

ZOOLOGICAL COLLECTION OF SOFIA UNIVERSITY "ST. KLIMENT OHRIDSKI": PAST AND PRESENT

Head of the research group:

Assoc. Prof. Elena Tasheva-Terzieva

Ognyan Sivilov, curator

Members of the group:

Prof. Plamen Mitov

Prof. Diana Zlatanova

Assoc. Prof. Albena Gjonova

Assoc. Prof. Ventseslav Delov

Assist. Prof. Denis Gradinarov

Assist. Prof. Romyana Kostova

Assist. Prof. Nevena Kolarova

Assist. Prof. Elitsa Tahchiyska

Vladimir Stefanov, biologist
Lyubomira Lyubomirova, biologist

Postdoc, PhD, Master and Bachelor students:

Steliyana Popova

Muhammed Mohammed

Martin Krustev

Boris-Sratsimir Ivanchev

Siyana Stoeva

INTRODUCTION

The Zoological Collection of Sofia University comprises more than 120,000 collection objects representing a wide range of invertebrate and vertebrate taxa, as well as microscopic slides of Protista and Fungi, primarily invertebrate parasites.

The foundations of the collection were established in the late 19th century by Professor Georgi Shishkov, the first full professor of Zoology at Sofia University and later its rector (1917–1918; 1928–1929) (Figs 1, 2). Originally developed primarily for educational purposes, the collection has also supported scientific research conducted by academic staff, undergraduate and graduate students, and PhD candidates from the Department of Zoology and Anthropology. It is housed within the Faculty of Biology, in specialized storage facilities and laboratories of the Department of Zoology and Anthropology.

Today, the collection plays a key role in the training of undergraduate students from all specialties of the Faculty of Biology, as well as in specialized master's programs and doctoral training within the Department. It also represents an important resource for researchers from other academic institutions in Bulgaria and abroad.



Figure 1. Part of the historical collection prepared by Professor Georgi Shishkov at the end of the nineteenth century.



Figure 2. Part of the historical collection of microscopic slides.

PROJECT GUIDELINES

The project "Investigation and Digitization of Materials from the Zoological Collection of Sofia University 'St. Kliment Ohridski'" aims to study, preserve, and digitize collection objects and associated records from the Zoological Collection hosted by the Faculty of Biology. All digitized materials will be made publicly accessible through an online portal, ensuring integration into global scientific data networks. The project encompasses both historical specimens and newly collected materials contributed by academic staff, students, and PhD candidates.

METHODOLOGY

Project activities included:

- 1) Inventory and assessment of collection materials, identification of priority taxa for digitization, and archival research.
- 2) Physical reorganization of the collection, including restoration, replacement of storage media and containers, specimen identification, and labeling.
- 3) Development of taxonomic collections using the Specify 7 digital collection management platform, hosted on a Sofia University server and accessible at <https://bfus.biofac.uni-sofia.bg/>.
- 4) Digitization of specimens and associated metadata, with assignment of unique catalog numbers using the "BFUS" acronym and taxon-specific identifiers.
- 5) Creation of an open-access web portal for use by researchers, students, and the general public.

Table 1. Digitalized specimens from different taxonomic collections

Collection	Collection objects	Families	Genera	Species
Acari	259	6	13	24
Hydrachnidia	684	8	12	37
Odonata	6	6	12	18
Heteroptera	431	27	91	102
Hymenoptera	418	8	40	94
Coleoptera	1000	36	71	92
Carabidae	161	1	5	24
Staphylinidae	342	1	8	29
Cleridae	626	1	11	20
Meloidae	128	1	13	22
Oedemeridae	191	1	8	17
Tenebrionidae	123	1	39	42
Cerambycidae	823	1	41	70
Invertebrate Chordata	9	3	2	2
Pisces	49	25	30	28
Amphibia	13	9	12	12
Reptilia	48	15	24	32
Aves	266	59	121	160
Mammalia	617	17	29	31
Total number	6194	226	582	856

RESULTS

As part of the project, the materials preserved in the Zoological Collection of Sofia University were reorganized and systematized. All major groups of invertebrates and chordates are represented in the collection. Among invertebrates, the most extensively represented groups include nematodes (soil, phytoparasitic, entomopathogenic, and entomoparasitic), chelicerates, crustaceans, and insects. The collection also includes a rich assemblage of marine invertebrates from the Mediterranean Sea, Red Sea, Black Sea, and other regions, including some of the oldest preserved specimens in BFUS.

