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Fly Times is simultaneously produced 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.

SUGGESTED CITATION

Mederos, J., Pollet, M. & Oosterbroek, P. 2024. First record of gynandromorphy in the genus *Rhipidia* (Diptera: Limoniidae). *Fly Times* 72: 50–55.

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 (doc, rtf, odt preferred) along with separate image files (jpg, png 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 for the spring issue and early December for the fall issue). For larger manuscripts your submissions may be considered for inclusion in the *Fly Times Supplement* series. Note, submission of a manuscript to *Fly Times* or *Fly Times Supplement* grants the Dipterists Society the non exclusive right to reproduce these contributions in whole or part

Please submit manuscripts to the editor-in-chief at:
sgaimari@gmail.com
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The 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* 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*! As usual, I am very impressed with the variety of excellent submissions, and I hope they are enjoyable to the readers. Please consider writing an article or two for the next issue, which is slated for fall of 2024. And for larger works, please consider the *Fly Times Supplement* series, found at https://dipterists.org/fly_times_supplement.html.

Also note, I am still working on improving the front and back covers of the *Fly Times.* Thank you to Zachary Dankowicz for another excellent cover photo! Moving forward, I encourage the photographers out there to submit images for the cover – keep dimensions in mind – they will be produced at 8-1/2 X 11 inches (*Fly Times* page size). Photos not used for the cover can still be included in the Diptera Are Amazing section. The back page may or may not stay like this, but the color is similar to recent Society publications such *Myia* and some of the *Fly Times Supplements*. For now, I'll be changing up the covers issue to issue, so please feel free to send your design ideas to me at sgaimari@gmail.com (cc editor@dipterists.org).

Cover photo – *Holcocephala* sp. (Asilidae) gnawing on a small parasitic wasp. Photograph by Zachary Dankowicz.

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SOCIETY BUSINESS

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NEWS AND RESEARCH

MONIDOLI-CR[1] – Sampling protocols for monitoring and protecting dolichopodid biodiversity in lowland and montane rainforests in Costa Rica (Diptera: Dolichopodidae)

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Summary (project proposal)
Costa Rica holds 4% of the world's biodiversity, despite its small surface (only 0.01% of the world), which is due to its position on the Isthmus of Panama, its topography and its elaborated conservation policy. Its invertebrate diversity, though, still remains the most poorly known. Considering the current worldwide decrease in insect populations, developing robust and sustainable monitoring methods to determine their status and trend becomes ever more important. And information on invertebrate faunas should be used more often in protection measures.

Between 1 and 25 March 2024, the dolichopodid fauna (Diptera: Dolichopodidae) of 5 protected areas in Costa Rica would be investigated. This array includes 3 lowland tropical rainforests in the Caribbean lowlands and along the Pacific coast, one premontane and one montane tropical rainforest. Specimens would be collected with traps and sweepnets. In each of the 5 areas, 4 sampling sites would be selected in which 10 pan trap units (one unit = 1 blue, 1 yellow and 1 white) would be operational. In one of these sites, also a Malaise trap would be installed. In search for a faster and equivalent monitoring method (to the pan trap method), at each sampling site, a timed sweepnet collecting procedure would be applied at least twice. Samples of 5 traps of the same type would be pooled per site, which would produce a combined 120 pan trap samples, together with 5 samples of Malaise traps and about 150 sweepnet samples.

By investigating three sites for the first time the geographical and topographical framework on biodiversity patterns of Dolichopodidae in Costa Rica will be further extended. Moreover, data on dolichopodid faunas at two sites that have been sampled between 2 and 3 times since 2003 might provide first indications on the impact of climate change (drought mainly) in these areas. Finally, we also hoped to gain information on the suitability of timed sweepnet collections as long term monitoring method for Dolichopodidae. And results would be disseminated among involved parties in the appropriate format.

1 Specific objectives of the mission

The primary aims of this survey were:

- To test timed sweepnet collecting as **monitoring method** in comparison with the pan and Malaise trap methods previously used during similar surveys. Collected data should reveal whether the former method could be considered as alternative to, in particular, the pan trap method for monitoring dolichopodid communities in the Neotropics.

1 MONIDOLI-CR refers to Monitoring Dolichopodidae in Costa Rica

- To **share data and results** with organizations and people involved (researchers, land owners and managers) to broaden their perspective of biodiversity in order to improve the measures to protect this (invertebrate) biodiversity on the investigated lands.
- To further extend the **altitudinal** and **geographical gradient**, by adding one premontane and two lowland rainforest sites (Table 1). The collected data should at least include indications whether lowland rainforest communities are more similar (i.e., share more species) than montane communities.
- To investigate the biodiversity patterns in dolichopodid communities **over time** by investigating three sites that have been sampled between 2 to 3 times before since 2003. These data might be a small but welcome contribution to "Climate Change Impacts on Biodiversity In Costa Rica" (https://climate.copernicus.eu/climate-change-impacts-biodiversity-costa-rica) (provided to the Copernicus project, a Copernicus project initiated by the European Commission.

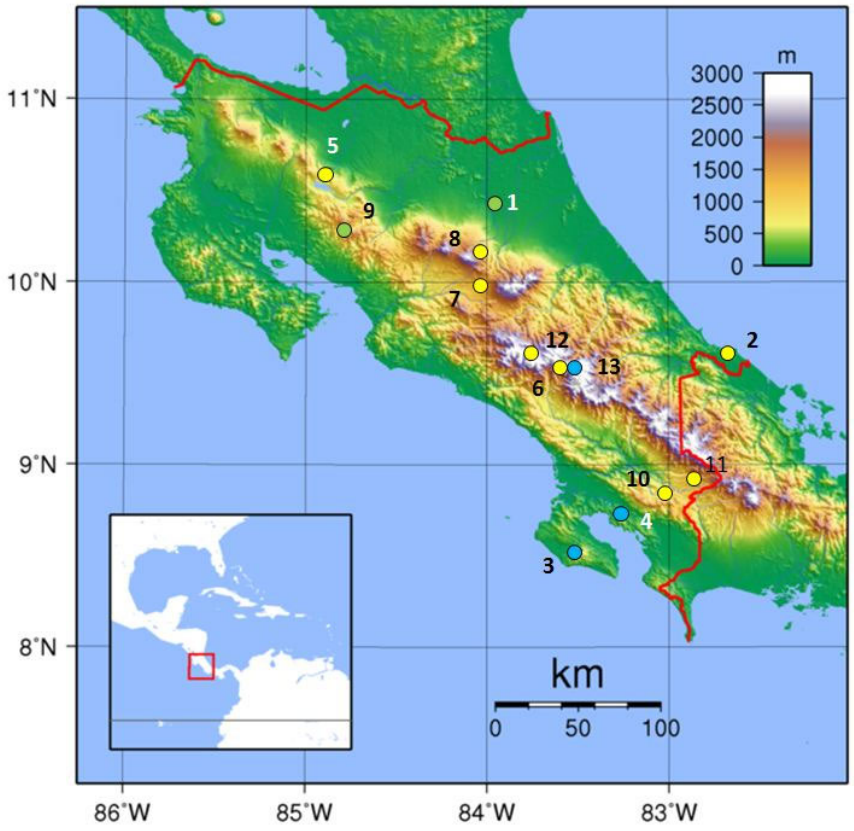


Fig. 1. Past and new sampling sites in Costa Rica. Circles refer to sampling sites. Yellow: sampled in previous surveys only; blue: sampled in present survey only; green: sampled in previous and present surveys. Numbers refer to Table 1.

2 Organisation, study area and sampling sites

Table 1 and Figure 1 present an overview of surveys that built the framework on biodiversity patterns of Dolichopodidae of Costa Rica since 2003. Yellow circles/cells represent sites that were investigated in previous surveys only, green circles/cells sites that have been visited before and were investigated in 2024 again, and blue circles/cells sites that were investigated in 2024 for the first time.

A. Santa Elena, Estación Biológica Monteverde (site 1B)

B. Puerto Viejo de Sarapiquí, OTS La Selva (site 1B)

C. San Gerardo de Rivas (site 1B)

D. San Gerardo de Rivas (site 2A)

E. Los Mogos, Private Reserve Swarovski Optik Rainforest (site 2A)

F. Los Mogos, Private Reserve Swarovski Optik Rainforest (site 4B)

Fig. 2. Selected pan trap sampling sites of the 2024 expedition in Costa Rica.

Six of the 7 research sites that were included in our initial proposal (see Tables 1–2) have been reached despite logistic problems (see 4 Encountered issues). Only the access trail to the Cloudbridge Nature Reserve sites (San Gerardo de Rivas) proved too long and steep to allow the transport of the sampling material (incl. 40 liters of fixative fluids). And the Centro Biológico Las Quebradas proved no valid alternative due to its considerable distance and the uncertainty about promising dolichopodid habitats in this Center with a main focus on water management. Ultimately, we installed two sampling sites (2 x 30 pan traps) along rio Chirripó near our lodge in San Gerardo de Rivas instead.

3 Material and methods – collecting techniques and strategy

Quite early in the expedition, applying the proposed timed sweepnet sampling protocol proved challenging to (nearly) impossible in certain sites/habitats. These sites included dense lowland rainforest, dense riparian shrub vegetations but also certain rocky river banks. In particular in the

latter habitat type, collecting specimens on sight was the only way to gather Dolichopodidae. Not only proved these flies extremely vigilant (and fled by the slightest movement of the collector), but some species were very hard to collect as it is, not rarely residing in the splash zone on rocks. It was also observed that plants with hooks or spines rendered sweepnet sampling unpracticable. In these situations, traps seem to remain the best sampling method after all. We did collect timed sweepnet samples on 13 occasions in three research areas though, which will be compared to the pan and Malaise trap samples.

Contrary to our initial proposal (i.e., one Malaise trap per study area), two Malaise traps were installed in three of the 5 study areas, including the Estación Biológica de Monteverde, OTS Estación Biológica La Selva and the Private Reserve Swarovski Optik Rainforest.

Table 1. Overview of sampling sites in Costa Rica making part of the dolichopodid biodiversity framework. § L: lowland rainforest, PM: premontane rainforest, M: montane rainforest and UM: upper montaine rainforest.

no.	conservation area	province	study area	biome§	2003	2005	2007	2010	2015	2020	2024
1	ACC - Central	Heredia	OTS - Estación Biológica La Selva	L							
2	ACLAC - La Amistad Caribe	Limón	Parque Nacional Cahuita	L							
3	ACOSA - Osa	Puntarenas	Rio Nuevo Reserva Natural	L							
4	ACOSA - Osa	Puntarenas	Tropical Field Station La Gamba	L							
4	ACOSA – Osa	Puntarenas	Private Reserve Swarovski Optik Rainforest	L							
5	ACAT - Arenal - Tempisque	Alajuela / Guanacaste	Volcán Tenorio National Park (+ Reserva Privada Volcán Tenorio)	PM							
6	ACLAP - La Amistad Pacifico	San José	Canaán (San Gerardo de Rivas)	PM							
7	ACLAP - La Amistad Pacifico	Cartago	Parque Nacional Tapantí	M							
8	ACC - Central	Heredia	Parque Nacional Braulio Carillo (+ Zurquí)	M							
9	ACAT - Arenal - Tempisque	Puntarenas	Estación Biológica Monteverde	M							
	ACAT - Arenal - Tempisque	Puntarenas	Reserva Bosque Nuboso de Santa Elena								
10	ACLAP - La Amistad Pacifico	Puntarenas	OTS - Las Cruces Biological Station	M							
11	ACLAP - La Amistad Pacifico	Puntarenas	La Amistad Biosphere Reserve	M							
12	ACLAP - La Amistad Pacifico	San José	Reserva Forestal Los Santos / Reserva Forestal Río Macho	UM							
13	ACLAP - La Amistad Pacifico	San José	nr Cloudbridge Nature Reserve	PM							

Short but heavy rainfall (unusual for this time of the year) hampered (pan trap) sampling at San Gerardo de Rivas and Los Mogos severely. Fortunately, most of the traps could be recovered but yields were flushed away to a great extent. For that reason, we considered the return on investment (i.e., installation of 120 pan traps and 2 Malaise traps) too low to apply this approach at the last site of this expedition (Reserva Natural Rio Nuevo). We did install 5 pan trap units in two sites in the latter nature reserve but only for a few hours. Instead, we mainly focused on sweepnet collecting, also the timed variant.

Table 2 presents an overview of the executed **sampling campaign** and the resulting samples:

- **Selection of sampling sites**. In 2 of the 5 study areas, 8 sites were selected for sampling, and 9 sites in one study area (Estación Biológica de Monteverde). In sites 1 (OTS Estación Biológica La Selva) and 9 (Estación Biológica de Monteverde) which have been visited before, some of the same sampling sites were studied. In nearly all study areas, the morning/afternoon of our arrival was used to explore the area for the most promising sites and traps installed the next morning. Priority habitat types were river banks, rainforest, and creeks (quebradas).
- **Pan traps**. In each of the above sites, 5 pan trap units were operational, with one unit comprising 1 blue, 1 white and 1 yellow pan trap. They were installed on soil surface level in three-colour sets (see Fig. 4A), fixed with metal pins and filled with a mix of formalin (0.5%) and salt water with detergent. This fixative solution was largely recycled during the servicing of the traps and re-used. Yields of 5 traps of the same colour were pooled per site. All sites produced a combined 93 pan trap samples.
- **Malaise traps** (Fig. 3C-D). Two Malaise traps were installed in three of the 5 sampling areas. The collecting jars were filled with 75% alcohol and serviced at the same time as the pan traps. Malaise traps produced a combined 6 samples.
- **Timed sweepnet sampling**. In order to check whether this method might be an alternative for the trapping techniques (especially the pan traps), in 12 of the final 18 pan trap sampling sites Dolichopodidae were collected by sweeping the vegetation and humid soil for 15 minutes. This was executed only once in 11 sites and twice in one site. In addition, also species-rich sites such as seeps, small creeks, and rocks in riverbeds were given special attention, in particular in San Gerardo de Rivas and Reserva Natural Rio Nuevo.

A. Tropical Field Station La Gamba (La Gamba)

B. Private Reserve Swarovski Optik (Los Mogos)

C. Reserva Natural Rio Nuevo (nr Puerto Jiménez, Osa)

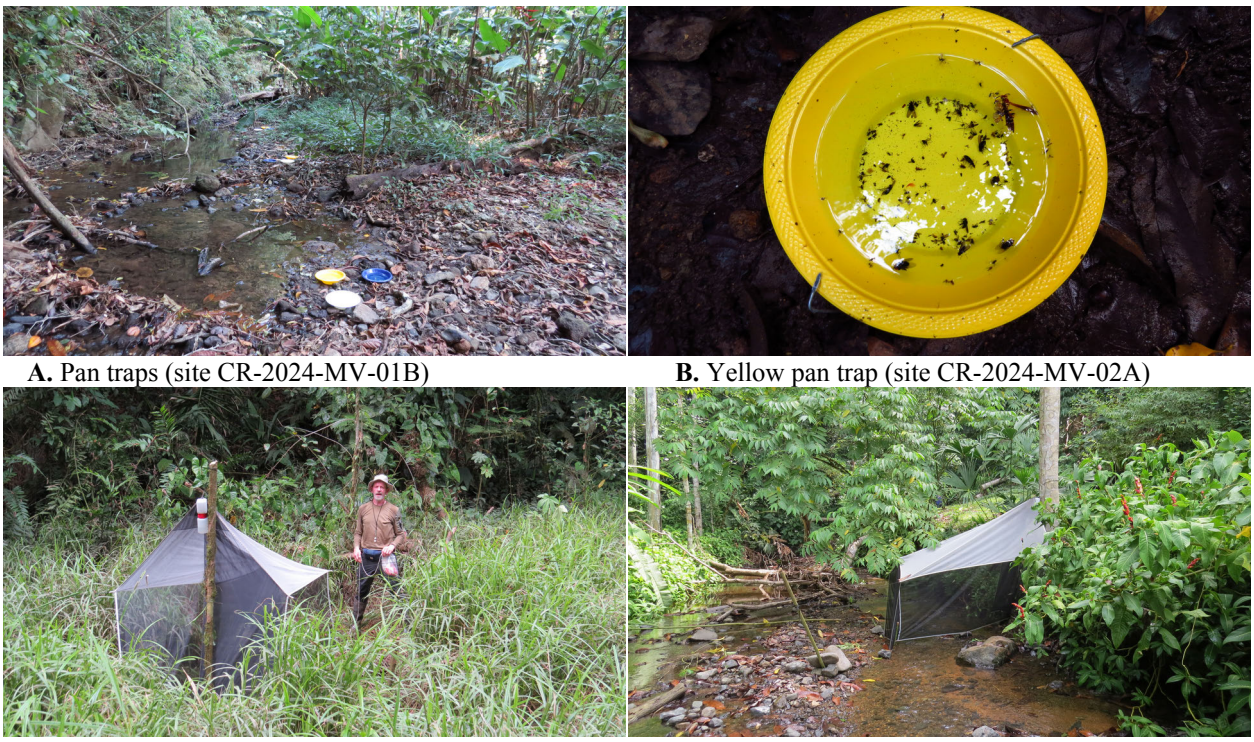
D. Dos Brazos, along Rio Tigre (nr Puerto Jiménez, Osa)

Fig. 3. Sites investigated with sweepnets during the 2024 expedition in Costa Rica.

4 Encountered issues

Unexpectedly and contrary to the 6 previous expeditions in Costa Rica, major issues were encountered with the rental car. Not only was the rental fee substantially higher than agreed upon during reservation, but the car broke down after a few days. Moreover, the replacement car did not only not fulfill the requirements (2WD high-on-the-wheels SUV) – which forced us to rely on local contacts to bring and get us to the research sites that were often not easy to reach – but broke down as well at the end of the expedition. Due to those problems, we lost at least two research days (at Nuevo Arena and on Osa Peninsula) by waiting for assistance by the rental car company.

Also, the administrative processing of permit applications took way longer than before. In order to avoid this and allow the officers sufficient time to handle our application, documents had been submitted as early as September 2023! Regardless, we received our last research permit (for ACOSA Area de Conservación) only one week before we arrived at this research area. These research permits make part of a set of documents required for the export permit. We managed to assemble all necessary documents, including approval letters by the University (UCR) and the National Museum of Costa Rica (MNCR) during the expedition, but new problems arose eventually. As a matter of fact, rules changed overnight and the documents that had been submitted in a digital format all of a sudden also had to be submitted physically. Moreover, the officer remarked that the signature on my passport differed slightly from that on my permit application!?! And that the digital signature by the UCR director had to be replaced by a handwritten one. Anyhow, the most important result is that we successfully negotiated an agreement with MNCR about the deposition of type specimens and other material collected since 2003 in Costa Rica, a commitment we will respect.



A. Pan traps (site CR-2024-MV-01B) **B.** Yellow pan trap (site CR-2024-MV-02A)

C. Installing Malaise trap (site CR-2024-LS-01A) **D.** Operational Malaise trap (site CR-2024-SPR-02A)

Fig. 4. Sampling methods applied during the 2024 expedition in Costa Rica.

Table 2. Executed sampling scheme and strategy during the 2024 survey in Costa Rica. Numbers in pale green indicate that the initial planning has been accomplished; numbers in dark green that we installed more traps than initially proposed; and yellow that less traps and/or samples were installed/collected than planned.
[¥] For full name, see Table 1; [§] MT: Malaise traps, PT: pan traps, SW: sweepnet

No.	Conservation Area (SINAC)[¥]	Locality	Study areas	Sampling period	No. sampling sites	no. traps		no. samples[§]		
						PT	MT	PT	MT	SW
9	ACAT	Santa Elena	(nr) Estación Biológica de Monteverde	3-6/03/2024	5	135	2	27	2	23
9	ACAT	Santa Elena	Reserva Bosque Nuboso de Santa Elena	04/03/24	-	-	-	-	-	6
1	ACC	Puerto Viejo de Sarapiquí	OTS La Selva	8-11/03/2024	4	120	2	24	2	22
13	ACLAP	San Gerardo de Rivas	nr Cloudbridge Nature Reserve	12-15/03/2024	3	63	-	15	-	19
4	ACOSA	Los Mogos	Private Reserve Swarovski Optik Rainforest	16-19/03/2024	4	120	2	24	2	8
4a	ACOSA	La Gamba	Tropical Field Station La Gamba	18/03/2024	-	-	-	-	-	6
3	ACOSA	Osa Peninsula	(nr) Reserva Natural Rio Nuevo	20-21/03/2024	2	30	-	3	-	15
Totals				3-24/03/2024	18	468	6	93	6	99

5 Results - sample and data processing

During the expedition, most time was dedicated to the trapping campaign, the collection of specimens with sweepnets, and the preparation of the samples for exportation. However, also quite some time was spent on rental car issues and follow-up of permit issues.

In the next phase the collected **samples** will be **processed**. Dolichopodidae will be sorted and stored separately. An inquiry with the National Museum of Costa Rica (MNCR) in 2020 revealed that further distribution of samples or specimens to third parties is allowed as long as it is mentioned in the proposal and approved of by the collecting – research permits. In any case, Costa Rican rules concerning the distribution and study of Costa Rican biotic resources will be fully respected. As in the past, at least the following non-dolichopodid invertebrate taxa will be pulled from the samples and disseminated among colleagues in Europe, Canada and the US who currently deal with Neotropical faunas: Agromyzidae, Asilidae, Empidoidea (excl. Dolichopodidae), Muscoidea, Micropezidae, Stratiomyidae, Syrphidae (all Diptera), Hymenoptera, and Carabidae (Coleoptera). Residue samples (i.e. samples with the remainder of the invertebrates after extraction of the taxa listed above) will be pooled to sampling area and deposited either in RBINS or MNCR.

Dolichopodid specimens will be **identified** to morphospecies level. Representatives of the subfamily Achalcinae and some selected genera will be examined in more detail and incorporated in ongoing personal projects.

Data on sampling sites, samples, species and specimens will be stored in a private Microsoft Access database, NEOTROPICS, currently holding data on over 14,000 samples (excl. IBISCA) from 22 Neotropical countries, including 1,419 samples from Costa Rica.

A **preliminary report** with a description of the research activities in the field, the number of collected samples and preliminary observations will be provided to all parties involved during the first three months after the expedition.

The observed biodiversity patterns of Dolichopodidae will be **analysed** – at least in part – in collaboration with colleagues dealing with Neotropical dipterology, or having contributed to Costa Rican dolichopodid research. If yields are sufficiently high, the data set as described above will produce data for, or contribute to, at least 4 papers:

- Estimating dolichopodid diversity in submontane, lower and upper montane rainforests along four Cordilleras in Costa Rica.
- The ecological significance of the response of Dolichopodidae to different trap colours.
- Species diversity patterns in dolichopodid communities along altitudinal gradients in Central and Central America.
- A revision of Costa Rican (and other Neotropical) Achalcinae.

In addition, once all dolichopodid specimens have been examined also a dataset containing all identifications will be published to **GBIF**.

As data from previous surveys will also be incorporated into most of the analyses, the time frame of submission of most of these papers will be at least 5 years, and most possibly 10 years starting from this 2024 survey. Part of the samples has already been processed and from 2024 onwards, this task will receive extra attention.

In addition, **illustrated brochures** will be produced based on the research results and disseminated to all parties involved, in particular land owners and land managers. This should broaden their understanding of the invertebrate biodiversity on their lands and allows them to improve their protection. Indeed, we expect to discover a substantial number of undescribed species which implies that an equal number of type localities must be assigned. And these sites deserve protection, at least from a scientific point of view.

6 Deposition of entomological material

As a results of negotiations with the MNCR, the officers finally refrained from their initial requirement that a duplicate of each specimen had to deposited as a properly stored sample to their collections immediately after our sampling campaign. We repeatedly explained to them that this was simply impossible and useless for multiple reasons. Instead, we proposed that we would deposit holotypes, paratypes and other identified specimens that we collected during our 7 successive expeditions in Costa Rica as soon as we finished the examination of all material. Ultimately, the MNCR approved of this proposal. In addition, also paratypes and other identified specimens will ultimately be deposited to RBINS.

7 First results and conclusions

Overall, Costa Rica remains heaven for those who seek to find a staggering biodiversity (Fig. 5). But conditions seem to change. Some of our local contacts informed us that weather patterns have changed significantly during the past few years. E.g., it had rained severely in La Selva until last February, and soils started to dry only very recently which might explain seemingly lower dolichopodid abundances than expected. In contrast, species richness and abundances in Monteverde appeared quite similar as in previous expeditions. The biggest surprise was the discovery of a species of the *Tachytrechus alatus* species group in the Rio Chirripó (San Gerardo de Rivas), by far the biggest dolichopodid species I have ever collected! Moreover, it exhibited a very peculiar behaviour by residing on vertical rock walls very close to the water surface and submerging from time to time. The species was extremely agile but we managed to collect at least four specimens.

A. *Pseudosphinx tetrio* caterpillar (Los Mogos) **B.** Millipedes (OTS – Estación Biológica La Selva)

Fig. 5. Some non-Diptera invertebrates encountered during our expedition in Costa Rica (2024).

8 Acknowledgements

This expedition could not have been conducted without the assistance and/or support by a large number of people and organisations. First of all, we want to thank all owners/managers/guards of protected areas outside of the National Parks for their permission to carry out research on their property: Marvin Hidalgo (Estación Biológica Monteverde), Natalia Villegas (Reserva Bosque Nuboso de Santa Elena), Greilin Fallas-Rodriguez (Cloudbridge Nature Reserve), Jim Córdoba-Alfaro (BioSur Foundation CR - Reserva Natural Rio Nuevo), Terri and Gary Peterson, Dale Forbes and Andreas Treppo (Private Reserve Swarovski Optik Rainforest), and Konrad Fiedler, Werner Huber, Daniel Schaber and Anton Weissenhofer (Tropical Field Station La Gamba). We especially want to thank Marvin and his wife, Carmen Miranda Vargas, for their hospitality, and truly enjoyed the company of Terri and Gary Peterson and of Jim Córdoba-Alfaro in the field. Enrique Alonso Castro Fonseca (OTS – Estación Biológica La Selva) guided us swiftly through the tedious permit application procedures. We are also much indebted to Paul Hanson and his wife Carolina Godoy for their kindness, advice and good spirit. Thanks are also due to Maricelle Mendez and Armando Ruiz (MNCR) and Monika Springer (UCR) for providing us with their respective agreements regarding the export and depository of the collected specimens. And finally, we are – again - very grateful to the Leopold III Fund and the Fund for Scientific Research, FWO-Vlaanderen, for providing indispensable financial support.

