



**BETLES OF THE FAMILY CRYPTOPHAGIDAE (COLEOPTERA) IN THE
COLLECTION OF ZOOLOGICAL MUSEUM OF TARAS SHEVCHENKO
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The Cryptophagidae collection (Coleoptera: Cucujoidea) deposited at the Zoological Museum of the Taras Shevchenko National University of Kyiv (ZMKU) is described. The main authors of the collection are well-known researchers from the 1910–1930s, Orest Marcu and Karl Penecke. This is the largest collection of cryptophagids among the natural museums of Ukraine containing 304 specimens belonging to 85 species of 13 genera. In addition, 15 specimens of 5 species belonging to the families Erotylidae, Biphyllidae and Languriidae were among Cryptophagidae specimens. The collection, according to information available in the ZMKU, came to the museum not earlier than 1947 as the indemnity for the results of the II World War, most likely from Chernivtsi, where Marcu and Penecke worked. The vast majority of specimens is collected in the territory of modern Romania and Ukraine, and many specimens came from Chernivtsi. A table with an overview of all key details of the specimens is given, in which there are 6 fields: the name of the species on the label, details on the species identification, number of specimens, collection locality with the name of collector and remarks on the specimen, in particular, the instructions for decoding collection sites from the original labels. Annotations are made on the amount of the collection and the most important specimens and re-identification for each of the 13 genera. Some specimens are lost, probably during numerous collection migrations. In particular, some species (*Cryptophagus simplex*, *C. lapidicola*, *C. nitidulus*, *Caenoscelis subdeplanata*, *Atomaria grandicollis*, *A. peltata*, etc.) are represented in the collection only by the labels. The collection is important for the analysis of the composition of the fauna of the Carpathian region in the broad sense, since some species are encountered in the collection rarely; therefore it is important to clarify their locations to form the most comprehensive list of species of the Cryptophagids in the region. Several species of the family were included on the actual list of the fauna of the region on the basis of the study of this collection, in particular: *Atomaria linearis*, *A. analis*, *A. apicalis*, *A. gravidula*, *Cryptophagus fasciatus*, *C. setulosus*, etc.

Key words: Cryptophagidae, Coleoptera, Zoological museum of the Kyiv University, O. Marcu and K. Penecke collections, Carpathians.

Жуки родини Cryptophagidae (Coleoptera) в колекції Зоологічного музею Київського національного університету імені Тараса Шевченка

Очеретна К.

Наведено огляд колекції Cryptophagidae (Coleoptera), яка зберігається в Зоологічному музеї Київського національного університету імені Тараса Шевченка і містить 304 екземпляри 85 видів 13 родів. Колекцію зібрано у 1910–1930-х рр. Орестом Марку та Карлом Пенеке переважно на території сучасних Румунії та України (Чернівці). Представлено загальну таблицю з оглядом усіх ключових відомостей та анотації про найважливіші екземпляри і перевизначення. Екземпляри видів *Cryptophagus simplex*, *C. lapidicola*, *C. nitidulus*, *Caenoscelis subdeplanata*, *Atomaria grandicollis*, *A. peltata* та ін. представлені винятково етикетками. Окремі види включено до списку фауни Карпат на підставі аналізу цієї колекції, зокрема, *Atomaria linearis*, *A. analis*, *A. apicalis*, *A. gravidula*, *Cryptophagus fasciatus*, *C. setulosus* та ін.

Ключові слова: Cryptophagidae, Coleoptera, Зоологічний музей Київського національного університету, колекція Марку та Пенеке, фауна Карпат.

Introduction

Collections of zoological museums are extremely valuable assets of biological science, since they concentrate materials of a large number of researchers for long periods of time, which allow to estimate the faunal diversity of a researched region completely (Akimov et al., 2015). Analysis of such collections allows tracing changes in the fauna for decades unreachable even during the most advanced monitoring studies, because some rare species may be uncollected for years, and allow comparison of the new material with standard voucher specimens (Zagorodniuk, Chervonenko, 2015).

The Zoological Museum of the University of Kyiv (ZMKU) is one of the oldest museums in Ukraine, founded in 1805 as the Zoological Office at the Volyn Lyceum in Kremenets. The Department of Invertebrates currently possesses about 668,000 units of storage and exposition department (Shydlovskyy, 2012; M. Bilyashivsky, pers. message). The museum collections have series of rare specimens, which were the subject of this study. This work aimed a review of beetles of the family Cryptophagidae in the collection of ZMKU.

Material (description of the collection)

General description. The collection of Cryptophagids in ZMKU is a series, apparently delivered by one person. The collection was examined by the author in January 2019 with the assistance of its curator M. M. Bilyashivsky (Fig. 1b). It is stored in one large entomological drawer (Figs. 1a, 2) with up to two thousand specimens of several families, the first part of which are the two rows of pinned insects (Fig. 2), the beetles of the family Cryptophagidae. All species of the family are kept in the same box together with specimens of the other families: Tritomidae, Nitidulidae, Lathridiidae (Cucujoidea), and Derodontidae (Derontoidea). The specimens have labels that contain information about the collection, more rarely also about the collector.

The state of storage of the collection. Most of the specimens in the collection are kept in a satisfactory condition; specimens have not lost the basic morphological features important for diagnostics of species. However, during transportation or research by other scientists, etc., 10 species were apparently lost, and only labels are present instead of actual specimens.

Specifics of the collection. The time interval — the existing specimens were collected over a fairly long period of time, but most of the specimens can be dated from 1910 to 1930s, the period of active collecting of material by O. Marcu and K. Penecke, the former owners of the collection. Geography:



Fig. 1. The collection of Cryptophagidae in ZMKU collected by O. Marcu and K. Penecke: *a* — a label on the box; *b* — stage of work with the collection and its curator M. Bilyashivsky. Photos by the author and I. Zagorodniuk (*b*).

various collection sites, the largest number of specimens collected in Austria (mainly, K. Penecke collection) and Bukovina (O. Marcu collection). Specimens from Hungary, Germany, Italy, etc. are also available. Taxonomy: most species names correspond to the current nomenclature of the family, but some are considered to be junior synonyms (*Emphylus* Erichson, 1848 = *Spavius* Motschulsky, 1844; *Cryptophagus deubeli* Ganglbauer, 1897 = *C. montanus* Brisout de Barneville, 1863; *Antherophagus nigricornis* (Fabricius, 1787) and *A. pallens* (Linnaeus, 1758) united in one species — *A. pallens*) or, placed under two names (e.g. *A. pallens* (Linnaeus, 1758) and *A. silaceus* (Herbst, 1792)), as listed in Table 1.