A substantial proportion of the materials are preserved on microscopic slides, including protists and unicellular fungi (e.g., Foraminifera, Apicomplexa, Testate amoebae, Microsporidia), nematodes, mites (mainly Analgoidea and Hydrachnidia), aphids (Aphididae), and fleas (Siphonaptera) (Fig. 3). The dry insect collection consists primarily of pinned specimens of different orders.



Figure 3. Microscopic slides of protists and invertebrates.

Within the project framework, 6,194 collection objects were digitized, representing 856 species from 582 genera, grouped into 19 taxonomic collections (Tabl. 1). Digitization focused on a significant portion of vertebrate specimens and selected invertebrate groups, including mites (Acari and Hydrachnidia) and insects from the orders Odonata, Hemiptera (Heteroptera), Hymenoptera, and Coleoptera.

The chordate collections (Invertebrate Chordata, Pisces, Amphibia, Reptilia, Aves, and Mammalia) include 1,002 specimens from 265 species, 218 genera, and 128 families. The avian collection (Fig. 4) contains the highest species diversity. Of particular scientific value is the collection of small mammals (skulls and skins) assembled in the mid-20th century by Tsolo Peshev, Elena Martino, and Kirill Martino, which includes 31 type specimens (Fig. 5).



Figure 4. Mounted specimen of *Strix aluco* from the teaching vertebrate collection.

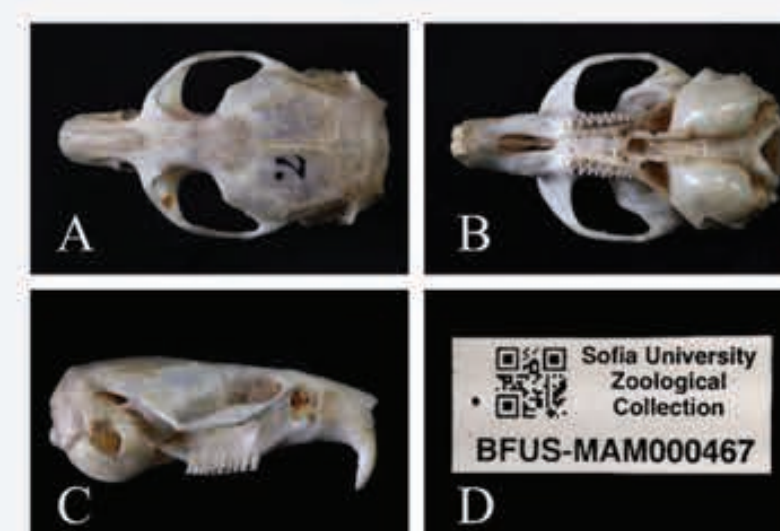


Figure 5. Skull of *Chionomys nivalis*, collected in 1951 from the Lakatnik area by Tsolo Peshev, Elena Martino, and Kirill Martino (BFUS). A: dorsal view; B: ventral view; C: lateral view; D: curatorial label with catalog number and QR code.

The Coleoptera collection (Fig. 6) is subdivided into eight systematic subcollections (Coleoptera, Carabidae, Staphylinidae, Cleridae, Meloidae, Oedemeridae, Tenebrionidae and Cerambycidae) and is the most extensively digitized, with 3,394 specimens representing 316 species from 196 genera and 43 families.