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Three online world databases on Agromyzidae and Chloropidae (Diptera)

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Here I present our three interactive databases, accessible free of charge since April 11, 2024 via the database page https://sdei.senckenberg.de

von Tschirnhaus, M. & Groll, E. 2024: World Agromyzidae Online. https://sdei.senckenberg.de/tschirnhaus-agromyzidae/

von Tschirnhaus, M. & Groll, E. 2024: World Chloropidae Online. https://sdei.senckenberg.de/tschirnhaus-chloropidae/

von Tschirnhaus, M. & Groll, E. 2024: World Bibliography of Agromyzidae and Chloropidae Online. https://sdei.senckenberg.de/tschirnhaus-bibliography/

Entries into these databases were closed at the end of April 2023, with some few later exceptions. That means that sources for the year 2023 in the Zoological Record and the CABI bibliography were not considered after that point. These databases contain 5,348 scientific names in Agromyzidae and 5,085 names in Chloropidae, 28,055 references, 3,508 keywords, 17,129 scanned file cards with over 350,000 references to the sources for each dipteran name, and extensive additional information including: DOI-codes; links for free internet access; geographical realms of each taxon and synonymous species names; the exact first page of the original description of a scientific name in Agromyzidae; all exact pages in the publication with the first description of a name in Chloropidae, the first page of the description highlighted by the exponent [1]; all taxonomical changes of a scientific name on the included file cards (which can be downloaded by clicking on them); the latest valid taxonomical change is included as a reference number plus page number on the data sheet; all genera in which a species-group name has ever been treated including those in different families; the exact date of issue of a paper or book (if known); all junior synonyms of a taxon; all misspellings if repeatedly used or being extremely similar; for the first time all found clade names for phylogenetic species clades and generic clades outside the ICZN Rules; my English translations of most original titles in other languages (if set in round brackets); all host plant genera with their family names published since K.A. Spencer's book (1990), *Host Specialization in the World Agromyzidae (Diptera)*; for chloropids, all fungus genera and other published larval substrates; all other animal and organism names published as commensals, predators, parasites or parasitoids of a valid or synonymous fly species, with an overview table included with a two-letter abbreviation in the introduction for the bibliography and used on the data sheet; tables for the used transliterations from languages with Cyrillic scripts.

The introductions to each of the two families include chapters on the nutrition of the fly larvae and a minimalist and sufficient definition of both families with added peculiar and partly unpublished exceptions in some Agromyzidae. Click the button **Keywords** (in blue font) in the English [or the button **Schlüsselwörter** in the German] version of the bibliography database for an overview of all keywords listed in alphabetic order. The same is possible by clicking **Authors** (in blue font) for a long list of all 36,640 authors and coauthors and their 4,503 additional different spellings or transliterations. Using either the Agromyzidae taxonomic database or that of the Chloropidae, the same button **Authors** (in blue font) presents you an alphabetic list of only those 516 authors (plus 40

variant spellings) who had described at least one new taxon in one of both families. Alternatively, for the authors of all new taxa in Agromyzidae you can enter the combination **Agromyzidae** in column **Name** and **further information** in column **Rank**: Among 64 file cards, 10 file cards for authors, who described new taxa in Agromyzidae are listed.

For most of the references, it is noted in which volume of which international bibliographies an article was included: ZR Zoological Record, EA Entomology Abstracts, RaE Review of applied/agricultural Entomology, BA Biological Abstracts, CABI, etc. As all volumes of the first two listed sources had been searched, it became evident that certain taxonomical publications never were reviewed in ZR or EA. Otherwise, the information can be helpful, to find out the earliest month or day of availability concerning the clarification of priority of new taxa or the taxonomic changes syn. nov., comb. nov., stat. nov, stat. rev., etc.

The result of each interactive search can be freely downloaded for further use. The introduction for each database thoroughly explains the handling of all details. For citing the databases read § 5 of the three introductions.

In the taxonomical databases for Agromyzidae and Chloropidae you find a button **Diptera** (in blue font) with a globe symbol: 15 links for Agromyzidae and 10 for Chloropidae enable the direct access to the most important further world databases or to extensive introductions dealing with each of those two families or with the Diptera as a whole.

Examples for the World Bibliography: Use the keyword **kleptoparasites** in column **Keywords** and you will find 35 references for (Agromyzidae or) Chloropidae. The keyword **%Orchidaceae** (Fig. 1) finds 49 references [% stands for the omitted letters of the genus name]. **Chalcidoidea** finds 2,542 sources for reared chalcid wasp species from host species belonging in Agromyzidae and/or Chloropidae.

Examples for database World Agromyzidae: Enter the word **ranunculi** [for *Phytomyza ranunculi* (Schrank, 1803)] in column **More info** (Fig. 2) and you find 29 junior synonyms and nomina nuda of that taxon. Enter **genus group name** in column **Rank** and you find 287 names included at any time originally or secondarily in the family Agromyzidae with all references to changes listed on the handwritten file cards. This number is reduced to 50 with the additional entry of **yes** in column **Valid**. Those 50 include genera for fossils and the valid combinations as subgenera. Enter **species group name** in **Rank**, **yes** in **Valid,** and **Palaearctic** [or palaearctic] in column **Region** and you receive 60 valid species which were described first from other Realms than the Palaearctic; but if you use **Palaearctic²** you receive 1,243 species originally described from the Palaearctic, and with **Palaearctic%** you see all 1,303 valid Palaearctic agromyzid species; the % stands for the omitted exponent ².

In the column **Rank**, select **further information**. Together with the word **Melanagromyza** in the first column **Name** you receive 40 file cards. Among them there are several with a header characterizing certain peculiar world *Melanagromyza* species, e.g. species with white halters. The most important words of such headers are highlighted in yellow. Given lists may be incomplete but often they contain undescribed or unidentified species with the collection code in the still private "von Tschirnhaus collection". Working with the databases, it may be helpful to go through all those file cards for valid genera and their morphological characteristics in order to get knowledge on important generic pecularities.

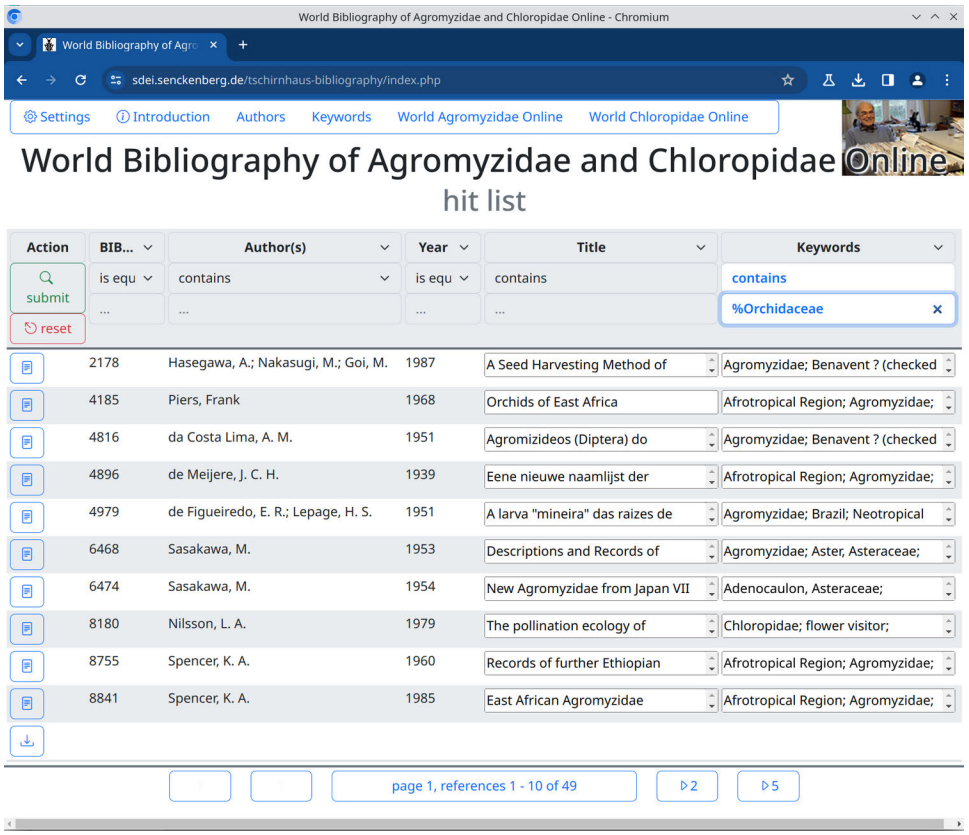

Fig. 1. Results from Keyword search term **%Orchidaceae** in the World Bibliography

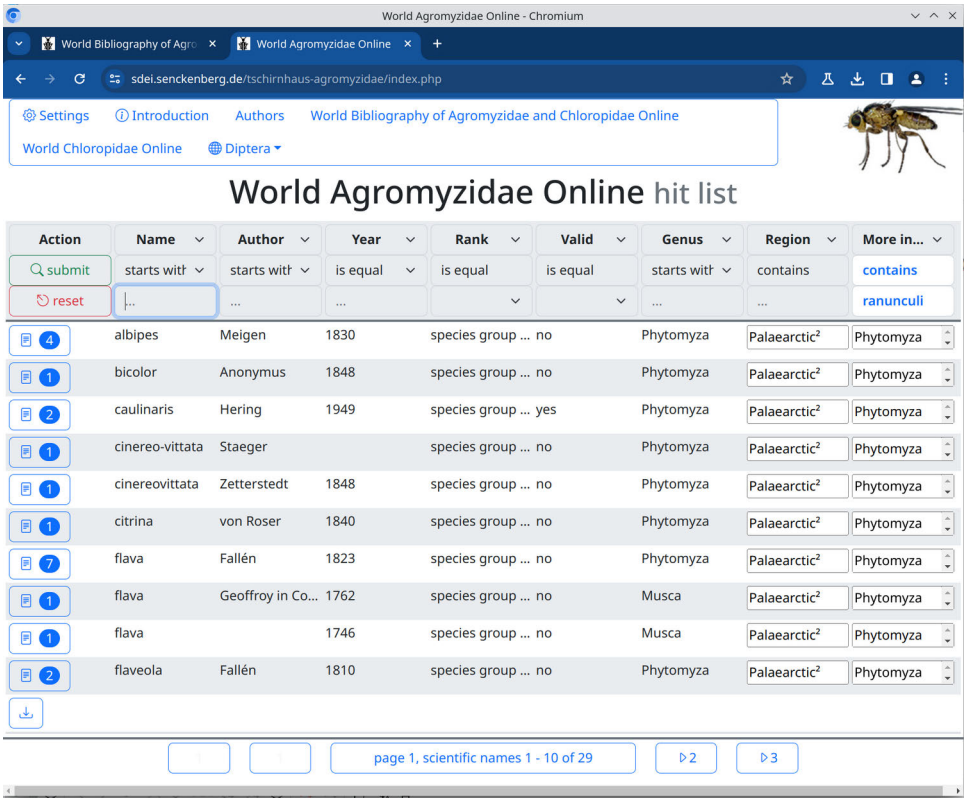

Fig. 2. Results from search term **%ranunculi** in More Info in the World Agromyzidae database.

To perform new searches or to get back to the full list, use the red **reset** button in the top left. After you have clicked on a record and have the card file and details, never use the browser's return arrow left (the go-back button)! Instead, click the green button **back to hit list** at the lower right of the browser window.

Some words on my collecting of scientific publications on Agromyzidae and Chloropidae since the year 1966 are included in von Tschirnhaus, M. (2023): Taxonomic changes and clarifications in the dipteran families Agromyzidae and Chloropidae (Diptera). *Studia dipterologica* 24(2) [2017]: 273-296. [PDF actually available from m.tschirnhaus@uni-bielefeld.de]. That article accompanies the three databases and presents a number of taxonomical notes, corrections and nomina nova for preoccupied names, which were detected during the labor to produce those databases.

In the course of hosting the three databases by Senckenberg Deutsches Entomologisches Institut, Müncheberg, the following database received a new link: Menzel, F, Groll, E. & Thiele, A. (2016): The Michael von Tschirnhaus Insect Collection. Database of localities and collecting details. – Online database, version 3: https://sdei.senckenberg.de/tschirnhaus-collection . Note, in the future, the worldwide collection of Diptera (nearly all families from all continents) collected by me will be deposited in the Senckenberg Deutsches Entomologisches Institut, along with my library.

With these databases, I hope that new and younger dipterists find this to be an easy-to-use resource to focus on one of both families and their fascinating coevolution with the phylogeny of vascular plants and liverworts.

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On the presence of *Rhipidia* (*Rhipidia*) *domestica* Osten Sacken (Diptera: Limoniidae) in the Iberian Peninsula, a first record for the Palaearctic

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Abstract: *Rhipidia domestica* Osten Sacken is recorded as new to the Iberian Peninsula and its presence is confirmed back at least to 2017. *Rhipidia domestica* is distributed widely throughout the New World, and is characterized by subpectinate antennae with a distinctive color pattern, combined with distinct thoracic and wing patterns. The two previously known species of *Rhipidia* from the Iberian Peninsula both have males with bipectinate antennae and differently patterned wings.

Introduction

Increased interest in the study of crane flies in the Iberian Peninsula, especially Spain, has led to the discovery of new records and species in the last decade (Carles-Tolrá, 2010; Eiroa & Carles-Tolrá, 2019; Eiroa *et al*., 2020; Ferreira *et al*., 2021; Hancock, 2020; Hancock *et al*., 2015; Kolcsar *et al*., 2021; Mederos & Eiroa, 2015; Mederos 2018; Mederos *et al*., 2014, 2018, 2019a, 2019b; Oosterbroek *et al*., 2020; Starý, 2014). Overall, studies have increased the number of Tipuloidea species or subspecies recorded from Andorra to 80, from Spain to 359, and from Portugal to 150 (Oosterbroek, 2021). Although many of the discoveries in this territory arise as a result of biodiversity surveys or some as long-term studies, many new records and new species are the result of sampling efforts (usually scarce) from volunteers and citizens without any experience with crane flies. As is the case in this work, these types of results are sometimes truly fortuitous findings.

During September and October 2019, the senior author's (JM) son noticed several crane flies in a small urban park in Barcelona city (Catalonia) (Fig. 1). These turned out to be a species of *Rhipidia* with subpectinate antennae in both sexes, and the antennae dark overall with flagellomeres 12 and 13 abruptly pale (as in Fig. 4). The discovery of this population initiated a review of images from 2017 of a female specimen of *Rhipidia* not identified at the time of capture. The casual finding of this specimen (within a package of strawberries purchased in a supermarket in Barcelona) brought about consultation with Dr. Eulalia Eiroa (University of Santiago de Compostela). Unfortunately, the package in which the specimen was found did not specify on its label the origin of the product; it was presumably from Huelva, in the southern region of Spain. Both this specimen and the specimens from Barcelona were determined as representing the same species and therefore we confirmed the presence of the species on the Iberian Peninsula since at least 2017.

To date, 27 species of *Rhipidia* have been reported from the Palearctic (Oosterbroek, 2024), divided between the subgenera *Eurhipidia* Alexander (four species) and *Rhipidia* Meigen (23). Only two species have been previously recorded from the Iberian Peninsula, *R. (R.) ctenophora* Loew and *R. (R.) maculata* Meigen, both with bipectinate flagellomeres on the male antenna, and antennae without abruptly pale subapical flagellomeres. In addition, this newly discovered species did not match any of the other Palaearctic species, indicating it represented a new introduction from outside the Palearctic.

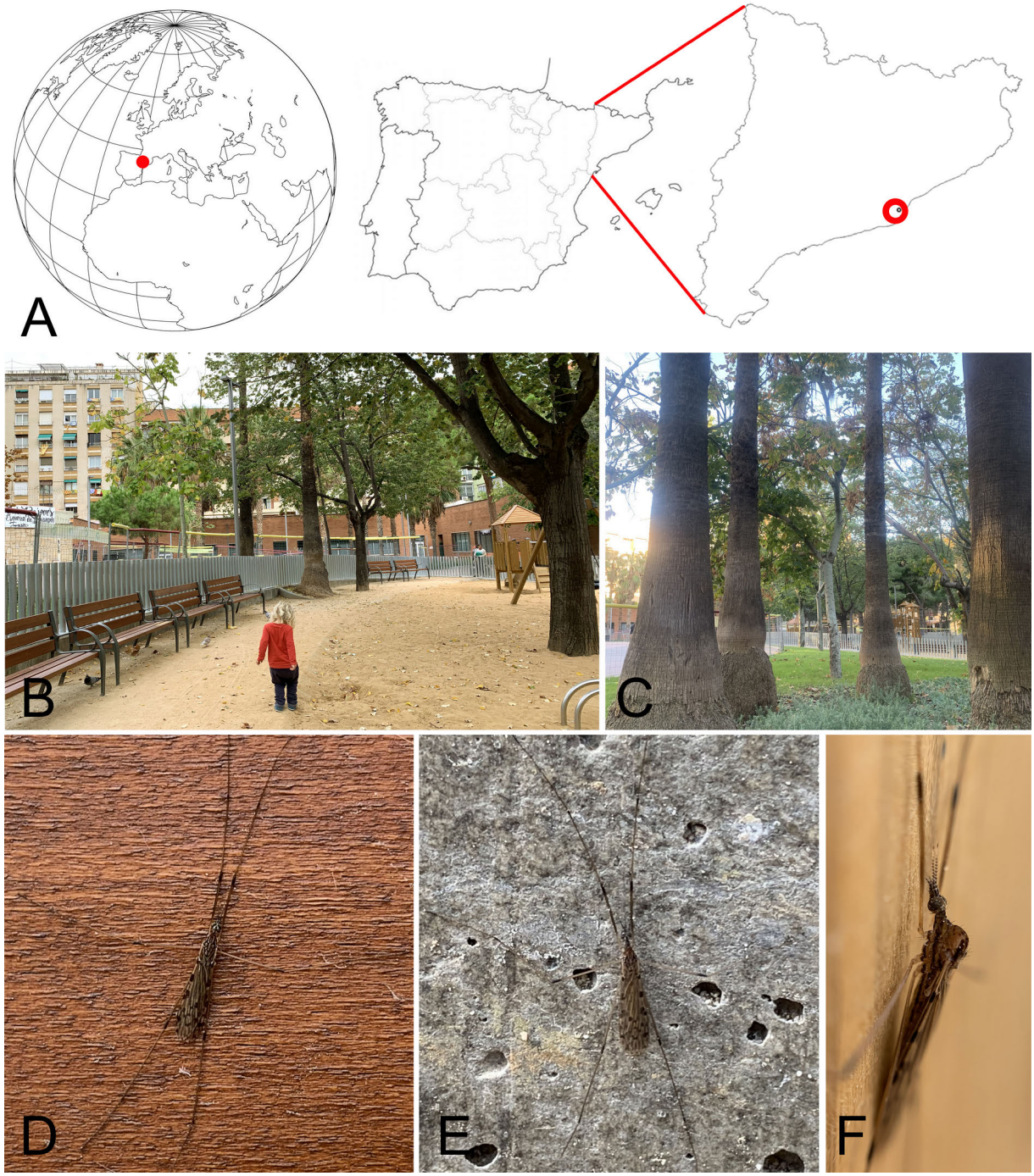

Fig. 1. (A) location where *Rhipidia domestica* was found, Barcelona (Catalonia); (B and C) general view of the Jardins de Montserrat urban park; (D-F) three specimens in the same park.

Alexander (1912) placed a group of *Rhipidia* species in the New World in a new subgenus *Arhipidia*, characterized by subpectinate antennae and constituting two groups of species "*subpectinata* Williston and its allies, *annulicornis* End(erlein), and *schwarzi* [Alexander], and *domestica* subgroup, with *multiguttata* [Alexander], and *domestica* and its races." In addition, *Rhipidia subpectinata pleuralis*, *R. schwarzi* and *R. domestica* all showed a distinctive antennal feature with flagellomeres 12-13 abruptly pale. *Rhipidia schwarzi* has numerous spots in the wing cells, different from the wing

pattern (consisting of a few larger spots) seen in the specimens from Spain. Alexander (1912) provided an identification key to distinguish among *R. subpectinata pleuralis* and the (then) three subspecies of *domestica, R. domestica domestica*, *R. domestica angustifrons* Alexander, 1912 and *R. domestica amazonensis* Alexander, 1912, using differences in thoracic patterning and wing coloration. Alexander (1919) also offered a key to the identification of the species in New York, USA, including *R. domestica* with the following characters: "Prescutum reddish brown with narrow black lines; pleura dull yellow with two narrow blackish longitudinal stripes; antennae with segments 12 and 13 light yellowish…" (Alexander, 1919: page 893). *Rhipidia domestica domestica* has a wide range in the New World, and in later years Alexander (1933, 1943, 1947, 1965, 1970) provided additional descriptive notes on this species from a variety of localities. The specimens from Spain were initially identified as *Rhipidia (Rhipidia) domestica* Osten Sacken, 1860 but slight differences in body and wing coloration, and the male hypopygial structure, required further comparisons with specimens from North America and with existing DNA barcoding samples to confirm the identification.

Materials & Methods

The cytochrome oxidase 1 (CO1) barcode gene was amplified and sequenced from specimens using the primers and protocols in Hebert et al. (2004). Sequences of flies from this study were aligned with existing sequences and analyzed in Mega 11 (Tamura 2021) using the neighbor-joining method. Outgroups chosen included and additional species of *Rhipidia*, *R. maculata* Meigen, 1818 (as *Rhipidia (Rhipidia) lecontei* (Alexander, 1940) on Genbank) and two other limoniines, a *Geranomyia* species and *Metalimnobia* (*Metalimnobia*) *novaeangliae* (Alexander, 1929) (as *Limonia novaeangliae* on Genbank).

Species	**Locality**	**Genbank Accession #**
Rhipidia domestica[1]	Barcelona, Spain	OP734809
Rhipidia domestica[1]	Barcelona, Spain	OP734808
Rhipidia domestica[1]	Wake Co., NC, USA	OP723517
Rhipidia domestica	Nassau Co., NY, USA	MN509213
Rhipidia domestica	Nassau Co., NY, USA	MN509212
Rhipidia domestica	Nassau Co., NY, USA	MN509211
Rhipidia domestica	Nassau Co., NY, USA	MN509210
Rhipidia domestica amazonensis[2]	Rio Grande do Sul, Brazil	MF176200
Rhipidia domestica amazonensis[2]	Rio Grande do Sul, Brazil	MF176199
Rhipidia domestica amazonensis[2]	Rio Grande do Sul, Brazil	MF176198
Rhipidia maculata (as *lecontei*)	Newfoundland & Labrador, Canada	KR392353
Rhipidia maculata	Alberta, Canada	KM929960
Rhipidia maculata	Saskatchewan, Canada	KM920680
Geranomyia sp.	Ontario, Canada	MG089954
Limonia novaeangliae	Suffolk Co., NY, USA	MN481424

[1] - collected during this study; [2]- in CCW list as a full species (*Rhipidia amazonensis*).

All the specimens studied are deposited in the collection of the Museu de Ciències Naturals de Barcelona (MCNB), Academy of Natural Sciences of Drexel University, Philadelphia, PA USA (ANSP) and in the private collection of the second author (MB). In addition, we had available the photographic images of the syntypic series of *Rhipidia domestica* Osten Sacken 1860. The following is a list of the material studied, offering the inventory number (when available) and the collection where the material is deposited in brackets.

Syntypes, *Rhipidia domestica* Osten Sacken 1860. 5 specimens, USA, Washington DC, original description gives "in May and August" (studied via photographic images).

1♂, [D.C.] [R. domestica nob.] [Type/70212] [MCZ-Ent/00598186] (Fig. 2A–D). https://www.gbif.org/occurrence/1306543154 – we designate this specimen as LECTOTYPE.
1♀, [Type/2/10212] red label, [O. Sacken],[MCZ-Ent/0010212] https://mczbase.mcz.harvard.edu/guid/MCZ:Ent:10212 – paralectotype.
1♂ [Type 5/10212] red label, [5] yellow label, [MCZ-Ent/00598189] https://mczbase.mcz.harvard.edu/guid/MCZ:Ent:598189 – paralectotype.
1♀, [Type/3/10212] red label, [MCZ-Ent/00598187] https://mczbase.mcz.harvard.edu/guid/MCZ:Ent:598187 – paralectotype.
1♀, [Type/4/10212] red label, [D.C.] [Rhipidia domestica O.S.] handwritten label [MCZ-Ent/00598188]. https://mczbase.mcz.harvard.edu/guid/MCZ:Ent:598188 – paralectotype.

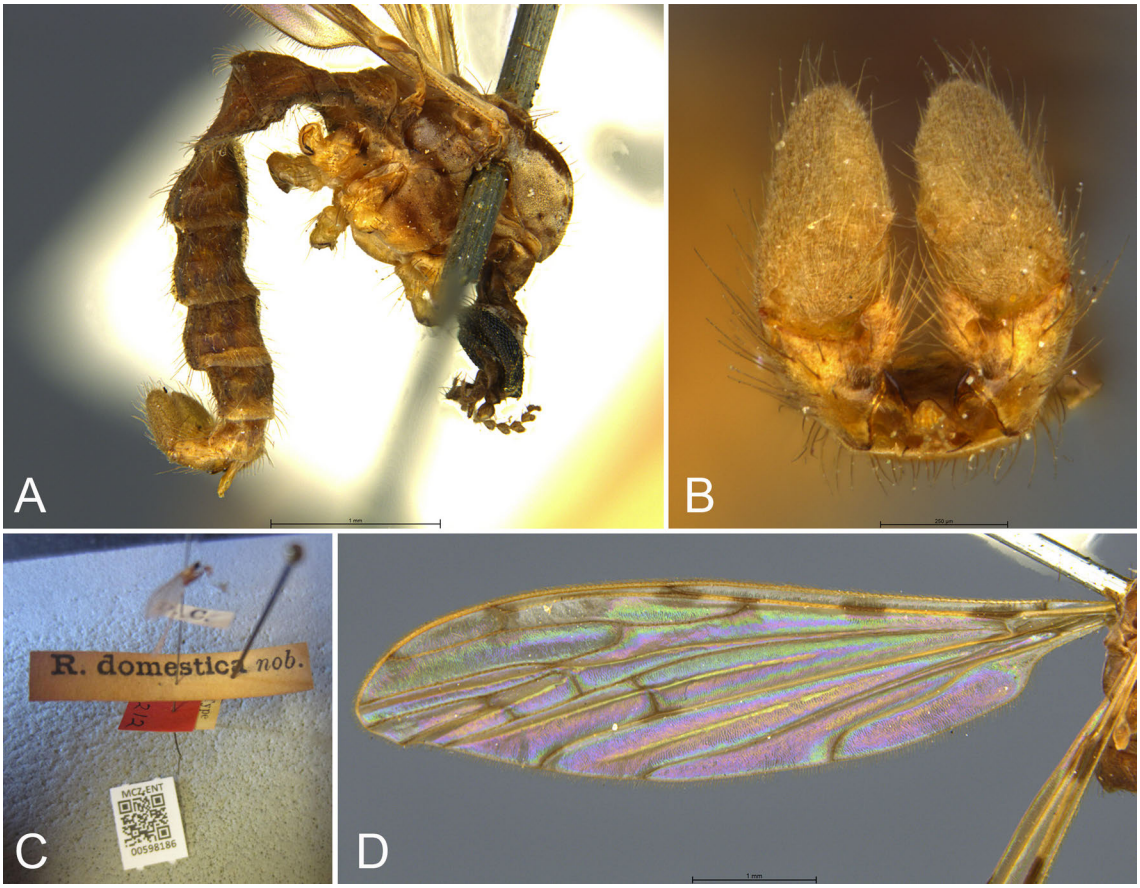

Fig. 2. Lectotype male *Rhipidia domestica* specimen MCZ-ENT00598186, at Museum of Comparative Zoology, Harvard University (© President and Fellows of Harvard College).

