

**The National Collections of Natural History at
Tel Aviv University: A biodiversity,
environment, and agriculture research
knowledge center**

2010/2011 Scientific Report

Submitted to the Ministry of Science

The website of The National Collections of Natural History, Tel Aviv University:
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Introduction

During the past academic year the collections continued to enjoy the support of the Ministry of Science & Technology as one of the ministry's Knowledge Centers. So in terms of training, collections care and improvement, significant steps were made this year to promote the collections as a research infrastructure and as well as to promote collections-based research.

Our report focuses only on academic achievements made with the use of the natural history collections at TAU during the academic year 2010/2011. This use ranges from biogeographic collections-based research, to use as comparative materials in zooarcheological research. In some studies it was the taxidermist who provided support for scientific research. In many others the chief contribution was taxonomic identifications carried out by the curators and collections managers, who regularly support much basic and applied research.

Naturally, the focus of the report is on activities carried out within Tel Aviv University. Many colleagues from other universities within and without Israel use the collections for research and teaching, but we did not necessarily manage to receive all relevant materials from them in time for this report, so there is more scientific activity than can be discerned from the present report.

Progress in the natural history collections

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 by 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 collections. 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 taxidermist. We are fortunate to have a group of active, knowledgeable, and dedicated technical staff members, who do their best, in the nearly impossible physical conditions and under-staffing, 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 national collections of natural history at Tel Aviv University.

Our overworked collections managers have also produced this report, and we are particularly grateful to the work of Revital Ben-David-Zaslow in compiling it. Here they also report a little about 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 collection managers

The staff members of TAU Natural History Collections continue their activities to promote and preserve the various collections. As in previous years, we have put much effort into advancing our goals. We continue to collect and preserve new scientific materials, rescue and incorporate important private and historical collections, maintain the existing collections, ship scientific material and data, and assist graduate students, academic courses, and “Nature Campus” activities.

During the academic year 2009/2010 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 35,000 new specimens were added to the various collections during this year.

The collections made by Prof. Yehuda Benayahu have also 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 300 new specimens of soft corals were added this year.

Everyday work on the insect collection includes the absorption and integration of donated collections; labeling and sorting of specimens from collecting trips; identification of and research on select groups (including over 75 shipments of scientific specimens to specialists, mostly overseas, during 2011); and preservation activities, such as renewal of naphthalene. Special treatment is required in cases of damage caused by mold and pests. As in the past years, we have continued digitizing this collection. Newly-caught insects are immediately given a catalog number and digitized. During the current year about 3,000 new insects were added to the collection. Prof. Dan Gerling collected groups of whiteflies from his collecting trip to Africa and Israel. A new species *Singhiella simplex* was discovered in Israel. It is probably invasion from India or Florida.

Vladimir Chikatunov performed a huge work of identification on a beetle collection from pitfall traps and malaise traps from various projects and areas (southern Arava and southern Jordan, Mt. Carmel, Nizzanim, Adullam, Avedat and Lehavim, the coastal plain, Nahal Shaharut, the Jordan Valley and others). There is a close working relationship between the "Plant Protection and Inspection Services" (PPIS, Ministry of Agriculture) and the insect and arthropod staff. As in previous years, the collection staff made identifications work and guided the PPIS members.

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. Tirza Stern has developed a unique database for this purpose and continues to work with the students, adjusting it to their special needs. The students of Avital Gasith continue to transfer their collections, consisting of freshwater invertebrates caught in various rivers in Israel, to the National Collections. Together with the samples, the collection managers are provided with the digitized database to assist their incorporation into the National Collections and to help avoid mistakes. 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. The vertebrates among them have been preserved, identified, digitized, and labeled; the invertebrates were preserved and sorted for future identification. An additional collaboration is being conducted with the laboratory of Yael Mandelik from the Faculty of Agricultural, Food and Environmental Quality Sciences, a collaborative project with Tamar Dayan and Abraham Hefetz. The research engages with biodiversity and ecosystem services in the arid agro-natural landscape of the Arava Rift Valley, across the Jordanian-Israeli border. It focuses on the pollinator guilds, specifically bees,

and the pollination services they provide to crops and wild plants. Wild and managed bees (*Bombus* and honey bees) are collected, using netting and pan traps (plates filled with soapy water). The museum staff is directing this research, instructing on how to identify the insects and how to conduct a collection. 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. Also students of Menachem Goren, collecting fish from the Mediterranean and freshwater rivers transferred their samplings together with the collecting data to the museum.

Annual report, tetrapod collection

Shai Meiri, Tzila Shariv , Arieh Landsman, Erez Maza, Igor Gavrillov, Daniel Berkowic , Stanislav Volynchik

Perhaps the biggest change in the tetrapod collection in the last year was a personal (or personnel) one: Tsila Shariv, collection manager of the “dry” collection, has retired after decades of dedicated work for the museum. She was replaced, on a very restricted basis, by Daniel Berkowic.

The tetrapod collections have grown by 1.4% (671 specimens) during the last year: 23 amphibians, 229 reptiles, 148 mammals and 271 birds collected since october 2010 have so far entered the collections. As of September 6th, 2011, the tetrapod collections hold 2380 amphibians, 12710 mammals, 15533 reptiles and 16623 birds.

There was no active collection or accidental “bycatch” of vertebrates in pitfalls designed to catch arthropod. We have, not so recently, applied for permits for a systematic collection of reptiles and wait for the decision of the NPA.

Enhanced connections with the NPA, the hospital, road #6 (supplying roadkill) and some private herpetologists, as well as a less fussy collecting policy, results in an increased influx of specimens. We hope to soon recruit extra personnel in

order to deal with the increased demand for labour – or else our collection policy need to be reverted to the much more restricted model of recent years.

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 sought after (academically) Israeli animals we are trying to establish a large comparative post-cranial collection (e.g., gazelles, hyenas, fallow deer, wolves). 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 all tetrapod specimens.

We have loaned tetrapod specimens belonging to 14 species in all classes to researchers in Israel and the USA. We have supplied tissue samples belonging to nine species of reptiles, birds and mammals to seven scientists in Israel, Greece, France, Senegal, the USA and South Africa. 33 people have visited the dry collection last year, from Israel, France, Portugal, the USA and Thailand.

The revision of avian taxonomy is not yet complete: we have revised the higher taxonomic levels, but still need to revise specific names.

We have held a series of workshops for the NPA – biologists and rangers of each of the five districts have visited the collection and received thorough explanations and lectures regarding the use and importance of natural history collections. We hope to hold one for the NPA enforcement division shortly.

We have tightened our connections with 3 other natural history museums, visiting the national collections at the Hebrew University, as well as Beit-Osishkin and the Natural History Museum at the German colony in Jerusalem.

The egg collection was much rejuvenated by the dedicated care Daniel has applied to the eggs collected by Pater Schmitz. This collection still awaits computerization, but at least it is no longer subject to fungal-caused decay. The

Schimtz collection as a whole was moved to the basement of the centre for cereal research that houses the rest of our “dry” collection. Dry, however, is a relative term as the last year has seen periodic bursts of the sewage piping at the ceiling of this basement. These may have damaged some skins (including our precious Israeli leopard skins), and a *Dermochelys* (leatherback sea-turtle) carapace. We have moved some of the skin collection to the top of cupboards pending the arrival of suitable cupboards in which to store them. The leaks were fixed, and we hope they will not occur again.

Forensic Ornithology at TAU Natural History Collections

Avigail Ben-Dov Segal

The fact that Israel must share its airspace with millions of migrating birds each year makes our aircraft activity highly vulnerable to bird strikes. These strike events can lead to damage to aircrafts and, in severe cases, a loss of life. Bird strikes can occur during flight and also during takeoff or landing in the airfield. A key element in the diverse array of aircraft safety and collision avoidance is the identification of the species of birds involved. Knowing the species identity helps understand the collision events and prevent future ones.

When very little remains are left from a bird strike the identification may still be possible using just a few feather fragments. Birds have species specific microscopic feathers characters which can aid in the identification. The Smithsonian forensic ornithology program, founded in the 1960's, pioneered and developed the feather identification methods used to date. In 1996, in the frame work of her MSc in TAU Zoology department and in collaboration with the Israeli Air Force, Judy Shamoun, prepared the microscopic feather slide reference collection and an identification key for over 100 bird species found in Israel. The reference collection was prepared using feathers from birds species of TAU natural history collections. Since then, bird remains have been examined routinely by the Israel Air Force Birdstrike prevention section and

joined later on by Ben Gurion Airport's Unit for the Prevention of Bird Nuisances in Aviation.

In 2011 a joint decision has been made and the feather identification lab has passed on to TAU, back to its home base. With the aid of the Smithsonian forensic ornithology lab and practice feather material provided by the department's taxidermist, the identification work resumed. So far, over 70 bird strike identifications were provided.

The identification is carried out using the slide reference collection and in conjunction with whole feather comparison to the invaluable bird collection at TAU. During this time, new methods and materials were developed for the microscopic slide preparation and are continually researched, with the aid the Smithsonian Institute.

In addition, the Civil Aviation Authority decided to transfer their strike material to TAU for identification as well.

Tel aviv university entomology: collections assessment

David G. Furth, National Museum of Natural History, Smithsonian Institution

TAU Entomology has very valuable collections with many primary types and vouchers from many Israeli entomologists and their research projects. It contains an impressive array insect biodiversity from Israel. This is truly an important part of the Israeli “natural heritage” and will be extremely valuable in the future for study by Israeli researchers, students, as well as for external researchers. It will provide the basis to address and answer many interesting questions, including about faunistics, environmental changes, etc. However, acquiring many important abandoned or donated collections as well as collecting new material has created some significant problems. Much of the collection is at significant risk as well as very inaccessible to researchers.

A Profile (assessment of collection health) of all of the TAU entomological collections was performed during February-March 2011, entered onto a spreadsheet with an associated detailed report. Each storage container in the collection was examined, i.e., specimens pinned (drawers), ethanol (jars), and microscope slides (slide boxes) and given a ranking score between 1-6, based on the Profile system developed by Smithsonian Entomology. 5,561 storage containers were examined: 257 containers are in urgent need of conservation, but there are 2962 that are in reasonably good curatorial health and are ready for some level of data capture.

The primary tau entomology issues are:

1) **Space**: The biggest problem is the collections are housed in 9 rooms on 4 floors of the Sherman Building.

2) **Standardized Containers**: There are too many different (non-standard) kinds of storage containers, especially cabinets. This makes access and collection improvement work very difficult. And they will NOT fit in the new Museum space. More cost effective and efficient collections management can be achieved IF Entomology is provided with enough standardized containers.

3) **Staffing Plan**: There is an urgent need for a curatorial management plan to delegate responsibilities to staff for collection improvement work, especially in preparation for moving to the Museum. Staff should be given flexibility and decision-making for their taxa (as Contact Persons) after they have “best practices” training.

4) **Pest Control**: Do not continue use of Naphthalene, begin elimination from collections (only from “secure” and standard cabinets), train some staff about pest damage indicators to inspect the entire collection once per year. Purchase multi-user freezer. Use well-sealed PDB cabinet for infestations or incoming specimens.

5) **Types**: Primary types should be segregated and databased for security and digital access.

6) Unique Specimen-level Identifiers: Proactively, not retroactively, begin using unique identifiers on each specimen, vial, slide. There is increasing need to provide valuable data from the collections and the need to be more accountable to administrators, educators, and other authorities, It is more cost-effective, to be able to track specimens from individual projects, to be able to deal with ownership rights, etc.

7) Cabinet/Drawer Labeling/Numbering: Few cabinets/drawers have higher taxon labels (order & family) externally. This makes access and use of the collections very difficult for staff and visitors and costs staff time.

8) Multiple Taxon Locations: As is evident on the Profile spreadsheet many orders/families are located in different places either in different rooms/floors. This makes access and work very difficult and inefficient.

9) Disaster Plan: Due to yearly flooding, moves caused by to building damage, potential war, etc. there should be action plans developed indicating what will be done to safeguard collections during such events.

10) Segregated Special Collections: This is very inefficient and will greatly interfere with any moves, e.g., Palmoni; Reich, Rosen, Swirski, Wahrman, HUI. They should be integrated and generally databased first.

Planning: A Collection Management & Procedures Plans are needed.

Exploring biodiversity in Israel - Carabidological survey of Israel using pitfall traps

Claudia Drees, Armin Ionescu-Hirsch, Ariel-Leib-Leonid Friedman, Gil Wizen, Thorsten Assmann

All trapping seasons have been finished. As some sites needed to be changed (i.e. because of repeated disturbance or other influencing factors) there was trapping activity in some sites until May 2011. Altogether, the traps were opened 19073 days (calculated for one trap).

Ground beetles. In total more than 4,000 specimens of ground beetles were found. The identification is actually still running. Up to now about 142 species were already found in the traps. As the species from several large genera (e.g. Bembidion, Dyschirius or Harpalus) are not yet identified to species level we expect the number still to increase. Beetles from those groups are sent to experts (e.g. Werner Marggi, Thun, CH for Bembidion; A. Hetzel, Darmstadt, D for Calosoma). In each of the sites ground beetles were found, although especially the dry sites show less ground beetle (in terms of both species and individuals) – a proper analysis will follow after the species list is completed.

Material of some species of which the collection holds only a few specimens was caught (e.g. *Anaulacus ruficornis* – up to now only 3 specimens in the collection, or *Chlaenius douei* – up to now only 1 specimen in the collection). *Chlaenius viridis* was caught for the first time in Israel. Several species were recorded from “new” biogeographic regions in Israel. More of such findings are expected.

Ants. All the ants from all traps were identified to species level (by A. Ionescu-Hirsch). In the examined sample 117 species and subspecies were identified and other three “morphospecies” remain unidentified to species level. Of the 117 identified taxa 111 are recorded in the last published checklist of ants of Israel (Vonshak and Ionescu, 2010), and six are new records. Five taxa are new records for Israel: *Monomorium bicolor bicolor* Emery, and *M. nitidiventre* Emery, are widespread taxa ranging from northern Africa to the southwestern Asian Palaearctic; *M. fezzanense* Collingwood and Agosti is known from the Arabian Peninsula; *Tetramorium biskrense* Forel is a typical North African species; and *Paratrechina flavipes* (F. Smith) is a tramp species. A species of *Tetramorium* from Nahal Keziv is new to science. It shows affinities to *T. myops* Bolton, which belongs to a small species group known until now only from India and the Afrotropical region.

The number of taxa collected in the 12 phytogeographic regions is shown in. These numbers are proportional to the number of deployed traps and represent 20-77% of the taxa known before this study from the respective regions (Vonshak and Ionescu, 2010). In most regions with more than three stations more than 60% of the previously known species were collected, which indicates the high efficiency of the used trapping setup. As expected, high percentages of coverage of the local ant fauna are recorded also for Mount Hermon and Samaria, despite the relatively low number of examined traps: given the high altitude, on Mount Hermon the ant fauna numbers few species as compared to lower regions; and Samaria was an under-sampled region for ants (Vonshak and Ionescu, 2010).

In ten of the twelve phytogeographic regions were collected 36 taxa previously unknown from these regions (73 new records). Forty eight (64%) of these records are of small Myrmicinae which were probably “overlooked” during previous sampling trips, given the fact that most of the collectors used the technique of direct sampling.

Scorpions. In total, 79 scorpions from 9 species (two with two subspecies) were found in the traps. Thus, most of the more common scorpion species in Israel were caught in the traps, mainly some of those living in desert habitats were not found. In total, of the 21 known scorpion taxa nearly 50% were detected.

Beetles from other families. About 140 **weevil species** were found during the survey, some of them rarely taken by sweeping techniques. Some findings are remarkable as they maybe a new genus. The **other beetle material** was sent to experts of the Hamburg Coleopterologists group. G. Wagner is working on the identification of darkling beetles (Tenebrionidae). H. Meybohm is working on scydmaenid beetles (Scydmaenidae) and he so far found at least one new record for Israel (*Euconnus nocturnus*, Enot Tsukim 20.4.2010 trap1) and moreover a

new species of the genus *Chevrolatia* (trapped in Carmel northfacing 4.4.2010 trap1). The identifications are still running.

