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Catalogue of the Diptera type material housed in the collections of the Muséum d'histoire naturelle in Geneva, Switzerland

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Abstract

A key challenge of natural history museums across the globe is to make collections accessible to researchers and the public alike. Through advances in digitization, databasing, online data curation and long-term storage, it is now possible to give access to the type material housed in museums, which represent the most precious specimens in collections. Here, we have generated a fully illustrated online catalogue of all primary and secondary Diptera types housed in the Muséum d'histoire naturelle of Geneva (MHNG). High-resolution habitus photographs of all type specimens and their labels are available on a digital repository, and an exhaustive list of this type material is provided. The MHNG collection holds 152 holotypes and 2025 paratypes with Empididae, Lauxaniidae, Sphaeroceridae and Tephritidae being the most represented families. Although the current Diptera collection is relatively recent, the ca. 150 000 specimens and associated type material are important resources for future taxonomic and systematic studies.

Keywords

Flies - holotypes - museum collections - paratypes - taxonomy - Tephritidae.

INTRODUCTION

Flies (Insecta, Diptera) are one of the four megadiverse lineages of insects on the planet with ca. 160 000 described species placed in 157 extant families (Evenhuis & Pape, 2022) with a much larger number yet to be discovered and named (Stork, 2018). Despite progress in the understanding of fly evolution and systematics (Wiegmann *et al.*, 2011; Wiegmann & Richards, 2018; Meusemann *et al.*, 2020), integrative taxonomic work has never been more instrumental to better understand the diversity of flies. Museum collections across the world house millions of specimens including type material upon which current classifications are based. Providing access to type material and associated label data is key to reinvigorate the taxonomy of understudied groups such as flies. With the development of high-resolution digitization (Balke *et al.*, 2013; Drew *et al.*, 2017), it is now possible to make the information housed in natural history collections available to a greater number of workers.

Approximately four million insect specimens are housed in the entomological collections of the Muséum d'histoire naturelle of Geneva (MHNG). This includes about 150 000 species of Diptera, representing > 5000 described species stored in > 700 modern unit-tray drawers (in addition to ca. 200 traditional drawers in the process of integration) as well as hundreds of entomological slides. In the early 19th century, the Diptera collection was relatively small, mostly the result of bycatches and small samples from regional surveys. Tournier (1889) published a first list of the dipteran species of the canton of Geneva based on MHNG material, however most of the specimens were since lost (Merz, 2012), the collection of Frey-Gessner is the only legacy of this period. The earlier types deposited at the MHNG date from the early 19th century with species of Hippoboscidae and Tabanidae (Meigen, 1820; Westwood, 1834), and from the end of the 19th century with species of Syrphidae (Becker, 1894). Although a precise history of collection acquisitions is difficult to reconstruct due to the lack of archives, the Diptera type collection at

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the MHNG is composed of important collections from G. Bächli, B. Bender, C. Besuchet (curator of Coleoptera at the MHNG until 1992), G. Bouvier, H. Dirickx, A. Freidberg, V. Korneyev, I. Löbl (curator of Coleoptera at the MHNG until 1999) and P. Schwendinger (curator of Arthropods at the MHNG until 2021). No dipterist was employed at the MHNG until 1998, when Bernhard Merz (curator of the Diptera at the MHNG until 2013) was appointed. He substantially expanded the collection especially among the Brachycera with Tephritidae as a focal group (the MHNG holds an important collection for this family in terms of taxonomic coverage and type material). His personal work and collaborations through the years augmented the collection to the ca. 150 000 specimens currently housed in the Museum, most of which are dry pinned specimens (a small collection of slides exists). The Nematocera were unfortunately less sought after and the collections are far less rich in these families. However, recent acquisitions have started to fill this gap. For instance, the latest major addition to the MHNG Diptera collection was material from Phil Withers, which was deposited in 2021 (Chandler *et al.*, 2021), and is progressively being integrated into the main collection. To provide a meaningful catalogue of type material in the MHNG collections, we screened

and recorded all primary and secondary types currently housed in the MHNG up to 2022.

MATERIAL AND METHODS

All specimens explicitly labelled as types (holotypes, paratypes, cotypes, types, allotypes) were digitized: a single photograph of the specimen habitus and its labels (Fig. 1) was taken using a Canon EOS 90D camera with a Canon EF-S 60/2.8 USM macro lens mounted on a Kaiser RSD K 5603 stand. All labels were recorded verbatim in Specify 6 (Specify Collections Consortium, Lawrence, USA), the biological collection data management platform implemented at the MHNG. Exhaustive atomized information available for each specimen (Specify database record) can be obtained from the corresponding author. All high-resolution images of the types are available on Zenodo (<https://doi.org/10.5281/zenodo.7634663>).

The catalogue is organized by family, taxa are given in the alphabetical order of the species, followed by the author(s), the determination genus as currently classified in the MHNG collection (in parentheses), the number of types deposited and the unique MHNG collection number

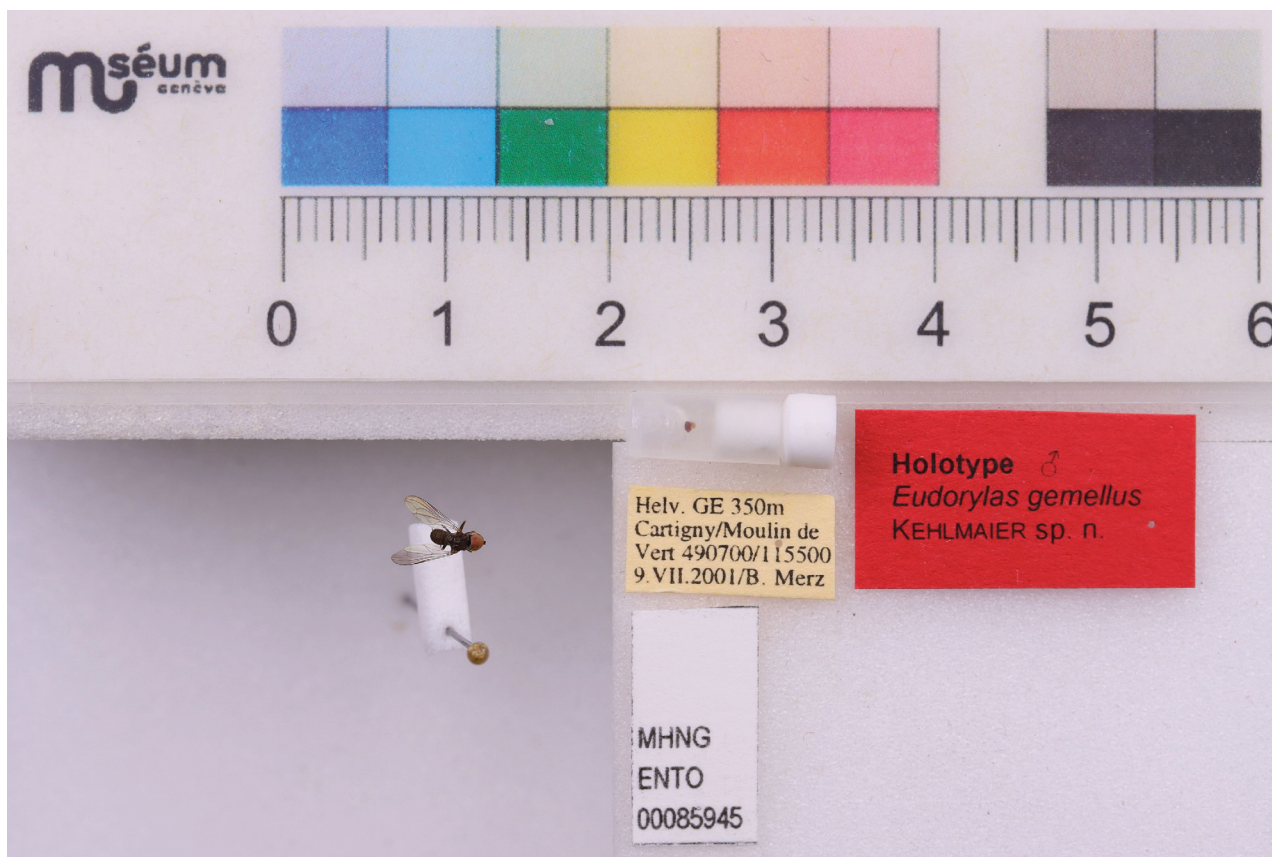


Fig. 1. Example of images of Diptera types housed in the MHNG available on Zenodo. Holotype of *Eudorylas gemellus* Kehlmaier, 2005 caught in the canton of Geneva, with its labels.

(in case of type series, only the first and last voucher numbers are given). Comments are given in brackets where needed. An image (Fig. 1) of a Diptera holotype is provided to illustrate mainly the labels associated with it.

CATALOGUE OF TYPES

In total, we recorded 152 holotypes, 2025 paratypes, 17 types (without precision) with no other mention or with doubtful labeling, 5 allotypes, 2 syntypes, and 1 neotype. Empididae, Lauxaniidae, Sphaeroceridae and Tephritidae are particularly well-represented families in the type material (Fig. 2). Most of the type material deposited in the MHNG Diptera collection belongs to

taxa described after 1980, which underlines the recent nature of this collection and its important growth in both species richness and type quantity in the past decades. Nineteen type specimens (from five species) recorded in the literature could not be located and are either mislabeled or misplaced. This catalogue will likely be a helpful tool for future taxonomic work and complements the existing published knowledge pertaining to the natural history collections of the MHNG (e.g., Zompro & Brock, 2003; Hollier, 2010, 2011, 2019; Hollier & Maehr, 2012; Hollier & Oswald, 2018; Landry *et al.*, 2019; Cibois *et al.*, 2020; Sartori & Bauernfeind, 2020; Vallotton & Smith, 2021).

