The George S. Wise Faculty of Life Sciences – The Department of Zoology
The Department of Molecular Biology and Ecology of Plants
Sackler Faculty of Medicine – Department of Anatomy and Anthropology
The Maurice &Gabriela Goldschleger School of Dental Medicine
The Lester and Sally Entin Faculty of Humanities – The Sonia and Marco Nadler Institute of Archeology

The Steinhardt Museum of Natural History

Israel National Center for Biodiversity Studies

Annual Report 2013/2014

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TEL AVIV UNIVERSITY אוניברסיטת תל-אביב
GEORGE S. WISE FACULTY OF LIFE SCIENCES הפקולטה למדעי החיים ע"ש ג'ורג' ס. וייז
DEPARTMENT OF ZOOLOGY המחלקה לזואולוגיה

January 6, 2015

Dear Friends and Colleagues,

We are pleased to present you with the 12th Annual Report of the National Collections of Natural History at Tel Aviv University; it is also the first report using our now-formal title – **the Steinhardt Museum of Natural History (SMNH)**.

It has been an intensive, productive, and fullfilling year, with much progress on all fronts – academic, scientific, and professional training, support to different government agencies, education, and exhibition development. Our team continues to grow steadily in all 3 Faculties involved, and the young faculty members, post-doctoral fellows, and collections managers are professional, productive, and self-motivated – making wonderful team members. The Israel Taxonomy Initiative continued its activity and accounts for much of the progress in this field in Israel in recent years, the joint Molecular Laboratory is undertaking projects in the Museum and for the Israel Nature and Parks Authority, the ancient DNA Laboratory continues its progress, and the newly established Arthropod Monitoring Laboratory is busy with many contracts around the country. The National Center for Aquatic Ecology is being estalished in the Museum in cooperation with the Ministry of Environmental Protection and the Israel Nature and Parks Authority, and a new project to promote Citizen Science with the Society for the Protection of Nature in Israel and the Maarag is beginning to shape up.

We are fortunate and grateful to organizations and individuals who have chosen to provide support to the development of SMNH this year – KKL-JNF, Millie Phillips of Australia, the Arison Foundation, the Planning and Budgeting Committee of the Council of Higher Education (VATAT), the Ministry of Environmental Protection, the Ministry of Agriculture and Rural Development, the Ministry of Tourism, the Ministry of Science, Technology & Space, and the National Heritage Program in the Prime Minister's Office. A lovely and valuable gift is that of ACW/Grey Israel that has volunteered to do the SMNH branding.

This has been a very long journey. The museum building was part of the university master plan since its establishment almost 60 years ago, yet it is only in recent years that the full scientific impact of natural history collections is fully understood worldwide. As 'biodiversity,' 'conservation,' and 'ecosystem services' become key concepts in science and decision-making, the significance of a comprehensive record of biodiversity and its study becomes increasingly evident, and with it many natural history museums flourish worldwide. We are confident that so will the Steinhardt Museum.

In the many long years of the museum development, we were never alone. We are very grateful to our many colleagues and friends at Tel Aviv University academic and administrative staffs, the Israel Academy of Sciences and Humanities, the Planning and Budgeting Committee of the Council of Higher Education (VATAT), the National Council for Research and Development, the Scientific & Public Council, the Ministries of Environmental Protection, Agriculture and Rural Development, Tourism, Science, Technology & Space, Finance, Transportation, Energy and Water, Health, the Airports Authority, Keren Kayemth LeIsrael (KKL-JNF), the Israel Nature and Parks Authority, the Society for the Protection of Nature in Israel, and in the research and higher

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education systems of Israel as well as many international colleagues, first and foremost the members of our International Scientific Advisory Board. We are also extremely grateful to the new donors from Australia, Canada, the US, and Israel, who joined our journey in the past year and look forward to many more years of fruitful cooperation. We are deeply indebted to Michael and Judy Steinhardt and to Yad Hanadiv (the Rothschild Foundation). We could not have chosen better partners in this venture and look forward to continuing our joint journey of promoting the science, professional training, and public education that support the conservation and management of Israel's ecosystems and their services.

Tamar Dayan
Director, the Steinhardt Museum of Natural History

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International Scientific Advisory Board

Vicki Buchsbaum, Pearse Institute of Marine Sciences, University of California, Santa Cruz, USA

Gretchen C. Daily, Department of Biology, Stanford University, Stanford, CA, USA

Jared Diamond, Department of Physiology, University of California, Los Angeles Medical School, Los Angeles, CA, USA

Paul Ehrlich, Department of Biological Sciences, Stanford University, Stanford, CA, USA

Daphne G. Fautin, Ecology and Evolutionary Biology, Invertebrate Zoology University of Kansas, USA

Marcus W. Feldman, Department of Biology, Stanford University, Stanford, CA, USA

Lord Robert May of Oxford OM AC Kt FRS, Department of Zoology, Oxford University, Oxford, UK

Harold A. Mooney, Department of Biological Sciences, Stanford University, Stanford, CA, USA

Peter Raven, Missouri Botanical Garden, St. Louis, MO, USA

Daniel Simberloff, Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN, USA

Edward O. Wilson, Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA

Scientific and Public Council

The Steinhardt Museum of Natural History and Israel National Center for Biodiversity Studies and all collections-based activities are recognized as a project of national significance. The Scientific and Public Council represents the public interest, whether in science, education, culture or tourism. We have asked a group of leaders in their respective fields to serve as members of this council; many members have already supported us over the years, helping out in their different areas of expertise.

Ruth Arnon

Itamar Borowitz

Ilan Chet

Aaron Ciechanover

Ariel David

Yael Dayan

Ami Federman

Gedalya Gal

Samuel Hayek

Shoni Rivnai

Brian Sherman

Shimshon Shoshani

Michael Steinhardt

Meir Shalev

Yaakov Turkel

Yossi Vardi (observer)

Ariel Weiss

Martin Weyl

Scientific and Public Supervision

Steering Committee under the auspices of the Israel Academy of Sciences and Humanities which represents the collections to the Budget and Planning Committee of the Council of Higher Education: Yossi Loya (Chairperson), Tamar Dayan, Yael Lubin, Rafi Mechoulam (observer), Oded Navon, Ehud Spanier, Yossi Segal.

Sponsors' Steering Committee: Sinaia Netanyahu (Chair), David Mingelgrin, Yoav Motro, Yoni Even-Tov, Eldar Kazevith, Neri Azogui, Tamar Dayan.

Steering Committee for the Israel Taxonomy Initiative, consortium of 19 organizations (Ministry of Environmental Protection, Ministry of Agriculture, Ministry of Health, Ministry of Science, universities, Academic Colleges, research institutes, Israel Nature and Parks Authority, Keren Kayemet LeYisrael, Society for the Protection of Nature): Leon Blaustein, Yossi Steinberger, Yael Lubin, Bella Galil, Alan Matthews. Observer: Ran Levy. Tamar Dayan and Menachem Goren direct the initiative.

Staff

Prof. Tamar Dayan – Director
Dr. Menachem Goren – Deputy-Director
Dr. Revital Ben-David-Zaslow – Administrative Director
Avigail Ben-Dov-Segal – Administrative Support
Tirza Stern – IT specialist

Zoological Museum

Department of Zoology, George S. Wise Faculty of Life Sciences

Division of Terrestrial Vertebrates

Prof. Shai Meiri – Curator of Amphibians, Reptiles, and Mammals
Dr. Roi Dor – Curator of Birds
Prof. Tamar Dayan – Curator of Mammals
Prof. (emeritus) Yoram Yom-Tov – Curator emeritus
Dr. Yossi Yovel – Associate Curator of Chiroptera
Arieh Landsman – Collections Manager – Reptiles and Mammals
Erez Maza – Collections Manager – Amphibians and Reptiles
Daniel Berkowic – Collections Manager – Birds and Mammals
Kesem Kazes – Technical Support – Reptiles
Avigail Ben-Dov-Segal – Forensic Ornithology, Bird Strike Monitoring
Igor Gavrilov – Taxidermist
Dr. Stanislav Volynchik – Taxidermist
Noam Leichtentritt – Technical Support – Taxidermy
Ori Frid – Technical Support – Taxidermy

Division of Fishes

Dr. Jonathan Belmaker – Curator of Mediterranean Fishes
Dr. Roi Holzman – Curator of Red Sea Fishes
Dr. Menachem Goren – Curator of Fishes
Dr. Revital Ben-David-Zaslow – Collections Manager
Nir Stern – Technical Support

Division of Invertebrates

Prof. Yehuda Benayahu – Curator of Octocorallia (Anthozoa)
Dr. Frida Ben-Ami – Curator of Mollusca
Dr. Noa Shenkar – Curator of Tunicata
Prof. Micha Ilan – Associate Curator of Porifera
Prof. (emeritus) Yossi Loya – Associate Curator of Hexacorallia (Anthozoa)
Prof. Bella Galil – Associate Curator of Crustacea and Scyphozoa
Dr. Sigal Shefer – Collections Manager – Bryozoa and Porifera
Henk Mienis – Collections Manager – Mollusca
Oz Rittner – Collections Manager – Mollusca

Alex Shlagman – Collections Manager –Octocorallia (Anthozoa) and Crustacea
Ya'arit Levitt – Technical Support – Crustacea
Dr. Gil Koplovitz – VATAT Supported Post-Doctoral Fellow (2013-2014) – Tunicata
Dr. Noga Sokolover - VATAT Supported Post-Doctoral Fellow (2014-) – Bryozoa
Dr. Omri Bronstein - VATAT Supported Post-Doctoral Fellow (2014-) – Echinodermata

Division of Entomology

Dr. Netta Dorchin – Head Curator – Diptera
Dr. Amnon Freidberg – Curator of Diptera
Dr. Vladimir Chikatunov – Curator of Coleoptera
Dr. Vasily Kravchenko – Curator of Lepidoptera
Dr. Sergei Zonstein – Curator of Arachnida
Prof. (emeritus) Dan Gerling – Associate Curator of Parasitica (Hymenoptera)
Prof. Abraham Hefetz – Associate Curator of Hymenoptera
Dr. Yael Mandelik – Associate Curator of Hymenoptera
Dr. Inon Scharf– Associate Curator of Neuroptera
Dr. Gal Ribak – Associate Curator of Coleoptera
Dr. Dany Simon – Collection Associate of Neuroptera
Dr. Moshe Guershon – Collections Manager – Hymenoptera and Collections Staff Manager
Dr. Zoya Yefremova – Collections Manager – Parasitica (Hymenoptera)
Dr. Wolf Kuslitzky – Collections Manager – Parasitica (Hymenoptera)
Dr. Armin Ionescu-Hirsch – Collections Manager – Hymenoptera
Dr. Tatyana Novoselsky – Collections Manager – Heteroptera
Leonid Friedman – Collections Manager – Coleoptera
Tirza Stern – Collections Manager – Auchenorrhyncha (Hemiptera)
Alex Shlagman – Collections Manager – Live Insect Collection
Elisabeth Morgulis – Technical Support
Oz Rittner – Collections Manager – Coleoptera
Dr. Avi Keysary – Volunteer
Dr. Efrat Gavish-Regev – VATAT Supported Post- Doctoral Fellow (2008-9, 2011-2014) – Arachnida
Dr. Achik Dorchin – VATAT Supported Post-Doctoral Fellow (2013-2014) – Hymenoptera
Ittai Renan – Manager - The Entomology Lab for Ecological Monitoring
Roni Shahal – Technical Support
Noa Nevo – Technical Support
Idan Talmon – Technical Support
Lisa Podolsky – Technical Support
Michal Hendel – Technical Support
Inbar Ruth – Technical Support
Na'ama Brener – Technical Support

Division of Molecular Systematics

Dr. Dorothee Huchon – Curator of Molecular Systematics
Prof. Eli Geffen – Associate Curator of Vertebrate Molecular Systematics
Dr. Tamar Feldstein-Farkash – Collections Manager and Molecular Systematics Laboratory Director

Division of Paleontology

Dr. Youri Katz – Curator of Paleontology
Dr. Olga Orlov-Labkovsky – Curator of Micropaleontology
Dr. Daniella Bar-Yosef – Collections Manager – Paleontology and Archeomalacology

Herbarium

Department of Molecular Biology and Ecology of Plants
George S. Wise Faculty of Life Sciences

Division of Algae and Lichens

Dr. Yaakov Lipkin (ret.) – Curator emeritus
Dr. Razy Hoffman – VATAT Supported Post-Doctoral Fellow (2012-) – Algae

Division of Fungi

Dr. Nissan Binyamini (ret.) – Curator emeritus
Bruria Gal – Collections Manager - Fungi

Biological Anthropology Museum

Division of Physical Anthropology

Department of Anatomy and Anthropology
Faculty of Medicine

Prof. Israel Hershkovitz – Curator of Physical Anthropology
Prof. Yoel Rak – Curator of Early Hominid Cast Collection
Prof. (emeritus) Baruch Arensburg – Curator emeritus
Julia Abramov – Collections Manager – Physical Anthropology
Adi Egozi – Technical Support – Physical Anthropology
Avital Tractman – Technical Support – Physical Anthropology
Shirly Cohen – Technical Support – Physical Anthropology
Dr. Rachel Sarig – VATAT Supported Post-Doctoral Fellow (2012-2014) – Dental Anthropology

Division of Biological Archeology

Sonia and Marco Nadler Institute of Archeology
Faculty of Humanities

Dr. Dafna Langgut – Curator of Palynology and Archeobotany
Dr. Lidar Sapir-Hen – Collections Manager – Archeozoology

Helena Rot – Technical Support – Palynology and Archeobotany
Dr. Meirav Meiri – VATAT Supported Post-Doctoral Fellow (2013-) – Ancient DNA

Nature Campus

Public outreach Project of Science and Environmental Education – Partnership with the I. Meier Segals Garden for Zoological Research and the Botanical Gardens
Dr. Yael Gavrieli – Director
Tuvia Eshcoly – Office administration and public programs Coordinador
Ilil Pratt – Project Manager/Content Developer
Daphna Lev – Project Manager/Content Developer
Chen Biton - Administrative Assistant
Anat Feldman – Editor
~30 graduate students as guides

Exhibitions Team

Hagai Segev – Curator of Exhibitions
Halina Hamou – Principal Designer

Israel Taxonomy Initiative

National Project of the Higher Education and Research Systems; Ministries of Environmental Protection, Agriculture, Energy and Water, Science and Technology, and Health; KKL-JNF, Israel Nature and Parks Authority, Society for the Protection of Nature in Israel.
Prof. Tamar Dayan and Dr. Menachem Goren – Directors
Profs. Leon Blaustein, Alan Matthews, Yossi Steinberger, Bella Galil, Yael Lubin – Steering Committee
Dr. Daniella Bar-Yosef – Coordinator

Progress in the Steinhardt Museum of Natural History

Natural history collections are dynamic archives that record biodiversity. As such, they grow annually by new collecting activities and by incorporating smaller private or institutional collections. The collecting activities comprise focused collecting expeditions as well as the products of numerous field studies carried out by scientists and their graduate students. Moreover, the Israel Nature and Parks Authority rangers collect vertebrate carcasses for the museum. Collecting, incorporating the collections, preserving and digitizing them, as well as managing the collections, the data, and the network of collectors and colleagues, is a formidable job that falls upon the shoulders of the curators, and, even more so, on those of the collections managers, technical assistants, and taxidermists. We are fortunate to have a group of active, knowledgeable, and dedicated technical staff members, who do their best, in nearly impossible physical conditions, to preserve and expand this priceless record of biodiversity, and to help promote scientific biodiversity research. Their work is highly specialized, their knowledge priceless; almost all have academic degrees, most have either a PhD or an MSc, and all are the crucial backbone of the Steinhardt Museum at Tel Aviv University.

Our collections managers produced this report, and we are particularly grateful to the work of Revital Ben-David-Zaslow in compiling it and Daniella Bar-Yosef Mayer in editing it. Here they provide a glimpse of the behind-the-scenes of managing the collections: collections news, collecting trips and expeditions, and new collections are reported here in a nutshell.

Collections News – A word from our collections managers

The staff members of the Steinhardt Museum of Natural History continue their activities to promote and preserve the various collections. We continue to collect and preserve new scientific materials, rescue and incorporate important private and institutional collections, maintain the existing collections, ship scientific material and data abroad, and assist graduate students, academic courses, and "Nature Campus" activities.

During the academic year 2013/2014 we received and incorporated many specimens of various taxonomic groups collected worldwide by the collection curators and staff, students, rangers from the Israel Nature and Parks Authority, and others. Almost 65,000 new specimens were added to the various collections during this year.

The collections assembled by Prof. Yehuda Benayahu have been processed. They contain soft corals, sea anemones, sponges, tunicates, nudibranchs, and other invertebrates. As a routine procedure, tissue samples for molecular analysis were taken from most of the soft coral specimens and preserved. Almost 450 new specimens of soft corals were added this year.

We continue the fruitful cooperation with Tel Aviv University students collecting samples in the field. Collections made by students are immediately digitized in order to facilitate easy transfer of specimens to the museum in the near future. Cooperation between students and staff of the collections is excellent. We give the students support in all fields including preservation, identification, labeling, and cataloguing. Students of Tamar Dayan have transferred a very large collection to the museum, containing thousands of specimens of mammals, amphibians, reptiles, and arthropods caught in pitfall traps. An additional collaboration is with the laboratory of Yael Mandelik from the Faculty of Agricultural, Food and Environmental Quality Sciences of the Hebrew University, who studies wild bee pollination. All the Hymenoptera

specimens in this research are properly labeled and have a museum catalog number. At the end of this study the items will be incorporated into our collections. Students of Menachem Goren collected fish from the Mediterranean, and transferred their samplings together with the collecting data to the museum.

Entomology Division (including Arachnids)

Netta Dorchin, Amnon Freidberg, Moshe Guershon, Dan Gerling, Vladimir Chikatunov, Vasilyi Kravchenko, Sergei Zonstein, Zoya Yefremova, Tanya Novoselsky, Wolf Kuslitzky, Armin Ionescu, Dany Simon, Tirza Stern, Leonid Friedman, Alex Shlagman, Oz Rittner, Liz Morgulis, Efrat Regev-Gavish, Achik Dorchin, Avi Keysari

General Introduction

Israel's National Collection of Insects (TAUI) is estimated to contain over 2 million specimens, constituting more than 50% of the total animal specimens in the Steinhardt Museum. The main mission of the entomological division is to study and document the Israeli fauna of insects, but the collections also contain thousands of specimens from other parts of the world, e.g., Africa, Europe, North America and the Far East, reflecting collecting activities of our personnel according to their taxonomic expertise. The arachnid collection is included in TAUI and contains mainly spiders, but also other arachnids, such as Solifugae, Scorpiones, Opiliones and Pseudoscorpiones.

Most of the new material that is added to the collection originates from continuous collecting efforts of the museum staff and students, as part of taxonomic, ecological and biodiversity studies in various regions of Israel. Additional material is integrated into TAUI regularly from donations by professionals and amateurs, and sporadically also from the general public.

Main activities

New integrated collections

- Faculty of Agriculture: part of the bee collection (Yael Mandelik's lab, aprox. 2500 specimens).
- Movshovitz Lepidoptera collection: The Movshovitz family donated an important collection of worldwide Lepidoptera, consisting of ca. 40 drawers. This collection holds recent and comprehensive material from Israel, including relatively less sampled localities such as Mt. Hermon and Sinai, including rare specimens with both taxonomic and historical value.
- Müller Lepidoptera collection: Dr. Günter Müller (Hadassah Medical Center) donated his personal collection of European Lepidoptera, with ca. 2000 specimens of more than 300 species, including many rare or nearly extinct species.

Preparations for moving:

Beside the routine scientific and maintenance tasks, the entire team works continuously on preparing the collection for the future move into the new building, in particular the transfer of material to standard conditions (individual unit trays, drawers and cabinets).

Special species/specimens

- Ant collection: A sample of the extremely rare *Camponotus kugleri* collected by I. Renan from En Shaviv, the third location of this species to be recorded in Israel.

Routine maintenance work and minor changes were done in various groups, including Neuroptera, Tettigonoidea, Blatodea, Phasmida and other groups.

Special projects:

The Reich collection.

This large Lepidoptera collection is now in the process of reorganization as it has not been fully accessible. Old and damaged drawers are replaced with new ones by several staff members. The Reich collection holds Lepidoptera

specimens from all over the world, with an emphasis on moths of the subfamily Arctiinae. A type catalog of this collection is being prepared, including photographs of types that were sent to experts, and this has already proved the collection's importance for American Arctiinae systematics.

The Rosen Collection

The Rosen collection of parasitoid Hymenoptera is being integrated into TAUI collection (including databasing). This collection holds very important representatives of biological control agents.

Parasitic Hymenoptera collections

Our parasitic Hymenoptera collections have grown considerably in the past couple of years due to several specific projects, in which the wasps are reared directly from their hosts. Direct rearing from hosts as a collecting method (as opposed to sweeping or traps) is noteworthy because it provides invaluable information about the life history and potential ecological and/or agricultural importance of the relevant groups:

- A PhD work by Einat Shachar (under the supervision of Netta Dorchin) on the Cynipidae (oak gall-wasps) of Israel has so far added several thousands of cynipid specimens to the collection, as well as hundreds of parasitoid specimens of various families. Most of these specimens are already databased and identified; some are undescribed species (new to science).
- A survey of parasitic wasps that attack pest aphids (Homoptera), supported by a 3-year grant from the Ministry of Agriculture to Netta Dorchin and Dan Gerling, has so far added hundreds of specimens to the collection. This material is in the process of databasing and will be sent to experts for identification during 2015.
- Numerous parasitoid species of different families are added yearly to the collection as a result of routine or specific collections of gall midges (Cecidomyiidae) of various groups. This material has been databased and

integrated into the general collection, and is being studied in part by Irina Zonstein as part of her postdoctoral work.

The Mantodea Collection

As part of a revision of the Israeli Mantodea, all specimens of this group are being transferred into standard drawers/cabinets and added to the database.

The slide collection

All slides from different orphan collection, as well as our own slide collection were relocated, reorganized by collector, and labeled.

Future museum exhibitions

Members of the entomological team are active members in the working committees of the future museum exhibitions, especially the arthropod gallery.

Services, contacts and cooperations

Identification services

We keep providing critical identification services to the PPIS (Plant Protection Services, Ministry of Agriculture), the NPA (Nature and Parks Authority) - dragonfly collections, research institutions (Tel Hai) - ant collection, Faculty of Agriculture at the Hebrew University - bee collection, and Ben Gurion University - beetle collection.

In 2014 we identified ca. 350 samples (main groups: ants 200 samples, beetles 102, Aranea 1, Heteroptera 38, Parasitica 15) which sum up to more than 700 specimens.

Education

The living insect collection provides routine services to academic courses (Insect Faunistics, Excursions in the Zoological Garden), to visits in the Entomological Collections, and to Nature Campus, where live insects are used for demonstration of biological phenomena and principles. Material from the general insect collection is also used in these activities.

All collections managers participate in 'ID days' devoted to identifying material collected by students of the Insect Faunistics Course. The great majority of the material from these collections is then integrated into the general TAUI collection or used for teaching.

Databasing status

Data of 45684 new specimens were added to the database in 2014, of these, 23783 entries are from Israel and 21901 from abroad, for a new total of 196,953 databased insect specimens.

Special database projects:

- Digitized mapping of the insect collection is continuously updated. A protocol for follow-up of material transfer within the collection is being prepared.
- Digitized mapping of the "insect wet collection" (alcohol) was performed.
- Palmoni Collection: the Palmoni collection received several decades ago is being databased by Dr. Avi Keysari, a volunteer in the insect collection. In 2014, data on 2771 new specimens was added to the database, including Heteroptera, Embioptera, different Hymenoptera groups, Mantodea, and Isoptera.
- The work on standardizing the spelling of locality names for all zoological collections is underway.
- Files with digitized locality coordinates and maps of geographic regions of Israel are prepared for future use and GIS work on the collection data.

Isral Taxonomy Initiation (ITI) supported activities

- Wolf Kuslitzky continues to collaborate with Dr. Elad Chiel (Dept. of Biology and Environment, University of Haifa in Oranim) in the taxonomic aspects of the ITI survey: “The parasitoids of *Musca domestica* in the different areas of Israel”.
- Netta Dorchin continues the collaboration with Prof. Zvi Mendel from the Volcani Center (Bet Dagan), supported by an ITI grant for a survey of

predatory gall midges on mealybugs in agricultural crops. The project is the subject of an MSc study by Mr. Idan Hayon to be completed in early 2015.

- Tanya Novoselsky and Netta Dorchin continue the survey of the Tingidae (Hemiptera) of Israel that was supported by a survey grant from the ITI in 2014.
- An MSc student (Igor Aramiach) and three PhD students (Einat Sachar, Liz Morgulis and Zohar Yanai) continue their ITI supported studies on different groups of arthropods, supervised by Prof. Tamar Dayan, Dr. Netta Dorchin, Prof. Moshe Inbar (Haifa University), and Dr. Amnon Freidberg.