Outlook. Once, the ground beetle list is completed the data will be analysed in order to better understand the patterns of ground beetle- and ant- biodiversity in Israel. The two-factor-ANOVA-design of the trapping sites allows analysis of climatic and microclimatic (soil moisture) conditions influencing occurrence of the analysed invertebrate groups in Israel.

The ground beetle findings will be entered in the collections of TAU (partly done) and thus also to the museum's database. The material will (together with other material) be used to design and test identification tables of Israel's ground beetles. While for some groups such tables are already existing (e.g. *Carabus*, Assmann et al. 2008), for some further groups they are currently being developed.

Finally, the results of our trapping programme will hopefully present a good basis for the further exploration of Israel's ground beetle fauna and for possible projects related also to nature conservation aims, such as the compilation of Red Lists.

Macroevolutionary Aspects of Morphological Integration

Annat Haber

Differences between groups in their diversification rates and patterns result from a combination of extrinsic factors, such as environmental and geographic elements, and intrinsic features of the organisms. The study of morphological integration focuses on the intrinsic factors as reflected by the covariation between morphological characters during development. Thus, the study of morphological integration can complement ecological and behavioral studies in understanding diversification patterns. Many studies have examined the

connection between morphological integration and selective forces within species, and thus the microevolutionary effects of integration. Far fewer studies have considered integration across higher phylogenetic scales that enable them to evaluate the long-term macroevolutionary implications of integration.

The goal of this project is to utilize a dataset of morphological characters that I have recorded for ruminant species in order to further test and explore the macroevolutionary theory of integration as well as the association between integration and other species-level characteristics. An essential step towards this goal is to enhance our understanding of the statistical properties of the various techniques that have been developed for the study of integration, and improve them where necessary.

In the past six months I have focused on the methodological aspects of the study of integration. I elaborated on a simulation study that I have started to develop previously. This study compares the sampling distributions and statistical power of several integration indices, including the effect of number of characters, matrix shrinking, and parametric vs. nonparametric approaches. I improved the program codes that I have wrote for carrying out the bootstrap and permutation procedures that are commonly used in the study of integration. These procedures can now be carried out substantially faster and are more user friendly, potentially enhancing comparability of studies and collaboration. The paper presenting this study have been submitted to *Evolutionary Biology* and is now in review.

I also explored and tested the effect of accounting for body size using different methods. The effect of body size is an on-going debate in the study of integration. Yet, the implications of the different methods for estimating body size and accounting for it has not been fully explored before. I found that different methods yield different results, and that better understanding of both the biological and the statistical meaning of each method is needed.

In the coming year I intend to augment my dataset of ruminant morphology by digitizing the complete skull collection of *Gazella gazella* and *Gazella dorcas* curated in the museum. This will provide large enough samples to be able to test the effect of sexual dimorphism on integration patterns, as well as a better empirical base for methodological studies. It will also open the door for future studies that look into the ecomorphology and natural history of these local gazelle species.

In addition, I intend to further explore the evolution of integration patterns across the ruminant tree by using recently developed phylogenetic comparative methods. These methods allow fitting evolutionary models to multivariate spaces as opposed to testing one dimension at a time, thus increase power and accuracy. Finally, I will look into the association of integration and other species-level characteristics, including species richness, ecological diversity and geographic range.

Predicting Desert Locust Geographic Distribution in a Future Climate

Corinna S. Bazelet

Since beginning the postdoctoral research in April 2011 (3 months ago at time of writing), I have divided my time among many activities, with the majority of progress in two areas: (a) literature surveys and project planning for current postdoctoral project, and (b) continued work on existing collaborations and side projects.

The desert locust (*Schistocerca gregaria*) (DL) have been studied for almost 100 years, with much important research emerging within the last 50 years, particularly on the integration of migration and meteorology. As a first step in this project, I began a thorough literature survey on DL migration, physiology, behavior and recorded outbreaks. Appropriate published findings will be incorporated into my final model and compiled in a review article.

Additionally, I have begun to thoroughly survey the existing literature on modeling techniques, field methods for tracking locust swarms, and climate change predictions for the current DL geographic range. I also completed a preliminary survey of the Orthoptera housed in Israel's National Insect Collection for planning purposes (see future plans described below).

From June 14th until June 24th I participated in field work in the northern arid regions of South Africa in collaboration with Dr. Marie-Pierre Chapuis and Antoine Foucart of CIRAD Acridologie from Montpellier, France. On this field trip, we collected individuals of *solitarious* DL from the South African subspecies, *Schistocerca gregaria flaviventris*, which is not an agricultural pest and is suspected to have a reduced tendency to aggregate relative to its North African counterpart *Schistocerca gregaria gregaria*. I transported live individuals to Stellenbosch University for physiological experimentation. These specimens, once dead, will also be used for wing morphometric analysis as described below.

At Stellenbosch University, in collaboration with Dr. John Terblanche, I am currently in the process of measuring inflight metabolic rate of the field collected South African DL specimens. Measured values will be compared with published theoretical values and incorporated into the final prediction model. Also in collaboration with Dr. Terblanche, I am in the process of building the first step of the prediction model in the statistical software package R. In this first step of the model, which is based on first principles and biophysical equations, a DL swarm selects its preferred flight height on the basis of time of day, time of year, temperature, and available wind speeds and directions at different altitudes above Earth's surface. The selection of flight height is crucial in that it determines which winds the locusts encounter, and the distance and direction that the swarm will disperse.

In addition to work on the postdoctoral project, I have also been continuing work on previous obligations. I have completed revising and submitting two manuscripts from my PhD for publication in scientific journals. I have also continued my obligations as South African Regional Representative to southern and eastern Africa by performing identification services of South African Orthoptera collected in field ecology studies for Dr. James Pryke, Dr. Francois Roets and PhD student, Casper Crous. In August I will accompany another collaborator, Dr. David Weissman of the California Academy of Sciences, on a field trip in South Africa to investigate the field ecology of the little-known South African Jerusalem Cricket (Orthoptera: Stenopelmatidae). As co-supervisor (with Dr. Terblanche) for a B.Sc. Honours student at Stellenbosch University, Paige Potter, I have been assisting with laboratory measurement of water loss rates in a flightless cockroach (*Aptera fusca*) and with editing and revision of scientific publications.

I have also made significant progress on an ongoing side project, a review of the southern African endemic grasshopper subfamily, Euryphyminae (Orthoptera: Acrididae), and revision of a genus *Pachyphymus* (Orthoptera: Euryphyminae). For this revision, I am utilizing TPS7 software for a detailed morphometric analysis of approximately 15 morphological traits to enable differentiation and description of new *Pachyphymus* species.

Research activities 2009/10: Report for the Israel Academy of Sciences

Daniella E. Bar-Yosef Mayer

The past academic year was dedicated to several activities that relied on research in the malacological collections, based at the Natural History Collections, Tel Aviv University. Those include the study of archaeo-malacological shell assemblages of sites in Israel and in Turkey.

My research at the Neolithic site of Çatalhöyük, Turkey, continued. The study season at the site enabled the analysis of the archaeological context from which micro freshwater shells were collected. Those were analyzed for ecological parameters in order to enable an environmental reconstruction, a project still underway, and for which, my colleague , Dr. Burçin Gümüs and myself had intensive discussions and consultations with Mr. Henk K. Mienis, curator of malacology at Israel's National Collections of Natural History. The investigation of freshwater bivalve *Unio pictorum* at the site continued, with emphasis on the isotopic information within. Together with Dr. Melanie Leng of the NERC Isotope Geosciences Laboratory of the British Geological Survey, and biologist Dr. David Aldridge of Cambridge University, we are in the process of deciphering the results of isotopic analysis in order to enhance the understanding of environmental conditions at the site during its occupation, obtained from the freshwater gastropods as well as other fauna, flora, and geological data.

Other archaeomalacological activities included the initial cataloguing of shells from the Late Bronze and Iron Age sites of Tel Rehov (directed by Prof. Amihai Mazar) and Tel Hazor (directed by Dr. Sharon Zuckerman). The analysis of a small shell assemblage from a Roman site of "Crown Plaza" in Jerusalem revealed an industry of mother of pearly inlays, and the analysis of a worked ostrich eggshell from a Roman sanctuary at Megiddo jail sheds light on early Christian rituals.

Two reviews published this year entailed the comparison of Eastern Mediterranean malacofauna as known from prehistoric sites, to that of the rest of the Mediterranean (published in *Quaternary International*), and to that of South Africa (published in *Pyrenae: Journal of Western Mediterranean Prehistory and Antiquity*). These reviews form a significant contribution to archaeomalacology in that they broaden the potential of this field. They offer

better understanding of past human behaviour in light of innovations and distribution revealed by malacological finds.

Report on the activities in the collection of parasitic wasps (Hymenoptera: Parasitica) of the National Collection of Insects, TAU in 2010

Dr. W. Kuslitzky

With nearly 22,000 species in 37 subfamilies (Yu & Horstmann, 1997), the Ichneumonidae constitute one of the largest animal groups (Townes, 1969). According to the literature 219 species are known from Israel (Bodenheimer, 1937; Aubert et al., 1984; Kasparyan & Kuslitzky, 2008). However, based on the Tel Aviv University collection (TAU) and extrapolations, this number represents only a small part of the actual Israeli fauna of this family. As parasitoids of other insects, the Ichneumonidae are a major factor in the control of insect populations. In the biocontrol of agricultural and forest pests many successful examples are known of the use of Ichneumonidae, including the introduction and augmentation of local populations. One of the most important prerequisites for the use of entomophagous insects for biocontrol of pests is the knowledge of the parasitoid fauna in the treated area.

In the last year Ichneumonidae and Braconidae have been collected, mounted on pins and labeled (ca. 1,800 specimens). Other Parasitica superfamilies (Bethyloidea, Chalcidoidea, Proctotrupeoidea, Ceraphronoidea and Cynipoidea have been collected and preserved in alcohol or mounted (ca. 1,200 specimens). During the reporting period, the parasitic Hymenoptera were collected by the author of the report with the Malaise trap (Almagor, since June 2010), with a net in Mishmar Dawid, Beqoa', and around Rehovot, were reared from different hosts on *Centaurea* spp. (Asteracea). In addition there were contributions from A. Freidberg, L. Friedman and other collectors. The newly collected material of Ichneumonidae was sorted to subfamilies. The taxonomic treatment of the

Campopleginae was continued. The information of the collected specimens during the year was added to the two manuscripts: "The survey of the subfamily Collyrinae" and "The Ichneumonidae (Hymenoptera) of Israel. I (Pimplinae, Xoridae, Tryphoninae, Ctenopelmatinae and Phrudinae). The delay in the publication of these manuscripts is due to problems of the co-author (Dr. D. Kasparyan, St. Petersburg). The manuscripts are attached. (Appendices 1& 2). The following identified collections were received: subfamily Ophioninae from Dr. G. Broad (England) and part of Braconidae from J. Papp (Hungary). 2000 specimens of Braconidae were sent for identification to Dr. J. Papp (Budapest); ca. 300 specimens of Braconidae (Orgilinae and Agathidinae) - to Dr. A. Kotenko (Kiev), ca. 300 specimens of Ichneumonidae (Metopiinae) - to Dr. V. Tolkanitz, ca. 300 specimens of Eurytomidae - to Dr. M. Zerova (Kiev) and Eulophidae - to Dr. Z. Efremova. Ca. 30 species of Hymenoptera Parasitica were identified for the Plant Protection and Inspection Services, Ministry of Agriculture and for various scientists. All identified Braconidae (149 species) were arranged in the collection and a list of species was prepared. The list is attached (Appendix 3).

In addition to mentioned an abstract of the report "Biological Control of Olive fruit fly, *Bactrocera oleae* in Israel" (with Y. Argov and K. Holmer) on 5-th Meeting of the IOBC/wprs "Integrated Protection of Olive Crops", Jerusalem, Israel 15-20 May 2011 was published and two papers about thrips ("A Checklist of the Thrips (Thysanoptera) of Israel" and "A survey of Thrips (Thysanoptera) in the male inflorescences of *Phoenix* palms in Israel") (with R. zur Strassen, Germany) are ready for submittance to *Israel Journal of Entomology*.

Publication of the subfamilies Pimplinae and Xoridae (with Dr. D. Kasparyan, Russia) and arranging the collection of subfamily Banchinae were not made for reasons independent of the author.

Interim report on the partial revision of the genus *Cataglyphis* and the associated curation activity

Armin Ionescu

The primary function of taxonomy in biology is to describe, order and name species, such as to create the base of scientific communication (alpha-taxonomy). For this purpose is created a catalog of names and descriptions that enables the identification of species. In addition, identification keys are prepared for easy recognition of species by a wide range of biologists.

Although a fundamental feature of taxonomy is stability, in practice classifications and checklists are changing due to two main causes: (1) discovery of new species in newly collected material or during routine identification services, so that identification keys must be updated; (2) addition of new investigation tools, such as molecular technique. For example, the subfamilies Dolichoderinae and Formicinae of Israel were reviewed in 2009-2010, but the newly published checklist (Vonshak and Ionescu, 2010) has subsequently changed: *Bothriomyrmex* sp. was deleted after examination of additional material and a new tramp species, *Paratrechina flavipes* (F. Smith) was added. Therefore, alpha-taxonomy includes two main activities:

1. Continuous sorting of unidentified material.
2. Revisions.

Revisional work is hierarchical and the logic of the hierarchy imposes the order of the activities.

- For the ants of Israel the taxonomy must be updated after major world revisions.
- Addition of new taxa (new for the region or for science).
- Re-examination of the species relationships, especially after new techniques become available.

Interim report on the partial revision of 13 genera of Myrmicinae from Israel

In the submitted work plan for the period October 2010 – September 2011 I planned the review of the Myrmicinae genera *Bondroitia*, *Goniomma*, *Lophomyrmex*, *Monomorium*, *Myrmecina*, *Nesomyrmex*, *Oxyopomyrmex*, *Pyramica*, *Rhoptromyrmex*, *Solenopsis*, *Stenamma*, *Strongylognathus* and *Wasmannia*. In accordance with the plan and the additional recommendations of the "Va'ada melava", the objectives for a partial revision of the above listed taxa were:

- Until June 2011 the list of the revised species will be composed.
- Descriptions of species that are new for Israel will be prepared until September 2011.
- A key for the revised species will be prepared until September 2011.

To date all the specimens in TAUI belonging to the 13 genera were examined and reidentified according to the latest taxonomic publications. An updated checklist of the Israeli species was composed and published (Vonshak and Ionescu, 2010). Of the 44 species and subspecies in the list 5 are new records for Israel, as a result of re-identification of existing material; these new records are marked "aj" in Table 1 in Vonshak and Ionescu (2010). Since the publication of the checklist I examined and identified new material including that from two major pitfall-trapping projects (> 15000 specimens from > 1000 traps). As a result of the examination of this large sample of ants, species new to Israel were discovered, the zoogeography of the myrmecofauna of Israel is enhanced and the intra-specific variability of Israeli ants is better understood. Concerning the 13 studied genera, three taxa new for Israel, *Monomorium bicolor bicolor* Emery, *M. fezzanense* Collingwood and Agosti, and *M. nitidiventre* Emery, are added to the checklist which now has 47 entries.

Thirteen of the 44 taxa in Vonshak and Ionescu (2010) are recorded from zoogeographic regions of Israel from which they were not previously known (38 new records). The better knowledge of the distribution of ant species in

Israel enabled a preliminary study of the level of threat to the ant biodiversity of Israel. Two species, *Rhoptromyrmex schmitzi* (Forel) and *Strongylognathus palaestinensis* Menozzi, are already included in the IUCN Red-List.

Observations on the pattern of intra-specific variability across Israel suggest that taxa in four species complexes, *M. destructor*, *M. niloticum*, *M. subopacum* and *Solenopsis fugax*, are problematic and that their interrelationships cannot be resolved by morphology alone. Regarding the genus *Solenopsis*, I have worked out their morphometry and have sent specimens to R. Schulz and his coworkers at Senckenberg Museum who are investigating the taxonomy of the relevant species groups by a multitude of methods.

Keys for the identification of the species belonging to the 13 studied genera were prepared. From the pitfall-trapping projects about one third of the specimens were transferred into Eppendorf vials for easy cataloging and retrieval in future work. In addition to the listed taxa I identified four imported species that were intercepted by the customs authority and are presumably not established in Israel.