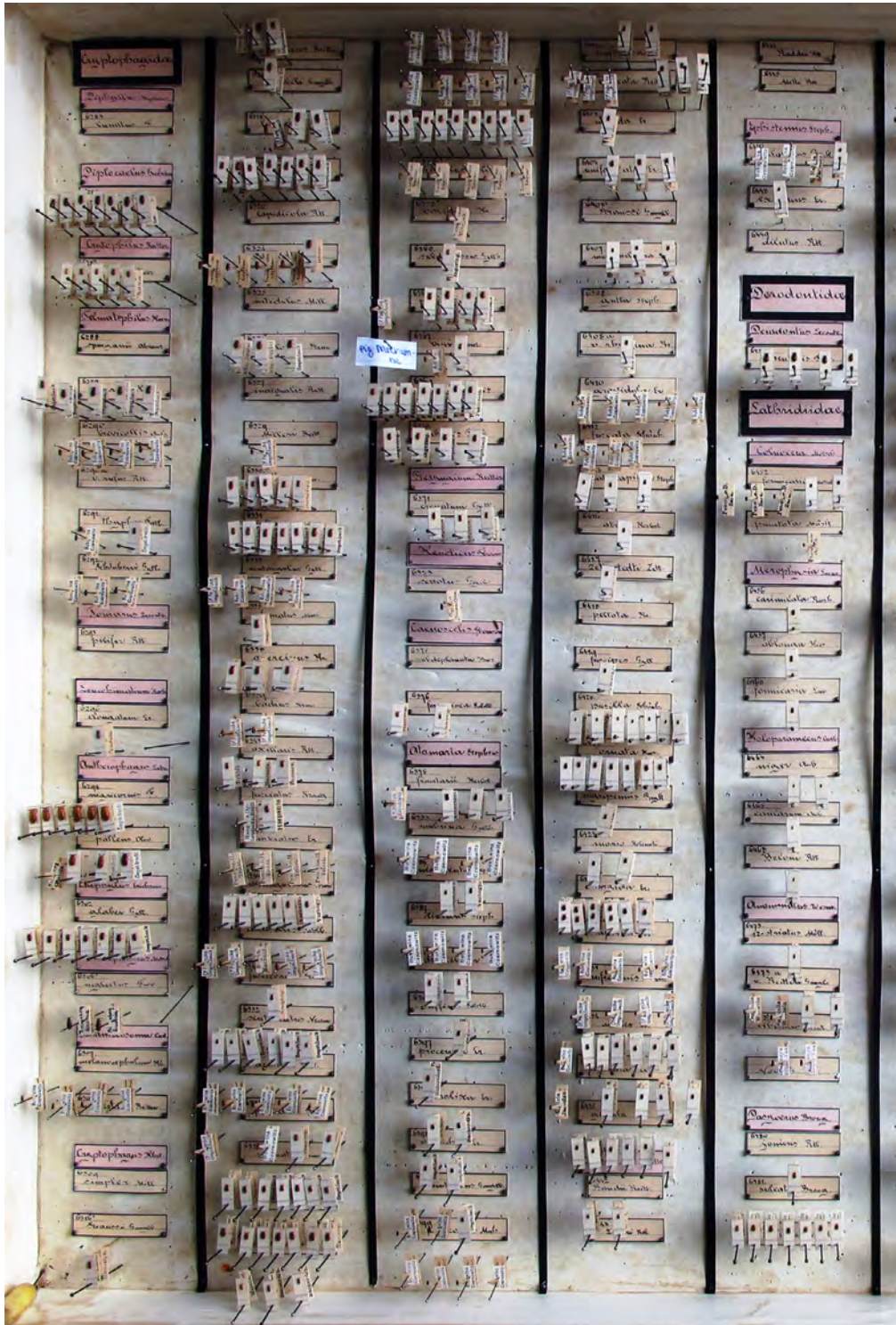


Fig. 2. General view of the drawer with collected specimens of Cryptophagidae. Photo by I. Kostiuk.

Re-identification. The drawer contains the specimens of other families — Erotylidae, Languriidae, and Biphyllidae. The original identification labels of most specimens is correct except the lost specimens, since they cannot be checked. Some species names are currently modified and the relevant specifications are listed in the Table 1. Probable collectors: if the labels had no collector name specified, the analysis of collection (handwriting, labels, customization of specimens, pins), most of them were collected by O. Marcu and K. Penecke themselves, judging from the geographical places of the collections. Basically, the labels do not contain information about the collector, with the exception of part of the collection with the designation of the name K. Penecke; the name of O. Marcu is specified on none of the labels.

Valuable specimens. The cryptophagid collection in ZMKU is important as a regional collection for analyzing the fauna composition of the Carpathian region. Several species of the family were included on the actual list of the regional fauna on the basis of the collection analysis. In particular, there are three species of the genus *Atomaria* (*A. linearis* Stephens, 1830, *A. analis* Erichson, 1846, *A. apicalis* Erichson, 1846, *A. gravidula* Erichson, 1846), two species of the genus *Cryptophagus* (*C. fasciatus* Kraatz, 1852 (Fig. 3), *C. setulosus* Sturm, 1845), and others.

Explanation of the table. All information about the collection is given in the Table 1. The fields in the table are as follows:

1. **The number** — the serial number of the record in the table, corresponding to the order of specimens in the Cryptophagidae family drawer. In some cases, when the species of Erotylidae, Biphyllidae, and Languriidae are in the drawer, these specimens are also listed in the table, since I did not change the order of the beetles in this study.

2. **Label** — definition of the specimen by the collector or the preparator, that is the name under which the specimen is stored. Examples of original labels are given on Fig. 3.

3. **Valid name** — verified re-identification.

4. **Number of specimens** in the series (not specimens of the species, as further may again be a series of this species from another location). If the number of specimens is not indicated, the specimens are missing, and only a pinned label remained.

5. **Locality and collector** — a record received from the label, often incomplete and with abbreviations, in a few cases irrecoverable, but usually sufficient for decoding of the full locality name. Sometimes the name of the collector, indirectly show the locality (known collector's research area).

6. **Remarks** — in the vast majority of records, it concerns the refinement of the name of the location, region or country, in some cases, the state of the specimen (or its destitution).