New equipment and infrastructure

- 300 new drawers with specimen trays were manufactured according to the TAUI standards. Upon arrival, these were distributed among the collections managers and research staff based on need, collection activity and size.
- 6 new insect cabinets were added to the collection.

The Entomology Lab for Ecological Monitoring

Ittai Renan

Arthropods are the most diverse group in terrestrial systems, accounting for over 85% of all known organisms. Arthropods inhabit a tremendous variety of niches across wide spatial scales and exhibit a variety of feeding habits and life forms that form, after the plants, a basis for most terrestrial food webs. Because of their high and fast reproduction rate, arthropod communities are sensitive to short and long term environmental changes. Large numbers of arthropod species and specimens can be efficiently collected. Therefore the group is utilized as a rich data source for ecological monitoring and ecosystem management.

The Entomology Lab for Ecological Monitoring was founded in spring 2014 within the Steinhardt Museum. Research in the lab focuses on conservation and

ecological management questions, utilizing arthropods as a sensitive tool for the assessment of ecological quality and ecosystem response to anthropogenic activities. Assessment includes multivariate analysis of community structure and composition, integrating various ecological indices and experimental approaches. The taxonomic identification is the basis of the analysis in each research. The identifications rely on the insects national collection and its experts as well as worldwide experts of different insects groups. The large scale arthropod sampling from different sites, seasons and methods, supplements the collection with valuable specimens; rare, new to Israel fauna and new species for science.

The lab's activity spanned geographically form Ramot Yissakhar in the north to Sedom in south of the Dead. The lab deals with monitoring of arthropod communities in borders between agricultural and natural landscapes and ecological corridors, providing operational recommendations for management restoration in national parks, estimating impacts of local anthropogenic pressure on sensitive ecological systems and monitoring population of a rear butterfly.

Projects are in collaboration with the Israel Nature and Parks Authority, The Society for the Protection of Nature in Israel, Israel's national Ecosystem Management Assessment Program, the Ministry of Environmental Protection, Ramat Hanadiv, and regional councils.

We aim to provide a high resolution tool for understanding ecological systems in order to contribute to the conservations efforts of Israel biodiversity and ecosystems.

Tetrapod Division

Shai Meiri, Dr. Roi Dor, Professor Tamar Dayan, Dr. Yossi Yovel, Dr. Tamar Feldstein, Arieh Landsman, Erez Maza, Igor Gavrilov, Daniel Berkowic , Dr. Stanislav Volynchik, Kessem Kazes, Noam Leichtentritt, Ori Frid.

Personnel

Dr. Roi Dor started working as the curator of birds. Noam Leichtentritt and Ori Frid have started to work part-time with the preparation team and are being taught taxidermy by Igor.

Daniel, Kessem, Erez and Arieh continue their work mainly in the collections – although Kessem has started MSc. studies at Ben Gurion University and therefore only works at the museum for one day a week.

Postdocs: Three postdocs have started working in the collection recently: Sharon Renan's work involves the amphibian collection.. Meirav Meiri – employed by the Institute of Archaeology, sampled some of the museum prize specimens. She will try to identify Schmitz's crocodile and oryx, Aharoni's bear, and Bodenheimer's cheetah, using ancient DNA techniques in a dedicated lab. She already managed to identify Schmitz's cheetah as belonging to the Asian cheetah clade, using these techniques. Karin Tamar started her postdoc involving the phylogenetic position and taxonomy of three reptile genera (*Hemidactylus, Rhynchocalamus* and *Pseudotrapelus*), and has already conducted some successful preliminary analyses – both morphological and molecular, hinting at the existence of potentially new species in some of these taxa.

The new molecular lab and old dry collection

The molecular lab, under Dr. Tamar Feldstein, is now up and running, and is routinely and successfully used for taxonomic identification, phylogenetic reconstructions and scientific projects. We have continued to improve the dry collections and the collection facilities, with Daniel, Kessem and volunteers

moving the sub-par large skin collection from hangers to shelves. This freed much room in the basement, room that will be used to better arrange existing material, as well as accommodating new collection cupboards that have been ordered.

Collection growth & active collecting

Between September 8th, 2013 and November 4th, 2014 our amphibian collection has grown by 54 specimens to 2515. Most represent specimens that were part of those housed in the Zoological garden following the draining of the checkpost pool. These belong to six species. These figures do not yet include three specimens of the recently re-discovered Hula painted frog, formerly *Discoglossus nigriventer*, now *Latonia nigriventer* which were promised to the collection by Sarig Gafni and Eli Geffen for after they revise the species. We further hope that their newly funded postdoc will help resolve the issue of the putative 2nd (some would say, 3rd) species of the tree frog, *Hyla felixarabica* Gvoždík, Moravec, Klütsch & Kotlík, 2010 in Israel, and whether indeed it is found in Israel, and in the collection, or not.

Over the same period the bird collection has grown by a full 750 specimens to 18,215. Many of the birds were collected by NPA rangers, or brought from the wildlife hospital (206). In addition, our effort to connect with bird banding stations and private bird banders has increased their contribution to the collection by more than 40 specimens, including contributions from the International Birding and Research Center in Eilat, The Jerusalem Bird Observatory, and Yeruham's Ornithology Center. This contribution is a unique resource for some species we rarely obtain, such as warblers. The most common bird species collected this year were Common Buzzard (*Buteo buteo*, 33 specimens), Kestral (*Falco tinnunculus*, 32 specimens), Sparrowhawk (*Accipiter nisus*, 26 specimens), White-throated Kingfisher (*Halcyon smyrnensis*, 26 specimens), Eagle Owl (*Bubo bubo*, 21 specimens), and Long-eared Owl (*Asio otus*, 19 specimes). Unfortunately, Most of these species are

large birds of prey that do not necessarily represent their relative abundance among the Israeli avian fauna, but are probably easier to locate and are more appealing to the collectors.

The mammal collection has grown by 760 new specimens over the same period – to 14193 specimens. Many (260) of these mammals were collected by NPA rangers, or brought from the wildlife hospital. The most common mammals we receive are golden jackals (*Canis aureus,* 72 specimens), gray wolves (*C. lupus*, 41 specimens), mountain gazelles (*Gazella gazelle*, 62 specimens) and striped hyena (*Hyaena hyaena*, 30 specimens from 2013). . Fully 82% of the animals we obtained last year from the NPA (214 specimens) belong to just the orders of Carnivora and Artiodactyla, and to the Perissodactyla (*Equus hemionus*, 3 specimens). We also obtained a large number of mainly small mammals (79), especially Southern white-breasted hedgehogs (*Erinaceus concolor*) and Egyptian fruitbats (*Rousettus aegyptiacus*) from the wildlife hospital at the Safari Park. Other noteworthy collectors were from Boris Krasnov, Georgy Shenbrot and their team (50 specimens, including 15 *Dipodillus dasyurus* and 10 house mice, *Mus musculus*, altogether 49 rodents and one shrew), Ramat Hanadiv Park (36 specimens of which 30 are carnivores, mostly jackals), and TAU personell (97 specimens, including 52 bats, 35 of them brought by Eran Amichai; Oren Kolodni is another collector of note with 16 specimens). We are happy to announce the "birth" of two new mammal species from Israel – Orr Comay positively identified the Macedonian mouse, *Mus macedonicus*, as distinct from *M. musculus* in owl pellets. Georgy Shenbrot, with Tamar Feldstein, have identified two species of the Lesser Egyptian Jerboa, well differentiated by habitat preferences, morphology (fur coloring and glans penis morphology) and genetics, basically splitting *Jaculus jaculus* along previously known sub-specific lines (see Mendelssohn and Yom-Tov 1999) to include both this species and *J. hirtipes* (Lichtenstein, 1823).

The bat collection: this year, in addition to increasing the collection of Israeli bats, we also collected specimens of 4 species of new-world tropical bats and one Central American desert bat enriching the bat collection with a total of 4 new species (we already had one old vampire bat). The tropical bats include: *Uroderma bilobatum, Artibeus jamaicensis* and *Desmodus rotundus* all of which belong to the new world Phyllostomidae family; and *Pteronotus davyi* that is the first specimen we have from the Mormoopidae family. The desert bat is *Myotis vivesi* which is endemic to the sea of Cortez and is an oceanic bat that feeds on fish. It is a very interesting species with long claws that allow it to rake the water in search of fish. The tropical species were collected with the help of Nancy Simmons from the American Museum of Natural History in NYC who offered future help with collecting bats (and other mammals).

The reptile collection has grown by 395 specimens, to 16831 specimens. By far the most abundant species collected were Aegean island geckos (85 *Mediodactylus* kotschyi, 8 *Hemidactylus turcicus*) and lizards *Podarcis erhardii* (18). These, mostly represented by their tails), were collected by Yuval Itescu and Alex Slavenko. Israeli specimens represent fully 64 species, the most abundant of which are land tortoises (*Testudo graeca*, 17 specimens), and fan-footed geckos (16 *Ptyodactylus guttatus*). We continue to enjoy a highly fruitful collaboration with two reptile enthusiasts, Aviad Bar (who brought 35 specimens belonging to 20 species last year) and Ofer Shimoni (29 specimens, 11 species), who collect dead reptiles they find (mostly in dry water holes in the Negev, and on the roads of Mt. Gilboa) and pass them to us., The NPA contributed 30 reptiles belonging to 19 species this year. NPA biologists allowed us to collect specimens from regions destined for development, which museum personnel and members of Shai Meiri's lab collected. All in all TAU staff members collected 108 Israeli specimens belonging to 36 species last year, under various permits, or as road casualties.

A new museum postdoc, Karin Tamar, has found that the populations designated as Schreiber's fringe-fingered lizard (*Acanthodactylus schreiberi*, שנונית שפלה) are, in fact, a distinct ecotype of the widespread Bosk's fringe-fingered lizard (*Acanthodactylus boskianus* שנונית נחלים), is nested well within Israeli populations of the latter, and is only distantly related to the nominate *schreiberi* from Cyprus. We suggest this species is deleted from the Israeli faunal lists, but that protection is nonetheless offered to the highly derived coastal populations (the former '*schreiberi'*). We have also found, in Kibbutz Ein Gedi, members of a probably invasive gecko, *Tarentola annularis*. Tails have been brought to the museum to verify Karin's detailed morphological analysis as to the taxonomy of this population. We have asked for a permit from the NPA to collect more specimens.

Overall the tetrapod collections have grown by some 1959 specimens since the writing of the previous report, nearly double the total of the previous year (1069). This represents a huge effort and dedication by the staff, Daniel, Kessem, Erez, Arieh, Stas, Igor, Ori and Noam, who should all be commended for their brilliant work.

Connection with other organizations and researchers

Our special ties with the Nature and Parks Authority (NPA) are continuing. Our personal ties with the NPA biologists, rangers and science division personnel, remain very good, and they are being helpful. In several occasions this year we were invited, e.g., by the district biologists, to actively collect reptiles in areas that were earmarked for development, and we thank them for the thought.

We continue our efforts to connect with bird banding stations and private bird banders in Israel, including the International Birding and Research Center in Eilat, The Jerusalem Bird Observatory and Yeruham's Ornithology Center. Two freezers were installed by the museum at the Hula Valley Agmon Center and at the Yeruham's Ornithology Center to promote collection in these areas. This

connection already made significant contributions to the collections, including species we hardly ever collect otherwise.

We maintain strong connections with prof. Stephen Goldberg (Whittier College, Texas), sending him multiple specimens of many species of reptiles for his analyses of reproductive biology (and sometimes parasitology). Prof. Goldberg publishes multiple papers each year based on specimens from our collection, and we benefit from him identifying specimens to sex.

The bird identification lab continues to use the bird collection in order to identify feather remains from bird strikes for the Israeli Air Force, the Israel Airports Authority and the Civil Aviation Authority. In addition the lab assists Ohad Hazofe, Nature and Parks Authority bird ecologist, to identify feathers found by NPA rangers in the possession of hunters.

Equipment, infrastructure, storage and curation

We are trying to have all Israeli tetrapods represented at the collection by at least two (male and female) complete skeletons. For some of the unique and more academically sought after Israeli animals we are trying to establish a large comparative post-cranial collection (e.g., gazelles, hyenas, fallow deer, and wolves). We started collecting bird wings since study-skins do not show wing feathers well. This will support research as well as species and age identification by rangers in the field. We have also started collecting tissue specimens of vertebrate specimens from which no other parts (e.g., skulls) are kept. We only keep such tissues where the animal was positively identified by a museum employee. We take tissue samples from nearly all tetrapod specimens (with the exception of rotting or tiny animals).

We try to move as many specimens as possible into dedicated collection cabinets. We are looking into starting to place specimens in transparent plastic boxes and we aim to purchase a trial batch the coming year. These boxes, used in the British Columbia Museum, keep specimens safer, and when accessing a

drawer allow a researcher to pick only the necessary specimens rather than move a whole bunch – thus minimizing damage. We also started looking into barcoding jars and drawers, so that immediate curation and identification of those specimens present in a cabinet or on a shelf is known. We hope that the move to the new building will accelerate the process

Conditions in the wet collections are abysmal as far as fire danger, exposure to humidity, temperature, asbestos and organic solvents, and to fungal, rodent and insect hazards are concerned. This is not only a danger to the collection, but also to the collection staff as some of the materials are carcinogenic. Fire hazard in an alcohol-filled inadequate shed is real.

Daniel Berkowic has finished computerizing about 30% of the egg collection. This work has been stalled due to shortage of manpower. The nest collection is still not computerized and its fate needs to be decided.

22 researchers from 9 institutions in six counties (Ukraine, Switzerland, USA, Belgium and the UK – as well as Israel) visited the dry collections last year.

Shipments of material:

This year we have shipped specimens belonging to six species of reptiles to be studied by Stephen R. Goldberg (see above): *Echis coloratus, Acanthodactylus beershebensis, Chalcides ocellatus, Telescopus fallax, Spalerosophis diadema,* and *Psammophis schokari*. We have sent samples for molecular work to Lukas Kratochvil (Karl University, Prague, many snake species) and to Salvador Carranza (CSIC, Barcelona; for mutual work with Karin Tamar, 3 reptile genera) and Fernando Martínez-Freiría (CIBIO, Universidade do Porto, Portugal, Palestine vipers).

The Feather Identification Lab

Avigail Ben-Dov Segal, Roi Dor and Tamar Feldstein

Military and civilian air traffic has increased dramatically over the last decade in Israel. This heavy traffic shares air space with half a billion migratory birds that pass through Israel twice a year (as well as resident birds), which hold a tremendous risk of bird strikes that may lead to damage and even loss of lives. Identifying the risks is an important step in order to prevent bird strikes and improve flight safety. Therefore, it is essential to identify the bird species that are responsible for bird strikes.

Since 2011 the Feather Identification Lab is working with the Israeli Air Force, the Israel Airports Authority, the Civil Aviation Authority and the Israel Nature and Parks Authority to identify feather remains. In 2013 official contracts were signed between the SMNH and the Israeli Air Force, the Israel Airports Authority and the Civil Aviation Authority to provide all feather identification for bird strikes in Israel. The lab provides over 100 bird strike identifications annually. In addition we also provide feather identification for Israel Nature and Parks Authority, mainly to detect poaching of wild birds.

The Lab's main goal is to identify feather remains (mainly from air strikes) to the lowest possible taxonomic level. Feather identification is conducted through preparation of histological slides for microscopic identification as well as through morphological identification of feathers. We have a comprehensive comparative collection of histological slides of many Palearctic species that is used for microscopic identification, as well as a large comparative feather collection that we continue to expand. Being part of the Steinhardt Museum of Natural History enables us to take advantage of the largest regional collection of bird specimens (> 18,000), which is an invaluable resource for identifying feathers.

The molecular lab at the museum (headed by Dr. Tamar Feldstein) now routinely provides genetic identifications from bird remains. This additional information complements our microscopic and morphological identification. It is particular important when damage was caused to an aircraft and in cases where the remains do not allow species level microscopic identification.

So far, in 2014, the lab provided identifications for 131 bird strike cases and 21 possible poaching cases. These identifications included 24 genetic analyses.

Molecular Laboratory

Tamar Feldstein

The molecular laboratory of the Steinhardt Museum offers molecular identification services for museum samples for which morphological identification is in question. The resulting molecular data expand the information available on unique samples and contributes to curation of the museum collections. Researches from around the world are welcome to use our tissue collection for their studies. This year we provided tissue samples from unique museum specimens for the study of cheetah biogeograpghy, run by Léna Godsall Bottriell & Paul Bottriell, from the Rex foundation. In addition, we provide molecular barcoding services for the Israel Nature Protection Authority (NPA) and to the Israel Airports Authority for the identification of birds that collided with airplanes.

In 2014 we have been involved in several projects, including:

- Managing the tissue collection: about 1000 tissue samples from 370 mammals and 1700 tissue samples from 650 birds were added to the museum tissue collection.
- Molecular identification of Egyptian jerboa. The study was summarized by Georgy Shenbrot from the Ben-Gurion University in a paper submitted to

the Biological Journal of the Linnean Society. Sequences were submitted to the GenBank under accession numbers KM257925-9, KM244575-9.

- Identification service, for the NPA, of invasive shrimps and mussels.
- Identification of a trematod fish parasite.
- Molecular identification of three ascidian species (sea squirt) from the Red Sea, one of them invaded the Mediterranean.
- Identification of 38 birdstrike samples belonging to 24 bird species and 1 bat. To complete the identification we sequenced the barcoding region of two museum samples from species that were not available on the GenBank. These sequences were submitted to the GenBank under accession numbers KM244573 and KM244574, respectively.

The laboratory is fully equipped with the necessary equipment to conduct DNA isolation and PCR amplifications. It has a PCR machine with a dual thermal cycler chassis, a bench top refrigerated centrifuge and a gel documentation system. To avoid contamination, a UV cabinet is dedicated to DNA extractions and PCR preparations.

Mediterranean Fishes

Jonathan (Yoni) Belmaker

Nowhere is the native biota faced with changes that are more rapid than in the Eastern Mediterranean, where the continual influx of invasive Red Sea species, warming water temperature, overfishing and pollution are transforming fish diversity. The Mediterranean natural history fish collection provides a globally unique resource that is being used to identify how these immense changes influence fish diversity, biogeography and, more generally, marine ecosystem services and function. Such understanding can be used to identify the consequences of these major changes to the integrity of the marine ecosystem

and, perhaps more importantly, to mitigate future adverse influences of human activity.

Research:

- This year we continued to take detailed measurements of Mediterranean and Red Sea fish ecomorphological traits from museum specimens. Research was primarily carried out by a graduate student (Ori Frid) and Tel Aviv University undergraduates. This data will be used to test for biotic and abiotic constraints on traits diversity associated with fish invasion.
- We are developing species distribution models using (among other data sources) the collection's georeferenced data to identify the geographical and environmental constraints on the distribution of invasive species (fig. 1; Parravicini et al, in press).
- We are continuing fish sampling based on trawl catch as part of Itai van Rijn's PhD. We performed four sampling trips this spring and four more in the fall. Sampled fish are being used to quantify how mortality and growth differ between invasive and native species based on otolith measurements. Representative samples are deposited in the collections.
- We undertook two fish sampling expeditions in September to Cyprus and to Turkey. Personnel included two graduate students (Ori Frid, Itai Granot) and a technician (Shahar Malamud).
- One PhD student and two Msc students are involved in projects that directly benefit from the natural history collection.

Fish samples were sent for genetic analyses to estimate connectivity among Mediterranean populations. The project is headed by David Mouillot (University of Montplellier, France).

The Ascidiacea Collection

Noa Shenkar

Ascidians (Phylum Chordata, Class Ascidiacea), or sea squirts, are the largest and most diverse class of the sub-phylum Tunicata (also known as Urochordata). They comprise approximately 3000 described species found in all marine habitats from shallow water to the deep sea. The class Ascidiacea presents fundamental opportunities for research in the fields of development, evolution, ecology, natural products and more. During 2013-2014 the Ascidiacea collection at the Steinhardt Museum has been greatly advanced. The establishment of the new Shenkar lab at the Department of Zoology, Tel-Aviv University, dedicated to the study of ecology of ascidians along the coasts of Israel, Mediterranean and Red Sea, has greatly promoted the collection by adding numerous specimens and by sorting the existing material. This year the collection was especially active with student research: Dr. Gil Koplovitz, conducting his post-doctoral research in Eilat, has significantly promoted the collection by adding 22 specimens collected in the deep reefs of Eilat using technical diving. 133 ascidian specimens have been collected by Gil since October 2012. Of those, 58 have been preserved in both formalin and ethanol. From the Gulf of Eilat, there are currently 127 ascidian specimens in the Steinhardt Museum, of which 47 have been identified to genus level only. In addition, numerous specimens were collected from the Mediterranean coast of Israel, and are currently sorted and added to the collection.

Several MSc students (Tal Gordon, Lilach Raichman-Nagar, Yaniv Shmuel), and Mey-Tal Gewing, a PhD student, have used the collections for their projects.

In March 2014 we have conducted an "Ascidian Taxonomy and Biology" workshop in Eilat with Mrs. Gretchen Lambert, a professional ascidian taxonomist from Friday Harbor Laboratories, University of Washington. Participants in the workshop included students and faculty from Israel and

abroad. The participants worked on samples from the collection, and collected additional samples from Eilat. This workshop has greatly assisted us with the identification of specimens in the collection from both the Red Sea and Mediterranean coast. During this period we have invested much effort in arranging the collection and computerizing the collection, which includes to date more than 700 specimens. We have created an underwater field guide for ascidians which was distributed among scientists. During 2014 we have collaborated with Prof. Euichi Hirose from the Faculty of Science, University of the Ryukyus, Japan on photosymbiotic ascidians in the Red Sea. This collaboration resulted in a joint publication (Koplovitz et al. 2014). In addition, we have used the collection for studying the evisceration phenomena in ascidians, a study that resulted in another scientific publication (Shenkar and Gordon, under review in Scientific Reports).

In addition, we distributed informative posters in diving clubs in Eilat. The purpose of the posters is to raise public awareness to this unique group of invertebrates and promote our ABC project. In order to learn how many different ascidian species occur in the region, and quantify how many were identified and occur in the collection, we conducted a rapid taxonomic assessment based on all ascidian photos collected, which resulted in an estimation of 60 species of ascidians along the Red Sea coasts of Israel.

We are continuously working on promoting the “Ascidiacea Field Guide to the Mediterranean and Red Sea coasts of Israel". In addition, several projects are being carried out by the Shenkar team:

***Eusynstyela latericius* – using molecular tools to distinguish between two morphotypes.**

The colonial ascidian *Eusynstyela latericius* is a common encrusting ascidian in Eilat, which appears in two very distinct morphotypes. However, using phenotypic identification, it has been concluded in the past that both morphotypes belong to one species, despite the vast morphological differences

in colony structure. In order to verify that both morphotypes belong to the same species, we are conducting molecular analysis using COI and 18S rRNA genes. We have collected several samples of two different morphs of *E. latericius* from several locations along the coast of Eilat, and they are currently undergoing molecular analysis in the museum.

Studying *Herdmania momus* and *Microcosmus exasperatus* introduction patterns.

We are conducting periodical surveys along the Mediterranean coast of Israel and expanding the available data regarding the distribution of the non-indigenous species *Herdmania momus* and *Microcosmus exasperatus*. These species are of particular interest due to their potential effect on the native fauna, and we are currently trying to involve the recreational diving community for data collection.

***Rhopalea idoneta* regeneration and phylogeny.**

The solitary species *Rhopalea idoneta* is highly abundant between 20-60 m depth in Eilat. Our observations revealed that despite its solitary appearance, it obtains remarkable abilities of regeneration, suggesting it has evolved from a colonial species. Our collaboration with Prof. Huchon's laboratory, Department of Zoology, has revealed it belongs to a colonial order, the Aplousobranchia. This finding has greatly promoted our understanding of ascidian phylogeny and evolution of a colonial life style. We plan to publish these results in 2015.

Porifera and Bryozoa collections

Sigal Shefer

Collection and field survey of the Porifera and Bryozoa community along the Mediterranean of Israel:

Bryozoa: Samples were collected along the Mediterranean coast of Israel at a depth of 100 m, in Herzliyya. Nine specimens were added to the collection.

Four specimens were collected by the team of SeArc Company (Dr. Ido Sella) and deposited in our collection.

Porifera: This year samples were collected during three excursions and two scuba dives. Two of the excursions were to the mesophotic sponge ground located at a depth of 100m, off Herzliya (34 specimens), and one to the mesophotic reef and off the IUI beach, Eilat at 110m (1 specimen). Sponges collected from shallow waters in Eilat (22 specimens) and Sdot Yam (4 specimens) were added to the collection. Six specimens of sponges belonging to the class calcarea were added to the collection by Dr. Tamar Feldstein. Overall 67 specimens were added to the collection this year.

The sampling excursions to Herzliya mexophotic sponge ground and to Eilat's shallow reefs, were part of studies conducted at Prof. Ilan's lab. The sampling of Eilat's mesophotic reef was conducted during the Second International Workshop on Mesophotic Coral Reef Ecology (MCEs).

