THE CERATOPOGONIDAE INFORMATION EXCHANGE

The CIE, issued twice a year (no subscription fee), was begun in 1968 as a newsletter to facilitate communication among workers interested in the dipteran family Ceratopogonidae. The format is extremely flexible. Contributions may be of any length and deal with any subject having some bearing on the study of ceratopogonids. For example, contributors may report their current interests or plans, observations or techniques of probable value to the readership, requests for addresses, study material or reprints, or any other matter of concern. The newsletter serves also as a bulletin for planning and communicating information on meetings, symposia, workshops and so forth. Finally, there is in every issue a compilation of recent literature in the field. Any person(s) wishing to contribute to the newsletter or to receive future issues via e-mail should contact:

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CIE No. 99–May 2017-The Ceratopogonidae Information Exchange Newsletter

Colleagues,

I hope that you will find something of interest or find a way that you can assist a colleague in this issue of the CIE Newsletter. The Recent Literature section contains 128 original research papers, reviews, reports and letters representing diverse research areas. “Picky eaters are rare...” – what an interesting title by Hopken et al. ! Andrey Przhiboro and Natalia Brodskaya’s digitization project of type specimens from the former Soviet Union is an excellent resource. I have again placed three images from papers in the Recent Literature section on the last pages of this issue. Also, I hope you will read the excellent historical account of the life of Daniel William Coquillett (who described 70 ceratopogonid species) by Neal Evenhuis in the April issue of Fly Times, our sister publication.

Recall that the December issue of this newsletter will be no.100! Please send your ideas for what might be included in the December issue as we reach that milestone.

If anyone is not listed in the Directory of Workers, please send your contact information (or an update) to me. Lastly, please also send copies of your published papers, research summaries, requests for information, etc. to me towards the December, 2017 issue no later than Friday, December 8th.

With Kind Regards,
Steve Murphree, Nashville, Tennessee, U.S.A.

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Request for Support
From: Alec Gerry, Department of Entomology, University of California, Riverside, U.S.A.

REQUEST FOR SUPPORT – CULICOIDES FOR SPECIES IDENTIFICATION DATABASE

Many of you were likely present at the International Congress of Entomology to hear Anca Paslaru (of the Institute of Parasitology, National Center for Vector Entomology, Switzerland) present her recent research using MALDI-TOF Mass Spectrometry (MS) to identify Culicoides to species. You may remember from Anca’s presentation that this method worked well for species that were collected in Switzerland (see Kaufmann et al. 2012, DOI: 10.1186/1756-3305-5-246). This method has also been recently applied to sand flies (Mathis et al., 2015; DOI: 10.1186/s13071-015-0878-2). The MALDI-TOF MS is apparently commonly used in Europe and can provide accurate, fast, and relatively inexpensive identification of insects to species. There is currently a growing database of publicly accessible species profiles using the MALDI-TOF MS (list of species available at http://mabritec.com/insects-id.html).

I had a recent discussion with Anca and with Alexander Mathis of the National Center for Vector Entomology in Switzerland, and I suggested that our Culicoides community could support the development of their reference MS
database by providing many other voucher *Culicoides* identified to species for examination using the MALDI-TOF MS technique.

Currently, the database is housed by a private company (Mabritec) as this ensures both a customer-oriented service and a greater sustainability. In the near future, the database should be hosted via a publicly accessible online platform, so that anyone with access to a MALDI-TOF MS machine could measure specimens of arthropod vectors on his or her own equipment and obtain automated species identification in a cost-efficient manner by submitting mass spectrometry data to the centralized data base. Further, the platform will provide access to standard operating procedures and also a user forum with the possibility for information exchange, troubleshooting etc. Ultimately, Alexander is confident that they can secure funding to assure free access for non-commercial institutions.

To support development of this database, we ask that you submit any *Culicoides* species that you can collect. Please submit a minimum of 5 voucher specimens - same identified species from the same location. Retain specimens at 4°C in 70% EtOH or higher or frozen from collection until submission. To ship, place specimens of a single identified species into a 1.5 ml PCR tube in 70% or higher EtOH. If shipping in EtOH is problematic, voucher specimens can be placed in the PCR tube on top of a small piece of tissue paper soaked with 100% EtOH to eliminate free EtOH in the tube. Send via 2-3 day shipping to the address below. Of course there is no fee for testing the voucher specimens that would be used to expand the database. If you have questions or would like more information about this technique, Alexander is happy to provide further information (alexander.mathis@uzh.ch).