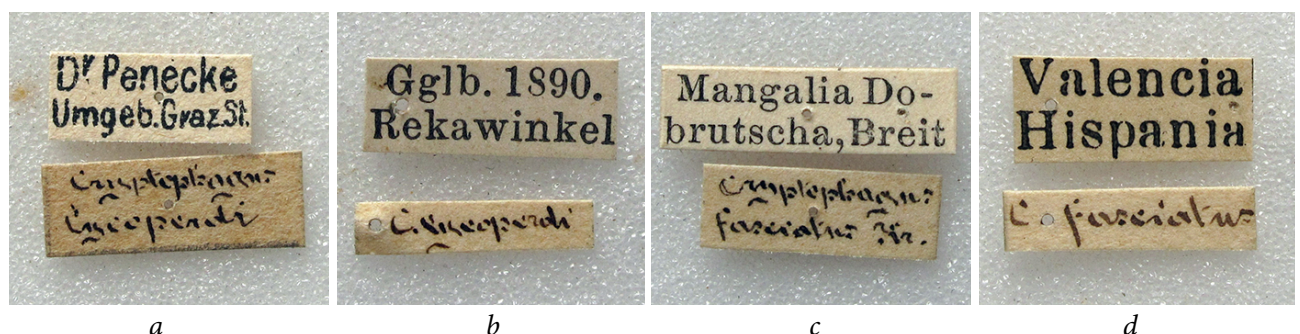


Fig. 3. Original labels on collected specimens of Cryptophagidae: *a* — *Cryptophagus lycoperdi* (Scopoli, 1763) from Austria (K. Penecke); *b* — *C. lycoperdi* (Scopoli, 1763) from Austria (L. Ganglbauer); *c* — *Cryptophagus fasciatus* Kraatz, 1852 from Romania (J. Breit); *d* — *C. fasciatus* Kraatz, 1852 from Spain. Photos by I. Kostiuk.

Table 1

List of species of the family Cryptophagidae in the ZMKU collection

№	Label	Valid name	Number of specimens	Locality and collector	Remarks
1	<i>Diplocoelus fagi</i>	Biphyllidae: <i>Diplocoelus fagi</i> Guérin-Méneville, 1838	5	Umgeb. Graz. St	Bezirk Graz-Umgebung, Austria
2	<i>Diplocoelus fagi</i>	Biphyllidae: <i>Diplocoelus fagi</i> Guérin-Méneville, 1838	2	Adelberg Car. S.	Baden-Württemberg, Germany
3	<i>Cryptophilus integer</i>	Languriidae: <i>Cryptophilus integer</i> (Heer, 1841)	5	L. Miller; D Rava	—
4	<i>Telmatophilus caricis</i>	<i>Telmatophilus caricis</i> (Olivier, 1790)	6	Umgeb. Graz. St	Bezirk Graz-Umgebung, Austria. 1 specimen has been lost
5	<i>Telmatophilus brevicollis</i>	<i>Telmatophilus brevicollis</i> Aube, 1862	4	Bukowina, Czernowitz	Chernivtsi, Ukraine
6	<i>Telmatophilus brevicollis</i> var. <i>rufus</i>	<i>Telmatophilus brevicollis</i> Aube, 1862	1	Bukowina, Czernowitz	Chernivtsi, Ukraine
7	<i>Telmatophilus typhae</i>	<i>Telmatophilus typhae</i> (Fallen, 1802)	1	Bukowina, Czernowitz	Chernivtsi, Ukraine. Noted on the label: tHyphae
8	<i>Telmatophilus typhae</i>	<i>Telmatophilus typhae</i> (Fallen, 1802)	1	Umgeb. Graz. St	Bezirk Graz-Umgebung, Austria. Noted on the label: tHyphae
9	<i>Telmatophilus schoenherri</i>	<i>Telmatophilus typhae</i> (Fallen, 1802)	3	Bukowina, Czerno-witz	Chernivtsi, Ukraine. Noted on the label: schOnherri
10	<i>Tomarus pilifer</i>	Erotyliidae: <i>Toramus pilifer</i> Reitter, 1885	—	—	Valid name:
11	<i>Leucohimatium elongatum</i>	Languriidae: <i>Leucohimatium arundinaceum</i> (Forskål, 1775)	1	Karamann L., Cas-telli	—
12	<i>Antherophagus nigricornis</i>	<i>Antherophagus pallens</i> (Linnaeus, 1758)	6	Umgeb. Graz. St	Bezirk Graz-Umgebung, Austria
13	<i>Antherophagus pallens</i>	<i>Antherophagus pallens</i> (Linnaeus, 1758)	2	Salzburg, Gastein	Austria
14	<i>Antherophagus pallens</i>	<i>Antherophagus pallens</i> (Linnaeus, 1758)	1	Lanseb. Kt. 7	—
15	<i>Antherophagus pallens</i>	<i>Antherophagus pallens</i> (Linnaeus, 1758)	1	Umgeb. Graz. St	Bezirk Graz-Umgebung, Austria
16	<i>Antherophagus pallens</i> (<i>silaceus</i>)	<i>Antherophagus silaceus</i> Herbst, 1792	1	Umgeb. Graz. St	Bezirk Graz-Umgebung, Austria
17	<i>Emphylus glaber</i>	<i>Spavius glaber</i> (Gyllenhal, 1808)	1	Penecke; Cr. Cisterniy	Cistérniga?
18	<i>Emphylus glaber</i>	<i>Spavius glaber</i> (Gyllenhal, 1808)	6	Umgeb. Graz. St	Bezirk Graz-Umgebung, Austria
19	<i>Macrophagus neglectus</i>	Languriidae: <i>Macrophagus robustus</i> Motschulsky, 1845	2	Bisamberg, Austria	—
20	<i>Paramecosoma melanocephalum</i>	<i>Paramecosoma melanocephalum</i> (Herbst, 1793)	4	Bukowina, Czernowitz	Chernivtsi, Ukraine

Table 1 continued

№	Label	Valid name	Number of specimens	Locality and collector	Remarks
21	<i>Paramecosoma univestre</i>	<i>Paramecosoma melanocephalum</i> (Herbst, 1793)	—	Bukowina, Czernowitz	Chernivtsi, Ukraine. Only label
22	<i>Cryptophagus simplex</i>	<i>Cryptophagus simplex</i> Miller, 1858	—	—	Only label
23	<i>Cryptophagus straussi</i>	<i>Cryptophagus straussi</i> Ganglbauer, 1897	1	Penecke; St. Gleinalpe	Steiermark, Österreich, Austria
24	<i>Cryptophagus croaticus</i>	<i>Cryptophagus croaticus</i> Reitter, 1879	1	Penecke; St. H.-Lantsch.	Switzerland, Graubünden
25	<i>Cryptophagus croaticus</i>	<i>Cryptophagus croaticus</i> Reitter, 1879	2	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
26	<i>Cryptophagus deubeli</i>	<i>Cryptophagus montanus</i> Brisout de Barneville, 1863	1	Ganglb.; 65 Bucsecs Tr.	Masivul Bucegi, România Munții Bucegi
27	<i>Cryptophagus lycoperdi</i>	<i>Cryptophagus lycoperdi</i> (Scopoli, 1763)	1	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
28	<i>Cryptophagus lycoperdi</i>	<i>Cryptophagus lycoperdi</i> (Scopoli, 1763)	2	Gglb. 1890 Rekawinkel	Rekawinkel Station in Eichgraben, Austria
29	<i>Cryptophagus pilosus</i>	<i>Cryptophagus pilosus</i> Gyllenhal, 1827	1	Penecke; St. Ingering.	Ingering: 865 m, Steiermark, Österreich, Austria
30	<i>Cryptophagus pilosus</i>	<i>Cryptophagus pilosus</i> Gyllenhal, 1827	1	Penecke D.; Meleda	—
31	<i>Cryptophagus pilosus</i>	<i>Cryptophagus pilosus</i> Gyllenhal, 1827	5	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
32	<i>Cryptophagus lapidicola</i>	<i>Cryptophagus lapidicola</i> Reitter, 1880	—	—	Only label
33	<i>Cryptophagus schmidti</i>	<i>Cryptophagus schmidti</i> Sturm, 1845	4	Germania, Coethen	Köthen
34	<i>Cryptophagus schmidti</i>	<i>Cryptophagus schmidti</i> Sturm, 1845	1	L. Miller; Wien	Köthen
35	<i>Cryptophagus schmidti</i>	<i>Cryptophagus schmidti</i> Sturm, 1845	1	L. Miller; Wien	—
36	<i>Cryptophagus setulosus</i>	<i>Cryptophagus setulosus</i> Sturm, 1845	2	Kronstadter Gbg.; Deubel	Braşov, Romania
37	<i>Cryptophagus setulosus</i>	<i>Cryptophagus setulosus</i> Sturm, 1845	1	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
38	<i>Cryptophagus milleri</i>	<i>Cryptophagus laticollis</i> P.H. Lucas, 1846	1	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
39	<i>Cryptophagus affinis</i>	<i>Cryptophagus laticollis</i> P.H. Lucas, 1846	1	Penecke; St. Ingering.	Ingering: 865 m, Steiermark, Österreich, Austria
40	<i>Cryptophagus affinis</i>	<i>Cryptophagus laticollis</i> P.H. Lucas, 1846	3	J. Tax; II Metkovich	—
41	<i>Cryptophagus cellaris</i>	<i>Cryptophagus cellaris</i> (Scopoli, 1763)	7	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria