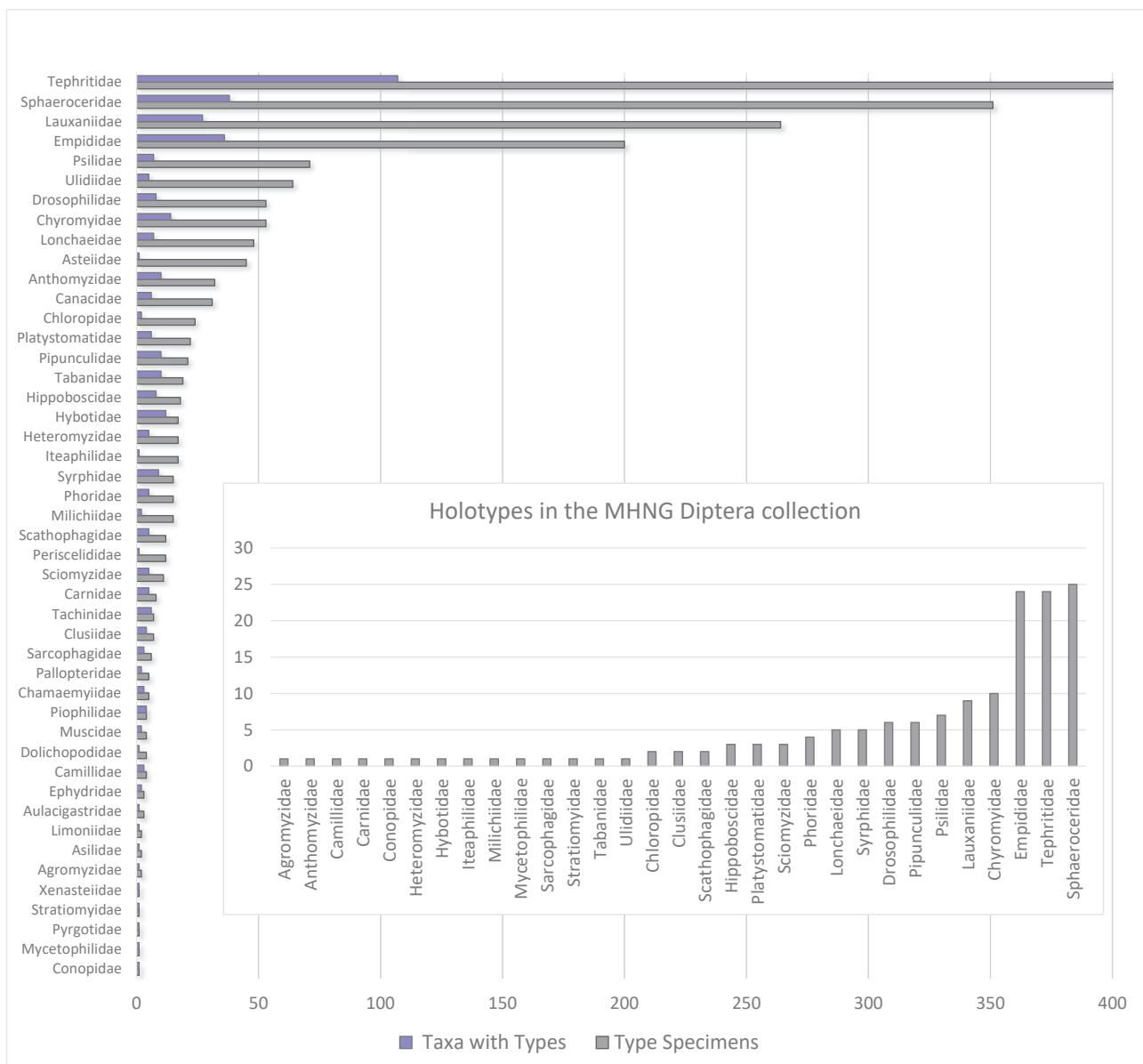


Fig. 2. Distribution of type material housed in the collection of the MHNG across the different families represented.

Type list**Agromyzidae**

maltensis Černý, 2004 (*Amauromyza*); 1 holotype (MHNG-ENTO-0087934), 1 paratype (MHNG-ENTO-0087935).

Anthomyzidae

clara Roháček, 2006 (*Anthomyza*); 1 holotype (MHNG-ENTO-0087941), 2 paratypes (MHNG-ENTO-0087942 and MHNG-ENTO-0087943).

curtisi Roháček, 2008 (*Amygdalops*); 3 paratypes (MHNG-ENTO-0087936 to MHNG-ENTO-0087938).

curtistylus Roháček, 2008 (*Amygdalops*); 1 paratype (MHNG-ENTO-0087936).

drachma Sueyoshi & Roháček, 2003 (*Anthomyza*); 2 paratypes (MHNG-ENTO-0087944 and MHNG-ENTO-0087945).

flavosterna Sueyoshi & Roháček, 2003 (*Anthomyza*); 2 paratypes (MHNG-ENTO-0087956 to MHNG-ENTO-0087947).

merzi Roháček, 2009 (*Epischnomyia*); 8 paratypes (MHNG-ENTO-0087946 to MHNG-ENTO-0087963).

simplicior Roháček, 2004 (*Amygdalops*); 1 paratype (MHNG-ENTO-0087940).

triarmigera Sueyoshi & Roháček, 2003 (*Ischnomyia*); 4 paratypes (MHNG-ENTO-0087964 to MHNG-ENTO-0087967).

trifurca Sueyoshi & Roháček, 2003 (*Anthomyza*); 5 paratypes (MHNG-ENTO-0087948 to MHNG-ENTO-0087952).

versitheca Roháček, 2009 (*Arganthomyza*); 3 paratypes (MHNG-ENTO-0087953 to MHNG-ENTO-0087955).

Asilidae

choremii Smart, Taylor & Hull, 2007 (*Pamponerus*); 2 paratypes (MHNG-ENTO-0085452 to MHNG-ENTO-0085453).

Asteiidae

clypeata Freidberg & Carles-Tolrá, 2010 (*Phlebosotera*); 45 paratypes (MHNG-ENTO-0088446 to MHNG-ENTO-0088489 and MHNG-ENTO-0088491).

Aulacigastridae

pappi Kassebeer, 2001 (*Aulacigaster*); 3 paratypes (MHNG-ENTO-0088430 to MHNG-ENTO-0088432).

Camillidae

cavernicola Papp, 1978 (*Katacamilla*); 1 holotype (MHNG-ENTO-0089613).

mathisi Papp, 1985 (*Camilla*); 1 paratype (MHNG-ENTO-0089516).

sabroskyi Papp, 1982 (*Camilla*); 2 paratypes (MHNG-ENTO-0089611 and MHNG-ENTO-0089612).

Canacidae

acrostichalis Freidberg & Beschovski, 1996 (*Tethina*); 10 paratypes (MHNG-ENTO-0088264 to MHNG-ENTO-0088273).

endiomena Munari, 2005 (*Sigaloethina*); 7 paratypes (MHNG-ENTO-0088257 to MHNG-ENTO-0088263).

guttata Freidberg & Beschovski, 1996 (*Tethina*); 2 paratypes (MHNG-ENTO-0088274 and MHNG-ENTO-0088275).

melitensis Munari & Ebejer, 2001 (*Tethina*); 2 paratypes (MHNG-ENTO-0088276 and MHNG-ENTO-0088277).

salinicola Beschovski, 1998 (*Tethina*); 6 paratypes (MHNG-ENTO-0088278 to MHNG-ENTO-0088283).

yaromi Freidberg & Beschovski, 1996 (*Tethina*); 4 paratypes (MHNG-ENTO-0088284, MHNG-ENTO-0088284, MHNG-ENTO-0088344 and MHNG-ENTO-0088345).

Carnidae

falcata Papp, 1997 (*Meoneura*); 1 paratype (MHNG-ENTO-0088254).

helvetica Papp, 1997 (*Meoneura*); 1 paratype (MHNG-ENTO-0088255).

merzi Ozerov & Krivosheina, 2013 (*Meoneura*); 1 holotype (MHNG-ENTO-0007225).

pseudoflavifacies Papp, 1997 (*Meoneura*); 1 paratype (MHNG-ENTO-0088256).

scatophila Freidberg, Ozerov & Papp (*Hemeromyia*); 4 paratypes (MHNG-ENTO-0088250 to MHNG-ENTO-0088253); [We could not find any trace of this taxon and consider therefore these specimens as *in litteris* types].

Chamaemyiidae

flavoantennata Beschovski, 1994 (*Chamaemyia*); 2 paratypes (MHNG-ENTO-0087886 and (MHNG-ENTO-0087887).

gaimarii Tanasijtshuk, 1996 (*Leucopis*); 2 paratypes (MHNG-ENTO-0087889 and (MHNG-ENTO-0087890).

hungarica Tanasijtshuk & Beschovski, 1991 (*Chamaemyia*); 1 paratype (MHNG-ENTO-0087888).

Chloropidae

genavensis Merz, 2008 (*Speccafrons*); 1 holotype (MHNG-ENTO-0088583), 8 paratypes (MHNG-ENTO-0088584 to MHNG-ENTO-0088591).

ismayi Merz, 2008 (*Siphunculina*); 1 holotype (MHNG-ENTO-0088494), 14 paratypes (MHNG-ENTO-0094610 and MHNG-ENTO-0088570 to MHNG-ENTO-0088582).

Chyromyidae

- alticum* Ebejer, 2007 (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0088618), 1 paratype (MHNG-ENTO-0088619).
- asiaticum* Ebejer, 2007 (*Aphaniosoma*); 9 paratypes (MHNG-ENTO-0088609 to MHNG-ENTO-0088617).
- bifalcatum* Ebejer, 2005 (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0088620), 4 paratypes (MHNG-ENTO-0088621 to MHNG-ENTO-0088624).
- corniger* Ebejer, 2007 (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0088625).
- fimbriatum* Ebejer, 2007 (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0088636), 13 paratypes (MHNG-ENTO-0088626 to MHNG-ENTO-0088635 and MHNG-ENTO-0088637 to MHNG-ENTO-0088639).
- korneyevi* Ebejer, 2007 (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0088640), 1 paratype (MHNG-ENTO-0088641).
- merzi* Ebejer, 2007 (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0088642), 1 paratype (MHNG-ENTO-0088643).
- miricerus* Ebejer, in prep. (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0097873).
- pallida* Ebejer, 2010 (*Gymnochiromyia*); 2 paratypes (MHNG-ENTO-0088650 and MHNG-ENTO-0088651).
- persimilis* Ebejer, 2010 (*Gymnochiromyia*); 8 paratypes (MHNG-ENTO-0088652 to MHNG-ENTO-0088659).
- praeditum* Ebejer, in prep. (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0097309).
- separatum* Ebejer, 2007 (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0088644).
- variabilis* Ebejer, 2007 (*Aphaniosoma*); 3 paratypes (MHNG-ENTO-0088645 to MHNG-ENTO-0088647).
- vicinum* Ebejer, 2007 (*Aphaniosoma*); 1 holotype (MHNG-ENTO-0088648), 1 paratype (MHNG-ENTO-0088649).

Clusiidae

- albimanus* (Meigen, 1830) (*Clusiodes*); 1 neotype (MHNG-ENTO-0087930) [Neotype designated by Lonsdale & Marshall (2007)].
- philomela* Lonsdale, 2016 (*Allometopon*); 1 holotype (MHNG-ENTO-0087927), 2 paratypes (MHNG-ENTO-0087928 and MHNG-ENTO-0087929).
- secaperas* Lonsdale, 2014 (*Sobarocephala*); 1 holotype (MHNG-ENTO-0087933).
- trisetosa* Lonsdale, 2009 (*Heteromerangia*); 2 paratypes (MHNG-ENTO-0087931 and MHNG-ENTO-0087932).

Conopidae

- hirsuta* Stuke & Clemens, 2008 (*Myopa*); 1 holotype (MHNG-ENTO-0086047).