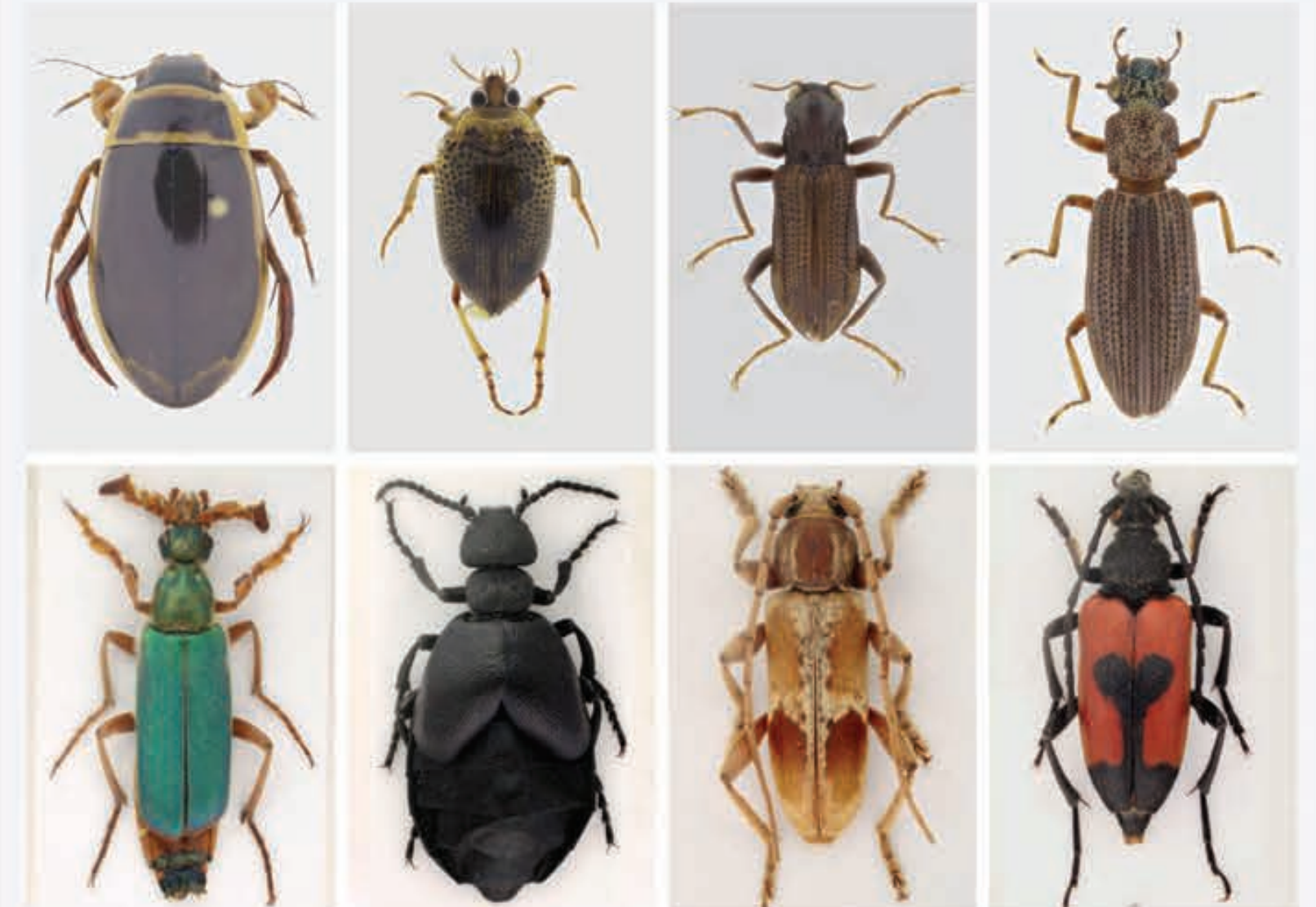


Figure 6. Some recently collected specimens of Coleoptera from the entomological part of BFUS collection.

CONCLUSION

As a result of the project, 14 peer-reviewed publications have been published, with several additional manuscripts currently in press. The project significantly improved collection management and storage conditions, enhanced the visibility of the collection, and facilitated access to its materials. Digitization has expanded the potential for research and educational use, including within digital learning environments.

