77.5847773) with a tropical savanna climate (Köppen climate classification Aw) with distinct wet and dry seasons. The garden was created by Haider Ali, ruler of Mysore princely state and military commander in 1760, later established as a Government botanical garden in 1856. Eight species known to be of common occurrence were identified (to genus) belonging to seven different families (Table 1, Figs 1–8). Among the members observed, those belonging to Sarcophagidae, Calliphoridae, Tachinidae and Muscidae have been reported to visit flowers in India (Mitra 2010). In this first-time documentation, dipterans were observed visiting flowers, and resting and landing on decaying organic matter, suggesting the need to further study dipterans as pollinators in this area. The genus *Greenomiya* was found in high numbers on the Chinese Ixora compared to other genera observed. Flies were not observed on vegetation with presence of ants and frequent passage of walkers in the garden.

Table 1. Dipterans observed in the garden

Sr. no.	**Genus**	**Family**	**Flora visited**
1.	*Rhinia*	Rhiniidae	Crape jasmine
2.	*Sarcophaga*	Sarcophagidae	Eucalyptus
3.	*Chrysoma*	Calliphoridae	Indian grass
4.	*Chrysotus*	Dolichopodidae	Chinese Ixora
5.	*Amblypsilopus*		Chinese Ixora
6.	*Gastrolepta*	Tachinidae	Castor, Chinese Ixora
7.	*Musca*	Muscidae	Indian grass, Common marsh buckweed
8.	*Greenomyia*	Mycetophilidae	Chinese Ixora

Top row: Fig 1. *Rhinia* (Rhiniidae). Fig. 2. *Sarcophaga* (Sarcophagidae).
Middle row: Fig 3. *Chrysoma* (Calliphoridae). Fig. 4. *Chrysotus* (Dolichopodidae).
Bottom row: Fig 5. *Amblypsilopus* (Dolichopodidae)*s*. Fig. 6. *Gastrolepta* (Tachinidae).

Fig 7. *Musca* (Muscidae)s. Fig. 8. *Greenomyia* (Mycetophilidae).

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A new strategy for the control of stable flies (*Stomoxys calcitrans*)

Gérard Duvallet[1] & Damien Morel[2]

[1] Medical Entomologist, Parasitologist, Professor Emeritus, Université Paul-Valery Montpellier, France; gduvallet@aol.com, gerard.duvallet@univ-montp3.fr

[2] Managing Director, BESTICO, Koppert Biological Systems group, France; dmorel@bestico.fr

Stable flies, *Stomoxys calcitrans* (Linnaeus) (Fig. 1), are serious livestock pests all over the world. In the United States, the cost generated by these flies for the livestock sector has been estimated at US $ 2.2 billion per year (Taylor *et al*. 2012). The same calculation formulas have been adapted to French livestock farming and give losses of 145 million euros per year for the meat sector and 234 million euros per year for the milk sector (Blanc-Debrune 2019). These losses are due to the painful bites which prevent the animals from feeding properly, to blood loss which can be very significant during peaks of abundance, and to the potential transmission of pathogens (Baldacchino *et al*. 2013).

Fig. 1. Stable fly, *Stomoxys calcitrans.*

Traditional control of these biting flies is the use of pour-on insecticides on the backs of animals. However, keepers have noticed for several years now that these products are no longer effective, despite a high frequency of applications. This has been confirmed by numerous laboratory studies showing, phenotypically and genetically, that *Stomoxys* have become resistant to all available insecticides, particularly in France (Salem *et al*. 2002; Tainchum *et al*. 2018; Olafson *et al*. 2019).

Therefore, we propose a new strategy to control these flies by combining effective and specific trapping of adults, and biological control of the larval and pupal stages by releasing parasitoids and predators. This is an integrated pest management (IPM) program.

The trap that we propose is based on a model initially developed against tsetse flies in Africa (Laveissière and Grébaut 1990), which is considered the most efficient and the most selective for *Stomoxys* (Gilles *et al*. 2007): the Vavoua trap (Fig. 2). This trap has been revisited for easy implementation and made accessible by the Alcochem Hygiene Company (https://stomoxys.com) (Fig. 3). Its blue color comes from research on the vision of flies, making it both very effective in attracting *Stomoxys* and selective in not impacting non-target fauna (Duvallet 2022).

But it will only be really effective in controlling stable flies if it is associated within the framework of integrated pest management, with biological control associating predatory mites for the control of eggs and Pteromalidae parasitoids for the parasitism of stable fly pupae (Skovgard 2004). The BESTICO company (https://bestico.fr), a subsidiary of the KOPPERT group, world leader in biological control (https://koppert.com), can provide keepers with "mini-wasps" (*Splalangia cameroni* and *Muscidifurax raptor*), micro-parasitoid hymenoptera that seek out pupal flies to lay their eggs inside and thus kill the fly in its puparium (Fig. 4). At the same time, predatory mites

(*Macrocheles robustulus*), supplied by the same firm, are released at the egg-laying sites to attack the eggs and fly larvae to devour them. These beneficial arthropods are cosmopolitan and connot be considered as invasive imported organisms.

Figs 2–3. Vavoua trap

Figs 4. *Muscidifurax raptor* ovipositing into a puparium of a fly.

We therefore invite livestock keepers to stop the application of insecticides, which are ineffective, dangerous for human and animal health, and harmful to the environment, and to move towards this integrated pest management strategy of combining traps and biological control.

Acknowledgments
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Systema Dipterorum **Update (Version 3.11) – Fall 2022**

Neal L. Evenhuis[1] & Thomas Pape[2]

[1] J. Linsley Gressitt Center for Research in Entomology, Bishop Museum, Honolulu, Hawai'i 978917-2704, USA; neale@bishopmuseum.org

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

The latest version of *Systema Dipterorum* (http://www.diptera.org/) was posted on 15 November and contains a total of 242,556 records (213,740 species-group, 24,158 genus-group, and 4,658 family-group names). Of these, there are 168,079 valid names of living species of flies buzzing around the world. [You know there are many, many, many more ... they just need to be described!]

For the first time ever we are more or less up-to-date with entering new names, and we have done an analysis of the numbers of available species-group names described every year since 1758, which shows that the average is 780 per year. Last year, 871 nominal species were described, a bit down from recent year averages, which have been in the 1000s, and this year (up to 15 November) 759 new nominal species have been described. The decade with the highest average per year was 1920–1929 (2,039 species per year).

As always we have our users to thank for helping to keep us on our toes, supplying us with corrections to the database where they find them. Shout outs to the following for their help in various ways since the last update in *Fly Times* (not in any particular order): Arthur Frost, Mark Mitchell, Stephen Smith, Ximo Mengual, Jeff Skevington, Ante Vujic, Gunilla Ståhls, Hiroshi Shima, Martin Villet, Adrian Pont, Phil Bragg, Pjotr Oosterbroek, Steve Gaimari, Doug Yanega, Richard Pyle, Jim O'Hara, Shannon Henderson, Jens-Hermann Stuke, Owen Lonsdale, Art Borkent, Peter Cranston, Morgan Jackson, Yury Roskov, Geoff Ower, Ralph Peters, Jere Kahanpää, Torsten Dikow, Michael von Tschirnhaus, Carlo Monari, Larry Hribar, Zachary Dankowicz, Aimee Ward, Jean-Sébastien Girard, Martin Hauser, Peter Adler, Daniel Whitmore, Andrew Whittington, Arturo Santos-Perez, Kevin Barber, Marc Pollet, Robert Douglas, Hongqu Tang, Daubian Santos, Daniel Carmo, Brad Sinclair, Jeff Cumming, and Ronald Rodrigues Guimarães.

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HISTORICAL DIPTEROLOGY

Charles P. and Mabel M. Alexander, the crane fly couple and their achievements

Pjotr Oosterbroek

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

Introduction

There are more than 11,800 insect taxa named by Charles P. Alexander (1889–1981), a really astonishing number [*endnotes 1, 2*]. The first described taxon was *Adelphomyia minuta* from the USA, published 21 August 1911, the last one was *Molophilus ornithostylus* from Chile, published early in 1981. In this period of almost 70 years, 1,048 original papers on nematocerous Diptera were published, the very large majority dealing with Tipulidae (s.l.) [*endnote 3*].

Fortunately, Charles received great help from his wife Mabel M. Alexander (born Miller; 1894–1979). They married in 1917 and spent 62 years together (Fig. 1). One of the important factors that contributed to the great productivity and to the feeling of well-being, experienced during most of Charles' career, was the companionship and full cooperation of Mabel, who assisted him in countless ways. She was with him on their many collecting trips, for example, and at home she organized the hundreds of cases filled with specimens, plainly a work of love and scientific dedication (Chastaia 1979). In effect, what has been accomplished represents the efforts of two people, not just one (Gurney 1982) and together they are considered the most productive team of systematists ever (Thompson 1999).

Fig. 1. Charles and Mabel Alexander in their garden at Amherst, Massachusetts, 17 August 1978 (photo by Chen-Wen Young)

In Charles' In Memoriam for Mabel he concludes "I have been pleased and privileged to prepare this account of my dear wife and helpmate throughout the many happy years. I cannot write or speak enough to do full justice to the constant help and cooperation that Mabel gave to me throughout our wedded life." (Alexander 1979f). Already much earlier, at the end of a short autobiographic

account (Alexander 1952c), he wrote “In conclusion, I wish to express my deepest thanks and appreciation to my wife, companion on innumerable field trips in search of flies in all parts of the United States and Canada [*endnotes 4, 5*]. Without her constant aid and encouragement, only a fraction of the accomplished work would have been possible”. [*endnote 6*, for an overview of biographies].

Publications (1,077)

Alexander published his first paper in 1903, at the age of 13, and up to 1910 published 19 papers, 17 on birds and two on Coleoptera (a list of these papers is given in Alexander 1952c). Starting in 1910 with the first paper on crane flies, reprint numbers were assigned to the publications, as well as a year with a letter (for example, in 1912 there are 13 papers, given as reprint #6 1912a, #7 1912b, etc.) ending in 1981 with reprint number 1,017 [*endnote 7*]. The CCW started with these reprint numbers but for various reasons needed to add additional numbers resulting in a total of 1,060 individual publications, not the original 1,017 [*endnote 8*]. A different topic, namely botany, was dealt with in his 1918 thesis “A study on the family Ericaceae and related heath-like plants of the order Ericales”, submitted toward a PhD degree at the Cornell University [*endnote 9*].

Of the above mentioned 1,080 papers (19 + 1,060 + 1), two are duplicates and one is a reprint [*endnote 10*], resulting in 1,077 original publications. On average, Alexander wrote 15.4 publications per year (Figure 2), even while he served as professor, department chair and as dean at the University of Massachusetts. The most productive year was 1920 in which 37 papers were published, which is one paper published every 10 days with six days left for the last one (1920 being a leap year).