Material studied: 3♂♂ & 1♀, Jardins de Monserrat, Esquerra de l'Eixample, Barcelona, Catalonia, 10/10/2019, Max Mederos & J. Mederos leg. (dry, on point) MZB 2019-1352 to MZB 2019-1355 [MCNB]; 5♂♂ 1♀, *idem*, (ethanol 70%) MZB 2019-1356, MZB 2019-1360 to 2019-1363, MZB 2019-1368 [MCNB]; 1♂, *ibidem*, 13/11/2019, J. Mederos leg. (dry, on point) MZB 2019-1738 [MCNB]; 1♂, 213 Lochside Dr., Cary, Wake Co., North Carolina, USA, 22/08/2020, M. Bertone leg. (ethanol 70%) MZB 2023-0001 [MCNB]; 4♀♀, *idem* MZB 2023-0002 [MCNB]. 1♂ 1♀ 14 Round Hill Road, Voorhees, N39.85734, W-74.9999, Camden Co., New Jersey, USA, 05/24-29/2021, J. Gelhaus leg. [ANSP]. 1♂ Petite Anse (Les Anses d'Arlet), l'Anse (Morne Jacqueline), Martinique. 07/02/2018 - 13/02/2018, 14°28'29.8"N, 61°04'34.3"W, alt. 111m (along path in xerophilous forest), blue pan trap, Marc Pollet leg. (MQ/2018/Dipterological survey of Martinique/MP&ADB) - sample code: MQ/2018/266.

Results & Discussion

During the study, specimens found in Barcelona were compared morphologically with specimens of *R. domestica* collected in North Carolina and New Jersey, USA, with photographs of the syntypes (MCZ) of *R. domestica* from Washington D.C., and also with one male specimen from Martinique. The specimens from Barcelona, North Carolina, and New Jersey agree in major features with the syntypes of *Rhipidia domestica*, including wing venation and pattern (Fig. 4A–D), thoracic pattern (Fig. 5A–F), and the male hypopygium. We do note differences in the hypopygium as drawn by Alexander (1943) from our specimens and the syntypes, specifically the proportion of the ventral gonostylus to the gonocoxite (Fig. 6A–D). In the US and Spain specimens we have examined and in the syntypes, the ventral gonostylus length is nearly twice that of the gonocoxite, whereas in the Martinique specimens and that illustrated by Alexander (1943) the ventral gonocoxite is only slightly longer than that of the gonocoxite. The aedeagus complex of the Barcelona specimen is given in Fig. 6E–F.

In addition, the studied specimen from Martinique showed a lighter color pattern on both the wing and the body then the other specimens. Alexander (1970) notes that *Rhipidia domestica* is variable in body and wing coloration and in details of the male hypopygium.

Cytochrome oxidase subunit 1 (CO1) barcode sequences (Genbank OP734808, OP734809, and OP723517) for the specimens from Spain and North Carolina cluster with others from North America (Fig. 3). This suggests that the specimens from Spain are consistent with *R. domestica*, as characterized by Osten Sacken (from District of Columbia) and by modern molecular data (DNA barcoding).

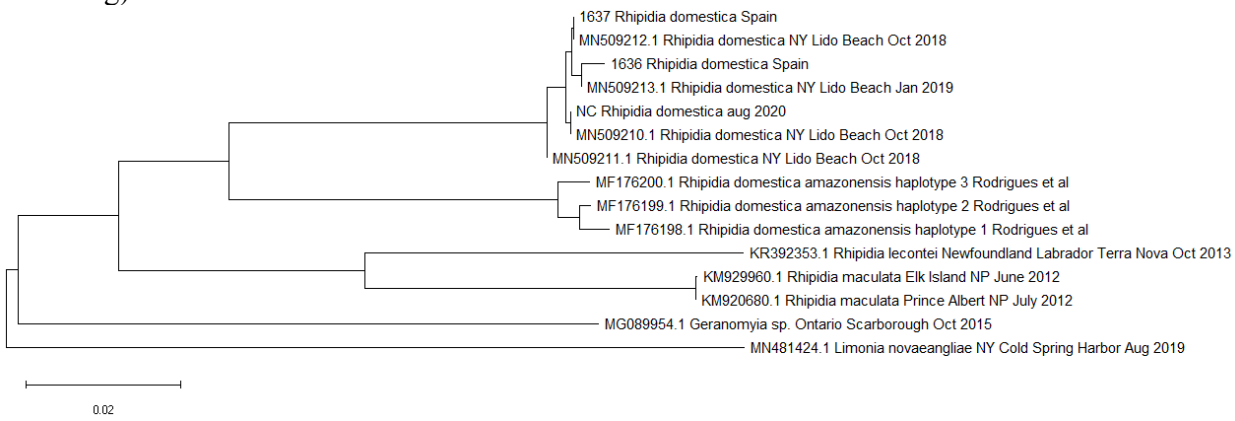

Fig. 3. Neighbor-joining tree of CO1 barcode sequences from specimens collected during this study and representative sequences available on Genbank.

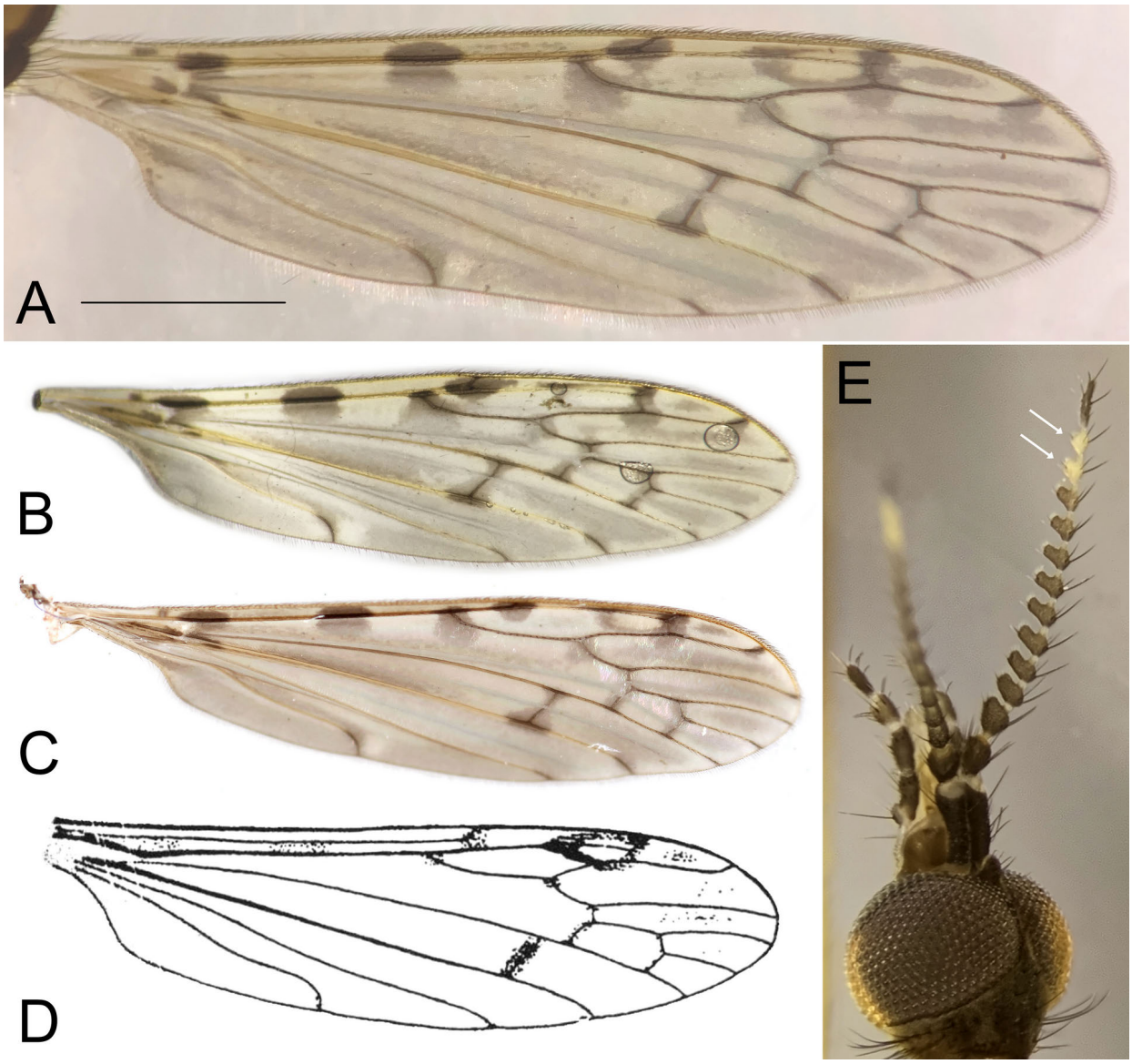

Fig. 4. Venation and wing spot pattern of *Rhipidia domestica*: (A) male specimen collected in Barcelona; (B) female specimen collected in Barcelona from a package of strawberries in 2017, presumably from Huelva (southern Spain); (C) male specimen collected in North Carolina (USA); (D) venation after Alexander, 1912; (E) head and antenna of a male specimen from Barcelona, indicating the penultimate white flagellomeres.

One major question remains: how did *Rhipidia domestica* get introduced into Barcelona? Previously, the Barcelona City Council kept the park closed during warmer months to carry out remodeling work, which included the introduction of several ornamental plants. In the years following the park's rehabilitation work, the species has never been observed in the park again. Alexander (1919) mentions that the immature stages of *R. domestica* can be found in decaying vegetable matter and manure; additionally, it has been reared from fermented sap of the sour gum tree, *Nyssa sylvatica* (Alexander, 1920), and banana stems (Alexander 1970). Perhaps this species arrived in the soil of the ornamental plants. Both co-authors (JKG & MAB) note that *Rhipidia domestica* is a very common species of crane fly in their suburban properties (NJ and NC, respectively), along with other sites with an urbanized influence. The species is also readily attracted to white and ultraviolet light. Thus,

it's possible it arrived in the Iberian Peninsula via aircraft, through transport of adults attracted to lights inside a loading plane, or through larvae in foreign soil brought into the area. We anticipate the species will likely spread through much of the more temperate European subcontinent.

In conclusion, study of the available material reveals that *Rhipidia domestica* has been in the Iberian Peninsula at least since 2017. In addition, males from Barcelona, North Carolina, and New Jersey showed strong similarities regarding the general coloration of the body, wings and in the morphology of the hypopygium, but marked differences are detected in the same characters with respect to the male specimen studied from Martinique.

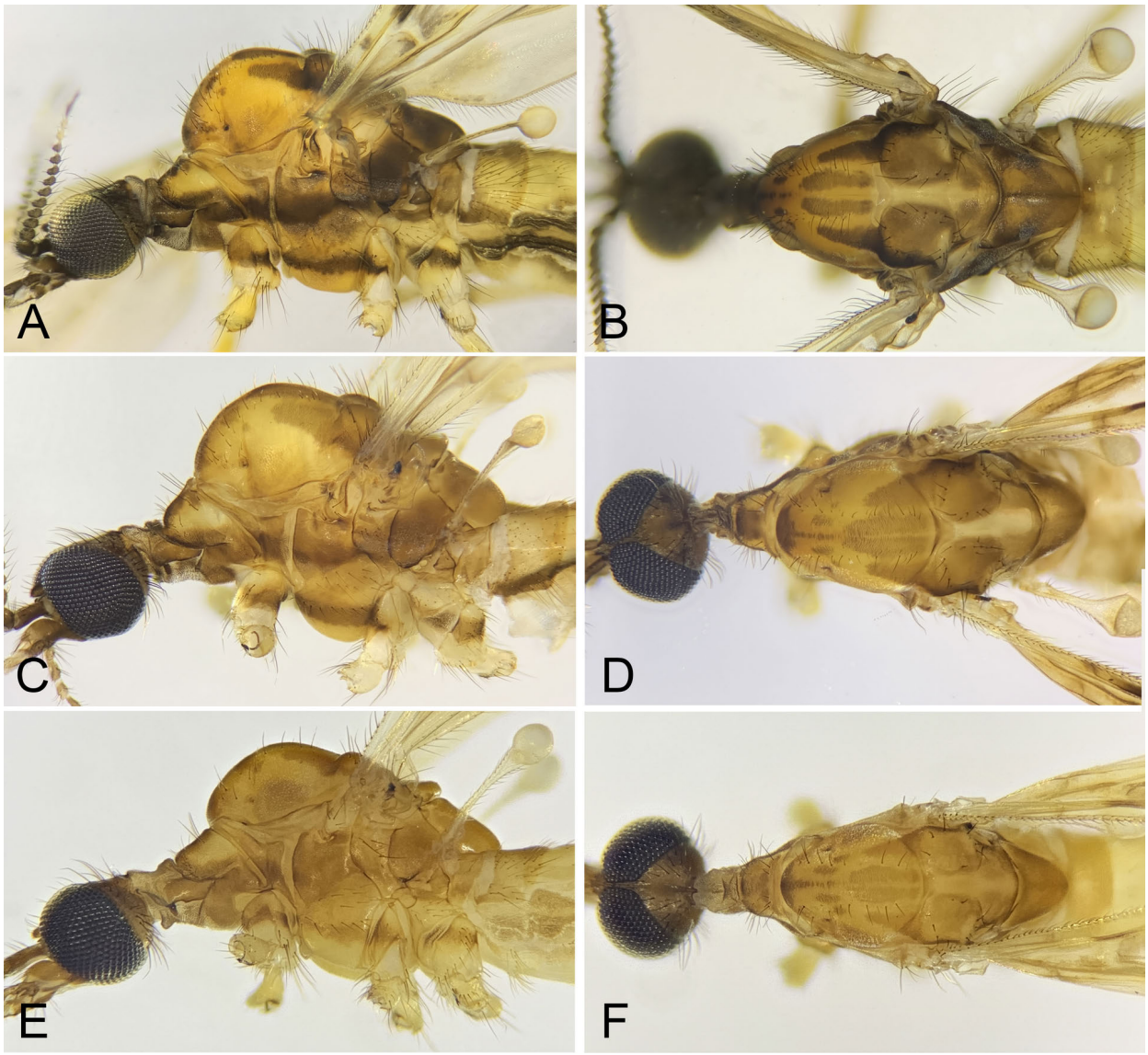

Fig. 5. Thorax and head of a male specimens of *Rhipidia domestica* from Barcelona (A and B), in lateral and dorsal views, respectively; idem from North Carolina (C and D) and from Martinique (E and F).

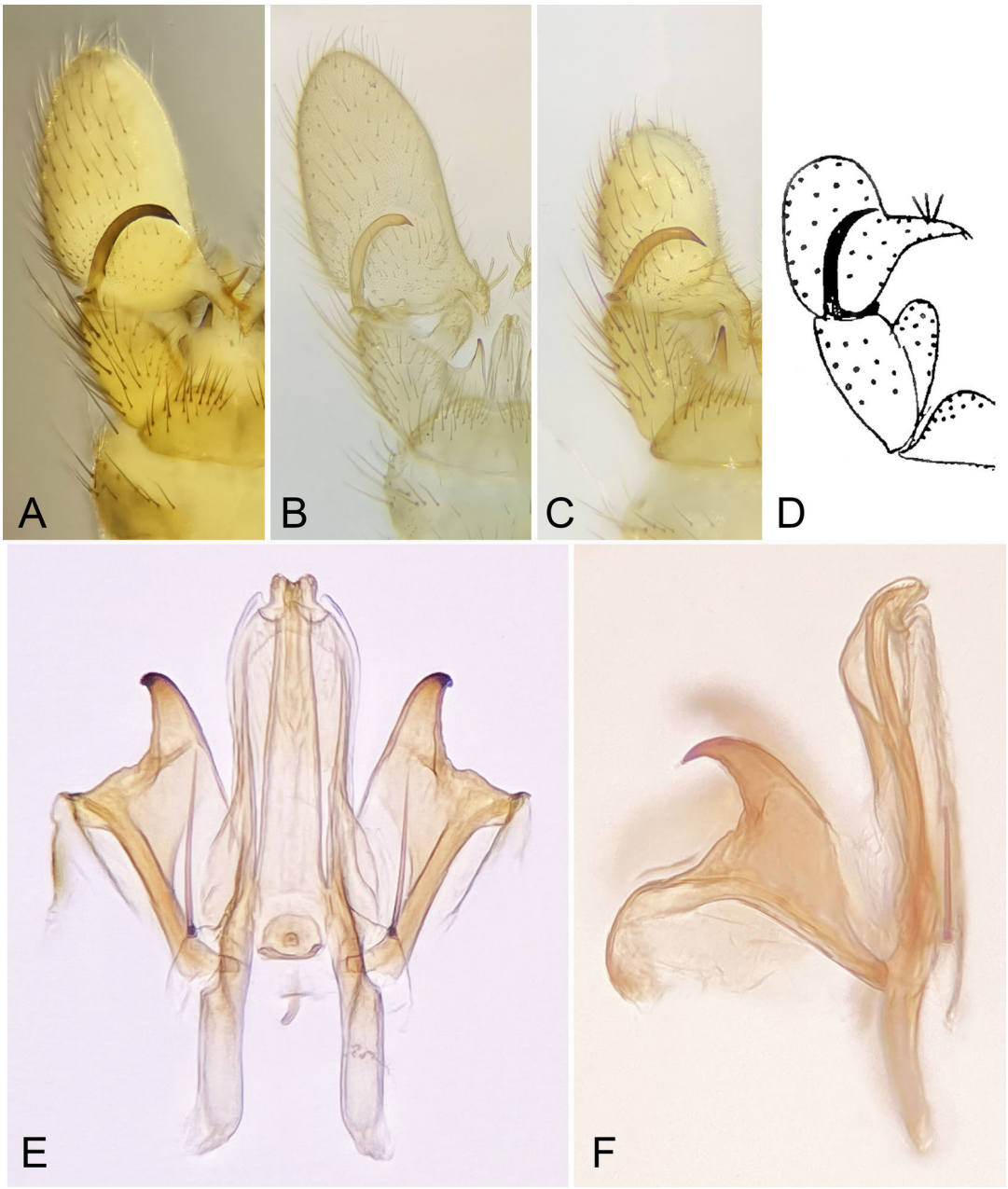

Fig. 6. Hypopygium of *Rhipidia domestica* specimens from Barcelona (A), North Carolina (B), Martinique (C) and after Alexander, 1943 (D, modified). Aedeagus complex in dorsal (E) and lateral view (F) of a Barcelona male specimen.

Acknowledgments

We thank Shawn Butler (NCSU Plant Disease and Insect Clinic) for amplifying the CO1 gene from the specimens. We thank Charles Whittemore Farnum, MCZ, for photographing the syntypic series of *Rhipidia domestica* and sharing those images with us. The first author thanks Marc Pollet for facilitating the study of the material from Martinique, collected during the 2018 "Dipterological survey of Martinique", as part of the larger "Etude de la faune entomologique et d'autres invertébrés de la RBI des Pitons du Carbet (Martinique)", organized by the Institut Carabéen pour la Nature et la Culture (ICNC). Glòria Masó and Berta Caballero-López, curators of the MCNB for their support during the study of the specimens deposited in the collections.

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Lost and found: name-bearing mosquito types (Culicidae: Diptera) at the Colección Nacional de Insectos, Instituto de Biologia, Universidad Nacional Autónoma de México (CNIN-IBUNAM), with a list of Simuliidae types

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A serendipitous find of important Culicidae and Simuliidae types in two Schmitt boxes (Fig. 1) during a research visit in September 2023 to the Colección Nacional de Insectos, Instituto de Biologia, Universidad Nacional Autónoma de México (CNIN-IBUNAM), Mexico City, was made. These specimens were known to be originally deposited at the Laboratorio de Entomología, Instituto de Salubridad y Enfermedades Tropicales, Mexico City, D. F., Mexico (ISET) (Wilkerson *et al*., 2021), but are now as the Colección de Artrópodos de Importancia Médica (CAIM) at the Instituto Nacional de Diagnostico y Referencia Epidemiológica (InDRE) (Ortega-Morales *et al.*, 2024; see also Guzman-Bracho, 2020).

Three of the five Culicidae holotypes found are of species endemic to Mexico (*Aedes ramirezi*, *Ae. kompi*, and *Wyeomyia stonei*), while the remaining two holotypes are for species (*Anopheles gabaldoni* and *Ae. cozumelensis*) also known in other parts of Central America, particularly in Belize and/or Guatemala (Fig. 2). Additionally, paratypes of six species endemic to Mexico (*Ae. chionotum*, *Ae. gabriel*, *Ae. niveoscutum*, *Ae. schicki*, *Ae. shannoni*, and *Sabethes ortizi*), paratypes of three species described from the southwestern United States that do or may extend into Mexico (*Ae. brelandi*, *Ae. burgeri,* and *Ae. deserticola*), and one non-type specimen of another species endemic to Mexico (*Ae. vargasi*) were also found (Fig. 3).

The Culicidae holotypes are for species described by Luis Vargas, Alfonso Díaz-Nájera, and Amado Martínez-Palacios, all of whom worked for ISET, and collaborator Wilbur George Downs from the International Health Division of the Rockefeller Foundation. The paratypes are for species described by Robert X. Schick and Thomas J. Zavortink when they worked with John N. Belkin on the "Mosquitoes of Middle America" project at the University of California Los Angeles. Most or all the paratypes from Belkin's project should have an associated microscope slide with the larval and pupal exuviae of the adult specimen. However, there were no slide-mounted exuviae of the paratypes recovered.

It is unclear how or when the Culicidae and Simuliidae types were transferred to the CNIN-IBUNAM, but they are considered to be donations. Unfortunately, no acquisition documents were retrieved from the archives despite best efforts (Harry Brailovsky, pers. comm.).

The following data from labels are in quotation marks separated by vertical bars: " | " indicating an entry line within a label, while " || " pertains to a separate data label.

Fig. 1. Discovered Culicidae and Simuliidae types: **A.** One of the Schmitt boxes containing the types; **B.** Drawer of sorted types in unit trays.

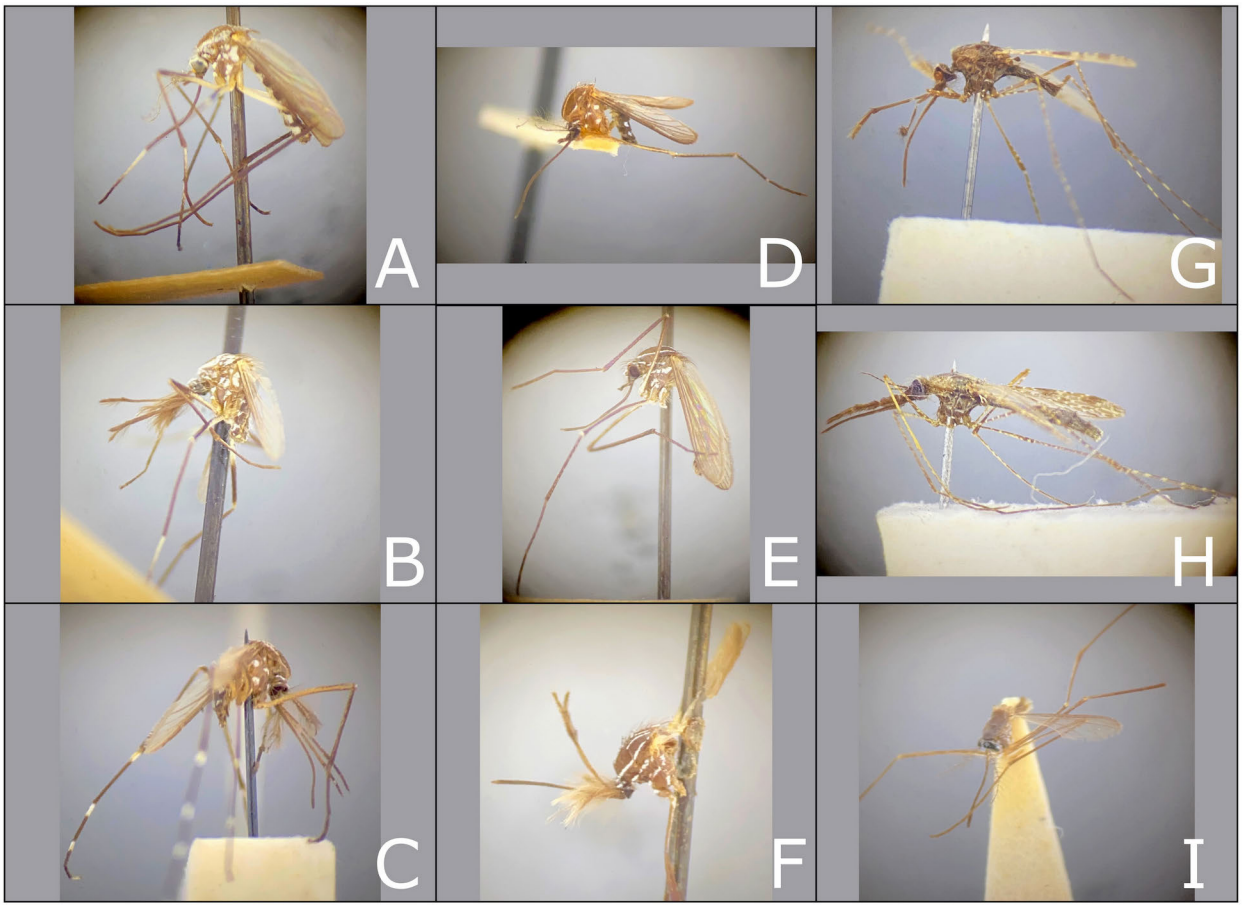

Fig. 2. Culicidae types found at CNIN-IBUNAM: **A.** *Aedes kompi*, holotype; **B.** *Ae. kompi*, allotype; **C.** *Ae. cozumelensis*, holotype; **D.** *Ae. cozumelensis*, allotype; **E.** *Ae. ramirezi*, holotype; **F.** *Ae. ramirezi*, allotype; **G.** A*nopheles gabaldoni*, allotype; **H.** *Ano. gabaldoni*, holotype; **I.** *Wyeomyia stonei*, holotype.