Identification of newly collected Porifera and Bryozoa samples:

Bryozoa: Bryozoa specimens were collected in sandy bottom by SeArc Company (Dr. Ido Sella). These species were identified by Dr. Noga Sokolover as belonging to the family Cupuladriidae that was never reported from Israel.

Porifera: Based on morphological characteristics and molecular analysis, we identified 11 sponge species to the family, genus or species level.

Molecular and morphological identification of the samples was supported by the Israel Taxonomy Initiative (ITI) as part of a survey entitled: "Taxonomy of the Israeli Mediterranean demosponges", by Sigal Shefer, Tamar Feldstein, and Micha Ilan.

Physical organization, and scientific documentation of the Porifera and Bryozoa samples present in the Steinhardt Museum

Porifera: The sponge collection is going through an archiving process. This process included updating scientific names, printing new labels and replacing fixative solutions.

Courses and Training:

Porifera: Sigal Shefer participated in an international workshop entitled "Drugs from the Sea" that was held in Eilat, on February 9-14, 2014. This workshop improved her understanding of biotechnological application of sponges. She also participated in the Second International Workshop on Mesophotic Coral Reef Ecology (MCEs), that took place in the Inter University Institute, Eilat, 26-31 Oct, 2014, where she was exposed to various updated methods of deep sea sampling and data collection.

Museum Sample loans:

Porifera: Two sub samples of 2 specimens of *Cinachyrella aloclada* were sent to Prof Paco Cardenas, Uppsala University (Sweden): PO25623, PO25617.

Sub samples from 9 specimens were given to Ray Keren, Ph.D. student of Prof. Micha Ilan (Dept. Zoology, TAU; July 29th, 2014): NS18860, 2147, NS20519, 2472, 2182, SP25279, NS20582, 1308, 1749.

Taxonomic identification service:

Bryozoa: Identification consultation was given by Dr. Noga Sokolover for MSc student in Shenkar lab at Tel Aviv University. The consultation included identification of 4 common Bryozoa species and advice on the use of key Bryozoa species for experiments.

Porifera: Eight sponge samples were identified for the Israel Oceanographic and Limnological Research Institute (IOLR), and two samples were identified for SeArc Company (Dr. Ido Sella).

The Echinoderm collection

Dr. Omri Bronstein

Accurate assessment of species diversity is essential to nearly all areas of biology: studies of biodiversity, ecology, conservation, and policy-making all necessitate correct species identification. In this context, echinoderms stand out as they are amongst the most conspicuous marine organisms of the benthic community. They are exclusively marine and occur in diverse habitats: from the intertidal down to the bottom of the deep-sea trenches; from sand to coral reefs; and from cold to tropical seas. The echinoderm collection at the Steinhardt Museum of Natural History is the largest and most comprehensive echinoderm collection in Israel, holding over 2000 records and covering dozens of species collected over more than half a century.

As this was the first year that the Echinodermata collection has been directly and comprehensively studied, priority was given to the study of the more conspicuous and ecologically significant groups of echinoderms; the Echinoidea and Asteroidea (i.e., sea urchins and starfish, respectively).

The objectives of the year 2014 were therefore:

- Taxonomic identification of the available museum collection, focusing on regular echinoids, providing a current species list and localities, including a description of the new species and new geographical records.
- Field surveys and sampling along the Israeli coasts of the Red Sea and Mediterranean Ocean from the intertidal to the mesophotic (deep reef), in order to enlarge the current collection.
- Incorporation of DNA-based species identification with morphological taxonomic assessments to scrutinize existing echinoid identification keys.

Advances

- The first part of the study was dedicated to the preliminary organization of the museum's echinoid collection. From the preliminary examination of this

collection several erroneous identifications and many questionable ones have been noted, while some registered specimens have not been located. Based on the scale of the needed re-evaluation, I further focused my efforts on 'regular' sea urchins (that comprise the majority of echinoid specimens in the collection).

- Field surveys and collections of echinoderms along the Red Sea and Mediterranean coasts of Israel were carried out from the shoreline to the deep mesophotic reef. Surveys were carried out by both regular and technical deep diving to a depth of 60m and assisted by a Remotely Operated Vehicle (ROV) for the greater depths.
- The Mediterranean excursions to 100m depth were part of studies conducted at Prof. Ilan's lab and a deep sea survey of the Israeli Nature and Park Authority. The Red Sea 100-150m excursions were preformed as part of the Second International Mesophotic Workshop in Eilat.
- Further samples have been provided to the echinoderm collection from various locations globally (e.g., Tanzania, Hawaii, Guantanamo - Cuba, etc.) as part of active research collaborations (see below).
- Molecular diagnostics have been applied to selected echinoids to facilitate taxonomic evaluations and identification of cryptic species.

Training and active collaborations

Throughout March 2014 Dr. Bronstein participated in a joint research project and received expert taxonomic training at the Natural History Museum (NHMW) Vienna, Austria. The project, sponsored by SYNTHESYS, combined personal training in the identification of echinoids by Dr. Andreas Kroh and Dr. Elisabeth Haring. Dr. Kroh is a leading expert in the fields of phylogeny, nomenclature, and systematics, while Dr. Haring is the head of the Central Research Laboratories at the NHMW and an expert of molecular systematics and evolution.

In addition, several projects are being carried out as international collaborations:

- **Re-evaluating the status of Red Sea *Tripneustes gratilla* (Linnaeus 1758).** This collaboration between Dr. Bronstein (Steinhardt Museum), Dr. Kroh and Dr. Haring (Natural History Museum Vienna) is a revision of the taxonomic assessments of *T. gratilla* from the northern Red Sea and Gulf of Aqaba. We utilized both morphological comparisons and molecular diagnostic tools in order to evaluate both historical and newly collected material from the Gulf of Aqaba, Red Sea, and Western Indian Ocean. This allowed the first assessment of the biogeographic relations between *Tripneustes* of the two former regions and the rest of this genus's global distribution.
- **The *Acanthaster planci* species complex: taxonomic and molecular evaluation.** This project, in collaboration with Dr. Gerhard Haszprunar from the Bavarian Natural History Collections aims to assert the existence of at list four species of the crown of thorns starfish based on molecular diagnostics and morphological character analyses.
- **Taxonomic re-evaluation of the red sea *Fromia ghardaqana*.** This project, in collaboration with Dr. David Lane from the University of Brunei, aims to re-evaluate the taxonomic status of this supposedly endemic Red Sea asteroid.

The Crustacea collection

Ya'arit Levitt

The subphylum Crustacea (phylum: Arthropoda) is the only large group of arthropods that is primarily aquatic, with more than 50,000 described species. Most crustaceans inhabit marine, freshwater, and terrestrial environments all over the world, and some species may even be found in extreme environmental conditions of temperature, pressure, and salinity. Crustaceans have a significant economic and ecological importance, and they are considered as an important

food source to human and marine animals. Since the beginning of my PhD studies on October 2013 on the infraorder Caridea, I have invested much effort in collecting specimens along the coasts of Israel, both Mediterranean and Red Sea and in reorganizing of this group in the collections. During October 2013-November 2014, 40 caridean specimens were added to the collection from the Mediterranean and Red Sea coasts of Israel and from the northern Jordan Valley water system.

During a scientific survey in 2012 along the Mediterranean coast of Israel some specimens have been found as a new alien genus to the Mediterranean Sea from the Indo-pacific Ocean (Levitt et al. 2014).

Almost 900 specimens of Crustacean were computerized, within them nearly 290 new specimens were added to the collection during the last two years. Some of the new material had been brought by Prof. Yair Achituv from Bar-Ilan University and the Marine Biology department, The Israel Oceanographic and Limnological Research (IOLR).

The entire Crustacea collection has been reorganized, and unidentified specimens are being studied.

Scleractinian corals in the mesophotic environment of the northern Red Sea

Gal Eyal, Michel Pichon, Lee Eyal-Shaham and Yossi Loya

Tropical coral reefs are the largest and most spectacular structures made by living organisms. The order Scleractinia (Cnidaria), constitutes ca. 1,300 species mostly described from shallow-water reefs (i.e. <30m). Recent studies have demonstrated that coral reefs below SCUBA diving depth (>30 m), commonly referred to as Mesophotic Coral Ecosystems (MCEs), host a thriving community of plants and animals that has remained almost completely

unexplored and may serve as deep reef refugia for shallow reef light-depended corals.

On account of the specific straits of the recent geological history of the Red Sea, coral reefs are often established on the upper part of a rapidly sloping sea floor. This situation is conducive to the development of scleractinian corals, including many zooxanthellate species, to depths where light penetration reaches levels barely sufficient for normal photosynthetic activity of the scleractinian algal symbionts, and going well beyond what is usually found in a typical reef environment. The deep fore-reef slope coral fauna in the northern Red Sea was studied a few decades ago through several cooperative research programmes between local and foreign universities, as well as various expeditions including notably the use of the two men submersible "Jago" (Hans Fricke *et al.*) in 1981-1992. More recently, the development of deep SCUBA diving techniques and the availability of small, but sophisticated, remotely operated vehicles (ROVs) has allowed an acceleration of investigations of the mesophotic fauna complementing results previously obtained and leading to new findings. Here we summarize recent results in terms of scleractinian coral diversity, with reports of 92 coral species belonging to 13 families and two *"INCERTAE SEDIS"* genera, suspected new species, uncommon species and new geographic records.

Our results highlight the importance of MCEs as potential deep reef refugia for shallow water corals and should mark important rule in conservation and decision makers to include these areas in nature reserves, marine protected areas, green zones, fishing restricted areas, etc.

Algae Collection - Systematic revision of the Galaxauraceae (Nemaliales, Rhodophyta)

Razy Hoffman

The objectives:

- To revise and identify all the species of Galaxauraceae family of the Israel National Algae Collection using DNA-based assistance.
- To investigate the source and population genetics of the invasive *Galaxaura rugosa* algae along the Israeli Mediterranean Sea.
- To maintain and preserve the National Algae Herbarium at Tel-Aviv University.
- To upgrade the collection of the National Algae Collection by the addition of different Galaxauraceae species from around the world.

Advances

- 1) All specimens of Galaxauraceae (wet and dry) of TAU algal herbarium were re-identified through morphological features and their current names were revised. These samples were found unsuitable for DNA extraction since they were all preserved in formalin.
- Samples of the invasive seaweed species *G. rugosa*, collected along the Israeli Mediterranean coast in 2012-14, were sent to the Department of Life Sciences at Tunghai University, Taiwan. Sequences of rbcL gene of selected specimens were achieved. This data is necessary for future planned bioinformatics studies.
- All samples of the wet algal collection were transferred from formaldehyde to alcohol. Samples collected by Dr. Lipkin during the Red Sea expeditions were transferred from plastic bags (filled with formalin) into glass containers and preserved in 70% alcohol. Maintenance of the collection took place and revision of Lipkin's catalog of the collection started in order to re-identify specimens, update the scientific names of collected specimens and to combine Hoffman’s personal collection with the TAU herbarium.

- Sixteen specimens of eight species distributed in four genera, *Actinotrichia taiwanica* (new endemic species to Taiwan), *A. fragilis*, *Dichotomaria elegans* (*Galaxaura elegans*), *D. marginata*, *D. obtusata*, *Galaxaura rugosa* (Same species in Israel but phenotypic smaller), *Tricleocarpa fragilis* and *T. cylindrical*, of the Galaxauraceae family were collected in Taiwan and upgraded the TAU algal collection by nearly 20% of the known species of this family in the world. Moreover, a notable and important part of Lipkin's collection which was kept at the herbarium of University of California, Berkeley, USA, for many years, returned after consultations with the curator who handled it.
- Review chapter of the alien algae and seagrasses found in the Mediterranean was published in a Springer book. This chapter, among others, deals with the invasiveness of *G. rugosa* and its effects on the local marine flora.
- A survey proposal of the alien Indo-Pacific seaweeds and seagrasses along the Israeli Mediterranean coast was sent to the Israel Taxonomy Initiative. The proposed survey was accepted and budgeted. This survey upgraded TAU algal collection by many new samples of local and alien algae. It revealed more than five new alien seaweed species to the eastern basin of the Mediterranean as well as many new species that have never been documented in Israel (not in any of the national algal lists) but some of them were reported as being found in other countries of the Levant, Egypt or Turkey. Two of the new found alien seaweeds originated from the Atlantic and not from the Indo Pacific region which is the main origin of alien species in the Mediterranean. One of the most interesting findings revealed during winter surveys was the discovery of two Mediterranean seaweed species of the Genus *Hildenbrandia.* This genus has never been documented from the eastern basin of the Mediterranean. The fact that not even a single seagrass bed was found yet is worrisome!

Activities Related To The Botanical Collection

Dafna Langgut

During the last year I established the Laboratory of Archaeobotany and Ancient Environments at the Institute of Archaeology. The research in the lab is botanical collection based. The different reference collactions available in the lab mainly focus on the Israeli flora and include the followings:

- Pollen and Spores Collection (a reference collection)
- Wood Collection (a reference collection)
- Charcoal Collection (a reference collection)
- Archaeobotanical collection (finds from archaeological excavations)

Actions related to the reference collections that have been taken during the past year:

- We prepared a new charcoal reference collection, related to the Israeli flora.
- We digitized all the four available collections mentioned above according to the museum database (together with Tirza).
- We replaced the tags of the wood and charcoal collections, following the requirements of the museum (together with Tirza).
- We collected new samples for the three references collections, mainly from Tel Aviv Botanical Gardens (with the corporation of Y. Sapir).
- We received and digitized the archaeobotanical collections of the late Prof. Y. Waisel.
- We lendt part of our archaeobotanical collection to the use of the D-REAMS Radiocarbon Dating Laboratory of the Weizmann Institute-Max Planck Center for Integrative Archaeology.
- Identification of botanical remains for the Israel Antiquity Authority (two contracts: Hirbeit Kseife together with Y. Tefer and Shaon Hol Project (Negev) together with Y. Vardi).
- Participation in archaeological excavations in order to collect samples for research purposes: Mashabey Sade – Negev Hills (March, 2014); Timna –

Southern Arava (February, 2014); City of David – Jerusalem (April, 2013); Tel Megiddo (June-July, 2014); Tel Azekah (July-August, 2014); Herodium (September, 2013), Negev Highlands rock-shelters (October, 2014); Terraces of Judea Mountains (October, 2014).

Ancient DNA

Meirav Meiri

I study ancient human DNA from various museums and archaeological collections; however, due to the serious problem of contamination, I also study the ancient DNA of livestock such as pigs and cattle from various collections including the ones at Tel Aviv University. Studies have shown that domestic (and commensal) animals can serve as a good proxy for documenting human movements.

My aim is to lay the foundation for reconstructing the genetic profile of human populations and their livestock in Israel in the Bronze and Iron Ages using ancient DNA. I wish to trace population groups and examine historical continuity versus periods of crises, as well as to study the impact of mobility and migrations in the Near East on people and societies during these centuries.

I also wish to use ancient DNA techniques in order to try and extract DNA from a few extinct specimens from the museum (e.g. Schmitz's crocodile, and oryx, Aharoni's bear, and Bodenheimer's and Schmitz's cheetahs).

During this year, I worked for almost a month in the lab of Prof. Eske Willerslev in Copenhagen, Denmark. I extracted and amplified 14 ancient human samples and seven ancient pig samples from Israel according to the Next Generation Sequencing protocols (e.g., Briggs & Heyn, 2012; Meyer & Kircher, 2010). The results were analyzed by Prof. Eran Halperin, and Dr. Dorothee Huchon at Tel Aviv University.

I also started to extract and amplify short mtDNA fragments of ancient human samples following Brandt *et al.* 2013 protocol and set of primers, and extracted and amplified short DNA fragment from Schmitz's cheetah using QIAamp DNA Micro Kit (QIAGEN, Crawley, UK).

In addition, following our pig paper (Meiri *et al.* 2013), I wanted to test whether European domestic pigs that were brought to our region pushed away the local Near Eastern pigs or hybridized with them. Therefore, I sent ten modern wild boar samples from the Steinhardt Museum to Single Nucleotide Polymorphism (SNP) analysis in Gene Seek Inc. USA. Ramos *et al*. (2009) developed a chip, PorcineSNP60 Beadchip, which covers 64,232 SNPs in the pig genome and can serve as an excellent marker to study pig populations.

Unfortunately, there was very little DNA in the ancient human and pigs using the Next Generation Sequencing techniques (less than 1%), and therefore, the data could not be used for any further analyses. It seems that during the process of preparing the samples for Next Generation Sequencing, we lose quite a lot DNA (as the pig samples yielded small DNA fragment using the traditional PCR method, but we hardly get DNA using Next Generation Sequencing). Moreover, using only shotgun sequencing is not good enough for badly preserved samples, and enrichment methods (where the amount of target DNA is increased in a library to be sequenced) should be carry on beforehand (e.g., Horn 2012).

Up to now, I did not succeed in extracting human DNA from Tel Megiddo, Tel es-Safi and Tel Azekah samples. This implies that the preservation state of the samples in our region is very poor due to high temperature and humidity. Therefore, there is a need to start the DNA screening on large set of samples, the amplification step needs to be done on very small fragments of the DNA (~80bp), and we need to look for sites with good preservation.

The DNA extraction from Schmitz's cheetah was successful, and it appears that it belongs to the Asian cheetah clade.

Preliminary results from the Porcine SNPs reveal that although the modern Israeli wild boars have mtDNA European genetic signature, all the SNPs data are completely local, meaning a Near Eastern genetic signal. These surprising results imply that European domestic females were hybridized with local Near Eastern males, and probably a severe bottleneck occurred in the past, which caused the populations today to be so homogeneous. At the moment, I am collaborating with a leading lab in Wageningen University, Netherlands for sharing and further analysing the data.

Laboratory of Archaeozoology

Lidar Sapir-Hen

Beginning in September 2013 I founded the laboratory of Archaozoology at TAU, engaged in research and published papers in scientific journals, supervised MA students and taught courses, participated in international conferences and in archaeological excavations.

- Launched the Laboratory of Archaeozoology, following several years in which there was no such active laboratory in the Institute of Archaeology at TAU. Establishing the laboratory included organization of a comparative collection (modern specimens) and making it accessible for research. It also included organizing the archaozoological collection (archaeological specimens) in the storage containers of the Zoological garden. Currently working to enlarge the comparative collections to meet with research requirements.
- Advising four MA students, one of them already submitted her thesis. The students' work is based on assemblages from archaeological sites dated to

the Bronze Age, Roman and Byzantine periods, and relies on the mammals comparative collections of the museum.

- Teaching: Archaeology of Animal Bones in the Bronze and Iron Ages. International Ma Program: Archaeology and the History of the Land of the Bible. TAU; Animal remains in archaeology: Human-animal-environmental interactions. BA and MA students. Ben-Gurion University in the Negev (BGU). Teaching includes frontal lectures and practical workshop based on recent mammal collections and archaeological assemblages.
- Nine papers were accepted or published in scientific journals, seven papers as monographs chapters.
- Active participation in international conferences:

  November 2014. The American Schools of Oriental Research Annual Meeting. San Diego, USA. Two lectures.

  June 2014. International Congress on the Archaeology of the Ancient Near East. Basel, Swiss. A lecture.

  November 2013. The American Schools of Oriental Research Annual Meeting. Baltimore, USA. Two lectures and a poster.

  November 2013. Society of Biblical Literature Annual Meeting. Baltimore, USA. A lecture.
- Active participation in archaeological excavations: Timna (January 2014), Megiddo and Azekah (August 2014). Participation includes advising site directors on finds retrieval methods, and lectures to students in field school using comparative collections.
- Carrying out research on archaeological assemblages of TAU and Israel Antiquities Authority (IAA). Including Late Bronze Megiddo, Iron Age Motza, Iron Age Timna, Iron Age Western Wall Plaza, Hellenistic Givati Parking Lot, Byzantine Tel Barukh, Early Bronze Ard el-Samra, Islamic Ard el-Hadra, Early Bronze Azekah, Byzantine Apollonia, Late Roman City of David.

- Invited lectures in the Department of Zoology (TAU), Archaeology (BGU) and researchers seminar for the IAA.
- Scholars hosted in the lab and using the collections, June-August 2014:
  Dr. Deirdre N. Fulton, Baylor University
  Dr. Natalie Munro, University of Connecticut

Archaeomalacology

Daniella E. Bar-Yosef Mayer

The past academic year was dedicated to several activities that relied on research in the malacological collections. Archaeo-malacological shell assemblages of sites in Israel and in Turkey continued, with special emphasis on the following: Manot Cave (directed by Ofer Marder of Ben Gurion University, Omry Barzilai of the IAA, and Israel Hershkovitz of Tel Aviv University), and Tell Bet Yerach (directed by Rafi Greenberg and Sarit Paz of Tel Aviv University). Manot is a cave in the Western Galilee which was occupied during the Upper Palaeolithic period, 40-30,000 years ago and in which for the first time in Israel there is evidence for shellfishing. In addition dead shells were collected as ornaments, and some were discovered in the context of a burial, which would make it among the earliest ornamental grave goods. Tel Bet Yerah, near the southern shore of the Sea of Galilee was occupied during the Early Bronze Age. Apart for some Mediterranean shells, most of the assemblage consists of lake and river molluscs which might enable the future reconstruction of the site's environment during its occupation.

Progress Report for the Paleontological Collection

Olga Orlov-Labkovsky, Daniella E. Bar-Yosef and Henk K. Mienis

Fossil Foraminefera (Olga Orlov-Labkovsky)

During the past academic year Olga continued to work on:

1. The preparation of the fossil material present in the Paleontological collection;
2. The organization of a Database for fossils;
3. The description of taxa and the detailed documentation of taxonomic lineages.

She continued to work on the collections of foraminifera (thin-sections or slides) of the Carboniferous system (Upper Paleozoic) in the Central and South Tien-Shan (Central Asia, Uzbekistan and Kazakhstan).

In addition she prepared the slide collection of the Fusulinida (originals and type-species) of the Moscovian Stage of the Carboniferous system of South Tien-Shan (North Nurata and Gissar).

Currently Olga is intensively working on the Carboniferous foraminifers of Uzbekistan. Among others she is arranging the catalogues of:

- The Fusulinida (slides) of the Lower Moscovian from River Kafirnigan, Gissar Range and Narishkinsai, North Nurata.
- The Foraminifera (slides) of the Visean-Serpukhovian transition (Carboniferous) from Paltau-XII section, Chatkal (Kocsu) Range, Uzbkistan.
- The Foraminifera (slides) of the Visean-Serpukhovian transition (Carboniferous) from the Mashat VI section, south-western foothills of the Talass Alatau Range, Kazakhstan.

Computerization of the Paleontological collection of Bytinski-Salz (Daniella Bar-Yosef)

During 2013-14 I taught an Introduction to Palaeontology course at the Department of Geological & Environmental Sciences in Ben Gurion University of the Negev. I participated in a workshop on the Triassic of the Negev, and I started the cataloguing of the palaeontological collections of the museum.

As a first step towards the computerization of the entire paleontological collection of the museum, the mollusc collection of Bytinski-Salz is being entered into the mollusc database. Most specimens are tagged and identified, but many of these old names are currently not accepted. Tentatively, the taxonomic definitions are revised as they are entered into the database based on available literature. However, they will require an in-depth revision by an expert in the future.

Quaternary Molluscs (Henk K. Mienis)

As part of his work in the Mollusc collection he is occasionally working on fossil molluscs mainly of Pleistocene and Holocene age.

1. In 1987 Prof. Yoseph Garfinkel excavated a Neolithic site near Gesher. Below the layer containing the remains of the Neolithic period a layer of sand with numerous land- and freshwater molluscs was found. This material, very rich in smooth and costated forms of *Melanopsis*, is currently being studied. Most of it has been identified already except for the extremely variable *Melanopsis* species. The material seems to fit in detail the molluscs described by Jaroslav Petrbok (1925) from the pluvial terraces of the Jordan near Deganya A. The presence of *Theodoxus chalucina* (Petrbok, 1925) and very large numbers of extremely variable *Melanopsis* specimens at both sites shows the strong relationship between Petrbok's material from Deganya A and Garfinkel's shells from Gesher.

2. On the beach of Terschelling, Friesland, the Netherlands, a number of fossil molluscs (mainly bivalves) were found in September/October 2014. They turned out to be of Eemian age and were washed out of Pleistocene layers off the coast of Terschelling. The marine Eemian mollusc fauna of N.W. Europe contains many species which are now living in the Mediterranean Sea.

3. The fossil samples of Glycymerididae in the former collection of D.A. Visker have been revised.

New Acquisitions

During the past academic year again some fossil material was received for permanent storage in the paleontological collection.

Name	Brief description of the material
S. Ashkenazi	Fossils from Jordan
H.K. Mienis	Eemian fossils from the Netherlands
I. Movshovitz	Fossil molluscs and brachiopods from Israel
O. Rittner	Fossils from the Arad area

The Paleontological library

The following books were donated by Henk K. Mienis to the library of the paleontological collection:

-Boussac, J., 1912. Essai sur l'évolution des Cérithidés dans le Mésonummulitique du Bassin de Paris. 93 pp, 16 plts. Laboratoire de Géologie, Paris. (reprint 1978, Dr. W. Backhuys, Rotterdam)

-Lewy, Z. & Edelman-Furstenber, Y., 2003. Taxonomy and Paleoecology of marine benthic macrofossils of high-productivity settings, Upper Campanian Phosphate Member of Sishash Formation. Geological Survey, Jerusalem, TR-GSI/20.2003: 32 pp, 5 plts.