Table 1 continued

№	Label	Valid name	Number of specimens	Locality and collector	Remarks
42	<i>Cryptophagus affinis</i>	<i>Cryptophagus laticollis</i> P.H. Lucas, 1846	3	J. Tax; II Metkovich	—
43	<i>Cryptophagus acutangulus</i>	<i>Cryptophagus acutangulus</i> Gyllenhal, 1828	3	Bukowina, Czernowitz	Chernivtsi, Ukraine
44	<i>Cryptophagus fumatus</i>	<i>Cryptophagus fallax</i> Balfour- Browne, 1953	1	Penecke; Cr. Fi- bereggenfurt?	—
45	<i>Cryptophagus quercinus</i>	<i>Cryptophagus quercinus</i> Kraatz, 1852	2	Moravia MU; Dr. Fleischer	—
46	<i>Cryptophagus quercinus</i>	<i>Cryptophagus quercinus</i> Kraatz, 1852	1	Moravia (Brno) MU; Dr. Fleischer	—
47	<i>Cryptophagus badius</i>	<i>Cryptophagus badius</i> Sturm, 1845	2	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz- Umgebung, Austria
48	<i>Cryptophagus axillaris</i>	<i>Cryptophagus axillaris</i> Reitter, 1875	3	Bucsecs; Deubel	—
49	<i>Cryptophagus fasciatus</i>	<i>Cryptophagus fasciatus</i> Kraatz, 1852	1	Mangalia, Dobrudscha, Breit	Romania
50	<i>Cryptophagus fasciatus</i>	<i>Cryptophagus fasciatus</i> Kraatz, 1852	1	Valencia Hispania	—
51	<i>Cryptophagus umbratus</i>	<i>Cryptophagus distinguendus</i> Sturm, 1845	2	Penecke; II Triest	—
52	<i>Cryptophagus umbratus</i>	<i>Cryptophagus distinguendus</i> Sturm, 1845	2	Penecke; II Triest	Only label
53	<i>Cryptophagus distinguendus</i>	<i>Cryptophagus distinguendus</i> Sturm, 1845	6	Zoppa; Tr. Varhegy	Várhegy (Buda), Hungary
54	<i>Cryptophagus dorsalis</i>	<i>Cryptophagus dorsalis</i> C.R. Sahlberg, 1819	4	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz- Umgebung, Austria
55	<i>Cryptophagus dorsalis</i>	<i>Cryptophagus dorsalis</i> C.R. Sahlberg, 1819	1	Styria, Magburg	Austria
56	<i>Cryptophagus fuscicornis</i>	<i>Cryptophagus fuscicornis</i> Sturm, 1845	1	Honigberg; Deubel Fr.	Romania, Braşov County
57	<i>Cryptophagus scutellatus</i>	<i>Cryptophagus scutellatus</i> Newman, 1834	6	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz- Umgebung, Austria
58	<i>Cryptophagus dentatus</i>	<i>Cryptophagus dentatus</i> (Herbst, 1793)	5	Bukowina, Czerno- witz	Chernivtsi, Ukraine
59	<i>Cryptophagus pallidus</i>	<i>Cryptophagus pallidus</i> Sturm, 1845	1	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz- Umgebung, Austria
60	<i>Cryptophagus pallidus</i>	<i>Cryptophagus pallidus</i> Sturm, 1845	1	Bukowina, Czernowitz	Chernivtsi, Ukraine
61	<i>Cryptophagus pallidus</i>	<i>Cryptophagus pallidus</i> Sturm, 1845	2	Honigberg; Deubel Fr.	Romania, Braşov County
62	<i>Cryptophagus saginatus</i>	<i>Cryptophagus saginatus</i> Sturm, 1845	2	E. Weber; Kur. Grius	—