HOLOTYPES (Culicidae)

Subfamily Anophelinae
Subgenus *Anopheles*
***Anopheles* (*Anopheles*) *gabaldoni* Vargas, 1941: 389**

HOLOTYPE: "Holotipo|| A. gabaldoni, n. sp.|| Tenosique, Tab.| v. 1941.| Col. M. Macias.|| 9141-2" [handwritten] (Fig. 2H)
ALLOTYPE: "Alotipo ♀|| Tenosique, Tab.| V. 1941. Col. M. Macias." [handwritten] (Fig. 2G)
With five paratypes.

Subfamily Culicinae
Tribe Culicini
Subgenus *Aztecaedes*
***Aedes ramirezi* Vargas and Downs, 1950: 164**

HOLOTYPE: "Ae (G) ramirezi| HOLOTIPO|| Gabriel Mariaca, Mor.| 2-VI/29| 47- I WG Downs" [handwritten] (Fig. 2E)
ALLOTYPE: "Ae (G) ramirezi| ALOTIPO|| Gabriel Mariaca, Mor.| 2-VI/29| 47 WGDowns|| ex rock pool|| A (G) ramirezi" [handwritten] (Fig. 2F)
With five paratypes.

Subgenus *Howardina*
***Aedes cozumelensis* Diaz Najera, 1966: 334**

HOLOTYPE: "Aedes| cozumelensis|| Holotipo|| 6529|| Col. A. Diaz Nájera| 25-IX-65| Cozumel, Q. R." [handwritten] (Fig. 2C)
ALLOTYPE: "Aedes| cozumelensis|| Alotipo|| Col. A. Diaz Nájera| 25-IX-65| Cozumel, Q. R.|| 6535" [handwritten] (Fig. 2D)
With 22 paratypes.

Subgenus *Protomacleaya*
***Aedes kompi* Vargas and Downs, 1950: 167**

HOLOTYPE: "Ae (G) kompi| HOLOTIPO|| Tepoztlan, Morelos| 1-VI/29| 47-2 WGDowns|| ex tree hole" [handwritten] (Fig. 2A)
ALLOTYPE: "Ae (G) kompi| ALOTIPO|| Tepoztla Mor| 1-VI/29| 47- 1|| 7| ex tree hole|| A (G) kompi" [handwritten] (Fig. 2B)
With two paratypes.

Tribe Sabethini
Subgenus *Wyeomyia*
***Wyeomyia stonei* Vargas and Martinez, 1953: 297**

HOLOTYPE: "6285|| W. stonei| Poana Teapa Tab| 26 III 1947| HOLOTIPO|| W. stonei" [handwritten] (Fig. 2I)
ALLOTYPE: "W. stonei ♀| Poana Teapa Tab| 26 III 1947| ALOTIPO" [handwritten]
With four paratypes.

PARATYPES (Culicidae)

Furthermore, several paratypes mostly from John Belkin's project "Mosquitoes of Middle America" (Heinemann and Belkin, 1977) were found:

1. *Aedes brelandi* Zavortink, 1972 [2 paratypes]
2. *Aedes burgeri* Zavortink, 1972 [2 paratypes]
3. *Aedes chionotum* Zavortink, 1972 [1 paratype]
4. *Aedes deserticola* Zavortink, 1969 [2 paratypes]
5. *Aedes gabriel* Schick, 1970 [2 paratypes]
6. *Aedes niveoscutum* Zavortink, 1972 [2 paratypes]
7. *Aedes shannoni* Vargas & Downs, 1950 [47 paratypes]
8. *Aedes schicki* Zavortink, 1972 [2 paratypes]
9. *Sabethes ortizi* Vargas & Díaz-Najera, 1961 [2 paratypes, Fig. 3B)]

A non-type female specimen of *Aedes vargasi* Schick, 1970 with a code MEX 71-15 was found mixed with the paratype series, possibly associated with a slide mount of larval and pupal exuviae "1 lp♀ (MEX 71-5) [UCLA]" {typographical error}(Schick, 1970:74).

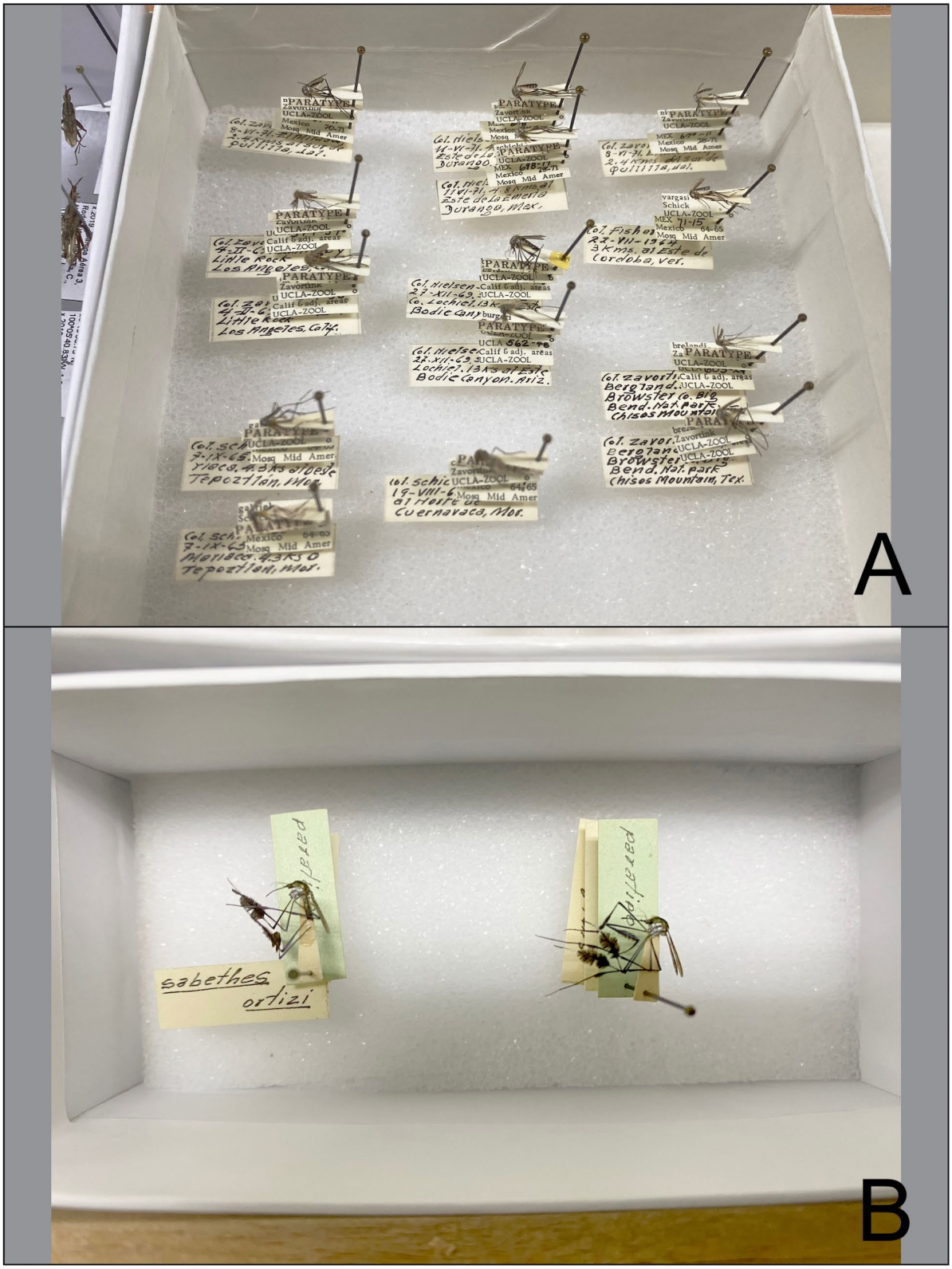

Fig. 3. Culicidae paratypes: **A**. *Aedes* spp. paratypes; **B.** *Sabethes ortizi* paratypes.

The following is the list of the black fly type specimens found:

HOLOTYPES (Simuliidae)

1. *Simulium anduzei* Vargas and Díaz-Nájera, 1948 [holotype & allotype]
2. *Simulium bustosi* Vargas and Martínez-Palacios, 1946 [holotype & allotype; 1 paratype]
3. *Simulium contrerense* Díaz-Nájera and Vulcano, 1962 [holotype & allotype]
4. *Simulium costalimai* Vargas and Martínez-Palacios, 1946 [holotype & allotype]
5. *Simulium dandrettai* Vargas, Martínez-Palacios and Díaz-Nájera, 1946 [holotype & allotype]
6. *Simulium downsi* Vargas, Martínez-Palacios and Díaz-Nájera, 1946 [holotype & allotype; 2 paratypes]
7. *Simulium dugesi* Vargas, Martínez-Palacios and Díaz-Nájera, 1946 [holotype & allotype]
8. *Simulium hechti* Vargas, Martínez-Palacios and Díaz Nájera, 1946 [holotype & allotype; 2 paratypes]
9. *Simulium jobbinsi* Vargas and Martínez-Palacios, 1946 [holotype & allotype; 6 paratypes]
10. *Simulium mangaberrai* Vargas, 1945 [holotype & allotype; 12 paratypes]
11. *Simulium marquezi* Vargas and Díaz-Nájera, 1957 [holotype & allotype; 5 paratypes]
12. *Simulium menchacai* Vargas and Díaz-Nájera, 1957 [holotype & allotype]
13. *Simulium ochoai* Vargas, Martínez-Palacios and Díaz-Nájera, 1946 [holotype & allotype; 2 paratypes]
14. *Simulium ruizi* Vargas and Díaz-Nájera, 1948 [holotype]
15. *Simulium temascalense* Díaz-Nájera and Vulcano, 1962 [holotype]
16. *Simulium veracruzanum* Vargas, Martínez-Palacios and Díaz-Nájera, 1946 [holotype & allotype; 3 paratypes]
17. *Tlalocomyia revelata* Wygodinsky and Díaz-Nájera, 1970 [holotype & allotype]

PARATYPES (Simuliidae)

18. *Simulium deleoni* Vargas, 1945 [3 paratypes]
19. *Simulium iriartei* Vargas, Martínez-Palacios and Díaz-Nájera, 1946 [4 paratypes]
20. *Simulium juarezi* Vargas and Díaz-Nájera, 1957 [2 paratypes]
21. *Simulium lassmanni* Vargas and Martínez-Palacios, 1946 [allotype; 3 paratypes]
22. *Simulium panamense* Fairchild, 1940 [2 paratypes]

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The last and the first Diptera collections of 2023 and 2024: fruit juices, vinegars, and wines as baits for Drosophilidae

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Introduction and Methods

Drosophilidae, along with other flies, rely on odors to locate food sources (Becher et al. 2010). This has been known for quite some time (e.g., Barrows 1907). Attractive compounds include acids, alcohols, and carbon dioxide (Zhu et al. 2003). Fruit juices and wines are sources of various acids (Kabasakalis et al. 2000, Robles et al. 2019). Vinegar contains acetic acid (Samad et al. 2016). Over the 2023–2024 New Year weekend, I decided to conduct some more trials of fruit juices, vinegar varieties, and wine varieties as baits for Drosophilidae. The same trap design was used as previously, except that these new traps were made from bottles of water rather than carbonated soft drinks (Fig. 1). The thinner plastic in the water bottles makes them easier to cut. Also, I did not make an interior funnel instead I used an entire bottle. In each test, baited traps were placed in the afternoon, hung within five feet of a composter with a large population of drosophilids. Two tablespoons of juice, vinegar, or wine were placed into each trap and then the traps were hung near the composter. Upon collection traps were immediately placed into 1 gallon plastic freezer bags. Bags were placed into a freezer until processing, usually 24 hours.

Fig. 1. Water bottle traps deployed with four baits simultaneously. From left: distilled white vinegar, apple cider vinegar, Concord grape juice, apple juice.

From 29 December 2023 to 2 January 2024 a trap was baited with Pinot Noir wine (13.5% alcohol). The wine was taken from an old bottle that had been in the refrigerator since Thanksgiving Day (late November). Pinot Noir, a red wine, was discussed previously, as were differences between red and white wines (Hribar 2020).

From 2–4 January 2024, three wines were used as baits: Asti (7.5% alcohol), brut California champagne (10.5% alcohol), and Napa Valley Cabernet Sauvignon (14.6% alcohol). Asti wine, aka Asti Spumante, is a white wine produced in the Province of Asti in Italy. It is a sweet, low alcohol wine made from the Moscato Bianco grape and contains dissolved carbon dioxide (MacNeil 2002). This wine has a fruity, floral aroma (Ewing-Mulligan & McCarthy 2001). Champagne is a carbonated white wine originally produced in the Champagne region of France (MacNeil 2002). It is now made in various areas using the "champagne process" and several varieties of grape are used including Chardonnay, Pinot Noir, and Pinot Meunier. Champagne is classified according to the amount of sugar added to the product, from Extra Brut to Doux (Pfanner 2012). Cabernet Sauvignon wine is made from the grape of the same name. It is the world's most widely planted red grape variety (OIV 2017). The wines produced from this grape have high levels of tannins and acidity. They are not carbonated.

From 13–15 January 2024 a California Merlot (13.5% alcohol) was compared to purple grape juice, and from 15–17 January 2024 purple grape juice was compared to white grape juice. Merlot wine is made from Merlot grapes; (Robinson et al. 2012). Merlot is the fourth most widely planted grape variety in the United States (OIV 2017). Purple or red grape juice is usually made from Concord grapes, whereas white grape juice is made from Niagara grapes (Huckleberry et al. 1990). Other grape varieties may be used, however, and in commercial production of white grape juice the Thompson Seedless may also be mixed with Niagara (Morris & Striegler 1996). Concord and white grape juices contain similar amounts of carbohydrates, but Concord juice has significantly higher amounts of antioxidants (Callaghan et al. 2017).

Finally, from 2–4 February 2024, four baits were tested: distilled white vinegar, apple cider vinegar, Concord grape juice, and apple juice. The vinegars were purchased from a supermarket, as was the apple juice. The grape juice was taken from the same bottle used previously. The vinegars were the same brand and each vinegar had been reduced to 5% acetic acid content by the manufacturer.

Many of the flies had fallen into the bait liquids and that may have changed their pigmentation. Regardless, identification of *Drosophila* flies is challenging and as I explained in my previous note (Hribar 2020), without access to a current key, reference collection, and good illustrations, I decided it was better not to attempt identification to species. Instead, I grouped the flies according to their morphological similarity. For the Pinot Noir collection and the comparison of three wines, I grouped the flies as follows. "Species 1" were those in the *repleta* species group that had been collected in previous trials. "Species 2" were similar to "Species 1" but had darker markings and a conspicuous black spot over one of the cross veins. "Species 3" were those similar to wild-type *D. melanogaster* Meigen. "Species 4" were a darker brown color and had dark wings. During the trials with grape juice, I collected a "Species 5" that had an entirely black abdomen and a "Species 6" that had dark wings. The African Fig Fly, *Zaprionus indianus* Gupta, was unmistakable. The identification of the flies collected in the final trial were identified as Species 1, Species 2, African Fig Fly, and "other".

Results and Discussion

The Pinot Noir bait attracted three of the four apparent species of *Drosophila* (Table 1). The trap fell or was knocked down onto the ground sometime during the second night, so there may have been additional flies that were carried away by ants; seven ants were found in the trap. Additionally, four Cecidomyiidae of at least two species were present in the trap, as were a termite and two wild cockroaches, *Carablatta lutea* (Saussure & Zehntne). The cockroaches, termite, and possibly the cecidomyiids probably crawled into the trap while it was on the ground. Numerous mites, *Macrocheles muscaedomesticae* (Scopoli), were seen in the trap and also attached to Species 1.

Table 1. Drosophilidae collected in trap baited with Pinot Noir wine.

Apparent Species	Number Collected
species 1	72
species 3	12
species 4	4
Total	88

The side by side comparison of three kinds of wine was interesting. Species 1 was collected in the greatest numbers in traps baited with all three wines (Table 2). As in the Pinot Noir trial, numerous *M. muscaedomesticae* were seen in the trap and attached to Species 1. Other than two small bark beetles found in the Cabernet Sauvignon trap, no other organisms besides flies and mites were found in this trial. Correspondence in the rank-order of species collected among the three wine types was examined via Kendall's tau correlation (Wessa 2016). Cabernet Sauvignon and Asti traps were perfectly correlated in their rank-order of species captured ($\tau = 1.0$) whereas there was not the same rank-order of species in the Champagne traps with either of the other wines ($\tau = 0.7379$ for both comparisons).

Table 2. Drosophilidae collected in traps baited with different wines.

Apparent Species	Cabernet Sauvignon	Asti Spumante	California Champagne
species 1	133	140	88
species 2	20	12	20
species 3	36	24	9
species 4	3	9	0
Z. indianus	1	1	0
Total	193	186	117

The comparison of Merlot wine to Concord grape juice was interesting in that all species of Drosophilidae collected were seen in greater numbers in the juice-baited trap (Table 3). Other insects seen in the juice-baited trap were one bark beetle, another beetle that I did not bother to identify, a

Table 3. Drosophilidae collected in traps baited with Merlot wine or Concord grape juice.

Apparent Species	Concord Grape Juice	Merlot Wine
species 1	62	51
species 3	100	43
species 4	0	2
species 5	17	13
species 6	2	0
Z. indianus	10	0
Total	191	109

cecidomyiid midge, and an *Aedes* mosquito. Mites were observed in these traps. The only other insect in the Merlot-baited trap was a cecidomyiid. Kendall's tau correlation was not significant in this comparison, even when the two species collected in the smallest numbers were removed from the calculations. The species collected in the greatest and second-greatest numbers were different for the juice and wine.

The third comparison, that of Concord grape juice to white grape juice, was actually not a comparison. Only three (3) flies were collected in the trap baited with white grape juice; all three were Species 1 of the *repleta* group. A small moth also was collected in the trap. No mites were seen in this trap. There were 113 Drosophilidae in the Concord grape-baited trap, along with one lonchaeid, one phorid, and one cecidomyiid (Table 4). Mites were seen in the Concord juice-baited trap. Concord grape juice is an attractant to Drosophilidae, and concentrations as low as 25% are satisfactory baits for the fruit pest *Drosophila suzukii* (Matsumura) (Piñero & Foley 2018).

Table 4. Drosophilidae collected in traps baited with Concord or white grape juice.

Apparent Species	Concord Grape Juice	White Grape Juice
species 1	23	3
species 3	71	0
species 6	3	0
Z. indianus	16	0
Total	113	3

The fourth comparison was interesting. Traps baited with Concord grape juice and apple cider vinegar collected the most flies, whereas few flies were collected in traps baited with apple juice and distilled white vinegar (Table 5). Insects other than Drosophilidae were collected as follows: Concord grape, 1 bark beetle, 1 dolichopodid, 3 phorids; apple juice, 4 phorids (at least two species); apple cider vinegar, 2 bark beetles and 1 staphylinid beetle; distilled white vinegar, 2 phorids and 1 small moth. Mites were found in the Concord grape and distilled white vinegar taps, but not in apple juice or distilled white vinegar traps. Apple cider vinegar and white vinegar are produced from different substrates. Cider vinegar is made from apples whereas distilled white vinegar is made from ethanol derived from grains (Nikol 1979, Bhat et al. 2014). Hodge (2022) found that apple cider vinegar was a better attractant for Drosophilidae than was white vinegar. Apple cider vinegar contains phenolic compounds and organic acids not found in distilled white vinegar (Morgan & Mosawy 2016). Moreover, different vinegars are differentially attractive to Drosophilidae. For example, Landolt et al. (2012) found that a combination of Merlot wine and rice vinegar was the most attractive bait for *D. suzukii* in Oregon. Addition of fruit juices to bait traps can boost collection numbers. Lasa et al. (2024) found that addition of apple juice to a fly bait mixture attracted more flies. Bal et al. (2017) collected more *D. suzukii* in traps baited with grape baits than apple baits.

Table 5. Drosophilidae collected in traps baited with fruit juice of vinegar.

	Juice		Vinegar	
Apparent Species	Concord Grape	Apple	Apple Cider	Distilled White
species 1	8	2	2	6
species 2	0	0	6	0
Z. indianus	5	1	2	0
others	86	14	38	0
Total	99	17	48	8

Macrocheles muscaedomesticae mites were found in all but two traps. Species 1 of the *repleta* group was collected in all traps. Mites were never seen attached to any species other than Species 1. The traps used in the trials reported here differ from those used previously in that there is no internal funnel in the new traps. This allows all of the flies to fall into the liquid baits. It is likely that the mites disengaged from the flies once they became submerged in the liquid. It is possible that mites were attached to other fly species. Nevertheless, when mites were seen on flies, they were always seen on Species 1 of the *repleta* group.

Some of the unidentified flies might be female *D. suzukii*. The females of this species are identifiable by their serrate ovipositor. Were my eyes better I would have tried to identify the females. I have found a single male *Drosophila suzukii* before (Hribar 2020b), so it is likely that there are females in these collections.

The Pinot Noir experiment ran for four days, and all of the other experiments ran for two days. It is interesting that when Concord grape juice was evaluated as a bait for *Z. indianus*, some of the highest capture rates were seen for freshly prepared baits two to four days after placement in the field (Epsky & Gill 2017). Lasa et al. (2020) reported that apple cider vinegar was a more attractive bait to *Z. indianus* than was Concord grape juice. This was not the result in these trials. It appears that in my backyard, at least, Concord grape juice is the better bait.

Obviously, this is a report on some "quick and dirty" trials of juice, vinegar, and wine as baits for Drosophilidae on Vaca Key, Florida. Deploying a small number of traps in the same area for only two to four days isn't a very exhaustive protocol. Many factors could have influenced the numbers and species composition of the flies collected in the traps; even something as simple as what day the traps were examined can influence results (Hodge & Arthur 1996). There is a strong seasonality component to abundance of Drosophilidae in temperate and subtropical areas (Poppe et al. 2013, Başpinar et al. 2022). These trials were conducted in December, January, and February, when the temperature was in the sixties and seventies. It is possible that different species might be collected in different numbers during hotter parts of the year. On the other hand, Başpinar et al. (2022) found that Drosophilidae were more common in the cooler parts of the year. Another difficulty with these results is the lack of specific identification, both in this report and in other publications. Many times, species other than *D. suzukii* or *Z. indianus* are lumped together as "non-target Drosophilidae". In spite of these shortcomings and drawbacks, trials shall continue, as there are many more juices, vinegars, and wines at the supermarket.

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An attempt to build a better fly trap

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During the past four years, I have been collecting Drosophilidae and other flies from my backyard while observing the relative attractiveness of various baits to the flies. During this time, I have been using traps made from plastic soft drink or water bottles (Hribar 2020, 2024). Those traps worked well but there were some problems recovering the trapped flies. If there was an interior funnel in the trap then the small flies oftentimes fell into the small crevice where the funnel joined the outer bottle. This made it difficult to extract the flies without damaging them. On the other hand, if there was no interior funnel the flies invariably fell into the liquid bait leading to discoloration and sometimes partial dissolution of the specimens, especially when vinegars were used as baits. Another problem I encountered was when flies had mites attached and the mites would fall off of the flies into the liquid bait.

I decided to construct a trap after I was inspired by the design published by Piñero & Foley (2018). I bought a package of 8 oz. plastic cosmetic jars, purchased from Amazon.com. I also bought a package of nylon hosiery, the smallest length, the ones that cover only the foot. A spare cup hook (the kind with the metal blade that prevents accidental dislodgement of the cup) and a hot glue gun were used during construction, as were a handheld drill and a drill press.

The first model of the trap consisted of two jars, two lids, nylon, and the cup hook (Fig. 1). Holes (1/2 inch diameter) were drilled into the lids (Fig. 2), nylon glued to the top of one lid (stretch it tightly before gluing it down) and the lids glued together (Fig. 3). Four small holes (3/16 inch diameter) were drilled near the opening of one of the jars (Fig. 4) and then the cup hook was threaded into the other end of the jar with the holes (make sure to drill a pilot hole before doing this step). When the two jars were screwed onto the lids this made a double-chambered device that was easily hung from a clothesline. I placed about a half inch of Concord grape juice in the bottom jar and hung it near my composter (Fig. 6). After a week, I examined it and found no flies, although the juice had grown a spectacular white flocculence. I washed the jar and refilled it with juice, this time filling the bottom jar with as much juice as it could hold (Fig. 7). Two days later, there were flies in the upper chamber and the juice was turning color. I wondered whether the size of the hole in the lids was a contributing factor to the small number of flies collected, so I had a larger hole (1 ¾ inch diameter) cut in two more lids and again put nylon between the two lids (Fig. 5). (Warning: the lids will become very hot as the large hole is cut with the drill press. Use something other than your bare hands to hold the lids.) I rebaited the trap, again filling the bottom jar with as much juice as it could hold. I rechecked the trap after two days. There was a clear difference between the number of flies collected in the trap with holes of different sizes (Table 1).

Based on this very small set of data, it would appear that the size of the hole in the lids is important, as is the proximity of the juice bait to the hole in the lids. All specimens collected in the trap were in excellent condition. No *repleta* group flies were collected, so I don't know how the mites would have fared in this trap but I would guess that they would be in excellent condition as well. One drawback of this trap is that a lot more liquid bait has to be used. Eight ounces is a cupful, whereas in the traps made from bottles only two or three tablespoons were needed.

Fig. 1. First model ready for bait and deployment.

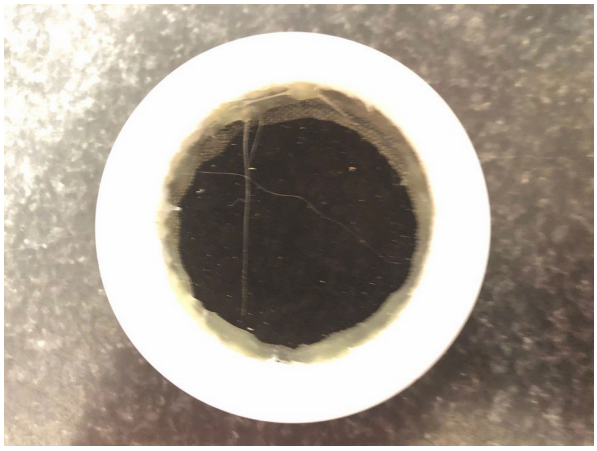

Fig. 2 (top left). Holes in lids with nylon sandwiched in between. **Fig. 3** (top right). Jar lids glued together. **Fig. 4** (bottom left). Access holes in capture chamber. **Fig. 5** (bottom right). Second model of the double lid with larger hole in lids.


Fig. 6 (left). First deployment of the first model with grape juice bait. **Fig. 7** (right). Second deployment of first model with more juice as bait and some captured flies.