Managerial work in the Bee Collection: Annual report and working plan.

Dr. Moshe Guershon

The bee collection at the National Collections of Natural History contains ca. 30,000 specimens half of them determined comprising 1,300 species from approximately 90 genera. A big proportion of these species are represented by specimens from the Israeli fauna, but the collection also contains a good number of representative specimens from all over the world.

Managerial work focused on: technical arrangement, maintenance and scientific work, including macro-taxonomy of specific groups in the collection.

Taxonomy, Species list and identification keys: A first species list of the Israel bee fauna was accomplished (data from: TAU collection, work in progress at Dr. Y. Mandelik and Prof. A. Dafni labs, and literature) resulting in ca 1100 species in 76 genera. Since the available key included only 47 genera, a new preliminary identification key for of all reported genera (76) in Israel was created. 18 of these genera are represented by a single species in the local reported fauna, so the key facilitates recognition to the species level in those cases. Additional keys to the species level are being prepared, mainly for genera with few (2-4) species (already done: *Apis*, *Bombus*, *Cubitalia*, *Systropha*, *Tarsalia* and *Xylocopa*). The preparation of an interactive illustrated identification key for Israeli bee genera is being continued, a first version is almost finished.

Approximately 900 unsorted specimens were determined to genus level. 9 specimens of *Xylocopa ustulata* were determined within the material examined in the collection, 2 from Eilat and the rest from Sinai. This is the first record of this species from Israel and the discovery was added to the *Xylocopa* paper in preparation. Two additional specimens of *X. varentzowi* (2 specimens were found last year) were sorted from the collection.

Digitalization of collection data: Labels data of *Nomada* specimens in the collection started to be digitalized into the collection database.

Fauna surveys and collecting trips: 9 collecting trips were performed to the following sites: Zemah, east Kinneret and Park haYarden, Nahal Ktalav and the Sharon areas. The work included collection of wild bees, followed by their arrangement and determination to genus level in the lab.

Visiting scientists: Mr. Stephen Rich from Germany visited the Eucerini collection and Dr. Christophe Praz from Switzerland the Megachilidae collection. I joined both experts while determining unsorted material to species level in the collection. Both took additional material for further determination.

Specialization courses: I participated in the Bee Course given in Tucson Arizona, Directed by Dr. J. Rozen from the American Museum of Natural History (AMNH) in New York. In addition, I participated in the course Bees as Pollinators, given by Dr. Christophe Praz who was invited by the Israeli Taxonomy Initiative (ITI) at the Faculty of Agriculture, Rehovot).

Next year working plan:

To continue sorting unidentified specimens to the genus level and the digitalization of labels' data into the database (selected groups).

Submission of the article on the *Xylocopa* species of Israel.

Dr. John Ascher, from the AMNH, will be coming next spring (funded by the ITI) and hosted by me for a survey on the local Nomadinae fauna, extensive curatorial work in the collection and teaching a course on bee taxonomy and biogeography.

To promote contact with additional experts in the world that will accept material for determination.

Porifera and Bryozoa collections – Annual Report – 2011

Sigal Shefer

The objectives for the current year were:

1. Collection and field survey of the Porifera and Bryozoa community along the Mediterranean and Red sea coasts of Israel.
2. Identification of newly collected Poriferan and Bryozoan samples as well as samples present in the Collections of Natural History at Tel Aviv University.
3. Generating database of the Porifera and Bryozoa collections, physical organization, scientific documentation and taxonomic updating.

Efforts have been made to make a progress in all the above categories.

1. Collection and field survey the Porifera and Bryozoa community along the Mediterranean and Red sea coasts of Israel:

Bryozoa

For over 30 years there has not been a survey of the bryozoa fauna of Israel. This year, I have collected samples of bryozoans in Akhziv, Rosh-Haniqra and Sedot Yam.

Porifera

Samples were collected during eight excursions to the following sites (north to south): Akhziv and Rosh-Haniqra, Sedot-Yam, Hadera, Tel Arshaf (Herzliyya), and Elat. The samples from Tel Arshaf were collected from deep water habitat (100 m) using a remotely operated underwater vehicle (ROV).

As part of the effort to survey the sponge community of Israel, a proposal was submitted to the Israel Taxonomy Initiative (ITI) for biodiversity surveys entitled: "Understanding the Israeli Mediterranean demosponges diversity with a focus on the order Dictyoceratida", by Sigal Shefer, Tamar Feldstein, Ruthy Yahel, Dorothée Huchon and Micha Ilan.

In order to identify members of the Dictyoceratida order in our collection, subsamples of sponge species belonging to this order were taken from Tturnamal collection. This collection, located at the Hebrew University, is an important collection of Mediterranean and Red Sea sponges from the Israeli coast between the years 1960-1970. Two additional Dictyoceratid samples were sent to us from Spain. These samples are used for comparative study, as part of the Dictyoceratida survey along the Mediterranean coast.

2. Identification of newly collected Porifera and Bryozoa samples:

Bryozoa

Mrs. Noga Sokolover is attending to participate in a taxonomic training course (15th to 19th August 2011) taught by Professor John Ryland, a leading expert in bryozoan taxonomy. This course will enable Noga to identify samples from our collection. For molecular phylogeny, DNA was extracted from nine Bryozoa samples and will be followed by amplification of cox1.

Porifera

Sponge samples collected during the latest excursions are processed for morphological identification by histological analysis of skeleton structure, composition, and organization (spicules and fibers). Some samples belong to at least six orders were identified to species or genus level (e.g. *Cinachyrella levantinensis*, *Petrosia ficiformis*, *Phorbas fictitius*, *Axinella polypoides*, *Axinella verrucosa*, *Chondrosia reniformis*, *Chondrilla nucula*, *Agelas sp.*). Special effort was given mainly on collection and taxonomic identification (morphological and molecular) of species from the order Dictyoceratida, in order to obtain preliminary results for the ITI proposal. From the specimen collected in the various excursions, *Sarcotragus spinosulus* was identified and several species of the genus *Psammocinia* were collected and are now in the process of identification to the species level. Some of the samples were collected from depth of 85-100 m, which have not been studied before.

3. Physical organization, and scientific documentation of the Porifera and Bryozoa samples present in the Natural History Collections

Bryozoa

All samples present at the Bryozoa collections of Tel Aviv University are now available on a computer file. Protocols for the preservation of Bryozoa samples were implemented. Acid free paper was purchased for the storage of dry specimens as recommended by the British Natural History Museum (BNHM) experts. A decision was made to keep the existing bryozoa wet collection in the same physical condition.

Porifera

The sponge collection is going through an archiving process. This process included updating unaccepted scientific names, printing new labels and stickers and refresh ethanol in the jars. Some of the samples that are located at Prof. Micha Ilan's Lab were moved to the Porifera collection located in the zoological garden. The computerized database was enlarged in about 30% this year. I have inspected the Tsuramal collection mentioned above. I scanned the slides of all

the specimens that were taken by Tsumamal some 40 years ago and submitted a copy of the digitized archive to the collection in Jerusalem.

Molecular collections - Annual Report - 2011

Tamar Feldstein

Activity objectives for 2010-2011:

1. Collection and molecular identification of the Israeli sponge fauna, as part of the Israel Taxonomy Initiative.
2. Completion of the experiment, commenced in the previous year, on the impact of pitfall solutions and other preservatives on the DNA integrity.
3. To strengthen the collaboration with the Israel Nature and Parks Authorities, and with researchers using tissue samples from the collection, by presenting lists of best practices for the use and conservation of molecular samples.

1. Collection and molecular identification of the Israeli sponge fauna.

The survey of calcareous sponge in the frame of the Israeli Taxonomy Initiative research grant to Dr. Dorothee Huchon, was completed. Molecular analyses of 18S and ALG11 sequences were performed for representatives of the specimens collected. The present samples were compared to the Moshe Tsumamal collection from 1960's located at the Hebrew University. During this process I took digital photos of the entire calcarea collection, using a binocular. This digital archive was handed to the curator of the collection in Jerusalem. I presented the results of this research at the VIII World Sponge Conference (Girona 2010), an international conference that gathers experts of sponge ecology and evolution. I also presented these results at the 47th annual meeting of the Zoological Society of Israel, Jerusalem.

An ITI research proposal on Irciniid demosponges was resubmitted together with Dr. Sigal Shefer, Dr. Ruthy Yahel, Dr. Dorothee Huchon and Prof. Micha Ilan. In the revised proposal we presented preliminary results from an ongoing effort to sample and identify the demosponge fauna of Israel.

2. Impact of preservatives on DNA integrity

The first experiment to test the impact of pitfall solutions on DNA preservation was completed and summarized in a report. The results of this experiment showed a substantial impact of the solvent in the conservation of insect and mammalian samples. Surprisingly, insects and mammalian samples did not behave similarly. As a result, I conducted a second experiment to scan the impact of a wide spectrum of solutions on the preservation of DNA from mammalian tissue. The results of the second experiment are currently being processed. A publication presenting these results will be written in the next months.

3. Collaboration with the Israel Nature and Parks Authorities and research laboratories

In order to strengthen the collaboration with the Israel Nature and Parks Authorities (NPA), all the NPA rangers were introduced to the various collections of Tel-Aviv University. I presented them the significance of the molecular collections as a way to preserve information about the fauna of Israel, and how they may contribute to the collections. I instructed them how to efficiently collect tissue samples, and free sampling kits were distributed. As part of the collaboration with NPA, Dr. Ruthy Yahel, the NPA marine ecologist is a co-author on the ITI proposal on Israeli Demosponges.

The tissue collection has a policy for tissue loan for scientific purposes. As part of this attitude tissue samples of *Lutra lutra* were provided for a research conducted at the laboratory of Dr. Gila Kahila Bar-Gal, the Koret School of Veterinary Medicine.

Finally, I trained in molecular techniques a few students, which use museum samples. More specifically, I participated in the training of Ms. Maya Spivak who is studying the shrew fauna of Israel, and Ms Shevy Rothman who studies fish parasites.

Progress Report for the Paleontological Collection 2010-2011

Olga Orlov-Labkovsky and Henk K. Mienis

The Taxonomy and Biodiversity of the Upper Permian Foraminifera of Israel

During the past academic year Olga Orlov-Labkovsky continued to work on the project "Foraminifers and Algae of Permian and Triassic Age from borehole David 1, Israel: the Permo – Triassic (P/T) transition in the Coastal Plain of Israel ". While Olga is taking care of the Permian Foraminifera, Dr. D. Korngreen of the Geological Survey of Israel in Jerusalem is studying the Triassic Foraminifera.

For that project Olga prepared so far 75 working-plates showing Foraminifera, identified the various taxa, composed a species list and defined the boundary between the Permian-Triassic systems.

The preliminary results of this joint project have been presented by D. Korngreen at the XVII International Congress on the Carboniferous and Permian, held in Perth, Western Australia (3-8 July 2011). Two reports were presented: "Permo – Triassic (P/T) transition in the Coastal Plain of Israel (David 1 borehole, north Arabian Plate margin)" (an oral presentation) and "Foraminiferal biostratigraphy of the Permian succession in Israel – new data." (a poster presentation).

From 5-8 September 2011 an International conference: "Permian: Stratigraphy, Paleontology, Paleogeography, Geodynamics and Mineral Resources" devoted to the 170th anniversary of the inauguration of the Permian System was held in Perm, Russia. Olga presented a keynote (custom report): "Permian deposits and Foraminifera in Israel".

The stratigraphy and taxonomy of Carboniferous foraminifers

Olga took part in the work of the International Subcommittee on Carboniferous Stratigraphy (SCCS). The workshop and the meeting were

devoted to the *Global Boundary Stratotype Sections and Points (GBSSP) of the Carboniferous System*". It included field trips, which were held in Nanjing and Southern Guizhou, China, from November 21st - 30th 2010.

The seminar was devoted to reviewing and discussing the collections of foraminifera, mainly from the following stratigraphic intervals: Visian - Serpukhovian, Bashkirian - Moscovian, Lower and Upper Moscovian, Moscovian - Kasimovian. Several collections of foraminifera from sections in South China and Olga's collection of foraminifera from the transition Visian - Serpukhovian of the section Paltau (Koksu Range) were shown during the meeting.

The preparation of fossil material present in the Paleontological collection

Olga continued to work on thin-sections of Foraminifera from assemblages of the Visian, Serpukhovian, Bashkirian and Moscovian deposits of the Carboniferous system (Upper Paleozoic) in the Middle Tien-Shan (Central Asia, Uzbekistan and Kazakhstan), the organization of a database for the fossils, the description of taxa and the detailed documentation of taxonomic lineages.

Cyprus

Henk Mienis continued and finished his work on the molluscs from the last Inter-Glacial period dated to the MIS 5e isotopic stage, collected at 20 sites in Cyprus by Dr. E. Galili (Atlit) and Dr. M. Sevketoglu (International Cyprus University). Molluscs were not collected at two of the 22 coastal sites all around Cyprus studied by the two archaeologists.

The samples differed not only in size, but also in their state of preservation. Some contained well preserved shells which were easily to dislodge from the sediments, others yielded only the internal moulds and were impossible to separate from the sediment.

Altogether 168 different mollusc taxa were found in the 20 samples. However the number of taxa per sample differed considerably and ranged between 1 and

69. Altogether 369 samples could be added to the paleontological collection. The most interesting species among them were the guide fossil for the MIS 5e isotopic stage *Persististrombus latus* (among paleontologists better known by its junior synonym *Strombus bubonius*), and *Bursa granularis* and *Conus ermineus*. These three species are still living today along the coast of tropical West Africa and form a firm evidence that during the last Inter-Glacial period the water of the Mediterranean was considerably warmer than today.

A full report describing these 22 sites on Cyprus will appear in the proceedings of the "INQUA 501 Seventh Plenary Meeting and Field Trip" held in Odessa, Ukraine, 21-28 August 2011.

Lower Nahal Soreq Wetlands

Henk Mienis carried out a reconstruction of the land- and freshwater mollusc fauna of the wetlands of the Lower Nahal Soreq Valley. The following material was available for this study:

- Late Pleistocene and Holocene-Recent channel cleanings of Ta'alat Soreq in the agricultural fields of Kibbutz Palmahim, leg. H.K. Mienis, Spring 1988;
- Archaeomalacological material from an excavation carried out by E. Braun near Palmahim;
- Archaeomalacological material from the excavations of Yavne Yam carried out by M. Fischer;
- Archaeomalacological material from an excavation of Yavne Yam North carried out by M. Ajami and U. Ad;
- samples collected in Wadi Rubin (now Nahal Soreq) between 1920 and 1960 present in the Mollusc collections of the Hebrew University of Jerusalem (HUJ) and the Tel Aviv University (TAU);
- samples collected in the old ditches draining Sede Soreq by G. Gafni and H.K. Mienis, 1 January 1980;
- samples collected in the new drainage channels of Sede Soreq by H.K. Mienis, spring 1988.

The studied material contained 37 different taxa: 17 species of freshwater snails, 12 species of terrestrial snails and 8 species of freshwater bivalves.

The cleanings from Ta'alat Soreq (in Sede Soreq) yielded the highest diversity: 31 species, including *Acroloxus lacustris*, *Biomphalaria alexandrina* (the intermediate host of *Schistosoma mansoni*), *Carychium tridentatum*, *Vertigo antivertigo*, *Vallonia enniensis*, *Vallonia pulchella*, *Euconulus fulvus* and *Pisidium milium*, all species which are now extinct in Israel. While in 1980 still 12 species (including 9 aquatic ones) were found alive in and around the old drainage ditches of Sede Soreq, this number was reduced to only 8 species (including only one aquatic species!) in 1988. The only freshwater mollusc found still alive in the channels was *Haitia acuta*, an invasive species from North-America!

The full report dealing with the reconstruction of the mollusc fauna of the Lower Nahal Soreq Valley is currently in print in the Archaeo+Malacology Group Newsletter.

The fossil material has been lodged in the Paleontological Collection of the TAU, most of the recent material in the Mollusc Collection of the TAU.