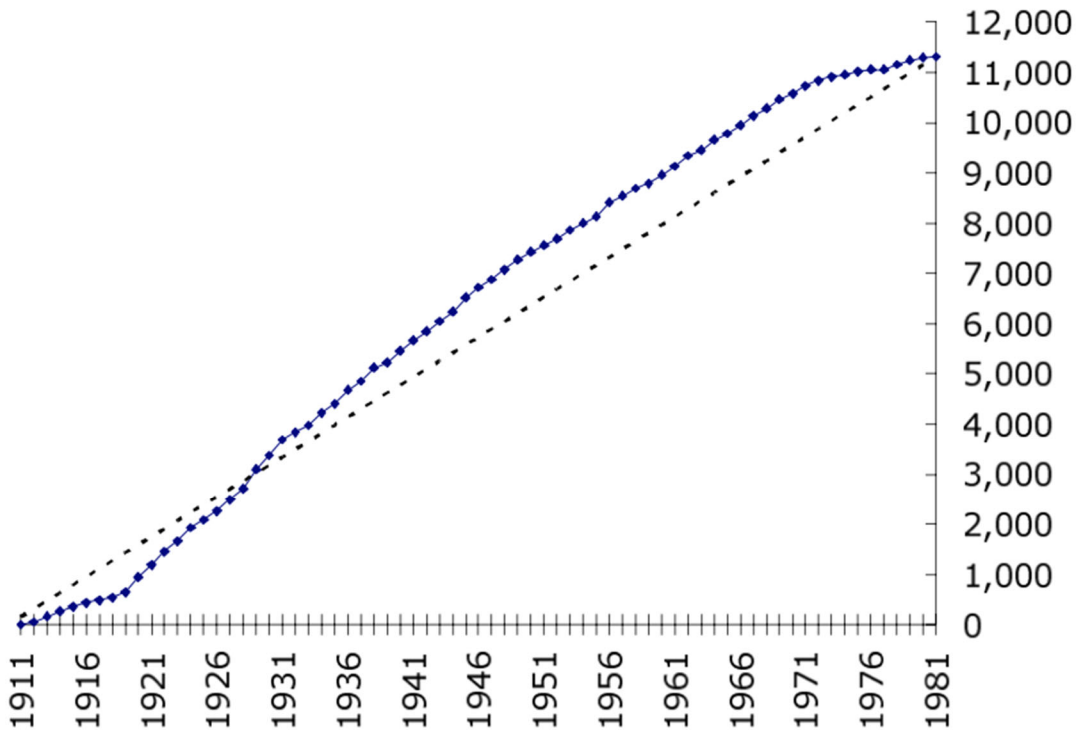

Fig. 2. Number of species of crane flies named per year, 1911–1981, cumulative (after Oosterbroek 2009).

Among the papers are 27 non-taxonomic papers, such as 18 obituaries and nine reviews of journals and dipterology [*endnote 11*]. There is also the thesis, and the description of a new species of

Plecoptera (Alexander 1936f). So, of the 1,077 original papers, 1,048 deal with the taxonomy and to a lesser extent the phylogeny, biogeography and biology of nematocerous Diptera, crane flies in particular [*endnote 12*].

Number of names (11,861)
A count of the insect names published by Alexander is rather straightforward. For this the following taxa are considered:
Genera, subgenera, species and subspecies of extant crane flies: 11,557 (source: CCW).
Other nematocerous families: 195 (source: Oosterbroek 2009 [*endnote 13*]).
Fossil crane flies: 64 (source: Alexander 1931e, 1938m; Evenhuis 1994 [*endnotes 14, 15*]).
Above-genus-level taxa: 44 (source: Alexander 1920r, 1927o; Sabrosky 1999; Oosterbroek 2009).
A new species of Plecoptera: 1 (source: Alexander 1936f).
Total: 11,861 [*endnote 16*].

Number of taxa described (11,550, 13,000 ?)
A total of 11,861 names does not mean that this is also the number of taxa described. That number is 11,550, as determined for these two categories:

A) Named and described taxa and the names are still in use [*endnote 17*], although the taxonomic position might have changed. Example: The above mentioned *Adelphomyia minuta*, now in *Paradelphomyia*.
B) Named and described but the names are no longer in use because they are synonyms of non-Alexander taxa. Example: *Cylindrotoma japonica* Alexander, 1919, is a synonym of *C. distinctissima* (Meigen, 1818) [*endnote 18*].

For the various groups mentioned above this gives the following:
Extant crane flies: 11,253 (A: 10,959, B: 294).
Other nematocerous families: 189 (A: 186, B: 3).
Fossil crane flies: 64 (A: 62, B: 2).
Above-genus-level taxa: 43 (A: 42, B: 1).
A new species of Plecoptera: 1 (A: 1).
Total: 11,550.

It should be realized that Alexander presented descriptions of many more taxa than those named by himself. How many is impossible to tell without going through his publications page by page (over 19,000 pages). But taking into account that Alexander covered the World, except generally speaking the West Palaearctic and Russia, the number might easily be close to or beyond 13,000.

As is obvious from Fig. 2, there has been during the 70 years of research a more or less constant output of species descriptions, with an average of 3 per week during all those years.

Number of taxa named (11,661)
Besides the names given to taxa that were described, also new names were introduced, in general to replace preoccupied names. In total, Alexander proposed 170 new names. Replacement names proposed for taxa that Alexander had previously named and/or described are not included here, as he had already named such taxa [*endnote 19*]. Because of this, 111 names remain to be added to the 11,550 taxa described, giving a total of 11,661 taxa named by Alexander. The difference with the number of names proposed by Alexander (11,861) and the number of taxa named (11,661) is entirely due to Alexander having described and/or named taxa that were later found to be synonyms of previously described taxa. There are 141 such names [*endnote 18*] and among the new names there are 59 [*endnote 19*].

Acknowledgments
I very much like to thank Fenja Brodo, Jon Gelhaus and Herman de Jong for their interest, support and valuable comments with earlier versions of this contribution. Much thanks also to Neal Evenhuis for his help with nomenclatural issues and to Stephen T. Robinson of the Archives Research Center of the University of Massachusetts for providing various pdfs of the Fernald Club Yearbooks.

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Endnotes

[1] In 1971, in a short paper on the occasion of the 10,000 species of Tipulidae described by him, Alexander mentions other entomologists who described large numbers of species, such as Francis Walker (1809–1874), circa 20,000 insect species; Maurice Pic (1866–1957), circa 15,000 Coleoptera; Edward Meyrinck (1954–1938), circa 15,000 Lepidoptera; Edmund Reitter (1845–1920), circa 15,000 Coleoptera (Alexander 1971k).

[2] To facilitate retrieving, the papers by Alexander are given here with the year and letter (e.g., 1971k) as cited in the CCW (for CCW see Oosterbroek 2022).

[3] Throughout his carrier, Alexander used the name Tipulidae for the crane flies.

[4] Koltz 1979 mentions eighteen ten-week collecting trips across North America for each of which Mabel kept a careful log that besides details on localities and the like are full of human-interest stories; in addition, Mabel did all the driving for these scientific expeditions. An additional five collecting trips are mentioned in the Smithsonian Institution Archives (no year) (see references).

[5] A detailed account of one of these trips can be found in Alexander 1959b.

[6] Biographies. Good, detailed dedications and (auto)biographies about Charles are: Byers (1982), Gurney (1959), Wheeler (1985) as well as the Smithsonian Institution Archives (no year) which among others includes a chronology. For Mabel, much information is found in these four accounts about Charles; especially dedicated to Mabel are: Alexander (1979f), Heard (2020) and Chastaia (1979). Shorter items, dealing with Charles or with both are (as far as known to me): Alexander (1952c), Anonymous (1942, 1946), Arnaud (1970), Dahl (1992), Gurney (1982), Knizeski (1979), Koltz (1979), Oosterbroek (2009) and Sherwood (1979). Finally mention should be made of the C.P. Alexander Award, information about which can be found in *Fly Times* issue 14 p. 5 (1995), issue 58 p. 1–2 (2017) and issue 60 p. 1–3 (2018).

[7] The Alexander papers, all of them available as pdf from the CCW, have been listed in four parts. The first three were privately issued as "The published writings of Charles P. Alexander". List number 1 covers 1910–1950 (reprints 1–669) (Alexander 1952c), number 2 covers 1951–1970 (reprints 670–950) (Alexander 1970l), number 3 covers 1970–1977 (reprints 951–1,000) (Alexander 1977c). His last publications were assigned reprint numbers by George Byers, covering 1978–1981 (reprints 1,001–1,017) (Byers 1982).

[8] The increase from 1,017 papers, as listed by Alexander and Byers [*endnote 7*], to 1,060 has various reasons. Seven Alexander publications in the CCW were not listed before (1928y, 1930k, 1932j, 1942g, 1959b, 1966h, 1979f); in the published writings two are listed as “unnumbered” (1940b, 1950a) and 18 papers have a single reprint number but have been split into several papers because they were published as parts in different issues on different dates (for example, publication 1913e has reprint number 23 but had to be split into six sections, published in three different issues of the journal on different dates in 1913 and 1914), or because a single reprint number covers the treatment of several families in catalogues and the like (for example, reprint 525 covers the 1943 treatment of five families for the Guide to the insects of Connecticut).

[9] Alexander’s attention to plants as well as his 1918 thesis on Ericales is outlined in Wheeler (1985). Crane-flies of New York, part I and II is sometimes mentioned as his PhD thesis but this is incorrect.

[10] Alexander 1919b is the same publication as Alexander 1918h including the same new species and their descriptions, likewise Alexander 1947c is a duplicate of Alexander 1941q; Alexander 1966g is a reprint of Alexander 1943g–1943k

[11] The 18 obituaries are: Alexander 1937l, 1941f, 1945w, 1948i, 1950a, 1951g, 1952a, 1952h, 1952o, 1953e, 1954l, 1957b, 1959c, 1967c, 1969a, 1975f, 1979f and Alexander & Alexander 1966; reviews of journals and dipterology are: 1932j, 1940b, 1942g, 1952c, 1955h, 1959b, 1960d, 1970l, 1977c.

[12] In addition to crane flies and one species of Perlidae (Plecoptera), Alexander published on the following families of nematocerous Diptera: Blephariceridae, Cecidomyiidae, Dixidae, Mycetophilidae (s.l.), Pachyneuridae, Psychodidae, Ptychopteridae, Tanyderidae and Trichoceridae. For the number of taxa per family and biogeographical region see Oosterbroek (2009).

[13] The species *Ptychoptera clitellaria* Alexander, 1935 was not accounted for in Oosterbroek (2009).

[14] Oosterbroek (2009) calculated the number of insect names being 11,755. This requires reconsideration as this paper does not include the fossil taxa described, among other omissions [*endnote 13*]. The 2009 paper includes a short biogeography and does pay more attention to the number of taxa in relation to families, biogeographical regions and synonymy.