Dolichopodidae

- merzi* Gatt, 2003 (*Microphorella*); 4 paratypes (MHNG-ENTO-0013124 to MHNG-ENTO-0013127).

Drosophilidae

- amputata* Papp, 2004 (*Hypselothyrea*); 1 holotype (MHNG-ENTO-0089614).
- aptera* Papp, 1979 (*Hypselothyrea*); 1 holotype (MHNG-ENTO-0089615), 8 paratypes (MHNG-ENTO-0089616 to MHNG-ENTO-0089623).
- deficiens* Papp, 2004 (*Hypselothyrea*); 1 holotype (MHNG-ENTO-0089624), 7 paratypes (MHNG-ENTO-0089625 to MHNG-ENTO-0089631).
- hungarica* Papp, 2000 (*Leucophenga*); 1 paratype (MHNG-ENTO-0089768).
- longimana* Papp, 2004 (*Hypselothyrea*); 1 holotype (MHNG-ENTO-0089632), 1 paratype (MHNG-ENTO-0089633).
- paralanigera* Papp, 2004 (*Hypselothyrea*); 1 holotype (MHNG-ENTO-0089738), 29 paratypes (MHNG-ENTO-0089739 to MHNG-ENTO-0089767).
- macai* Bächli & Vilela, 2020 (*Paracacoxenus*); 1 paratype (MHNG-ENTO-0089769); [This species was first named *Paracacoxenus* sp. aff. *kaszabi* Bächli & Vilela (2011) before its formal description by Bächli & Vilela (2020)].
- subaptera* Papp, 2004 (*Hypselothyrea*); 1 holotype (MHNG-ENTO-0089634).

Empididae

- adriatica* Chvála, 2008 (*Hilara*); 2 paratypes (MHNG-ENTO-0085455 and MHNG-ENTO-0085563).
- alpicola* Chlava, 2001 (*Hilara*); 1 holotype (MHNG-ENTO-0085564), 6 paratypes (MHNG-ENTO-0085565 to MHNG-ENTO-0085570).
- antalyensis* Chvála, 2008 (*Hilara*); 1 holotype (MHNG-ENTO-0085571), 9 paratypes (MHNG-ENTO-0085572 to MHNG-ENTO-0085580).
- argentigastrea* Chvála, 2001 (*Hilara*); 1 holotype (MHNG-ENTO-0085581), 1 paratype (MHNG-ENTO-0085582).
- autumnalis* Chvála, 2008 (*Hilara*); 1 paratype (MHNG-ENTO-0085583).
- bernhardi* Barták, 2000 (*Rhamphomyia*); 1 holotype (MHNG-ENTO-0085867), 2 paratypes (MHNG-ENTO-0085868 and MHNG-ENTO-0085869).
- bernermerzi* Chvála, 2008 (*Hilara*); 1 holotype (MHNG-ENTO-0085584), 7 paratypes (MHNG-ENTO-0085585 to MHNG-ENTO-0085591).
- bohémica* Chvála & Syrovatka, 1987 (*Empis*); 3 paratypes (MHNG-ENTO-0085454, MHNG-ENTO-0085456 and MHNG-ENTO-0085457).
- brevistriata* Chvála & Merz, 2009 (*Hilara*); 1 holotype (MHNG-ENTO-0085592), 17 paratypes (MHNG-ENTO-0085593 to MHNG-ENTO-0085609).
- cervi* Barták, 2006 (*Rhamphomyia*); 1 holotype (MHNG-ENTO-0085864).

- cimrmani* Barták, 2006 (*Rhamphomyia*); 1 holotype (MHNG-ENTO-0085865).
- crossleyi* Chvála & Merz, 2009 (*Hilara*); 1 holotype (MHNG-ENTO-0085610), 3 paratypes (MHNG-ENTO-0085612 to MHNG-ENTO-0085614).
- cypriana* Chvála, 2008 (*Hilara*); 1 holotype (MHNG-ENTO-0085615), 1 paratype (MHNG-ENTO-0085616).
- goetzei* Chvála, 2005 (*Hilara*); 6 paratypes (MHNG-ENTO-0085617 to MHNG-ENTO-0085622).
- helvetica* Chvála, 1999 (*Hilara*); 1 holotype (MHNG-ENTO-0085623).
- leukensis* Chvála & Merz, 2009 (*Hilara*); 1 holotype (MHNG-ENTO-0085624), 7 paratypes (MHNG-ENTO-0085625 to MHNG-ENTO-0085631).
- luteihalterata* Chvála & Merz, 2009 (*Hilara*); 1 holotype (MHNG-ENTO-0085632), 7 paratypes (MHNG-ENTO-0085633 to MHNG-ENTO-0085639).
- mantovensisi* Chvála, 2008 (*Hilara*); 1 holotype (MHNG-ENTO-0085640), 2 paratypes (MHNG-ENTO-0085641 and MHNG-ENTO-0085642).
- mediterranea* Chvála, 2008 (*Hilara*); 1 holotype (MHNG-ENTO-0085643), 24 paratypes (MHNG-ENTO-0085644 to MHNG-ENTO-0085654 and MHNG-ENTO-0085657 to MHNG-ENTO-0085669).
- merzi* Chvála, 1999 (*Hilara*); 1 holotype (MHNG-ENTO-0085792), 25 paratypes (MHNG-ENTO-0085793 to MHNG-ENTO-0085817).
- merzi* Barták, 2000 (*Rhamphomyia*); 1 holotype (MHNG-ENTO-0085870).
- nigrita* Chvála, 2005 (*Hilara*); 1 holotype (MHNG-ENTO-0085830), 12 paratypes (MHNG-ENTO-0085818 to MHNG-ENTO-0085829).
- nitidorella* Chvála, 1996 (*Hilara*); 6 paratypes (MHNG-ENTO-0085831 to MHNG-ENTO-0085836).
- planti* Chvála & Merz, 2009 (*Hilara*); 1 holotype (MHNG-ENTO-0085837), 4 paratypes (MHNG-ENTO-0085838 to MHNG-ENTO-0085841).
- rampazzii* Barták, 2006 (*Rhamphomyia*); 2 paratypes (MHNG-ENTO-0085876 and MHNG-ENTO-0085877).
- samarkandensis* Barták, 2000 (*Rhamphomyia*); 3 paratypes (MHNG-ENTO-0085871 to MHNG-ENTO-0085873).
- schachtii* Chvála, 2008 (*Hilara*); 2 paratypes (MHNG-ENTO-0085842 and MHNG-ENTO-0085843).
- sellacrinita* Barták, 2007 (*Rhamphomyia*); 1 paratype (MHNG-ENTO-0085874).
- siffointei* Barták & Kubík, 2010 (*Rhamphomyia*); 2 paratypes (MHNG-ENTO-0008789 and MHNG-ENTO-0085895).
- spectabilis* Chvála, 2008 (*Hilara*); 1 holotype (MHNG-ENTO-0085844), 1 paratype (MHNG-ENTO-0085845).
- speightii* Barták, 2006 (*Rhamphomyia*); 1 holotype (MHNG-ENTO-0085866).
- spiniplatyura* Chvála, 2008 (*Hilara*); 1 holotype (MHNG-ENTO-0085846), 1 paratype (MHNG-ENTO-0085847).
- sulcanda* Barták & Kubík, 2008 (*Rhamphomyia*); 4 paratypes (MHNG-ENTO-0085896 to MHNG-ENTO-0085899).
- thaiciliata* Barták & Kubík, 2008 (*Rhamphomyia*); 1 holotype (MHNG-ENTO-0085875).
- triseta* Chvála, 2005 (*Hilara*); 1 holotype (MHNG-ENTO-0085848), 13 paratypes (MHNG-ENTO-0085849 to MHNG-ENTO-0085861).
- veltmani* Chvála, 1999 (*Hilara*); 2 paratypes (MHNG-ENTO-0085862 and MHNG-ENTO-0085863).

Ephydriidae

- baechlii* Zatwarnicki & Mathis, 2007 (*Discomyza*); 1 allotype (MHNG-ENTO-0089777).
- roederi* Girschner, 1889 (*Psilopa*); 2 syntypes (MHNG-ENTO-0089778 and MHNG-ENTO-0089779); [The two syntypes were designated by Merz in 2002 according to the labels carried by the specimens. We did not find any related publication].

Heteromyzidae

- besucheti* (*Eccoptomera*); 1 holotype (MHNG-ENTO-008608); [We could not find any trace of this taxon and consider therefore this specimen as an *in litteris* type].
- fimbria* McAlpine, 2007 (*Borboroides*); 5 paratypes (MHNG-ENTO-0088592 to MHNG-ENTO-0088596).
- merzi* McAlpine, 2007 (*Borboroides*); 2 paratypes (MHNG-ENTO-0088597 and MHNG-ENTO-0088598).
- musica* McAlpine, 2007 (*Borboroides*); 6 paratypes (MHNG-ENTO-0088599 to MHNG-ENTO-0088604).
- shippi* McAlpine, 2007 (*Borboroides*); 3 paratypes (MHNG-ENTO-0088605 to MHNG-ENTO-0088607).

Hippoboscidae

- brachyphysa* Jobling, 1956 (*Raymondia*); 1 holotype (MHNG-ENTO-0091917).
- fjiarum* Maa, 1980 (*Myophthiria*); 1 paratype (MHNG-ENTO-0089774).
- italica* Theodor, 1954 (*Basilina*); 1 specimen (MHNG-ENTO-0091919 to MHNG-ENTO-0091921); [This specimen is not a type but we list it here because of the ambiguous label it carries: '*Basilina* sp. nov.?' This individual is the male of *B. italica* (previously only known by one female) described by Aellen (1955). This single specimen is mounted on three different microscope slides].
- lindbergi* Aellen, 1959 (*Nycteribia vexata* ssp.); 1 holotype (MHNG-ENTO-0091923), 1 allotype (MHNG-ENTO-0091922), 4 paratypes (MHNG-ENTO-0091924 to MHNG-ENTO-0091927).

megastigmatos Jobling, 1956 (*Ascodipteron*); 1 holotype (MHNG-ENTO-0091918).
neocaledonica Maa, 1980 (*Myophthiria*); 1 allotype (MHNG-ENTO-0089775), 1 paratype (MHNG-ENTO-0089776).
wilsoni Maa, 1980 (*Myophthiria*); 2 paratypes (MHNG-ENTO-0089772 and MHNG-ENTO-0089773).
zeylanica Maa, 1980 (*Myophthiria*); 1 allotype (MHNG-ENTO-0089771), 1 paratype (MHNG-ENTO-0089770).