-Moshkovitz, S., 2012. The Mollusca in the Marine Pliocene and Pleistocene sediments of the South-Eastern Mediterranean Basin (Cyprus-Israel). Report Geological Survey of Israel, Jerusalem, GSI/25/2012: 159 pp.

Catalogue of the Foraminifera Collection (slides and figures), 1. Moscovian Stage – Lower Moscovian

Olga Orlov-Labkovsky

Lower Moscovian, Zone *Aljutovella aljutovica*

1. 1/21. *Eostaffella* (*Eostaffella*) ex gr. *pseudostruvei* Rauser et Beljaev: 1/21, 2625-2, paraxial section, x80, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 1.
2. 2/21 *Acutella mutabilis* (Rauser): 2/21, 2622-3, nearly axial section, x80, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 2.
3. 3/21 *Acutella acuta* Grozdilova et Lebedeva forma lata: 3/21, 2622-4, axial section, x80, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 3.
4. 4/21 *Ozawainella* ex gr. *angulata* (Colani): 4/21, 2620-1a, axial section, x45, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 4.
5. 5/21 *Ozawainella umbonata* Brazhnikova et Potievskaya: 5/21, 2626-7, near axial section, x45, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 5.
6. 6/21 *Ozawainella pararhombaidalis* Manukalova: 6/21, 2620-1b, axial section, x45, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 6.
7. 7/21 *Neostaffella pseudoquadrata* (Manukalova): 7/21, 2618-5, nearly axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 8.

8. 8/21 *Profusulinella* aff. *beppensis* Toriyma: 8/21, 2617-3, near axial section, x35, River Kafirnigan, southern slopes Gissar Range; Plate27, fig. 11.
9. 9/12 *Profusulinella* aff. *beppensis* Toriyma: 9/21, 2617-7, near axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 12.
10. 10/21 *Ovatella ovata* (Rauser): 10/21, 2617-9, near axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate27, fig. 13.
11. 11/21 *Ovatella* aff. *ovata* (Rauser): 11/21, 2619-1, nearly axial section, x35, River Kafirnigan, southern slopes Gissar Range; Plate 27, fig. 14.
12. 12/21 *Aljutovella aljutovica* (Rauser): 12/21, 2644-3, tangential section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 28, fig. 2.
13. 13/21 *Aljutovella* ex gr. *aljutovica* (Rauser): 13/21, 2641-7, tangential section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 28, fig. 3.
14. 14/21 *Aliutovella subaljutovica* Safonova: 14/21, 2641-2, nearly axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 28, fig. 4.
15. 15/21 *Depratina prisca* (Deprat): 15/21, 2628-6, nearly axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 28, fig. 5.
16. 16/21 *Depratina paratimanica* (Rauser): 16/21, 2628-8, nearly axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 28, fig. 6.
17. 17/21 *Skelnevatella* aff. *cybaea* Leontovich: 17/21, 2619-7, tangential section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 28, fig. 8.
18. 18/21 *Verella postfusiformis* Bensh: 18/21, 2644-5, nearly axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 28, fig. 14.

Lower Moscovian, Zone *Aljutovella priscoidea – Aljutovella znensis*

19. 19.1/21. *Eostaffella exilis* Grozdilova et Lebedeva: 19/21, 496-61-2a, nearly axial section, x 80, River Merishkor, Range Nuratau (Coll. Chinikulov et all). Plate 29, fig. 1.
20. 19.2/21. *Eostaffella* (*Acutella*) *acuta* (Grozdilova et Lebedeva): 19/21, 496-61-2b, axial section, x 80, River Merishkor, Range Nuratau (Coll. Chinikulov et all). Plate 29, fig. 2.
21. 19.3/21. Depratina paratimanica Rauser: 19/21, 496-61-2a, nearly axial section, x 35, Merishkor, North Nuratau Range; Plate 30, fig. 9.
22. 19.4/21.*Aljutovella* ex gr. *paraaljutovica* Safonova: 19/21, 496-61-2b, tangential section, x35, Merishkor, North Nuratau Range. Plate 32, fig. 5 .
23. 20.1/21. *Eostaffella* (*Acutella*) *ozawainellaeformis* (Solovieva): 20/21, 496-62-7a, near axial section, x 80, River Merishkor, Range Nuratau (Coll. Chinikulov et all). Plate 29, fig. 3.
24. 20.2/21. *Ozawainella donbassensis* Sosnina 20/21, 496-62-7b, axial section, x 45, River Merishkor, Range Nuratau (Coll. Chinikulov et all). Plate 29, fig. 7.
25. 20.3/21. *Schubertella obscura* Lee et Chen: 20/21, 496-62-7c, axial section, x 35, River Merishkor, Range Nuratau (Coll. Chinikulov et all). Plate 29, fig. 19.
26. 20.4/21. *Schubertella* sp.: 20/21, 496-62-7c, axial section, x 35, River Merishkor, Range Nuratau (Coll. Chinikulov et all). Plate 29, fig. 22.
27. 20.5/21. *Aljutovella* ex gr. *paraaljutovica* Safonova: 20/21, 496- 62-7c, paraxial section, x35, Merishkor, North Nuratau Range. Plate 32, fig. 4.
28. 20.6/21. *Aljutovella parasarotovica* Safonova: 20/21, 496- 62-7d, paraxial section, x35, Merishkor, North Nuratau Range. Plate 32, fig. 6.

29. 21.1/21. *Millerella* sp.: 21/21, 496-62-3a, paraxial section, x 80, River Merishkor, Range Nuratau (Coll. Chinikulov et all). Plate 29, fig. 4.
30. 21.2/21. *Ovatella* ex gr. *ovata* (Rauser): 21/21, 496-62-3b, near axial section, x 35, River Merishkor, Range Nuratau (Coll. Chinikulov et all); Plate 29, fig. 23.
31. 21.3/21. *Ovatella* ex gr. *ovata* (Rauser): 21/21, 496-62-3c, paraxial section, x 35, River Merishkor, Range Nuratau (Coll. Chinikulov et all) Plate 29, fig.24 .
32. 21.4/21. *Moellerites nuratovensis* (Solovieva): 21/21, 496-62-3a, nearly axial section, x 35, Merishkor, North Nuratau Range; Plate 31, fig. 2.
33. 21.5/21. *Moellerites nuratovensis* (Solovieva): 21/21, 496-62-3k, tangential section, x 35, Merishkor, North Nuratau Range. Plate 31, fig. 3.
34. 21.6/21. *Aljutovella saratovica* (Putrja et Leontovich): 21/21, 496-62-3h, axial section, x35, Merishkor, North Nuratau Range. Plate 32, fig. 3.
35. 22.1/21. *Ozawainella donbassensis* Sosnina: 22/21, 496-61-3a, axial section, x 45, River Merishkor, Range Nuratau (Coll. Chinikulov et all) Plate 29, fig. 5.
36. 22.2/21. *Schubertella gracilis* Rauser: 22/21, 496-61-3b, axial section, x 35, River Merishkor, Range Nuratau (Coll. Chinikulov et all); Plate 29, fig. 20.
37. 22.3/21. *Schubertella gracilis* Rauser: 22/21, 496-61-3c, axial section, x 35, River Merishkor, Range Nuratau (Coll. Chinikulov et all). Plate 29, fig. 21.
38. 22.4/21. *Skelnevatella* aff. *cybaea* (Leontovich): 22/21, 496-61-3b, paraxial section, x 35, Merishkor, North Nuratau Range. Plate 31, fig. 8.
39. 23.1/21. *Ozawainella donbassensis* Sosnina 23/21, 496-61-1a, axial section, x 45, River Merishkor, Range Nuratau (Coll. Chinikulov et all) Plate 29, fig. 6.
40. 23.2/21. *Moellerites parasimplex* (Bensh): 23/21, 496-61-1c, nearly axial section, x 35, Merishkor, North Nuratau Range. Plate 31, fig. 5.
41. 23.3/21. *Moellerites* sp.: 23/21, 496-61-1b, paraxial section, x 35, Merishkor, North Nuratau Range. Plate 31, fig. 6.
42. 24.1/21. *Ozawainella mosquensis* Rauser: 24/21, 2651-7, axial section, x45, River Kafirnigan, southern slopes Gissar Range; Plate 29, fig. 8.
43. 24.2/21. Depratina paratimanica Rauser: 24/21, 496-62-7, nearly axial section, x 35, Merishkor, North Nuratau Range. Plate 30, fig. 10.
44. 25/21. *Ozawainella mosquensis* Rauser: 25/21, 497/104-10, axial section, x45, Kokcha, south-western ending of the Range North Nuratau. Plate 29, fig. 9.
45. 26/21. *Reitlingerina* ? *timanica* (Rauser): 26/21, 2645-6, axial section, x45, River Kafirnigan, southern slopes Gissar Range. Plate 29, fig. 10.
46. 27/21. *Pseudostaffella* (?) ex gr. *praegorskyi* Rauser: 27/21, 497/104a-1, near axial section, x35, Kokcha, south-western ending of the Range Sorth Nuratau Plate 29, fig. 11.
47. 28/21. *Neostaffella* aff. *topilini* (Putrja): 28/21, 2650-4, near axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 29, fig. 14.
48. 29/21. *Neostaffella rotundata* Bensh: 29/21, 2648-1, tangential section, x35, River Kafirnigan, southern slopes Gissar Range; Plate 29, fig. 15.
49. 30/21. *Moellerites parasimplex* (Bensh): 30/21, 496-62-4a, paraxial section, x 35, Merishkor, North Nuratau Range; Plate 30, fig. 4.
50. 31/21. *Skelnevatella cafirniganica* (Bensh): 31/21, 2649-9, nearly axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 32, fig. 1.

51. 32/21. *Aljutovella aljutovica* (Rauser): 32/21, 2647-4, nearly axial section, x35, River Kafirnigan, southern slopes Gissar Range. Plate 32, fig. 2.
52. 33/21. *Verella postspicata* Bensh: 33/21, 2649-3, nearly axial section, x20, River Kafirnigan, southern slopes Gissar Range; Plate 33, fig. 4.
53. 34/21. *Verella postspicata* Bensh: 34/21, 2649-2, nearly axial section, x20, River Kafirnigan, southern slopes Gissar Range. Plate 33, fig. 5.
54. 35/21. *Eofusulina* aff. *triangula rasdorica* (Putrja): 35/21, 496-43-2, nearly axial section, x20, Narvansay, Nuratau Range Plate 33, fig. 6.
55. 36.1/21 . *Eofusulina* aff. *triangula rasdorica* (Putrja): 36/21, 496-62-1a, nearly axial section, x20, Merishkor, Nuratau Range. Plate 33, fig. 7.
56. 36.2/21. *Eofusulina triangular tethys* Solovieva: 36/21, 496-62-1b, axial section, x20, Merishkor, Nuratau Range. Plate 33, fig. 9.
57. 37/21. *Eofusulina triangular tethys* Solovieva: 37/21, 496-43-1, axial section, x20, Narvansay, Nuratau Range; Plate 33, fig. 8.

Lower Moscovian, Zone *Moellerites parasimplex – Fusulinella subpulchra*

58. 38/21 *Acutella* ex gr. *mutabilis* (Rauser): 38/21, 2780-15, nearly axial section, x80, River Sarbin, southern slopes Gissar Range. Plate 34, fig. 2.
59. 39/21. *Ozawainella paratingi* Manukalova: 39/21, 2780-6, axial section, x45, River Sarbin, southern slopes Gissar Range; Plate 34, fig. 3
60. 40/21.*Ozawainella paratingi* Manukalova: 40/21, 2780/13, axial section, x45, River Sarbin, southern slopes Gissar Range. Plate 34, fig. 4.
61. 41.1/21. *Ozawainella vozhgalica* Safonova: 41/21, 2784-3a, axial section, x45, River Sarbin, southern slopes Gissar Range. Plate 34, fig. 5.
62. 41.2/21. *Neostaffella formosa kamensis* Safonova: 41/21, 2784-3b, nearly paraxial section, x45, River Sarbin, southern slopes Gissar Range. Plate 34, fig. 10.
63. 42.1/21. *Ozawainella* ex gr. *mosquensis* Rauser: 42/21, 2780-12a, nearly axial section, x45, River Sarbin, southern slopes Gissar Range; Plate 34, fig. 6.
64. 42.2/21. *Ozawainella* ex gr. *mosquensis* Rauser: 42/21, 2780-12b, tangential section, x45, River Sarbin, southern slopes Gissar Range. Plate 34, fig. 7.
65. 42.3/21. *Profusulinella paratimanica* Rauser: 42/21, 2781-8, axial section, x35, River Sarbin, southern slopes Gissar Range. Plate 34, fig. 14.
66. 43/21. *Neostaffella umbilicata* (Putrja et Leontovich): 43/21, 2783-25, axial section, x35, River Sarbin, southern slopes Gissar Range. None Slide. Plate 34, fig. 8.
67. 44/21. *Neostaffella* sp.: 44/21, 2783-2, tangential section, x45, River Sarbin, southern slopes Gissar Range. Plate 34, fig. 9.
68. 44/21. *Schubertella* ex gr. *gracilis* Rauser: 44/21, 2783-4, axial section, x35, River Sarbin, southern slopes Gissar Range. Plate 34, fig. 17.
69. 45/21. Moellerites parasimplex (Bensh): 45/21, 2789-12, nearly axial section, x35, River Sarbin, southern slopes Gissar Range. Plate 35, fig. 6.
70. 46/21. Moellerites bedakensis (Solovjeva): 46/21, 2789-16, nearly axial section, x35, River Sarbin, southern slopes Gissar Range. Plate 35, fig. 7.
71. 47/1. *Priscoidella priscoidea* (Rauser): 47/21, 2779-7, nearly axial section, x35, River Sarbin, southern slopes Gissar Range Plate 35, fig. 9.

72. 48/21. *Fusulinella bockiformis* Bogush: 48/21, 2779-3, nearly axial section, x35, River Sarbin, southern slopes Gissar Range. Plate 36, fig.2.
73. 48/21. *Fusulinella* ex gr. *pulchra* Rauser et Beljaev:; 48/21, 2779-3, paraxial section, x35, River Sarbin, southern slopes Gissar Range. Plate 36, fig. 5.
74. 50/21. *Beedeina* ex gr. *pseudoelegans* (Chernova): 50/21, 2780-16, nearly paraxial section, x35, River Sarbin, southern slopes Gissar Range. Plate 36, fig. 8.

Mollusc Collection

Henk K. Mienis, Oz Rittner and Revital Ben-David-Zaslow

Research

During the academic year 2013/14 we continued to carry out research in the fields of taxonomy, systematics, nomenclature, Lessepsian migration and the presence of exotic and invasive species among the mollusc fauna of Israel.

Especially much attention has been given to the exotic land- and freshwater molluscs occurring in Israel during the past academic year. Without doubt this will be a major subject of interest also in the coming years.

Support with identifications

Various ecological studies on the marine molluscs of the Eastern Mediterranean and the Gulf of Aqaba are currently being carried out by a number of students at the Tel Aviv University (Ehud Gilad & Zohar Yanai), Ben-Gurion University of the Negev (Yael Leshno) and Bar-Ilan University (Yael Tzuberi). They received our expertise by the identification of their material. At least part of the identified material is being kept for permanent storage in the Steinhardt Museum of Natural History.

Other identifications were carried out for members of the Israel Malacological Society and several research teams at other institutions (see below).

New records from Israel

From Joseph Eliahu we received photographs of a nudibranch not reported before from the Mediterranean coast of Israel. It turned out to be *Trapania toddi*, an Indo-Pacific species here recorded for the first time from the Mediterranean Sea. This Lessepsian migrant was photographed in situ in the Akhziv Canyon at a depth of 21 m (Mienis *et al.,* 2014).

From Rami Tsadok we received interesting samples of molluscs collected with an unmanned submersible around gas seeps at a depth of about 950 m off Palmahim. It contained many species which had not been recorded so far from the Eastern Mediterranean off Israel. New species for the fauna are for example: *Clelandella miliaris*, *Moelleriopsis messanensis*, *Putzeysia wiseri*, *Laeviphitus verduini*, *Taranis moerchii*, *Idas modiolaeformis* and *Lucinoma kazani* (Mienis & Rittner, 2014). More species may be expected in the near future.

Renewed investigations of the lower part of the Qishon River by Dr. Eldad Elron of DHV Med for the Nahal Kishon Authority have revealed the presence of a viable population of the brackish water mussel *Mytilopsis sallei* just west of the Irish Bridge (Mienis, 2014b). It is the first inland record of this highly invasive species from the inland waters of Israel.

A study of archaeomalacogical material from excavations in Tiberias and from a peat layer in Nahal Poleg has revealed that the Mediterranean land snail *Trochoidea pyramidata* was probably living in Israel during the Early Arabic period (Mienis, 2014c). Since then it has disappeared at some time again from our terrestrial mollusc fauna.

Cooperation with the Israel Oceanographic and Limnological Research, National Institute of Oceanography

We identified large numbers of littoral Limpet-like gastropods, which had been collected by Dr. Edna Shefer at permanent stations along the Mediterranean coast of Israel for her research on the presence of residues of heavy metals in

the autochthonous species of *Patella* and the allochthonous Lessepsian migrants *Cellana rota* and *Siphonaria crenata*. Edna has retired recently but her work will be taken over by Ya'el Segal.

From Dr. Bella S. Galil and Dr. Hadas Lubinevsky we receive regularly the most interesting mollusc samples collected during the annual surveys carried out off Palmahim and Ashdod. Among the recent finds was a specimen of the Odd bobtail squid *Heteroteuthis dispar* caught at a depth of 1550 m off Rosh HaNiqra (Mienis *et al*., 2013). It represents the first record of it from the Levantine Sea off Israel.

Dr. Buki Rinkevich and Lee Shaish are donating regularly voucher specimens of Eastern Mediterranean molluscs which have been used for DNA research. This has resulted among others in the discovery of remains of a specimen of *Chiroteuthis veranii* off the coast of Israel (Shaish *et al.*, 2014).

Other Mediterranean molluscs are still being received occasionally from Dr. Gil Rilov and his team.

Cooperation with the Plant Protection & Inspection Services of the Ministry of Agriculture

Mrs. Svetlana Vaisman of the mollusc identification unit of the Plant Protection & Inspection Services (PPIS) at Bet Dagan continued to work 4-5 hours a week in the mollusc collection. Most of the time she is picking and identifying micro-molluscs from leaf litter and soil samples collected at various anthropogenic sites in Israel.

This year Mrs. S. Vaisman brought us for identification only 6 samples of land and freshwater snails intercepted by inspectors from the Plant Protection & Inspection Services (PPIS) of the Ministry of Agriculture. At the moment the PPIS is coping with severe financial cutbacks and had to reduce its activities in the arrival hall at Ben-Gurion Airport.

Yet some rather interesting species were present among the intercepted material. On 9th January 2014 a juvenile *Cernuella virgata* was found in Ashdod on a shipment of hand apples from France, a similar shipment arriving at Haifa on 26th April 2014 from France contained 4 specimens of *Oxyloma elegans* and a single specimen of *Cochlicopa lubrica.* On 9th April 2014 a temporary labourer arriving at Ben Gurion Airport from Thailand tried to smuggle 4.6 kg of freshwater snails. The material consisted of 422 viviparous snails of which 90% belonged to *Filopaludina (Siamopaludina) martensi martensi* and 10% to *Filopaludina (Siamopaludina) javanica continentalis* and 79 specimens of *Pomacea canaliculata.*

Due to new restrictions concerning the import, cultivation and trade of Apple snails of the genus *Pomacea* in countries belonging to the European Union special attention was being paid to the presence of Apple snails in Israel, because any export of aquatic merchandise from Israel to the European Union has to be accompanied by a statement issued by the Ministry of Agriculture that the merchandise was cultivated without the presence of Apple snails. For that reason nurseries of aquatic plants were visited by a joint team of the PPIS (Svetlana Vaisman, Dr. Yo'av Motro and several local inspectors) and the SMNH (Henk Mienis and Oz Rittner) during the last academic year. So far Apple snails were found in one nursery in Tel Mond and in a complex of ponds in a public garden in Ramat HaSharon. The latter infestation turned out to be directly connected with the nursery in Tel Mond because they had provided all the aquatic plants, fish and snails. At the moment the PPIS and the Israel Nature and National Parks Protection Authority are involved in the eradication of the Apple snails in both Tel Mond and Ramat HaSharon.

The visits to other nurseries of aquatic plants have revealed the presence of quite a number of exotic freshwater snails which had not been recorded previously from such commercial enterprises in Israel: *Cyclotropis bedaliensis*,

Gyraulus chinensis, *Austropepla ollula*, *Radix luteola*, *Radix rubiginosa* and *Stagnicola turricula.*

Cooperation with the Israel Nature and National Parks Protection Authority

The phylum Mollusca is protected by law in Israel. The only exception is being formed by a small group of Mediterranean Cephalopods which are of commercial interest. Any malacological fieldwork carried out by the authors of this report is carried out with a proper license supplied on an annual base by the Israel Nature and National Parks Protection Authority (INNPPA).

During the past academic year we worked in close cooperation with their freshwater ecologist Dr. Dana Milstein. The cooperation between the PPIS of the Ministry of Agriculture and the INNPPA has to solve the Apple snail problem in Israel, for which the staff of the mollusc collection is carrying out the identifications.

Cooperation with archaeologists

In recent decades archaeologists became aware of the importance of a proper identification of their archaeomalacological material. Well identified shell material may provide the archaeologist with information concerning such various subjects as climate, food, trade routes, exploitation of shells as votive objects, utensils, beads, pendants, etc.

During the past academic year we worked on archaemalacological material from the following sites:

-Jewish Quarter in the Old City of Jerusalem excavated by the late Prof. Nahman Avigad and Dr. Hillel Geva;

-Horbat Bet Loya excavated by Dr. Oren Gutfeld;

-Shallale excavated by Prof. Shimon Dar;

-Tiberias excavated by the late Prof. Izhar Hirschfeld;

-the Refuse dump of the Temple Mount in Jerusalem studied by Zachi Dvira (Zweig);
-the Refuse dump of Apollonia/Arsuf excavated by Prof. Oren Tal;
-various Chalcolithic and Early Bronze sites excavated by Dr. Edwin van den Brink;
-Tell es-Safi/Gath excavated by Prof. Aren M. Maeir;
-and others.

Cooperation with the Israel Malacological Society

New material is regularly received from members of the I.M.S., often after they have published their studies in the journal published by the I.M.S. 'Triton'.

From the I.M.S. we receive regularly 50 copies free of charge in order to exchange them with malacological journals published by similar societies of zoological museums abroad.

Most of the malacological journals are stored permanently in the library of the Steinhardt Museum of Natural History, while the general zoological journals are being stored in the library of the National Natural History Collections of the Hebrew University of Jerusalem.

Cooperation with malacologists abroad

Prof. R.A. Bank (the Netherlands) is currently revising the complex of *Euchondrus "ovularis"* auct. (not Olivier, 1801) in Israel.

A Dutch-German team consisting of Jordy G. van der Beek, Frans de Jong, Dr. Bernd Sahlmann and Dr. Vollrath Wiese are currently revising the Scaphopoda from the Red Sea.

New acquisitions

New material, not only from colleagues at various institutes but also from private collectors and even from the legacies of deceased collectors, has arrived regularly during the past year. All these new samples were immediately identified and prepared for permanent storage.

For the small shell related ethnographical collection we received a shell-box made of the Indo-Pacific mussel species *Codakia tigrina.*

In addition we could add much material (shell spoils, etc.) from a former shell button factory in Ra'anana discovered in June 2014.