[15] As far as known, Alexander did not describe fossils in families other than crane flies.

[16] Not taken into account here are nomina nuda, a conclusive list of which is not available.

[17] 'In use' is just a short way of saying that the name is still used, or can be used (for example names of tribes and subtribes which have been in use but not so much anymore nowadays).

[18] Alexander did describe this so-called 'non-Alexander taxon', therefore it counts as a description. This in contrast to synonymy with a taxon described by himself already earlier, then there are two descriptions for a single taxon; there are 136 such cases in crane flies and five among the other nematocerous families (for example *Ptychoptera uelensis* Alexander, 1928 was also described by him as *basilewskyi* Alexander, 1955 and as *stuckenbergi* Alexander, 1956).

[19] The CCW has 168 such names in extant crane flies, there is one in Blephariceridae (the subgenus name *Metacurupira* Alexander, 1958) and one in the above-genus-level taxa (the trichocerid subfamily *Kawaesemyianae* Dahl & Alexander, 1976). Of these 170 names, 59 refer to taxa described by Alexander previously but turned out to need replacement. So, 59 taxa were already named by him, therefore the count here is 111 remaining replacement names for taxa described by others.

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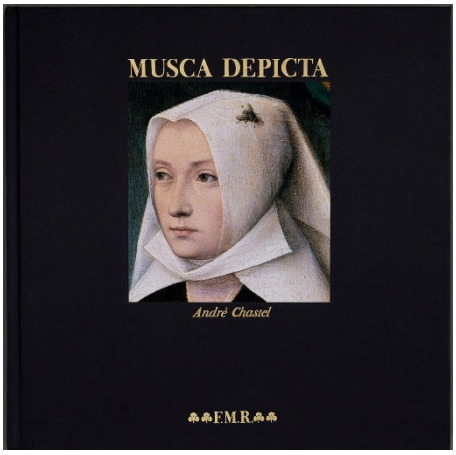
Some Diptera in the Louvre

Stephen D. Gaimari

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



Finding flies in paintings and other artwork has always been of interest to me, and no better place than the Louvre in Paris to find such gems! In a recent (pre-pandemic) trip to Paris with my kids, we visited the Louvre, and I was excited to peruse the paintings of the École de Pays-Bas (Dutch School), whose painters seem to be natural dipterists, depicting a fair number of flies in their still-life paintings. An extremely good book covering such depictions of flies in paintings in general is the book "Musca Depicta" by André Chastel (1984; https://www.francomariaricci.com/en/books/musca-depicta), which is profusely and beautifully illustrated. Although most of the covered works therein have flies associate with people (as on the book cover to the right), there are a fair number of still-life paintings as well. So herein I display some of the Diptera that I encountered in the Louvre, probably to the annoyance of my kids who wanted to move faster to see more, and not to spend quite so much time in the section of Dutch painters (despite their great grandfather on my mother's side being from the Netherlands)!

I am quite sure you can tell that I'm not a professional art photographer! Some odd angles, rather than perfect straight-on shots, but I think you get the idea! To be fair, some of the paintings were up high, so I could only shoot upwards! Following are the artworks displayed, in order:

Fig. 1. "Fleurs dans une carafe de cristal, avec une branche de pos et un escargot" (Flowers in a crystal vase, pea stem and a snail) by Abraham Mignon, after 1660. Oil on panel. (https://collections.louvre.fr/en/ark:/53355/cl010061685). Pendant to "Fleurs, oiseaux, insectes et serpents, souris, lézard et grenouille" (Flowers, birds, insects and snakes, mouse, lizard and frog), which actually does not have any flies, at least that I saw.

Fig. 2. "Corbeille de fleurs avec deux papillons" (Basket of flowers with two butterflies) by Jan van Huysum, first half of the 18th century. Oil on panel. (https://collections.louvre.fr/en/ark:/53355/cl010066707). Note, an engraving of the same work is present in the British Museum.

Fig. 3. "Fleurs dans une coupe en verre, coquillages, papillons et sauterelle" (Flowers in a glass bowl, shells, butterflies and grasshoppers) by Balthasar van der Ast, circa 1640–1650. Oil on panel. (https://collections.louvre.fr/en/ark:/53355/cl010067252).

Fig. 4. "Raisins, pêches et grand verre" (Grapes, peaches and tall glass) by Willem van Aelst, 1670. Oil on canvas. (https://collections.louvre.fr/en/ark:/53355/cl010063533).

Fig. 5. "Guirlandes de fleurs entourant un médaillon représentant le triomphe de l'Amour" (Garlands of flowers surrounding a medallion representing the triumph of Love) by Daniel Seghers (aka The Jesuit of Antwerp, of the École de Pays-Bas du Sud, Flemish School), and Domenico Zampieri (aka Domenichino, of the École Italienne, Italian School) for the medallion, circa 1625–1627 (during Segher's stay in Rome). Oil on canvas. This one is my favorite! (https://collections.louvre.fr/en/ark:/53355/cl010060842).