New acquisitions

The following new material has been donated to the Paleontological Collection:

- E. Galili Pleistocene molluscs from Cyprus
- A. Israeli Pleistocene (Eemian) molluscs from Terschelling, the Netherlands
- Y. Katz Various fossils from Ukraine
- H.K. Mienis Pleistocene-Holocene molluscs from the Lower Nahal Soreq Valley and Pleistocene (Eemian) molluscs from Terschelling, the Netherlands
- O. Orlov-Labkovsky -Foraminifera (slides): Visean-Serpukhovian transition (Carboniferous) from Ispay section, Pskem Range, Uzbekistan;

-Foraminifera (samples), Bashkirian/Moscovian, Zongdi section (Ziyun) of Guizhou Province of South China (interval 90M – with *Eofusulina* and *Profusulinella*, interval 120M - with *Fusulinella*, interval 136M – with *Fusulinella*;
-Foraminifera and Coral (samples), Visean/Serpukhovian, Yashui section (Huishui) of Guizhou Province of South China (interval 30M – with *Janischewskina typical*, interval 49M with *Rugosa sp.*

INPA Various fossils from Sinai, Egypt confiscated at the border crossing between Egypt and Israel near Taba

Progress Report: Morphology of *Vipera palaestinae* in Israel; intraspecific variability and sexual dimorphism.

Stanislav Volynchik

My paper headed "Morphology of *Vipera palaestinae*; intraspecific variability and sexual dimorphism" was accepted for publication in Russian Journal of Herpetology. The purpose of this study is to fill a gap in scientific knowledge on the external morphology, and investigate a question of sexual dimorphism of this snake. In this paper, for the first time, the recently obtained data on the morphology of *V. palaestinae*, based on an analysis of a very large sample, collected during the last decades in different sites of Israel, are published. Here I present new data on intraspecific variations in external morphology and sexual dimorphism in different characteristics of Vipers, *V. palaestinae* in Israel. Corporal proportions and scalation pattern of museum specimens of this snake, the most common *viperid* species in Israel, were recorded and analyzed.

In total I examined 335 (191 males and 144 females) preserved specimens with a total length >700 mm of *V. palaestinae* from the Zoological Museum of the Department of Zoology, Faculty of Life Sciences, Tel Aviv University.

Specimens from 15 zoogeographical areas of Israel were collected during the years 1947-2010, and deposited in the Natural History Collections of Tel Aviv University. ***The obtained material covered the entire range of distribution of the species in Israel.*** Altogether, 26 metric, meristic and qualitative characters describing morphological dimensions, scalation pattern and corporal ratios were recorded.

A brief conclusions of my research: Strong sexual dimorphism was found in tail measurements (its relative length, and number of subcaudal scales), head proportions and in the number of ventral scales. The sexual differences were evident in the head scalation – females have significantly more supralabial and sublabial scales; males, in turn exceed females in circumorbital scale counts. There is no sexual size dimorphism (SSD) in either body weight, in snout-vent or in total length.

The sexes display a similar allometry between SVL / head and SVL / tail length ratios; between tail length and the number of subcaudal scales. There is no correlation between SVL and the number of ventral or dorsal scales. The morphological features caused by reproduction requirements is well registered and was evident in relating to tail measurements and body scalation, although the possible causes and selective forces of the pholidosis intersexual distinctions can be cleared up through future ecological studies.

Overall, males and females of *V. palaestinae* are similar in many respects of their corporal (except tail) measurements, in scalation pattern different degree of intraspecific variability and sexual dimorphism was recorded among all head, body and tail scale counts, despite this sexes demonstrate analogous ratios between major metric and meristic traits. The results indicate the resemblance of sexes in most of their external morphological aspects, except the reproduction-induced differences, reflecting the absence of pronounced ecological divergence between males and females of *Vipera palaestinae*.

Progress Report for the Mollusc Collection 2010-2011

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

Research

During the academic year 2010/11 several taxonomic research projects have been carried out in the Mollusc Collection.

Further studies of molluscs from the Red Sea have led to the description of a new genus *Yaronia* Mienis, 2011 with *Collonia gestroi* Caramagna, 1888 as the type-species. The genus name is honouring the late Dr. Isaac (Jitzchak) Yaron (1934-1985), whose fine mollusc collection from the Red Sea forms an important part of the mollusc collection of the Tel Aviv University.

A Venerid bivalve species from the Red Sea with an enigmatic exterior covered by a firm layer of sand grains including three tubular pseudo-ribs was described as *Samarangia lewinsohni* Mienis, 2011 in honour of the late Dr. Chanan Lewinsohn (1926-1983), who carried out extensive dredging operations in the Gulf of Aqaba during the sixties and seventies of the 20th Century.

The ongoing study of the genus *Xerocrassa* has led to the recognition of a new subspecies, which has been described subsequently as *Xerocrassa simulata lothari* Mienis, 2011. The name is honouring the late Dr. Lothar Forcart (1902-1990), who made an intensive study of the land snails of Israel and even submitted an impressive manuscript on that subject to the Israel Academy of Sciences and Humanities. Unfortunately after a delay of more than 20 years it was decided by the "Fauna Palaestina Committee" not to publish the manuscript. A copy of this unpublished manuscript is present in the Mollusc Collection of the Tel Aviv University. The new subspecies is restricted in its distribution to kurkar outcrops of the two eastern kurkar ridges in the southern Shefela between Nahal Soreq in the north and more-or-less the road Ashqelon-Qiriyat Gat in the south.

The presence of far too many invasive species among the land- and freshwater molluscs of Israel remains a subject of serious concern. The tropical invasive species *Thiara scabra* (Müller, 1774) is enlarging its distribution rapidly and has established now also viable populations in the National Water Carrier and in several coastal streams.

A new invasive gastropod *Pyrgophorus* species is also rapidly establishing populations in Israel. The genus *Pyrgophorus* is confined in its distribution to the New World where it lives in the coastal streams of the southern United States, Central America, northern South America and several islands in the Caribbean Sea. How *Pyrgophorus* arrived in Israel has remained so far a riddle.

New material, identification and computerization

The research project dealing with "The impact of biological invasions and climatic change on the biodiversity of the Mediterranean Sea", carried out by Dr. M. Goren and Dr. B.S. Galil, has produced also this year numerous samples of cephalopods. For the first time four specimens of the Horned or Curled octopus *Eledone cirrhosa* (Lamarck, 1798) has been caught off the Mediterranean coast of Israel. *Chromodoris annulata* Eliot, 1904 is a Lessepsian migrant new for the Mediterranean fauna of Israel. It was already known from Turkey and Cyprus.

Also this year we identified large numbers of littoral Limpet-like gastropods, which had been collected by Dr. E. Shefer (Israel Oceanographic & Limnological Research Institute, Haifa) 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* (Gmelin, 1791) and *Siphonaria crenata* Blainville, 1827.

Mrs. S. Vaisman brought us for identification some 20 samples of land snails intercepted by inspectors from the Plant Protection & Inspection Services of the

Ministry of Agriculture., which were found on imported and exported agricultural and horticultural merchandise. Mrs. Vaisman is a regular visitor of the mollusc collection in order to become more acquainted with the land- and freshwater molluscs of Israel, with special emphasis on the economically important species among them

New material was also regularly received from colleagues and friends in Israel and abroad (see new acquisitions).

Between all these various activities we have maintained our focus on the incorporation of the very large collection of Zvi Orlin into the general Mollusc Collection. More than 5500 samples have now been registered and properly labelled, but it will take still some time till we finish the job. The identifications are being carried out by Henk Mienis and Oz Rittner while the latter is also dealing with the computerization and labelling of the material.

At the moment 54031 samples representing 8167 taxa in the mollusc collection have been computerized. The majority of the new species and subspecies which we could add this year to the collection were from the Zvi Orlin collection.

Cooperation with the Nature Reserves and National Parks Authority

During the past academic year the cooperation with the Israel Nature and Parks Authority (INPA) has been rather intensified.

Numerous meetings took place between Dr. Dana Milstein, Henk Mienis and Oz Rittner concerning the publication of an illustrated guide dealing with a large selection of the freshwater molluscs of Israel. The target group for this guide consists of the rangers of the INPA, but also other parties have already shown interest in this project.

The intensive cooperation with the INPA has also led to a joint investigation of the freshwater mollusc fauna of a number of streams on the Golan Heights (16-17 May 2011) and Biqat Bet Zayda (12 September 2011).

Also this year rangers of the INPA confiscated a large shipment of illegally imported shell material. This time the shells were of collection quality from the Philippines including very nice specimens of *Lyncina aurantium*, *Mauritia mappa*, *Cassis cornuta*, *Epitonium scalare*, huge shells of *Chicoreus ramosus*, *Murex pecten*, *Siratus alabaster*, *Conus suratensis* and *Nautilus pompilius*.

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 are immediately identified and prepared for permanent storage.

During the academic year 2010/2011 material has been received directly or indirectly from the following persons:

<u>Name</u>	<u>Brief description of the material</u>
D. Abelist	Marine molluscs from the Mediterranean of Israel
M. Alpert	Land snails from Israel
P. Amitai	Land snails from Israel
R. Bank	Brackish water molluscs from the Netherlands
F. Ben-Ami	Land- and freshwater molluscs from Israel
I. Ben-Ari	Land snails from Israel
A. Ben-Dov Segal	Land snails from Israel
R. Ben-David Zaslow	Land snails from Israel
O. Ben-Yehuda	Land snails from Israel
M. Blecher	Land and freshwater molluscs from Israel
R.A. Brandt	Land snails from Lybia and Egypt
S. Dar	Land snails from Israel
B. Dharma	Neritidae and Physidae from Indonesia
A. Dotan	Marine molluscs from the Mediterranean off Israel
M. Fainzilber	Freshwater molluscs from Lake Tanganyika
B. Galil	Marine molluscs from the Mediterranean off Israel
E. Galili	Marine molluscs from the Mediterranean Sea and fossil marine shells from Cyprus
A. Gasith	Inland molluscs from Israel
L. Gavish	Land snails from Israel
J. Gerritzen	Land snails from Israel
G. Goodfriend	Land snails from Israel
H. Heinemann	Marine molluscs from Saudi-Arabia, Mauritius, South Africa and Croatia

E.L. Heiman	Land snails from Israel
Y. Hershkovitz	Freshwater molluscs from Israel
S. Ilan	Land- and freshwater molluscs from Israel
A. Israeli	Molluscs from the Netherlands
D. Kestin	Freshwater molluscs from Israel
O. Kolodny	Land snails from Israel, France, Italy and Switzerland
Y. Krotman	Freshwater molluscs from Israel
G. Lindner	Land snails from Crete
L. Meerema	Land snails of the Netherlands
H.K. Mienis	Land, freshwater and marine molluscs world-wide
D. Mienis	Land- and freshwater molluscs from Israel and the Netherlands
D. Milstein	Freshwater molluscs from Israel
J. Orr	Land snails from Cyprus
R. Ortal	Land snails from Italy, Malta and Cyprus; marine molluscs from Cyprus
S. Raz	Land snails Evolution Canyon I
O. Rittner	Land- and freshwater snails from Israel
P.M. Sammut	Land snails from Greece
Ch. Schmidt	Land- and freshwater molluscs from Turkey
A. Sepiol	Land snails from Poland
E. Shefer	Marine molluscs Mediterranean coast of Israel
S. Shefer	Marine molluscs Mediterranean coast of Israel
A. Shoshani	Freshwater molluscs from Israel
S.B. Singer	Marine snails from South Africa
M. Symonds	Neritidae from Malaysia
E. Tchernov	Freshwater snails from Israel
S. Vaisman	Land- and freshwater molluscs intercepted by PPIS
J. Wahrman	Land snails from Israel and Cyprus
D. Wegmeister	Land- and freshwater molluscs from Israel
H. Zinner	Land snails from Israel
D. Zurel	Marine molluscs from the Mediterranean coast of Israel

Type Material

Type material of the following two recently described taxa have been lodged in the collection: *Samarangia lewinsohni* Mienis, 2011 and *Xerocrassa simulata lothari* Mienis, 2011. A list of type specimens present in the Mollusc Collection has been published in previous reports (Mienis, 2010 & 2011). A collation of additional type specimens located in the collection or received afterwards is given elsewhere in this report.

The Malacological library

For the library of the Mollusc Collection, a most important tool for taxonomic and systematic studies, we received some additional titles. This year we received again numerous journals from Zoological Institutes or Malacological Societies in exchange of "Triton", the malacological journal published by the Israel Malacological Society.

SECOND ADDITION TO THE CATALOGUE OF TYPE SPECIMENS IN THE MOLLUSC COLLECTION OF THE TEL AVIV UNIVERSITY

Henk K. Mienis

Type material of nine taxa is added to the provisional lists of type specimens present in the Mollusc Collection of the Tel Aviv University (Mienis, 2010 & 2011). Two taxa were recently described as new to science from material already present in the Mollusc Collection, the seven additional type samples are from the former shell collection of the author.

GASTROPODA

Family Clausiliidae

Alopi (*Alopi*) *valachiensis zagani* Szekeres, 1969

Paratypes TAU MO 73661/2: Rumania, Ciucaş Massif (Bodzaer Mountains), western side of the mountain Zăgan, above Valea Gropşoara, ± 1700 m height, 3 km NE Cheia.

Family Cerionidae

Cerion alberti Clench & Aguayo, 1949

Paratypes TAU MO 73662/2: Cuba, the "El Fuerte" cape, entrance of the Banes Bay, Ramon Antilla peninsula.

Cerion huntingtoni Clench, 1938

Paratypes TAU MO 73663/3: Bahamas, Columbus Point, SE-tip of Cat Island.

Cerion (Strophlops) malonei Clench, 1937

Paratypes TAU MO 74664/3: Bahamas, Long Island, 3½ miles SE of Simms.

Cerion (Strophlops) paucicostatum Clench, 1934

Paratypes TAU MO 73665/3: Bahamas, South Eleuthera, Miller's Hill.

Remarks: Clench (1952: 108) renamed this species *Cerion mossi*, because *Cerion paucicostatum* Clench, 1938 turned out to be a junior homonym of *Cerion paucicostatum* de la Torre, 1929.

Cerion paucicostatum indianorum Clench, 1934

Paratypes TAU MO 73666/4: Bahamas, South Eleuthera, Wemyss Bight.

Cerion piraticus Clench, 1937

Paratypes TAU MO 73667/3: Bahamas, East end of Mariguana, Valsey Wells.

Family Hygromiidae

Xerocrassa simulata lothari Mienis, 2011

Holotype TAU MO 72626: Israel, kurkarhill between Azriqam and Be'er Toviyya.

Paratypes TAU MO 72632/41 & 72629/60: Israel, kurkarhill between Azriqam and Be'er Toviyya.

BIVALVIA

Family Veneridae

Samarangia lewinsohni Mienis, 2011

Holotype TAU MO 72642: Israel, Elat, off Coral Beach Reserve, 30 m.

Paratypes: TAU MO 72641/1: Israel, Elat, off Coral Beach Reserve, 40-50 m;

TAU MO 72643/1: Israel, Elat, off Coral Beach Reserve, 25 m; TAU MO

60390/1: Israel, Elat, off Coral Beach Reserve, 20 m.

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ON THE DETERIORATION OF ZOOLOGICAL COLLECTIONS

During his extended stay at the Tel Aviv University Dr. David Furth (Department of Entomology, Smithsonian Institution Washington D.C.) presented a talk about causes of deterioration of zoological collections. He mentioned briefly the occurrence of Byne's "Disease" in mollusc collections. Since this item is hardly known among the staff of the Steinhardt National Collections of Natural History some more background information is given on that subject because it affects also our mollusc collection and it asks for attention when we will move to the new collection housings in the near future.

Byne's "Disease" in the Shell Collection

Henk K. Mienis

It is the general opinion that nothing special is needed in order to keep a shell collection. For example a small private collection can be stored in a couple of carton boxes, a larger one in a nice cupboard with a number of drawers. But nothing is less true. Especially with sea shells strange things can happen. This for example occurred with George Byne, an amateur shell collector from England, who noticed that his precious shells started to show dull white areas on the exterior and in some cases they looked as if these spots were covered with a fine white powder. On further inspection he noted that something was "eating" his shells and he assumed that "a bacillus" or bacteria was the culprit. He described his observations in the "Journal of Conchology" (Byne, 1899). Similar cases of deterioration were also noticed in other shell collections and soon many others complained of Byne's disease effecting their shell collection.