Hybotidae

bartaki Chvála, 1989 (*Platypalpus*); 2 paratypes (MHNG-ENTO-0085903 and MHNG-ENTO-0085904).
biancistroides Yang & Li, 2011 (*Hybos*); 1 paratype (MHNG-ENTO-0008792).
carpathica Chvála, 1966 (*Tachydromia*); 1 paratype (MHNG-ENTO-0085910).
dalongtanus Yang & Li, 2011 (*Platypalpus*); 1 paratype (MHNG-ENTO-0008790).
fluviatilis Chvála, 1995 (*Chersodromia*); 2 paratypes (MHNG-ENTO-0085900 and MHNG-ENTO-0085901).
hirsuticercis Schnitter, Trost & Wallaschek, 2003 (*Drapetis*); 1 paratype (MHNG-ENTO-0085902).
merzi Shamshev & Grotaert, 2012 (*Syndyas*); 1 holotype (MHNG-ENTO-0008947).
nigricolor Merz & Chvála, 1998 (*Platypalpus*); 3 paratypes (MHNG-ENTO-0085905 to MHNG-ENTO-0085907).
palavensis Chvála, 1989 (*Platypalpus*); 2 paratypes (MHNG-ENTO-0085908 and MHNG-ENTO-0085909).
pingqianus Yang & Li, 2011 (*Platypalpus*); 1 paratype (MHNG-ENTO-0008791).
rhyacophila Chvála, 1995 (*Tachydromia*); 1 paratype (MHNG-ENTO-0085911).
yinyuhensis Yang & Li, 2011 (*Hybos*); 1 paratype (MHNG-ENTO-0008793).

Iteaphilidae

merzi Shamshev & Sinclair, 2009 (*Iteaphila*); 1 holotype (MHNG-ENTO-0085878), 16 paratypes (MHNG-ENTO-0085879 to MHNG-ENTO-0085894).

Lauxaniidae

alpina Merz, 2007 (*Sapromyza*); 1 holotype (MHNG-ENTO-0087705), 1 paratype (MHNG-ENTO-0087706).
bilobata Merz, 2001 (*Lauxania*); 1 holotype (MHNG-ENTO-0087620), 3 paratypes (MHNG-ENTO-0087621 to MHNG-ENTO-0087623).
cangshanensis Li & Yang, 2013 (*Homoneura*); 1 paratype (MHNG-ENTO-0087531).
carlestolrai Merz, 2009 (*Sapromyza*); 1 holotype (MHNG-ENTO-0087707), 1 paratype (MHNG-ENTO-0087708).

crispa Li & Yang, 2013 (*Homoneura*); 1 paratype (MHNG-ENTO-0087532).
digitata Shi & Yang, 2008 (*Homoneura*); 1 paratype (MHNG-ENTO-0087533).
dolabrifforme Sasakawa & Kozánek, 1995 (*Calliopum*); 1 paratype (MHNG-ENTO-0087518).
flavoscutellata Shi, Yang & Gaimari, 2011 (*Noonamyia*); 61 paratypes (MHNG-ENTO-0087636 to MHNG-ENTO-0087696).
hermonensis Yarom, 1990 (*Sapromyza*); 7 paratypes (MHNG-ENTO-0087709 to MHNG-ENTO-0087715).
intonsina Yarom, 1990 (*Sapromyza*); 3 paratypes (MHNG-ENTO-0087716 to MHNG-ENTO-0087718).
israelis Yarom, 1990 (*Sapromyza*); 6 paratypes (MHNG-ENTO-0087878 to MHNG-ENTO-0087883).
jinpingsensis Shi, Gaimari & Yang, 2013 (*Noeetomima*); 2 paratypes (MHNG-ENTO-0087884 and MHNG-ENTO-0087885).
laszlopappi Merz, 2007 (*Sapromyza*); 1 holotype (MHNG-ENTO-0087719), 89 paratypes (MHNG-ENTO-0087719 to MHNG-ENTO-0087740 and MHNG-ENTO-0087798 to MHNG-ENTO-0087865).
luteifasciata Yarom, Freidberg & Papp, 1987 (*Mycterella*); 4 paratypes (MHNG-ENTO-0087631 to MHNG-ENTO-0087634).
mediospinosa Merz, 2003 (*Homoneura*); 1 holotype (MHNG-ENTO-0087534), 33 paratypes (MHNG-ENTO-0087535 to MHNG-ENTO-0087567).
merzi Shi, Yang & Gaimari, 2011 (*Dioides*); 1 holotype (MHNG-ENTO-0087522), 8 paratypes (MHNG-ENTO-0087523 to MHNG-ENTO-0087530).
multimaculata Yarom, 1990 (*Sapromyza*); 7 paratypes (MHNG-ENTO-0087866 to MHNG-ENTO-0087872).
nigra Yarom, Freidberg & Papp, 1987 (*Mycterella*); 1 paratype (MHNG-ENTO-0087635).
obtusus Shi, Yang & Gaimari, 2009 (*Cestrotus*); 1 paratype (MHNG-ENTO-0087519).
quadrimaculatus Shi, Yang & Gaimari, 2011 (*Cestrotus*); 1 holotype (MHNG-ENTO-0087520), 1 paratype (MHNG-ENTO-0087521).
semiannulata Li & Yang, 2013 (*Homoneura*); 2 paratypes (MHNG-ENTO-0087568 and MHNG-ENTO-0087569).
siciliana Merz, 2001 (*Lauxania*); 1 holotype (MHNG-ENTO-0087624), 6 paratypes (MHNG-ENTO-0087625 to MHNG-ENTO-0087630).
tibialis Yarom, 1991 (*Paroecus*); 8 paratypes (MHNG-ENTO-0087697 to MHNG-ENTO-0087704).
trisurstyla Li & Yang, 2013 (*Homoneura*); 2 paratypes (MHNG-ENTO-0087570 and MHNG-ENTO-0087571).
undulata Merz, 2007 (*Sapromyza*); 1 holotype (MHNG-ENTO-0087873), 2 paratypes (MHNG-ENTO-0087874 and MHNG-ENTO-0087875).
villosula Merz, 2009 (*Sapromyza*); 2 paratypes (MHNG-ENTO-0087876 and MHNG-ENTO-0087877).

zengae Shi & Yang, 2011 (*Homoneura*); 1 paratype (MHNG-ENTO-0087619).

Limoniidae

austriaca Christian, 1980 (*Chionea*); 2 paratypes (MHNG-ENTO-0085431 and MHNG-ENTO-0085432).

Lonchaeidae

bambusae MacGowan, 2007 (*Silba*); 1 holotype (MHNG-ENTO-0004723), 30 paratypes (MHNG-ENTO-0086052 to MHNG-ENTO-0086081).

korea MacGowan, 2007 (*Setisquamalonia*); 4 paratypes (MHNG-ENTO-0086048 to MHNG-ENTO-0086051).

longidentata MacGowan, 2007 (*Silba*); 1 holotype (MHNG-ENTO-0004719).

tenuipennis MacGowan, 2007 (*Silba*); 3 paratypes (MHNG-ENTO-0086087 to MHNG-ENTO-0086089).

translucens MacGowan, 2007 (*Silba*); 1 holotype (MHNG-ENTO-0004720), 1 paratype (MHNG-ENTO-0086090).

Milichiidae

aelleni Papp, 1978 (*Leptometopa*); 1 holotype (MHNG-ENTO-0088347), 13 paratypes (MHNG-ENTO-0088348 to MHNG-ENTO-0088357, MHNG-ENTO-0088490, MHNG-ENTO-0088492 and MHNG-ENTO-0088493).

maroccana Papp (*Phyllomyza*); 1 type (MHNG-ENTO-0088346); [The list of the taxa described by L. Papp does not mention this taxon (Darvas, 2021). Therefore, we consider this specimen as *in litteris* type].

Muscidae

shinonagai Couri, Pont & Dauterive, 2010 (*Dichaetomyia*); 3 paratypes (MHNG-ENTO-0094888 to MHNG-ENTO-0094890).

tatricus Gregor, 1988 (*Thricops*); 1 paratype (MHNG-ENTO-0089792).

Mycetophilidae

matilei Hackman, 1970 (*Phronia*); 1 holotype (MHNG-ENTO-0085424).

Pallopteridae

reducta Merz & Sueyoshi, 2002 (*Temnosira*); 1 paratype (MHNG-ENTO-0087513).

simillima Merz & Sueyoshi, 2001 (*Temnosira*); 4 paratypes (MHNG-ENTO-0087509 to MHNG-ENTO-0087512).

Periscelididae

soniae Merz & Roháček, 2005 (*Stenomicrogaster*); 12 paratypes (MHNG-ENTO-0088433 to MHNG-ENTO-0088444).

Phoridae

brevipes Papp, 1982 (*Rhynchomicropteron*); 1 holotype (MHNG-ENTO-0085912).

dudichi Papp, 1982 (*Rhynchomicropteron*); 1 holotype (MHNG-ENTO-0085913), 1 paratype (MHNG-ENTO-0085914).

necaphidiforme Disney, 1990 (*Rhynchomicropteron*); 2 paratypes (MHNG-ENTO-0085427 and MHNG-ENTO-0085915).

nepalensis Disney, 1991 (*Rhynchomicropteron*); 1 holotype (MHNG-ENTO-0085425), 8 paratypes (MHNG-ENTO-0085426, MHNG-ENTO-0085428 and MHNG-ENTO-0085916 to MHNG-ENTO-0085921).

nudiventer Papp, 1982 (*Rhynchomicropteron*); 1 holotype (MHNG-ENTO-0085988).

Piophilidae

baechlii Merz, 1996 (*Parapiophila*); 1 paratype (MHNG-ENTO-0087516).

latipennis Ozerov & Barták, 1993 (*Mycetaulus*); 1 paratype (MHNG-ENTO-0087515).

shatakini Ozerov, 2000 (*Actenoptera*); 1 paratype (MHNG-ENTO-0087514).

vernica Ozerov & Barták, 1993 (*Parapiophila*); 1 paratype (MHNG-ENTO-0087517).

Pipunculidae

auctus Kehlmaier, 2005 (*Eudorylas*); 1 paratype (MHNG-ENTO-0085939).

bermeri Kehlmaier, 2005 (*Eudorylas*); 1 holotype (MHNG-ENTO-0085940), 1 allotype (MHNG-ENTO-0085941), 2 paratypes (MHNG-ENTO-0085942 and MHNG-ENTO-0085943).

brachium Kehlmaier & Withers, 2019 (*Semicephalops*); 1 paratype (MHNG-ENTO-0103009).

coei Kehlmaier, 2005 (*Eudorylas*); 1 holotype (MHNG-ENTO-0085944).

cypriota Kehlmaier, 2005 (*Claraeola*); 1 holotype (MHNG-ENTO-0085937), 1 paratype (MHNG-ENTO-0085938).

estebani Withers & Claude, 2021 (*Tomosvaryella*); 1 holotype (MHNG-ENTO-0103008), 6 paratypes (MHNG-ENTO-0094612 to MHNG-ENTO-0094617).

gemellus Kehlmaier, 2005 (*Eudorylas*); 1 holotype (MHNG-ENTO-0085945), 1 paratype (MHNG-ENTO-0085946).

manasi Kehlmaier, 2011 (*Eudorylas*); 1 holotype (MHNG-ENTO-0085947).

osito Kehlmaier, Gibbs & Withers, 2019 (*Tomosvaryella*); 1 paratype (MHNG-ENTO-0094611).

venturai Kehlmaier, 2005 (*Eudorylas*); 1 paratype (MHNG-ENTO-0085989).