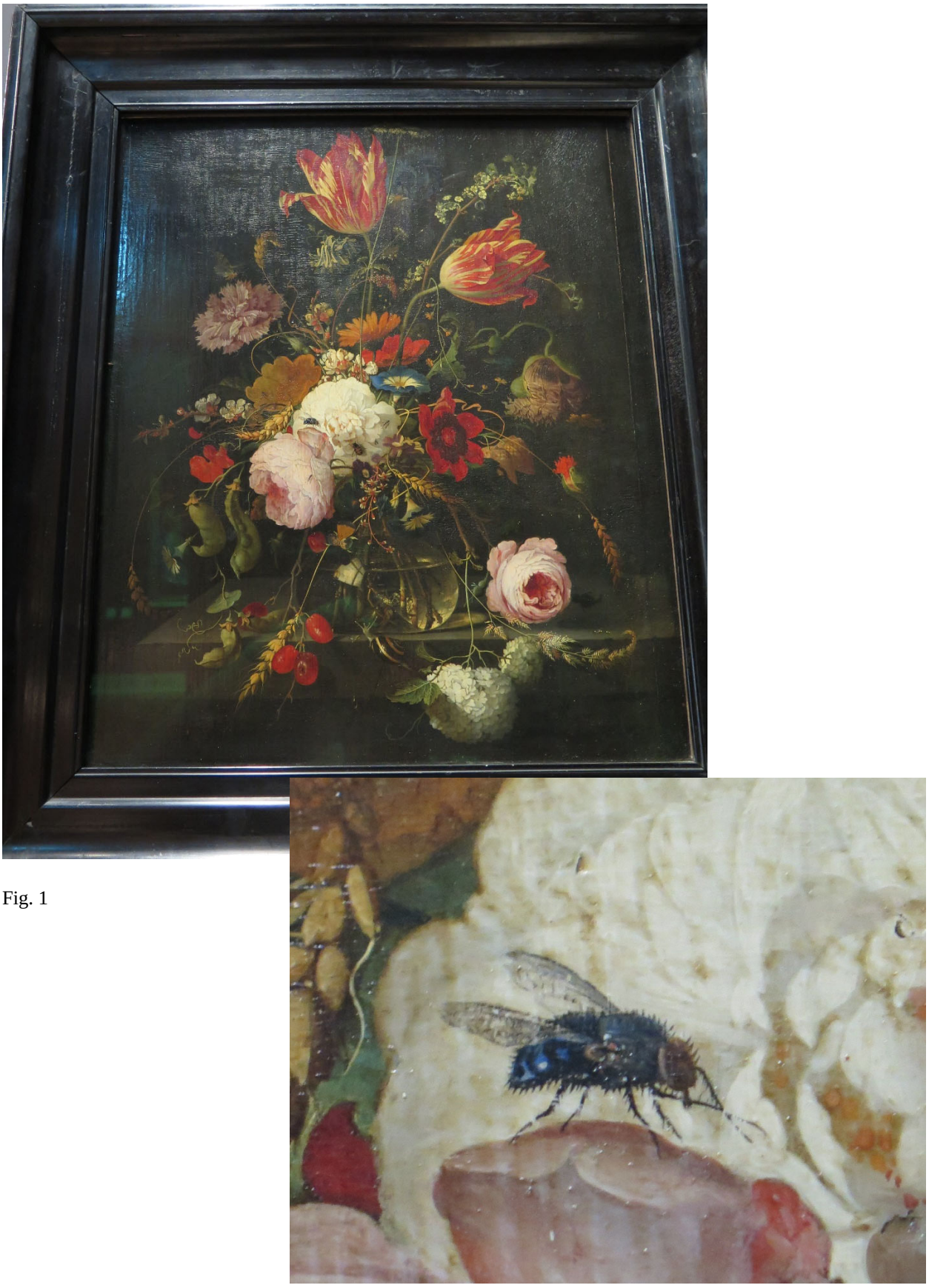


Fig. 1

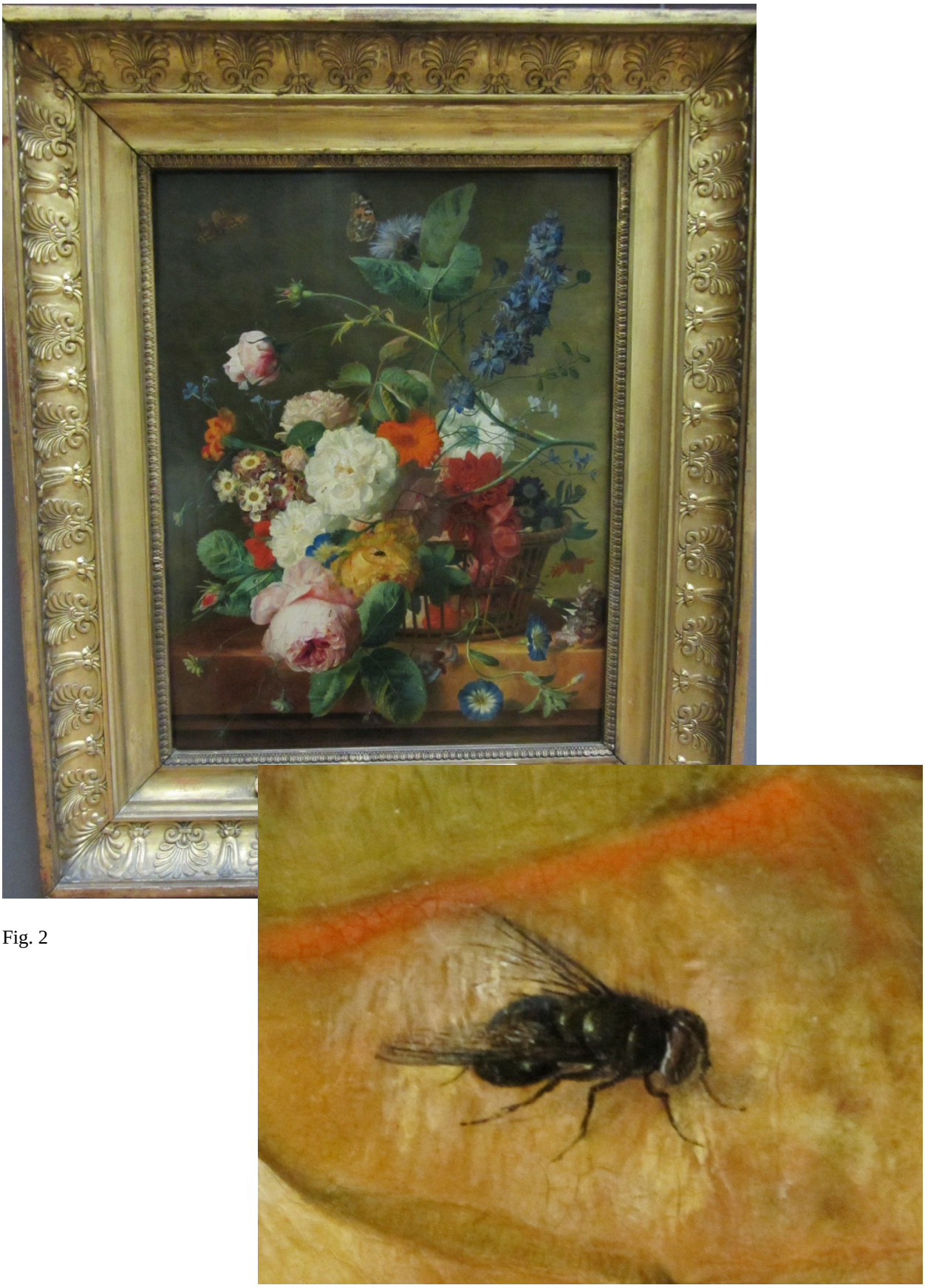


Fig. 2

Fig. 3

Fig. 4

Fig. 5

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PHILAMYIANY

Diptera on stamps (4): Bibionidae, Chironomidae, Keroplatidae, Psychodidae, and Tipulidae

Jens-Hermann Stuke

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

This fourth contribution to "Diptera on stamps" presents all of the Nematocera depicted on stamps with the exception of Simuliidae and Culicidae. Since the latter families include many important vectors of diseases they are comparatively commonly shown on stamps, there being at least 480 stamps showing Culicidae alone, usually comprising *Anopheles* in a malaria context. The remaining Nematocera to be found on stamps are represented by the families Bibionidae, Chironomidae, Keroplatidae, Psychodidae and Tipulidae.

A bibionid is shown as an attractive insect on one stamp of a remarkable sheet from the Faroe Islands, whilst a second Bibionidae stamp from Slovenia shows the fossil remains of a *Plecia* species. The latter, together with a fossil Psychodidae from Peru, appears to comprise one of only two known stamps showing fossil Diptera. Three Chironomidae are figured on stamps from the Antarctic Region, of which they are highly characteristic. The French stamp of *Microzeta mirabilis* is one of the very first to show a fly which does not have any medical importance, whilst the sheet showing the New Zealand Glowworm *Arachnocampa* sp. (Keroplatidae) does not illustrate an adult fly but instead deals with the fascinating and famed bioluminescence of its larvae. In addition to the fossil psychodid specimen mentioned above, there are three other stamps showing Psychodidae from various territories, including two which, perhaps unsurprisingly, deal with Phlebotominae species which are vectors of Leishmaniasis. One of these honours the Israeli parasitology expert Saul Adlers (1895–1966) who developed a leishmaniasis vaccine. Diptera are frequently found on stamps honouring researchers who have worked with dipteran vectors of diseases, typically illustrating the life cycle of the parasite in a manner which is intended to inform and enlighten. What a contrast therefore is the Psychodidae stamp from Iceland which depicts a harmless and ‘cute’ animal! Finally, there are three stamps showing Tipulidae. The Norwegian stamp shows a watercolour painting by Theodor Kittelsen (1857–1914) which originates from about 1894. Another more typical situation for Diptera on stamps is of an unidentified tipulid shown as the prey of a bird. The Faroe Islands stamp shows a tipulid as part of the ‘stone fence’ biotope – nature conservation being a comparatively modern reason why Diptera are now landing on stamps.

Although not really a stamp, one remarkable related issue is also shown here: from a booklet with stamps celebrating the Lapland excursion of the Swedish scientist Carl Linnaeus is figured an original drawing by Linnaeus showing a Keroplatidae species.

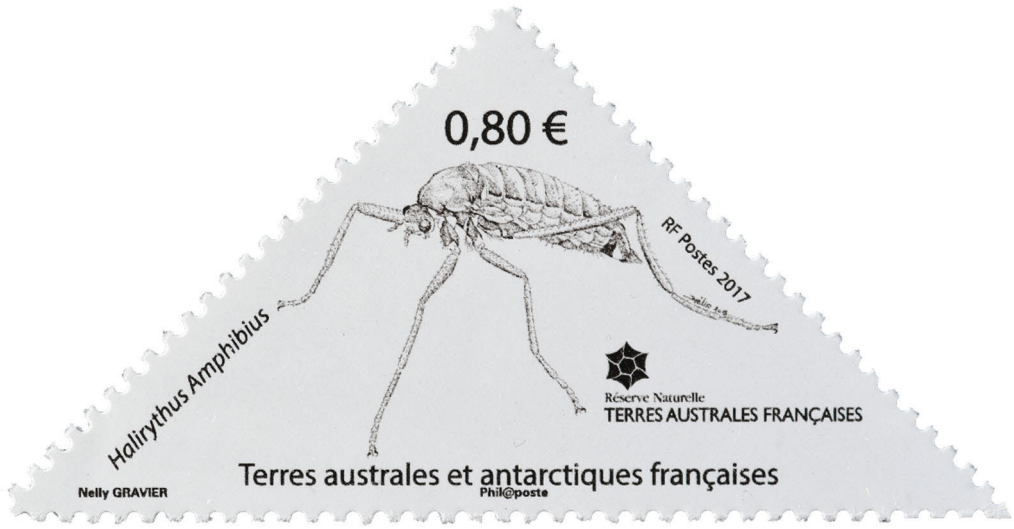
For each stamp I have provided the country and year of issue, title of stamp, title of stamp series (where available/relevant), face value, Michel number and stamp number (the latter both copied from https://colnect.com/).

BIBIONIDAE

***Bibio pomonae* (FABRICIUS, 1775) – Denmark [Faroe Islands] 2018**: Lærlitt loðmýggj, *Bibio Pomonae* [Fauna 2018], 12 Danish krone. – Michel number: FO 910; stamp number: FO 701b.

† ***Plecia* spec. – Slovenia 2002:** Fossil *Bibio*, C No Face Value. – Michel number: SI 394; stamp number: SI 485.

CHIRONOMIDAE



***Halirytus amphibius* EATON, 1875 – France [Terres Australes et Antarctiques] 2017**: *Halirythus Amphibius*, 0.80 Euro. – Michel number: TF 943; stamp number: TF 555.

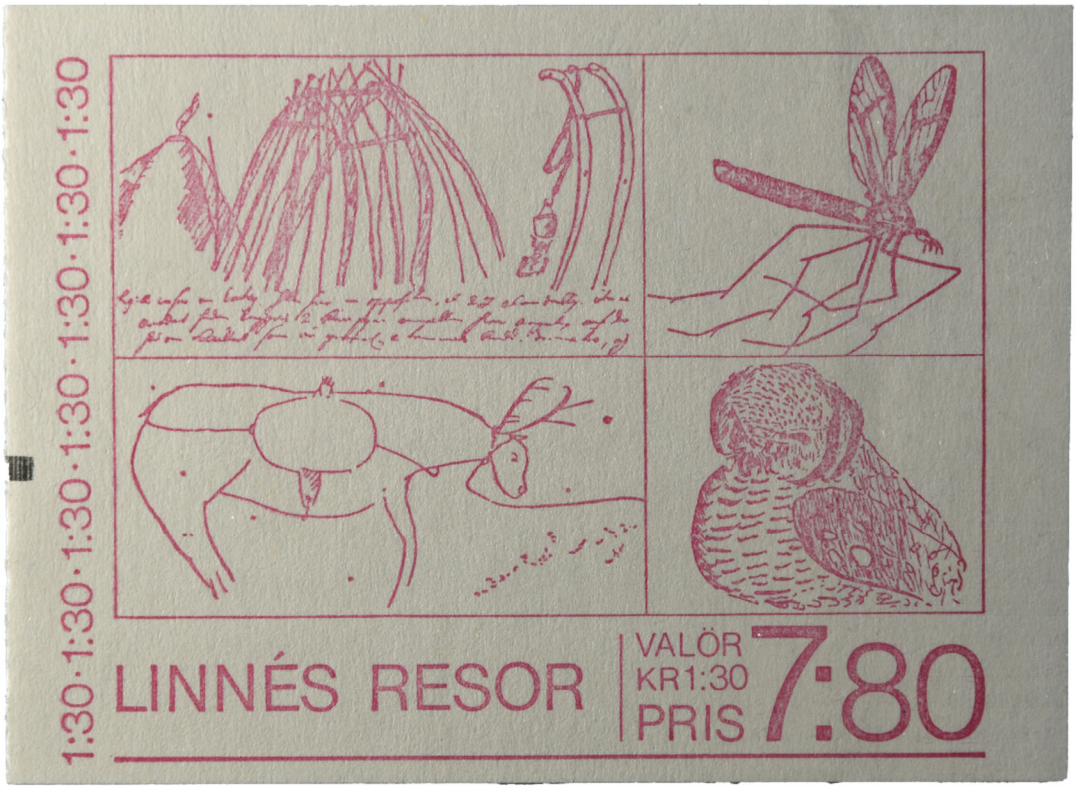
***Microzetia mirabilis* SÉGUY, 1965 – France [Terres Australes et Antarctiques] 1972**: *Microzetia mirabilis* [Insectes de l'Antartique], 25 French franc. – Michel number: TF 71; stamp number: TF 48.

***Parochlus steineni* GRESSITT, LEECH & WISE, 1963 – Britain [Falkland Islands] 1982**: *Parachlus steineni*, 26 Falkland Islands penny. – Michel number: FK-GE 111; stamp number: FK-GE 71.