It took some time till chemists discovered that the corrosion of the shells was not caused by a disease, but by a chemical reaction. They showed that the shell's calcium carbonate (CaCO_3), the basic component of shells, under influence of acidic vapours will turn slowly but steadily into calcium acetate, which shows up as crystallized salts (the white powder!) on the exterior of the shells (Nicholls, 1934) i.e. it is a chemical and physical breakdown that may look like a mould growth, but is in fact an efflorescence or breakout of salts (Tennant & Baird, 1985; Shelton, 1996 & 2008).

Where do these acidic vapours come from?

These acidic vapours are produced by the material used for preserving the shells! This sounds a little bit strange but it is unfortunately the truth. That tiny piece of paper used as a label, the carton box serving as a protective container, the cotton plug or natural cork sealing the glass vial and especially that precious wooden shell cabinet, all these items produce acidic vapours. When these vapours react with atmospheric water then usually acetic acid or formic acid is

formed and when these tiny droplets come into contact with shells then the breakdown of even the most robust shell starts.

Museums containing old collection cabinets made of oak were the first to get rid of those often beautiful cupboards, because that type of wood is known as being rather acid (Nicholls, 1934). Today such cupboards are still rarely made for collection purposes. Most modern cupboards are made of multiplex, plywood, fiberboard, etc., all derived wood products which have been treated with formaldehyde, itself an acid, which is slowly but steadily released in the drawers. Therefore these new types of cabinets are sometimes even more harmful for storing shells than the antique hardwood ones (de Prins, 2005, Sturm, 2006).

What is the situation in our shell collection?

When I started working in the shell collection in 1999 the dry and the wet shell collection were kept in the same room. A rather bad situation because all the glass vials were constantly producing vapours from either "alcohol" or formalin. Fortunately within a few weeks the wet shell collection was moved to the wet invertebrate collection and the paleontological-geological collection of the late Prof. H. Bytinski-Salz got a place in the same room of the dry mollusc collection. That together with the installation of air-conditioners has reduced the humidity in the collection room considerably.

However the old local collection of the university, which had been kept during the last years of its presence at Abu Kabir in a rather humid cellar before it was moved to Ramat Aviv, had already attracted Byne's "disease"/Bynesian Decay as did the Visker-collection of which the shell material had arrived in a perfect condition from the Netherlands in 1969.

In the late nineties the university received the collections from A. Hadar and V. (H.) Treves. These private collections, which had also been kept under rather humid conditions in wooden cupboards in Tel Aviv, contained very nice

specimens but some of them, especially among the Cypraeidae and Volutidae, suffered considerable from Byne's "disease" (Plate 1).

What can be done to curb the symptoms of Byne's "disease"?

As soon as a shell shows the first signs of Byne's "disease" for which also the term Bynesian Decay exists (Sturm, 2006), it should be cleaned thoroughly with water. That is not so difficult because the salty powder on the shell is soluble in water. The second step is to change after some time the water and to leave the shell for another 24 hours in fresh water. The next step is to dry the exterior and the interior of the shell completely. This can take severely days.

Although in several articles (de Prins, 2005; Sturm, 2006) the advice is given to oil the affected areas of the shell in order to restore at least some of the original colour (the gloss has been lost forever), the most up to date advices rule out the oily method (Shelton, 2008).

After we have cleaned the shell, it is possible to return the shell to the collection, because this type of shell corrosion is not contagious. It even happens that in a certain sample consisting of 3-4 shells only one shell shows signs of Byne's "disease" while the others remain in perfect condition. However before returning the shell the most important thing is to pinpoint the cause of this type of deterioration.

What happens with affected shells if they are not being treated?

If shells affected by Byne's "disease" remain untreated in the collection then the corrosion develops to such a stage that holes start to appear in the shell. In extreme cases the entire shells may turn into a white powder i.e. in salt crystals consisting of calcium acetate. This is not a story written by Hans Christian Andersen or the Grimm Brothers, but pure reality. It has happened in Jerusalem with fragments of a large freshwater mussel from the Nile: *Chambardia rubens arcuata*, found during the excavations of Tel Gezer. These fragments were stored in wide glass vials closed by cotton plugs. When I saw them for the first time they were partly disintegrated, however, 10 years later only a white

powder was present in the vials. In several European museums they have found under similar circumstances glass vials containing white powder instead of the type specimens of certain species which should have been in those tubes!

Are we using the correct method for preserving the dry shells?

The first step in a good direction has been taken. At this moment all the smaller samples are locked in so-called Ziplock polyethylene bags. They have turned out to be harmless. Polystyrene in solid form (transparent boxes in all sizes) is also harmless. This cannot be said of PVC boxes and bags, because that type of plastic releases chloride after some time (de Prins, 2005), which will have a negative effect on the shells. Also the second step has been carried out: all labels are now printed on acid free i.e. archival paper. The current air-conditioners are also a step in the right direction, however the future collection room should be one with a fully climate controlled environment.

Not solved at the moment is the housing of the entire dry mollusc collection: we are still using wooden cupboards for it. We hope that steel cabinets will become available for the collection as soon as we will move to the new building, which will house the Steinhardt National Collections of Natural History.

Additional warning

Byne's "disease" is not restricted to shell collections. Egg shells can show the same kind of degradation (Agnew, 1981), while it may also occur in bones, fossils and corals containing large amounts of calcium carbonates. Check your collections for the presence of such deteriorations before it is too late!

Acknowledgement

I like to thank my colleague and friend Oz Rittner for the beautiful plate illustrating this report.



Plate 1: Examples of Byne's "disease" in the Mollusc Collection. Figs. 1-7. At left an affected and right an unaffected specimen. 1. *Lyncina argus* (Linnaeus, 1758), 2. *Cypraea tigris* Linnaeus, 1758, 3. *Lyncina vitellus* (Linnaeus, 1758), 4. *Cymbiola vesperilio* (Linnaeus, 1758), 5. *Harpulina lapponica* (Linnaeus, 1767), 6. *Lyria mitraeformis* (Lamarck, 1811), 7. *Amoria damonii* Gray, 1864, 8. Close up of the aperture of *Lyncina argus* (Linnaeus, 1758).

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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

Amnon Freidberg

Collecting trip to Africa

Between 12 January and 14 February, 2011 I conducted a collecting trip in Africa, focusing on Benin and Togo (West Africa), Burundi (Central Africa) and Kenya (East Africa). About ten days were devoted to work at two insect collections (the one in IITA, Benin, and a second one in ICIPE, Nairobi). The fruitfly collections in these institutes comprise some important specimens for my on-going studies, and I have borrowed some of them.

Most of the time was devoted to collecting, including long-distance and time-consuming travel. In Benin I spent four such days, and in Togo, which I reached by driving from Benin, I spent five days. Collecting in Benin was only moderately good, as the terrain around the capitol, Cotonou, is low, flat and was very dry in that season. In Togo we drove to the relatively low Kloto Mts., which proved to be good for insect collection, including fruit flies and weevils.

In Burundi we (I was joined by four Italian colleagues who together covered in their expertise wasps, beetles and flies) spent nine days mostly traveling widely around this small and hilly country. Some habitats, especially in agricultural areas, proved to be rather sterile, whereas some more natural areas, especially Kibira Forest and National Park in the north, proved to be very rich for both

flies and beetles. This part of the trip was conducted in cooperation with INECN (*Institut National pour l'Environnement et la Conservation de la Nature*), Burundi, who provided us with vehicles, drivers and guidance. In return we provided some of their staff members with a quick course on the insect groups which we were interested in.

From Burundi we flew back to Kenya, where I stayed about ten more days. Together with my Italia colleagues I made a quick excursion of four days to Kakamega Forest (in western Kenya), a site that will never disappoint you. After their departure, I spent several more days working on the ICIPE collection and collecting on the slope of Mt. Kenya and in Karura Forest, Nairobi.

All the material (a TOTAL of about 10000 specimens) is already mounted and labeled, and it comprises the following orders: Diptera 6500; Coleoptera 1500; Hymenoptera 800; Heteroptera 1000; other orders 200.

Collecting in Israel (Primarily as part of ITI projects)

During the 2010-2011 fiscal year, AF together with other entomologists, primarily the master students, Elizabeth (Liz) Morgulis and Levona Bodner, conducted a survey of tephritoid flies, during which many such flies as well as numerous other specimens were collected. This team, often accompanied by other entomologists spent about 25 days in the field, and although the collected specimens have not been counted, my estimate is an addition of 5000-8000 specimens to the collection.

The ITI-funded survey of freshwater snails

Frida Ben-Ami

The ITI-funded survey of freshwater snails and their parasites aims at (i) identifying freshwater-snail-infecting parasites in Israel using comparative morphology and molecular techniques, and (ii) surveying both indigenous and introduced freshwater gastropods. It is partly driven by the invasion and establishment in Israel of two freshwater snails, *Tarebia granifera* and *Thiara scabra*, which may serve as intermediate hosts of parasitic trematodes that cause diseases in humans and livestock, as well as by the recent emergence in several fish farms in the Beit She'an Valley of a trematode previously found in an aquarium harboring tropical fish. Parasites play a vital role in the maintenance and regulation of biodiversity, both through their hosts and via other free living species that rely on these hosts. Invading parasites and the infectious diseases they transmit have also become a major threat to wildlife conservation and endangered species, by influencing host genetic diversity and altering species composition. Although comprehensive databases of indigenous and non-indigenous freshwater gastropods of Israel have been compiled recently, knowledge of their parasites and how they interact with native vs. introduced snails is still lagging behind. This lack of knowledge stands in striking contrast with important public health and agricultural implications of snail-infecting parasites in freshwater bodies in Israel, because adult stages of many trematodes are non-fastidious in their choice of definitive hosts. Introduced gastropods can aggravate the situation either by transmitting invasive pathogens or through increased resistance to native parasites which allows them to outcompete native snails. Ultimately this study will serve as a basis for future research in conservation biology that may improve our current understanding of the players affecting freshwater gastropod fauna in Israel and assist in developing effective eradication and containment schemes to the benefit of agriculture and public health.

Activity report: October 2011

Yehuda Benayahu

1. Comprehensive collection of soft corals was conducted by Y. B. in Dongsha Atoll Taiwan, during July 2011. Ca 200 samples were collected in various sites and habitats there. This trip was an additional survey in Taiwan, following five previous ones, conducted in an attempt to investigate the soft coral biodiversity in the region and to characterize the faunistic differences between sites. This has been the first ever conducted soft coral survey in Dongsha Atoll, where my visit has been the first of a non-Taiwanese researcher there.

2. During my summer sabbatical in NCB Naturalis, Leiden he Netherlands (August-September, 2011) soft coral material from La Reunion and Penghu Taiwan, all deposited at TAU, was investigated. The study yielded three new species. The results of these studies will be published later, during 2012. During this visit to Leiden the validity of *Sinularia leptocladus* (Ehrenberg, 1834), a common Indo-Pacific soft coral (Family Alcyoniidae) has been confirmed by detailed examination the type specimen. This study also led to re-examination of related material from the Red Sea and from numerous sites across the Indo-Pacific, in their greatest part deposited at ZMTAU. The results yielded several new *Sinularia* species, including the northern Red Sea and reassignment of a variety of samples of the genus. The findings of this study will be compiled into several publications.

3. Further collection of Xeniidae soft corals has been conducted in Eilat (~50 samples). The material was identified and compared to type material. Several respective types were re-described using scanning electron microscopy and consequently re-assigned to the correct genus *Ovabunda* instead of *Xenia*). The Xeniidae collection of the HUJ was identified and deposited back there.

Benthic biodiversity surveys off the Mediterranean coast of Israel

Bella S. Galil

In 2011 ten campaigns was conducted off the Mediterranean coast of Israel in order to sample the benthic biota. Bella Galil, Eva Mizrahi, Orly Bessudo, Andrea Alevi, Adva Shalev, Noami Ben Shushan, Nadav Kallenberg, Matan Oren, participated in the cruises that took place aboard the R/V Shikmona and Etziona of the National Oceanographic Institute, IOLR.

The surveys were conducted as part of baseline studies or monitoring surveys (off Palmahim, 05.2011, 09.2011, 34-37m depth, box core and trawl samples; off Ashdod, 05.2011, 08.2011, 09.2011, 6-30m depth, grab samples and trawl samples; off the coastal streams, 08.2011, 7-15 m depth, grab samples; Haifa Bay 05.2011, 9.2011, 5-18m depth, Offshore 07.2011 1264-1325 m). The macrofaunal samples –several hundred specimens – include rare records for the Israeli coast and new records of alien species (in press).

The material is housed in the Natural History Collections, Department of Zoology, Tel Aviv University, Israel.

Ichthyological Laboratory

Menachem Goren

As part of the ongoing study on the impact of sea warming and the continuous invasion of Red Sea species into the Mediterranean, we have conducted six research cruises off the coast of Ashdod, using the fishing vessel Motty (a trawler), captained by Mr. Levy Ornoy.

We are currently focusing on examining the relationship between the gradient of water depth and structure of the marine community, and the role that the invasive species play at the different depths. We sampled the biota at depths of 20, 40, 60, 80,100,120, 250 and 400 m, and found significant differences in

their composition at the different depths. The material was brought to the ichthyological laboratory where it was sorted, identified, measured and examined. Some species were studied for stomach content and reproductive stage. Part of the catch has been preserved and deposited in the fish and invertebrate sections of the National Collections. Preliminary findings reveal that over the last three years the alien species have extended their distribution to deeper waters. We intend to continue this research to the end of 2011.

New records for the Israeli coast of the Mediterranean (reported last year)



Chaetodon austriacus (TAU – P. 14384). Picture: Oz Rittner.



Champsoodon nudivittis (TAU – P. 14329). Picture: Oz Rittner.

Malacological field work in Israel and the Netherlands

Henk K. Mienis

Field work in Israel

During the academic year 2010-2011 two fieldtrips have been carried out to the Golan Heights in cooperation with the Israel Nature and Parks Protection Authority. The first took place on 16-17 May 2011 and the second on 12 September 2011. On 16-17 May 2011 the mollusc fauna of 11 aquatic biotopes have been surveyed by Dana Milstein and Avi Uzan, both of the INPPA, and Revital Ben-David, Oz Rittner and Henk Mienis of the TAU. The aquatic biotopes were located at:

- Upper Daliyot, a large pond-like aquatic biotope south of the road;
- Nahal Fachura, east of the road;
- Nahal Zavitan;
- Lower Nahal Meshushim, under the bridge;
- En Eucalyptus;
- Nahal Gamla, near Yonatan;
- Upper Gilbon;
- Lower Gilbon;
- En Gilbon (Officer's Pool);
- Tanouriya;
- En Facham.

In the streams *Theodoxus michonii* and *Melanopsis buccinoidea* were the dominant species, although *Theodoxus* was not present at all the localities. In Nahal Meshushim to additional riverine species were encountered: *Globuliana gaillardotii* and *Valvata saulcyi*. At quiet places in the streams with among others stands of *Typha* and a rich submerged vegetation the endemic *Gyraulus heliciformis* was encountered rather commonly, often accompanied by *Ferrissia clessiniana*. The latter is a small limpet-like species originally from the river Nile, which started to appear for the first time in Israel towards 1960. It is still behaving like an invasive species, although it arrived most probably in Israel in a natural way by means of a form of aerial distribution (hitchhiking on the elytra of aquatic beetles or other large insects) and occurs locally in very dense

populations. The richest locality turned out to be the Tanouriya stream: a combination of a broad shallow stream with running water in the middle and numerous areas with a lush aquatic vegetation or quiet patches with a muddy bottom along the sides. Seven different species were encountered at that locality. Two species of tiny Pea mussels (*Pisidium*) were encountered in such muddy habitats. To our dismay *Pseudosuccinea columella* (Say, 1817) was the only gastropod species encountered in the large pond-like aquatic biotope south of the road in the upper stretch of the Daliyot stream. This snail is an invasive species of North American origin and a well-known intermediate host of the liver flukes *Fasciola hepatica* and *Fasciola gigantica*. Also one of the local Lymnaeids encountered during this survey: *Galba truncatula*, is a known intermediate host of *Fasciola hepatica*.

On 12 September 2011 fieldwork was carried out near Majrassa by Dana Milstein and Avi Uzan of the INPPA, and Henk K. Mienis, Oz Rittner and Zohar Yanai of the TAU. Four localities were surveyed close to the Sea of Galilee:

- Upper Zaki;
- Lower Zaki;
- Lower Meshushim;
- Majrassa.