Table 1 continued

№	Label	Valid name	Number of specimens	Locality and collector	Remarks
63	<i>Cryptophagus saginatus</i>	<i>Cryptophagus saginatus</i> Sturm, 1845	5	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
64	<i>Cryptophagus subfumatus</i>	<i>Cryptophagus subfumatus</i> Kraatz, 1856	6	Penecke; St. Marburg	—
65	<i>Cryptophagus subfumatus</i>	<i>Cryptophagus subfumatus</i> Kraatz, 1856	1	Penecke; Cr. Sitterdorf	Austria, Völkermarkt in Carinthia
66	<i>Cryptophagus cylindrus</i>	<i>Cryptophagus cylindrellus</i> Johnson, 2007	1	Penecke D.; Meleda	—
67	<i>Cryptophagus cylindrus</i>	<i>Cryptophagus cylindrellus</i> Johnson, 2007	2	Penecke; St. Bacher.-Gb.	—
68	<i>Cryptophagus Thomsoni</i>	<i>Cryptophagus pallidus</i> Sturm, 1845	4	Bukowina, Czernowitz	Chernivtsi, Ukraine
69	<i>Cryptophagus scanicus</i>	<i>Cryptophagus scanicus</i> (Linnaeus, 1758)	2	Bukowina, Czernowitz	Chernivtsi, Ukraine
70	<i>Cryptophagus scanicus</i>	<i>Cryptophagus scanicus</i> (Linnaeus, 1758)	3	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
71	<i>Cryptophagus scanicus</i> var. <i>patrnelis</i>	<i>Cryptophagus scanicus</i> (Linnaeus, 1758)	1	Dr. Penecke Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
72	<i>Cryptophagus scanicus</i> var. <i>patrnelis</i>	<i>Cryptophagus scanicus</i> (Linnaeus, 1758)	9	Dr. Penecke; Koralpe St.	Austria
73	<i>Cryptophagus hirtulus</i>	<i>Cryptophagus uncinatus</i> Stephens, 1830	5	Lusitania Evora	Portugal
74	<i>Cryptophagus validus</i>	<i>Cryptophagus lapponicus</i> Gyllenhal, 1827	1	Herzegowina, Voliyak	—
75	<i>Cryptophagus subdepressus</i>	<i>Cryptophagus subdepressus</i> Gyllenhal, 1827	1	Penecke; St. Ingering	Ingering: 865 m, Steiermark, Österreich, Austria
76	<i>Cryptophagus pubescens</i>	<i>Cryptophagus pubescens</i> Sturm, 1845	5	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
77	<i>Micrambe vini</i>	<i>Micrambe ulicis</i> (Stephens, 1830)	1	Adana Asia min.	—
78	<i>Micrambe vini</i>	<i>Micrambe ulicis</i> (Stephens, 1830)	1	Gallia mer. Reitter	—
79	<i>Micrambe Perrisi</i>	<i>Micrambe perrisi</i> (Brisout de Barneville, 1882)	7	Penecke D.; Paklenica	Zadar County, Croatia
80	<i>Micrambe abietis</i>	<i>Micrambe abietis</i> (Paykull, 1798)	2	Penecke; St. Ingering	Ingering: 865 m, Steiermark, Österreich, Austria
81	<i>Micrambe abietis</i>	<i>Micrambe abietis</i> (Paykull, 1798)	2	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
82	<i>Pteryngium crenatum</i>	<i>Pteryngium crenatum</i> (Fabricius, 1798)	3	Ganglb.; Capella	—

Table 1 continued

№	Label	Valid name	Number of specimens	Locality and collector	Remarks
83	<i>Henoticus serratus</i>	<i>Henoticus serratus</i> (Gyllenhal, 1808)	1	Tyrolis, Janiersen	—
84	<i>Caenoscelis subdeplanata</i>	<i>Caenoscelis subdeplanata</i> Brisout de Barneville, 1882	—	—	Only label
85	<i>Caenoscelis ferruginea</i>	<i>Caenoscelis ferruginea</i> (Sahlberg, 1820)	2	E. Weber; Kn. Fressburg	—
86	<i>Atomaria fimetarii</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>fimetarius</i> (Fabricius, 1792)	1	Bukowina, Czernowitz	Chernivtsi, Ukraine
87	<i>Atomaria fimetarii</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>fimetarius</i> (Fabricius, 1792)	3	Ganglb.; 95 Kronstadt	Braşov, Romania
88	<i>Atomaria umbrina</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>umbrina</i> (Gyllenhal, 1827)	4	Bukowina, Czernowitz	Chernivtsi, Ukraine
89	<i>Atomaria nigriventris</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>nigriventris</i> Stephens, 1830	1	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
90	<i>Atomaria nigriventris</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>nigriventris</i> Stephens, 1830	1	Zoppa; Tr. Varhegy	Várhegy (Buda), Hungary
91	<i>Atomaria linearis</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>linearis</i> Stephens, 1830	4	Bukowina, Czernowitz	Chernivtsi, Ukraine
92	<i>Atomaria diluta</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>diluta</i> Erichson, 1846	2	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
93	<i>Atomaria affinis</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>affinis</i> C.R. Sahlberg, 1834	1	Zsezö, Zah. Fr.	—
94	<i>Atomaria procerula</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>longicornis</i> C.G. Thomson, 1863	1	Penecke; Cr. Sittersdorf	Austria, Völkermarkt in Carinthia
95	<i>Atomaria proluxa</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>pulchra</i> Erichson, 1846	1	Penecke; Car.Woebein	—
96	<i>Atomaria proluxa</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>pulchra</i> Erichson, 1846	1	Penecke; St. Bacher-Gb.	—
97	<i>Atomaria proluxa</i> var. <i>pulchra</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>pulchra</i> Erichson, 1846	2	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
98	<i>Atomaria acutifrons</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>bicolor</i> Erichson, 1846	2	Bukowina, Czernowitz	Chernivtsi, Ukraine
99	<i>Atomaria acutifrons</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>bicolor</i> Erichson, 1846	1	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
100	<i>Atomaria fuscicollis</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>nigrirostris</i> Stephens, 1830	3	Bukowina, Czernowitz	Chernivtsi, Ukraine. 1 specimen has been lost
101	<i>Atomaria impressa</i>	<i>Atomaria</i> (<i>Agathengis</i>) <i>impressa</i> Erichson, 1846	2	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
102	<i>Atomaria plicata</i>	<i>Atomaria</i> (<i>Atomaria</i>) <i>plicata</i> Reitter, 1875	6	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
103	<i>Atomaria munda</i>	<i>Atomaria</i> (<i>Atomaria</i>) <i>munda</i> Erichson, 1846	1	Wien; Dr. Kraus	—