KEROPLATIDAE

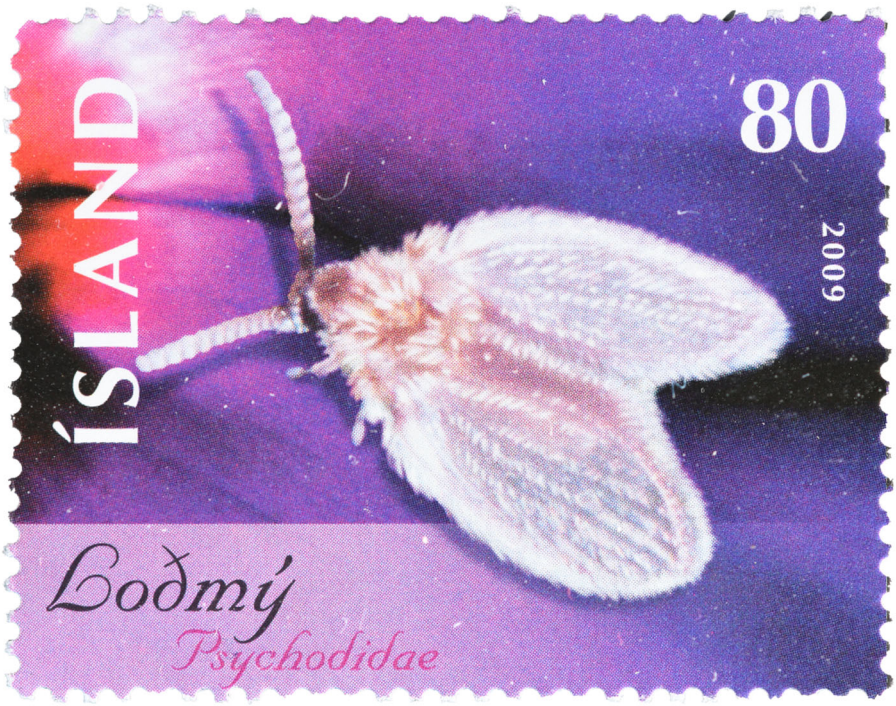
***Arachnocampa* spec. – New Zealand 2016**: New Zealand Native Glowworms, 0.80 + 1.40 + 2.00 + 2.50 New Zealand dollar. – Michel number: NZ BL369; stamp number: NZ 2631a.

PEDICIIDAE



***Pedicia rivosa rivosa* (LINNAEUS, 1758) – Sweden 1978**: van Linné fran Lapplandsresan, 6*1.30 Swedish krona. – Michel number: SE MH67; stamp number: –; booklet.

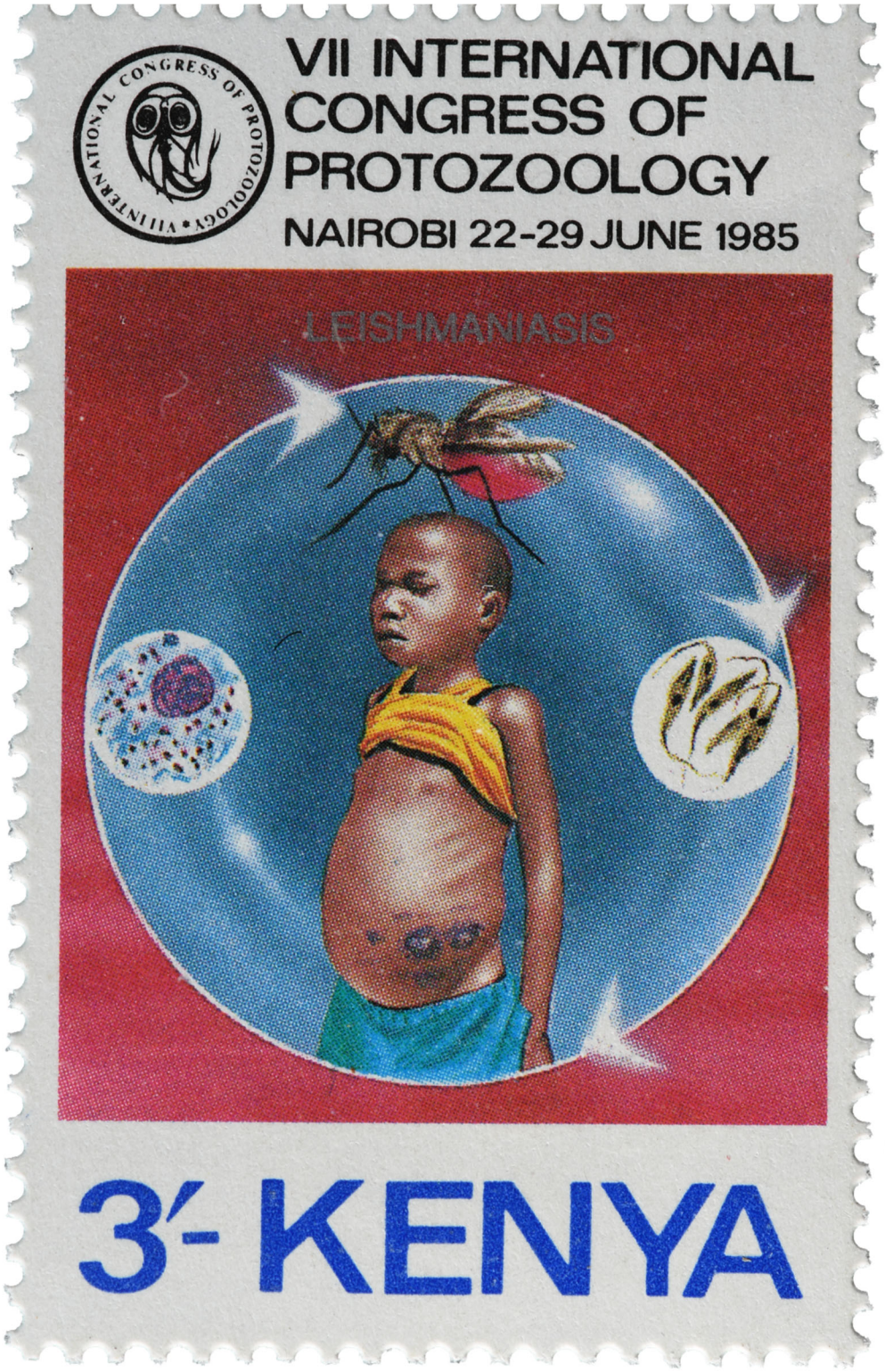
PSYCHODIDAE



***Psychoda* spec. – Iceland 2009**: Loðmý, Psychodidae, 80 Icelandic króna. – Michel number: IS 1221; stamp number: IS 1160.

† ***Sycorax peruensis* PETRULEVIČIUS *et al.*, 2011 – Peru 2014**: Sycorax peruensis [Insectos Prehistoricos], 8 Peruvian nuevo sol. – Michel number: PE BL93; stamp number: PE 1867; souvenir sheet.

Phlebotominae indet. – Israel 1994: Saul Adler, 1966–1895, 4.50 Israeli new shekel. – Michel number: IL 1299; stamp number: IL 1202.



Phlebotominae indet. – Kenya 1985: Leishmaniasis [VII International Congress of Protozoology, Nairobi 22–29 June 1985], 3 Kenyan shilling. – Michel number: KE 331; stamp number: KE 338.

TIPULIDAE

***Prionocera turcica* (FABRICIUS, 1787) – Iceland 2007**: Kaplafluga, *Prionocera turcica*, 70 Icelandic króna. – Michel number: IS 1180; stamp number: IS 1121.

***Tipula* spec. – Denmark [Faroe Islands] 2007**: [no title] [Fauna 2007], 5.50 Faroese króna. – Michel number: FO 618; stamp number: FO 494d.

***Tipula* spec. – Britain [Isle of Man] 2000**: Spotted flycatcher – *Muscipara striata* [WWF], 26 Manx penny. – Michel number: IM 861; stamp number: IM 860b.

***Tipula* spec. – Norway 2007**: **"**Et overfall**"** [Theodor Kittelsen], A Europa, no face value. – Michel number: NO 1607; stamp number: NO 1502.

Acknowledgement
Thanks to David Clements who checked the manuscript! John Skartveit (Bergen), Rüdiger Wagner (Schlitz) and Rainer Heiss (Berlin) identified some of the shown species. Any comments concerning either the identification of the Diptera shown or references to overlooked stamps would be very welcome!

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MEETING NEWS

North American Dipterists Society Field Meeting in the Pinelands of southern New Jersey, June 13–17, 2022

Jon Gelhaus[1] and the Gelhaus Lab (Bob Conrow, Solange Akimana, Maddie Worth)

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

The seventeenth Field Meeting of the North American Dipterists Society was held June 13–17, 2022 in southern New Jersey, in the heart of the New Jersey Pinelands, also known as the Pine Barrens. The host venue including our lodging, lab and meeting areas was the Lighthouse Center for Natural Resource Education in Waretown, New Jersey. The Center is located on Barnegat Bay on the New Jersey coast and within a 20 minute drive from the heart of the New Jersey Pine Barrens (Fig. 1). Habitats explored include beach, salt marsh, coastal forest and wetlands, coastal plain acidic streams and bogs, sandy openings, meadows, oak-pine woodland and transition sites between inner and outer Atlantic Coastal Plain areas.

Fig. 1. Photos from the Lighthouse Center property (clockwise from upper left) showing vernal wetland in coastal forest, the buildings, salt marsh, and Barnegat Bay. Photos by (clockwise) Jon Gelhaus, Jon Gelhaus, Kate Lindsay and Juan Manuel Perilla López.

The meeting had 21 attendees. This included 3 high school students and college undergraduates, 7 graduate students, 5 faculty researchers, and 6 other researchers (Fig. 2). The attendees provided a

great mix of expertise and enthusiasm in topics such as Diptera taxonomy, general natural history, collecting and preparation, and insect photography. The Society provided gratis registration and lodging costs to two students (high school student Zachary Dankowicz, undergraduate Joe Wilson), the James Bossert and Chen Young Diptera Research Fund at the Academy of Natural Sciences provided lodging and registration costs for Gelhaus, 3 Drexel students in his lab (grad students Bob Conrow and Solange Akimana, undergraduate Maddie Worth), and the Society awarded 2 graduate students who applied for travel grant support (Kate Lindsay, Univ of Guelph, Teagan Mulford, Brigham Young Univ.) with grants of $500 plus registration and lodging waivers. In total the registrations and lodging costs for 7 students were supported, 4 of whom gave talks, also with travel grants awarded to two graduate students, both of whom gave talks.

Fig. 2. Photo of participants of the North American Dipterist Society Field Meeting 2022. Front row, left to right: Jon Gelhaus, Maddie Worth, Solange Akimana, Teagan Mulford, Chris Maier, Stephen Luk, Juan Manuel Perilla López, Bill Murphy. Second row, left to right: Riley Nelson, Bob Conrow, Brittany Wingert, Kate Lindsay, Zachary Dankowicz, Jim Hogue, John Stireman. Back row: Joseph Wilson, Alan Mata, Greg Dahlem, Stephen Bullington, Andrew Fasbender. Not shown: Allen Norrbom. Photographer C. Riley Nelson.

Registration was an affordable $200 for the week ($170 for students) and included most meals, presentations, visit to the Academy of Natural Sciences' collections, transport to special sites for sampling, and the use of the Lighthouse Center venue for meeting rooms, dining hall, lodging and collecting (Fig. 3). Lodging comprised a room with two beds, with each room sharing a bathroom with the adjacent room. Attendees provided their own linens/sleeping bags, although some were available for use. Due to COVID concerns we spaced lodging out so nearly all attendees had a room to themselves. The complex was roomy and airy with plenty of windows which also helped to reduce the chance of infection, and the organizer heard of no COVID infections linked to the meeting.