Publications

- 1) Gradinarov D. & Petrova Y. 2024a Blister beetles (Coleoptera: Meloidae) in Sakar Mountains, Bulgaria. In: Georgiev D. & Yancheva V. (Eds) Fauna of Sakar Mts, Part 1. *ZooNotes, Supplement 15*: 32-42
- 2) Gradinarov D. & Petrova Y. 2024b Four alien fruit-feeding sap beetle species (Coleoptera: Nitidulidae) from Sakar Mts, Bulgaria. In: Georgiev D. & Yancheva V. (Eds) Fauna of Sakar Mts, Part 1. *ZooNotes, Supplement 15*: 43-50
- 3) Gradinarov D. & Petrova Y. 2025a New occurrence data of *Phytoecia argus* (G.F. Frölich, 1793) (Cerambycidae: Lamiinae) in Bulgaria. *ZooNotes* 276: 1-3
- 4) Gradinarov D. & Petrova Y. 2025b On the distribution of *Calamobius filum* (Rossi, 1790) (Cerambycidae: Lamiinae) in Bulgaria. *ZooNotes* 277: 1-4
- 5) Gradinarov D. & Petrova Y. 2025c Water beetles (Insecta: Coleoptera) in Sakar Mountains, Bulgaria. In: Georgiev D. & Yancheva V. (Eds) Fauna of Sakar Mts, Part 2. *ZooNotes, Supplement 17*: 74-94
- 6) Gradinarov D. & Petrova Y. 2025d Longhorn beetles (Coleoptera: Cerambycidae) in Sakar Mountains, Bulgaria. In: Georgiev D. & Yancheva V. (Eds) Fauna of Sakar Mts, Part 2. *ZooNotes, Supplement 17*: 9-45
- 7) Gradinarov D. 2025 First country record of *Sphindus dubius* (Gyllenhal, 1808) (Coleoptera: Sphindidae) from Sakar Mountains, Bulgaria. In: Georgiev D. & Yancheva V. (Eds) Fauna of Sakar Mts, Part 2. *ZooNotes, Supplement 17*: 46-49
- 8) Gradinarov D. Petrova Y. & Sivilov O. 2026 Review of the families Mycteridae, Pythidae and Salpingidae (Coleoptera, Tenebrionoidea) of Bulgaria. *Biodiversity Data Journal* 14: e185958
- 9) Kolarova N., Gradinarov D. & Petrova Y. 2024 Hard ticks (Acari: Ixodida) in Sakar Mountains, SE Bulgaria. In: Georgiev D. & Yancheva V. (Eds) Fauna of Sakar Mts, Part 1. *ZooNotes, Supplement 15*: 20-31
- 10) Kolarova N., Sjöholm C., Boström J., Åkesson S. & Ilieva M. 2025 New Records of Feather Mites (Acariformes: Analgoidea) on Passerines (Aves: Passeriformes) from Greenland. *Birds* 6 (3): 38
- 11) Krustev M., Ivanchev B.-S. & Gradinarov D. 2026 Dragonflies and damselflies (Insecta, Odonata) collected during student fieldwork practices of Sofia University in the vicinity of Sinemorets village, SE Bulgaria. *ARPHA Conference Abstracts* 9: e181351
- 12) Mitov P. G. 2025 The alien acorn barnacle *Amphibalanus amphitrite* (Darwin, 1854) (Balanidae, Balanomorpha, Crustacea), newly recorded from the Bulgarian Black Sea Coast. *Acta zoologica bulgarica* 77 (3): 365-375
- 13) Mitov P. G. 2026 *Hemigrapsus sanguineus* (de Haan, 1835) – a new alien crab for the Bulgarian Black Sea coast (Decapoda: Brachyura: Varunidae). *ARPHA Conference Abstracts* 9: e181470
- 14) Mohammed M. & Lapeva-Gjonova A. 2025 First record of *Urocerus augur* from Bulgaria, with new occurrence data on *U. gigas* from collections and citizen science (Hymenoptera: Siricidae). *Fragmenta entomologica* 57 (2): 263-270