During the academic year 2013/2014 material has been received directly or indirectly from the following persons:

Name	Brief description of the material
S. Ashkenazi	Marine molluscs from Puerto Rico
R. Atidia	Land snails from Israel
D.E. Bar-Yosef	Marine molluscs and land snails from Morocco
U.J. Bar-Ze'ev	Land snails from Israel
C. Bogi	Marine molluscs from the Eastern Mediterranean
S. Davis	Land snails from Greece
S. Elger	Land snails from Israel and Italy
E. Elron	Freshwater molluscs from Israel
W.J. Eyerdam	Molluscs from the Philippines and Haiti
B.S. Galil	Marine molluscs from the Eastern Mediterranean
J. Gerritzen	Land and marine snails from Israel and Seychelles
J.T. Gerritzen-Mienis	Marine molluscs from Denmark
M. Goren	Land snails from Israel
Ch. Grasselly	Land snails from Bulgaria, France, Spain and Turkey
O. Hauser	Amphibious and land snails from terrariums in Israel
M.K. Jacobson	Land snails from Cuba
O. Katsir	Land snails from Israel and Turkey
O. & G. Kolodny	Land- and freshwater snails from Israel, Italy, Jordan and Turkey
L. Meerema	Land snails from Israel and Seychelles
D. Mienis	Land snails from Israel and Portugal, and a shell box made of Codakia tigrina
H.K. Mienis	Land- and freshwater molluscs from the Netherlands and Israel
I. Movshovitz	Molluscs world-wide

R. Ortal	Land snails from Israel
S. Payne	Land snails from Greece
I. van Rijn	Marine molluscs from the Eastern Mediterranean
B. Rinkevich	Marine molluscs from the Eastern Mediterranean
O. Rittner	Land- and freshwater molluscs from Israel and Argentina
A. Rubin	Land snails from Israel
P. & W. Schnell	Molluscs from Germany and New Guinea
H. Schütt	Freshwater molluscs from Slovenia, Croatia, Hercegovina, Macedonia and Greece
V. Seemann	Land snails from Israel
M. Shaham	Land and freshwater snails from the Czech Republic, Spain, Costa Rica, Laos, Cambodia and Vietnam
A. Shlagman	Land snails from Israel
A. Shmida	Land snails from Jordan
C. de la Torre	Land snails from Cuba
S. Vaisman	Molluscs intercepted by inspectors of Ministry of Agriculture (PPIS) and material collected in Israel
M. Volokita	Land snails from Israel
Z. Yanai	Freshwater molluscs from Israel
N. Yellin-Lipschitz	Land snails from Israel, Croatia, France and Ukraine

The recently received material from the legacy of Dr. Nechama Yellin Lipschitz (1942-2013) contained some 300 samples of land snails, which were mainly collected in Israel during joint fieldwork with Uri J. Bar-Ze'ev.

Computerization of the collection

The computerization of the mollusc collection is carried out at the moment by Oz Rittner (collection of recent molluscs and occasional arrivals of fossil material) and Dr. Daniella E. Bar-Yosef Mayer (the fossil molluscs in the paleontological collection of Hanan (Hans) Bytinski-Salz).

At the moment 60307 samples representing 9082 taxa in the mollusc collection have been computerized. The majority of the new species and subspecies (199) which we could add this year to the collection were mainly from the collections of Zvi Orlin and the paleontological collection of Hanan (Hans) Bytinski-Salz.

Type Material

A list of type specimens present in the Mollusc Collection has been published in previous reports (Mienis, 2010, 2011, 2012, 2013 & 2014). A collation of additional type specimens located in the collection or received afterwards is given elsewhere in this report.

The Malacological library

The library is for the Mollusc Collection a most important tool for taxonomic and systematic studies. New books received for the malacological library (2013/2014):

Recent donations

Received from Dr. Bilal Öztürk of the Ege University in Izmir, Turkey:
Öztürk, B., 2014. Shelled Marine Molluscs of the Turkish Coasts. Informal group 'Lower Heterobranchia' (Mollusca-Gastropoda). Publications of the Faculty of Fisheries, 81: 131 pp. Ege University Press, Izmir.

Received from Dr. D.G. Herbert, Kwazulu-Natal Museum, Pietermaritzburg, South Afica:
Herbert, D.G., 2012. A revision of the Chilodontidae (Gastropoda: Vetigastropoda: Seguenzioidea) of Southern Africa and the south-western Indian Ocean. African Invertebrates, 53 (2): 381-502.

Received from Henk K. Mienis:
Cecalupo, A., 2005. Elenco della famiglia Cerithiidae Férussac, 1822 (Prosobranchia). Nomenclatura delle species conosciute o poco note e relativa revision sistematica Fossili e Attuali, Vol. I. Quaderni della Civica Stazione Idrobiologica di Milano, 26: 363 pp.
Cecalupo, A., 2005. Elenco della famiglia Cerithiidae Férussac, 1822 (Prosobranchia). Nomenclatura delle species conosciute o poco note e relativa revision sistematica Attuali, Vol. II. Quaderni della Civica Stazione Idrobiologica di Milano, 27: 373 pp.

New acquisitions

Cossignani, T. & Ardovini, R. (Eds.), 2011. Malacologia Mediterranea. 536 pp. L'Informatore Piceno, Ancona.

In addition we have received many reprints and again numerous journals from Zoological Institutes or Malacological Societies in exchange of 'Triton', the malacological journal published by the Israel Malacological Society.

Fifth addition to the catalogue of type specimens in the mollusc collection of the Steinhardt Museum

Henk K. Mienis

Type material of 5 taxa is added to the provisional lists of type specimens present in the Mollusc Collection of the Steinhardt Museum of Natural History, Tel Aviv University (Mienis, 2010, 2011, 2012, 2013 & 2014). Four type samples were donated to the Mollusc Collection during the academic year 2013/14, while another type was found in the former collection of Zvi Orlin.

GASTROPODA

Family Cypraeidae

Erosaria turdus singeri Heiman, 2014.
Paratypes TAU MO 79018/2: South Arabia, Arabian Gulf, south side of Abu Ali Island.

Erosaria turdus kuwaitensis Heiman, 2014
Paratypes TAU MO 79019/2: Kuwait, Arabian Gulf, Al-Kuwait.

Erosaria turdus somaliaensis Heiman, 2014
Paratypes TAU MO 79020/2: Somalia, Indian Ocean, near Obbia (=Hobyo).

Family Eulimidae

Fusceulima boscheineni Engl, 1998
Paratype TAU MO 78537: Canary Islands, Lanzarote, Puerto del Carmen, 20-50 m.

Family Polygyridae

Ashmunella kochi amblya Pilsbry, 1940
Paratypes TAU MO 78607/2: USA, New Mexico, Guadalupe Mountains, Pine Spring Canyon, south east of Orange.

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Thanks are due to Zvi Orlin (Qiriyat Motzkin) and Eduard L. Heiman (Rehovot) for the donation of the type samples to the Mollusc Collection of the Steinhardt Museum of Natural History.

References

Engl, W., 1998. New species of the family Eulimidae from the Canary Islands – Part 3. Description of *Fusceulima boscheineni* n.sp. La Conchiglia, 289: 11-14, 60.

Heiman, E.L., 2014. *Erosaria turdus singeri*, a new subspecies. Triton, 29: 12-14.

Heiman, E.L., 2014. *Erosaria turdus kuwaitensis* another new subspecies from the Persian Gulf. Triton, 29: 15-16.

Heiman, E.L., 2014. *Erosaria turdus somaliaensis* a new subspecies from an area near Obbia, Eastern Somalia. Triton, 29: 17-18.

Mienis, H.K., 2010. Provisional catalogue of type specimens in the mollusc collection of the Tel Aviv University. In: The National Collections of Natural History. Annual Report 2008/2009. Tel Aviv University: 43-49.

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Mienis, H.K., 2012. Second addition to the catalogue of type species in the mollusc collection of the Tel Aviv University. In: The National Collections of Natural History.
Annual Report 2010/2011, Tel Aviv University: 58-59.

Mienis, H.K., 2013. Third addition to the catalogue of type species in the mollusc collection of the Tel Aviv University. In: The National Collections of Natural History.
Annual Report 2011/2012, Tel Aviv University: 55-57.

Mienis, H.K., 2014. Fourth addition to the catalogue of type species in the mollusc collection of the Tel Aviv University. In: The National Collections of Natural History.
Annual Report 2012/2013, Tel Aviv University: 56-59.

Pilsbry, H.A., 1940. Land Mollusca of North America (North of Mexico). Vol. 1, Part2. The Academy of Natural Sciences of Philadelphia, Monographs, 3: I-VIII, 575-994, i-ix.

Collecting trips and expeditions

A dynamic archive, our Natural History Collections grow annually through donations, research projects, and collecting trips and expeditions. Many research projects have added numerous specimens to our collections, while other collections have benefited from focused collecting trips. Here we report on some of the new collecting activities of our scientists.

Collecting trips of the Entomology

Moshe Gershon

Israel: Several dozens of collecting trips were made along the year. Collecting methods included net sweeping, light and Malaise traps, as well as direct rearing from host plants. Overall, more ca. 15,000 insect specimens from different orders were collected (based on the digitized database).

Abroad:

- Dr. Netta Dorchin (together with a group students) – participation in the 8th International Congress of Dipterology in Germany.
- Dr Netta Dorchin toguetether with Zohar Yanai (PhD student) visited the museum of Lausanne as part of the taxonomic work on mayflies.
- Dr, Vasiliy Kranchenko spent several months collecting in Mali and other African countries.

Malacological fieldwork in Israel

Henk K. Mienis and Oz Rittner

Malacological fieldwork mainly dealing with land and freshwater molluscs has been carried out occasionally by the authors during the academic year 2013-2014. Most of the fieldwork was carried out in close cooperation with the Plant

Protection & Inspection Services of the Ministry of Agriculture. The most important results are briefly mentioned here.

Abbreviations:
INNPPA – Israel Nature & National Parks Protection Authority
PPIS – Plant Protection & Inspection Services, Ministry of Agriculture
SMNH – The Steinhardt Museum of Natural History and Israel National Center for Biodiversity Studies, Tel Aviv University.

12 November 2013: Hula Nature Reserve
Participants: Oz Rittner, Henk Mienis (both SMNH), Svetlana Vaisman (PPIS) and Yifat Artzi (INNPPA).

A total of 11 out of the 14 stations sampled in March 2013 were again sampled in November. In addition three stations (A-C) were sampled for the first time. Each station is followed by the species which were encountered alive.

Station 1: A tiny round pond with water lilies near the entrance of the Nature Reserve: *Haitia acuta* and *Planorbella duryi*;
Station 2: "Canal" behind the shelter (now four separated ponds) with water lilies: *Bithynia phialensis*, *Planorbella duryi* and *Haitia acuta.*
Station 3: Pond near the shelter garden: *Haitia acuta.*.
Station 4: Shosh pond (large): *Haitia acuta.*
Station 5: Entrance of the canal into the lake near the beginning of the visitor's path: *Haitia acuta* and *Pseudosuccinea columella.*
Station 7: Exit of the Western Pond: *Bithynia phialensis*, *Valvata saulcyi*, *Pseudosuccinea columella* and *Haitia acuta*.
Station 8: Entrance to the reservoir: *Haitia acuta*, *Galba truncatula* (on the walls) and *Pseudosuccinea columella*.
Station 9: Migdal Ram, lake east of the tower: *Valvata saulcyi* and *Haitia acuta*.
Station 10: Migdal Ram, Saduq, west of the tower: *Haitia acuta* and *Stagnicola palustris.*

Station 11: Saduq, northern bank: *Haitia acuta*, and *Oxyloma elegans*.
Station 12: "Berekh" of Nahal Eynan: *Bithynia phialensis, Melanopsis buccinoidea, Melanopsis costata, Melanopsis saulcyi* (=hybrid between *buccinoidea* and *costata*), *Valvata saulcyi, Haitia acuta* and *Planorbis planorbis antiochianus*.
Station A: Water lily basin (Nymphaea alba): *Bithynia phialensis* and *Haitia acuta*.
Station B: Palms lower Nahal Eynan: *Radomaniola gaillardotii, Valvata saulcyi, Haitia acuta* and *Planorbis planorbis* antiochianus.
Station C: "waterfall" between Saduq and Ma'agar: *Haitia acuta*, *Bulinus truncatus* (with axial ribs) and *Pseudosuccinea columella.* The fast running water forms a strange biotope for these three species, which prefer standing or slow moving water with rich aquatic vegetation.

The following 14 aquatic or amphibious species were encountered alive during the survey: *Radomaniola gaillardotii, Bithynia phialensis, Melanopsis buccinoidea, Melanopsis costata, Malanopsis saulcyi, Valvata saulcyi, Haitia acuta, Bulinus truncatus, Planorbella duryi, Planorbis planorbis antiochianus, Galba truncatula, Pseudosuccinea columella, Stagnicola palustris* and *Oxyloma elegans*.

Three species: *Haitia acuta, Planorbella duryi* and *Pseudosuccinea columella*, are invasive, exotic species of North-American origin. The cap-like gastropod Ferrissia clessiniana collected in March 2013 was not found, however three other species: *Radomaniola gaillardotii, Bulinus truncatus* and *Galba truncatula*, were found during the current survey and not in March.

The complete absence of any mussel species (*Unio*, *Potomida*, *Corbicula*, *Musculium* and *Pisidium*) remains a matter of concern. Likewise not a single *Theodoxus* specimen was found alive.

An extended report dealing with this survey has been submitted to the Israel Nature and National Parks Protection Authority (Rittner & Mienis, 2014).

9 December 2013 Ramat Gan

Participant: Henk Mienis (SMNH).

Gardens in streets east and west of Herzl Street in Ramat Gan were checked for the supposed presence of *Rumina saharica*, an invasive species. Large populations were located for the first time in the following streets/boulevards: Herzl, Lambam, Avraham, HaRoeh, Natan, Mavo Natan and Simtat Elimelekh. In the near future we will extend this survey to other parts of Ramat Gan.

19 December 2013 Moshav Nehalim

Participants: Svetlana Vaisman (PPIS) and Henk Mienis (SMNH).

A preliminary survey of the presence of terrestrial snail and slugs in the hothouses belonging to the Hishtil Nurseries was carried out in Moshav Nehalim. The following species were encountered: *Oxyloma elegans, Novisuccinea ovalis, Euchondrus septemdentatus, Lucilla scintilla, Zonitoides arboreus, Aegopinella nitidula, Lehmannia valentiana, Limacus flavus, Monacha syriaca* and *Theba pisana*.

In addition we found an unidentified juvenile slug (which we try to grow to maturity) and a so far unidentified snail species.

The dominant species were *Novosuccinea ovalis* and *Aegopinella nitidula.* The latter is new for the mollusc fauna of Israel. It had been found a few weeks earlier in the Saloner Garden Centre in Sitriyya on *Lobelia* which had been supplied by HiShtil (Mienis *et al.* 2014).

The *Euchondrus*, *Monacha* and *Theba* specimens were found along the inner side of the hothouse in the form of empty shells.

20 January 2014 Givatayim and Bene Beraq

Participants: Oz Rittner, Henk Mienis (both SMNH) and Svetlana Vaisman (PPIS)

The purpose of this fieldtrip was to locate a possible living population of *Xerocrassa davidiana picardi.* This endemic subspecies is restricted in its distribution to kurkar outcrops in Bene Beraq, Ramat Gan and Givatayim. It has to be considered a highly endangered if not already extinct terrestrial gastropod.

A few empty shells of *Xerocrassa davidiana picardi* were found on Givat Kozlovsky in Givatayim. A single empty shell on a tiny remnant of the once large kurkar outcrop in Rehov Arazim, Bene Beraq, and a few empty shells on a kurkar slope in HaLochamim (but none on the immediate area surrounding the new waterreservoir on the top of the hill!), Bene Beraq. Not a trace of *Xerocrassa davidiana picardi* was found on the remains of a once large kurkar slope in Rehov Haim Perl, Bene Beraq. At most places we still found living specimens of *Sphincterochila aharonii* which is another endemic species on kurkar slopes in Israel, and the more ubiquitous species: *Eopolita protensa jebusitica*, *Euchondrus* species (a so far undescribed species, which will be descriced by Prof. R. Bank), *Monacha syriaca*, *Xeropicta vestalis joppensis* and *Helix engaddensis.*

There is more and more evidence that there are no viable populations left of *Xerocrassa davidiana picardi* in Israel.

28 January 2014 Ramat Gan

Participants: Oz Rittner, Henk Mienis (both TAU) and Svetlana Vaisman (PPIS)

The purpose of this fieldtrip was to locate additional living populations of *Rumina saharica*, and invasive land snail.

Three new localities were located: Gan Avraham, slope facing Josef HaGlili, corner Herzl-Zohar Street and Jabotinski Road 76, garden. The distribution of *Rumina saharica* seems to be restricted to the triangle Jabotinski-Bialik-Krinizi (Mienis, Rittner & Vaisman, 2014).

The dominant species in gardens throughout the area was *Cornu aspersum megalostomum.* They were crawling around everywhere after the rain early in the morning. In the area west of Herzl Street also *Theba pisana* was encountered regularly in gardens.

11 February 2014 Tel Mond and Sede Yizhaq

Participants: Svetlana Vaisman and Amit Mizrahi (both of the PPIS) and Henk Mienis (SMNH).

The purpose of this fieldtrip was to check nurseries of aquatic plants for the presence of exotic molluscs. In Tel Mond we brought a visit to the shop and nursery of 'Tropical Fish'. In the area open for the public there are a large number of concrete basins with the more common fish in them like Goldfish and Koi carps. In the same basins are sometimes also Water lilies *Nymphaea* species in various shades and other aquatic plants. In the shop are a large number of aquariums among them three with freshwater snails (*Pomacea maculata*) of selected sizes. Behind the public area are a large number of earthen basins lined with plastic foil were aquatic plants are being grown.

Eight species of freshwater snails were encountered in the premises of 'Tropical Fish'. Exotic species are preceded by an asterisk (*). **Filopaludina martensi martensi*, **Pomacea maculata* (old *insularum*), *Bithynia phialensis*, *Melanoides tuberculata*, **Pseudosuccinea columella*, **Ferrissia clessiniana*, **Planorbella duryi* and **Haitia acuta.*

The Apple snails *Pomacea maculta* were commonly encountered in the earthen basins, even the rosy egg masses were encountered on the walls or on the plants above the water.

According to the owner of the shop and nursery he is not interested in snails. At the other hand he has them for sale in the shop. Both *Filopaludina* and *Pomacea* are regularly encountered in the luggage of Thai labourers when arriving from Bangkok at Ben Gurion Airport. The owner employs Thai labourers in his business!

In Sede Yizhaq we visited the aquatic plant nursery 'Linoy', which was until recently growing plants for export. We found the nursery in a very bad condition. The original owner had passed away and all the work is currently carried out by a single person. Most of the basins on tables don't receive at the moment irrigation and a large part of the plants has dried up. Yet three species of terrestrial and nine species of aquatic snails were encountered. Exotic species are preceded by an asterisk (*).

Terrestrial species: **Novisuccinea ovalis, *Zonitoides nitidus* and *Deroceras berytensis*.

Aquatic species: *Bithynia species, Melanoides tuberculata, *Haitia acuta, *Physella gyrina, *Planorbella duryi, Galba truncatula, *Pseudosuccina columella, *Radix luteola* and *Stagnicola palustris*.

Radix luteola, a species from S.E. Asia, is here recorded for the first time from Israel (Mienis, H.K., Vaisman, S. & Rittner, O., 2014).

24 February 2014 Hazorea

Participants: Svetlana Vaisman (PPIS) and Henk Mienis (SMNH).

The purpose of this fieldtrip was to check the Hazorea Water Lily nursery for the presence of exotic freshwater molluscs. 13 Species were collected of which 12 are exotic ones. Exotic species are preceded by an asterisk (*).

Terrestrial and amphibious species: **Cyclotropis bedaliensis, *Novisuccinea ovalis, *Zonitoides nitidus* and **Deroceras laeve.*

Aquatic species: *Melanoides tuberculata*, **Physella (Acutiana) acuta, *Physella gyrina, *Gyraulus chinensis, *Planorbella duryi, *"Austropeplea" ollula*, **Pseudosuccinea columella*, **Radix rubiginosa* and **Stagnicola turricula*.

The two Lymnaeid species "*Austropeplea" ollula* (Gould, 1859) and *Stagnicola turricula* (Held, 1836), and the amphibious operculate gastropod *Cyclotropis bedaliensis* are here recorded for the first time from Israel. Most likely it reached the Hazorea Water Lily nursery with occasional imports of aquatic plants from abroad. *Radix rubiginosa* had been collected once before from an aquarium in Netzer Sereni. Here it is reported for the first time from a nursery. This is also the case for *Gyraulus chinensis* of which twice single specimens had been found in the Hula Agamon.

11 March 2014 Givat Brenner and Sitriyya.
Participants: Svetlana Vaisman and Yo'av Motro (both PPIS) and Oz Rittner and Henk Mienis (both SMNH).

The purpose of this fieldtrip was to check the nursery in Givat Brenner for the presence of exotic molluscs and the Sloner Garden Centre in Sitriyya especially for the presence of *Deroceras invadens* and *Aegopinella nitidula.*

In Givat Brenner 31 species of land and freshwater snails were collected. Exotic species are preceded by an asterisk (*).

Terrestrial species: *Carychium minimum, Oxyloma elegans, *Novisuccinea ovalis, *Vallonia pulchella, Rupestrella rhodia, Buliminus labrasus labrosus, Euchondrus spec., Cristataria haasi kharbatensis, *Zonitoides arboreus, *Zonitoides nitidus, *Aegopinella nitidula, Eopolita protensa jebusitica, *Oxychilus translucidus, *Lehmannia valentiana, Limacus flavus, *Deroceras*

*invadens, *Deroceras leave, Sphincterochila cariosa, Caracollina lenticula, *Prietocella barbara, Microxeromagna lowei, Monacha obstructa, Monacha syriaca, *Xerotricha conspurcata, *Cornu aspersum megalostomum, Levantina spiriplana caesareana* and *Theba pisana*.

Aquatic species: **Pomacea species, Melanoides tuberculata, *Haitia acuta* and *Planorbella duryi*.

At least part of the land snails: *Rupestrella rhodia, Buliminus labrasus labrosus, Cristataria haasi kharbatensis, Sphincterochila cariosa* and *Levantina spiriplana caesareana*, are typical rock snails. Without doubt they reached the nursery with rocks which are up for sale.

In Sitriyya 18 species of land and freshwater snails were collected. Exotic species are preceded by an asterisk (*).

Terrestrial species: *Carychium minimum, Oxyloma elegans, *Novisuccinea ovalis, *Zonitoides nitidus, *Aegopinella nitidula, *Lehmannia valentiana, Limacus flavus, Deroceras berytensis, *Deroceras invadens, *Deroceras leave, *Prietocella barbara, Monacha syriaca, *Cornu aspersum megalostomum* and *Theba pisana*.

Aquatic snails: **Physella (Acutiana) acuta, *Physella (Physella) gyrina, *Planorbella duryi* and *Galba truncatula*.

3 April 2014 Te l Aviv and Ramat HaSharon in search for Giant African snails
Participants: Svetlana Vaisman (PPIS) and Henk Mienis (SMNH).

We visited the sites in Tel Aviv where in the past the Giant African snail *Lissachatina fulica* was found in gardens. The following snails and slugs were collected:

Rehov Joseh Eliahu 12: several fresh empty shells of *Lissachatina fulica* together with life specimens of *Cornu aspersum megalostomum* and *Eobania vermiculata.*

Rehov HaNevi'im 32: one fresh shell of *Lissachatina fulica* and living specimens of *Cornu aspersum megalostomum, Eopolita protensa jebusitica* and *Limacus flavus*.

Rehov HaAlkushi 6: *Cornu aspersum megalostomum* and *Theba pisana*.

Rehov Mitzpeh 7 corner Rehov Megiddo 8: *Cornu aspersum megalostomum* and *Limacus flavus.*

In Ramat HaSharon we visited a site were someone claimed to have seen a Giant African snail crawling in an alley between a kindergarten and a high rise building in Rehov Menachem Begin in December 2013. That observation was questioned by both of us since he had seen the snail just after an extremely cold period with snowfall i.e. when African Giant snails in Israel are in hibernation. We did not find a trace of a Giant African snail nor of any another large snail for example *Cornu aspersum megalostomum*. At the end of the alley large numbers of living *Xerotricha conspurcata* were found adhered to a wall.

On an address in Rehov Ani Ma'amin the Giant African snail had been found in a garden in August 2000 by Mr. Shalom Hayat. The original owners of the garden had moved out. We found the garden surrounded by a large fence with cameras. According to a neighbour no Giant African snails are living in her adjoining garden although *Cornu aspersum megalostomum* is a very common species over there.

10 April 2014: Moshav Kfar Hess

Participants: Svetlana Vaisman (PPIS) and Henk Mienis (SMNH).

On 8 April 2014 Doron Bornshtein of the PPIS collected a tiny snail on *Syzygium*, an ornamental shrub of African origin in one of the nurseries belonging to the Prat Nurseries in Moshav Kfar Hess. Two days later we visited the nursery in order to solve the identity of that snail. We were able to visit only two parts of the nursery: a hothouse near their office and the open garden shrub and plants nursery where the snail had been collected.

The following terrestrial gastropods were collected (exotic snails are preceded by an asterisk): In the hothouse near the office of the nursery: **Novisuccinea ovalis*, **Zonitoides arboreus*, **Lehmannia valentiana*, *Limacus flavus*, **Deroceras laeve*, *Caracollina lenticula*, *Monacha syriaca* and **Prietocella barbara.* In the open nursery of garden shrubs and plants: *Monacha obstructa*, *Monacha syriaca*, **Prietocella barbara*, *Xeropicta vestalis joppensis* and *Theba pisana.* The snail collected by Doron Bornshtein turned out to be a juvenile *Xeropicta vestalis joppensis.*

29 April 2014: Afula

Participants: Svetlana Vaisman and Dr. Edna Levy (PPIS), and Oz Rittner and Henk Mienis (SMNH).

In Afula we visited the Hishtil Nursery for export of perennials and herbs. In spite of all efforts only specimens of a single species were found: the amphibian *Novisuccinea ovalis*, a species of North-American origin. The snails were mainly found on those places where the irrigation consisted of overhead misting. Everywhere they are using "Metazon" the year round for the control of snails and slugs.