Meals provided included Monday dinner (Gelhaus cooked chili, cornbread and brownies), Tuesday dinner (Wawa hoagies, a local staple) and Thursday dinner (barbecue chicken, pulled pork, pasta, salads, etc.). We also provided breakfast foods and beverages for each morning and supplies for fixing a takeaway lunch. Wednesday dinner was left to the attendees after a long day in the field, with most taking advantage of the great seafood restaurants in the area.

Fig. 3. Breakfast in the eating area proved to be a great time to socialize and plan the day's collecting activities. Photo by Jon Gelhaus.

Schedule of activities:
Sunday, June 12 – set up, light trapping at Lighthouse center (Gelhaus, Stireman and students)

Monday, June 13 – Arrival of attendees, dinner, group photo, introductory presentation by Gelhaus. Light trapping at Lighthouse Center

Tuesday, June 14 – Presentations by attendees (Part 1, due to rain in AM) (Fig. 4). Collecting in the afternoon at Franklin Parker Preserve, Chatsworth, New Jersey, in the heart of the Pine Barrens with light trapping at Parker Preserve after dinner.

Wednesday, June 15 – One group investigated in the morning the Evert Preserve, a large bog and woodland located in transition between Inner and Outer Coastal Plain. After lunch, a group collected at the Rechnitz Pine Barren Reserve which included open and closed pine-oak forest, an enormous

log pile, and an Atlantic White Cedar/Sphagnum bog along Mount Misery Creek. Another group searched out hill-topping sites around Candace Ashmun Preserve with the help of NJCF staff member Bill Scullion.

Fig. 4. Presentations were given in the Lighthouse Center meeting room. Here Bob Conrow is speaking about his research on Tipuloidea. Photo by Juan Manuel Perilla López.

Thursday, June 16 – Visit to the Diptera collection in late morning to mid afternoon at the Academy of Natural Sciences of Drexel University in Philadelphia (Fig. 5). Presentations by attendees (Part 2) after dinner. There were 9 presentations given over two sessions with 5 given by students. Riley's presentation included a video greeting from Wayne Mathis!

Friday, June 17 – Most attendees returned home after breakfast. Some stayed an additional day in the area to explore the New Jersey shore and further collecting.

Fig. 5. Visit to the Entomology collection at the Academy of Natural Sciences of Drexel University. From Left: John Stireman reviewing Tachinidae, Jim Hogue examining Syrphidae, Stephen Luk and collection manager Jason Weintraub discussing the collection. Photos from Jon Gelhaus.

The venue site, The Lighthouse Center, offered a variety of habitats to sample including beach, salt marsh, coastal forest, and vernal wetlands, all of which were explored by all the attendees. We light trapped there Sunday and Monday nights, and several Malaise traps were set up on the property (Fig. 6). For some of the group this was their first view of the invasive Spotted Lantern Fly (Fulgoridae) as it has spread across New Jersey to Waretown in the last year or so and now is at the Lighthouse Center grounds.

Fig. 6. Left: Malaise trap set up at the Lighthouse Center, with an unexpected inhabitant. Middle: John Stireman prepping malaise trap sample in the Lighthouse Center lab with Alan Mata and Zachary Dankowicz observing. Right: Andrew Fasbender sorting sweep samples for Ceratopogonidae. Photos from left: Jon Gelhaus, Stephen Luk, Jon Gelhaus.

The New Jersey Conservation Foundation opened their properties for sampling by our attendees. These included the Parker Preserve, 9000 acres of pine-oak forests and bogs in the center of the New Jersey Pine Barrens. We collected there on Tuesday afternoon and later light trapped there on Tuesday evening (Fig. 7).

We also explored the Evert Preserve, a transition bog and forest site between the Inner and Outer Coastal Plain. An extensive boardwalk through the bog allowed us to sample deep in the bog (Figs. 8, 10). We also sampled at the Rechnitz Preserve with sand trails through open woodland bringing us to secluded pristine Atlantic White Cedar and sphagnum bogs along Mount Misery Creek (Fig. 9).

The Ashmun Preserve was a 10 min drive from the venue and provided a mixture of open and woodland habitats with a stream intersecting through the property. Other groups explored the area for hill-topping locations and visited the Atlantic Ocean beaches. Flowering shrubs at the edges of coastal forest just a few miles from the venue were great for a variety of floral visiting flies.

A great variety of Diptera were sampled and photographed by the group (Figs 11–12). Significant finds noted during the meeting include two new state records for New Jersey for Limoniidae (to be reported in a later *Fly Times*) and notable finds for Syrphidae, Dolichopodidae, Sciomyzidae, Asilidae, Ceratopogonidae and Bombyliidae. Other collections made during this meeting will likely appear in our research in the coming years. In another two-winged find, Bill Murphy proved to be the group's "owl whisperer" when he fished a juvenile Great Horned Owl from the water (Fig. 7) of the coastal marsh after the owl apparently crash-landed and couldn't get out.

Fig. 7. Sampling included (clockwise from top left): searching for the elusive hill-topping sites in low elevation southern New Jersey with guide Bill Scullion, NJCF, and Greg Dahlem and John Stireman; light trapping with group at Parker Preserve; monitoring the light sheet with Jon Gelhaus and John Stireman at Lighthouse Center; and owl rescuer Bill Murphy. Photos by (clockwise from top left) Juan Manuel Perilla López, Stephen Luk, Juan Manuel Perilla López and Kate Lindsay.

Fig. 8. Evert Preserve. From Left: Riley Nelson and Solange Akimana having a conversation in French. Brittany Wingert collecting; Zachary Dankowicz photographing an insect held by Maddie Worth (upper); Riley Nelson and Stephen Luk with dueling cameras; From left: Photos by Jon Gelhaus, Bill Murphy, Solange Akimana (upper), Jon Gelhaus (lower).

Fig. 9. Rechnitz Preserve. From left: Log pile on road; Jim Hogue and group hiking; Atlantic White cedar/*Sphagnum* bog along Mount Misery Creek (upper); Pitcher Plant (lower). Photos from Jon Gelhaus, Solange Akimana (pitcher plant).

Fig. 10. From left: Bog at Evert Preserve is traversed by a boardwalk; bog at Parker Preserve (upper); forest regenerating from prescribed burn at Parker Preserve (lower). Photos from Teagan Mulford, Juan Manuel Perilla López.

Fig. 11. Various Diptera photographed during the Field Meeting. Photos from left: Top Row: Asilidae, Ceratopogonidae. Middle Row: Chloropidae, Pyrgotidae. Bottom Row: Tabanidae, Syrphidae. Photos by, from left: Top row: Riley Nelson, Zachary Dankowicz. Middle row: Stephen Luk (both). Bottom row: Zachary Dankowicz, Jon Gelhaus.

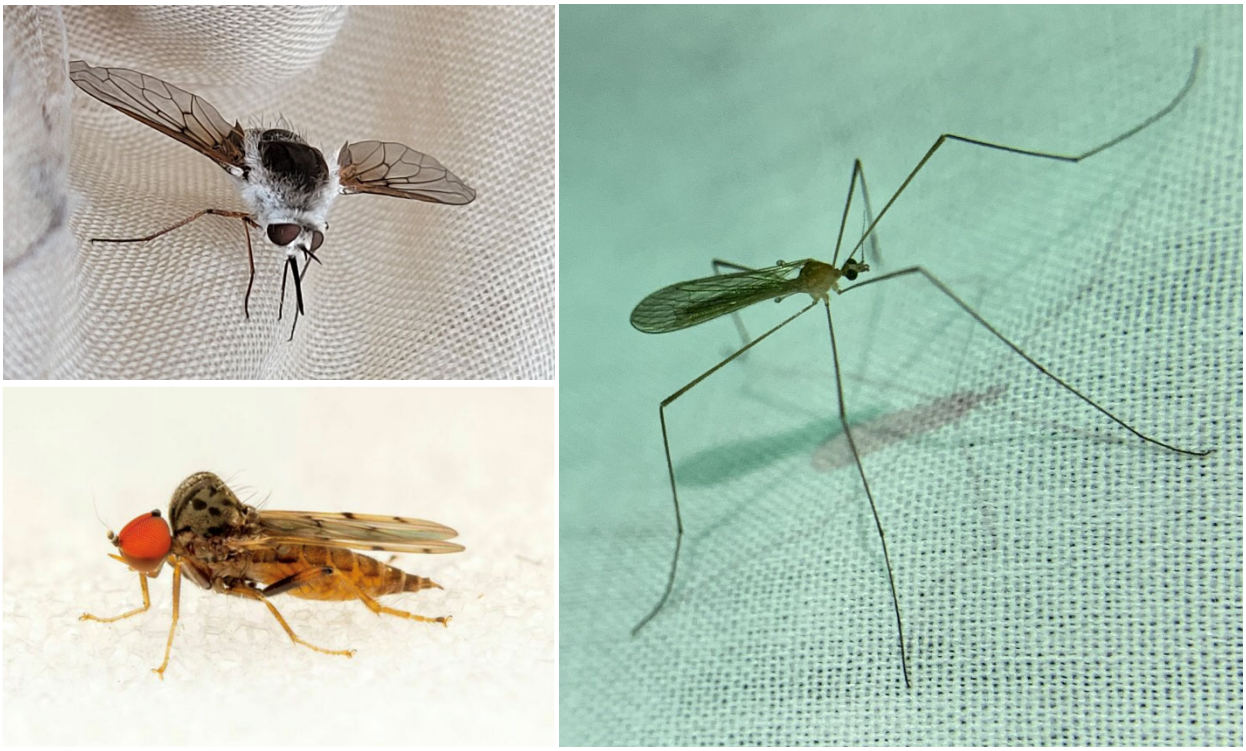

Fig. 12. Various Diptera photographed during the Field Meeting. Photos from left: Bombyliidae (upper), Hybotidae (lower), Limoniidae. Photos by, from left: Teagan Mulford (upper), Zachary Dankowicz (lower), Jon Gelhaus.

It was an honor to host this meeting – I have enjoyed coming to the Field Meetings of the North American Dipterists Society for many years and was glad to provide this opportunity for my colleagues. I was pleased to see the interest and excitement from the younger dipterists and hope we can continue to support their attendance.