Table 1 continued

№	Label	Valid name	Number of specimens	Locality and collector	Remarks
104	<i>Atomaria unifasciata</i>	<i>Atomaria (Atomaria) unifasciata</i> Erichson, 1846	3	Nikolsburg; Netuschill	—
105	<i>Atomaria straussi</i>	<i>Atomaria (Atomaria) grandicollis</i> Brisout de Barneville, 1882	—	—	Only label
106	<i>Atomaria mesomelaena</i>	<i>Atomaria (Atomaria) mesomela</i> (Herbst, 1792)	1	Hezo-Zah. Tr.	—
107	<i>Atomaria gutta</i>	<i>Atomaria (Atomaria) gutta</i> Newman, 1834	—	—	Only label
108	<i>Atomaria gutta var. rhenana</i>	<i>Atomaria (Atomaria) gutta</i> Newman, 1834	1	Penecke; St. Marburg	Styria, Magburg, Austria
109	<i>Atomaria gravidula</i>	<i>Atomaria (Atomaria) gravidula</i> Erichson, 1846	5	Bukowina, Czernowitz	Chernivtsi, Ukraine
110	<i>Atomaria fuscata</i>	<i>Atomaria (Atomaria) fuscata</i> (Schonherr, 1808)	4	Bukowina, Czernowitz	Chernivtsi, Ukraine
111	<i>Atomaria atricapilla</i>	<i>Atomaria (Atomaria) atricapilla</i> Stephens, 1830	3	Penecke; Hu. Neusiedl.	—
112	<i>Atomaria atra</i>	<i>Atomaria (Atomaria) atra</i> Herbst, 1793	1	Zoppa; Tr. Varhegy	—
113	<i>Atomaria zetterstedti</i>	<i>Atomaria (Atomaria) zetterstedti</i> (Zetterstedt, 1838)	1	E. Weber; Carinthia	—
114	<i>Atomaria peltata</i>	<i>Atomaria (Atomaria) peltata</i> Kraatz, 1853	—	—	Only label
115	<i>Atomaria fuscipes</i>	<i>Atomaria (Atomaria) fuscipes</i> (Gyllenhal, 1808)	1	Zoppa; Tr. Varhegy	—
116	<i>Atomaria pusilla</i>	<i>Atomaria (Atomaria) pusilla</i> (Paykull, 1798)	6	Penecke; St. Marburg	Styria, Magburg, Austria
117	<i>Atomaria pusilla</i>	<i>Atomaria (Atomaria) pusilla</i> (Paykull, 1798)	1	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
118	<i>Atomaria ornata</i>	<i>Atomaria (Atomaria) ornata</i> Heer, 1841	5	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
119	<i>Atomaria ornata</i>	<i>Atomaria (Atomaria) ornata</i> Heer, 1841	2	Penecke; St. Ingering.	Ingering; 865 m, Steiermark, Österreich, Austria
120	<i>Atomaria nigripennis</i>	<i>Atomaria (Atomaria) nigripennis</i> (Kugelann, 1794)	1	Dr. Kraufs; Wien	—
121	<i>Atomaria morio</i>	<i>Atomaria (Atomaria) morio</i> Kolenati, 1846	2	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
122	<i>Atomaria turgida</i>	<i>Atomaria (Atomaria) turgida</i> Erichson, 1846	8	Penecke; St. Aflenz	Two specimens on one needle
123	<i>Atomaria turgida</i>	<i>Atomaria (Atomaria) turgida</i> Erichson, 1846	1	Penecke; Car. Behuaborg	—
124	<i>Atomaria turgida</i>	<i>Atomaria (Atomaria) turgida</i> Erichson, 1846	1	Penecke; St. Lantoeb.	—

Table 1 continued

№	Label	Valid name	Number of specimens	Locality and collector	Remarks
125	<i>Atomaria apicalis</i>	<i>Atomaria (Atomaria) apicalis</i> Erichson, 1846	5	Bukowina, Czernowitz	Chernivtsi, Ukraine
126	<i>Atomaria ruficornis</i>	<i>Atomaria (Atomaria) testacea</i> Stephens, 1830	4	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
127	<i>Atomaria analis</i>	<i>Atomaria (Atomaria) analis</i> Erichson, 1846	6	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
128	<i>Atomaria analis</i>	<i>Atomaria (Atomaria) analis</i> Erichson, 1846	1	Bukowina, Czernowitz	Chernivtsi, Ukraine
129	<i>Atomaria cognata</i>	<i>Atomaria (Atomaria) analis</i> Erichson, 1846	1	Halizia, Jaroslau	—
130	<i>Atomaria cognata</i>	<i>Atomaria (Atomaria) analis</i> Erichson, 1846	3	Penecke; St. Gleinalpe	Steiermark, Österreich, Austria
131	<i>Atomaria cognata</i>	<i>Atomaria (Atomaria) analis</i> Erichson, 1846	1	Radmaus Df.-Car. Dr. Penecke;	—
132	<i>Atomaria gibbula</i>	<i>Atomaria (Atomaria) gibbula</i> Erichson, 1846	2	Radmaus Df.-Car. Dr. Penecke;	—
133	<i>Atomaria gibbula</i>	<i>Atomaria (Atomaria) gibbula</i> Erichson, 1846	4	Dr. Penecke; Umgeb. Graz. St.	Bezirk Graz-Umgebung, Austria
134	<i>Sternodea baudii</i>	<i>Sternodea baudii</i> Reitter, 1875	2	Calabria St. Enfernia	—
135	<i>Sternodea Lederi</i>	<i>Sternodea lederi</i> Reitter, 1876	—	—	Only label
136	<i>Sternodea Raddei</i>	<i>Sternodea raddei</i> Reitter, 1876	—	—	Only label
137	<i>Sternodea miki</i>	<i>Sternodea miki</i> Reitter, 1888	—	—	Only label
138	<i>Ephistemus globulus</i>	<i>Ephistemus globulus</i> (Paykull, 1798)	2	Bukowina, Czernowitz	Chernivtsi, Ukraine
139	<i>Ephistemus globulus</i>	<i>Ephistemus globulus</i> (Paykull, 1798)	1	Halizia, Jaroslau	—
140	<i>Ephistemus globulus</i>	<i>Ephistemus globulus</i> (Paykull, 1798)	1	Hungaria, Budapest	—
141	<i>Ephistemus exiguus</i>	<i>Curelius exiguus</i> (Erichson, 1846)	1	F. Tax; D. Metkovics	—
142	<i>Ephistemus dilutus</i>	<i>Curelius dilutus</i> Reitter, 1883	—	—	Only label

Annotations on the genera presented in the collection

The collection of ZMKU contains specimens of 13 genera of cryptophagids. All the annotations on the genera are prepared according to one scheme. The genera are placed in alphabetical order.

***Antherophagus* Dejean, 1821.** Two species in 5 series: *A. pallens* (Linnaeus, 1758) and *A. silaceus* (Herbst, 1792). Specimens identified as “*A. nigricornis* (Fabricius, 1787)” actually all belong to *A. pallens*.

Most of the specimens were collected in Austria (Graz). There are 11 specimens of genus, of which only 1 specimen belongs to *A. silaceus*. Condition is good, no considerable damages.

***Atomaria* Stephens, 1829.** One of the most completely represented genera in the collection: 48 series of 33 species were identified, but only labels are present instead of the *A. grandicollis* Brisout de Barneville, 1882 and *A. peltata* Kraatz, 1853 specimens. Most of the specimens were collected in Austria and Bukovina (Chernivtsi), for most specimens the collector is K. Penecke. Condition is good, no damages, except the two lost species mentioned above and *A. gutta* Newman, 1834, one series of which is lost.

***Caenoscelis* C.G. Thomson, 1863.** Represented by two species of two series — *C. subdeplanata* Brisout de Barneville, 1882 and *C. ferruginea* (Sahlberg, 1820) from Austria. Condition is good, no damages, except the specimens of the *C. subdeplanata* missing in the collection, only the label is available.

***Cryptophagus* Herbst, 1792.** The most completely represented genus in the collection: 34 species in 55 series, mostly 1–2 specimens in each. Specimens were collected mainly on the territory of Austria, Romania, Bukovina (Chernivtsi); *C. distinguendus* Sturm, 1845 is represented from Hungary. Current valid names were applied for some specimens. Condition is good, there are no damages, except three species of the genus are lost for the collection — *Cryptophagus simplex* Miller, 1858, *C. lapidicola* Reitter, 1880, *C. nitidulus* Miller, 1858.