Platystomatidae

- alf* Korneyev, 2001 (*Angeloapteromyia*); 1 holotype (MHNG-ENTO-0086258), 12 paratypes (MHNG-ENTO-0086259 to MHNG-ENTO-0086270).
- cestoventris* Byun & Suh, 2001 (*Rivellia*); 2 paratypes (MHNG-ENTO-0086274 and MHNG-ENTO-0086275).
- chvalai* Korneyev, 2001 (*Angeloapteromyia*); 1 holotype (MHNG-ENTO-0086271), 1 paratype (MHNG-ENTO-0086272).
- harai* Byun & Suh, 1998 (*Rivellia*); 2 paratypes (MHNG-ENTO-0086276 and MHNG-ENTO-0086277).
- merzi* Korneyev, 2001 (*Angeloapteromyia*); 1 holotype (MHNG-ENTO-0086273).
- nigroapicalis* Byun & Suh, 2001 (*Rivellia*); 2 paratypes (MHNG-ENTO-0086278 and MHNG-ENTO-0086279).

Psilidae

- confusa* Shatalkin & Merz, 2010 (*Chamaepsila*); 1 holotype (MHNG-ENTO-0085990), 2 paratypes (MHNG-ENTO-0085991 and MHNG-ENTO-0085992).
- forcipis* Shatalkin & Merz (*Chamaepsila*); 1 holotype (MHNG-ENTO-0085993), 29 paratypes (MHNG-ENTO-0085994 to MHNG-ENTO-0086022); [This taxon originates from Montenegro and was therefore not included by Shatalkin & Merz (2010), who only treated the Swiss Psilidae; they probably planned to extend their work to the Balkans and to describe *C. forcipis* but did not do so. Therefore, these specimens are considered as *in litteris* types].
- helvetica* Shatalkin & Merz, 2010 (*Psila*); 1 holotype (MHNG-ENTO-0086044), 2 paratypes (MHNG-ENTO-0086045 and MHNG-ENTO-0086046).
- massanea* Claude & Tissot, submitted (*Chamaepsila*); 1 holotype (MHNG-ENTO-0103013), 2 paratypes (MHNG-ENTO-0103014 and MHNG-ENTO-0103015).
- merzi* Shatalkin, 2000 (*Psila*); 1 holotype (MHNG-ENTO-0086023), 20 paratypes (MHNG-ENTO-0086024 to MHNG-ENTO-0086043).
- ristolasiensis* Claude & Tissot, submitted (*Chamaepsila*); 1 holotype (MHNG-ENTO-0103016), 8 paratypes (MHNG-ENTO-0103017 to MHNG-ENTO-0103024).
- withersi* Claude & Tissot, submitted (*Chamaepsila*); 1 holotype (MHNG-ENTO-0103010), 2 paratypes (MHNG-ENTO-0103011 and MHNG-ENTO-0103012).

Pyrgotidae

- wonjuensis* Kim & Han, 2001 (*Parageloemyia*); 1 paratype (MHNG-ENTO-0087508).

Sarcophagidae

- krathonmai* Pape & Bänziger, 2000 (*Sarcophaga*); 2 paratypes (MHNG-ENTO-0089793 and MHNG-ENTO-0089794).
- pandifera* Blackith & Pape, 1999 (*Sarcophaga*); 1 holotype (MHNG-ENTO-0089796), 1 paratype (MHNG-ENTO-0089795).
- saprianovae* Pape & Bänziger, 2000 (*Sarcophaga*); 2 paratypes (MHNG-ENTO-0089797 and MHNG-ENTO-0089798).

Scathophagidae

- caucasica* Ozerov, 1993 (*Norellia*); 1 paratype (MHNG-ENTO-0089786).
- kirgizika* Ozerov, 2008 (*Gimnomera*); 1 holotype (MHNG-ENTO-0089780), 3 paratypes (MHNG-ENTO-0089781 to MHNG-ENTO-0089783).
- merzi* Ozerov, 2008 (*Parallelomma*); 1 holotype (MHNG-ENTO-0089787).
- oasis* Ozerov & Freidberg, 2010 (*Scathophaga*); 4 paratypes (MHNG-ENTO-0089788 to MHNG-ENTO-0089791).
- zlobini* Ozerov, 2008 (*Microprosopa*); 2 paratypes (MHNG-ENTO-0089784 and MHNG-ENTO-0089785).

Sciomyzidae

- dentata* Merz & Rozkošný, 1995 (*Pherbellia*); 1 paratype (MHNG-ENTO-0087900).
- korneyevi* Rozkošný & Knutson, 2005 (*Euthycera*); 2 paratypes (MHNG-ENTO-0087892 and MHNG-ENTO-0087893).
- lyami* Withers, 2009 (*Renocera*); 1 holotype (MHNG-ENTO-0087901).
- merzi* Rozkošný & Knutson, 2006 (*Euthycera*); 1 holotype (MHNG-ENTO-0087894), 5 paratypes (MHNG-ENTO-0087895 to MHNG-ENTO-0087899).
- parva* Papp, 2004 (*Apteromicra*); 1 holotype (MHNG-ENTO-0087891).

Sphaeroceridae

- aemula* Roháček, 1993 (*Leptocera*); 2 paratypes (MHNG-ENTO-0088802 and MHNG-ENTO-0088803).
- affinis* Hayashi, 2002 (*Poecilosomella*); 22 paratypes (MHNG-ENTO-0089334 to MHNG-ENTO-0089355).
- appendix* Papp, 1991 (*Aptilotus*); 1 holotype (MHNG-ENTO-0088668).
- asiatica* Hayashi & Papp, 2004 (*Lotobia*); 18 paratypes (MHNG-ENTO-0089260 to MHNG-ENTO-0089277).
- asiatica* Papp, 1988 (*Sphaerocera pseudomonilis* ssp.); 1 holotype (MHNG-ENTO-0088660), 4 paratypes (MHNG-ENTO-0088661 to MHNG-ENTO-0088664).
- australis* Papp, 1979 (*Apterobiroina*); 1 holotype (MHNG-ENTO-0088665), 2 paratypes (MHNG-ENTO-0088666 and MHNG-ENTO-0088667).

- besucheti* Papp, 1981 (*Minocellina*); 1 holotype (MHNG-ENTO-0089215), 34 paratypes (MHNG-ENTO-0085429, MHNG-ENTO-0085430 and MHNG-ENTO-0089216 to MHNG-ENTO-0089247).
- brachyptera* Roháček & Marshall, 1988 (*Minilimosina*); 1 holotype (MHNG-ENTO-0089296), 37 paratypes (MHNG-ENTO-0089297 to MHNG-ENTO-0089333).
- burckhardti* Papp, 1995 (*Biroina*); 1 holotype (MHNG-ENTO-0088669).
- cavata* Hayashi, 1994 (*Paralimosina*); 18 paratypes (MHNG-ENTO-0089197 to MHNG-ENTO-0089214).
- cavernicola* Papp & Roháček, 1983 (*Crumomyia*); 1 holotype (MHNG-ENTO-0088781), 1 paratype (MHNG-ENTO-0088782).
- ceylanica* Papp, 1979 (*Hackmaniella*); 1 holotype (MHNG-ENTO-0088785), 4 paratypes (MHNG-ENTO-0088786 to MHNG-ENTO-0088789).
- conspicua* Papp, 2002 (*Poecilosomella*); 1 paratype (MHNG-ENTO-0089356).
- dimorpha* Roháček & Papp, 1988 (*Paralimosina*); 1 holotype (MHNG-ENTO-0088940), 8 paratypes (MHNG-ENTO-0088941 to MHNG-ENTO-0088945 and MHNG-ENTO-0089194 to MHNG-ENTO-0089196).
- gallica* Papp & Roháček, 1983 (*Crumomyia*); 1 holotype (MHNG-ENTO-0088783), 1 paratype (MHNG-ENTO-0088784).
- gigantea* Roháček & Papp, 1988 (*Paralimosina*); 1 holotype (MHNG-ENTO-0088926).
- horrida* Roháček, 1978 (*Limosina*); 1 paratype (MHNG-ENTO-0088790).
- icaros* Roháček & Papp, 1988 (*Paralimosina*); 1 holotype (MHNG-ENTO-0088927), 6 paratypes (MHNG-ENTO-0088928 to MHNG-ENTO-0088933).
- indica* Roháček & Papp, 1988 (*Paralimosina*); 1 holotype (MHNG-ENTO-0088934), 3 paratypes (MHNG-ENTO-0088935 to MHNG-ENTO-0088937).
- indica* Papp, 1989 (*Pterogrammoides*); 1 holotype (MHNG-ENTO-0089379).
- intricata* Papp, 1991 (*Terrilimosina*); 1 holotype (MHNG-ENTO-0089382), 2 paratypes (MHNG-ENTO-0089383 and MHNG-ENTO-0089384).
- lobata* Roháček & Papp, 1988 (*Paralimosina*); 1 holotype (MHNG-ENTO-0088938), 1 paratype (MHNG-ENTO-0088939).
- loebli* Papp, 1981 (*Indiosina*); 1 holotype (MHNG-ENTO-0088791), 5 paratypes (MHNG-ENTO-0088792 to MHNG-ENTO-0088796).
- loebli* Roháček & Papp, 1984 (*Ischiolepta*); 1 holotype (MHNG-ENTO-0088797), 4 paratypes (MHNG-ENTO-0088798 to MHNG-ENTO-0088801).
- nigrinotum* Hayashi & Papp, 2007 (*Chaetopodella*); 24 paratypes (MHNG-ENTO-0088689 to MHNG-ENTO-0088712).
- norbomi* Papp, 1988 (*Copromyza*); 1 holotype (MHNG-ENTO-0088780).
- orientalis* Papp, 1995 (*Biroina*); 1 holotype (MHNG-ENTO-0088670), 18 paratypes (MHNG-ENTO-0088671 to MHNG-ENTO-0088688).
- orientalis* Hayashi & Papp, 2007 (*Chaetopodella*); 24 paratypes (MHNG-ENTO-0088713 to MHNG-ENTO-0088736).
- pappi* Hayashi, 1997 (*Poecilosomella*); 22 paratypes (MHNG-ENTO-0089357 to MHNG-ENTO-0089378).
- rufifrons* Hayashi, 1991 (*Coproica*); 20 paratypes (MHNG-ENTO-0088748 to MHNG-ENTO-0088767).
- sexsetosa* Papp, 1982 (*Leptocera*); 1 holotype (MHNG-ENTO-0088804), 9 paratypes (MHNG-ENTO-0088805 to MHNG-ENTO-0088813).
- smetanai* Marshall, 1987 (*Terrilimosina*); 5 paratypes (MHNG-ENTO-0089509 to MHNG-ENTO-0089513).
- stepheni* Papp, 1991 (*Opalimosina*); 1 paratype (MHNG-ENTO-0088925).
- straminea* Roháček & Marshall, 1985 (*Trachyopella*); 1 paratype (MHNG-ENTO-0089515).
- supraelegans* Hayashi & Papp, 2004 (*Lotobia*); 18 paratypes (MHNG-ENTO-0089278 to MHNG-ENTO-0089295).
- thaii* Papp, 1989 (*Minocellina*); 1 holotype (MHNG-ENTO-0089248), 11 paratypes (MHNG-ENTO-0089249 to MHNG-ENTO-0089259).
- thaii* Papp, 1989 (*Pterogrammoides*); 1 holotype (MHNG-ENTO-0089380).
- unica* Papp, 1979 (*Reunionia*); 1 holotype (MHNG-ENTO-0089381).