Thanks to:

- Lighthouse Center for Environmental Education, Waretown New Jersey, and manager Pola Galie for discounted rental, cooperation and access.
- New Jersey Conservation Foundation, and Science Director Dr. Emile DeVito for use of their properties, and Land Manager Bill Scullion for help with access and finding specific habitats
- Drexel University, Biodiversity, Earth and Environmental Science department (BEES) – and Chair David Velinsky – provided two van vehicles, fuel, equipment including microscopes, waders, nets, and other supplies.
- Entomology Department of the Academy of Natural Sciences (ANSP) of Drexel University – provided supplies and equipment, and Jason Weintraub and Greg Cowper for hosting the attendees in the entomology collection of the Academy of Natural Sciences.
- James Bossert/Chen Young Fund for Diptera Research at the ANSP for funding registrations for five students
- North American Dipterists Society – for support of the meeting, funding student registrations and travel grants for 2 students
- All of the attendees for supporting this meeting by their attendance!

Presentations given at North American Diptera Society Field Meeting 2022

June 14

Maddie Worth, Drexel University,
High diversity of *Geranomyia* crane flies (Limoniidae) in a small forested fragment of Costa Rica

Teagan Mulford, Brigham Young University,
Biogeography of *Proctacanthus* (Diptera: Asilidae) in North America

Bob Conrow, Drexel University
Molecular Adventures: My journey to generate the first molecular phylogeny of the crane fly family Tipulidae and study the phylogenetic origins of habitat diversity among the family

June 16

Andrew Fasbender, Rithron Associates
A simple project? Resolving species identity in *Ceratoculicoides* (Ceratopogonidae)

Juan Manuel Perilla López, Wright State University
Revising the Neotropical *Chrysotachina* (Tachinidae: Polideini): Combing out the hairiness of tachinids.

Allen Norrbom, USDA, Systematic Entomology Laboratory, Washington DC
Stalk-mining flies of the genus *Strauzia* (Diptera, Tephritidae)

Kate Lindsay, University of Guelph
Solving the *Scipopus* problem (Micropezidae)

Riley Nelson, Brigham Young University
Diptera Photo Gallery

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Announcing the 18th North American Dipterists Society Field Meeting for 2024

Barbara Hayford [1] & Andrew Fasbender [2]

[1] Coastal Interpretive Center, Ocean Shores, Washington, USA; bhayford@gmail.com

[2] Rhithron Associates Inc., Missoula, Montana, USA; afasbender@rhithron.com

Following a productive gathering in New Jersey last June, the next North American Dipterists Society Field Meeting will be held on the opposite side of the continent in western Washington state in summer 2024. The state contains a diverse collection of biomes, from the xeric scablands of the Columbia Plateau to the temperate rainforests of the Olympic Peninsula. We are currently negotiating with venues but anticipate the conference site will be in the foothills of the Cascade Range west of Mount Rainier, a little over an hour's drive south of SeaTac airport. The venue is located on a forested campus with nearby public lands allowing easy access to coniferous forest in various stages of succession, ranging in elevation from less than 200 to 1500+ meters. The area also hosts diverse aquatic habitats ranging from groundwater seepages and first order springs to subalpine lakes and braided rivers such as the Nisqually and Cowlitz. We have already identified and have permits for several potential collecting sites on state and National Forest land, and there is also the potential for a day trip to collect on the Olympic Peninsula. Exact dates and full details on the site will be provided in the Spring 2023 issue of *Fly Times*, and through the dipterists mailing list (https://lists.dipterists.org/mailman/listinfo/dipterists).

High elevation bog, Olympic Peninsula, Washington USA, 17.v.2022.

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

Stephen D. Gaimari, Shaun L. Winterton & Martin Hauser

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

The 10th International Congress of Dipterology (ICDX), being held from 16–21 July 2023 in Reno, Nevada, USA, is rapidly approaching with just seven months to go. We look forward to seeing all of you there! Please visit the Congress website (https://dipterists.org/icdx) regularly for updates, and please use the form to indicate your interest in attending. We will also keep folks posted through the dipterists mailing list (https://lists.dipterists.org/mailman/listinfo/dipterists; if you haven't signed up yet, you should!). The portal for registering for the Congress and abstract submissions will be opened in January 2023, so time to get ready! I will send those links and information out when they open.

The venue hosting ICDX is the Silver Legacy Resort in Reno, Nevada, with the following special room rates for the Congress (see https://dipterists.org/icdx/accommodation.html for the booking portal and further information): $70/night for a single, $80/night for a double, plus $10 for each additional person in a room (up to a total of 4 per room), plus $22.70/night "resort fee", $3/night "tourism surcharge", plus taxes on the room rate.

We are ***extremely strongly requesting that people stay only at the venue hotel*** (Silver Legacy), and book only through our booking portal, because the very substantial concessions they are providing are contingent upon our filling the rooms in our Congress block! If people go to outside hotels we won't reach the numbers required for these huge concessions, and we do not have the funding to support that. Not to mention, the Silver Legacy is a beautiful hotel with lots of restaurants and things to do, and the rates are very favorable for the area!

So please do your part and stay at the Silver Legacy!

The Congress website already has many useful resources as you prepare for the meeting, with more to come. These resources include information on:

- Visa Requirements
- Flights and travel
- Competitions
- Permits and Collecting
- Insect Collections
- Tours and Tourist information

We are very pleased to announce that our plenary and banquet speakers for the Congress are as follows – see https://dipterists.org/icdx/plenaries.html for more details:

- Dr. May Berenbaum (University of Illinois)
- Mr. Charley Eiseman (Massachusetts)
- Dr. David Grimaldi (American Museum of Natural History)
- Dr. Fiona Hunter (Brock University)
- Dr. Erica McAlister (The Natural History Museum)
- Dr. Rudolf Meier (Museum für Naturkunde)

We are planning a diverse selection of symposia with 19 already confirmed (see https://dipterists.org/icdx/symposia.html). Please contact our Symposium coordinator Martin Hauser (mhauser@dipterists.org) and/or the appropriate symposium organizers, if you are interested in contributing to one of these or if you wish to propose and organize a symposium. We will also have general sessions, and add symposia as needed. Please note that all presentations and posters will be in-person and there will not be a virtual format. Some general guidelines are at https://dipterists.org/icdx/guidelines.html.

Reno is on the eastern side of the Sierra Nevada, and is a relatively small city in northern Nevada close to the California border. It is known for tourism and casinos and is located in a high desert river valley. It is close to extensive natural scenic areas ranging from montane Sierra Nevada forests of pine and sequoia to high desert and salt lakes. Post-congress tours will be available, and will be announced soon. Reno is a safe and secure town with ample shopping, historical tours, riverside walks and excellent dining. A rental car office (Enterprise) is located at the venue, with discounted rates for Congress delegates (rate code is L54H176), for those who wish to explore more widely.

As a small non-profit running a big meeting, the Society is relying heavily on sponsorships, and encourages you to consider a donation to the Society, large or small. Among our sponsors so far, I am very excited to report sponsorships from the organizations to the right, as well as the people and organizations below (who I don't have logos from yet!), and to heartily thank them all for their support!

Center for Biological Diversity

Don't Pack a Pest

Michael & Bonnie Irwin

Pensoft Publishers

Reno-Sparks Convention & Visitors Authority

Species File Group

Please contact us if you are considering sponsorship, large or small!

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Reflections on International Congresses of Dipterology

Shaun L. Winterton

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

I believe most dipterists would agree with me that the absolute greatest highlight on our conference calendar is the International Congress of Dipterology (ICDs). ICDs bring that rare mix of high-quality presentations of excellent research by eminent workers in Dipterology with a wonderfully cordial social program. Indeed, while the formal activities and program are very enjoyable, I mostly look forward to the informal social program and networking. It cannot be understated how these informal social gatherings are important to developing collaborations and building a sense of community in our field, especially for students, post-docs and early career researchers. This sense of community is lost over email, conference calls and virtual presentations, and I would argue is best cultivated over coffee or tea in between presentations, or over a meal or at the bar at the end of the day's session.

Reflecting on previous congresses I have attended, six in all, I have very fond memories from all of them and have developed extensive research networks as well as long-lasting friendships. The importance of this, especially to students cannot be overstated. Most of the most productive collaborations during my career have had their genesis at a preceding Dipterology congress.

Some congress moments are humorous, like when the slide projector ejected Sonja Scheffer's slides out of the top of the carousel during her presentation at the Oxford Congress (ICD4); I might add that Sonja showed great composure in the face of adversity to present *sans* slides in the end. Many more moments are inspirational (i.e., panel discussions or awards), or are important opportunities to bring our community together in one room to discuss developing yet another Diptera manual for a region in need. I can truly say that I have enjoyed every congress I attended, and make a point to go to an ICD first, over any other international meeting.

I attended ICD4 in Oxford as a student, and as we head towards ICDX in July, 2023 (just 7 months away), I find myself as an older generation dipterist and congress organizer, coming full circle I think. Especially as we come out of COVID-19 lock-downs, I look forward to renewing old acquaintances, forging new friendships and collaborations over drinks, and being inspired again in a conference hall with like-minded researchers who share a passion for flies.

See you all in Reno this coming July!

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

Noémie Gonzalez & Arlette Fauteux

Laboratoire de lutte biologique, Université du Québec à Montréal
Montréal, Québec H3C 3P8, Canada; http://www.laboluttebio.uqam.ca

The 11th International Symposium on Syrphidae (5–10th September 2022) took place in the magnificent surroundings of Barcelonnette, France, in the beautiful Alps. It was a great opportunity where eighty researchers, professionals, and avocational dipterists from around the world were gathered to talk about the wonderful creatures that are hoverflies! Topics were really diversified covering phylogeny, taxonomy, biological control, monitoring, conservation, pollination, biogeography, and even migration, of hoverflies. This experience was very enriching. Important tools to improve knowledge on hoverflies were also presented and discussed such as: TaxoFly project, SPRING project, Syrph the Net, info fauna, syrphidae.com, and Journaal van Syrphidae. Information was shared in many different forms with multiple talks, posters, round tables, and even thanks to a novelty, lab sessions. The symposium was closed by a great field trip to an alpine lake in the Alps. This was a wonderful opportunity to share interesting conversations in a magnificent landscape. We want to thank Gabriel Nève and everybody involved in the great organization of this symposium at the Séolane center.

Finally, we want to highlight the kindness, mutual help, and humility of the hoverfly community making this event a safe place for everyone sharing love and interest for such incredible insects. For those who missed the Symposium, the Programme and Abstracts book is available from https://syrphidae11.sciencesconf.org/data/pages/book_syrphidae11_english_v8.pdf

Also note, this volume, and those from previous meetings, are also available on the Resources page of the North American Dipterists Society, at https://dipterists.org/resources.html#journals.

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North American Dipterists Society Organized Meeting Wrap-up (Vancouver, BC, Canada)

Andrew D. Young[1] & Jessica Gillung[2]

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

[2] Lyman Entomological Museum, McGill University,
Sainte-Anne-de-Bellevue, Québec, Canada

This year's annual Dipterists Society meeting was organized by Andrew Young and Jessica Gillung. This report was put together by Andrew, who chaired the meeting.