22 May 2014: Tel Aviv

Participants: Svetlana Vaisman (PPIS) and Henk Mienis (SMNH).

We visited once again the sites in Tel Aviv where in the past the Giant African snail *Lissachatina fulica* had been found in gardens. A single empty, fresh shell was found in the garden at Rehov Yosef Eliahu 12, likewise at Rehov Megiddo 8. At Rehov Mizpeh 5 we found 12 empty shells of which some were very large. The latter garden belongs to the gardener who is taking care for the garden in Rehov Yosef Eliahu 16! Everywhere *Cornu aspersum megalostomum* was encountered and in the garden at Rehov Mizpeh 7 also a single shell of *Eobania vermiculata*.

23 June 2014: Hazorea

Participants: Svetlana Vaisman (PPIS) and Henk Mienis (SMNH), towards the end Ya'el Haze (PPIS) joined the team.

In the wake of the find of an empty shell of *Cyclotropis bedaliensis* in the Hazorea Waterlily Nursery during our previous visit on 24 February 2014 and the fact that this species also lives in an aquatic plant nursery in Zippori we visited the nursery in Hazorea again.

We sampled thoroughly all the reservoirs in the hothouses and found numerous specimens of the tiny *Cyclotropis bedaliensis* among saplings of *Anubias* species, a well-known aquarium plant, which had been received from the nursery in Zippori! At the other end Zippori receives regularly waterlilies from the nursery in Hazorea.

Besides all the species found on 24 February 2014 we managed to locate specimens of *Radix luteola* in one of the hothouses (Mienis, Vaisman & Rittner, 2014a-b). We had looked in vain for that species during our previous visit when we checked the possible connection between the presence of that species in the Linoy nursery for aquatic plants in Sede Yizhaq and the nursery in Hazorea. The following two species *Oxyloma elegans* and *Galba truncatula* are also recorded for the first time from this nursery. Both might be of local or foreign (European) origin.

15 July 2014: Zippori

Participants: Svetlana Vaisman (PPIS) and Oz Rittner and Henk Mienis (both SMNH).

The purpose of the survey of the Ofra Aquatic Plants in Zippori was to detect a connection between the populations of the freshwater mollusc fauna of this nursery and the Hazorea Waterlily Nursery, since the nurseries exchange certain plants which each other. Few species of aquatic snails were found, but these were present everywhere. This is probably caused by the fact that the whole nursery is being irrigated by means of a closed water circuit.

The following five species were collected. Exotic species are preceded by an asterisk (*). Amphibian terrestrial gastropod: *Oxyloma elegans*. Aquatic freshwater gastropods: **Physella (Acutiana) acuta, *Physella (Physella) gyrina, *Planorbella duryi*, and **Pseudosuccinea columella*.

Of *Planorbella duryi* a specimen with a bright red body was collected and of *Physella acuta* a specimen with a body lacking any pigmentation. *Pseudosuccinea columella* was encountered only in one small reservoir with *Nymphaea alba.* However that population consisted of numerous specimens. No trace was seen of the tiny *Cyclotropis bedaliensis* which had been collected in the nursery in Hazorea from saplings of *Anubias* species, which had been received from the nursery in Zippori.

Terrestrial species seen throughout the area covering the nursery but not collected included: *Buliminus labrosus labrosus*, *Euchondrus septemdentatus*, *Eopolita protensa jebusitica*, *Monacha obstructa*, *Monacha syriaca*, *Xeropicta vestalis joppensis* and *Helix engaddensis engaddensis.*

28 July 2014: Akko South, former salt-swamps of the Na'aman estuary

Participants: Svetlana Vaisman (PPIS) and Oz Rittner and Henk Mienis (both SMNH).

The purpose of the survey of the former salt-swamps of the Na'aman estuary south of Akko was to check the current situation of two species of terrestrial snails: *Cochlicella acuta* and *Xerotricha apicina*, and one amphibious species: *Phytia myosotis*, in the area. *Cochlicella* was found in large numbers aestivating high on tall weeds and shrubs. Of the other species only empty shells were found.

31 July 2014: Kefar Hess, Prat Nursery, Moshik subsidiary

Participants: Svetlana Vaisman (PPIS) and Henk K. Mienis (SMNH).

Since the Prat Nursery in Kefar Hess maintains several subsidiaries in the moshav, we surveyed this time the Moshik nursery for the presence of snails and slugs.

This nursery consists at least of four separate areas:

1: A shaded area where garden plants are being grown in plastic containers or plastic bags. Various weeds are present in the area and also in the containers cq. bags.

2. A hothouse for the propagation of potted plants mainly *Euphorbia milii*, *Monsteria deliciosa*, *Sansevieria* species and others. These plants are either grown in pots or are planted in the ground, but in both cases are being grown on the tables. Between the tables lots of weeds are growing on the ground.

3. A shaded area where garden plants are being grown either in containers or bags. The area is less infected by weeds than area 1.

4. Another shaded area for growing garden plants and an adjoining hothouse where mainly ferns are being grown in plastic pots on tables. The latter area is almost void of weeds. 17 Different species were found. They are enumerated in the table. Exotic species are preceded by an asterisk (*).

Area 4	Area 3	Area 2	Area 1	
-	+	-	-	*Galba truncatula*
+	+	+	+	**Novisuccinea ovalis*
-	+	+	-	*Oxyloma elegans*
-	-	+	-	**Vallonia excentrica*
-	+	-	-	*Euchondrus* species
-	-	+	-	**Lamellaxis clavulinus*
-	+	+	+	**Zonitoides arboreus*
-	-	+	-	**Zonitoides nitidus*
-	-	+	-	**Hawaiia minuscula*
-	-	+	-	**Deroceras invadens*
-	-	+	-	**Deroceras laeve*
-	-	+	-	*Caracollina lenticula*
-	+	+	+	**Prietocella barbara*
-	+	-	+	*Monacha obstructa*
+	-	-	+	*Monacha syriaca*
-	-	-	+	*Xeropicta vestalis joppensis*
-	-	-	+	*Theba pisana*
2	7	11	7	total

The presence of *Euchondrus* species, *Monacha obstructa*, *Monacha syriaca*, *Xeropicta vestalis joppensis* and *Theba pisana* in areas 1 and/or 3 is caused by penetration of these autochthonous species from outside the nursery. Living specimens of *Lamellaxis clavulinus* were quite commonly encountered in area 2, both on the tables and on the ground.

26 August 2004: Ramat HaSharon

Participants: Oz Rittner and Henk Mienis (SMNH).

Rumours that Apple snails (*Pomacea*) were seen in a pond in the public garden "Gan HaNetzach" in HaNetzach Street in Ramat HaSharon urged us to visit the site. The pond has an irregular form and covers an area of approximately 20x20 m. It is a so-called ecological pond in which grey (used) water is being purified by the aquatic vegetation growing in the pond. The latter consisted among others in very shallow almost dry areas of *Cyperus* species and dense bushes of Horsetail grass *Equistum hymale* while in the open water various species of multicoloured Water lilies *Nymphaea* species and a yellow variety of the Indian

lotus *Nelumbo nucifera* were growing. Koi carps were most prominent among the fish present in the pond.

At first only old egg masses were seen on the base of *Cyperus* or a rocks protruding above the water, later on we noticed in another part of the pond also pink coloured fresh egg masses on protruding rocks, and on the stems and underside of lotus leaves well above the surface of the water, therefore adult snails should be in the neighbourhood. Indeed several grown up specimens were seen and collected. They turned out to belong to *Pomacea maculata* a species of South-American origin. They were not the only snails in the pond. At least three other species were present the North-American species *Physella (Acutiana) acuta* and *Planorbella duryi* and the S.E.-Asian species *Radix rubiginosa.* All has to be considered invasive species in Israel.

On 4 September 2014 the site was visited by Dr. Yoav Motro and Mrs. Svetlana Vaisman (both of the PPIS). Again several large specimens of *Pomacea maculata* were collected and all the egg masses were removed. In addition two other species *Planorbella duryi* and *"Austropeplea" ollula* were collected.

On 9 September 2014 the pond was again inspected for the presence of Apple snails. Some new egg masses were found and 12 adult snails.

The pond hand been designed and populated by the "Tropical Fish Farm" in Tel Mond! Interestingly *Radix rubiginosa* and *"Austropeplea" ollula* were recently collected in the Hazorea Water lily Nursery.

9 September 2014: Kefar Rut

Participants: Svetlana Vaisman and Yo'av Motro (PPIS) and Henk Mienis (SMNH)

The "Aqua Garden" firm in Kefar Rut carries out the design of garden and park ponds. These ponds are being stocked with fish from their own hatcheries. They

have always a large variety of aquatic plants available for planting in the ponds. Most of these plants are from the Hazorea Water Lily Nursery.

Three different areas in the nursery and hatchery were checked for the presence of molluscs: the fish cages, the aquatic plants received from Hazorea and a round pond near the entrance of the nursery which is in use already for 27 years and is only replenished with water when the level in the pond drops too much. Ten different species were collected which are enumerated in the table. Exotic species are indicated by an asterisk (*).

27 year old pond	Hazorea plants	Fish cages	Species/Area
+	-	-	*Bithynia phialensis*
Only empty shells	+	+	*Melanoides tuberculata*
+	-	-	**Physella (Acutiana) acuta*
-	+	-	**Physella (Physella) gyrina*
+	+	+	**Planorbella duryi*
-	+	-	*Galba truncatula*
-	+	-	**Pseudosuccinea columella*
-	-	+	**Radix rudiginosa*
-	+	-	*Stagnicola palustris*
-	+	-	**Deroceras laeve*

Acknowledgements

We like to thank all the owners of the nurseries and garden centres for allowing us to check their premises for the presence of molluscs. Likewise we are grateful to Mrs. Svetlana Vaisman (Plant Protection and Inspection Services, Ministry of Agriculture, Bet Dagan) for carrying out the picking of the molluscs from the collected soil and litter samples.

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Malacological fieldwork in the Netherlands

Henk K. Mienis

In the period 19 September – 19 October 2014 I visited the Netherlands. The opportunity was seized to carry out some malacological fieldwork in the provinces Friesland and North-Holland. The following fieldwork was carried out:

North-Holland:

a. A further survey of the presence of freshwater molluscs near the inundation sluice in S.E.-Beemster;
b. A follow up survey of the terrestrial mollusc fauna of a graveyard in Purmerend;
c. A check of the situation of *Eobania vermiculata* in a park in Purmerend, the only known population of this Mediterranean land snail in the Netherlands;

Friesland:

a. A survey of the mollusc fauna of a show garden in Oosterend, Terschelling;
b. A follow up survey of a storage yard near Stryp used for repair and reinforcement of the Waddensea-dike on Terschelling;
c. A survey of the Boortorenplak (Gasdrillpond), a small lake in the dunes N.W. of North-Midsland, Terschelling;
d. A survey of the amphibious mollusc fauna of a salt-swamp on the Boschplaat, Terschelling;

e. A further look at the land snails and slugs of Heeremastate, an old park in Joure.

At all these locations special attention was paid to the presence of invasive species.

Results

Fieldwork in the province North-Holland.

a. Inundation sluice in S.E. Beemster. On 25 September 2014 a small lake in a normally closed area of the inundation sluice could be briefly surveyed for the presence of freshwater molluscs. Among the collected material were three species: *Potamopyrgus antipodarum*, *Radix balthica* and *Gyraulus crista*, which had not been observed in previous years. *Potamopyrgus antpodarum* is a highly invasive species originating from New Zealand. Forty species of land- and freshwater molluscs are now known to live in the area belonging to the inundation sluice.

b. Cemetery Overweersepolderdijk, Purmerend. This cemetery dating from 1875 had been surveyed for the first time in the autumn of 2012. The presence of 13 species was established among them the invasive slug *Lehmannia valentiana* (Mienis, 2012). During a brief visit to that graveyard on 25 September 2014 I found two species not seen before over there: the invasive slug *Boettgerilla pallens* and the non-local *Candidula intersecta.* The slug is living predominantly subterranean and was found under a stone and the *Candidula* in a dry open area of the graveyard. The latter is usually considered a species for the dunes along the coast of the North Sea.

c. *Eobania* in the Kooimanpark in Purmerend. *Eobania vermiculata* is a typical circum-Mediterranean land snail. In the Netherlands it has been found occasionally in cauliflower and other vegetables imported from Italy. However since 2010 I have found several empty shells and two living ones in a plot with lilies in the Kooimanpark in Purmerend. This time (14 October 2014) I found

several life ones in the same plot and additional specimens in a nearby plot with Hosta, likewise a plant species belonging to the lily family. This seems to be the only population of *Eobania vermiculata* in the Netherlands (Mienis, in print).

Fieldwork in the province Friesland.
a. The show garden in Oosterend, Terschelling. The show garden in Oosterend is a rather large field near a former farm. Already for quite some time it is not being cultivated. In spring and summer it is covered with wild flowers among them orchids. In the field is also a small pond and here and there some poorly developed fruit trees are growing. A mowed path is running through the garden and the garden is freely open to the public as long as they stay on the path.

A survey carried out in autumn 2012 revealed the presence of 10 terrestrial mollusc species, while 15 species were found in autumn 2013. Between 28 September and 8 October 2014 I have visited the garden once or twice a day in order to check the presence of snails and slugs on 20 pieces of wet carton (17x35 cm). In this way 1011 specimens were caught belonging to 20 different species. In addition two terrestrial species were observed elsewhere in the garden, while in the pond at least 3 aquatic mollusc species were living. At this moment 25 different terrestrial and 3 aquatic mollusc species are known to live in this garden.

Interestingly a single specimen of an extremely rare terrestrial planarian in the Netherlands: *Rhynchodemus sylvestris*, was found in that garden in autumn 2013 (Mienis, 2014a). This year 28 specimens of the same flatworm were found adhered to the undersides of the wet cartons!

b. The 'Dijkmagazijn' east of Stryp, a storage yard of stones for repair and reinforcement of the Waddensea-dike on Terschelling. The 'Dijkmagazijn' east of Stryp serves as a storage yard for heavy stones which are used for repair or reinforcement of the Waddensea-dike along the inhabited part of Terschelling.

These stones are brought to Terschelling either from the mainland of the Netherlands (bricks and fabricated very heavy stones) or from elsewhere in Europe (irregular heavy natural boulders). Most likely now and then snails are hitchhiking on these stones and reach in that way this Waddensea island.

In the years 2006, 2012 and 2013 the author has surveyed the yard for the presence of terrestrial snails and slugs. During those years only seven different species were found: 5 snail species and two slugs.

This year the yard was visited 5 times, which resulted in the registration of 9 additional species. At this moment 16 different species are known from that site: 13 snails and 3 slugs (Mienis, in print). The only species which reached the site by means of hitchhiking is most probably *Oxychilus alliarius* because the artificial habitat present in the yard is quite unlike its natural requirements.

c. The Boortorenplak (Gasdrillpond), a small lake in the dunes N.W. of North-Midsland, Terschelling.. In the early sixties a drilling company searched for gas in the dunes N.W. of North-Midsland. Gas was indeed found but not in a commercial quantity. After they removed the Gasdrill in 1963 the only thing which remained in the dunes was a small lake called Boortorenplak (Gasdrillpond).

On 1 and 6 October 2014 I surveyed briefly the large pond. Due to the dry weather in the summer of 2014 the water level had dropped about 1 meter and even a White water lily *Nymphaea alba*, which had been planted in the pond was found near the dry part of the pond's southern bank.

Eight aquatic mollusc species were found in the pond: the gastropods *Galba truncatula, Lymnaea stagnalis, Radix auricularia, Radix balthica, Planorbis planorbis, Planorbarius corneus* and the bivalves *Musculium lacustre* and *Pisidium milium*. At least the three largest species: *Lymnaea stagnalis, Radix*

auricularia and *Planorbarius corneus* were most probably released by man in the pond.

d. The salt-swamp on the Boschplaat, Terschelling. The east end of Terschelling is formed by the Boschplaat, a declared European Nature Reserve. A large part of it is formed by a huge salt-swamp crossed by gullies which are filled twice a day with seawater from the Wadden Sea. Large parts of the area are covered by halophytes like: *Atriplex portulacoides*, *Salicornia europeae*, *Limonium vulgare, Aster tripolium* and others.

Some 50 years ago I had found under such vegetation species like *Phytia myosotis* (now usually called *Myosotella myostis*) and *Assiminea grayana*: two species of marine origin behaving as amphibious snails. However for some time rumours were spreading that those species were now over there on the brink of extinction because of changes in the habitat.

On 5 October 2014 I had the opportunity to visit the Boschplaat and to sample the area east of the so-called 'Tweede Slenk' (2nd Gully). The area had indeed changed drastically, much more grasses were growing there than 50 years ago. However near the gullies the same halophytes were still growing and on the border line of *Atriplex* and *Salicornia* stands I found under the bushes of the latter still numerous living specimens of *Phytia myosotis* and *Assiminea grayana* and in lesser numbers also *Littorina saxatilis* and even specimens of the bivalve *Abra tenuis.*

e. Heeremastate, a park in Joure. During a short stay in Joure I was able to visit briefly the Heeremastate. A first survey of the mollusc fauna living in the park belonging to a former stately home by that name had been carried out in autumn 2013 (Mienis, 2014b). Although several interesting invasive slugs were found like: *Tandonia sowerbyi* and *Lehmannia valentiana*, I searched in vain for *Helix pomatia*, which had once been transferred to the garden.

On 23 September 2014 I visited the park. Unfortunately it coincided with the construction of all kind of stands for the Jouster Merke, an important annual market hold since 1482 in that village. Therefore the fieldwork was rather limited in scope. Yet 13 species of terrestrial molluscs: nine species of snails and four slugs, were found of which *Vallonia excentrica* and *Deroceras laeve* had not been collected in 2013. This means that 23 molluscs are now known from Heeremastate.

Where possible a selection of typical European species has been collected for permanent storage in the Mollusc Collection of the Tel Aviv University. They will be used as a working tool for comparing snails and slugs intercepted by inspectors of the Plant Protection and Inspection Services of the Ministry of Agriculture from merchandise arriving in Israel from European countries.

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Outreach - Nature Campus

Nature Campus has made progress in its two operational avenues:

1. Outreach educational programs

Visits of school children, families, and other audiences to Nature Campus: Zoo, Botanic Gardens and Natural history collections were on the rise. During 2013-2014 11,100 people participated in Nature Campus activities. The visitors comprised of 71% school children, 11% families and private groups, 18% adults in courses and in-service training. This is an increase of more than 23% compared to 2012-2013.

Some highlights in Nature Campus programs:

- In the last 2 years we have put a special effort to advance Evolution understanding among students and teachers alike. In the last year we developed a series of evolution learning lessons and hosted 2 elementary schools in a series of 4 science days in Evolution. These programs won excellent feedbacks. We also developed and ran Evolution programs in our Science Camps and they too were hits.
- We further developed our taxonomic programs and now have science days on mammals, reptiles, birds, amphibians and insects. Those programs are drawing a growing audience.
- This year we had 1480 adults visiting the Museum, the Botanic Garden and the Zoological Garden.

2. On-line outreach

During the last year we moved our on-line activities to a new upgraded platform. New websites for Nature Campus and its satellite content website EarthWeb were developed. This upgrade was needed as the old websites overflowed with their content, and there was no more space for new pages. The renovation of the websites included not only the websites design but also the whole surfing experience. The new platform has updated navigation logic,

based on surfers' interests and associations. It directs at any page to related items, related either in content, links, graphics, and presentations or other. The platform will also host in the near future the SMNH, ITI and the Zoological Garden websites. For more information http://campusteva.tau.ac.il/

Some highlights of our on-line development:

- Teaching Evolution became a major focus in our on-line activities. Following University of California Berkeley – Berkeley Museum of Paleontology, we published a Hebrew adaptation of UCMP 'Understanding Evolution conceptual framework'. For more information http://earthweb.tau.ac.il/content/teaching-resources/understanding-evolution
- We opened a new section of on-line lectures, already hosting 40 lectures. This will enable a much larger and far-away audience.
- Together with the Department of Zoology and the Hoopoe Foundation we published signage on TAU campus as well as on-line content about the common birds on TAU campus. For more information - http://campusteva.tau.ac.il/content/campus-birds

Other activities

- Nature Campus is part of the development team of SMNH exhibitions.
- Nature Campus is also part of the development team of the Zoological Garden redesign.

Grants & Gifts

- 15,000 ILS from the MAARAG, for writing Chapter 2: The Ecological Infrastructure, in Israel Ecosystem Assessment

The Israel Taxonomy Initiative

Conservation of biodiversity – the variety of life forms on earth – depends on scientific knowledge and expertise. Government agencies, research institutes, and conservation organizations around the globe have identified an alarming gap between existing taxonomic knowledge of biodiversity and the need for this information to guide conservation practices. Taxonomic research is essential In order to identify the great majority of living organisms, to understand the evolution of life, and to halt the loss of species; but the state of the discipline is presently inadequate. Many sophisticated tools and models – morphological, biochemical, and genetic – as well as advanced software, are available for taxonomists; however, basic research lags seriously behind needs. The Millennium Ecosystem Assessment – a UN taskforce to review the trends and implications of changes in global ecosystems - identifies the lack of knowledge of species and their geographic distributions as one of the impediments to sustainable development; the international treaty of the Convention on Biological Diversity initiated the Global Taxonomy Initiative in an effort to remedy this situation.

In Israel, where geographic, topographic, and climatic conditions have produced amazing and unique diversity of life, taxonomic research is declining. A recent report submitted to the Israel Academy of Sciences and Humanities demonstrated that within 10 years, the average period required to train a young taxonomist, Israel would have no scientists in research or teaching positions who can train the next generation of taxonomists. Thus, a major and urgent effort is required to salvage this field and to ensure the continuation of a critical discipline.

In addition to nature and environmental conservation, taxonomic research has applied implications for agriculture, the economy, human welfare and health; it is therefore crucial that it remains viable in face of fleeting fashions in scientific research.

The Israel Taxonomy Initiative is a consortium of government ministries and agencies, research universities and higher education institutions that aims to promote training of taxonomists and basic knowledge of Israel's biodiversity by

- Providing doctoral and post-doctoral fellowships;
- Providing funding for overseas training for graduate students;
- Providing funding for biodiversity surveys;
- Inviting taxonomists from the international scientific community to teach short courses on local species groups.

Our goal is to resurrect Israeli taxonomy and increase our knowledge of biodiversity, thus promoting the contribution of science to conservation of Israel's ecosystems and developing the sustainable use of the country's natural assets.

The following grants have been awarded to date:

Doctoral Scholarships:

2009/10: Malkie Spodek, scale insects; Ittai Renan, beetles; Noga Sokolover, moss animals.

2010/11: Karin Tamar, reptiles; Nir Stern, fish.

2011/12: Anna Halasz, corals; Shevy Rothman, fish parasites.

2012/13: Einat Schachar, Gall wasps; Elizabeth Morgulis, fruit flies; Gal Eyal, corals.

2013/14: Zohar Yannai, dragonflies and damselflies; Yaarit Levitt, Decapod crustaceans.

M.Sc. Scholarships:

2012/13: Igor Armiach, spiders; Shlomi Aharon, spiders.

2014/15: Michael Kolker, larval fishes.

Post-Doctoral Fellowships:

2009/10: Noa Shenkar, ascidians; Efrat Gavish-Regev, spiders.

2010/11: Noa Shenkar, ascidians; Efrat Gavish-Regev, spiders; Alla Alster, blue-green algae.

2013/14: Achik Dorchin, eucerine bees.

Biodiversity surveys:

2009/10: Dorothee Huchon, sponges; Menachem Goren, fish; Leonid Friedman and Amnon Freidberg, Entiminae beetles; Amit Dolev, bats.

2010/11: Nehama Ben-Eliahu, serpulid worms; Jean-Jacques Itzhak Martinez, ants; Frida Ben-Ami, flukes; Vasiliy Kravchenko, moths; Amnon Freidberg and Elizabeth Morgulis, flies; Ariel Chipman, centipedes.

2011/12: Oz Barazani, crucifer plants; Guy Bloch, bees; Leonid Friedman and Amnon Freidberg, snout beetles; Netta Dorchin, gall midges; Dotan Rotem and Ittai Renan, insects; Shai Meiri, reptiles; Sigal Shefer, demosponges; Yossi Loya, stony corals.

2012/13: Ada Alamaru, Yossi Loya & Dorothee Huchon, Ctenophores; Leonid Friedman, Red Weevils; Netta Dorchin and Zvi Mendel, midges; Sigal Shefer, Tamar Feldstein & Micha Ilan, demosponges; Ehud Spanier & Jason Goldstein, decapods; Yossi Loya, Mesophotic corals.

2013/14: Elad Chiel, housefly parasitoids; Eric Palevsky, soil dwelling predatory mites; Guy Yehuda and Ofer Ovadia, Charopytes; Shlomi Aharon and Yael Lubin, spiders in caves; Netta Dorchin and Tatyana Novoselsky, lace bugs; Razy Hoffman, seaweeds and seagrasses; Gil Koplovitz and Noa Shenkar, ascidians.