**Ship voucher specimens to:**
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Institute of Parasitology  
University of Zurich  
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8057 Zurich, Switzerland

Alec Gerry  
Professor of Entomology, UC Riverside  
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**Research Report**

From: Andrey Przhiboro and Natalia Brodskaya, Zoological Institute, St. Petersburg, Russia

Dear Colleagues,

We are glad to inform you about our recent work of digitization of the Ceratopogonidae type specimens kept in the collection of the Zoological Institute, Russian Academy of Sciences (St Petersburg).

The Zoological Institute holds one of the richest Ceratopogonidae collections, especially of bloodsucking biting midges of the Holarctic Region. In total, the collection contains several million of Ceratopogonidae specimens in more than 400 species. It includes rich material of larvae and pupae associated with the reared adults. The
collection includes the type specimens of the vast majority of species described in the genera *Culicoides* and *Leptoconops* from the territory of the former Soviet Union. A preliminary catalogue of the type specimens (except for *Leptoconops*) was published by Glukhova and Brodskaya (1995).

In 2016, we contributed to the project of digitized collections of the Zoological Institute, an internet resource developed for the website of the Institute ([http://zin.ru/Collections/collections_en.html](http://zin.ru/Collections/collections_en.html)). This work has been done in cooperation with and with technical support from the members of the IT department of the Zoological Institute, Alexey Golikov and Roman Khalikov.

The digitized collection of Ceratopogonidae is available:
in English ([http://zin.ru/Collections/Ceratopogonidae/index_en.html](http://zin.ru/Collections/Ceratopogonidae/index_en.html)) and
in Russian ([http://zin.ru/Collections/Ceratopogonidae](http://zin.ru/Collections/Ceratopogonidae)).

It includes the brief description of the collection, with a short introduction into its history, and the pages about each digitized specimen. At present, the digitized collection contains the images and information for the 110 slide-mounted type specimens of 61 species in the genus *Culicoides* described from the territory of the former Soviet Union and kept in our collection. For each specimen, we provided the general view of its slide, microscopic images of the details of diagnostic value, the detailed label data in Russian, the same data transliterated and translated into English, the references to the original descriptions, and some additional data on the types. For most of these species, no photographs of the types were published.

The microscopic images were taken under a Leica DFC320 microscope with a Leica DM5000B digital camera, mostly using Nomarski interference contrast. In all cases, we took a series of images, then z-stacked them using Helicon Focus 5.1 software and edited using Adobe Photoshop CS software. Considering the different state of preservation, not all the type specimens for each species were digitized. First of all, we included the specimens in better condition. For the same reason, we could not take microscopic images of some body parts of the specimens.

However, we hope that this resource will be useful. In the future we plan to display the type specimens of more species in *Culicoides* and other genera.

Andrey Przhiboro and Natalia Brodskaya

[Editor's Note: this is an important contribution to our science and many thanks to Andrey and Natalia and their colleagues at the Zoological Institute!]

**Recent Literature:**

**Taxonomy and Morphology**

**Alarcon-Elbal, P. M., R. Estrada, V. Jesus Carmona-Salido, C. Calvete, and J. Lucientes. 2016.** Faunistic composition and population dynamics of *Culicoides* biting midges (Diptera: Ceratopogonidae) from Castile-La Mancha. *Anales de Biologia* 38: 37-61. [In Spanish]


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**Ecology and Methodology**


Bluetongue Virus and Other Pathogens


Wernike, K., A. Aebischer, G. Roman-Sosa, and M. Beer. 2017. The N-terminal domain of Schmallenberg virus envelope protein Gc is highly immunogenic and can provide protection from infection. *Scientific Reports* 7: 42500 (10 pages).


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Fig. 1. An adult female biting midge *Forcipomyia* (*Trichohelea*) sp. attached to the ventral hindwing of *Amblysciries tolteca prenda* in Patagonia, Arizona (Cochise County) (Photo by H. L. Salvato).

[From: Salvato, M., H. Salvato and W. L. Grogan, Jr. 2016]
From: Alarcon-Elbal et al. 2016

Figure 2. Frequency of capture (%) of different species of Culicoides biting midges (insectivore and/or generalist feeders more abundant) in sampling locations of Castilla-La Mancha.

Figura 2. Frecuencia de captura (%) de las diferentes especies de Culicoides (insectívoros y/o generalistas más abundantes) en las estaciones de muestreo de Castilla-La Mancha.
From: Stewart 2016

A biting midge (Culicoides subfusca) engorged with blood – a potential transmitter of Bluetongue disease.

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