The Organized Meeting of the North American Dipterists Society was held Tuesday, November 15th, 2022 during the Joint Annual Meeting of the Entomological Society of America, the Entomological Society of Canada, and the Entomological Society of British Columbia, held in Vancouver, British Columbia, Canada. This was the first in-person Organized Meeting since 2019 due to COVID, and it was well-attended by Diptera enthusiasts. It was great to see everybody again! The meeting program included two ~15-minute talks.

Andrew Young was moderator, and gave a brief introduction of the meeting and to the Society (https://www.youtube.com/watch?v=BzLUZFhwhIc), with a focus on the updates to the Society over the last several years, including its official incorporation as a non-profit organization. Art Borkent pointed out that participants have traditionally all introduced themselves to the room at the Dipterists Society meetings, and the group did so shortly thereafter.

Introductions were followed by two talks from members (full presentation titles below). Luc Leblanc gave the first talk of the night, detailing the life and legacy of the late William (Bill) Turner. Luc's eulogy to his friend and colleague included many snippets of Bill's meticulously kept notes, offering a glimpse into the man's passion for entomology and for teaching. Bill's final publication was *Fly Times Supplement* 4, "The HORSE FLIES and DEER FLIES of IDAHO, OREGON, and WASHINGTON STATE (Diptera: Tabanidae)," of which Luc had brought a hard copy to the meeting. The second and final talk of the night was given by Kevin Moran, who presented some of his preliminary (but strongly supported!) phylogenies from his ongoing syrphid work. He highlighted a repeated pattern within some syrphid tribes of sister-group relationships between Australian and Neotropical taxa, and proposed Gondwanan vicariance as a possible driver of diversification in the group. Kevin's talk led to much spirited discussion among the group.

Overall, the meeting was a great success, and it was wonderful to see everyone in person. Thanks very much to the presenters and attendees! You can watch the presentations from this year's meeting, as well as last year's, at https://www.youtube.com/@dipterists.

The career, legacy, and life of dipterist William J. Turner (1940–2022)
Luc LeBlanc (University of Idaho, Moscow, Idaho);
https://www.youtube.com/watch?v=i6xsWFM_KkA

Evidence for Transantarctic dispersal or Gondwanan vicariance in Syrphidae
Kevin Moran (Carleton University and Canadian National Collection of Insects, Ottawa, Ontario, Canada); https://www.youtube.com/watch?v=zGEz7u_suA0

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DIPTERA ARE AMAZING!

This *Platycheirus* (Syrphidae) larva was photographed by Andrew Young and found by Alice Dabrowski in the photographer's driveway on an aphid-infested sow thistle. The larva was actively feeding on aphids at night when these photographs were taken. The exact species is currently unknown, and the larva is currently overwintering in Andrew's basement in hopes that it will pupariate in spring.

This surrealist photo was sent in by George Poinar, commenting that he was photographing some fungus gnats taken from his hummingbird feeder when things went awry. George was just photographing the fungus gnats at the bottom of the feeder while adding more sugar solution, and ended up both shocked and pleased with the bizarre photographic result!

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BOOKS AND PUBLICATIONS

Book review:
Field guide to flies with three pulvilli. Families of Homeodactyla of Northwest Europe

Martin Hauser

Plant Pest Diagnostics Branch, California Department of Food & Agriculture
3294 Meadowview Road, Sacramento, California 95832, USA; phycus@gmail.com

Zeegers, Theo & Schulten, André (2022) Field guide to flies with three pulvilli. Families of Homeodactyla of Northwest Europe. Dominic Dijkshoorn, 257 pp. ISBN/AEN 978-90-5107-068-2. 15 €

Despite the (for non-dipterists) awkward title, this is the book I dreamed of having in my teens, and I wished I wrote in my twenties. But I did not – and therefore I am very excited to have it now in my hands due to the efforts of the two authors! Theo Zeegers and André Schulten first published the Dutch version in 2021 and the English version in September 2022.

What caught my eye immediately while flipping through the book was the large number of excellent photographs (mainly life habitus) and very clear, often colored line drawings. The structure of this book is very intuitive and clear, which makes it easy to use and a pleasure to read through.

It is a modern field guide (for Northwestern Europe) and covers 159 species of Acroceridae, Athericidae, Coenomyiidae, Rhagionidae, Stratiomyidae, Tabanidae, Xylomyidae, and Xylophagidae.

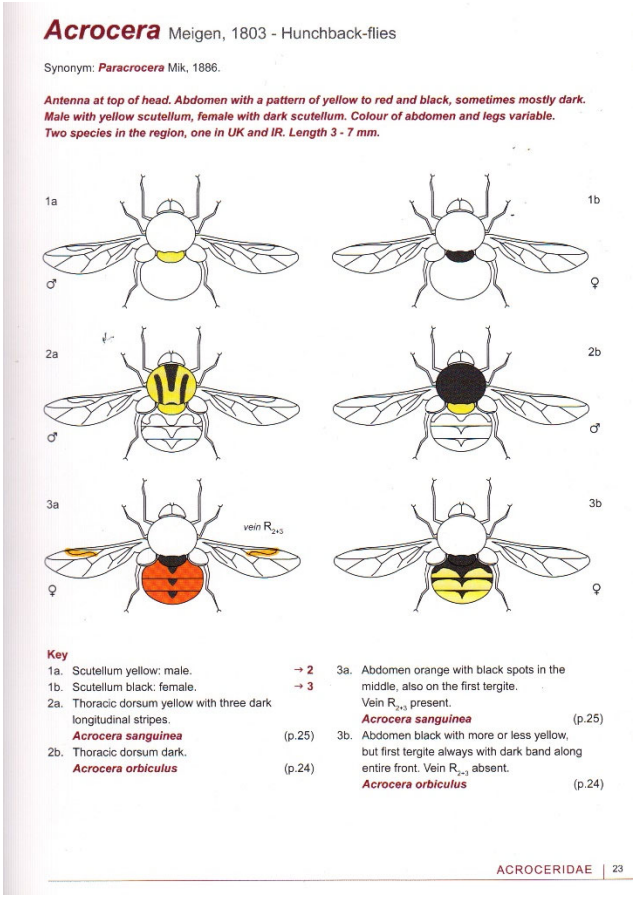
The book starts with some short introductory chapters, which are rather brief, but cover all important aspects (it is a field guide, not a novel), relying heavily on the excellent graphics of André Schulten. There is a map of the area for which this guide is intended, and a nice size comparison, showing the outlines of different fly species in their original size, compared with a 1 € coin. The morphology and terminology are illustrated on two pages, in a very clear and compelling style.

The next chapter has a key to families, which is richly illustrated with line drawings and photographs. The following chapters deal (in alphabetical order) with the eight families, and all start with a key to the genera and then keys to the species. Many species have a full page with photographs, body length, identification, habitat, behavior, occurrence, and a phenology graph. For some of the rare species, for which no photographs are available, and little is known, multiple species are combined on one page.

The supplement chapter contains a very useful table, listing all species and their common names, with indications of which countries they have been found and in which months they are flying. The geographic distribution differentiates between present in a country, found only once or twice, extinct, absent, doubtful or status unknown.

Many of the keys are based on previous keys and publications, but are updated and modified. They all work very well and ensure a correct identification. Because it is a field guide, no characters are used for which dissections or a microscope is needed, but in the situations where this would be important, the relevant literature is listed.

This book is not only a very useful, modern field guide, it is also aesthetically very pleasing with its numerous life pictures and excellent graphics and layout, it will serve as an inspiration for hopefully many future field guides to come.



Acrocera Meigen, 1803 - Hunchback-flies

Synonym: ***Paracrocera*** Mik, 1886.

Antenna at top of head. Abdomen with a pattern of yellow to red and black, sometimes mostly dark. Male with yellow scutellum, female with dark scutellum. Colour of abdomen and legs variable. Two species in the region, one in UK and IR. Length 3 - 7 mm.

1a ♂ 1b ♀

2a ♂ 2b ♂

3a ♀ vein R_{2+3} 3b ♀

Key

1a. Scutellum yellow: male. → 2
1b. Scutellum black: female. → 3
2a. Thoracic dorsum yellow with three dark longitudinal stripes. ***Acrocera sanguinea*** (p.25)
2b. Thoracic dorsum dark. ***Acrocera orbiculus*** (p.24)
3a. Abdomen orange with black spots in the middle, also on the first tergite. Vein R_{2+3} present. ***Acrocera sanguinea*** (p.25)
3b. Abdomen black with more or less yellow, but first tergite always with dark band along entire front. Vein R_{2+3} absent. ***Acrocera orbiculus*** (p.24)

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Oxycera rara (Scopoli, 1763)

UK: **Four-barred Soldier**

♂ © Tim Faasen

Body length: 6 - 8 mm.
Identification: Thoracic dorsum dark, in female usually with narrow, short yellow longitudinal stripes limited to front half. Trim noticeably wide. Scutellum completely yellow. Legs yellow, femora and hind tibia usually partly dark. Abdomen with two pairs of yellow lateral spots (on third and fourth tergite) pointing obliquely forward and widely separated at lateral margin. FEMALE. Occiput completely yellow.
Habitat: At calciferous waters in both forest and open areas.
Occurrence: Southern species, rapidly spreading north in recent years. UK: common, but absent from Scotland and IR. NL: southern half. Reached DE recently.
Flight: Mid - June - early August.

♀ © Frank Vassen

UK IR NL BE LU DE NGE NFR
Mar Apr May June July Aug Sep Oct

♀ © Frank Vassen

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SOCIETY BUSINESS

On the back pages of *Fly Times*, North American Dipterists Society business is recorded, as is desired for Society transparency.

No documents are provided in this issue, as the minutes of the annual meeting of Directors, held on 10 December 2022, will be approved and published in the next issue.

However, we do have some information of immediate import and effect:

1) we here welcome a new Director, Jessica Gillung (McGill University)
2) we thank our outgoing Field Meeting Chair, Jon Gelhaus (The Academy of Natural Sciences of Drexel University) for masterfully organizing and running an excellent Field Meeting in New Jersey this past June (see the article herein)
3) we welcome our incoming Field Meeting Co-Chairs, Barbara Hayford (Coastal Interpretive Center) and Andrew Fasbender (Rhithron Associates)
4) we thank out General Meeting Chair, Andrew Young (University of Guelph) for organizing an excellent meeting of the Society at ESA in Vancouver (see the article herein)!

As of this writing, following are the Directors and the Officers of the Society.

Directors

Stephen Gaimari
Jessica Gillung
Martin Hauser
Shaun Winterton
Christopher Borkent

Officers

Stephen Gaimari, President
Martin Hauser, Vice President
Shaun Winterton, Secretary
Christopher Borkent, Treasurer
Jessica Gillung, Meeting Chairperson
Barbara Hayford, Field Meeting Co-Chair
Andrew Fasbender, Field Meeting Co-Chair
Andrew Young, General Meeting Chair

Outgoing Officers

Jon K. Gelhaus, Field Meeting Chair

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