The lower reaches of these Golan streams turned out to be much richer than the upper ones: not less than 15 different species could be recorded. These included living specimens of two bivalve species: *Unio terminalis* and *Corbicula fluminalis*. Unfortunately the invasive tropical freshwater gastropod *Thiara scabra* has managed to get a foothold in the lower part of the Zaki and in the Majrassa. At the latter locality numerous very large colourful specimens were encountered with tiny spines on the shoulders. In the shallow water rich in submerged aquatic plants or on the nearby wet banks four species belonging to the Lymnaeidae were found: *Galba truncatula*, *Radix auricularia virginea*, *Radix natalensis* and *Stagnicola palustris*.

Fieldwork in the Netherlands

In the spring and autumn of 2011 I visited again my native the Netherlands. During the periods 9-16 April and 24 September – 20 October malacological fieldwork has been carried out in the provinces North-Holland and Friesland. I got the aid of my grandson Amos Israeli on the island Terschelling, Friesland, in spring 2011. The fieldwork was carried out with the following objectives:

- A follow up survey by means of the wet carton-method of the land snail fauna of the 'Jollemabosje', a tiny oak-birch forest on the island Terschelling;
- A continuation of a general survey of land- and freshwater molluscs of the island Terschelling with special emphasize on the presence of invasive species;
- A search for fossil marine molluscs of Pleistocene age (Eemian) on the beaches of Terschelling;
- A preliminary survey of the coastal batteries of Durgerdam (Lighthouse Island), part of the former 'Defence Line of Amsterdam';
- A continuation of a general survey of land- and freshwater molluscs in the Waterland region of the province North-Holland, with the emphasize on the presence of invasive species;
- A follow up survey of the snails living in the old Jewish cemetery of Monnickendam.

Results

-Jollemabosje, Terschelling, Friesland. During five nights (10-14 April 2011) the wet carton-method was used to monitor the presence of terrestrial gastropods in this tiny oak-birch forest. Each morning the cartons were controlled for the presence of snails and slugs. The latter were counted and identified and part of them was preserved for further study. In this way 51 slugs and only two snails were caught. They turned out to belong to six different species (Mienis, 2011b). The snail *Aegopinella nitidula* and the slug *Arion subfuscus* had never been recorded before from the Jollemabosje. This brings the number of terrestrial gastropods found in this woodlet to 16, while one year

earlier, before I started to apply the wet carton method for the first time in the autumn of 2010 (Mienis, 2011a), only 7 species were known. From 1 October until 7 October the Jollemabosje was again surveyed by means of the wet carton methods. Far less specimens were caught in this way than during previous efforts. No additional species could be registered, however, the record of *Arion rufus*, which had been based so far on a batch of eggs, was confirmed by the finds of two very large adults and one juvenile slug. One of the two adults was of the normal dark brown colour, but the second one was of a rather pale greyish colour never encountered before by me in the Netherlands.

-A general survey of the land and freshwater molluscs of the island Terschelling. On the southern slope of the Seinpaal-dune in West-Terschelling two additional specimens of the rare colour variety of the common garden snail *Cepaea nemoralis* forma *hyalozonata* were found. Surprisingly also a juvenile but otherwise typical specimen of *Lehmannia valentiana* was encountered under a piece of decaying wood on the east slope of the Seinpaal-dune in West-Terschelling. This is only the second find of this invasive slug on this island. The first locality: a drain on the old cemetery near the lighthouse 'Brandaris', was destroyed a few years ago during renovation works. A follow up survey of the Formerumerwiel, a small lake near Formerum, caused by a dike collapse, resulted in the registration of three additional aquatic and or amphibious species. Five species are now known from this inland brackish water lake, while until three years ago not a single species was known from this wetland. Most numerous turned out to be *Potamopyrgus antipodarum* an invasive species from New Zealand. *Cepaea nemoralis*, *Cornu aspersum*, *Monacha cantiana* and *Candidula intersecta*, which have to be considered all invasive terrestrial snails on Terschelling, are becoming more-and-more common on Terschelling and don't remain confined to gardens and parcs, but start to expand their distribution to parts of the dunes.

-Eemian fossils on the beach of the island Terschelling, Friesland. Excellently preserved fossil specimens of Pleistocene (Eemian) age were found on the

beach of Terschelling. They belonged among others to: *Turritella communis*, *Nucella lapillus*, *Nassarius reticulatus*, *Aequipecten opercularis*, *Acanthocardia tuberculata*, *Laevicardium oblongum* and *Mactra stultorum plystoneerlandica*.

-A preliminary survey of the coastal batteries of Durgerdam (Lighthouse Island). On 30 September 2011 a preliminary survey of the terrestrial mollusc fauna took place of the Lighthouse Island near Durgerdam, N.E. of Amsterdam. The Lighthouse Island forms part of the former 'Defence Line of Amsterdam'. Its mollusc fauna had never been studied in the past. The survey was carried out by Henk Mienis with the help of Leo Meerema. The presence of at least 21 species of terrestrial species was established. Noteworthy was the recording of *Alinda biplicata* and *Arianta arbustorum*, two species rarely encountered on other fortifications belonging to the 'Defence Line of Amsterdam'. Also interesting was the absence of *Cornu aspersum*, an invasive species now present almost everywhere in North-Holland. The freshwater mollusc fauna was only sampled in part because of logistic problems: it was almost impossible to sample the artificial stony habitat consisting of large basalt boulders which constitute the bank all around this artificial island. We noted however the presence of the highly invasive bivalves *Corbicula fluminea*, *Dreissena polymorpha* and *Dreissena bugensis*. The Quagga mussel (*D. bugensis*) seems to live higher on the stony banks than the Zebra mussel (*D. polymorpha*).

-A continuation of a general survey of land- and freshwater molluscs in the Waterland region of the province North-Holland, with the emphasize on the presence of invasive species. The invasive Girdled snail *Hygromia cinctella*, known only from a few widely separated localities in the Netherlands until a few years ago, but in the meantime found by me at over 30 localities in the town of Purmerend and two localities in Monnickendam, was discovered at two additional localities in Monnickendam and in one garden each in Kwadijk and Oosthuizen, both belonging to the municipality Zeevang. A small population of

another invasive species: the Chocolate banded snail *Eobania vermiculata*, was still found alive in the western part of the 'Burg. R. Kooimanpark' in Purmerend. It had been discovered overthere by me during a visit in the autumn of 2010.

-A follow up survey of the snails living in the Jewish cemetery in Monnickendam. The Jewish cemetery in Monnickendam was searched for the presence of land snails on 26 September 2011. Quite a number of additional species were recorded which had not been seen in autumn 2010. Most noteworthy were the invasive species: *Tandonia sowerbyi*, *Limacus flavus*, *Deroceras panormitanum* and *Hygromia cinctella*. All the results of the fieldwork in the Netherlands were carried out in support of the "Atlas Project of Dutch Mollusca".

Material preserved for further study forms now part of the Mollusc Collection of the Steinhardt National Collections of Natural History.

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Outreach - Nature Campus

Over the last decade Nature Campus has played a central part in imparting the concept of biodiversity and expanding the public's understanding of the role of the biosphere and its importance beyond the traditional concept of nature conservation. It currently offers 'science days' and guided tours, posters, lesson plans for activities inside and outside the classroom, research workshops, and publications. In the past year alone, Nature Campus major accomplishments were:

1. Visits of school children, families, and other audiences to Nature Campus: Zoo, Botanic Gardens and Natural history collections

- a. Total visitation during 2010-2011 was 10,000 people, of which half were school children, tenth were families and private groups and the rest were various groups: students from other higher education institutions, senior citizens, soldiers, etc.
- b. The gardens opened their gates free of charge to guided tours in 2 large open events sponsored by Tel Aviv University's Vice President's office; during the White Night at Tel Aviv 240 people of all ages and sectors of society visited the Zoo and Botanic Garden; during Scientists' night, an European Union project, another 1,100 visited the Zoo and Botanic Garden. Following the huge success of these events we are getting ready to the 2 next events: Scientists' night at the end of September and Green Campus Day at the start of the academic year.
- c. Spaceship Earth Hanuka, Passover and summer camps were a huge success with 8 groups of eager kids, mostly children and grandchildren of TAU employees, thus networking with and enriching TAU community.

- d. In addition to our usual visitors, we enjoyed over 2,500/month visitors to Nature Campus website, over 1,500/month visitors to EarthWeb (our natural resources website), and over 900/month to the Collections website.

2. Inputs to professional development and networking with environmental organizations and the education system

- a. A series of professional development days for the Israel Nature and Parks Authority rangers served to nurture the working relationships between the organizations and will help us formulate our collections policy;
- b. A series of professional development days for the professional team of the Society for the Protection of Nature in Israel - The Environmental Protection Division (EPD) comprised scientific lectures with policy roundtable.
- c. The cooperation with the Society for the Protection of Nature in Israel extended this year to participation as advisors in the development of a workshop for decision-makers in government bodies how to assimilate biodiversity conservation considerations in their policy design.
- d. A professional development day for the JNF (KKL) Forestry Division on biodiversity conservation in managed forests.
- e. A professional development day on sustainable development to senior tier of the Ministry of Education – Science and Technology Administration.
- f. Professional enrichment one days program to the Ministry of Education inspectors and guides of kindergarten teachers.
- g. And, we lectured in dozens of in-service teachers' training about biodiversity.

3. Publications and on-line

- a. A series of 4 PowerPoint presentations on the biodiversity and conservation of winter pools under creative commons license and in cooperation with the Society for the Protection of Nature in Israel.
- b. A series of 5 lesson plans and 4 PowerPoint presentations and relevant background on the natural history of Shachmon Wadi in Eilat. All the teaching materials are available on-line under Creative Commons licence for educational use.
- c. Translation to Hebrew and adaptation to israel Ecological Society of America Publications – ‘Communicating Ecosystem Services’ in order to address local media, community groups, state legislators or other audiences. The Tool Kits provide background information on specific ecosystem services, as well as general tips and suggestions for developing presentations or writing articles for a non-scientific audience. Tool Kits have been completed on the following services are one about the services of pollination and the other about the services of marine nurseries. Both kits are available on-line under Creative Commons licence for educational use.
- d. Nature Campus website was redesigned in order to accommodate it to the plethora of accumulated content pages;
- e. Israel’s report to the OECD on biodiversity for the Ministry of Environmental Protection;

4. Grants & Gifts

- a. Generous gifts of Lynn Schusterman, Madlyn and Len Abramson, and Carol and Joe Reich, given in honor of Michael Steinhardt's birthday.
- b. Generous gift from Doug Unger.

- c. A grant from the Ministry of Justice: Department of the Public Trustee and the Official Receiver (P.I.). For science for all publications on the internet. (150,000 NIS ca. \$40,000).
- d. A grant from the Price Foundation matched by TAU (total \$20,000) to sponsor the enrichment program of Ironi Yod-Beit arab high school from Yafo. Unfortunately, after 11 years the foundation pulled out of TAU with this program the last to be funded.

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; Roy Talbi, reptiles.

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.

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.

Overseas training for students:

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

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

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.

New museum faculty and staff

Roi Holzman

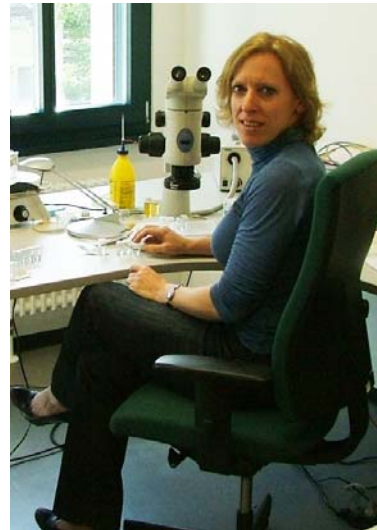
Roi Holzman graduated from the Hebrew University of Jerusalem, where he carried out his PhD research under the supervision of Prof. Amatzia Genin, studying the nocturnal interactions between fish and zooplankton over coral reefs. This work was carried out at the Inter-University Institute for Marine Science in Eilat. After submitting his dissertation, Roi was awarded a Rothschild post-doctoral fellowship to study the hydrodynamics of suction feeding fishes at the University of California in Davis,



with Prof. Peter Wainwright. He spent four years in Davis studying multiple aspects of this unique feeding mechanism, including hydrodynamics, mechanics and morphological diversity related to fish feeding. Taking a biomechanical approach allows Roi to treat the complex fish skull as a machine, and to understand the functional significance of morphological diversity. This, in turn, helps him to understand the evolution of feeding performance within ray-finned fishes. In his new position at Tel Aviv University, Roi is once again, at the Inter-University Institute for Marine Science in Eilat; while in Tel Aviv he serves as an associate curator of fish, and uses them to investigate the general principles that underlie the evolution of complex functional systems.

Netta Dorchin

Netta Dorchin graduated from Tel Aviv University, where she carried out her PhD research under the supervision of Dr. Amnon Freidberg, focusing on the systematics and ecology of gall-inducing insects. She then conducted two-year of postdoctoral research at the Department of Zoology, the University of Cape Town, South Africa, on the ecology of gall-inducing wasps as biological control agents against invasive weeds. Her second postdoctoral



research, at Bucknell University, Lewisburg, PA, focused on evolutionary ecology and systematics of gall midges. Since November 2007, she is the Curator of Diptera at the Alexander Koenig Zoological Research Museum, Bonn, Germany; and since June 2010, is the head of the museum's Arthropods Department. As one of a handful of experts on the large dipteran family Cecidomyiidae (gall midges), she has described new species from Israel, Africa, North America and Australia, and discovered dozens of additional species that still await description. In her studies she has explored various aspects of insect-plant interactions, including behavioural ecology, developmental morphology and physiology. She currently employs morphological, genetic and life-history data for inferring gall-midge phylogeny and examining the role of host associations and gall types in the speciation of these insects. She is slated to become a faculty member at the Department of Zoology and the curator of entomology.

Publications

The national collections of natural history are an important research infrastructure, used by scientists within and outside of the university. Over a decade ago we compiled the list of publications based on our natural history collections, and arrived at over 1200 publication produced by over 550 scientists. This list was incomplete, for technical reasons related to reconstructing this record, and because it did not include the sizable list of publications based upon the anthropological collections. Our current list of the 2010/2011 publications, alas, is also incomplete; it includes all publications of TAU members affiliated with the collections (whether they are directly collections-based or not), and under-represents publications of individuals from other institutions, since our follow-up is far from complete.

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2. Anderson, W.D.Jr, Baranes A and Goren M. Redescription of the perciform fish *Symphysanodon disii* (Symphysanodontidae) Gulf of Aqaba, Red Sea, with comments on *S. pitondelafournaisei* and sexual dim in the genus. Zootaxa.
3. Benayahu, Y. and Perkol-Finkel, S. *Klyxum adii* spec. nov. (Octocorallia: Alcyonacea) from Kenya. Zool. Med. Leiden.
4. Bergman, O., Haber, M., Mayzel, B., Anderson, M. A., Shpigel, M., Hill, R. T., Ilan, M. Marine Based Cultivation of *Diacarnus* Sponges and the Bacterial Community Composition of Wild and Maricultured Sponges and Their Larvae. Marine Biotechnology DOI:10.1007/s10126-011-9391-6.
5. Cohen, E., Koch, L., Myint Thu, K., Rahamim, Y., Aluma, Y., Ilan, M., Yarden, O. and Carmeli, S. Novel terpenoids of the fungus *Aspergillusinsuetus* isolated from the Mediterranean sponge *Psammocinia* sp. collected along the coast of Israel. Bioorganic & Medicinal Chemistry DOI:10.1016/j.bmc.2011.05.045.
6. Cohen-Shacham, E., T. Dayan, E. Feitelson, and R.S. de Groot. 2011. Ecosystem service tradeoffs in wetland management: drainage and rehabilitation of the Hula, Israel. Hydrological Sciences Journal.
7. Dieker, P. and Drees, C. Two high-mountain burnet moth species (Lepidoptera, Zygaenidae) react differently to the global change drivers climate and land-use. Biological Conservation.
8. Fishelson, L., Golani, D., Russell, B. and Goren, M. Rodlet cells in the alimentary tract of three genera of lizardfishes (Synodontidae, Aulopiformes): more on these enigmatic "gate guards" of fishes. Cybium.
9. Gutman, R., T. Dayan, I. Schubert, O. Levy, and N. Kronfeld-Schor. 2011. The effect of the lunar cycle on stress hormone levels and foraging ecology of nocturnal and diurnally active spiny mice. PLOS 6(8):1-9(e23446).
10. Leader, Z., Y. Yom-Tov and U. Motro. 2011. Diet shift in sympatric barn and long-eared owls, *Tyto alba* and *Strix otus*. Isr. Journal of Ecol. Evol.