Overseas training for students:

2010/11: Karin Tamar, reptiles; Ittai Renan, beetles.

2011/12: Anna Halasz, corals; Achik Dorchin, bees; Ittai Renan, beetles; Rebbeca Biton, reptiles and amphibians; Noga Sokolover, Moss animals; Naama Kimmerling, coral reef fish larvae.

2012/13: Haggai Wasserstrom, acarology; Yonathan Guttel, freshwater mollusks; Achik Dorchin, bees; Karin Tamar, reptiles; Philip Nemoy, Sponges;

2013/14: Igor Armiach, spiders; Shlomi Aharon, spiders; Ittai Renan , beetles; Gal Eyal , corals; Elizabeth Morgulis, fruit flies; Einat Shachar, Gall wasps; Nir Stern, sardines; Shevy Rothman, parasitic worms.

Visiting Scholars:

2010/11: David Furth, leaf beetles; Dmitry Apanaskevich, ticks; Gregory Evans, mites; Krzysztof Szpila, flies; Christophe Praz, bees; John Heraty, parasitoid wasps.

2011/12: Rony Huys, crustaceans; Roman Romanov, green algae; Marco Bologna, blister beetles; John Ascher, Bees; Torsten Dikow, flies; Edward Ueckermann, mites.

2012/13: Robert Raven, spiders; Philipp Wagner, reptiles; Olof Biström, diving beetles; Lorenzo Prendini, scorpions.

2013/14: Edward Ueckermann, Soil dwelling acarine predators; Ms. Gretchen Lambert, Ascidians.

Proposals for 2014/15:

Due to the near-ending of the program, the only call for proposals was for an M.Sc. student. Two proposals were submitted and one was granted.

Chapters in the history of the Steinhardt Museum of Natural History of Tel Aviv University

Professor Lev Fishelson, renowned and respected biologist 1923-2013 (published in Israel Journal of Ecology & Evolution 2013)

Menachem Goren

On November 20th, 2013 the Israeli and international scientific community lost a great scientist and great human being, Professor Lev Fishelson, who passed away at the age of 90.

Lev was born in Chelmno (Poland) in 1923. When the Germans invaded Poland in 1939, he escaped with his family to the USSR, where he survived the war and graduated university. After the war, like many Jewish survivors, he sought to reach Palestine, was arrested by the British and deported to a transit camp in Cyprus, where he met his wife, Luba.

In 1949, Lev finally settled in the young State of Israel. In 1950 he joined the Biological Institute in Tel Aviv (later to become Tel-Aviv University) as an assistant. He completed his M.Sc. studies in 1959 (Acridoidea of Israel, taxonomy and biogeography) and his Doctorate in 1966 (Comparative embryology and development of fishes of the genus *Tilapia* [Cichlidae]).

Lev Fishelson soon gained an international reputation as a brilliant and enthusiastic marine scientist, with a vast knowledge and original ideas, and a readiness to co-operate and share ideas with both leading scientists and young students.

He was among the pioneers who studied and described the reef communities in the Red Sea; he discovered and described a mega-bacterium and its symbiotic relations in the surgeon fish gut; he developed the method of tilapia hybridization, an important upgrade for the aquaculture in Israel and many other countries; and he discovered sex reversal in some coral fishes.

His scientific contribution has been acknowledged worldwide. Lev was awarded a Plaque of Distinction by the Israel Ministry of the Environment, an Honorary Doctorate by RAU-Johannesburg, S. Africa, and a Silver Medal by the Alexander von Humboldt Foundation, Germany. He was an Honorary Fellow of the Interuniversity Institute in Eilat, of the Israel Ecological Society, and of the Israel Zoological Society. He was a Member of the Academy of Science, Erfort, Germany. He received many other distinctions.

In addition to his scientific work, which has been published in more than 200 articles and book chapters, Lev contributed to the dissemination of scientific knowledge to both students and the public. He published textbooks and popular articles in Hebrew, and volunteered to lecture whenever asked to do so. He was a member of various professional committees that work to improve nature conservation and the establishment of marine nature reserves.

Professor Lev Fishelson will always be remembered and appreciated as an outstanding scientist, teacher and – above all – as a *Mensch (*a true gentleman of honor and integrity).

Publications

The Steinhardt Museum of Natural History is an important research infrastructure, used by scientists within and outside of the university. Here we list the 2013/2014 publications, that includes all publications of TAU members affiliated with the collections (whether they are directly collections-based or not). It under-represents publications of individuals from other institutions, since our follow-up is far from complete.

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2014 Second International Mesophotic Coral Reef Workshop (MCEIsrael), Oct.26-31, Inter-University Institute (IUI), Eilat, Israel (Chairman and organizer of workshop) Israel (Loya, Y.)

2014 33rd annual meeting of the Entomological Society of Israel, Volcani Center, Bet Dagan, Israel (Dorchin, N.).

2014 8th International Congress of Dipterology, Potsdam, Germany (Dorchin, N.).

2014 Archaeobotanical remains in Ramat Beit Shemesh: Methodology and Concept. A Symposium on Advanced Methods in Salvage Excavations at Ramat Beit Shemesh: Tel Aviv University and Israel Antiquity Authority, Tel-Aviv, Israel (D. Langgut).

2014 Diet and Status of Ancient Metal Workers: the early Iron Age at Timna, Israel. In: The American Schools of Oriental Research Annual Meeting. San-Diego, USA (Sapir-Hen, L.).

2014 Dietary Habits and Identity in Early Roman Jerusalem as Reflected in Faunal Remains of the Kidron Garbage Dump. In: The American Schools of Oriental Research Annual Meeting. San-Diego, USA (Spiciarich, A. and Sapir-Hen, L.).

2014 EAA (European Association of Archaeologists), Istanbul. Paper presented: Neolithic voyages to Cyprus: Wind patterns, routes and mechanisms (Bar-Yosef Mayer, D. E).

2014 Evaluating species delineation in *Sardinella* and *Spratelloides* genera (Clupeidae) by aligning DNA barcoding markers with traditional morphological parameters. Second International Fish Barcode of Life Conference. Chetumal, Mexico. September 24-26. (Stern N., Rinkevich B., Goren M).

2014 First appearance of *Citrus medica* in the southern Levant. The History and Archaeology of Citrus fruits in the Mediterranean: introductions, diversifications, uses. Pompeii, Italy (D. Langgut).

2014 Fuel Use at Iron Age Timna Site 34: The Anthracological Perspective. Annual Meeting of the American Schools of Oriental Research (ASOR), San-Diego, USA (M. Cavanagh, D. Langgut, E. Ben-Yosef).

2014 Host age modulates parasite infectivity, virulence and reproduction. CNRS Conférences Jacques-Monod – Infectious diseases as driver of evolution: the challenges ahead, (F. Ben-Ami)

2014 How Did the Qesem People Use their Teeth? The Union Internationale des Sciences Préhistoriques et Protohistoriques – UISPP, Burgos, Spain. (Sarig, R.).

2014 ICAZ (International Council for Archaeo-Zoology), San Rafael, Argentina. Paper presented: Shell Midden to Shell artifact: *Unio* shells as a multi-purpose resource (Bar-Yosef Mayer, D. E).

2014 ILANIT/FISEB 2014. Eilat, Israel (Holzman R.).

2014 Is total castration optimal? Empirical evidence from a crustacean-bacterium host-parasite system. 10th Symposium on Cladocera, (L. Goren, M. Reisler, F. Ben-Ami).

2014 Old Fish-New parasite. 11th Annual Congress of the Israel Association for Aquatic Sciences May 22, 2014. Peres Center for Peace, Tel Aviv-Jaffa, Israel. (Rothman, S., M. Goren and A. Diamant).

2014 Parasitoids of housefly in Israel. The 33th Conference of the Entomological Society of Israel. (Chiel, E., W. Kuslitzky).

2014 Prolonged droughts (~1250-1100 BCE) and their link to the "crisis years": new palynological evidence from the southern Levant (*Invited lecture: economy travel costs and board are reimbursed*). International conference on Climate and Environment in the late 2nd Millennium B.C. Aegean and Mediterranean: "Too Cold for this P(a)lace?" Leuven, Belgium (D. Langgut).

2014 Social Status, Ethnicity and Animal Economy at the Late Bronze/Iron Age Copper Smelting Sites at Timna, Israel. In: 9th International Congress on the Archaeology of the Ancient Near East. Basel, Swiss (Sapir-Hen, L. and Ben-Yosef, E.).

2014 Society for Integrative and comparative Biology (SICB) annual meeting, Austin, Texas (Holzman R.).

2014 The biodiversity of testate amoebae within the Mediteranean region of Israel. 7th International Symposium on Testate Amoebae 8-12 September 2014, Poznań, Poland, (Bobrov A., Kravchenko Vasiliy D., Müller Günter C.).

2014 The coastal system of the eastern Mediterranean sea is becoming a province of the Red Sea. International conference: ECSA 54 - Coastal systems under change: tuning assessment and management tools**.** Sesimbra, Portugal. 12-16, May, 2014. (Goren M., Galil B.S., Diamant A.).

2014 The environmental parameters affect Cichlids reproduction in Lake Kinneret. 11th Annual Congress of the Israel Association for Aquatic Sciences May 22, 2014. Peres Center for Peace, Tel Aviv-Jaffa, Israel. (Canings D., A. Gasith T. Zohary and M. Goren).

Graduate students

Much active scientific research is conducted by graduate students. Here we list the graduate students of faculty members affiliated with the the Steinhardt Museum of Natural History at Tel Aviv University. We list also a few graduate students from other institutions of higher education, but names and affiliations of many others from Israel and abroad who used the collections are unknown to us.

PhD students

2004-2014 Liat Gahanama (A. Freidberg)
A revision of the *Schistopterum* clade of Schistopterini.

2004-2014 Constantin Grach (A. Freidberg)
Ecology and biology of costal dune insects.

2005- Tal Levanony (T. Dayan)
Patterns of biodiversity in natural and cultural landscapes: a model Mediterranean forest ecosystem.

2007- 2014 Y. Aluma (M. Ilan)
Environment impact on sponge-fungi association.

2007-2014 Emmanuelle Cohen-Shacham (T. Dayan)
Policies for managing ecosystem services

2007- Ronit Justo-Hanani (T. Dayan)
Legal and administrative aspects of genetically modified organisms in Israel.

2007-2014 Aldona Kurzawska (D.E. Bar-Yosef Mayer and A. Marciniak)
Insight into Hunter-Gatherers' Life: The Role of Dentalium Shells in Late Epipalaeolithic Sites of the Levant.

2008-2014 Ada Alamaro (Y. Loya)
Evolutionary implications of sex change in fungiid corals
.

2008-2014 Iris Bernstein (T. Dayan)
Landscape planning for ecological corridors and biodiversity conservation in peri-urban environments: The case of Modiin Forest Corridor.

2008-	H. Cohen (I. Hershkovitz) Fracture characteristics
2008-	Ariella Gotlieb (T. Dayan and Y. Mandelik) Agriculture and conservation in the Arava Valley
2008-2013	H. May (I. Hershkovitz) Ancient DNA of Neolithic skeletons
2008-2014	Noga Sokolover (M. Ilan) Bryozoans ecology
2008-	D. Stein (I. Hershkovitz) 3D-Reconstruction of the vertebral
2009-2014	Omri Bronstein (Y. Loya) Bioerosion of reef corals by sea urchins.
2009-2014	Anat Feldman (S. Meiri) Snake Macroecology. Tel Aviv University.
2009-2014	Keren, R. (M. Ilan) Acquisition of sponge-associated bacteria
2009-2014	Karin Tamar (S. Meiri) Taxonomy and phylogeny of Israeli reptiles.
2009-	Ittai Renan (A. Freidberg) Taxonomy and ecology of dune insects in the western Negev.
2009-	Doron Shulz (Y. Benayahu) Sport fishing: ecological and economic implications.
2010-	Anna Halaz (Y. Benayahu) Phylogeny of octocorals, family Xeniidae.
2010-	Liron Goren (F. Ben-Ami) The evolutionary ecology of *Daphnia* and its microparasites in Israel.
2010-	Nir Stern (Goren M.) Systematic and phylogenic of the family Clupeidae (Pisces).
2010-	T Tunis-Sella (I. Hershkovitz) The chin.

2011- Itay Berger (T. Dayan).
The influence of invasive Common Myna (Acridotheres tristis) on foraging and nesting behaviors of local *House Sparrow* (Passer domesticus)

2011- Victor China (Holzman R.)
Hydrodynamics and Kinematics of prey capture in fish larvae

2011- A. Lavi (M. Ilan)
Interactions within sponge microbial community.

2011- Rony Izhar (F. Ben-Ami)
The evolution of virulence under conditions of frequent multiple infections.

2012- Orr Comay (T. Dayan).
Owl pellet taphonomy and the paleoecology of Qesem Cave

2012- Laurent Davin, (D.E. Bar-Yosef Mayer, Boris Valentin, Francois Valla, and Anna Belfer-Cohen).
At the dawn of the Neolithic, societies of the southern Levant through their ornament acquisition, manufacture and use on Natufian sites.

2012- Or Givan (Belmaker J.)
Commonness and rarity in Mediterranean fishes.

2012- Boaz Grous (Langgut D. and O. Lipschits and Y. Gadot)
The Carrying Capacity of Ella Valey during Historial Periods

2012- Roee Maor (T. Dayan).
Evolutionary Trends in the Activity Patterns of Carnivores (Mammalia: Carnivora)

2012- Elizabeth Morgulis (Dorchin, N. and A. Freidberg).
Phylogenetic classification of the genera Acanthiophilus Becker and Tephritomyia Hendel (Diptera: Tephritoidea: Tephritidae)

2012- Maria Novosolov (S. Meiri and D. Orme).
Global lizard diversity.

2012- Einat Shachar (Dorchin, N.).
Taxonomy and Ecology of oak gall wasps in Israel (Hymenoptera: Cynipidae)

2012- Itai van Rijn (Belmaker J.)
The Seasonal growth and mortality in indigenous and invasive Mediterranean fishes.

2012- Bat-sheva (Shevy) Rothman (Goren M.)
The phylogeny of Monogenea (Platyhelminth) fish parasites.

2012- Enav Vidan (Belmaker J. and Meiri S.)
Functional diversity drivers – Palaearctic lizards at multiple scales..

2012- Zohar Yanai (Dorchin, N.).
The mayflies (Insecta: Ephemeroptera) of Israel: taxonomic and ecological aspects

2012- Mey-Tal Yaniv (Shenkar, N.)
Early detection of non-indigenous ascidians along the Mediterranean coasts of Israel.

2013- Aviv Avisar (DayanT.)
Managing visitor impacts in the open landscapes of Israel.

2013- Maya Bahral (Scharf, I.).
The consequences of learning for ant foraging behavior and inter-specific interactions.

2013- Gal Eyal (Y. Loya)
Biodiversity of Mesophotic (30-60 m depth) scleractinian corals in the Gulf of Eilat/Aqaba.

2013- Lee Eyal- Shacham (Y. Loya)
Legislation of Marine Protected Areas in Israel: Mediterranean and Red Sea Reproductive strategies of deep reef (60 m depth) corals.

2013- Yuval Itescu (S. Meiri and P. Pafilis).
Is evolution on islands special? Evolutionary pathways in an island lizard.

2013- Ya'arit Levitt (Shenkar N.)
Diversity and spatial distribution of *Caridea* species along the coasts of Israel

2013- Opher Mendelssohn (DayanT.)
Regional management of pest control.

2013- Sigal Orlansky (F. Ben-Ami)
The costs and benefits of resistance to parasites: The case of *Daphnia similis*.

2013- Tom Schlesinger (Loya, Y.)
Recruitment of stony corals at the coral reefs of Eilat.

2013- Hilla Shamoun (DayanT.)
Anthropogenic effects on the carnivore guild in an agro-rural-natural landscape.

2013- Oliver Tallowin (S. Meiri and A. Allison).
Evolution of reptiles along elevation gradients in a tropical island.

2013- Gadi Zeira (F. Ben-Ami)
The influence of invading snails and their trematodes on freshwater habitats.

2014- Leigh Kroeger (Belmaker J.)
Fish vulnerability to climate change and invasion.

2014- Tali Magoty Cohen (Dor R.)
Ecology and genetics of a recent avian invasive species in Israel

2014- Yonatan Meresman (Ribak G.)
Evolution of wing elasticity in beetles (Coleoptera)

2014- Dayana Yahalomi (D. Huchon)
Evolution of Myxozoan mitochondrial genomes.

2014- Stan Yavno (Holzman R.)
Functional morphology of the suction feeding mechanism in larval fishes

MSc students

2007- Thehila Nagar (M.Goren)
Feeding habits in some freshwater fishes in Israel.

2009- Dolev Kastin (M. Goren)
reproductive and growing biology of the cyprinid fish *Garra rufa.*

2009-2014 Maya Spivak (S. Meiri and D. Huchon)
Phylogeny and Taxonomy of Israeli shrews.

2010-2014 Ram Baranin (Y. Loya)
Legislation of Marine Protected Areas in Israel: Mediterranean and Red Sea Reproductive strategies of deep reef (60 m depth) corals.

2010- Levona Bodner (A. Freidberg)
The Tephritoidea (Diptera) of Israel

2010-2013 Yael Dagan (F. Ben-Ami)
The evolution and maintenance of sexual reproduction in the Melanoides-trematodes model host-parasite system.

2010-2014 Dana Genosar (T. Dayan)
The ecology and management of overabundant species.

2010- Ariel Kedem (T. Dayan with N. Kronfeld-Schor)
Snake predation risk on spiny mice.

2010-2014 Yael Mandelberg (Y. Benayahu)
Collagen producing octocorals of the genus *Sarcophyton*.

2010-2014 J. Peled-Levi (Y. Yom-Tov and T. Alon-Mozes)
Urban planning and wildlife.

2010-2014 M. Rachamim (Y. Yom-Tov and A. Barnea)
Breeding biology of the great tit in urban and natural environment.

2010- Vivan Slone (I. Hershkovitz)
Vertebral hemangiomas.

2011- Ofir Gilad (Y. Benayahu and R. Haj Ali)
Biomechanical properties of an octocoral collagen fibers

2011-2014 Yonathan Guttel (F. Ben-Ami)
The maintenance of hybrid zones in a freshwater snail by parasitism.

2011-2014 Amy Kadison (S. Meiri)
Reptile geographic ranges.

2011 - Miriam Pines (Sapir-Hen L. and O. Tal)
Crusader Diet: Arsur (Apollonia-Arsuf) as a Case Study in War and Peace.

2011- Yehala Roterman (Y. Benayahu and U. Gofna)
Bacteria in invasive and indigenous bivalves.

2011- Schwartz, I. (M. Ilan)
Ecology and biotechnological application of the Red Sea sponge *Crella cyatopho.*

2011- Iris Wiseman (S. Meiri and M. Goren).
Overfishing in Israel.

2012-2014 Tal Keren (Holzman R.)
Phenotypic and kinematic diversity in reef fishes

2012-2014 Lilach Raichman (Shenkar N.)
Ecological aspects of the invasive ascidian *Microcosmus exasperatus*

2012- Yoni Alcalay (Scharf, I. and O. Ovadia).
Behavioral syndromes of pit-building antlion larvae.

2012- Mark Cavanagh (Langgut, D. and E. Ben Yosef)
Identifying the Wood Fual that was used for Metalorgical Activity in Timna

2012- Gilad Danon (Dorchin, N.).
Behavioral and ecological evidence for host associated differentiation in Dasineuriola sp. (Diptera: Cecidomyiidae).

2012- Farovich, Y. (M. Ilan)
Antimicrobial natural products from sponge-associated bacteria

2012- Ehud Gilad (Benayahu, Y. and Y. Edelman-Furstenberg).
Bivalve assamblages as environmental indicator.

2012- Idan Hayon (Dorchin, N.).
Taxonomy and biology of predatory gall midges (Diptera: Cecidomyiidae) on *citrus mealybugs* (Hemiptera: Pseudoccidae) in Israel.

2012- Idan, T. (M. Ilan)
Sponges and corals of the Mediterranean mesophotic reefs

2012- Ohad Mass (S. Meiri).
Latitudinal diversity of Israeli Mediterranean biome mammals.

2012- Naim, A. (M. Ilan Wageningen University)
Analysis of steady state cell proliferation and shedding in a selection of Red Sea sponges.

2012- Noga Perry (Benayahu, Y. and U. Gofna).
Bacteria induce metamorphosis of coral plaulae.

2012- Jonatan Reberger (F. Ben-Ami)
Parasite-Mediated Determinants of Coexistence between Sexual and Asexual Host Snails.

2012- Erez Shoham (Benayahu, Y.).
Soft corals of the mesophotic zone at Eiat (nortern Red Sea).

2012- Ximena Velasquez Pedrosa (Benayahu, Y.).
Flat worms (Platyhelminthes) of the Isreali Mediterannaen and Eilat shallow habitats.

2012- Miri Zilka (Holzman R. and Eisenbeg E.)
The hydrodynamic basis of prey capture in low Re numbers

2013- Tal Amit (Loya, Y.)
Microbial populations on corals in shallow and deep (mesophotic) coral populations.

2013- Yuval Baar (Scharf, I. and S. Meiri).
The effect of climate on body size and shape of insects in Israel.

2013- Or Ben-Zvi (Loya, Y.)
Fluorescence in shallow vs. deep water (mesophotic) corals.

2013 Davud Cumings (M. Goren)
The impact of water level and habitat composition and structure on reproduction of cichlids in Lake Kinneret.

2013- Ori Frid (Belmaker J.)
Ecological impacts of coastal fishing .

2013- Camelia Gochev (Benayahu, Y. and G. Zilman).
Settlement of coral planulae in response to hydrodynamic conditions

2013- Itai Granot (Shenkar, N. and Y. Belmaker)
Processes structuring the assembly of fouling communities.

2013- Ziv Kassner (Ribak G.)
Sensory and mechanical constraints on target interception and flight control in Odonata

2013- Yanir Klein (Dayan T. and Kronfeld-Schor N.)
Interspecific effects on spiny mouse reproduction

2013- Olga (Dayan T. and Kronfeld-Schor N.)
Lead contamination in bats

2013- Renanel Pickholtz (Belmaker J.)
Landscape ecology of invasive herbivorous fishes.

2013- Chen Piller (Benayahu, Y.).
Environment friendly antifouling paints: effiency and toxicity

2013- Margarita Pogorelov (Dayan T.)
Economic aspects of crane management at the Hula wetland.

2013- Hanna Rapuano (Loya, Y.)
Reproductive effort in fungiid corals.

2013- Yaniv Shmuel (Shenkar N.)
Ecology and reproduction of *Halocynthia spinosa* in the Red Sea

2013- Erez Shpirer (D. Huchon)
Identification of nematocyst-restricted genes in Myxozoa.

2013- Alex Slavenco (Meiri, Y. and P. Pafilis)
Evolution of life history in an Aegean-islands lizard.

2013 - Abra Spiciarich (Sapir-Hen L., O. Lipschits and Y. Gadot)
Dietary Habits and Identity of Early Roman Jerusalem as Reflected in the Kidron Garbage Dump.

2013- Hadas Urca (F. Ben-Ami)
The effects of temperature and food availability on multiple infections and virulence evolution.

2013- Shelley Zalmanoviz (F. Ben-Ami and O. Rechavi)
Epigenetic effects of helmet formation in *Daphnia*.

2013- Michal Zeitzov (Dayan T.)
Barn owls as biological control agents in the northern Negev

2014- Shay Adar (Scharf I. and Dor R.)
Foraging behavior, habitat selection and intraspecific interactions of pit-building wormlions

2014- Ariel Akron (Dayan T.)
Ecosystem services of Israeli wetlands

2014- Lior Avidan (Holzman R.)
Assessment of fish community in the Northern Gulf of Aqaba (Eilat)

2014- Assaf Ben-David (Dayan T. and Itzhaki I.)
The effect of encroaching pine forests on birds in Ramat Hanadiv

2014- Roy Ben Bezalel (F. Ben-Ami)
Parasite-mediated determinants of coexistence between sexual and asexual host snails.

2014- Shachar Ben Cohen (Dor R.)
Morpholpgical, genetic and behavioral aspects with emphasis on invasive populations of the House Sparrow in Israel.

2014- Stav Brown (Ribak G.)
Effect of larval growth on scaling of dispersal flight in beetles

2014- Lior Davis (Dayan T. and Meiri S.)
Community-wide character displacement in shore birds.

2014- Liran Dray (D. Huchon)
The complete mitochondrial genome of *Rhopalaea idoneta*.

2014- Bar Feldman (Loya, Y.)
To be determined.

2014- Inbal Goldshtein (Dor R.)
Breeding ecology of terns in Isra

2014- Tal Gordon (Shenkar N.)
Ecological aspects of the tropical ascidian *Polycarpa cryptocarp*

2014- Mila Grinblat (Loya, Y.)
To be determined.

2014- Ophir Hirschberg (F. Ben-Ami)
Sinkholes as a source of life in the Dead Sea.

2014- Ophir Hirschberg (F. Ben-Ami)
How biotic and abiotic factors affect the infectiousness and development of *Pasteuria ramosa*.