Table 1. Insects collected in cosmetic jar trap baited with Concord grape juice.

	Date	
Insects	13–15 March 2024	15–17 March 2024
African Fig fly	1	4
Other Drosophilidae	12	73
Phoridae	2	1
Lonchaeidae	0	1
Psocoptera	1	0
Parasitic wasp	0	4

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Flying in the Cayman Islands

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The Cayman Islands (hereinafter referred to as the 'islands') is a British Overseas Territory remotely lying south of Cuba and northwest of Jamaica. The islands are located on the southern margin of the North American tectonic plate; specifically, on the Cayman Ridge, which forms the northern margin of the Cayman Trough. This trough is 100–150 km wide and precipitously drops off to a depth of 6000 m. The movie, *The Abyss*, was partially filmed at this trough.

The country is an isolated, three-island archipelago. Grand Cayman (197 sq km, 18 m at its highest point), and the sister islands Cayman Brac (38 sq km, 43 m) and Little Cayman (28 sq km, 12 m), occupy a combined total area of only 78 sq km. Except for the sheer bluffs at the east end of Cayman Brac, the islands are considerably flat. The current population of all three islands is approximately 70,000, of which, around 36,000 are expatriates on work permits.

The islands are best known for tourism and as a major international financial centre – as well as its 'infamy' in Hollywood and novels as an off-shore jurisdiction for hiding money. Much lesser known is that the islands are part of the Caribbean Islands Biodiversity Hotspot, which is one of the most critically endangered hotspots in the world (https://canari.org). The United Kingdom government has recently shown increased interest in identifying and protecting the invertebrate biodiversity in its overseas territories, including these islands.

Brunt and Davies (1994) provided details of the islands' biogeography, as well as both the terrestrial and marine natural history, in 25 chapters authored by 31 contributors.

Davies and Brunt (1994) summarised the scientific studies that had been conducted in the islands, beginning in the mid to late 1890s. The insect fauna was first significantly studied during the historic, four-month-long, Oxford University Expedition of 1938. Flora and fauna from all three islands were documented, but mainly from Grand Cayman. Numerous new species of insects, including some endemics, were recognized from this material. And new endemic species continue to be described from the 1938 material, for example: a leafcutter bee (Genaro, 2003), a digger bee (Vivallo, 2014), and a cossid moth (Yakovlev, 2020).

The next major scientific study that included insects was the four-and-a-half-week-long Royal Society – Cayman Islands Government Expedition of 1975, conducted mainly on Little Cayman (Stoddart and Giglioli, 1980). Dr. Richard R. Askew was the lead entomologist. Askew has a particular interest in Hymenoptera – especially Chalcidoidea – as well as Odonata, and Lepidoptera (e.g., Askew and Stafford, 2008). Dr. Peter Fitzgerald was his assistant, who, at the time, was a Ph.D. candidate at the Cayman Islands government's Mosquito Research and Control Unit (MRCU). Askew (1980, 1994) summarised the insect fauna known to be in the islands. I am in contact with both Askew and Fitzgerald.

Based on what is in the collections that I have examined, what I and others have collected, and a continuing search of the published literature, there are at least 258 families of insects in 19 orders

known to be in the Cayman Islands. This includes at least 58 known endemic species (a little over half are Coleoptera) and 7 known endemic subspecies. Not bad for small, flat pieces of rock in the middle of the ocean!

But let me rewind: I am not a Dipterist. I am, historically, a hymeopterist – but with a 'touch' of dipterology in my *M.Sc*. research – specifically in Chalcidoidea (Coote and Ellis, 1986a, 1986b; Coote, 1994; Coote, 1995; Coote, 1997; Schauff, LaSalle, and Coote, 1997). So then, how did I end up submitting this note to the *Fly Times*?

I have been spending around half of every year in Grand Cayman since 2017. After having left an entomological life for nearly 30 years, I have spent part of the last four years as a volunteer with the National Trust for the Cayman Islands (NTCI), on top of my regular day job. They have a small insect collection (~1,000 specimens) in Cornell drawers in a professional cabinet. I was asked by the NTCI in 2020, as a volunteer, to curate their collection and collect more specimens for it.

In 2021, I 'discovered' fellow on-island entomologist, Robyn Tourle (also a hymenopterist), and together and with other locals who started before us (e.g., Christine Rose-Smyth, Ann van B. Stafford, Peter Davey), we have been documenting the insect biodiversity in these islands. So, I went from being a long-ago hymenopterist to being a generalist in order to create a national insect collection, which necessarily includes Diptera. Given that I have added so many fly families to the collection, I thought it may be of interest to some dipterists to report on my findings, so far.

I have, to date, pinned/pointed over 2,500 specimens in 15 orders and 75 families – including an order not previously recorded from the islands (based on an expert to whom I showed my photos): Zoraptera. I have collected by hand, and with baits, black lights, incandescent lights, Malaise traps, and New Jersey light traps. The New Jersey light traps are being run by the MRCU, from which I have extracted 12 families of flies, in addition to mosquitoes, of course.

Figures 1–8 show some examples of collecting habitats in the islands. And there are many more, for example: roadside vegetation, forest edges, vacant weedy lots, ironwood forest, ponds, agricultural lands, etc.

Fig. 1. Boardwalks and trails in mangroves.

Notably, I ran two Malaise traps for the Global Malaise Trap Program (GMP) for 12 consecutive months at two dry forest locations. I have yet to raise the funds needed to send the samples to the Centre for Biodiversity Genomics (CBG) at the University of Guelph, Ontario, Canada, to have the thousands of specimens identified. New species and new geographic distribution records will undoubtedly be discovered in this material.

Fig. 2. Dry, mixed forests with seasonally flooded karst depressions. **Fig. 3.** Urban gardens. **Fig. 4.** Dry, rocky shrublands. **Fig. 5.** Seaside and bluff vegetation. **Fig. 6.** Mixed, sparse forests with karst substrates. **Fig. 7.** Dry, secondary forests. **Fig. 8.** Moist, weedy, shrubby areas on forest edges.

As for Diptera, the NTCI collection housed 111 specimens (plus an uncounted number of cecidomyiids in a capsule) in 11 families before I started collecting. Of these, 78 are ephydrids that were collected and identified by W.N. Mathis. So far, I have added an additional 27 Diptera families to the collection, represented by 663 specimens, which includes 99 unidentified Brachycera and 10 unidentified lower flies. I don't know how many new family or new geographic distribution records this material represents for these islands.

There are three known (at least by me) endemic species of flies in these islands: the asilid *Efferia caymanensis* (Scarborough, 1988), the drosophilid *Drosophila endobranchia* (Carson and Wheeler, 1968), and the stratiomyid *Brachyodina caymanensis* (Woodley, 2015). *Efferia caymanensis* is the only species of the genus *Efferia* in the West Indies that belongs to the *staminea* group (Scarborough and Perez-Gelabert, 2008; 2009), and *D. endobranchia* evolved to establish a residence on and in two species of gecarnoid land crabs (Carson, 1974; Stensmyr, et al., 2008). And there is one known endemic subspecies of Psychodidae: *Micropygomyia* (*Lutzomyia*) *cayennensis braci* (Lewis, 1967).

And there are, of course, many species – both native and invasive – of Culicidae!! Mosquitoes – known locally as 'mozzies' – have been a historic problem due to the extensive, mangrove breeding grounds. Papers published about the 1938 and 1975 expeditions, and other publications and articles since then, confirm this reality. The government created the MRCU in 1965 to combat the situation, with Dr. Marco Giglioli as the first Director. I won't go into details on mosquitoes or the MRCU, other than to point out that, in 1974, one MRCU light trap, during one night in Bodden Town, Grand Cayman, captured 793,103 mosquitoes (Davies, 1994)!

In 2021, I proposed to the NTCI for the creation and international recognition of a national insect collection. Finally, in March of 2024, the NTCI collection was designated as the Cayman Islands Natural History Collection (CINHC). The CINHC includes not only the insect collection, but also arachnids. For example, I have collected 404 spiders and three others have collected an additional 180 specimens. Based on my photos, an expert at the CBG told me that this material represents "easily 50 new species". The CINHC also includes other invertebrates (including an endemic species of scorpion), the herbarium, fossils, and animal bones. I have registered the CINHC name with the Insect and Spider Collections of the World website at the Bishop Museum, Hawaii.

The preliminary reference list below includes papers – and the relevant references listed therein – that specifically refer to fly species known to be in the Cayman Islands – in either their title, abstract, or text. I have not included the numerous papers on Culicidae. This list is not otherwise comprehensive: it only represents what I, and others, have found to date and where we can confirm that the islands are named in them. Undoubtedly, there are many other publications to add to this list. If any reader of this note can provide more references that specifically name Cayman Islands species, then please let me know.

Finally, I list below the 45 families of Diptera known to be in the Cayman Islands – at least what I know to be there. If any reader of this note can provide additional Cayman Islands records to this list, please let me know. The higher classification is how this humble hymenopterist understands it! The family names are simply listed alphabetically in our database, not phylogenetically, because of our non-entomological, 'local' audience in the islands. The + sign means that that family is known to be in the islands but has not yet been added to the collection.

Suborder BRACHYCERA
Infraorder MUSCOMORPHA
- *Superfamily* ASILOIDEA: Asilidae, Bombyliidae, Therevidae
- *Superfamily* EMPIDOIDEA: Dolichopodidae, Empididae+, Hybotidae

Unranked CYCLORRHAPHA
- *Superfamily* PHOROIDEA: Lonchopteridae+, Phoridae
- *Superfamily* SYRPHOIDEA: Pipunculidae, Syrphidae

Section SCHIZOPHORA
Subsection CALYPTRATAE
- *Superfamily* MUSCOIDEA: Muscidae
- *Superfamily* OESTROIDEA: Calliphoridae, Sarcophagidae, Tachinidae
- *Superfamily* HIPPOBOSCOIDEA: Hippoboscidae, Streblidae+

'Subsection' ACALYPTRATAE
- *Superfamily* CARNOIDEA: Canacidae, Chloropidae, Milichiidae
- *Superfamily* EPHYDROIDEA: Drosophilidae, Ephydridae
- *Superfamily* LAUXANIOIDEA: Lauxaniidae
- *Superfamily* NERIOIDEA: Micropezidae
- *Superfamily* OPOMYZOIDEA: Agromyzidae, Asteiidae+, Clusiidae
- *Superfamily* SCIOMYZOIDEA: Sciomyzidae, Sepsidae
- *Superfamily* SPHAEROCEROIDEA: Sphaeroceridae
- *Superfamily* TEPHRITOIDEA: Lonchaeidae, Platystomatidae, Tephritidae, Ulidiidae

Infraorder STRATIOMYOMORPHA: Stratiomyidae
Infraorder TABANOMORPHA: Tabanidae
'*Suborder*' LOWER DIPTERA ('nematocerous' families)
Infraorder BIBIONOMORPHA
- *Superfamily* SCIAROIDEA**:** Cecidomyiidae, Keroplatidae, Mycetophilidae, Sciaridae

Infraorder CULICOMORPHA
- *Superfamily* CHIRONOMOIDEA: Ceratopogonidae, Chironomidae
- *Superfamily* CULICOIDEA: Culicidae

Infraorder PSYCHODOMORPHA: Psychodidae, Scatopsidae
Infraorder TIPULOMORPHA: Tipulidae

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First record of gynandromorphy in the genus *Rhipidia* (Diptera: Limoniidae)

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Abstract: We record the first observation of gynandromorphy in the genus *Rhipidia* (Diptera: Limoniidae), in the species *R. (R.) willistoniana* (Alexander, 1929), from the island of Martinique in the West Indies. The adult crane fly shows polar gynandromorphy of the antenna and genitalia.

Introduction

Anomalous forms of sexual differentiation are gynandromorphy, intersexuality, and hermaphroditism (de Jong 1997, Oosterbroek & de Jong 2001). Gynandromorphs are individuals in which certain parts of the body show fully developed male characters, while other parts are entirely female, in a bilateral, polar, or oblique way (Hall 1988, Werner 2012); intersexes show male as well as female structures in their genitalia; hermaphrodites are individuals that externally show either male or female features but can produce both spermatozoa and eggs. All three forms have been documented in a large variety of organisms (mammals, reptiles, birds, arthropods...).

The first intersex in Tipuloidea is mentioned in Edwards (1938, p.12), having observed in the genus *Molophilus* Curtis (Limoniidae, Chioneinae) 'rare abnormal [male] specimens in which the cerci are present as in the female [while] the remaining parts of the hypopygium being normal'. Later, Starý (1969 p. 141) mentions a specimen of *Dicranomyia* (*Numantia*) *fusca* (Meigen) (Limoniidae, Chioneinae) with genitalia that on the left side show well-developed male genital organs, and on the right-side female organs, although not completely developed (Fig. 3b). This description does fit intersexuality as well as bilateral gynandromorphism. Geiger (1983) discusses intersexuality (in his words 'gynadromorphe de type inhabituel') based on a specimen of *Dicranomyia* (s. str.) *mitis* (Meigen) with both reproductive organs present at the end of the abdomen (Fig. 3c).

The first anomalous sexual form in Tipulidae was described and illustrated by Young (1987) belonging to *Tipula* (*Papuatipula*) *koiari* Young (Fig. 3a). This specimen does possess a well-developed male-like left wing and a brachypterous female-like right wing with, in addition, one cercus is present on the right side, and a vaguely defined male hypopygium on the left side, and both hypovalves being present on the ventral side. Although de Jong (1997) considers this a case of intersex, the presence of male and female characters arranged on both sides of the body (right, female characters; left, male characters) suggests that this specimen shows a bilateral gynandromorphy as well. Finally, de Jong (1997), after examination of the intersex terminalia of two other species of Tipulidae, *Nephrotoma aculeata* (Loew) and *N. cornicina* (Linnaeus), could corroborate the homology of the posterior extension of male sternite 8 and the female hypogynial valves, and the homology of the male gonocoxite and gonostylus with the posterior process of female sternite 9. A third intersex case in *Nephrotoma*, in *N. guestfalica* (Westhoff), is mentioned in Oosterbroek & de Jong (2001).

Material
Limoniidae Rondani, 1856
Subfamily Limoniinae Rondani, 1856
Genus *Rhipidia* Meigen, 1818
Species *Rhipidia (Rhipidia) willistoniana* (Alexander, 1929)

Specimen studied. Martinique, Trace des Jésuites (haut) (Le Marigot), Réserve Biologique Intégrale Pitons du Carbet, 23/01/2018 - 30/01/2018, 389 m.a.s.l., yellow pan trap (YPT), M. Pollet leg., 14°44'57.3"N, 61°05'08.4"W (primary forest), sample code MQ/2018/PdCo3/TracJes1/SS2/YPT1-10. The specimen is housed in the Museu de Ciències Naturals de Barcelona (MCNB), preserved in 70% ethanol with the inventory number MZB 2021-3739.

Among the more than 22,000 craneflies examined from Martinique (Mederos et al., 2023), only one gynandromorph specimen was found, belonging to the most abundant species on the island, *Rhipidia* (*R.*) *willistoniana* (Alexander). Males of this species possess well developed branched flagellomeres (Fig. 1a), and a complex hypopygium (Fig. 1e, f). Females possess unbranched flagellomeres with a serrate appearance (Fig. 1b), and a usually shaped ovipositor (Fig. 1c, d).

The gynandromorph specimen of *R.* (*R.*) *willistoniana* studied here (Fig. 2) shows a morphology that corresponds with polar gynandromorphy, with the anterior and posterior parts of the opposite sex (Fig. 2d). Specifically, the specimen shows male features anteriorly (with fully branched flagellomeres, Fig. 2a) and female features posteriorly (ovipositor, Fig. 2b, c). It is unclear what the effect of this condition has on the fertility and reproduction of the studied specimen. Mahmood & Bajwa (2006) studied a case of gynandromorphism in *Culex pipiens* Linnaeus, 1758 with anterior male and posterior female traits, which revealed three normal spermathecae (and other structures), suggesting a fertile individual. Our specimen has a generalized deformation of the ovipositor, with an apparent fusion of the hypogynial valves at its apical end and the presence of a single cercus, also strongly deformed (Fig. 2b, c). This condition could potentially have a negative effect on reproduction, given the impossibility of effective copulation with another specimen. In addition to the deformation of the structure, there is a marked reduction in the length of the hypogynial valves. For all the above, this represents the first case of gynandromorphism in genus *Rhipidia*.

Acknowledgments
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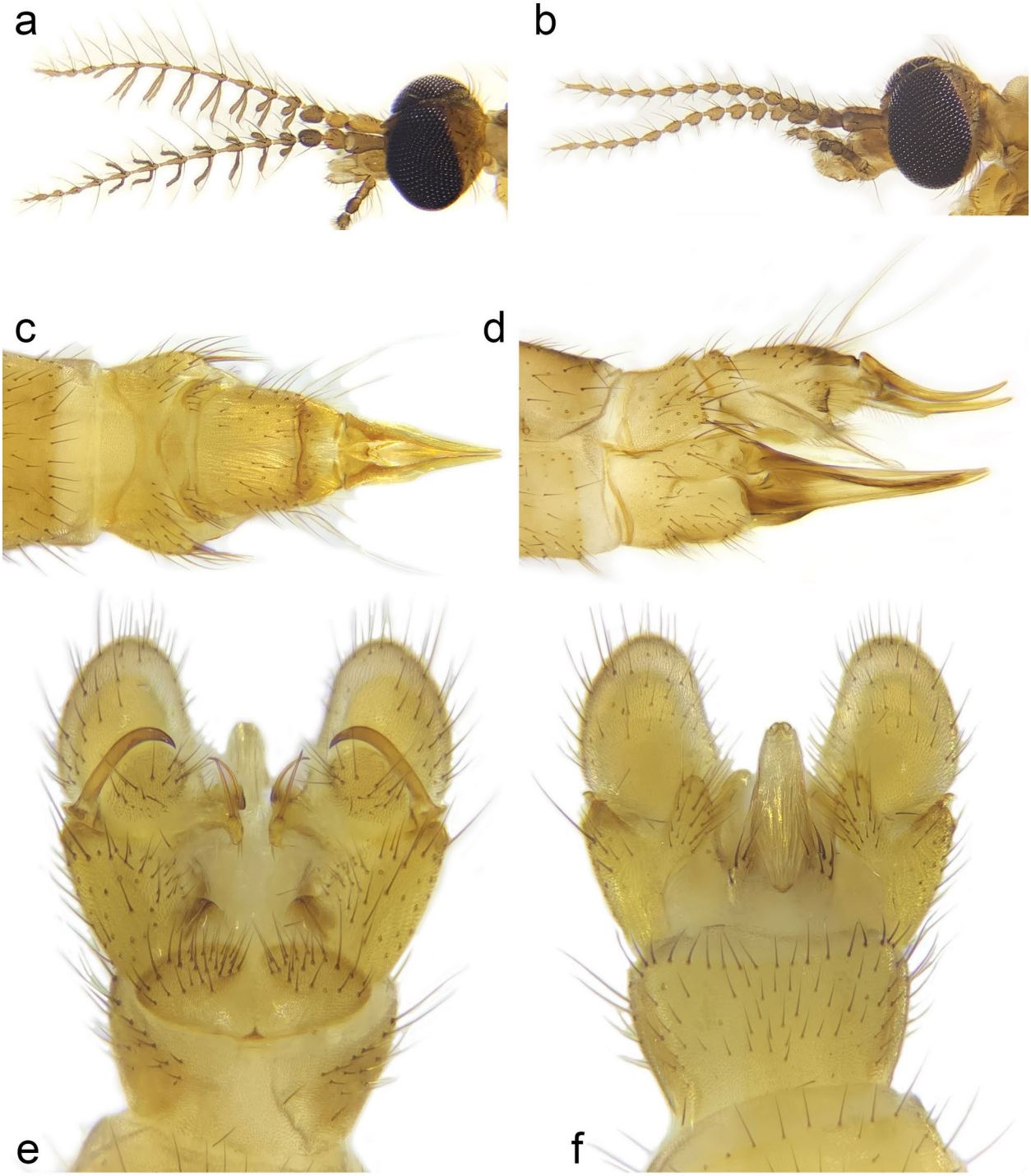

Fig. 1. *Rhipidia (R.) willistoniana*. Head and antenna in lateral view, of normal male (a) and female (b). Ovipositor in dorsal (c) and lateral view (d). Hypopygium in dorsal (e) and ventral view (f).

Fig. 2. *Rhipidia (R.) willistoniana*, gynandromorph specimen. Head and antenna in dorsal view (a). Ovipositor in lateral (b) and dorsal view (c). Habitus, dorsal view (d).

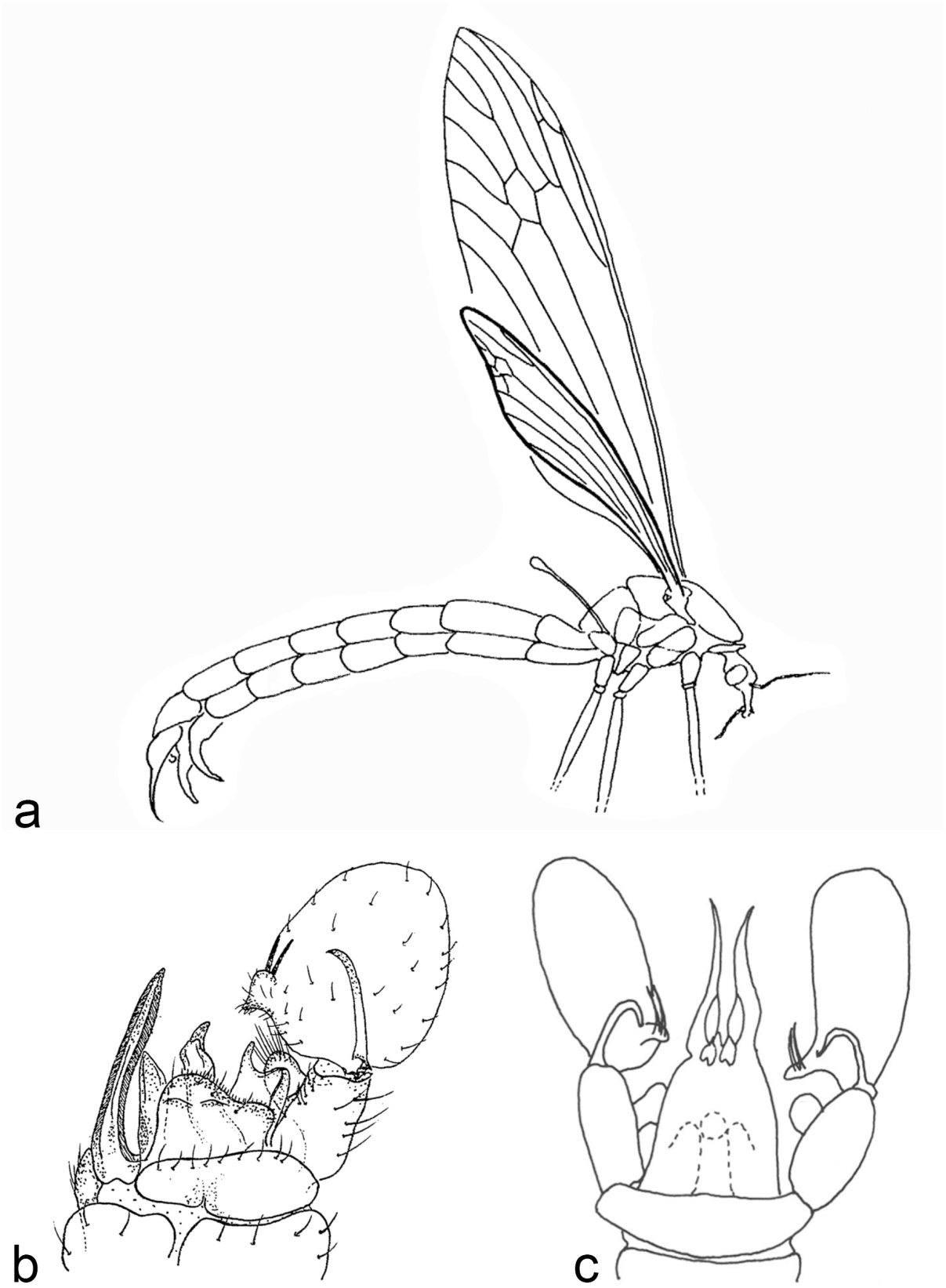

Fig. 3. *Tipula* (*Papuatipula*) *koiari* (a, after Young 1987); *Dicranomyia* (*Numantia*) *fusca* (b, after Starý 1969); *Dicranomyia* (s. str.) *mitis* (c, after Geiger 1983).

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Mounting crane flies from alcohol: an easier way

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I am trying to finish up several projects and one of these necessitates pulling crane flies out of alcohol and then mounting them for identification and eventual museum storage. The specimens in this case have been sitting in alcohol for almost three decades and so have become more fragile. Crane flies are far better preserved dry: pinned, glued to the side of a pin, or glued onto points.

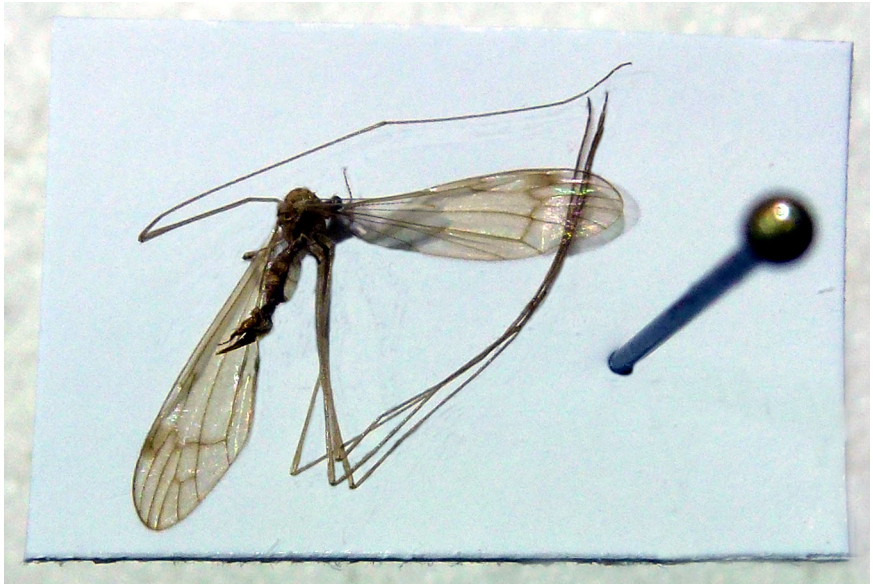

Fig. 1. A female *Dicranomyia* floated onto a piece of photographic paper.