11. Levy, O., T. Dayan, and N. Kronfeld-Schor. 2011. Interspecific competition and torpor in golden spiny mice: two sides of the energy acquisition coin. Integrative and Comparative Biology.
12. Mandelik, Y., T. Dayan, V. Chikatunov, and V. Kravchenko. The relative performance of taxonomic vs. environmental indicators for local biodiversity assessment: a comparative study. Biological Conservation.
13. Meiri, S., D. Simberloff, and T. Dayan. 2011. Community-wide character displacement in the presence of clines: A test of Holarctic weasel guilds. Journal of Animal Ecology.
14. Roll, U. Grenyer, R. and Meiri, S. Not so holy after all. Israel Journal of Ecology and Evolution.
15. Sapir-Hen, L., G. Bar-Oz, I. Sharon, A. Gilboa, and T. Dayan. Understanding faunal contexts of a complex tell: Tel Dor, Israel, as a case study. Journal of Archaeological Science.
16. Volynchik. S. Morphology of *Vipera palaestinae*; intraspecific variability and sexual dimorphism. Russian Journal of Herpetology.
17. Zurel, D. Gophna, U. and Benayahu Y. Parity and disparity between two *Chama* oysters: The reproductive biology of the Indo-Pacific *C. pacifica* Broderip 1835, invasive to the Mediterranean Sea; and *C. savignyi* Lamy, 1921, indigenous to the Red Sea. Marine Ecology.

Chapters in books

1. Plotkin, M., Volynchik, S., Hiller, R., Bergman, D.J. and Ishay, J.S.. 2010. The Oriental Hornet *Vespa orientalis* (Hymenoptera: Vespinae) Cuticular Yellow Stripe as an Organic Solar Cell: A Hypothesis. In: Collignon L. N., Normand C. B. (eds.) Photobiology: Principles, Applications and Effects. Nova Science Publishers Inc. New York. Chap. XII, pp. 233-242.

Books

1. Galil BS, Clark PF, Carlton JT (eds) 2011 In the wrong place - alien marine crustaceans: distribution, biology and impacts. Invading Nature, springer Series in Invasion Ecology 6: 1-716.
2. Livingstone S. R., Pollard D., Polidoro B.A., Cuttelod A., Bariche M., Bilecenoglu M., Carpenter K. E., Collette B. B., Francour P., Goren M., Kara M. H., Massutí E., Papaconstantinou C., and Tunesi L. 2011. Overview of the Conservation Status of the Marine Fishes of the Mediterranean Sea. Gland, Switzerland and Malaga, Spain: IUCN. vii + 61pp.

Papers presented in scientific meetings

- 2010 The International field meeting of the I.U.G.S. Subcommittee on Carboniferous Stratigraphy in China (O. Orlov-Labkovsky).
- 2010 18th European Meeting of the Paleopathology Association, Vienna, Austria (I. Hershkovitz).
- 2010 7th International Congress of the Archaeology of the Ancient Near East, London, England (I. Hershkovitz).
- 2010 Alien Species Are Replacing The Native Species In The Eastern Mediterranean, Meeting of the Scientific Advisory Committee 11th Session of the Sub-Committee on Marine Environment and Eco) systems (SCMEE) of the General Fisheries Commission For The Mediterranean. Malta, 29 November - 2 December. (Goren M., Yokes M.B., Galil, B.S., Diamant A., and Stern, N.).
- 2010 Research of Mollusc shells at Çatalhöyük, Turkey. Annual meeting of the Israel Prehistoric Society (Bar-Yosef Mayer, D.E).
- 2010 Soft corals of the family Xenidiidae: What does the sclerite microstructure reveal? European Meeting of the International Society for Reef Studies, The Netherlands (Y. Benayahu).
- 2010 The 47th Annual Meeting of the Zoological Society of Israel, Jerusalem, Israel (S. Meiri).
- 2010 The impact of invasive species on the soft bottom fish communities in the eastern Mediterranean The 47th Conference of the Zoological Society of Israel, Jerusalem 5 December. (Stern N. and Goren M.).
- 2010 The new Mediterranean - the Impact of Biological Invasions and Climate Change on the Biodiversity of the Mediterranean Sea. The world we live in, Biodiversity in the 21st Century. French - Israeli workshop, October 10-13th. Ramat Hanadiv Israel (Goren M.).
- 2010 Two species of carpenter bees new to the Israeli fauna (Hymenoptera: Apidae: *Xylocopa*). Proceedings of the 29th Conference of the Entomological Society of Israel. Bet Dagan, Israel (Guershon, M.).
- 2011 Foraminiferal biostratigraphy of the Permian succession in Israel – new data. The XVII International Congress on the Carboniferous and Permian, Perth, Western Australia, 3-8 July 2011 (O. Orlov-Labkovsky).
- 2011 Permo – Triassic (P/T) transition at the Coastal Plane in Israel (David 1 borehole, north Arabian Plate margin). The XVII International Congress

- on the Carboniferous and Permian, Perth, Western Australia, 3-8 July 2011 (O. Orlov-Labkovsky).
- 2011 13th Congress of the European Society for Evolutionary Biology, Tübingen, Germany (F. Ben-Ami).
- 2011 Alien and native species in eastern Mediterranean: a parasitological viewpoint. 7th International conference on Marine Bioinvasions (23-25 August 2011, Barcelona) (Diamant, A. Goren M., Galil, B.S., Yokes M.B.).
- 2011 Ascidiacea global distribution. World Conference on Marine Biodiversity, Aberdeen, Scotland (UK) (Shenkar, N.)
- 2011 Biology and ecology of the loach *Nemacheilus jordanicus*. 8th Annual Congress, The Israel Association for Aquatic Sciences April 11-12, 2011, Hadera, Israel. (Rotman Bat-Shave and Goren M.).
- 2011 Eastern Mediterranean: Old Sea – New Biodiversity. 7th International conference on Marine Bioinvasions (23-25 August 2011, Barcelona) (Goren M., Galil, B.S., Diamant, A. Yokes M.B.)
- 2011 Evolutionary and plastic responses of animal growth to different temperatures: adaptations and constraints. European Science Foundation Workshop, Tartu, Estonia (S. Meiri).
- 2011 Parasite fauna in alien and native fish species in eastern Mediterranean. 8th Annual Congress, The Israel Association for Aquatic Sciences April 11-12, 2011, Hadera, Israel. (Klopman, Y., Diamant A. and Goren M.).
- 2011 Permian deposits and Foraminifera in Israel. International conference "*Permian: Stratigraphy, Paleontology, Paleogeography, Geodynamics and Mineral Resources*" devoted to 170 anniversary of the opening of the Permian System. 5–8 September 2011, Perm, Russia (O. Orlov-Labkovsky).
- 2011 Spatial distribution of Red Sea migrant fishes along the Eastern Mediterranean. 8th Annual Congress, The Israel Association for Aquatic Sciences April 11-12, 2011, Hadera, Israel. (Stern N. and Goren M.).
- 2011 Using next-generation sequencing to illuminate the phylogenetic position of Myxozoa. Evolution 2011. Norman, (Oklahoma). June 17 - 21. (Huchon, D. Rubinstein, N., Feldstein, T. and Diamant, A.)

Graduate students

Much active scientific research is conducted by graduate students. Here we list the graduate students of faculty members affiliated with the National Collections 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

- 2000- Reuvat Nitzan (T. Dayan and A. Ar)
Population dynamics of the chukar partridge in Israel.
- 2003-2010 B. Bahaa (I. Hershkovitz)
Macro and microstructure of the annulus fibrosus.
- 2004-2010 Mati Halperin (Y. Benayahu)
Genetic diversity, demography and behavior of the three-spot dascyllus, *Dascyllus trimaculatus* Rüppell, in the northern Gulf of Eilat (Red Sea).
- 2003 - Leon Novak (M. Ilan)
Engineering a bacterial expression system to produce large amounts of known and of modified naturally occurring bioactive compounds of pharmacological interest.
- 2004- Shai Barkan (Y. Yom-Tov and A. Barnea).
Memory of resident and migratory birds.
- 2004- Liat Gahanama (A. Freidberg)
A revision of the *Schistopterum* clade of Schistopterini.
- 2004- Constantin Grach (A. Freidberg)
Ecology and biology of coastal dune insects.
- 2004 - Boaz Mayzel (M. Ilan)
Magnetoreception in sponges.
- 2005- Rachel Armoza (Y. Loya)
Ecological and physiological aspects of sex hormones in corals.

- 2005 - M. Haber (M. Ilan)
Biosynthesis and function of Natural products from sponge associated microorganisms.
- 2005- Irina Khalfin (M. Ilan)
Function of natural products from sponge associated fungi.
- 2005- Yaron Krotman (M. Goren)
Fish biodiversity and ecology in oasis habitats in the Dead Sea Valley.
- 2005- Tal Levanony (T. Dayan)
Patterns of biodiversity in natural and cultural landscapes: a model Mediterranean forest ecosystem.
- 2006-2010 O. Hai (I. HersHKovitz)
Spinal evaluation in Lower Back Pain.
- 2006-2011 Eran Levin (Y. Yom-Tov and N. Kornfeld).
Ecophysiology of free-tailed bats.
- 2006-2010 R. Sarig (I. HersHKovitz)
Interproximal attrition.
- 2006- Frida Belinky (D. Huchon and A. Lotem)
Multiple approaches to solve basal metazoan phylogeny and its implication on intron evolution.
- 2006- Yoni Vortman (A. Lotem)
Mate choice and multiple sexual signals in the Barn Swallow *H. r. transitive*.
- 2006- Chen Yoffe (Y. Benayahu)
Symbiont transmission in cnidarian hosts: integrated processes and mechanisms determine specificity.
- 2007- Y. Aluma (M. Ilan)
Environment impact on sponge-fungi association.
- 2007- Emmanuelle Cohen-Shacham (T. Dayan)
Policies for managing ecosystem services
- 2007- G. Ibrahim (I. HersHKovitz)
Whiplash.

- 2007- Ronit Justo-Hanani (T. Dayan)
Legal and administrative aspects of genetically modified organisms in Israel.
- 2007- 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.
- 2007- Ido Sella (Y. Benayahu)
Biomaterial from a soft coral
- 2007- Roe Segal (Y. Loya)
Toxicological effects of heavy metals on reef organisms.
- 2007- Amir Shitenberg (D. Huchon and M. Ilan)
Phylogeny and evolution of demosponges.
- 2007- Dror Zurel (Y. Benayahu and U. Gofna)
Lessapsian migrant species as vectors for dispersal of marine bacteria
- 2007- Maaya Weizel (Y. Loya)
Novel technology for establishment of totipotent tissues and "immortal" lines of a unique model system.
- 2008- J. Abass (I. Hershkovitz)
- 2008- Ada Alamaro (Y. Loya)
Evolutionary implications of sex change in fungiid corals
- 2008- 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- H. May (I. Hershkovitz)
- 2008- Ilana Pizer-Mason (T. Dayan)
The macroecology of activity patterns.

- 2008- Tali Reiner-Brodezky (A. Lotem)
Mate choice and recognition in the barn swallow
- 2008- Noa Sokolover (M. Ilan)
Bryozoans ecology
- 2009- Omri Bronstein (Y. Loya)
Bioerosion of reef corals by sea urchins.
- 2009- Anat Feldman (S. Meiri)
Snake Macroecology. Tel Aviv University.
- 2009- Keren, R. (M. Ilan)
Acquisition of sponge-associated bacteria
- 2009- Ittai Renan (A. Freidberg)
To be determined.
- 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 phylogenetic of the family Clupeidae (Pisces).
- 2009- Karin Tamar (S. Meiri)
Taxonomy and phylogeny of Israeli reptiles.
- 2011- A. Lavi (M. Ilan)
Interactions within sponge microbial community.
- 2011- Roni Yizhar (F. Ben-Ami)
The evolution of virulence under conditions of frequent multiple infections.

MSc students

- 2004- Daniel Yashunski (M. Goren)
Succession of fish community in planted corals in Elat.
- 2005- Kfir Gaier (M. Goren)
The impact of grazing fish on invertebrate communities in eastern Mediterranean.
- 2007-2011 Hagit Alphandary (M. Goren and Prof. Henig)
Analysis of decision making process in the case of Kishon River
- 2007-2010 Hagar Ben-Bassat (D.E. Bar-Yosef Mayer, and A. Gilboa)
Beads and Pendants at Tel Dor During the Early Iron Age: Origin, Technology and Social Perspectives.
- 2007-2011 Yael Klopman (M.Goren)
Some ecological aspects regarding the interaction of Red Sea fish invaders and their parasite".
- 2007- 2011 Miri Taub (M.Goren)
The impact of recreation activity on the biota in inland aquatic habitats.
- 2007- Eyal Bloche (T. Dayan)
The effects of physical state perception on decision making in foraging.
- 2007- Tamar Marcus (T. Dayan)
Spatial aspects of climate change and conservation.
- 2007- Thehila Nagar (M.Goren)
Feeding habits in some freshwater fishes in Israel.
- 2008-2011 Albag, O. (M. Ilan)
Biology of *Topsentia aqabaensis*.
- 2008-2011 Itai Berger (Y. Yom-Tov, Y. Leshem and S. Markman)
Parental behavior of the orange-tufted.
- 2008-2011 Yasmin Gabay (Y. Benayahu)
Effect of seawater acidification on xeniid soft corals.
- 2008-2010 Y. Paker (Y. Yom-Tov, A. Barnea and T. Alon-Mozes)
The wildlife in urban gardens.

- 2008-2011 D. Stein (I. Hershkovitz)
3D-Reconstruction of the vertebral epiphyseal ring.
- 2008- Aviv Avisar (T. Dayan and U. Shanas)
Assessing the impact of visitor pressure in nature reserves.
- 2008- Matan Ben Ari (D. Gerling)
Bionomics of the whitefly *Dialeurolobus rhamni* in the Judean hills.
- 2008- Hila Lahav (T. Dayan and A. Hefetz)
Ant communities under different land management practices.
- 2008- Roni Lee (M. Goren)
Comparative study of reproductive aspects of invaders and native fish in Eastern Mediterranean.
- 2008- Yahel Porat (T. Dayan and Y. Carmel)
Different land management practices and their impact on reptile communities.
- 2009- Eran Amichai (Y. Yom-Tov and N. Kornfeld)
The biology of *Asellia tridens* in the Jordan Valley, Israel.
- 2009- Daniel Berkowic (S. Meiri and S. Markman)
Egg size and body size changes in cuckoos and hosts in response to climate change.
- 2009- Dolev Kastin (M. Goren)
reproductive and growing biology of the cyprinid fish *Garra rufa*.
- 2009- Ya'arit Levitt (M. Goren)
Invaders fish – native fish relationship along depth gradient in Eastern Mediterranean.
- 2009- Hadas Marshall (T. Dayan and Y. Mandelik)
Bee communities in the Arava Rift Valley.
- 2009- Roe Maor (T. Dayan)
To be determined.
- 2009- Elizabeth Morgulis (A. Freidberg)
The Ulidiidae (Diptera) of Israel

- 2009- Ateret Shabtai (Y. Benayahu and G. Rilov)
Population dynamics of the invasive oyster *Spondylus spinosus* in the Israeli Mediterranean coast.
- 2009- Natalie Shalev (Y. Benayahu and G. Rilov)
Development of benthic communities on a planned artificial reef at Eilat.
- 2009- Maya Spivak (S. Meiri and D. Huchon)
Phylogeny and Taxonomy of Israeli shrews.
- 2010- 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- Lital Dabool (S. Meiri)
Phylogeny Macroecology of reptile reproduction.
- 2010- Yael Dagan (F. Ben-Ami)
The evolution and maintenance of sexual reproduction in the Melanoides-trematodes model host-parasite system.
- 2010- Gal Eyal (Y. Loya)
Settlement and recruitment of scleractinian corals along a depth gradient (0-60 m).
- 2010- Lee Eyal (Y. Loya)
Legislation of Marine Protected Areas in Israel: Mediterranean and Red Sea Reproductive strategies of deep reef (60 m depth) corals.
- 2010- Dana Genosar (T. Dayan)
To be determined.
- 2010- Yuval Itescu (S. Meiri)
Turtle Macroecology.
- 2010- Ariel Kedem (T. Dayan with N. Kronfeld-Schor)
Snake predation risk on spiny mice.