2014- Yuval Jacobi ((Shenkar N. and G. Yahel)
Ascidian filtration rates

2014 - Christina Jones (Sapir-Hen L., O. Lipschits and Y. Gadot)
The Persian period at Azekah

2014- Noa Keidar (N. Dorchin)
The role of enemy reduced space in host-associated differentiation of gall inducing midges

2014- Michaela Kolker (Holzman R.)
morphological disparity in larval fishes

2014- Tzlil Labin (Dayan T. and Kronfeld-Schor N.)
Light pollution in a desert community.

2014- Liraz Levi (Holzman R.)
Quantifying suction flows in larval fishes

2014- Hadas Levin (May H.)
3D geometric-morphometric analysis of the proximal femur: Shape as a risk factor for degenerative changes of the hip and hip fracture

2014- Nadine Magal (N. Dorchin)
Development of a molecular barcode for identification of immature stages of bark and wood beetles

2014-	Meoded, R. (M. Ilan and J. Piel) Sponge secondary metabolite pathways
2014 -	Lee Oz. (Sapir-Hen L. and I. Finkelstein). The Iron IIA in the Ophel excavations
2014-	Guy Sinaiko (N. Dorchin) Sequential radiation of natural enemies following differentiation of their gall-inducing hosts
2014-	Weinberger, A (M. Ilan) Bacterial symbionts the Red Sea sponge *Theonella swinhoei* and their role in Arsenic (As) metabolism
2014-	Yonatan Wexler (Scharf I.) Personality and the effect of stress on personality in the red flour beetle as a model

Post-doctoral fellows

2011-	Razi Hofman
2011-2013	Efrat Gavish Regev
2012-2014	Achik Dorchin
2012-2014	Gil Koplovitz
2012-2014	Jarkko Routtu
2012-	Rachel Sarig
2013	Singh, P.R.
2013-	Omri Bronstein
2013-	Meirav Meiri
2013-	Noga Sokolover
2014 -	Karin Tamar

Visiting scientists at the Steinhardt Museum of Natural History

The attached list includes visitors from institutions **other than** Tel Aviv University who came personally to use the natural history collections of Tel Aviv University in the past academic year. Much use is made of the collections by additional scientists who did not visit them in person. Some scientists get identification services for their research projects and others have lists of specimens and locations mailed to them for various types of research. Moreover, during this period numerous parcels containing scientific materials were mailed abroad for researchers in their home institutions.

Date	Name	Institute	Country	Taxonomic group
2013 Cct	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2013 Cct	E. Bachar-Sacham	Bezalel	Israel	Mammals
2013 Nov	J. Willman	Washington University in Saint-Loui	USA	Anthropology
2013 Nov	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2013 Nov	L. Shaish	Israel Oceanographic and Limnological Research	Israel	Molluscs
2013 Nov	Y. Leshano	Ben Gurion University	Israel	Molluscs
2013 Nov	M. Kovtamyuk	Weizman Institute	Israel	Molluscs
2013 Nov	E. Ayali	Bar Ilan University	Israel	Mammals
2013 Nov	O. Melnyk	Kiev University	Ukraine	Mammals
2013 Nov	V. Kostiuk	Kiev University	Ukraine	Mammals
2013 Dec	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2013 Dec	G. Sisna-Vatura	Haifa University	Israel	Molluscs
2013 Dec	G. Rilov	Israel Oceanographic and Limnological Research	Israel	Molluscs
2013 Dec	O. Raven	Israel Oceanographic and Limnological Research	Israel	Molluscs

Date	Name	Institute	Country	Taxonomic group
2013 Dec	T. Guy-Haim	Israel Oceanographic and Limnological Research	Israel	Molluscs
2013 Dec	G. Levy	Israel Oceanographic and Limnological Research	Israel	Molluscs
2013 Dec	Y. Ciat		Israel	Birds
2014 Jan	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 Jan	Y. Leshano	Ben Gurion University	Israel	Molluscs
2014 Jan	G. Shangrut	Ben Gurion University	Israel	Mammals
2014 Jan	N. Sapir	Hebrew University	Israel	Birds
2014 Jan	H. Shirihai		Israel	Birds
2014 Jan	Y. Ciat		Israel	Birds
2014 Jan	C. Nicholas	University of Iowa	USA	Anthropology
2014 Feb	I. Freed		Israel	Mammals and Birds
2014 Feb	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 Feb	L. Klein	Bar Ilan University	Israel	Molluscs
2014 Feb	M. Abra	Tel Aviv University	Israel	Mammals
2014 Mar	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 Mar	E. Ofir	Israel Oceanographic and Limnological Research	Israel	Molluscs
2014 Mar	P. Golidin	Taurida National University	Ukraine	Mammals
2014 Mar	M.C. De Franceno	University of Italy	Italy	Mammals
2014 Mar	Y. Tcharka		Israel	Birds
2014 Mar	C. Giusto	Museo Civico di Storia Naturale "G. Doria", Genoa	Italy	Entomology
2014 Mar	E. Colonnelli	Museo de Zoo. Univ. Roma la Sapienza Roma	Italy	Entomology
2014 Apr	Y. Arzanov	Institute of Arid Zones, Rostov-on-Don	Russia	Entomology

Date	Name	Institute	Country	Taxonomic group
2014 Apr	G. Ballantyne	University of St. Andrews	UK	Entomology
2014 Apr	M. Kishinevsky	University of Haifa, Oranim	Israel	Entomology
2014 Apr	S. Piet	Radboud University Nijmegen Medical Center	Netherlands	Anthropology
2014 Apr	D.G. Martínez	Museo Nacional de Ciencias Naturales	Spain	Anthropology
2014 Apr	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 Apr	D. Orolidin		Ukraine	Mammals
2014 May	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 May	J. Haran	University of Orleans	France	Entomology
2014 May	Y. Ciat		Israel	Birds
2014 May	E. Hadad		Israel	Mammals and Birds
2014 May	N. Sapir	Hebrew University	Israel	Birds
2014 May	L.G. Bottriell	The Royal College of Surgeons of England	England	Mammals
2014 May	P. Bottriell	The Royal College of Surgeons of England	England	Mammals
2014 Jun	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 Jun	H. Lubinsky	Israel Oceanographic and Limnological Research	Israel	Molluscs
2014 Jun	L. Klein	Bar Ilan University	Israel	Molluscs
2014 Jun	A. Ben-Dov		Israel	Mammals and Birds
2014 Jun	C. Makris	Michigan State University	USA	Entomology
2014 Jun	B. Shalmon	Israel Nature and Parks Authority	Israel	Entomology
2014 Jun	A. Behar	Kimron Veterinry Institute	Israel	Entomology
2014 Jun	A. Roth	Kimron Veterinry Institute	Israel	Entomology
2014 July	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 July	I. Maul	Senckenberg University	Germany	Mammals

Date	Name	Institute	Country	Taxonomic group
2014 July	G. Shangrut	Ben Gurion University	Israel	Mammals
2014 July	G.J. Haskel	University of Manitoba	Canada	Mammals
2014 Aug-Sep	O. Gon	SAIAB	South Africa	Fish
2014 Aug	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 Sep	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2014 Sep	A. Dotan	Beit Berl	Israel	Molluscs
2014 Sep	D. Golanu	Hebrew University	Israel	Fish
2014 Sep	J. Freyhof	Geo Bon	Germany	Fish
2014 Oct	H. Shirihai		Israel	Birds
2014 Oct	S. Freidline	Max Planck Institute for Evolutionary Anthropology in Leipzig	Germany	Anthropology

Support for academic and other courses

The natural history collections are university-based and as such, their role is also to promote higher education. Some courses are TAU courses, several of which are our compulsory first and second year courses, taught to hundreds of students; however, other universities (Technion, University of Haifa, Open University) use our facilities for their specialized courses, as does the Avshalom Institute. Many Nature Campus activities also take place using the collections for varied audiences.

Purpose	Name	Institute	Taxonomic group
Faunistics of Aves (academic course)	Y. Yom-Tov and E. Geffen	Tel Aviv University	Birds, Taxidermist and Museum Class
Insects the Flagship of Biodiversity (academic course)	A. Freidberg, Dorchin, N. and D. Simon	Tel Aviv University	Entomology
Parasitoids (academic course)	D. Gerling	Tel Aviv University	Entomology
Macroecology (academic course)	S. Meiri	Tel Aviv University	Birds, Mammals and Reptilia
Introduction to animal life – vertebrates (academic course)	S. Meiri	Tel Aviv University	Birds, Mammals and Reptilia
Zoological garden and Natural History Museum tours (academic course)	S. Meiri	Tel Aviv University	Birds, Mammals and Reptilia
Introduction to Animal Kingdom: Invertebrates and Vertebrates (academic course)	A. Abelson and S. Meiri	Tel Aviv University	Mammals
Introduction to Archaeozoology	L. Sapir Chen	Tel Aviv University	Mammals
Archaeozoology workshop	L. Sapir Chen	Tel Aviv University	Mammals, Fish and Museum Class

Purpose	Name	Institute	Taxonomic group
Vertebrates Anatomy (academic course)	D. Eilam, M. Ovadia and U. Oron	Tel Aviv University	Reptilia, Mammals and Taxidermist
The Invertebrates: Comparative Functional Biology (academic course)	M. Ilan, Y. Benayahu and A. Abelson	Tel Aviv University	Invertebrates, Entomology and Histology
Ichthyology (academic course)	M. Goren	Tel Aviv University	Fishes and Museum Class
Trips in the experimental zoo and Natural History Museum (academic course)	T. Dayan	Tel Aviv University	Birds, Mammals and Reptilia
Biology and Systematic of Marine Invertebrates: (academic course)	Y. Benayahu	Interuniversity Institute for Marine Sciences	Invertebrates
Topics in Fish Biology (academic course)	R. Holzman and M. Kiflawi	Interuniversity Institute for Marine Sciences	Fishes
Osteology And Anthropology (academic course)	I. Hershkovitz	Tel Aviv University	Anthropology
From gatherers to eradicators? (academic course)	D. Langgut	Tel Aviv University	Palynology and Archaeobotany
Physical Anthropology (academic course)	Y. Rak	Tel Aviv University	Anthropology
Chapters in Human Evolution (academic course)	Y. Rak	Tel Aviv University	Anthropology
Human Evolution: fossil evidences (academic course)	Y. Rak	Tel Aviv University	Anthropology
Dental Anthropology (academic course)	R. Sarig	Tel Aviv University	Anthropology
Plants of the Bible (academic course)	D. Langgut	Tel Aviv University	Palynology and Archaeobotany
Man-environment-climate (academic course)	D. Langgut	Tel Aviv University	Palynology and Archaeobotany

Purpose	Name	Institute	Taxonomic group
Faunistics (academic course)	Z. Arad	Technion	Birds, Mammals and Museum Class
Faunistica (academic course)		Open University	Birds, Mammals and Museum Class
Bird-Watching		Israeli Air Force	Birds and Museum Class
Bird-Watching		The Society for the Protection of Nature in Israel	Mammals, Birds and Museum Class
Various seminars	Nature Campus	Tel Aviv University	Mammals, Birds, Entomology and Museum Class
Guided tours to schoolchildren	Nature Campus	Tel Aviv University	Mammals, Birds, Entomology and Museum Class

Support for various individuals and organizations

The Steinhardt Museum function as a national collection, by providing services to the scientific committee, as well as to other organizations and, to the best of our abilities under currently constrained conditions, also to the general public. Here we list **a sample** of the services provided by the collections in the past academic year. We apologize that the list is not full, but in the current conditions of under-staffing we are unable to dedicate the human-power to monitor and record all such activities.

Purpose	Name	Institute	Taxonomic group
Taxonomic guidance (learning the procedure)	V. Sepliarsky	Plant Protection and Inspection Services	Entomology
Taxonomy Identification		Plant Protection and Inspection Services	Entomology
Taxonomy Identification		Israel Nature and Parks Authority	Entomology
Taxonomy Identification		Ministry of Environmental Protection	Entomology
Taxonomy Identification		Ministry of Health	Entomology
Taxonomy Identification		Ministry of Agriculture	Entomology
Taxonomy Identification		Israel Defense Forces	Entomology
Taxonomy Identification		Hebrew University	Entomology
Taxonomy Identification	J.J.I. Martinez	Tel Hai College	Entomology
Taxonomy Identification	I. Renan	Israel Nature and Parks Authority	Entomology
Taxonomy Identification		Ministry of Agriculture	Arachnidae
Taxonomy Identification		Plant Protection and Inspection Services	Arachnidae
Taxonomy Identification	U. Shalom, A. Sirati, D. Ish Shalom, T. Yeger	Ministry of Environmental protection	Arachnidae

Purpose	Name	Institute	Taxonomic group
Taxonomy Identification		Entomological Laboratory	Arachnidae
Taxonomy Identification	S. Vaisman	Plant Protection and Inspection Services	Molluscs
Taxonomy Identification	E. van dan Brink	Israel Antiquity Authority	Molluscs
Taxonomy Identification	A. M. Maeir	Israel Antiquity Authority	Molluscs
Taxonomy Identification	O. Tal	Israel Antiquity Authority	Molluscs
Taxonomy Identification	Z. Dvira	Israel Antiquity Authority	Molluscs
Taxonomy Identification	I. Hirschfeld	Israel Antiquity Authority	Molluscs
Taxonomy Identification	S. Dar	Israel Antiquity Authority	Molluscs
Taxonomy Identification	O. Gutfeld	Israel Antiquity Authority	Molluscs
Taxonomy Identification	N. Avigad	Israel Antiquity Authority	Molluscs
Taxonomy Identification	H. Geva	Israel Antiquity Authority	Molluscs
Taxonomy Identification	E. Sheffer	IOLR - Haifa	Molluscs
Taxonomy Identification	H. Lubinevsky	IOLR - Haifa	Molluscs
Taxonomy Identification	G. Rilov	IOLR - Haifa	Molluscs
Taxonomy Identification	B. Rinkevitch	IOLR - Haifa	Molluscs
Taxonomy Identification	D. Milstein	Israel Nature and Parks Authority	Molluscs
Taxonomy Identification	Enforcement Distric	Israel Nature and Parks Authority	Molluscs
Taxonomy Identification	Y. Artzi	Israel Nature and Parks Authority	Molluscs
Taxonomy Identification	North Distric	Israel Nature and Parks Authority	Molluscs

Purpose	Name	Institute	Taxonomic group
Taxonomy Identification	E. Elron	DHV Med	Molluscs
Taxonomy Identification	I. Sella	SeArc Company	Molluscs
Taxonomy Identification	Y. Achitov	Bar Ilan University	Invertebrates: Stony Corals
Taxonomy Identification	Y. Artzi	Israel Nature and Parks Authority	Fishes
Taxonomy Identification		IOLR - Haifa	Fishes
Taxonomy Identification	I. Sella	SeArc Company	Fishes
Taxonomy Identification	I. Sella	SeArc Company	Crustacean
Taxonomy Identification	G. Rilov	IOLR - Haifa	Spong
Taxonomy Identification	I. Sella	SeArc Company	Spong
Taxonomy Identification	R. Yahel	Israel Nature and Parks Authority	Spong
Taxonomy Identification	I. Sella	SeArc Company	Bryozoa
Taxonomy Identification	I. Sella	SeArc Company	Echinodermata
Taxonomy Identification		Israeli Air Force	Mammals
Taxonomy Identification		Israel Nature and Parks Authority	Mammals
Taxonomy Identification		Israeli Air Force	Birds
Taxonomy Identification		Israel Airport Authority	Birds
Taxonomy Identification		Israel Nature and Parks Authority	Birds
Molecular identification	D. Milstein	Israel Nature and Parks Authority	Molluscs
Molecular identification	D. Milstein	Israel Nature and Parks Authority	Crustacean
Molecular identification	H. Lubinevsky	IOLR - Haifa	Crustacean
Molecular identification		Israel Airport Authority	Birds
Molecular identification		Israel Airport Authority	Birds
Molecular identification	G. Shenbrot	Ben-Gurion University	Reptilia
DNA Shipment	L. Kratochvil	Karl University, Prague	Reptilia

Purpose	Name	Institute	Taxonomic group
DNA Shipment	P. Pafilis	University of Athens, Greece	Reptilia
DNA Shipment	S. Goldberg	Whittier College, USA	Reptilia
DNA Shipment	S. Carranza	CSIC, Barcelona, Spain	Reptilia
DNA Shipment	F. Martínez-Freiría	CIBIO, Universidade do Porto, Portugal	Reptilia
DNA Shipment	P. Bottriell	The Royal College of Surgeons of England	Mammals
DNA Shipment	L.G. Bottriell	The Royal College of Surgeons of England	Mammals
DNA Shipment	S. De Grave	Museum of Natural History, Oxford University, England	Crustacean
Electronic Data	M. Türkay	Senckenberg Forschungsinstitut, Frankfurt	Crustacean
Electronic Data	L. Whittaker	Israel Nature and Parks Authority	Mammalia
Electronic Data	D. Milstein	Israel Nature and Parks Authority	Fishes
Electronic Data	B. Rinkevitch	IOLR - Haifa	Fishes
Electronic Data	A. Bauer	Vilanova University, USA	Reptilia
Electronic Data	F. Martínez-Freiría	CIBIO, Universidade do Porto, Portugal	Reptilia
Electronic Data	B. Shacham	Hebrew University	Reptilia
Shipment of Specimens	S. Goldberg	Whittier College, USA	Reptilia
Shipment of Specimens	G. Dally	Museum and Art Gallery of the Northern Territory, Australia	Fishes
Shipment of Specimens	Y. Ikeda	Imperial Household Agency, Japan	Fishes
Shipment of Specimens	R. Bank	University of Groningen, the Netherlands	Molluscs

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	B. Sahlmann	Haus der Natur, Cismar, Germany	Molluscs
Shipment of Specimens	J. van der Beek	otterdam, the Netherlands	Molluscs
Shipment of Specimens	A.F. de Jong	Natuurhistorisch Museum Rotterdam, the Netherlands	Molluscs
Shipment of Specimens	V. Wiese	Haus der Natur, Cismar, Germany	Molluscs
Shipment of Specimens	L.J. van Gemert	Zeist, the Netherlands	Molluscs
Shipment of Specimens	J.-J. ter Poorten	Hilversum, the Netherlands	Molluscs
Shipment of Specimens	B. Reijnen	National Museum of Natural History , Leiden The Netherlands	Soft Corals
Shipment of Specimens	C.S. McFadden	Harvey Mudd College, USA	Soft Corals
Shipment of Specimens	L. van Ofwegen	National Museum of Natural History , Leiden The Netherlands	Soft Corals
Shipment of Specimens	A. Zitek	University of Natural Resources and Life Sciences, Vienna (BOKU-UFT), AUSTRIA	Soft Corals
Shipment of Specimens	M.M. Gilis	Ecole Polytechnique Fédérale de Lausanne, Switzerland	Soft Corals
Shipment of Specimens	P. Cardenas	Uppsala University, Sweden	Sponges
Shipment of Specimens	P. Lehtinen	University of Turku Finland	Arachnida
Shipment of Specimens	Melika	Plant Health and Molecular Biology Laboratory, Directorate of Plant Protection, Israel	Arachnida

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	J. Eger	Dow AgroSciences LLC, Florida, USA	Arachnida
Shipment of Specimens	Machado	Texas A&M University, Department of Entomology. Heep Center, USA	Arachnida
Shipment of Specimens	J.P. Boudot	Immeuble Orphée, France	Arachnida
Shipment of Specimens	P.J. Schwendinger	Department of Arthropodology and Entomology I, Museum of Natural History, Switzerland	Arachnida
Shipment of Specimens	Y.M. Marusik	University of Turku Finland	Arachnida
Shipment of Specimens	S. Li	Institute of Zoology, Chinese Academy of Sciences, Chaina	Arachnida
Shipment of Specimens	C. Hörweg	Hörweg: Zoology (Invertebrates), Naturhistorishes Museum Wien, Austria	Arachnida
Shipment of specimens	J. Astrin	Museum Koenig, Germany	Entomology
Shipment of Specimens	D. Burckhardt	Naturhistorisches Museum	Entomology
Shipment of Specimens	Melika	Plant Health and Molecular Biology Laboratory, Directorate of Plant Protection, Israel	Entomology
Shipment of Specimens	Askew	France	Entomology
Shipment of Specimens	S. D. Gaimari	California Department Of Food And Agriculture, U.S.A	Entomology
Shipment of Specimens	Hancock	The Hunterian (Zoology Museum), University of Glasgow	Entomology

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	Stuke	Germany	Entomology
Shipment of Specimens	Marshall	School of Environmental Sciences, University of Guelph	Entomology
Shipment of Specimens	Ozerov	Zoological Museum, Moscow, Russia	Entomology
Shipment of Specimens	Whitmore	Department of Life Sciences (Entomology), The Natural History Museum	Entomology
Shipment of Specimens	Lonsdale	Agriculture and Agri-Food Canada	Entomology
Shipment of Specimens	Knutson	USA	Entomology
Shipment of Specimens	Mokam	Departement of Biological Sciences, University of Ngaoundere	Entomology
Shipment of Specimens	G. Evans	USA	Entomology
Shipment of Specimens	Giusto	Storia Naturale "Giacomo Doria", Italy	Entomology
Shipment of Specimens	Letsch	Department of Tropical Ecology and Animal Biodiversity, University of Wienna	Entomology
Shipment of Specimens	M. Nabozhenko	Southern Scientific Centre, Russia	Entomology
Shipment of Specimens	Barclay	Department of Life Sciences (Entomology), The Natural History Museum	Entomology
Shipment of Specimens	P. Weill	Pau France	Entomology
Shipment of Specimens	C. Makris	Michigan State University, USA	Entomology
Shipment of Specimens	R. Beenen	Naturalis Biodiversity Center, Netherlands	Entomology

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	G. Kergoat	Centre de Biologie pour la gestion des Populations (CBGP), France	Entomology
Shipment of Specimens	Felix	c/o Ben Brugge, Naturalis Biodiversity Centre, Netherlands	Entomology
Shipment of Specimens	L. Borowiec	Department of Biodiversity and Evolutionary Taxonomy, University of Wroclaw, Poland	Entomology
Shipment of Specimens	Caldara		Entomology
Shipment of Specimens	E. Colonnelli	Museo de Zoo. Univ. Roma la Sapienza Roma, Italy	Entomology
Shipment of Specimens	B.A. Korotyaev	Zoological Institute Russian Academy of Sciences, Russia	Entomology
Shipment of Specimens	Bialooki	Pau France	Entomology
Shipment of Specimens	M.A. Mazur	Opole University, Department of Biosystematics, Poland	Entomology
Shipment of Specimens	J. Haran	University of Orleans, France	Entomology
Shipment of Specimens	Y. Arzanov	Institute of Arid Zones, Rostov-on-Don, Russia	Entomology
Shipment of Specimens	M. Bologna	Dipartimento di Biologia Ambientale, Universita Roma Tre, Italy	Entomology
Shipment of Specimens	Ober	Zoologische Staatssammlung München, Germany	Entomology
Shipment of Specimens	M.Y. Mandelshtam	Zoological Institute Russian Academy of Sciences, Russia	Entomology

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	Kostal	Pau France	Entomology
Shipment of Specimens	B. DeMarco	Department of Entomology, Michigan State University, USA	Entomology
Shipment of Specimens	B. Seifert	Department of Entomology, Senckenberg Museum für Naturkunde, Germ	Entomology
Shipment of Specimens	D. Mezger	Field Museum of Natural History, Department of Zoology, Divison of Insects, Moreau Lab, Chicago, USA	Entomology
Shipment of Specimens	S. Salata	Department of Biodiversity and Evolutionary Taxonomy, University of Wroclaw, Poland	Entomology
Shipment of Specimens	X.C. Volynkin	Tigirek State Natural Reserve, Russia	Entomology
Shipment of Specimens	L.F. Gall	Peabody Museum of Natural History, USA	Entomology
Shipment of Specimens	A. Hausmann	Zoologische Staatliche Staatssammlung München, Germany	Entomology
Shipment of Specimens	Gibson	Canadian National Collection of Insects, Agriculture & Agri-Food, Canada	Entomology
Shipment of Specimens	Bhatti		Entomology
Shipment of Specimens	Scheuchl		Entomology
Shipment of Specimens	Risch	Austria	Entomology
Shipment of Specimens	M. Terzo	Université De Mons, Belgique	Entomology
Shipment of Specimens	C. Praz	Eth Zurich, University of Neuchatel, Switzerland	Entomology

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	F. Dathe	Deutsches Entomologisches Institut, Leibniz-Zentrum für Agrarlandschaftsforschug Germany	Entomology
Shipment of Specimens	Patiny		Entomology
Shipment of Specimens	A. Pauly	Institut royal des Sciences naturelles de Belgique, Departement Entomologie, France	Entomology
Shipment of Specimens	A. Mueller	Entomological Collection, ETH Zurich, Switzerland	Entomology
Shipment of Specimens	Schwarz	Austria	Entomology
Shipment of Specimens	A.A. Michez	Laboratory of Zoology, University of Mons, France	Entomology