Stratiomyidae

- merzi* Rozkošný & Woodley, 2009 (*Oxycerina*); 1 holotype (MHNG-ENTO-0085451).

Syrphidae

- auberti* Goedlin de Tiefenau, 1996 (*Syrphus*); 2 paratypes (MHNG-ENTO-0085934 and MHNG-ENTO-0085936).
- floccosus* Hurkmanns, 1996 (*Merodon*); 5 paratypes (MHNG-ENTO-0085927 to MHNG-ENTO-0085931); [We could not find the description or a mention of this taxon and consider therefore these specimens as *in litteris* types. Interestingly the two species designated by Hurkmanns on material housed in the MHNG were not formally described. See also *Merodon merzii* Hurkmanns].
- lanigulosa* Becker, 1894 (*Cheilosia*); 1 holotype (MHNG-ENTO-0085922).
- longiventris* Becker, 1894 (*Cheilosia*); 1 holotype (MHNG-ENTO-0085923).
- merzii* Hurkmanns (*Merodon*); 1 holotype (MHNG-ENTO-0085932); [We could not find the description or a mention of this taxon and consider therefore these specimens as *in litteris*

types. Interestingly the two species designated by Hurkmans on material housed in the MHNG were not formally described. See also *Merodon floccosus* Hurkmans].

trisolcata Becker, 1894 (*Cheilosia*); 1 holotype (MHNG-ENTO-0085924).

uviformis Becker, 1894 (*Cheilosia*); 1 holotype (MHNG-ENTO-0085925).

vujici Claussen & Dozkal, 1997 (*Cheilosia*); 1 paratype (MHNG-ENTO-0085926).

wollastoni Wakeham-Dawson, Aguiar, Smit, McCullough & Wyatt, 2004 (*Melanostoma*); 2 paratypes (MHNG-ENTO-0085933 and MHNG-ENTO-0085935).

Tabanidae

aberrans Philip, 1941 (*Chrysops*); 1 paratype (MHNG-ENTO-0085433).

bouvieri Philip, 1959 (*Tabanus*); 1 type (MHNG-ENTO-0097766).

jacobi Bouvier, 1945 (*Hybomitra aterrima* var.); 1 type (MHNG-ENTO-0085437).

gallii Bouvier, 1936 (*Haematopota*); 3 types (MHNG-ENTO-0085434 to MHNG-ENTO-0085436).

jacoti Bouvier, 1936 (*Jashinea*); 1 type (MHNG-ENTO-0085438).

kasaii Bouvier, 1941 (*Tabanus*); 1 type (MHNG-ENTO-0085450, 5 cotypes (MHNG-ENTO-0085445 to MHNG-ENTO-0085449); [We could not find the description or any mention of this species and consider these specimens as *in litteris* types].

leclercqi Philip (*Nemorius*); 1 paratype (MHNG-ENTO-0085441); [We could not find the description or any mention of this species and consider these specimens as *in litteris* types].

schoutedeni Bouvier, 1936 (*Tabanus*); 1 type (MHNG-ENTO-0085442).

shwardti Philip, 1942 (*Tabanus*); 2 paratypes (MHNG-ENTO-0085443 and MHNG-ENTO-0085444).

vitripennis Meigen, 1820 (*Nemorius*); 1 holotype (MHNG-ENTO-0085439), 1 paratype (MHNG-ENTO-0085440).

Tachinidae

alpestris Tschorsnig, 1997 (*Chetogena*); 1 paratype (MHNG-ENTO-0089799).

marae Cerretti, 2005 (*Pales*); 1 paratype (MHNG-ENTO-0089802).

merzi Cerretti, 2005 (*Nealsomyia*); 1 paratype (MHNG-ENTO-0089801).

rutilioides Jaenicke, 1867 (*Paradejeania*); 1 paratype (MHNG-ENTO-0089805).

simplex Tschorsnig & Herting, 1998 (*Meigenia*); 1 paratype (MHNG-ENTO-0089800).

ustulata Reinhard, 1959 (*Phorocera*); 2 paratypes (MHNG-ENTO-0089803 and MHNG-ENTO-0089804).

Tephritidae

amberboae Korneyev & Merz, 1996 (*Terellia*); 17 paratypes (MHNG-ENTO-0087198 to MHNG-ENTO-0087214).

apicalis Merz, 2002 (*Goniurellia*); 1 holotype (MHNG-ENTO-0086782), 2 paratypes (MHNG-ENTO-0086783 and MHNG-ENTO-0086784).

apicalis Hardy, 1980 (*Trupanea*); 4 paratypes (MHNG-ENTO-0087294 to MHNG-ENTO-0087297).

apicata Freidberg, 1980 (*Myopites*); 2 paratypes (MHNG-ENTO-0086847 and MHNG-ENTO-0086848).

arabicus White, 2006 (*Dacus*); 2 paratypes (MHNG-ENTO-0086291 and MHNG-ENTO-0086292).

arborea Hardy, 1980 (*Trupanea*); 4 paratypes (MHNG-ENTO-0087298 to MHNG-ENTO-0087301).

artemisiae Hardy, 1980 (*Trupanea*); 1 paratype (MHNG-ENTO-0087302).

baezi Merz, 2000 (*Chaetostomella*); 3 paratypes (MHNG-ENTO-0086563 to MHNG-ENTO-0086565).

bagheera Richter & Kandybina, 1997 (*Rhagoletis*); 2 paratypes (MHNG-ENTO-0086333 and MHNG-ENTO-0086334).

beardsleyi Hardy, 1980 (*Trupanea*); 2 paratypes (MHNG-ENTO-0087303 and MHNG-ENTO-0087304).

bernhardi Korneyev & White, 1996 (*Urophora*); 6 paratypes (MHNG-ENTO-0087344 to MHNG-ENTO-0087349).

bimaculata Freidberg, 1980 (*Tephritis*); 7 paratypes (MHNG-ENTO-0086929 to MHNG-ENTO-0086935).

bimaculatum Zia, 1964 (*Pardalaspinus*); 2 paratypes (MHNG-ENTO-0086328 and MHNG-ENTO-0086329).

bisetosa Merz, 1992 (*Noeeta*); 11 paratypes (MHNG-ENTO-0086849 to MHNG-ENTO-0086859).

campiglossina Freidberg & Merz, 2006 (*Gymnosagena*); 5 paratypes (MHNG-ENTO-0086793 to MHNG-ENTO-0086797).

chrysantemifolii Frias, 1985 (*Trupanea*); 1 paratype (MHNG-ENTO-0087305).

circumflava Korneyev, 1998 (*Urophora*); 1 holotype (MHNG-ENTO-0086805).

clarissima Korneyev, 1987 (*Terellia*); 1 paratype (MHNG-ENTO-0087215).

coleoprata Freidberg & Kaplan, 1993 (*Tarchonanthea*); 14 paratypes (MHNG-ENTO-0086914, and MHNG-ENTO-0086916 to MHNG-ENTO-0086928).

conyzifoliae Merz, 1992 (*Tephritis*); 16 paratypes (MHNG-ENTO-0087076, MHNG-ENTO-0087077, and MHNG-ENTO-0086936 to MHNG-ENTO-0086949).

daclaciae Drew & Roming, 2013 (*Bactrocera*); 3 paratypes (MHNG-ENTO-0086280 to MHNG-ENTO-0086282).

denotata Hardy, 1980 (*Trupanea*); 3 paratypes (MHNG-ENTO-0087338 to MHNG-ENTO-0087340).