In a previous issue of *Fly Times*, issue 69: 3–4 (2023), I wrote about how I had successfully unfurled the wings from mounted crane flies that had been previously preserved in alcohol. A wing was cut off and floated onto a piece of photographic paper that could be trimmed and then pinned beneath the rest of the specimen for posterity. It occurred to me that the same technique could be used for handling the entire specimen, not just one wing. I have experimented with floating the smaller crane flies onto pieces of photographic paper, encouraging the wings and legs to lie flat. Sometimes the wings adhered tightly to the paper, holding the rest of the specimen in place. These flies could be left on the paper and pinned (Fig. 1). The rear end of the abdomen usually is free for dissection if needed. Sometimes the entire specimen could be easily lifted off the paper and then glued to a point.

Processing specimens from alcohol by floating them on small pieces of photographic paper is far more efficient than floating them on microscope slides, as I had done before. Small pieces of photographic paper are easier to handle than microscope slides in the petri dishes that I use for this procedure. More concerning, the wings, especially of smaller crane flies, tend to stick to the slide as the moisture evaporates. Specimens had to be carefully monitored so that the wings could be gently lifted off the slide just before they were completely dry. In the process of lifting the wings, using the smooth surface of the length of the pin, they often curled up obscuring the venation.

Photographic paper dries well and remains almost flat after being submersed in alcohol. We shall have to see, however, whether there is any deterioration in either the paper or specimens over time.

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Creation and development of a mass-rearing facility for sterile insect techniques to control mosquitoes at the Anastasia Mosquito Control District

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For more than 60 years, sterile insect technique (SIT) has been developed and successfully implemented as a sustainable area-wide integrated pest management program against several pest and vector species of medical and veterinary importance, including screwworms, tsetse flies, and mosquitoes (Benedict 2022, Morreale et al. 2022). SIT is a species-specific and environmental-friendly technology for the control of mosquitoes with positive public acceptance worldwide (Benedict 2021, Sypes et al. 2021).

In recent years, mosquito-borne diseases have emerged, resurged, and caused major global epidemics and public health problems, such as the outbreaks of malaria in 2023, Chikungunya in 2014, Zika in 2016, and dengue fever in Florida. Due to a lack of vaccines and increased insecticide resistance, control of mosquito-borne diseases has been facing major problems and challenges. *Aedes aegypti* Linnaeus is a container-inhabiting mosquito and a major vector of yellow fever, dengue, Zika, and Chikungunya. *Aedes aegypti* was a predominant species in St. Augustine, Florida before the 1990s and this species gradually disappeared after the invasion of *Aedes albopictus* Skuse in the 1980s. The last recorded collection of *Ae. aegypti* in St. Augustine was 1991 (Betts 1994). After *Ae. aegypti* disappeared for 25 years, it reappeared in downtown St. Augustine in early 2016, then continued to establish itself throughout St. Johns County (Dixon et al, 2020). When Anastasia Mosquito Control District (AMCD, https://www.amcdsjc.org) found the resurgence of this species, the district quickly collaborated and worked with the Department of Health (DOH) of St. Johns County to launch an eradication program and conducted the inspection and education about prevention and control through a door-to-door, street by street weekly campaign lasting for several months. However, AMCD's eradication efforts for *Ae. aegypti* failed (Xue et al. 2020). Therefore, AMCD has consulted and collaborated with federal agencies, universities, and industry partners to identify new control tools/methods. Luckily, scientists from the University of Florida (UF, Gainesville, FL), USDA/Center for Medical, Agriculture, and Veterinary Entomology (CMAVE, Gainesville, FL), and MosquitoMate (Lexington, Kentucky) assisted and collaborated with AMCD to control this species of mosquitoes. In 2016, the AMCD Board of Commissioners approved the proposal and collaboration with D. Hahn at UF and K. Linthicum at USDA/CMAVE to adopt SIT for control of *Ae. aegypti* in St. Augustine. The City of St. Augustine was one of the testing sites for SIT evaluation grants funded by the Florida Department of Agriculture and Consumer Service (FDACS) to D. Hahn and K. Linthicum from 2017-2018, 2018-2019, and 2020-2021. Later, the Centers for Disease Control and Prevention (CDC) and Florida DOH funded D. Hahn, K. Linthicum, and R.D. Xue for the operational control of *Ae. aegypti* by SIT in St. Augustine for 2 years (2020-2022). Also, in 2017, AMCD's Board of Commissioners approved the proposal to collaborate with MosquitoMate to release *Wolbachia*-infected male mosquitoes for evaluation in St. Augustine, Florida. MosquitoMate and AMCD did the field testing in 2018 and 2019. Both methods showed a 70–90 % population reduction after the release of SIT male mosquitoes and *Wolbachia*-infected male mosquitoes (Sypes et al. 2021, Chen et al 2022). During the mass field trials using the two new methods, more than 80% of St. Augustine residents in the evaluation area accepted the new methods after surveys were conducted (Sypes et al. 2021).

Since the completion of the successful SIT projects, and the benefits gained from the collaborations with federal agencies, universities, and industry (Xue et al. 2016, Xue & Qualls 2022), AMCD started to campaign to build our SIT mass-rearing facility. One of the biggest issues faced by industry-producing SIT mosquitoes is the shipping of treated mosquitoes from other cities to their release locations. Having an SIT facility in Northeast Florida could allow for easier shipping to areas experiencing *Ae. aegypti* populations along the East Coast. On 14 May 2020, the AMCD Board of Commissioners approved the SIT funding proposal and requested the Forida State legislature to match AMCD's funding for the development of the SIT program. The proposal included letters from AMCD Board's Chairperson Jeanne Moeller and Executive Director R.D. Xue to the State Senators and Representatives, and the St. Johns County's Administrator. The proposal also included flyers about SIT and *Wolbachia*-infected mosquitoes (MosquitoMate's ZAP mosquitoes), SIT trial results in St. Augustine reported by D. Hahn from 2017–2019, evaluation reports from S. Dobson from MosquitoMate for 2018–2019. A draft building design, floor plan, and budget were also presented. Support letters were also included from R. Pereira, Head of the Insect Pest Control Section, Joint Food Agriculture Organization /International Atomic Energy Agency (FAO/IAEA), Division of Nuclear Techniques in Food and Agriculture, FAO/United Nations, J. Conlon, Technical Advisor of the American Mosquito Control Association, USDA/CMAVE's Center Director K. Linthicum, UF/Dept. of Entomology and Nematology's D. Hahn, MosquitoMate's S. Dobson, former SIT pioneer D. Dame, and six county-based mosquito control organizations in northeast Florida. The six supportive representatives from local mosquito control programs were B. Allen, Entomologist from Jacksonville MCD, P. Jiang, Director from the City of Gainesville MCD, B. Jackson, Director from Bradford County Public Works, M. Wasdin, Director from Putnam County Sanitation Department, S. Barlett, Director from Volusia County MCD, and M. Positano, Director from East Flagler MCD.

On 17 June 2021, the AMCD Board approved the release of the request for proposal (RFP) for the SIT mass-rearing facility. On 12 August 2021, the Board accepted and approved the RFP submitted by Harrell Construction for the SIT building design (Fig. 1) and building the SIT building at a contract cost of $2,099,361. On 6 June 2022, the Board approved the final contract with Harrell Construction to build the SIT mass-rearing facility. The SIT building was planned to be in operation by the end of March 2023, but due to COVID-19 supply chain issues construction has stalled with a completion date by the middle of 2024 (Fig. 1).

Fig. 1. SIT building floor plan (left bottom) and the building (right), St. Augustine, Forida, USA.

The agreed building layout divides the 6,000 s.f. building into two large areas: the 1st area includes 4 offices, a small break/conference room, and a new molecular biology laboratory; the 2nd area

includes 4 mass rearing rooms separated by a center separation room. Also included in this area is a radiation treatment room with a Rad Source irradiator (Atlanta, GA) (Fig. 2). The four mass-rearing rooms can serve as larval rearing (Fig. 3), pupal sex-separated room (Fig. 4), and adult-holding rooms depending on setup. In addition, a washing/cleaning room and a storage room are included in the SIT space. AMCD plans to run in full operation starting in the middle of 2024. In the beginning, AMCD will focus on mass rearing and releasing radiated *Ae. aegypti* at 250,000–1 million males/week and mass-rearing *Aedes albopictus* infected with *Wolbachia* at 250–500,000 males/week. In the meantime, we will collaborate with universities and industry at national and international levels to explore/study/develop SIT for control of the WNV vector *Culex* mosquitoes, EEE vector *Culiseta* mosquitoes, malaria-vector *Anopheles* mosquitoes, and salt marsh mosquitoes. After competencies are gained, AMCD plans to increase mass production and provide SIT-treated male mosquitoes to other county programs in northeast Florida per request.

Fig. 2. Radiation machine for irradiating mosquitoes at AMCD's mass rearing facility, St. Augustine, Florida.

Fig. 3. Larval mass rearing equipment (left) and pupal sex separator (right) in the SIT building.

AMCD has used its experience in the creation and development of an SIT facility for the control of vector mosquitoes and will adopt this technique as one component of the integrated mosquito management program. Although the cost and sustainability of the operation of SIT programs have been a concern (Benedict 2021), the species-specific and environment-friendly method will play an important role in the successful control of mosquitoes and mosquito-borne diseases. This technique and development of the mass raring facility will benefit the citizens of St. Johns County and the people of Northeast Florida. This is part of the stated AMCD's mission and goals which would like to be recognized as one of the leaders in the field of mosquito control, applied research, and education in the state and nation.

On 24 August 2023, US Congressman John Rutherford and his office staff took a tour of AMCD's Disease Vector Education and SIT Facility (Fig. 6). AMCD held a dedication of SIT on 18 January 2024 (Figs 4, 5), and a grand opening ceremony for the Disease Vector Education Center and SIT mass rearing facility on 26 March 2024 (Fig. 7), before the 19th Annual Arbovirus Surveillance and Mosquito Control Workshop.

Fig. 4. Commissioner/Vice Chairperson Mrs. Martha Gleason spoke at the dedication ceremony of the SIT facility, on 18 January 2024.

Thanks, and appreciation for the support from AMCD's former and current Board of Commissioners, staff, many peers/colleagues, Harrell Construction Company, CDC/DVBD, University of Florida, USDA/CMAVE, MosquitoMate, FDACS, FDOH, and 6 regional mosquito control programs from the northeast and north central Florida, and the citizens of St. Johns County, Florida.

Fig. 5 (top row). Commissioner Mrs. Catherina Brandhorst (right) and two former Commissioners Mrs. Jeanne Moeller (middle), and Mr. Donald Girvan (left) on the SIT building dedication ceremony, 18 January 2024, with plaque to left. **Fig. 6** (bottom left). Congressman John Rutherford and his staff visiting AMCD's SIT mass-rearing facility on 24 August 2023. From right: Whitney Qualls, the office staff of the congressman, Trish Becker (commissioner), John Rutherford (congressman), field director of Congressman, and Steve Peper. **Fig. 7.** Dr. Rui-De Xue (right) & Mr. Richard Weaver (left) at the grand opening ceremony of the Disease Vector Education Center and mass-rearing facility for SIT for control of mosquitoes, March 26, 2024.

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Systema Dipterorum Version 5.2 – update

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The total number of names – available plus unavailable – in *Systema Dipterorum* (http://diptera.org/) has increased to 245,419 and will in the not-so-distant future surpass a quarter of a million. The number of names keeps growing for both the species-group, genus-group and family-group, but the present update is showing a very small reduction in the number of valid names for both species and genera as compared to the previous update. This is caused in part by taxonomic research resulting in new synonymizations, and in part by various fine-tuning like the discovery of duplicate entries 'hiding' under alternative spellings or authorships.

The current statistics for *Systema Dipterorum* Version 5.2 (posted 15 May 2024) are as follows:

	Total	**Available**	**Taxonomically Valid**	**Valid Extant Spp.**
Species	216,660	210,039	173,951	**169,259**
% Reference linked	86.44%			
% Authority linked	74.08%			
Genus	24,355	20,876	12,710	
% Reference linked	85.66%			
% Authority linked	60.81%			
Family	4,404	2,033	558	

Of the valid species, 2,077 are listed with the Status Line "Unplaced or Nomen Dubium", and perhaps not surprisingly 740 of these are in the family Tachinidae and with the large majority proposed by Robineau-Desvoidy. This category contains a particularly diverse array of nominal species, ranging from poorly described taxa where types are no longer in existence to better-documented ones described from unidentifiable specimens (e.g., maggots or fragments) and awaiting careful revisionary work.

A large amount of 'housekeeping' is still needed, in particular completing the citing of the original publication for each record, as well as providing a link to the authority we have relied on. We cannot stress strongly enough how much we appreciate when users drop us a note when they discover that something is missing, wrong, or misinterpreted. Every so often these small discoveries lead to the finding and improvement of similar or even entirely different issues.

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PHILAMYIANY

Diptera on stamps (7): Syrphidae, Syrphinae

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Syrphidae is one of the best known and most obvious Diptera families, and it is not surprising that hoverflies are depicted more regularly on stamps. The first issue showing a Syrphinae is remarkable because the hoverfly is shown as a useful insect on a Turkish stamp as early as 1981. Surprisingly, this is the only stamp that refers to the benefits of aphidophagous Syrphinae. The stamp from the Azores shows the endemic *Spaerophoria nigra*. *Episyrphus balteatus* is one of the most distributed and dominant hoverflies in Europe and is shown on the wonderful British stamp from 2020. Only the USA stamp from 2001 highlights an ecological connection with a Syrphidae as prey of a carnivorous plant. A philatelistic curiosum is a sheet from the Netherlands with an print of a *Sphaerophoria* female that stretches over four stamps.

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/).

Acknowledgement
Martin Hauser (Sacramento) helped with the identification of the Nearctic Syrphidae.

***Syrphus vitripennis* Meigen, 1822 – Turkey 1981:** *Syrphus vitripennis* Meig [Usefull insects II], 20 + 2½ Turkish lira. – Michel number: TR 2585; stamp number: TR B185.

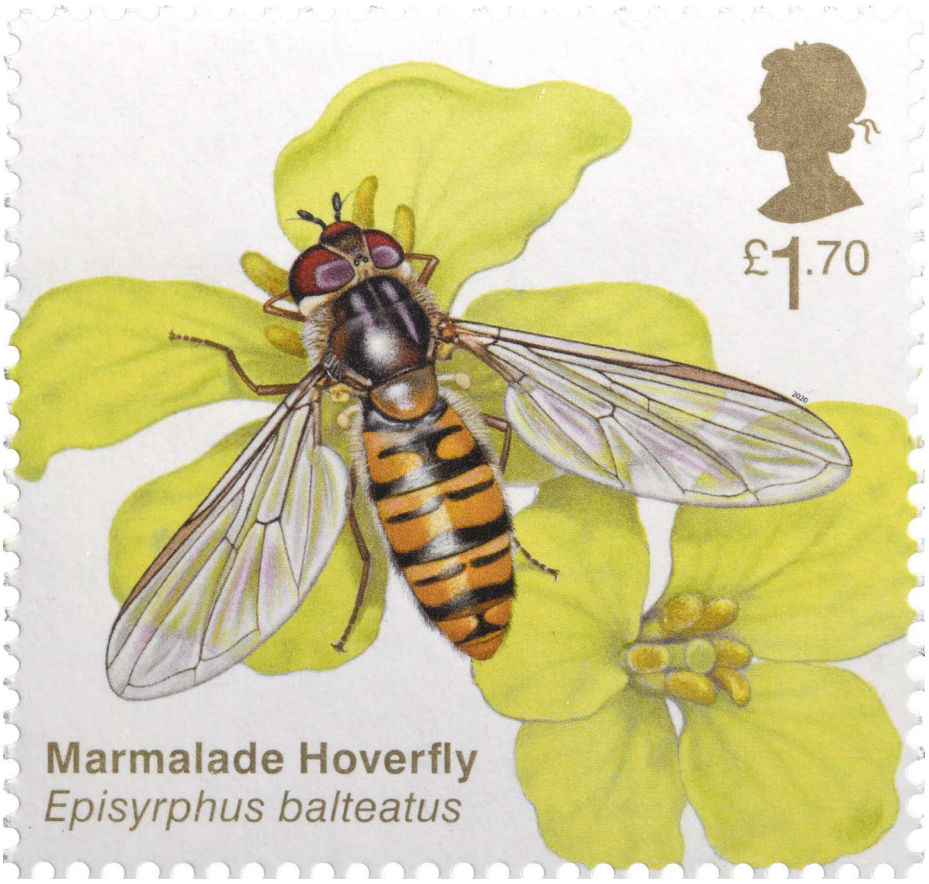
***Syrphus octomaculatus* Walker, 1836 – Britain [Falkland Islands] 1984:** Hover fly, *Syrphus octomaculatus* [Animals (Fauna), Insects], 10 Falkland Islands penny. – Michel number: FK 399; stamp number: FK 396.

***Sphaerophoria nigra* Frey, 1945 – Portugal [Azores] 1985:** *Sphaerophoria nigra* Frey [Insects of the Azores], 40 Portuguese escudo. – Michel number: PT-AZ 370C; stamp number: PT-AZ 350a; imperforated horizontally.

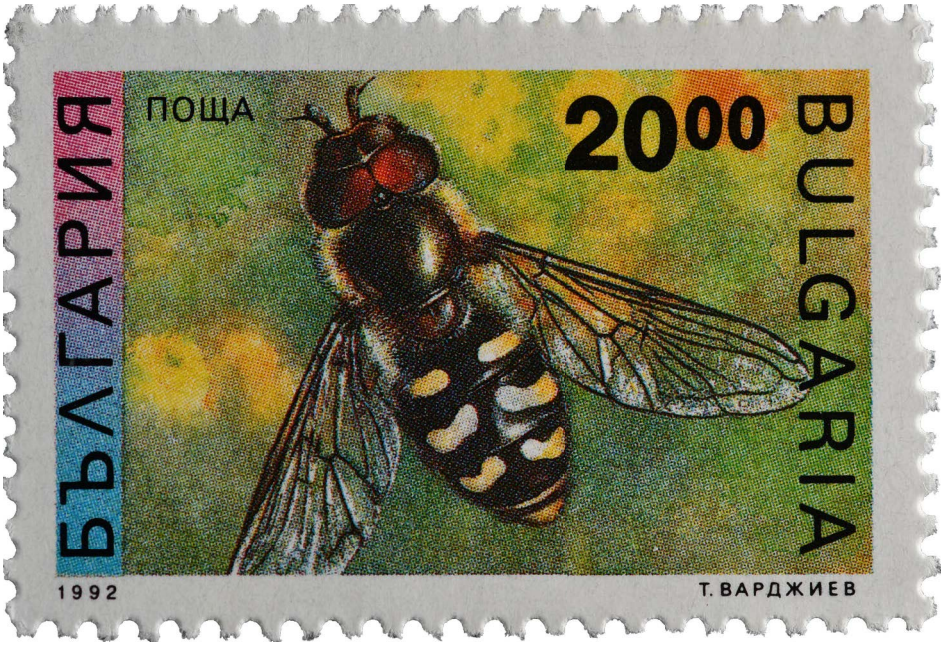
***Chrysotoxum* spec. – Germany 1984:** Schwebfliege [Für die Jugend], 120 + 60 Pfennig. – Michel number: DE 1205; stamp number: DE B619.

***Eupeodes nitens* (Zetterstedt, 1843) – Sierra Leone 1994:** *Metagyrphus* [sic!] *nitens*, 200 Sierra Leonean leone. – Michel number: SL 2986; stamp number: SL 2098.

Syrphini (cf. *Sphaerophoria*) – USA 2001: English Sundew [Carnivorous Plants], 34 United States cent. – Michel number: US 3482; stamp number: US 3531.



***Episyrphus balteatus* (De Geer, 1776) – Britain 2020:** Marmalade Hoverfly, *Episyrphus balteatus* [Brillant Bugs], 1.70 British Pounds. – Michel number: GB 4661; stamp number: GB 4034.



***Scaeva pyrastri* (Linnaeus, 1758) – Bulgaria 1992:** [Insects], 20.00 Bulgarian lev. – Michel number: BG 3999; stamp number: BG 3716.

***Sphaerophoria* spec. – Netherlands 2021:** Grote Klaproos [Beleef de Natuur, De Onlanden], 1° No Face Value. – Michel number: NL 3993; stamp number: NL 1626; sheet.

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DipterART: The fly paintings of Maria Lassnig

Martin Hauser & Stephen D. Gaimari

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Here are three paintings featuring flies by the late Austrian artist Maria Lassnig (1919–2014). She was born in Kappel am Krappfeld in the south Austrian state of Carinthia, with a long career as an artist ending in Vienna at nearly 100 hundred years old. She is known for themes involving body awareness, and had several pieces involving invertebrates, including at least these three on Diptera. Her work is featured in permanent collections at the Museum of Modern Art in New York City, and the Museum Albertina in Vienna, and has been exhibited in many museums around the world. A comprehensive biography for Maria Lassnig is found at https://www.hauserwirth.com/artists/2795-maria-lassnig/. A special thanks goes to Sabine Petri (Stuttgart, Germany), who brought these painting to out attention, while exploring galleries in Austria. She photographed the first and third paintings while they were on display at the mumok (Museum Moderner Kunst Stiftung Ludwig Wien).

Untitled, Undated. Oil on canvas. On loan from a Private Collection.

Ich von einer Fliege umkreist (Me, Encircled by a Fly), c. 1990–1999. Chalk, pencil, and watercolor on paper, 65.2 X 47 cm. Currently for sale via Hauser & Wirth galleries.

Insektenforscher I (Insect Researcher I), 2003. Oil on canvas, 140 × 150 cm. Collection of the Essl Museum Klosterneuburg, Vienna, Austria (part of the Haselsteiner Family Collection, Albertina Museum, Vienna, Austria).

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What's your fly personality?

Charlotte Alberts[1a], Ezra Bailey[2a], Allan Cabrero[1b], Escher Cattle[2b], Teomie Rivera-Miranda[3], & Constance Taylor[4]

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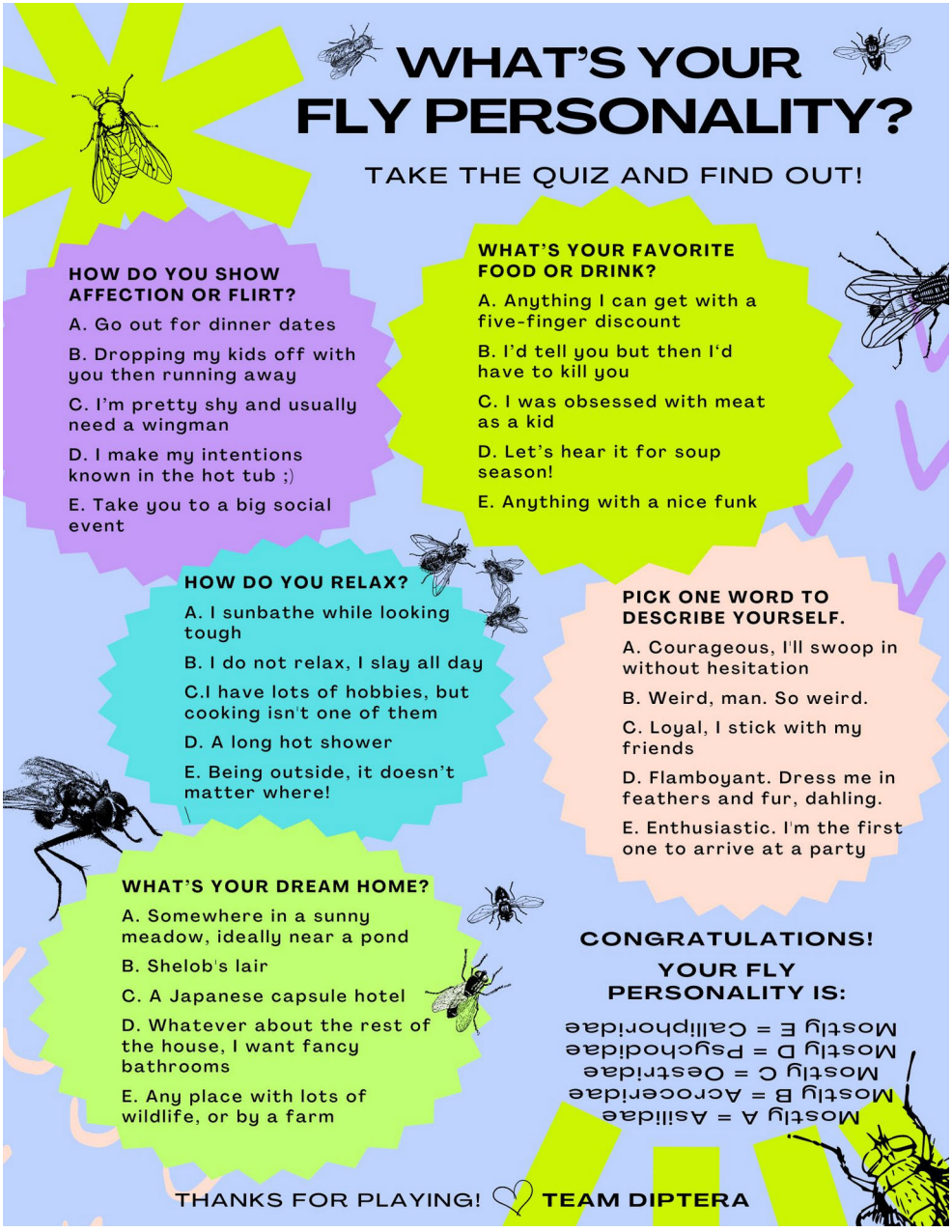

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MEETING NEWS

Updates and final call for registration: The Dipterists Society 18th biennial field meeting, 15–19 July 2024 at the Evergreen State College, Olympia, Washington USA

Barbara Hayford[1] & Andrew Fasbender[2]

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The 18th Biennial Field Meeting of the Dipterists Society will be held 15–19 July at the Evergreen State College (TESC), located in the city of Olympia in Washington State. Registration closes on 30 June with late registration at $600 for participants and $350 for students. Registration includes lodging and breakfasts and dinners. Accommodation consists of apartment suites made up of lockable private bedrooms sharing a common area and bathroom. Participants will also have access to a lab space with stereomicroscopes for sorting and identifying specimens. Please register at https://dipterists.org/field_meetings.html.

Fig. 1. The Longhouse, TESC campus, Fall, 2023, B.L. Hayford.

TESC is located about an hour's drive southwest of Seattle-Tacoma International Airport, a regional hub for the Pacific Northwest serviced by most major airlines. The campus encompasses 400 hectares of coastal forest in the Puget Sound Lowlands. Campus trails allow access to forests, estuaries, streams, and Puget Sound shoreline. The meeting will be held in the beautiful "House of Welcome" (in Quinault, s'g^{w}i g^{w}i ʔ altx^{w}) Longhouse Education and Cultural Center (Longhouse, Fig. 1). We will set up benches at the Longhouse with stereomicroscopes for sorting and identifying specimens near the meeting space for ease of access and to promote collaborative discussions.