***Curelius* Casey, 1900** is represented by two species in two series, formerly belonging to the genus *Ephistemus* — *C. exiguus* (Erichson, 1846) and *C. dilutus* Reitter, 1883. Geography of the collections — there is only one specimen of *C. exiguus*, collected from Metkovich (Croatia), another species — *C. dilutus*, have been lost. The degree of storage of *C. exiguus* is satisfactory, no damages, the species *C. dilutus* is lost for the collection.

***Ephistemus* Reitter, 1877** presented in the collection by 3 series of 1 species — *E. globulus* (Paykull, 1798). There are no re-identifications. Two other species — “*Ephistemus exiguus*” and “*E. dilutus*” — are currently belong for the separate genus *Curelius* Casey, 1900. Geography of the collections is diverse — Bukovina, Galicia, Hungary. In each series, there are only 1–2 specimens. In total, actually there are 4 specimens available. The degree of storage is satisfactory, no obvious damages.

***Henoticus* C.G. Thomson, 1868** is represented by one actual specimen of *H. serratus* (Gyllenhal, 1808). Collection from the territory of Austria (Tyrol). Storage is satisfactory, no damages.

***Micrambe* C.G. Thomson, 1863** is represented by three species in 5 series; there are 13 specimens in total. The name *Micrambe vini* (Panzer, 1797) is no longer used and replaced by the current name — *M. ulicis* (Stephens, 1830). The collections are from Austria, Croatia, mainly collector is K. Penecke. In each series there are 1–2 specimens, except for the species *M. perrisi* (Brisout de Barneville, 1882), which is represented by 7 specimens in 1 series. The degree of storage is satisfactory, no obvious damages.

***Paramecosoma* Curtis, 1833** is presented by 4 individuals in two series. The name of *Paramecosoma univestre* Reitter, 1877 is currently used as a synonym for *P. melanocephalum* (Herbst, 1793), but it is impossible to verify the correctness of the definition, this specimen is lost for the collection. Geography of the collections — Bukovina (Chernivtsi, Ukraine). The degree of storage is satisfactory, no damages. In the second series there are only labels of the specimens.

***Pteryngium* Reitter, 1877** is presented by one series, containing the three factual specimens of *Pteryngium crenatum* (Fabricius, 1798) (monotype genus). Collections are from the Balkan Peninsula. The degree of storage is satisfactory, no damages.

Spavius Motschulsky, 1845 is presented by *Spavius glaber* (Gyllenhal, 1808) (monotype species), in two series and 7 actual specimens. Previously belonged to the genus *Emphylyus* Erichson, 1848. Collections are from Romania and Austria. The degree of storage is satisfactory, there are no any damages.

Sternodea Reitter, 1875 is represented by 4 series of 4 species — *Sternodea baudii* Reitter, 1875, *S. lederi* Reitter, 1876, *S. raddei* Reitter, 1876, and *S. miki* Reitter, 1888. Geography of the collections – Italy (Calabria). In general, there are actually 2 specimens of the species *Sternodea baudii*, the other species are present only by the label. The degree of storage is satisfactory, there are no obvious damages, but specimens of the three species — *S. lederi*, *S. raddei*, and *S. miki* — are lost for the collection, only their labels are preserved.

Telmatophilus Heer, 1841 is represented by 3 species in 6 series: *Telmatophilus caricis* (Olivier, 1790), *T. brevicollis* Aube, 1862, and *T. typhae* (Fallen, 1802). The species *Telmatophilus schoenherri* (Gyllenhal, 1808) currently belongs to the species *T. typhae*, and is not a distinct species. The collections mainly concern Bukovina (Chernivtsi) and Austria (Graz). There are actually 16 specimens of beetles of this genus. The degree of storage is satisfactory, there are no any damages.

Comparison of the genera. Information on all the above-mentioned genera and their representation in the collection of the ZMKU are summarized in Table 2. It is evident that the highest numbers of abundance are characterized by the genera *Atomaria* (111 specimens of 31 species) and *Cryptophagus* (129 specimens of the 31 species); the following positions are — *Telmatophilus* (16 specimens of 3 species), *Micrambe* (13 specimens of 3 species), and *Antherophagus* (11 specimens of 2 species).

General summary of the collection analysis

Total size of collection. In total, the collection includes 304 specimens belonging to 85 species of 13 genera of the Cryptophagidae family. The collection is in good condition, some of the specimens probably were lost. Species are collected on the territory of the Palaearctic, a large part of which is represented by the fauna of Bukovina (modern Chernivtsi Region), Romania, Austria, Germany; some specimens were collected in Hungary.

Table 2

Representation amount of Cryptophagidae specimens in ZMKU collection by genus

Genus	Actual species	Actual specimens	Only labels, species	Only labels, specimens
<i>Cryptophagus</i>	31	129	3	3
<i>Atomaria</i>	31	111	3	3
<i>Telmatophilus</i>	3	16	–	–
<i>Micrambe</i>	3	13	–	–
<i>Antherophagus</i>	2	11	–	–
<i>Spavius</i>	1	7	–	–
<i>Paramecosoma</i>	1	4	1	1
<i>Ephistemus</i>	1	4	–	–
<i>Pteryngium</i>	1	3	–	–
<i>Sternodea</i>	1	2	3	3
<i>Caenoscelis</i>	1	2	1	1
<i>Curelius</i>	1	1	1	1
<i>Henoticus</i>	1	1	–	–

In general, labels (including lost specimens where only labels are available) indicate that there were 98 species in the collection, of which 5 species represent other families, according to modern classification (*Diplocoelus fagi* (Chevrolat, 1837) (Biphylidae) and *Cryptophilus integer* Heer, 1841, *Leucohimatium arundinaceum* (Forskal, 1775) and *Macrophagus robustus* Motschulsky, 1845 (Languriidae), and *Toramus pilifer* Reitter, 1885 (Erotylidae). The author re-identified the last 93 species in accordance with the current nomenclature and taxonomy, therefore in the final list of this collection there are 85 species, excluding the synonyms. In total, 10 species for the collection are completely lost (there are only labels themselves), therefore the total number of actually available species of the family Cryptophagidae in the collection of ZMKU is 75, belonging to 13 genera.

Taking into account all the re-identifications and specifications of species names, locations, specimen amount, we currently have 304 individuals of the Cryptophagidae family. Most species are presented by 1–2 collected specimens. Some species are completely lost in the process of transportation, and since often there was only one specimen, only a label remained, often not detailed.

Historical information. After 1945, a number of Romanian entomological collections from Bucharest and collections from different natural museums of Ukraine were transmitted to Zoological Museum in Kyiv. A particular value among them has the collection of Coleoptera of O. Marcu and K. Penecke, a large part of which is represented by the fauna of Bukovina (modern Chernivtsi region).