- dimorphica* Freidberg & Merz, 2006 (*Elgonina*); 6 paratypes (MHNG-ENTO-0086621 to MHNG-ENTO-0086626).
- ebejeri* Merz, 2002 (*Goniurellia*); 1 holotype MHNG-ENTO-0086785, 3 paratypes (MHNG-ENTO-0086786 to MHNG-ENTO-0086788).
- exquisita* Munro, 1939 (*Marriottella*); 2 paratypes (MHNG-ENTO-0086827 and MHNG-ENTO-0086828).
- fedotovae* Korneyev & White, 1991 (*Eurasimona*); 4 paratypes (MHNG-ENTO-0086757 to MHNG-ENTO-0086760).
- fini* Freidberg, 2002 (*Microtreta*); 12 paratypes (MHNG-ENTO-0086833 to MHNG-ENTO-0086844).
- flavicornis* Freidberg & Merz, 2006 (*Elgonina*); 3 paratypes (MHNG-ENTO-0086635 to MHNG-ENTO-0086637).
- flavoscutellata* Merz & Dawah, 2004 (*Neoceratitis*); 1 holotype (MHNG-ENTO-0086305), 21 paratypes (MHNG-ENTO-0086306 to MHNG-ENTO-0086326).
- foliosi* Frias, 1985 (*Trupanea*); 1 paratype (MHNG-ENTO-0087341).
- footei* Frias, 1985 (*Trupanea*); 2 paratypes (MHNG-ENTO-0087342 and MHNG-ENTO-0087343).
- freidbergi* Merz, 2000 (*Campiglossa*); 2 paratypes (MHNG-ENTO-0086556 and MHNG-ENTO-0086557).
- hancocki* Wang & Chen, 2002 (*Gastrozona*); 1 paratype (MHNG-ENTO-0086304).
- hurvitzi* Freidberg, 1980 (*Tephritis*); 14 paratypes (MHNG-ENTO-0087095 to MHNG-ENTO-0087108).
- iani* Korneyev & Merz, 1998 (*Urophora*); 34 paratypes (MHNG-ENTO-0087350 to MHNG-ENTO-0087372, and MHNG-ENTO-0087457 to MHNG-ENTO-0087467).
- igori* Korneyev, 1990 (*Campiglossa*); 2 paratypes (MHNG-ENTO-0086558 and MHNG-ENTO-0086559).
- inexpectata* Freidberg & Merz, 2006 (*Elgonina*); 8 paratypes (MHNG-ENTO-0086627 to MHNG-ENTO-0086634).
- infusctata* Freidberg & Merz, 2006 (*Elgonina*); 4 paratypes (MHNG-ENTO-0086638 to MHNG-ENTO-0086641).
- itoi* Wang, 1996 (*Trypeta*); 2 paratypes (MHNG-ENTO-0086464 and MHNG-ENTO-0086465).
- ivannikovi* Korneyev & White, 1996 (*Urophora*); 2 paratypes (MHNG-ENTO-0087468 and MHNG-ENTO-0087469).
- jabeliae* Freidberg, 1980 (*Tephritis*); 7 paratypes (MHNG-ENTO-0087109 to MHNG-ENTO-0087115).
- kakamega* White, 2006 (*Dacus*); 1 holotype (MHNG-ENTO-0086293).
- kakamega* Freidberg & Merz, 2006 (*Gymnosagena*); 1 holotype (MHNG-ENTO-0086798).
- khaoyaiae* Drew & Roming, 2013 (*Bactrocera*); 2 paratypes (MHNG-ENTO-0086283 and MHNG-ENTO-0086284).
- korneyevi* Merz, 2011 (*Euaestella*); 1 holotype (MHNG-ENTO-0086751).
- korneyevorum* Mohamadzade Namin & Nozari, 2011 (*Terellia*); 2 paratypes (MHNG-ENTO-0087216 and MHNG-ENTO-0087217).
- laqueatus* Enderlein, 1920 (*Pardalaspinus*); 1 paratype (MHNG-ENTO-0086330).
- leporis* Korneyev, 1993 (*Homoeotricha*); 2 paratypes (MHNG-ENTO-0086803 and MHNG-ENTO-0086804).
- longicauda* Freidberg & Merz, 2006 (*Gymnosagena*); 4 paratypes (MHNG-ENTO-0086799 to MHNG-ENTO-0086802).
- longicornis* Freidberg, 2002 (*Microtreta*); 2 paratypes (MHNG-ENTO-0086845 and MHNG-ENTO-0086846).
- luteipes* Merz, 1992 (*Tephritis*); 17 paratypes (MHNG-ENTO-0087078 to MHNG-ENTO-0087094).
- maculata* Merz & Dawah, 2005 (*Tanaica*); 1 holotype (MHNG-ENTO-0086877), 34 paratypes (MHNG-ENTO-0086878 to MHNG-ENTO-0086911).
- madagascarensis* White, 2006 (*Dacus*); 1 holotype (MHNG-ENTO-0086294), 2 paratypes (MHNG-ENTO-0086295 and MHNG-ENTO-0086296).
- mariannae* Merz, 1992 (*Tephritis*); 16 paratypes (MHNG-ENTO-0087116 to MHNG-ENTO-0087131).
- merzi* White, 2006 (*Dacus*); 1 holotype (MHNG-ENTO-0086297).
- merzi* Korneyev, Smith, Hulbert, Frey & Korneyev, 2022 (*Rhagoletis*); 1 holotype (MHNG-ENTO-0012822), 5 paratypes (MHNG-ENTO-0012823 to MHNG-ENTO-0012825 and MHNG-ENTO-0012827 to MHNG-ENTO-0012828).
- merzi* Freidberg & Kütük, 2003 (*Tephritis*); 9 paratypes (MHNG-ENTO-0087132 to MHNG-ENTO-0087140).
- merzi* Mohamadzade Namin, 2011 (*Urophora*); 2 paratypes (MHNG-ENTO-0087470 and MHNG-ENTO-0087471).
- mirabilis* Merz, 1999 (*Freidbergia*); 1 holotype (MHNG-ENTO-0086761), 20 paratypes (MHNG-ENTO-0086762 to MHNG-ENTO-0086781).
- mirabilis* Zonstein & Freidberg, 2006 (*Setoides*); 10 paratypes (MHNG-ENTO-0086865 to MHNG-ENTO-0086874).
- montana* Freidberg & Hancock, 1989 (*Cryptophorellia*); 2 paratypes (MHNG-ENTO-0086567 and MHNG-ENTO-0086568).
- montana* Korneyev, 2006 (*Terellia*); 1 holotype (MHNG-ENTO-0087288).
- multipunctatus* Merz & Dawah, 2005 (*Dicheniotes*); 4 paratypes (MHNG-ENTO-0086617 to MHNG-ENTO-0086620).
- mutabilis* Merz, 1992 (*Tephritis*); 22 paratypes (MHNG-ENTO-0087141 to MHNG-ENTO-0087162).

- nairobensis* White, 2006 (*Dacus*); 1 holotype (MHNG-ENTO-0086298).
- neuenschwanderi* Freidberg, 1982 (*Urophora*); 9 paratypes (MHNG-ENTO-0087472 to MHNG-ENTO-0087480).
- nigra* Merz, 2008 (*Oxyaciura*); 1 holotype (MHNG-ENTO-0086860), 2 paratypes (MHNG-ENTO-0086861 and MHNG-ENTO-0086862).
- octoradiata* Merz, 2002 (*Goniurellia*); 4 paratypes (MHNG-ENTO-0086789 to MHNG-ENTO-0086792).
- odontolophi* Korneyev, 1993 (*Terellia*); 6 paratypes (MHNG-ENTO-0087227 to MHNG-ENTO-0087232).
- omeiensis* Zia, 1964 (*Proanoplomus*); 1 paratype (MHNG-ENTO-0086331).
- phalolepidis* Merz & White, 1991 (*Urophora*); 8 paratypes (MHNG-ENTO-0087481 to MHNG-ENTO-0087488).
- pibari* Kwon, 1985 (*Chejuparia*); 1 paratype (MHNG-ENTO-0086566).
- pollinosa* Freidberg & Merz, 2006 (*Elgonina*); 4 paratypes (MHNG-ENTO-0086642 to MHNG-ENTO-0086645).
- pollinosa* Merz & Dawah, 2005 (*Tanaica*); 1 holotype (MHNG-ENTO-0086912), 2 paratypes (MHNG-ENTO-0086913 and MHNG-ENTO-0086915).
- pulchralis* White, 2006 (*Dacus*); 1 holotype (MHNG-ENTO-0086299), 1 paratype (MHNG-ENTO-0086300).
- quelpartensis* Kwon, 1985 (*Paroxyna*); 2 paratypes (MHNG-ENTO-0086560 and MHNG-ENTO-0086561).
- quilicii* White, 2006 (*Dacus*); 1 holotype (MHNG-ENTO-0086301).
- quinquemaculata* Wang, 1996 (*Paragastrozona*); 1 paratype (MHNG-ENTO-0086327).
- reducta* Hans & Norrbom, 2005 (*Trypeta*); 4 paratypes (MHNG-ENTO-0086533 and MHNG-ENTO-0086536).
- reductiseta* Merz & Dawah, 2005 (*Arabodesis*); 1 holotype (MHNG-ENTO-0086555), 14 paratypes (MHNG-ENTO-0086541 to MHNG-ENTO-0086554).
- rhapontici* Merz, 1990 (*Terellia*); 4 paratypes (MHNG-ENTO-0087233 to MHNG-ENTO-0087236).
- rohdendorfi* Korneyev & Merz, 1997 (*Rhagoletis*); 31 paratypes (MHNG-ENTO-0086335 to MHNG-ENTO-0086358, and MHNG-ENTO-0086457 to MHNG-ENTO-0086463).
- ruiiliensis* Wang, Xiao & Chen, 2008 (*Bactrocera*); 2 paratypes (MHNG-ENTO-0086285 and MHNG-ENTO-0086286).
- sabroskyi* Novak, 1974 (*Paroxyna*); 1 paratype (MHNG-ENTO-0086562).
- sabroskyi* Freidberg, 1982 (*Terellia*); 52 paratypes (MHNG-ENTO-0087237 to MHNG-ENTO-0087287, and MHNG-ENTO-0087289).
- sauterina* Merz & Freidberg, 1994 (*Tephritis*); 18 paratypes (MHNG-ENTO-0087163 to MHNG-ENTO-0087180); [This species was initially named *Tephritis sauteri*, a junior primary homonym of *T. sauteri* Enderlein, 1911. Merz & Freidberg (1994) replaced it with *sauterina*].
- sauteri* Merz, 1992 (*Tephritis*); [This name was replaced by *T. sauterina* (See also comment under this species)].
- scorzoneræ* Merz, 1993 (*Tephritis*); 15 paratypes (MHNG-ENTO-0087181 to MHNG-ENTO-0087195).
- sepsoides* Freidberg & Merz, 2006 (*Marriottella*); 4 paratypes (MHNG-ENTO-0086829 to MHNG-ENTO-0086832).
- seticauda* Wang, 1996 (*Trypeta*); 2 paratypes (MHNG-ENTO-0086538 and MHNG-ENTO-0086539).
- setosa* Merz & Dawah, 2005 (*Sphenella*); 1 holotype (MHNG-ENTO-0086875), 1 paratype (MHNG-ENTO-0086876).
- shenonica* Wang, 1989 (*Cybaforma*); 1 paratype (MHNG-ENTO-0086290).
- sinensis* Wang, 1990 (*Dacus*); 1 paratype (MHNG-ENTO-0086302).
- sinica* (Wang, 1990) (*Tephritis*); 2 paratypes (MHNG-ENTO-0087196 and MHNG-ENTO-0087197).
- sogdiana* Korneyev & Merz, 1998 (*Urophora*); 32 paratypes (MHNG-ENTO-0086806 to MHNG-ENTO-0086826, and MHNG-ENTO-0087489 to MHNG-ENTO-0087499).
- splendida* Freidberg & Merz, 2006 (*Elgonina*); 18 paratypes (MHNG-ENTO-0086646, MHNG-ENTO-0086647, and MHNG-ENTO-0086653 to MHNG-ENTO-0086668).
- stackelbergi* Korneyev, 1990 (*Oxyna*); 2 paratypes (MHNG-ENTO-0086863 and MHNG-ENTO-0086864).
- tarbinskiorum* Korneyev, 2006 (*Terellia*); 2 paratypes (MHNG-ENTO-0087290 and MHNG-ENTO-0087291).
- tengritavica* Korneyev & Merz, 1998 (*Urophora*); 3 paratypes (MHNG-ENTO-0087500 to MHNG-ENTO-0087502).
- trinervii* Korneyev & White, 1996 (*Urophora*); 3 paratypes (MHNG-ENTO-0087503 to MHNG-ENTO-0087505).
- trivandrumensis* Drew & Roving, 2013 (*Bactrocera*); 1 holotype (MHNG-ENTO-0086287), 2 paratypes (MHNG-ENTO-0086288 and MHNG-ENTO-0086289).
- tsoii* Korneyev & White, 1993 (*Urophora*); 2 paratypes (MHNG-ENTO-0087506 and MHNG-ENTO-0087507).
- vanharteni* Merz, 2008 (*Euarestella*); 1 holotype (MHNG-ENTO-0086752), 4 paratypes (MHNG-ENTO-0086753 to MHNG-ENTO-0086756).
- whitei* Korneyev & Mohamadzade Namin, 2013

(*Terellia*); 1 holotype (MHNG-ENTO-0087292), 1 paratype (MHNG-ENTO-0087293).

yaromi Freidberg & Merz, 2006 (*Elgonina*); 9 paratypes (MHNG-ENTO-0086742 to MHNG-ENTO-0086750).

yemenensis White, 2006 (*Dacus*); 1 holotype (MHNG-ENTO-0086303).

yuanensis Zia, 1964 (*Proanoplomus*); 1 paratype (MHNG-ENTO-0086332).

yushunica Wang, 1996 (*Trypeta*); 1 paratype (MHNG-ENTO-0086540).