The meeting starts on Monday the 15th with participant check-in through the afternoon and an opening presentation following dinner. The 16–18th will consist of field excursions to collecting sites south and west of Olympia as well as in the southern and eastern portions of the Olympic Peninsula during the day, while evenings will host a series of 10-15 minute talks from participants on their research. Friday the 19th will consist of a "goodbye" breakfast and checkout.

Collecting sites include lowland forests, saltwater marshes, prairies, and subalpine habitats representing a range of ecosystems and biotopes in Western Washington. We have permission to collect Diptera from four distinct sites by the Washington Department of Natural Resources, the Washington Department of Fish and Wildlife, and TESC. A brief description of collecting sites follows.

We can collect specimens on TESC campus during the meeting. The campus provides access to South Puget Sound lowland habitats including coastal forests. The north side of the property offers coastal frontage on Eld Inlet of Puget Sound, and there are multiple streams which flow through the campus. Well maintained trails that originate at the meeting venue, the Longhouse, are easily accessible for setting up Malaise traps and black-lighting.

The Chehalis River Surge Plain WDNR Natural Areas Preserve (NAP) is located along the southern boundary of the Olympic Peninsula (Figs 2, 3). The Chehalis River represents the largest watershed wholly contained within the State. This site has three areas with access to coastal forest, wetlands, estuaries, sloughs, and the lower Chehalis River. This NAP contains the largest and best quality tidal surge plain wetland in Washington and is one of the best along the west coast of the lower 48 states. Vegetation communities are characterized by Sitka spruce/red-osier dogwood/skunk cabbage vegetation, ferns, bulrush, willow, sedges, and cattails. Well maintained trails provide easy access.

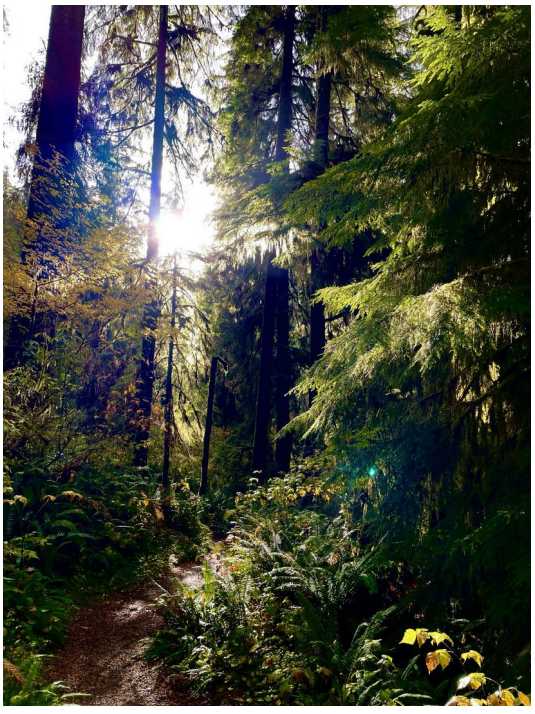
Figs 2–3. The Chehalis River Surge Plain, Spring, 2024. **2.** The Surge Plain. **3.** Trail

We have permission to sample at two Mima-Mound sampling sites: the Mima Mound NAP and the West Rocky Prairie Wildlife Area Unit (Fig. 4 and see https://en.wikipedia.org/wiki/Mima_mounds). These unique prairie mounds are glacial relics. Sites are characterized by woodlands that differ from the other forests we will be visiting and include Douglas fir, deciduous trees, and a Garry oak

woodland and savannah (widely spaced oak trees with grass understory). Prairie plants and grasslands are also present. The Mima Mound NAP has more sampling restrictions but has a comprehensive plant list whereas the West Rocky Prairie site has greater access to these biotopes and access to streams.

Fig. 4. Mima Mounds. Photo by Appple, all rights waived (CC0). https://en.wikipedia.org/wiki/Rocky_Prairie (accessed via Wikipedia, 18 June 2024)

The South Fork Skokomish access for the Olympic National Forest includes an easy trail and hiking area through subalpine to alpine forested ecosystem along the eastern front of the Olympic Mountains. Low wet coastal forests (Fig. 5) transition to subalpine forests and streams (Fig. 6) characterized by Douglas fir, western white pine, and deciduous trees such as alder and maple. Streams and rivers cross this region. This access also includes the Skokomish River, a 20–30m wide stream which flows into Puget Sound.



Figs 5–6. Olympic National Forest, 2023, B.L. Hayford. **5.** Lowland forest, November. **6.** Subalpine stream, Spring.

Combined, these sites provide a representative sample of the varied biotopes of western Washington, and we expect that participants will be rewarded with an interesting and diverse Diptera fauna. At the time of this publication registration for the Field Meeting closes in less than two weeks, so if you are interested in attending sign up ASAP!

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OPPORTUNITES & REQUESTS

A request for Asilidae (Apocleini) specimens for doctoral research

Teagan Mulford

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I am a PhD student at Northern Arizona University, currently undertaking a revision of the Nearctic portion of the genus *Promachus* and phylogenetic analysis of the broader tribe Apocleini as part of my doctoral research. My aim is to resolve the phylogenetic relationships and discover biogeographical patterns within this tribe using molecular techniques.

To achieve these objectives, I am in need of specimens from the following genera, from as many regions as possible: *Alcimus, Amblyonychus, Anacinaeces, Apoclea, Carreraomyia, Mallophora, Megaphorus, Philodicus, Promachella, Tuberconspicus,* and *Promachus.*

Clockwise from left, *Promachus rufipes, Promachus quadratus, Mallophora orcina*. All photos courtesy of Steve Collins, at https://robberfly.org/

If you are uncertain if your robber fly fits the bill, morphologically, the Apocleini can be distinguished from other asilids by a distinct venation character, where veins R_4 and R_5 sharply diverge from each other at the apex of the wing.

Ideally, specimens should be freshly caught and preserved in 95% ethanol to facilitate DNA extractions for molecular analyses. However, for rarer genera, please do not hesitate to contact us

regarding pinned specimens, as we will be utilizing Ultraconserved Elements (UCEs) for phylogenetic reconstructions which will allow incorporation of museum specimens.

All extracted specimens will be given a unique voucher label and deposited in the Northern Arizona University Arthropod Collection, unless otherwise specified by the sender.

For any further information or inquiries (or if you'd like to send me cool photos of robber flies) please contact me at teaganmulford@gmail.com!

Thank you for your collaboration and support.

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DIPTERA ARE AMAZING!

The two photographs submitted for this issue are both by Zachary Dankowicz. The top photo is a huge female *Tipula abdominalis* perched on a wooden stake (manual in situ focus stack). The bottom photo (also our cover image) is a species of *Holcocephala* gnawing on a small parasitic wasp.

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BOOKS AND PUBLICATIONS

Review
The phylogeny of the genera of biting midges (Diptera: Ceratopogonidae) of the world

Dalton de Souza Amorim

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Borkent, A. 2024. The phylogeny of the genera of biting midges (Diptera: Ceratopogonidae) of the world. Zootaxa 5438 (1): 001–274. doi: 10.11646/ZOOTAXA.5438.1.1

A demand for (technically sound) information to deal with the issue of biodiversity is not an abstraction. The Swiss giant Re concluded in a recent report that biodiversity underlies all activities of the society globally and that more than half of the global GDP is moderately or highly dependent on services ecosystems (Retsa et al. 2020).

Providing this kind of information is not a trivial task, despite the mistaken perspective from different decision-makers in and out of academia. The size of this challenge is much larger than indicated in most textbooks. Hebert *et al*. (2016) estimate that Cecidomyiidae alone may have 1.6 million species worldwide, for a family that is presently known from slightly over 6,600 described species (Gagné & Jaschhof 2021). Access to material in the field faces legal issues, complex logistics, and funding shortages. After the specimens are in labs, there is risk of samples rotting without even being properly or extensively curated or analyzed (Evenhuis 2007). Making the material available to specialists alone is complex: it demands expertise often unavailable to sort samples down at least to the family level—there are over 1,100 families of Hexapoda—, it is expensive and time-consuming. Then expertise, when there is funding available, begins: identifying down to genus, down to species, describing or redescribing, imaging, writing papers etc. It is a long way requiring high levels of scholarship. There is a naïve understanding of the nature of taxonomy, as specimens would have labels indicating their names. Species, in science, with their delimitation and characterization, are hypotheses; they are not given. Building and polishing the hypotheses on 2 million species is quite a challenge.

There has been quite an effort in the past 10 or 15 years to reduce the so-called taxonomic impediment, where the rate of study of biodiversity lags far behind the task at hand. Large scale approaches to finding the hidden biodiversity really mean targeting dark taxa (in the sense of Hartop et al. 2022). Sequencing and imaging (Srivathsan 2019), describing taxa on a large scale (Amorim et al. 2023), developing the means to use artificial intelligence for sorting (Wührl, et al. 2022), etc., have been brought to the scene. Automation of different parts of the process have begun to be a real

and available resource (Brydegaard *et al*. 2024). True large scale integrative taxonomy, using both molecular and morphological data, has been shown to be viable—at the same time addressing larger numbers of described species and a responsible approach on naming species (e.g., Amorim et al. 2023; Meier et al. 2023).

Biodiversity, however, is not constituted only of species-level knowledge. Someone must build the biological system itself. In other words, the diversity of species in the planet is not provided by specialists as a single list of all species in alphabetic order. There is a phylogenetic tree connecting all species in a single system, which as much as possible reflects kinship relationships among species and groups of species. Mistakes in the reconstruction of the tree can make the life of users of taxonomic information a nightmare. And the tree is the backbone of additional achievements: identification keys, organized catalogs, manuals, field guides, biogeographical interpretations, evolutionary interpretation of habitat shifts and much more.

A lot of funding, time, expertise and training has drifted away from the production of primary taxonomic information to the molecular analysis of the phylogeny of groups. This was inevitable. It took us, however, to a weird place. On the one hand, after at least 40 years of molecular phylogenies, there are many cases in which different labs produced hypotheses highly inconsistent with each other —and, in some cases, the same lab producing at different stages phylogenies that deny the quality of previous published phylogenies. More than that, it has also drained positions, funding and students from the production of primary taxonomic information—i.e., it slowed down the production of primary biodiversity knowledge. A good proportion of students now dealing with molecular data do not understand the biological system, the complex issues on communication about biological diversity (the Codes of Nomenclature), phylogenetic thinking itself, or even the diversity and taxonomic structure of the groups they study themselves.

There is amazing resilience, however, in the community. An exceptional example is the recently published monograph with a phylogeny of the Ceratopogonidae of the world. The family Ceratopogonidae is much larger than many taxonomists may even dream of. It was the eighth most species-rich family in the extensive, single-site study of the dipteran fauna in Costa Rica (Brown et al. 2018, Borkent et al. 2018) and is the seventh most species-rich in the world, with over 6,200 named species and many thousands unnamed. And it was the second most species-rich family among the top-20 families of insects found in samples of 39 sites on all continents, regardless of clade age, continent, climatic region and habitat type (Srivathsan et al. 2023).

Borkent (2024) formally examined for his study all 109 genera of the family, including males and females, eggs, larvae, and pupae for all that are known. Pupal features were based on his monograph of the pupae of this family (Borkent 2014). Features were also carefully studied in 21 species of seven different Culicomorpha families, providing the necessary understanding for the rooting of character transformation. Over 360 adult morphological features were studied and the resulting data matrix includes 204 characters from adults, pupae, larvae, and eggs.

The final phylogeny of the family has 102 genera, with information coming from over 140 species examined. There are certainly divergent opinions on the use of "groundplan" to root the phylogenetic analysis, instead of a set of outgroups with the most reliable terminal chosen as sister to all other sampled outgroups and ingroups. I personally understand that it is better to formally include a good outgroup taxonomic sampling in the matrix, which sets the "groundplan" along the numerical analysis itself—providing a reliable, repeatable analysis of the data. Nevertheless, Borkent

informally did an extensive outgroup analysis and document his ideas on how to root each of the characters. There is a rather extensive discussion of "uncertain character states", addressing more complex issues of homology, features that are present only in a few males or females (because of the challenge of observing some features), etc. Because characters (in a list of characters) are themselves hypotheses, the construction of characters often deal with some level of uncertainty and this discussion is transparent and necessary—though not presented to readers in many morphological studies. Also, the discussion highlights plastic features that should not be relied upon for some inferences.

Of the entire study, I really appreciate the effort to have an extensive ingroup sampling. Weak taxonomic sampling may be one of the major threats to phylogenetic analyses, together with bad choices of genes and it may explain part of the conflicts between different molecular phylogenies. The point is that poor taxonomic sampling generates analytical issues (especially because of saturation of third bases, etc.) that can be detrimental to the reliability of the phylogenies obtained. This also affects morphology-based phylogenies, with incorrect recognition of homology, etc. For a group like the Diptera, with potentially hundreds of thousands of extant species and diversifying for about ~300 million years, undersampling can severely disturb the results. Borkent's effort to cover the entire family, in some cases, with species of different subgenera, brings credibility to the results.

I have even more appreciation for the effort to document the character states in the list of characters of adults with high quality imaging—unfortunately not so for larvae (but done so for the pupae by Borkent 2014). There can be a lot of unnecessary noise for readers while going through morphology-based phylogenetic studies, looking at complex structures and understanding precisely what the authors mean while describing some character states in these structures. Imaging tools now available often produce photos that are better than drawings. Imaging in Borkent's paper brings readability, credibility and a wide array of information that is also useful for identification keys etc. The morphological documentation of the paper will also be key in future studies to precisely place the rich fossil record in the phylogeny, leading to reliable calibration of molecular studies. Indeed, this monograph comes at the heels of a series of important other large papers published on the ceratopogonids and related Culicomorpha in the past years (e.g., Borkent 2008, 2012, 2014, 2019a,b, Borkent & Dominiak, 2020, Borkent et al. 2022).

Phylogenetic proposals are not free of consequences: they affect the way we see a given slice of the biological diversity, for the good or the bad. Good phylogenies imply proper solutions for synonymies, corroboration of monophyly, indication of paraphyly etc. Many implications of Borkent's phylogeny of the Ceratopogonidae are addressed in the paper, with a number of new synonymies, new status, and new combinations, as well as some new tribes and new tribal placements.

Phylogenies guide the interpretation of the biogeographic evolution of the groups. Ceratopogonids are one of the best represented groups in the insect fossil record, with about 3,600 fossil specimens assigned to over 300 species. The oldest fossil records of the family are species of the Hauterivian Lower Cretaceous genus *Lebanoculicoides*—for a group that diverged from other family-rank clades in the Triassic (Bertone *et al*. 2008). There is a long process of evolution of the family, and a good association between fossils to molecular phylogenies with decent sampling already showing a remarkable congruence between their fossil record and the cladistic relationships of extant groups, bringing considerable light on the evolution of this group of flies—a clade mostly with aquatic larvae, but in some cases with species with larvae adapted to terrestrial environments. Mapping some

of the morphological features to the phylogeny may now help to make sense on the evolution of their biology, especially on the toothed mandibles and modified claws, connected to the ingestion of hemolymph or blood of different groups as well as predation.

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SOCIETY BUSINESS

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

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

1. The approved minutes of the annual meeting of Directors, held 10 December 2023, prepared by Acting Secretary Martin Hauser (11 pages)
2. The financial statement as part of the minutes of the 2023 annual meeting of Directors, updated at year end to reflect the full fiscal year (calendar year), prepared by President Steve Gaimari (1 page).
3. The approved minutes of the Special Meeting of Directors, held 31 January 2024, prepared by Acting Secretary Martin Hauser (2 pages)
4. The approved minutes of the Special Meeting of Directors held 2 April 2024, prepared by Acting Secretary Martin Hauser (2 pages)

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

Directors

Stephen Gaimari
Jessica Gillung
Martin Hauser
Christopher Borkent

Officers

Stephen Gaimari, President
Martin Hauser, Vice President
Christopher Borkent, Treasurer
Giar-Ann Kung, Education Chairperson
Jessica Gillung, Meeting Chairperson
Barbara Hayford, Field Meeting Co-Chair
Andrew Fasbender, Field Meeting Co-Chair

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Dipterists Society

DIRECTOR'S MEMO

Minutes of Directors Meeting

Prepared and filed 13 June 2024 by Martin Hauser, Acting Secretary

Held Saturday, 10 December 2022, call to order at 13:15 PST at Large Conference Room, CDFA/PPD, 3294 Meadowview Rd., Sacramento, CA 95832.
Presiding: Steve Gaimari
Secretary: vacant, Gaimari requested Chris Borkent to keep notes, subsequently Martin Hauser accepted appointment as Acting Secretary

Call to order:
It was noted by the President that Secretary & Director Shaun Winterton chose not to stand for reelection for either his Officer or Director positions, but had planned to complete his term through this meeting. An unforeseen circumstance prevented him from attending, so he tendered his resignation from both positions effective at 08:00 PST today.

Annual Conflict of Interest Statements were distributed to all Directors and Officers prior to the meeting. Those present in person signed and returned them to the President. Those attending virtually, or elected during the meeting, would sign and email the forms to the President after the meeting.

Attendance:
In person: Stephen Gaimari (Director/President) (SG), Martin Hauser (Director/Vice President) (MH), Christopher Borkent (Director/Treasurer) (CB).
Virtual: Jessica Gillung (Director/Meeting Chairperson) (JG), Barbara Hayford (Field Meeting Co-Chair) (BH), Andrew Fasbender (Field Meeting Co-Chair) (AF).

Apologies:
None.

Item 1. ***Treasurer's report (CB).***
(Interim and Annual Financial Summaries filed in the main office and Secretary's record):

- As of 30 November 2023 (interim), total income was recorded as $179,755.86 and total expenses were $171,938.43. Ending balance was recorded as $69,318.71. Submitted by CB. *SG moved to accept submitted interim treasurer's report, Seconded by JG. Passed unanimously*.
- [The final 2023 Annual Financial Summary (through 31 December 2023) was finalized by SG after the close of the fiscal year, and is filed here.
    - The difference between the Interim and final Annual Financial Summaries reflect that the various refunds and reversals were included as transactions in the interim Financial Summary, while only the applicable totals (with refunds and reversals actually applied) are reflected in the final Annual Financial Summary. These final totals are also reflected in our federal and state tax filing with IRS form 990-EZ.]

Dr. Martin Hauser • Director & Acting Secretary / Vice President
Dipterists Society • P.O. Box 231113 • Sacramento, California 95823, USA
Telephone: (217) 390-2417 • Email: mhauser@dipterists.org
A 501(c)(3) non-profit organization • EIN 84-3962057 • https://dipterists.org

Item 2. *Old business*.

1) *Review of Unanimous Written Consents executed in 2023* (SG):
   - Approval of the minutes of the 2022 Annual Directors Meeting.
   - Approval of Field Meeting proposal and contract from Evergreen State College, authorizing signature and making $1,000.00 deposit.
   - Authorizes support of $6,000.00 for Fly School III.
   - Modification of date and time of 2023 annual Directors meeting.

2) *Review of action items from minutes of December 2022* Directors meeting (SG):
   - Continued use of IATS Payments for online financial transactions, such as memberships, donations, and meeting registrations. Direct wire transfer, checks, and PayPal are alternative payment methods.
   - Continued use of Mark Zivkovic (Pasquesi-Sheppard LLC) for tax preparation for the 2023 tax year. Taxes have been so far prepared *gratis*, with no expectation that there will be no charges moving forward. Tax filing for 2022 done on time, documents provided by SG.
   - Documents for continuing non-profit status submitted on time during 2023 by SG to the California Secretary of State (Corporation Statement of Information), fee $25.58 paid; California Attorney General's Department of Justice Registry of Charitable Trusts (registration, annual treasurers report), fee $25.58 paid.
   - Payment for PO Box continued, $166.00 covering period 1 January through 31 December 2023.
   - 2022 Directors annual meeting minutes posted in Fly Times issue 70.
   - Continued use of Kerber Gost Insurance Agency in Bakersfield, CA, part of Nonprofits Insurance Alliance of California (NIAC), with policies for both General Liability and Directors/Officers coverage; premium is $1310.00 annually ($650.00 for General Liability, $660.00 for Directors/Officers coverage), paid on 30 March 2023.
     - They provided at no extra charge the required Certificate of Liability for ICDX, with certificates of property and liability insurance for aggregate of $2,000,000.00.
   - Field meeting tasks as discussed in the 2022 Directors meeting were accomplished thanks to the hard work of BH and AF, including approval via UWC to secure contract with Evergreen State College and $1,000.00 down payment made.
   - After tabling discussion in the 2022 Directors meeting, used UWC to provide general support of $6,000.00 to Fly School III, being held in Costa Rica in 2024. This support allowed registration cost to be lowered by $200.00 per student (from $600.00 down to $400.00).
   - All payments to the venue (Silver Legacy Resort) for ICDX were made on time.
   - Several bill payments approved at 2022 Directors meeting were made on time, including renewing our VPS (OVHcloud, $46.23 + $127.90 covering period to 16 March 2025), our domain registry (Dreamhost, $35.98 covering period to 1 June 2025), and our mailing list platform (MailmanLists, $58.65 covering period to 30 June 2024).

Item 3. *Reports.*

1) *Membership* (SG): In total we have had 100 members; 80 are paid up-to-date (20 are not paid up-to-date), up from 57 in 2022; 36 previous members have renewed their membership; 44 paid as new members; 16 members paid at the student rate; 29 members opted to be recurring members. Of members who paid after our 2022

Directors meeting, 26 are Founding Members; following are new Founding Members, supplementing our list in the previous Minutes, for a total of 53 – they are Chris Cohen, Paul Cooney, Raymond Gagné, Larry Hribar, Michael Irwin, Marija Ivković, Giar-Ann Kung, Ximo Mengual, Kevin Moulton, Thomas Pape, Erick Rodriguez, Justin Runyon, James Wallman, Terry Whitworth, Brittany Wingert, Norm Woodley, Andrew Young (note, Larry, Brittany, and Andrew bumped up to Founding Member after being Individual Members before); 11 Founding Members continued to pay at the Founding Member rate year over year – they are Stephen Bullington, Peter Cranston, Kathleen Donham, Michael Engel, Stephen Gaimari, Barbara Hayford, Morgan Jackson, James Kennedy, Adrian Pont, Paul Rude, and Ken Schneider. Several members added donations on top of their memberships – they are Charlotte Alberts, Peter Cranston, Stephen Gaimari, Leonard Munstermann, Bjoern Rulik, Gary Steck, Sohath Yusseff-Vanegas. In total, our membership consists of people residing in 12 countries (up from 5), as follows: 6 Australia, 1 Belgium, 15 Canada, 1 China, 1 Croatia, 1 Denmark, 1 France, 3 Germany, 1 India, 1 Mexico, 5 United Kingdom, 64 United States.

Note, since the end of the Director's meeting, but still in 2023, an additional 11 members paid (some of which were renewals), including 2 additional Founding Members. The membership by country is supplemented with Canada (1 Founding), Denmark (1 Founding), United Kingdom (1), United States (3).

2) *Website* (SG): The Society website is still being actively developed and modified as needed. The ICDX webpages are still up and being modified to reflect the post-ICDX status; there are no immediate plans to decommission it, at least until it has been adequately archived by the internet archive Wayback Machine (https://web.archive.org/); the payment portals have been decommissioned. A basic webpage for the 18th Field Meeting is up, with an "I am interested in attending" form to send to the organizers to keep track of interested dipterists.

Google Analytics: "Total clicks" (how many times a user clicked to our site) 4,502 (up from 1,800); daily average was 13.4 clicks, with highest number at 105 on 16 July 2023 (day one of ICDX); clicks were from 111 countries and territories. "Total impressions" (how many times a user saw a link to our site in their search results) 122,718 (down from 180,000); daily average was 364.1, with highest number at 1506 on 6 August 2023; impressions were from 221 countries and territories; the "average position" (the position of our site in search results) was 24.1 (up from 29.8). Our top five queries were related to ICDX ("international congress of dipterology", "icdx diptera", icdx reno", "icdx"), followed by "fly times". The most visited page was https://dipterists.org/icdx/, with 2,192 clicks and 15,914 impressions. There were three times more clicks and impressions from users on desktops than on mobile plus tablet devices.

6) *Dipterists Directory* (SG): Total of 187 people in the directory, up from 135 last year; 93 of these are non-members of the Dipterists Society. 34 countries (up from 28) are represented, including 4 African countries, 5 Asian (up from 4), 2 Australasian, 14 European (up from 10), 2 Middle Eastern (up from 1), 3 North American, and 4 South American. Of these, 55.6% are North American, followed by 21.5% European, 7.8% South American, 5.9% Asian, 3.8% African, 3.8% Australasian, and 1.6% Middle Eastern.

7) *Dipterists mailing list* (SDG): We continue to use MailmanLists. We have 837 people (up from 771) (843 emails, with some two-email accounts) signed on from 91 countries (up

from 87), including 26 African countries, 12 Asian (up from 10), 2 Australasian, 3 Central American (up from 2), 32 European, 6 Middle Eastern (up from 5), 3 North American, 7 South American. There were 75 threads (up from 18) in 2023, with multiple threads every month. Posts were mostly announcements of various kinds, about meetings (particularly ICDX), open positions, publications, general inquiries, grants, etc. Regarding removals from the list, 14 email addresses were disabled due to email bounces, 21 unsubscribed, and 1 email was banned for spam (which did not hit the list).

8) *Social media – Facebook* (SG): 1342 people "like" (up from 902) and 1412 "follow" (up from 955) the page; the top five countries represented by our followers are the USA (22.8%), India (9.7%), Mexico (5.5%), Canada (4.7%), and Brazil (4.6%). There were 25 posts (down from 29) this year, with modest numbers of comments and likes. Our post reach (the number of people who saw any of your posts at least once) was 1737 (up from 1093).

– *Twitter* (CB): 422 followers and 100 posts in 2023, with most support and posts related to ICDX.

– *Youtube* (SG): 82 subscribers. The channel has 4 Playlists, including "2021 organized meeting of the North American Dipterists Society" (6 videos, total of 298 views), "2022 organized meeting of the North American Dipterists Society" (3 videos, total 125 views), "10th International Congress of Dipterology" (18 videos, 1045 views between 21 November and 4 December), and "Diptera" (1 video, 106 views between 21 November and 4 December).

9) *Publications* (SG): For Fly Times, the Fall 2022 issue (69) was published on 20 December 2022, with 18 articles with 31 authors in 73 pages; the Spring 2023 issue (70) was published on 20 June, with 15 articles by 21 authors, as well as posting our previous Board Meeting minutes, in 76 pages; the Fall 2023 issue (71) is set for publication before 20 December, currently with 20 submitted manuscripts. Fly Times Supplement 5 was published in hard copy on 9 June 2023, and made available online as print-on-demand in September. The title is "Abstracts Volume, 10th International Congress of Dipterology, 16–21 July 2023, Reno, Nevada, USA", edited by SG. Its companion, also published in print and made available online at the same time, is the "Scientific Program, 10th International Congress of Dipterology, 16–21 July 2023, Reno, Nevada, USA", edited by SG and MH. There is currently one Supplement submitted and two others near submission. No articles were published in MYIA in 2023.