Information about the collectors. The collection was created by Karl Penecke and Orest Marcu. Karl Penecke worked at the University of Chernivtsi from 1901 to 1908 on a position of titular professor, later assistant professor (1909–1917), and since 1918 became an ordinary professor of geology, stratigraphy and paleontology (Gräf, Kreissl, 1978). Karl Penecke was mostly interested in the Curculionidae family (Penecke, 1933) and Staphylinidae (Penecke, 1912), but other families are quite well represented in the collection. In the later period he practiced exclusively on paleontology (Bernhard, 2005).

In 1924, Orest Marcu resigned from the Lyceum of E. Hurmuzachi and got the position of assistant at the University of Chernivtsi, and later — a teacher of the Department of Zoology and Parasitology of the Faculty of Natural Sciences. Studied the fauna of the Coleoptera of Bucovina and Romania under the direction of Eugen Botezat (Marcu, 1928), and its significant contribution to the research on beetles of the Bukovina forests (Geryak, Skilsky, 2017). In 1926, he defended his doctoral dissertation at the same university. During 1940–1947, Orest Marcu held the position of professor of Zoology and Zoogeography at The Alexandru Ioan Cuza University (Iași, Romania), and later became a professor at the Department of Biogeography at the The Babeş-Bolyai University (Cluj-Napoca, Romania), where he was also a director of the Institute of Speleology.

In addition to the collections of O. Marcu and K. Penecke, which compose the majority of the collections, there a range of specimens collected by other well-known researchers and collectors. The most notable among them are L. Miller (1820–1897), the German entomologist (in particular, a specimen of *Cryptophagus schmidti* Sturm, 1845, collected by him in Austria), F. Deubel (1845–1933) — Romanian amateur entomologist, who worked with L. Ganglbauer (Serafim, Maican, 2011) (in particular, specimens of *Cryptophagus setulosus* Sturm, 1845 and *C. axillaris* Reitter, 1875 from Romania), J. Breit (1874–1962) — Austrian entomologist, specialized on Coleoptera (in particular, the specimen of *Cryptophagus fasciatus* Kraatz, 1852 from Romania), L. Ganglbauer (1856–1912) — a well-known Austrian entomologist, specialist in Coleoptera (in particular, the specimen of *Atomaria (Agathengis) fimetarius* (Fabricius, 1792), collected by him in 1895 in Romania), G. Kraufs (XIX – early XX centuries) — German entomologist (in particular, the specimen of *Atomaria (Atomaria) munda* Erichson, 1846, collected, most likely, in the late nineteenth century in Germany). It should be noted that the last researcher is a well-known collector, who specialises mainly on fauna of the Orthoptera. Therefore, it should be emphasised that the collection of O. Marcu and K. Penecke includes specimens from other collections that were collected in 20–30 years earlier than the beginning of the active

research activity of this collectors. This indicates the transfer of specimens between collectors and other significant funds' migrations.

Acknowledgements

The author sincerely thanks M. M. Bilyashivsky for giving access to the collection of the ZMKU and important comments on the history of the collection, I. V. Zagorodniuk for assistance in studying the collection and preparation of the article. This study was conducted in the framework of the research topic of the Institute of Zoology of the National Academy of Sciences of Ukraine № 0116U003100 "Entomofauna of Ukraine: inventory and identification, phylogeny, morphology and taxonomy of the most important groups of insects in the context of the world fauna" (2016–2020 years).

References

- Akimov, I.A., Kharchenko, V.A., Puchkov, A.V., Zerova, M.D., Kolodochka, L.A., Anistratenko, V.V., Fursov, V.M., Cherney, L.S. and Levchuk, O. M., 2016. Scientific Fund Collections of I. I. Schmalhausen Institute of Zoology, NAS of Ukraine. Proceedings of the National Museum of Natural History, 14: 95–108. (In Ukrainian: Акімов, І.А., Харченко, В.О., Пучков, О.В., Зерова, М.Д., Колодочка, Л.О., Аністратенко, В.В., Фурсов, В.М., Черней, Л.С. і Левчук, О.М. Наукові фондові колекції Інституту зоології ім. І. І. Шмальгаузена НАН України)
- Bernhard, H., 2005. Historisch bedeutende Grazer Paläontologen. Berichte Inst. Erdwiss. Univ. Graz., 10: 46–48.
- Geryak, Y.M. and Skilsky, I.V., 2017. Impact of Orest Marku in study of entomofauna of Bukovyna. In: Regional Aspects of Floristic and Faunal Research, Proceedings of the fourth international scientific conference. Putyla, Ukraine, 28–29 April 2017. Chernivtsi, 281–283. (In Ukrainian: Геряк, Ю.М. і Скільський, І.В. Внесок Ореста Марку у вивчення ентомофауни Буковини)
- Gräf, W. und Kreissl, E., 1978. Penecke Karl Alfons. In: Österreichisches Biographisches Lexikon 1815–1950 (ÖBL). Band 7, Verlag der Österreichischen Akademie der Wissenschaften, Wien, 1–406.
- Marcu, O., 1928. Beitrage zur Coleopterenfauna der Bucovina. Bulletin scientifique de l'école polytechnique de Timișoara. (Comptes rendus de sciences de la Société Scientifique de Timișoara). Imprimerie Cartea Romaneasca, Timișoara, 1 (1925): 347–355.
- Penecke, K.A., 1912. Übersicht der mit *Stenus biguttatus* L. verwandten Arten des europäischen Faunengebietes. Wien. Ent. Ztg., 31 (6–7): 235–239.
- Penecke, K.A., 1933. Zur Curculionidenfauna der Dobrudscha. Verh. u. Mitt. siebenbürg. Ver. Natw. zu Hermannstadt, 81/82 (1931/32): 70–71.
- Serafim, R. et Maican, S., 2011. Catalogue of Cerambycidae, Megalopodidae and Chrysomelidae (Coleoptera: Chrysomeloidea) recently entered in the patrimony of "Grigore Antipa" National Museum of Natural History (Bucharest). "Igor Ceianu" Collection. Travaux du Muséum National d'Histoire Naturelle "Grigore Antipa", 54 (2): 425–460.
- Shydlovskiy, I.V., 2012. History of the museum and zoological museums of Ukrainian universities. LNU, Lviv, 1–112. (In Ukrainian: Шидловський, І.В. Історія музейної справи та зоологічних музеїв університетів України)
- Zagorodniuk, I. and Chervonenko, O., 2015. Natural history collections as the basis of fundamental research of nature diversity. In: Natural History Museums: The Role in Education and Science, Volume 2. National Museum of Natural History, NAS of Ukraine. Kyiv, 23–25. (In Ukrainian: Загороднюк, І. і Червоненко, О. Зоологічні колекції та музеї як центри дослідження біорізноманіття)

Отримано 12.10.2019

Підписано до друку 28.11.2019

Received 12.10.2019

Accepted 28.11.2019