Ulidiidae

freyi Kameneva, 2006 (*Herina*); 1 paratype (MHNG-ENTO-0086095).

merzi Kameneva, 2007 (*Herina*); 1 paratype (MHNG-ENTO-0086096).

mongolica Soós, 1971 (*Melieria*); 2 paratypes (MHNG-ENTO-0086093 and MHNG-ENTO-0086094).

rajabii Mohamadzade & Kameneva, 2013 (*Herina*); 2 paratypes (MHNG-ENTO-0086097 and MHNG-ENTO-0086098).

rivosecchii Merz, 2002 (*Herina*); 1 holotype (MHNG-ENTO-0086151), 57 paratypes (MHNG-ENTO-0086152 to MHNG-ENTO-0086208).

Xenasteiidae

shalam Freidberg, 1994 (*Xenasteia*); 1 paratype (MHNG-ENTO-0088445).

Missing types

Lonchaeidae

bispicata MacGowan & Withers 2014 (*Lonchaea*); 2 paratypes.

Psychodidae

ellisi Withers, 1987 (*Telmatoscopus*); 5 paratypes.

minima Withers, 2004 (*Trichomyia*); 1 holotype, 1 paratype.

vallanti Withers, 1986 (*Telmatoscopus*); 2 paratypes.

Scatopsidae

lydiae Withers, 2004 (*Rhexosa*); 1 holotype, 7 paratypes.

DISCUSSION

The present work lists all Diptera specimens labelled as types and currently housed in the MHNG. In addition, to facilitate further taxonomical studies, we compiled the original descriptions of the listed taxa apart from

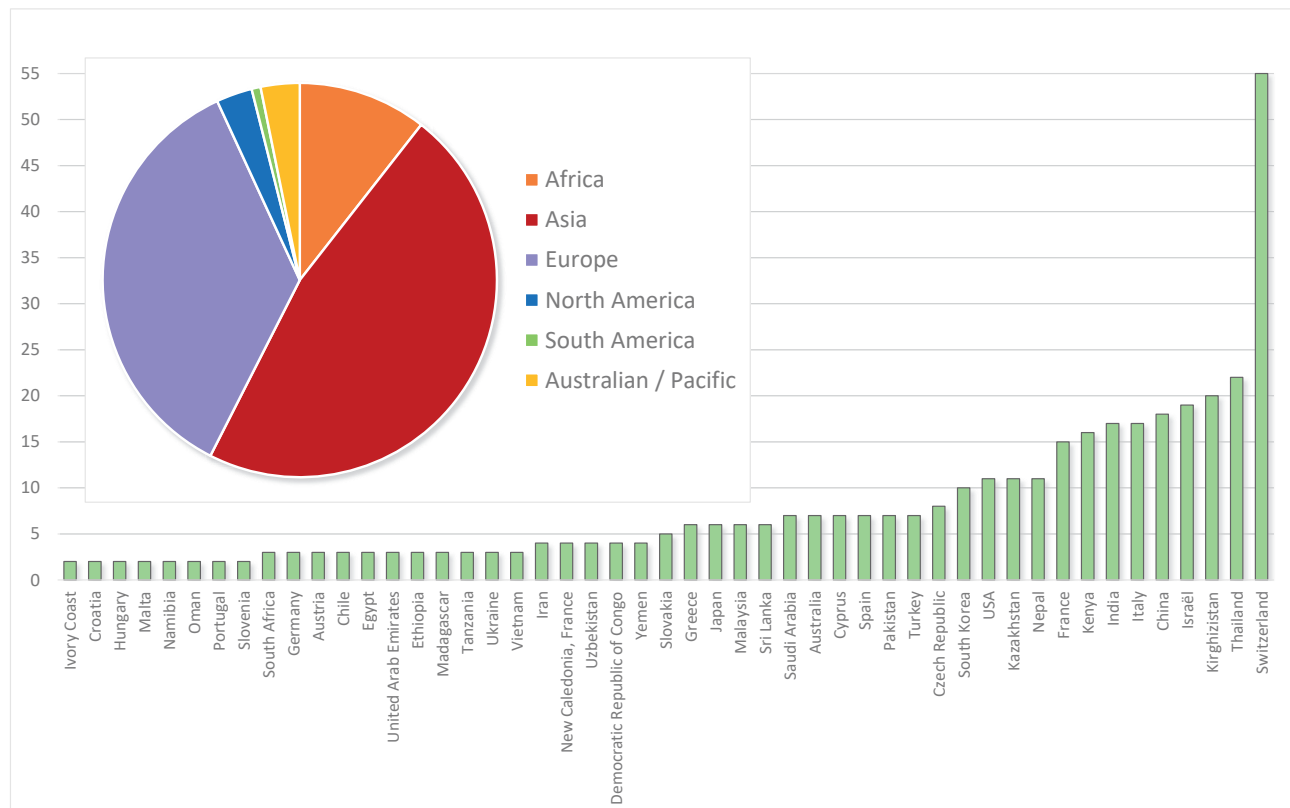


Fig. 3. Geographic origin of the taxa represented by type material in the MHNG.

eight taxa for which we could not find any references. In these cases, the associated specimens were considered as *in litteris* types (see also comments in the species list). These were mostly represented in modern material with some taxa designated by B. Merz.

About half of the types originates from Asia, more precisely from expeditions carried by Bernhard Merz in central Asia (Kirghizistan, Kazakstan), Ivan Löbl (India and Nepal) and Peter Schwendinger in Thailand (Fig. 3). Interestingly, Switzerland is the country where most of the type specimens originated, underlying the potential for taxonomic discoveries in some poorly studied groups in a small and (relatively) well prospected country even in very recent times (Korneyev *et al.*, 2022).

About half of all the holotypes housed in the collection of the MHNG were collected by Merz, Löbl and Schwendinger and also by Amnon Freidberg, an Israeli tephritid specialist with whom Merz collaborated on several occasions (Fig. 4). Most of the type material belongs to the families Tephritidae, Lauxaniidae and Empididae, which were the main interest of B. Merz. Sphaeroceridae, a family of small flies, sometimes apterous, which were sifted from soil litter by Löbl and Schwendinger while searching for beetles and spiders respectively, are also well represented. The work of B. Merz has been instrumental in bringing the Diptera

collection of the MHNG from a quantitatively small and taxonomically reduced collection to one of international importance for some families. It is noteworthy that a substantial number of type specimens were collected as bycatches of Löbl and Schwendinger. This unexpected outcome illustrates the importance of exhaustive non-targeted sampling in field campaigns, in the face of ever growing administrative and political impediments to this type of natural history research activities in the 21st century (Löbl, 2016).

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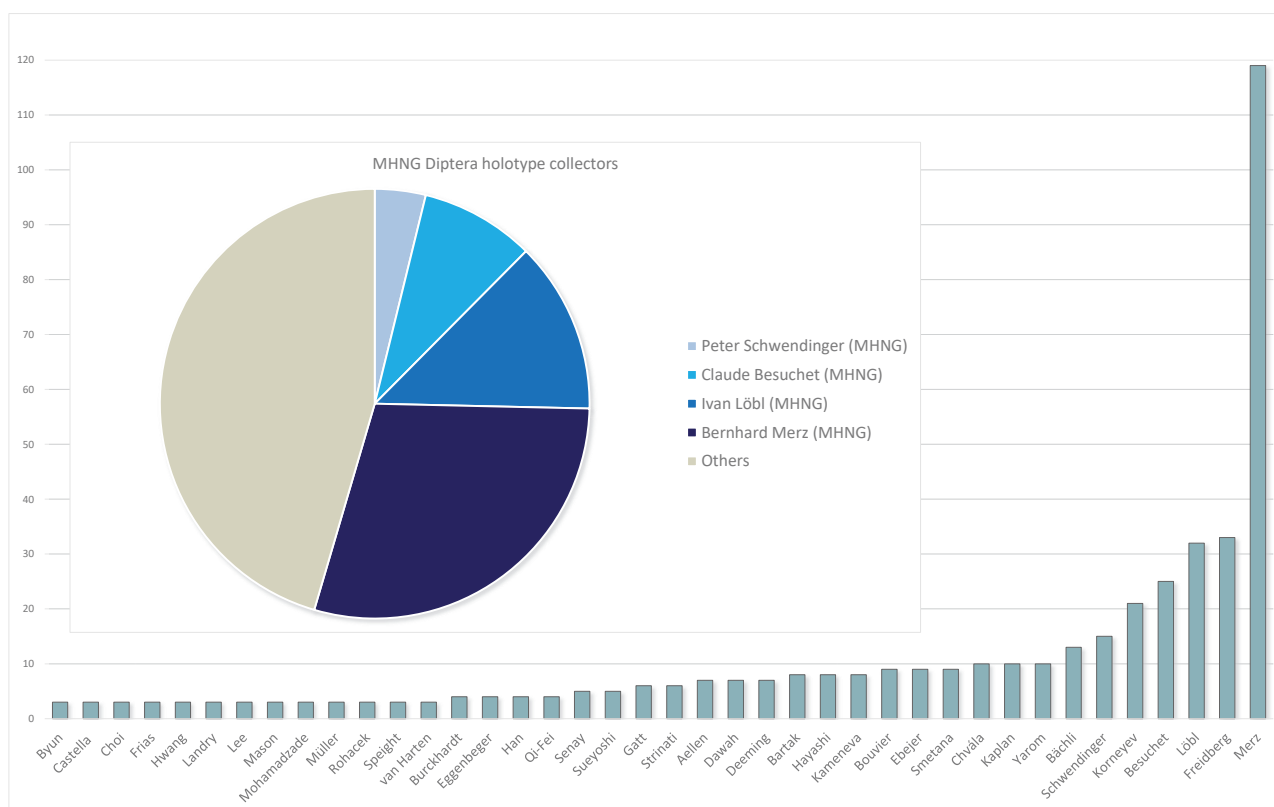


Fig. 4. Collectors of the taxa represented by type material in the MHNG.

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