10) *ICDX report* (SG): The 10th International Congress of Dipterology was held as planned, at the Silver Legacy in Reno, Nevada, USA, from 16–21 July 2023. The initial down-payment to the master account ($9000) was made on 17 March 2023, per the contract, and the final payment ($120,819.38) was made on 6 September 2023. The full amount was $131,816.35, noting a $2005.97 difference due to complementary rooms applied to the master account. The cost breakdown is as follows – audio/visuals $13.372.00, catering $116,351.14. The venue received room occupancy revenue of $76,876, which is unrelated to our payments, except that is the source of the complementary rooms.

The numerous people who worked to make this happen were thanked, including MH, CB, Shaun Winterton, Alessandra Rung, Giar-Ann Kung, Hanna Prins, Kong Lunaria, Ben Maples and Brittany Kohler. Special thanks were given to MH for his tireless work as the symposium chair, in addition to innumerable other activities that helped this Congress happen, and to Andrew Silva and the Silver Legacy Resort team who did a marvelous job to make our event run smoothly.

The Scientific program consisted of 222 abstracts, with 190 oral presentations in

20 symposia, a general session, a book launch event, plenary talks (5), and a banquet address. The poster session consisted of 32 posters. In total, students gave 39 of the oral presentations, around 20%, and 10 of the posters, around 30%. The Scientific Program and Abstract Volume were published in hard copy by TheBookPatch.com. The Scientific Program was distributed to all delegates in their conference bags; we purchased 210 of them. The Abstract Volume (which was Fly Times Supplement 5) in hard copy was an optional paid add-on during registration; we purchased 42 based on these prepayments. Electronic versions of both were provided on an ICDX USB drive distributed to all delegates in their conference bags.

The Society held a t-shirt design competition in December 2022, with decisions in January 2023. In total, 35 designs from 10 artists were submitted. Of these, three designs by two artists (Taina Litwak and Derric Nimmo) were selected, with each awarded $100 and a t-shirt. T-shirts and hats (with the Dipterists Society logo) were sold as merchandise at the Congress. We can use any of these designs for any merch moving forward.

There were 201 total registered delegates (4 no-shows) from 35 countries, along with 30 accompanying persons (12 of which were non-paying, so could not fully participate), and 5 exhibitors (2 no-shows). Of registered delegates, 48 were students, about 24%. In total, 188 attended the Congress banquet (9 of which were covered by the congress), which was an optional paid add-on during registration. The following demographics were requested by one of our sponsors (IUBS) in our report to them: 70 registered delegates were women (35%), 68 registered delegates were 35 years old or younger (35%), 27% of symposium organizers were women, 39% of posters were authored by women, 31% of oral presentations were given by women.

Registration and other costs for individual delegates are broken down as follows. Note, the official amounts may be slightly different, in deference to the financial summary numbers. Early Registration: $475 (129, 15 of which were paid by the society); Regular Registration: $550 (27); Late Registration: $650 (1); Early Student Registration: $300 (38, 4 of which were paid by the society); Regular/Late Student Registration: $350 (10); Accompanying Persons Registration: $250 (18); Banquet: $75 (179); Abstract Volume (hard copy): $30 (38); T-shirts: $25 (33 bot fly, 32 ICDX, 38 Med fly, 36 mosquito); Hats: $20 (41).

In total, SG approached more than 200 companies, organizations, and institutions to request sponsorship, and put an announcement in Fly Times. Following is an alphabetical list of our sponsors and their donations over $100 (there were many smaller donations from individual delegates when registering). Note, this list does not include the North American Dipterists Society, as they were the hosts for the meeting, although they significantly contributed financially to the ICDX. Each institutional/ corporate sponsor was featured with a half-page at the end of our Scientific Program, their logos on the back of the Abstract Volume, and their logos with hyperlinks on our webpage. Note, the official amounts may be slightly different, in deference to the financial summary numbers. Following are the non-personal donations: African Natural History Research Trust (United Kingdom), $11,744.96; Amber Inclusions (Lithuania), $192.53; Berryessa Gap Winery (USA), donated 6 cases of wine for the banquet, matching the donation from SG; Center for Biological Diversity (USA), $1000; Don’t Pack a Pest (USA), $5000; Entomological Society of Canada (Canada), $375; Entoquip (USA), $307.47; International Union of Biological Sciences (France), $4907.31; Linnean Society of London (United Kingdom), $554.01; Magnolia Press (New Zealand), donated books as prizes; Majkowski Woodworking Company (Poland), $5000; Natalie Port (Germany), loaned original artworks for display; NHBS Ltd (United Kingdom), $615; Pensoft Publishers (Bulgaria), $750; Reno-Sparks Convention &

Visitors Authority (USA), $5000; Royal Entomological Society (United Kingdom), $372.80 and a virtual dipterology issue of their journal distributed on the ICDX USB drive given all delegates in their conference bags; S.W. Williston Diptera Research Fund (USA), not a direct sponsor, but provided grants for students to attend ICDX; Species File Group (USA), $765. Following are the personal donations: Ashley Kirk-Spriggs (United Kingdom), $475; Casey Rush (USA), $475; David Grimaldi (USA), $650; Fenja Brodo (Canada), $580; Fiona Hunter (Canada), $200; Michael & Bonnie Irwin (USA), $10,000; Stephen & Helen Gaimari (USA), donated 6 cases of wine for the ICDX banquet and evening receptions; Terry & Faye Whitworth (USA), $10,000.

The Society held a student grant competition in March 2023. In total, 41 proposals were received from students in 19 countries; nine grants were awarded to students from six countries, totaling $12,000. These grant recipients were Andre Amaral (Germany, $1500), Caroline Costa de Souza (Brazil, $1500), Rochelle Daley (Jamaica, $2000), Zachary Dankowicz (USA, $1500), Heloísa Flores (Brazil, $500), Socrates Letana (USA, $500), Ali Zeltzin Lira-Olguin (USA, $1500), Alicja Pełczyńska (Poland, $1500), and Tiffany Yau (Canada, $1500). In addition, two grants totaling $1800 were awarded to undergraduate students at the local University of Nevada, Reno, namely Hannah Prins ($900), Khong Lunaria ($900).

11) *Entomological Society of America general meeting* (JG): The Organized Meeting of the North American Dipterists Society took place on Tuesday, November 7 from 19:00–21:00 EST during the Annual Meeting of the Entomological Society of America held in National Harbor, Maryland, USA. No abstract submissions were received, so the meeting was reclassified as a “Function” by the ESA organizers. As a result, we did not have access to a projector or computer. A total of 21 people attended the Organized Meeting, most of them dipterists, as expected. We also successfully engaged coleopterists, neuropterists, and lepidopterists with an appreciation for flies. This wide range of interests and backgrounds ensured a dynamic and engaging conversation among attendees: we got to know each other, discussed our favorite flies, and explored the most interesting places we have been to in order to collect flies.

12) *18th Field Meeting progress report* (BH, AF): Most time was spent securing a venue. Most were unwilling to book more than a year in advance. While initially favoring the University of Washington Pack Experimental Forest, poor communication and uncertainty over lodging and dining rate increases led us to exclude them. The Evergreen State College (ESC) had much better communication and was willing to lock in costs, while also being closer to the area of operations of BH. We negotiated a contract with ESC which was forwarded to the Dipterists Society Board of Directors (the proposal was accepted unanimously), and the contract was signed in late October 2023, and a $1,000.00 deposit made by SG. After this, a notice was sent to the Dipterists mailing list announcing the location and dates of the meeting.

We entered a contract with the Evergreen State College (Olympia, WA) to host the Field Meeting July 15-19, 2024. The venue is located about one hour’s drive from Seattle Tacoma Airport on a forested campus with frontage on Eld Inlet of Puget Sound. We anticipate the cost of the meeting for participants will be around $510 USD, which includes lodging (a private lockable bedroom with shared common space) and four breakfasts and dinners from the evening of the 15th to the morning of the 19th. Parking is an extra $6 per day for each vehicle. We will also have access to a conference area with a projector for talks and lab space with microscopes so participants can sort and identify specimens. Rhithron Associates Inc. has offered to

sponsor refreshments for the presentations, though no formal agreement has been set.

BH has arranged a general collecting permit for Washington State, for Olympic National Forest, and is currently applying for Washington DNR lands; she has been scouting collecting sites for the day excursions. We have already received three emails from people planning on attending the meeting, and several more informal expressions of interest. Based on prior meetings we expect that most attendees will register within three months of the meeting date.

Following is the plan of action for 2024. *End of 2023/Winter 2024*: finalize refreshment sponsorship with Rhithron; set cost for attendance; set up registration website, including an option to give a 12–15 minute presentation. *Spring 2024*: compile list of attendees and presentation titles; submit announcement for spring 2024 issue of Fly Times; finalize what ESC will provide and what we need to bring (ethanol, ethyl acetate, etc.); write form letter for international Visa applications; select field sites and write up directions to each; put together draft participant packet. *July 1–14 July 2024*: compile final participant list; set presentation schedule; finalize and print participant packet; coordinate carpooling from airport. *Fall 2024*: write report on meeting for Fall 2024 Fly Times.

Item 4. *New business*.

1) *Field meetings*: SG thanked BH and AF for the comprehensive Field Meeting report, and asked if anything more should be discussed, such as student grants. SG stated he is ready to make any website modifications at the direction of BH and AF, including setting up a registration portal. *SG moved that the Society will provide a grants program for student participants after the costs are finalized by BG and AF, with specifics of that program by approval via UWC. Seconded by MH. Passed unanimously.*

2) *Society's name*: SG pointed out that we have discussed how the use of "North American" in our society's name may act as a hindrance to greater international participation. Although we have made some advances over the last year, we are nowhere near being the fully integrated international society that we can be. As such, SG suggested we discuss broadening our appeal and reach by giving the society a new name. SG suggested "Dipterists Society", with possible subtext "An International Society for Dipterology". SG pointed to several things this change would require, including: revising bylaws to accommodate this change; updating all legal documents; changing the name across the board on our website, other electronic resources, any new printed resources; a new logo/seal, at least changing the text around the logo image, with the logo/seal updated on our mail and envelope templates, the website in various places, and anywhere else necessary; developing an appropriate banner as part of the header of our webpage, various templates, and any other appropriate place, containing the text "Dipterists Society", and perhaps additionally "An International Society for Dipterology". *SG moved that the North American Dipterists Society change its name to "Dipterists Society", and that he be authorized to seek and engage an attorney for dealing with all legal aspects of this name change. Seconded by JG. Passed unanimously.*

3) *Director positions*: SG suggested that with becoming more fully international under our new name, we should discuss additional Director positions to reflect this international scope. The discussion pointed out that this will require considerable thought and strategy to appropriately represent the dipterological community. *SG moved that we table the discussion of further directorships until we have had to time to most fully consider our options. Seconded by JG. Passed unanimously.*

4) *Relationship with the Council of International Congresses of Dipterology (CICD)*: SG pointed out that we had previously tabled discussion of our name change in order to give the CICD an opportunity to independently pursue an international dipterists society, if they wanted to do so by the ICDX. With no action on that front at ICDX, SG was approached by Ashley Kirk-Spriggs, Rudolf Meier, and Thomas Pape (all Chairs or former Chairs of CICD) to discuss a possible relationship between the CICD and the Dipterists Society. This is a complex issue involving both parties, and cannot be entered into lightly, without working through the details. *SG moved that he continue to work closely with the Chair of the CICD, in consultation with the Directors of the Dipterists Society, representatives/subcommittee of the CICD, and an attorney specializing in business law in order to develop an appropriate plan and modified set of Dipterists Society bylaws to satisfy whatever relationship is pursued; the motion also includes the permission needed for SG to seek and engage an appropriate attorney. Seconded by MH. Passed unanimously.*

5) *Fly School*: SG was approached at ICDX by Giar-Ann Kung and Brian Brown regarding Fly School becoming a function of the Dipterists Society. modeling an education component after the meetings component of the Society (i.e., the structure of having a Meeting Chairperson overseeing all meetings, and then Chairs/Co-Chairs for individual meetings, e.g., Field Meeting Co-Chairs) was discussed. Possibilities of expanding the educational component of the Dipterists Society were discussed, noting that Fly School is an excellent model for such possibilities. *SG proposed that we establish a permanent Officer position of Education Chairperson, who will have responsibility to oversee the educational activities of the Society, and we concur that we will appoint auxiliary Officer position(s) of Chair or Co-Chair for each event as the primary organizer(s) for that event. Seconded by JG. Passed unanimously.*

6) *Officer position*: After having discussed willingness to stand for such a position, SG suggested, and we discussed, Giar-Ann Kung for the Officer Position of Education Chairperson, noting that she (and Brian Brown) were the organizers of both previous Fly Schools, as well as the upcoming Fly School III. *SG moved that we nominate Giar-Ann Kung for the Officer Position of Education Chairperson. Seconded by JG. Passed unanimously.*

7) *Support for Fly School III*: In addition to the reported $6,000.00 we provided for general support of Fly School III in 2023, we discussed a grant program specifically to support a subset of students via evaluation of proposals. *SG moved that we set up a grant program of a maximum of $6,000.00 to support student attendance at Fly School III. Seconded by CB. Passed Unanimously.* We continued discussion of setting the maximum amount per request for any given student, so we could include this in the grant announcement. *SG moved that we set $1,000 as the request-limit per student, with final award amounts to successful applicants to be decided by Directors. Seconded by MH. Passed unanimously.*

8) *Society publications*: We discussed that future Dipterists Society publications could be available in hard copy, as demonstrated by the high quality hard copies produced by TheBookPatch for the ICDX program and abstracts, as well as one of our Fly Times Supplements. With this demonstrably reliable publisher, we could consider producing such hard copies of publications moving forward, making them available at a reasonable

cost to individuals, and with the Society sending some to libraries. *SG moved that we produce our publications (Fly Times, Fly Times Supplement, Myia) in hard copy and PDF, with some number of hard copies printed by the Society and distributed to libraries (discussion of how many and which libraries to be tabled for selection at a later date, to be finalized by UWC), and making them available as print-on-demand through our publisher TheBookPatch (https://www.thebookpatch.com/); retail prices will be set for print-on-demand on an issue-by-issue basis, as actual cost is based on volume size. Seconded by MH. Passed unanimously.*

9) *Society publications back-issues*: There was further discussion about the back-issues of the Society's publications Fly Times and Fly Times Supplements. We discussed uploading these to our publisher (TheBookPatch) as print-on-demand, possibly printing sets to be sent to the chosen libraries in #8. Fly Times Supplements would each be produced singly, as would the more recent (larger-sized) Fly Times. Earlier issues of Fly Times were often shorter, so could be grouped into chronological sets of appropriate size. *SG moved that he be authorized to explore the cost of producing hard copies of all back issues of the Fly Times and Fly Times Supplements, with decisions to be deferred to future UWC. Seconded by MH. Passed unanimously.*

10) *Dipterists Society taxes*: SG described the excellent performance of Mark Zivkovic (of Pasquesi-Sheppard LLC) consulting on the taxes of the society in previous years, noting that in all past years these services were provided *gratis*, but we have no such expectation moving forward. *SG moved that we continue with Mark Zivkovec as our tax preparer. Seconded by CB. Passed unanimously*.

11) *Insurance*: Our billing cycle with Kerber Gost Insurance Agency runs through 1 May each year. SG proposed keeping our present insurance coverages for 2024/2025, i.e., General Liability and Officers & Directors, and will include the occasional need to get Certificates of Liability for various meetings. *SG moved that we continue with Kerber-Gost Insurance Agency, with the same coverages, and that we approve of the acquisition of a Certificate of Liability for the 2024 Field Meeting and for every meeting going forward that might require such a certificate. Seconded by MH. Passed unanimously.*

12) *Membership renewals*: After tabling discussion at last year's Directors meeting, we brought up two option for membership – calendar year, or one-full-year from the date of payment. Discussion centered on the fact that we have payments in every month, and some people set up their recurring payments well apart from calendar year. *SG moved that the membership cycle is one full year from the date of payment for each member. Seconded by MH. Passed unanimously.*

13) *Calendar of necessary filings and actions*: SG related that all filings and actions are up to date, and discussed all actions that will need to be taken or regular bills paid during or after 2024. The items are as follows: filing of state and federal taxes [due 15 April annually]; filing the Annual Registration Renewal and associated documents with the California Attorney General's Office DOJ Registry of Charities and Fundraisers [due 15 May annually]; filing of the Corporation State of Information, form SI-100, to the California Secretary of State [due 30 November of odd years]; renewing our USPS Post Office Box [due 15 December annually]; renewing our insurance policy with Kerber-Gost [due 31 March annually]; renewing our domain registry for dipterists.org with DreamHost [due 1 May annually]; renewing our VPS with OVHcloud [due 17 March of odd years];

renewing our email listserver with MailManLists [due 15 June annually]. Each of these items was discussed individually, towards the idea that we consider all of these bill payments and document filings as standard operating procedures that should not require yearly approvals, noting that changes can be made by approval of Directors at any time, and that each of these should be reported each year. All agreed that this could be addressed with a blanket motion. *SG moved to accept the following items as standard operating procedures, without the requirement to request approval each year, but with the requirement that reporting is done at each annual Directors meeting: filing of state and federal taxes; filing the Annual Registration Renewal and associated documents with the California Attorney General's Office DOJ Registry of Charities and Fundraisers; filing of the Corporation State of Information, form SI-100, to the California Secretary of State; renewing our USPS Post Office Box; renewing our insurance policy; renewing our domain registry for dipterists.org; renewing our VPS; renewing our email listserver. Seconded by CB. Passed unanimously.*

14) *Dipterists Society meeting at Annual Meeting of the Entomological Society of America*: JG lead discussion of adding a component of this meeting as a catered social event after talks each year, suggesting this would draw more participants and interest, and would facilitate more camaraderie among dipterists. *JG moved that we add a component at the ESA Dipterists Meeting to include a social event after talks, with an accompanying budget for catering to be approved each year by the Directors via UWC. Seconded by SG. Passed unanimously.*

Item 5. *Election and/or Re-election of Directors and Officers*.

1) *Directors*: There are five Director spots and four candidates up for re-election, as one Director has resigned. *SG moved that we hold an up-or-down vote on the entire slate of four candidates, leaving one Director spot vacant until such time as we identify, approach, nominate, and approve someone to fill this vacancy. Seconded by CB. Passed unanimously.*

   Shall the four current Directors standing for re-election (Chris Borkent, Steve Gaimari, Jessica Gillung, Martin Hauser) be re-elected to continue to fill four of the five Director positions of the Dipterists Society for 2024? Unanimously voted yes.

2) *Officers*: The current Officer positions in the Society are: President (currently SG), Vice-President (currently MH), Secretary (currently vacant, formerly Shaun Winterton), Treasurer (currently CB), Meeting Chairperson (currently JG), and Education Chairperson (currently vacant). The current Auxiliary Officers are Field Meeting Co-Chairs (currently BH and AF). With the Secretary position vacant, MH will perform the duties of Secretary until we identify, approach, nominate, and approve of someone to fill this vacancy. With the Education Chairperson position vacant, Giar-Ann Kung was nominated for this position. *SG moved that we hold an up-or-down vote on the entire slate of candidates for office as described. Seconded by MH. Passed unanimously.*

   Shall the Current Officers and Auxiliary Officers continue to serve in their executive capacities as described, and shall the nominee Giar-Ann Kung be elected to fill the role of Education Chairperson? Unanimously voted yes.

Item 6. *Date of next Directors meeting*.

1) Scheduled Monday 9 Dec, 2024, as per the Society by laws.

Item 7. ***Meeting Adjournment.***

1) Adjournment proposed by JG. Seconded by SG. Passed unanimously. Meeting adjourned at about 16:30 PST.

Submitted by:
Martin Hauser
Acting Secretary

Dipterists Society 2023
Annual Financial Summary
(January 1, 2023 – December 31, 2023)

INCOME	
ICDX abstracts book	$1,080.49
ICDX banquets	$13,755.46
Donations	$63,401.90
Dipterists Society memberships	$5,239.19
ICDX registrations	$85,266.33
Tshirts/Hats	$4,386.90
TOTAL	**$173,130.27**

EXPENSES	
General expenses ICDX	-$146,561.53
General expenenses Society	-$2,672.44
Transaction fees	-$2,997.17
Grants	-$12,109.98
Education support	-$6,000.00
TOTAL	**$170,341.12**

Beginning balance	**$61,501.28**
Net (Gain)	**$2,789.15**
Ending balance**	**$64,290.43**

****Accounts**

Ending Paypal balance	**$1,247.05**
Ending CBT balance	**$63,043.38**

Dipterists Society

DIRECTOR'S MEMO

Minutes of Directors Meeting

Prepared and filed 14 June 2024 by Martin Hauser, Acting Secretary

Notice for this Special Meeting was given by Steve Gaimari by email to all Directors and the Education Chairperson on 22 January 2024, after polling all for availability.
Meeting held Wednesday, 31 January 2023, call to order at 14:00 using Microsoft Teams.
Presiding: Steve Gaimari
Acting Secretary: Martin Hauser

Attendance: **Virtual:** Stephen Gaimari (Director/President) (SG), Martin Hauser (Director/Vice President, Acting Secretary) (MH), Jessica Gillung (Director/Meeting Chairperson) (JPG), Giar-Ann Kung (Education Chairperson).

Apologies: Christopher Borkent (Director/Treasurer) (CB).

Item 1. ***Review of events leading up to this meeting.***

- At the annual meeting of Directors held on 10 December 2023, a grant program was approved to support participation in Fly School III, up to a maximum of $6,000. This program was set with a $1,000 request-limit per applicant. Applications would be duly considered by the Directors and successful applicants would be informed.
- On 14 December 2023, SG sent notices by email to all 35 people who had been selected to attend Fly School III by the program, requesting a one page (maximum) statement of financial need, describing how this funding will help accomplish their goals in attending Fly School, and justifying the amounts requested. The due date was 8 January 2024, and as of that date, we received 22 such applications, with a total requested amount of $19,280.
- Each Director (except CB) independently ranked the 22 applications, within three tiers, A (must fund), B (may fund), C (do not fund). The rankings were assembled into a spreadsheet by SG, which was distributed among the Directors before the meeting. Rankings were converted into numerical scores to represent average rankings to aid in the discussion.

Item 2. ***Consider grant proposals for students accepted to the Fly School III program, and allocated funding to successful applicants*****:**

- The Directors discussed the ranking system, and the strategy to use for allocating funds. For example, to give lesser amounts to more applicants versus giving larger amounts to fewer applicants. It was decided to try to fund more applicants.
- Those applicants who were highly ranked in the A tier across all assessments were discussed, with agreement that they should be funded.
- Each grant application, regardless of ranking, was discussed in detail until all Directors agreed on a final rank for each, taking into account their financial need and the anticipated outcomes of the training they would receive at Fly School.
- The Directors discussed how to make the $6,000 be of the most benefit, so allocated funding to the top 11 applicants. The amounts awarded were based on our

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assessment of their financial need (based on their application statement), with an aim to be sure the support would be enough for their participation.

- Grant amounts ranged from $250 up to $750, allocated among the 11 applicants from nine countries, including students from the host country, Costa Rica.
- Grant awards would be given in the form of discounted registration fees. That is, the Dipterists Society would provide the funds ($6,000) directly to the Los Angeles County Natural History Museum (who are running Fly School III), and they would deduct the grant amounts from the registration fees owed by those students.

Item 3. ***Consider contingency plan for successful grant applicants if they do not attend.***

- Authority given to SG to reallocate such funds among successful applicants, to increase individual grant amounts using his discretion to provide funds where most needed
- Authority given to SG to use his discretion to consider allocation of such funds among previously wait-listed participants in Fly School III, who were called to attend due to others dropping out, who were not given the opportunity to apply for funding.

Item 4. ***Meeting Adjournment.***

- Adjournment proposed by SG. Seconded by JG. Passed unanimously. Meeting adjourned at 16:04.

Submitted by:
Martin Hauser
Acting Secretary

Dipterists Society

DIRECTOR'S MEMO

Minutes of Directors Meeting

Prepared and filed 13 June 2024 by Martin Hauser, Acting Secretary

Notice for this Special Meeting was given by Steve Gaimari by email to all Directors on 27 March 2024, after polling all for availability.
Meeting held Tuesday, 2 April 2024, call to order at 14:00 PDT using Microsoft Teams.
Presiding: Steve Gaimari
Acting Secretary: Martin Hauser

Attendance: **Virtual:** Stephen Gaimari (Director/President) (SG), Martin Hauser (Director/Vice President, Acting Secretary) (MH), Christopher Borkent (Director/Treasurer) (CB).

Apologies: Jessica Gillung (Director/Meeting Chairperson) (JG).

Item 1. ***Review of events leading up to this meeting*****:**

- Through a Unanimous Written Consent on 15 February 2024, a grant program was approved to support participation in the 2024 Field Meeting, up to a maximum of $3,000. This program was set with a $500 request limit per applicant, plus a registration fee waiver. Applications would be duly considered by the Directors and successful applicants would be informed.
- On 26 February 2024, SG sent notice by email via the dipterists mailing list regarding open registration for the Field Meeting, and the open Travel Grants program with an application deadline 31 March 2024. Details of the grant opportunity were given on the Dipterists Society website's grants and awards page.
- As of 31 March 2024, 5 applications were received, with a total requested amount of $2,268.13 plus registration fee waivers. Note, two applicants had already paid their registration fees (total $700), which would need to be accounted for with cash awards.

Item 2. ***Consider grant proposals for attending 2024 Field Meeting, and allocated funding to successful applicants.***

- The Directors discussed each applicant to determine whether their proposal was acceptable and budget was adequately justified. Given the small number of applicants, discussion centered around whether any of the 5 applicants should not be funded.
- All applications were found to be high quality with justified budgets, and all 5 applicants were approved for their full requested amount, in addition to registration fee waivers.
- Grant amounts ranged from $268.13 up to $500, allocated among the 5 applicants from two countries.
- Grants will be awarded in the form of checks for US recipients, and funds will be allocated to one non-US recipient using PayPal or bank transfer. Funds will be sent to the recipients after the meeting has concluded and necessary receipts submitted.

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Item 3. ***Consider contingency plan for successful grant applicants if they do not attend.***

- Such funds will remain with the Dipterists Society.

Item 4. ***Meeting Adjournment.***

- Adjournment proposed by MH. Seconded by CB. Passed unanimously. Meeting adjourned at 14:30.

Submitted by:
Martin Hauser
Acting Secretary

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