- 2010- Yael Mandelberg (Y. Benayahu)
Collagen producing octocorals of the genus *Sarcophyton*.
- 2010- Maria Novosolov (S. Meiri)
Macroecology of island reptiles.
- 2010- Shimon O. (M. Ilan)
Biotechnology of *Chondrosia reniformis* and *Chondrilla nucula*.
- 2010- Zohar Yanai (T. Dayan with A. Gasith)
To be determined.
- 2010- Yaniv M. (M. Ilan)
Ecology of *Chondrosia reniformis* and *Chondrilla nucula*.
- 2010- J. Peled-Levi (Y. Yom-Tov and T. Alon-Mozes)
Urban planning and wildlife.
- 2010- M. Rachamim (Y. Yom-Tov and A. Barnea)
Breeding biology of the great tit in urban and natural environment.
- 2010- Vivian Slone (I. Hershkovitz)
Vertebral hemangiomas.
- 2010- T. Tunis-Sella (I. Hershkovitz)
The chin.
- 2011- Jassica Brukirer (M. Goren)
Some ecological aspects regarding the succession of biota on artificial substrate in the Mediterranean.
- 2011- Yonathan Guttel (F. Ben-Ami)
The maintenance of hybrid zones in a freshwater snail by parasitism.

Post-doctoral fellows

- 2009-2010 Merav Vonshak
- 2009-2010 Hadass Steinitz
- 2009-2011 Claudia Drees

2010- Ofir Levy
2011- Annat Haber
2011- Corina S. Bazelet

Fellowships and grants

Support for collections-based research is provided by fellowships and grants. Here we list the fellowships and grants of faculty members of Tel Aviv University who are affiliated with the collections. Needless to say, the many colleagues from other research institutions in Israel and abroad also receive fellowships and grants that hinge, at least in part, on work in the natural history collections. These data, however, are not available to us.

While these fellowships and grants and others cannot support collections maintenance, they are crucial for collection development since they provide the funds for active collecting, which are otherwise unavailable in the State of Israel. We do our best to help scientists use the collections and to promote collections-based biodiversity research.

- 2003-2010 The World Bank/UNESCO/IOC International Targeted Group of Experts on "indicators of coral bleaching". A group which is composed of 15 scientists as follows: from USA (3) Hawaii (1), England (2), Australia (2), Kenya (3), Israel (1), Philippines (1), Mexico (1) and France (1). The group meets and works together 2-3 weeks every year at 4 reef sites: Heron Island (Great Barrier Reef, Australia), Puerto Morelos (Mexico), Philippines (exact location to be determined) and Zanzibar (Y. Loya Co-Chairman with Prof. O. H. Guldborg).
- 2006- 2010 Sponge (Metazoa: Porifera) phylogenetics using novel molecular markers. The Israel Science Foundation (NIS 270,000 per year). (D. Huchon).
- 2007-2010 Ministry of Science, Culture and Sport grant for establishing knowledge center at the national collections of natural history (3 year grant; total of 1,900,000 NIS [ca. \$500,000]) (T. Dayan).
- 2007-2011 Israel Science Foundation (ISF), Etiology of Black Band Disease (BBD) (Y. Loya and R. Rosenberg, TAU).
- 2007-2011 Mate choice and the evolution of phenotypic diversity: the unique sexual signals of the East Mediterranean Barn Swallow. The Israeli Academy of Science and Humanities (A. Lotem and R. Safran).

- 2008-2011 Israel Science Foundation (ISF). Energetic factors affecting seasonal migration , sexual segregation in free-tail bats. (Y. Yom-Tov and Kronfeld-Schor, N.).
- 2008-2011 Israel Science Foundation, with Drs. M. Kam, A. Degen and B. Krasnov (\$175,000) (E. Geffen).
- 2008-2011 Israel-Italy R&D project. The impacts of biological invasions and climate change on the biodiversity of the Mediterranean Sea (Goren, M. and Galil, B.).
- 2008-2011 The Israel Academy of Sciences and Humanities, centers of Excellence. Climate changes on the environment and human society in the upper Jordan Valley. (Y. Yom-Tov).
- 2009- SYNTHESIS grant, Museum für Naturkunde, Berlin (S. Meiri with S. Markman)
- 2009- SYNTHESIS grant, University of Copenhagen (S. Meiri with S. Markman); 4000€
- 2009-2010 ITI - Israel Taxonomy Initiative, Revision of Israeli calcareous sponges (Porifera, Calcarea) using molecular and morphological characters, \$ 6,850 (Huchon D.).
- 2009-2011 GLOWA Jordan River research grant. Modeling the impact of global climate change on terrestrial biodiversity in the Jordan River Basin: Testing planning scenarios and climate change scenarios (3 year grant; *ca.* EURO 84,000 total) (T. Dayan P.I. of subproject)
- 2009-2011 Grantor IITA; topic Novel Strategies for Managing Whiteflies on Cassava; duration: 2 years, 25.000\$ (D. Gerling).
- 2009-2012 EU project (Technology Enhanced Learning), DynaLearn: Engaging and informed tools for learning conceptual system knowledge (Benayahu Y. with collaborators EURO 3,193,495.00).
- 2009-2012 Israel Science Foundation research grant. The evolution of activity patterns of mammals: a macroecological and macroevolutionary perspective (3 year grant; *ca.* \$ 40,000 per annum) (T. Dayan).
- 2009-2013 Hydrodynamics of contact of larvae with substrate (Benayahu Y. with G. Zilman, Faculty of Engineering, TAU, NIS 594,000)
- 2009-2013 Israel Science Foundation, with M. Kam (\$240,000) (E. Geffen).

- 2009-2013 United States-Israel Binational Science Foundation (BSF). Research project: Phylogeny of the octocorals (phylum Cnidaria), family Xeniidae: Application of molecular and morphology based approaches (Benayahu Y. with C. McFadden, Harvey Mudd College, Claremont, CA and R. Toonen, University of Hawaii, \$ 160,000).
- 2010 Grantor FAO Eritrea Topic: Field collection, rearing of the biological control agent: insect *Cales noacki* in support of the international efforts for biological control. Duration 6 months. 5000\$ (D. Gerling).
- 2010 -2012 Examining the impact of fisheries management on the Lake Kinneret ecosystem by developing and applying a fisheries based model. (Goren, M with G. Gal - Israel Oceanographic and Limnological Research institute). - Israel Water Authority.
- 2010- Israel Taxonomic Initiative grant for a PhD scholarship in reptile taxonomy (S. Meiri with Karin Tamar).
- 2010- John S. Latsis Public Benefit Foundation grant, (S. Meiri with Panayiotis Pafilis and Efstratios Valakos); 8000€
- 2010 University of Haifa Research Authority Prize: 6,000 NIS (D. E. Bar-Yosef Mayer).
- 2010-2011 Iarel Taxonomy Initiative. Survey of parasites of freshwater snails (19,000\$) (F. Ben-Ami and M. Ucko)
- 2010-2012 High Council for Scientific and Technological Cooperation between France-Israel, Research Networks Program in Water Science, Resource Management. ("The relationship between ecosystem management and the provision of ecosystem services in wetlands: a comparison between the Hula (Israel) and Camargue (France)") (2 year grant; ca. \$ 40,000 per annum) (T. Dayan and. P. Grillas).
- 2010-2013 ODEMM – Options for Ecosystem-based Marine Management - EU7 (Goren, M.).
- 2010-2013 European FP7 Cooperation Work Programme: Food, Agriculture and Fisheries, and Biotechnology (Brussels, Belgium) (Ilan, M.).
- 2010-2013 ISF - Israel Science Foundation, Analysis of four nuclear and mitochondrial myxozoan genomes, NIS 234,000 (D. Huchon (P.I.)).

- 2011- Israel Taxonomic Initiative grant for a taxonomic survey of the Tephritoidea (Diptera) of Israel (A. Freidberg with E. Morgulis)
- 2011- Israel Taxonomic Initiative grant for taxonomy course with a foreign expert (S. Meiri with Lee Grismer)
- 2011 Krill Prize for Excellence in Scientific Research (Wolf Foundation) (S. Meiri).
- 2011- SYNTHESIS grant, Natural History Museum, London (S. Meiri with S. Markman); 4000€
- 2011-2012 Iarel Taxonomy Initiative (M. Ilan)

Visiting scientists at the National Collections

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
2010 Oct	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2010 Oct	A. Pakerski	Hebrew University	Israel	Birds
2010 Nov	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2010 Nov	D. Koringreen	Geological Survey of Israel	Israel	Fossil
2010 Nov	Y. Ben-Ari	Israel Nature and Parks Authority	Israel	Molluscs
2010 Nov	M. Staner	Hebrew University	Israel	Reptilia
2010 Nov	I. James		Israel	Mammals & Birds
2010 Nov	Z. Shtain		Israel	Mammals & Birds
2010 Dec	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2010 Dec	M. Meiri	TAU University	Israel	Mammals
2010 Dec	M. Bellmaker	Harvard University	USA	Mammals
2010 Dec	Y. Marusik	Institute for biological problems of North Magadan	Russia	Entomology
2011 Jan	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2011 Jan	M. Peter	Oranim Academic College	Israel	Birds

Date	Name	Institute	Country	Taxonomic group
2011 Jan	B. Yuval	Hebrew University	Israel	Echinodermata
2011 Jan	S. Raz	University of Haifa	Israel	Molluscs
2011 Jan	Y. Sharir	University of Haifa	Israel	Fish
2011 Jan	Y. Marusik	Institute for biological problems of North Magadan	Russia	Entomology
2011 Jan	S. Bailey	New York University	USA	Athropology
2011 Feb	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2011 Feb	D. Milstein	Israel Nature and Parks Authority	Israel	Molluscs
2011 Feb	Y. Marusik	Institute for biological problems of North Magadan	Russia	Entomology
2011 Feb	I. Bruchmann	University of Flensburg	Germany	Entomology
2011 Mar	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2011 Mar	I. Bruchmann	University of Flensburg	Germany	Entomology
2011 Mar	W. Starke		Germany	Entomology
2011 Mar	T. Assmann	Leuphana University	Germany	Entomology
2011 Mar	P. Zumstein	Leuphana University	Germany	Entomology
2011 Mar	N. Drescher	Leuphana University	Germany	Entomology
2011 Mar	H. Meybohm	Grosshansdorf	Germany	Entomology
2011 Mar	A. Hetzel	Darmstadt	Germany	Entomology
2011 Mar	A. Gomez	University of Cambridge	USA	Athropology
2011 Apr	J. Dausat	University of Aberdeen	France	Mammals
2011 Apr	W. Lu	Jamestown	USA	Entomology
2011 Apr	T. Harpaz	Faculty of Agriculture, Food and Environment	Israel	Entomology
2011 Apr	H. Bohn	Zoologische Staatssammlung Muenchen	Germany	Entomology
2011 Apr	A. Bobrov	Moscow	Russia	Entomology
2011 Apr	E. Narchuk	ZIN, St. Petersburg	Russia	Entomology

Date	Name	Institute	Country	Taxonomic group
2011 May	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2011 May	B. Medlei	Forensic Institute Abu Kabir	Israel	Molluscs
2011 May	E. Narchuk	ZIN, St. Petersburg	Russia	Entomology
2011 May	T. Deuvev	Muséum national d'Histoire naturelle	France	Entomology
2011 May	S. Risch		Germany	Entomology
2011 May	M. Gasperetti	University of Cambridge	USA	Athropology
2011 Jun	Y.L. Werner	Hebrew University	Israel	Reptilia
2011 Jun	L. Sapir-Chen	Tel Aviv University	Israel	Mammals
2011 Jun	A. Kleinman	Tel Aviv University	Israel	Mammals
2011 Jun	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2011 Jun	E. Shefer	Israel Oceanographic and Limnological Research	Israel	Molluscs
2011 Jun	A. Dotan		Israel	Molluscs
2011 Jun	S. Miller	Smithsonian Institution	USA	Entomology
2010 July	M. Bellmaker	Harvard University	USA	Mammals
2010 July	M. Bellmaker	Harvard University	USA	Athropology
2010 July	A. Henry	Harvard University	USA	Athropology
2010 July	P. Gunz	Max-Planck-Institute for Evolutionary Anthropology	Germany	Athropology
2010 July	P. Gunz	Max-Planck-Institute for Evolutionary Anthropology	Germany	Athropology
2010 July	V. Eshed	IAA	Israel	Athropology
2011 July	S. Vaisman	Ministry of Agriculture	Israel	Molluscs
2011 July	Y. Zoberi	Bar-Ilan University	Israel	Molluscs
2011 July	D. Milstein	Israel Nature and Parks Authority	Israel	Molluscs
2011 Aug	M. Meiri	TAU University	Israel	Mammals
2011 Aug	D. Gaurent	Lampea	France	Mammals
2011 Aug	S. Vaisman	Ministry of Agriculture	Israel	Molluscs

Date	Name	Institute	Country	Taxonomic group
2010 Aug	P. Gunz	Max-Planck-Institute for Evolutionary Anthropology	Germany	Athropology
2010 Aug	V. Eshed	IAA	Israel	Athropology
2011 Aug	D. Eyal	The Interuniversity Institute for Marine Sciences in Eilat	Israel	Corals
2011 Aug	L. Eyal	The Interuniversity Institute for Marine Sciences in Eilat	Israel	Corals
2011 Aug	L.J. Numhauser Togniola	Sociedad Chilena de Entomologia	Chile	Entomology
2011 Sep	D. Milstein	Israel Nature and Parks Authority	Israel	Molluscs
2011 Sep	B. Medlei	Forensic Institute Abu Kabir	Israel	Molluscs
2011 Sep	C. Praz	Zurich Switzerland	Switzerland	Entomology
2011 Sep	A. Tanasevitch	Institute for Forest Ecology and Production	Russia	Entomology
2011 Sep	T. Piterkina	Institute for Forest Ecology and Evolution	Russia	Entomology
2011 Sep	L.J. Numhauser Togniola	Sociedad Chilena de Entomologia	Chile	Entomology
2011 Sep	K. Szpyla	Nicolaus Copernicus University	Poland	Entomology

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 Mammals and Reptilia (academic course)	Y. Yom-Tov and E. Geffen	Tel Aviv University	Mammals, Reptilia, Taxidermist and Museum Class
Insects the Flagship of Biodiversity (academic course)	A. Freidberg and D. Simon	Tel Aviv University	Entomology
Macroecology (academic course)	S. Meiri	Tel Aviv University	Birds, Mammals and Reptilia
Faunistica (academic course)	Z. Arad	Technion	Birds, Mammals and Museum Class
Faunistica (academic course)		Open University	Birds, Mammals and Museum Class
Introduction to Archaeozoology	L. Sapir Chen	Tel Aviv University	Mammals
Archaeozoology workshop	L. Sapir Chen	Tel Aviv University	Mammals, Fish and Museum Class
Introduction to Animal Kingdom: Invertebrates and Vertebrates (academic course)	M. Ovadia and A. Gasith	Tel Aviv University	Mammals and Entomology

Purpose	Name	Institute	Taxonomic group
Vertebrates Anatomy (academic course)	D. Eilam, M. Ovadia and U. Oron	Tel Aviv University	Reptilia, Mammals and Taxidermist
Animal Behavior	I. Golani	Tel Aviv University	Mammals and Museum Class
The Invertebrates: Comparative Functional Biology (academic course)	M. Ilan, Y. Benayahu and A. Abelson	Tel Aviv University	Invertebrates, Entomology and Histology
Osteology And Anthropology (academic course)	I. Hershkovitz	Tel Aviv University	Anthropology
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
Ichthyology (academic course)	M. Goren	Tel Aviv University	Fishes and Museum Class
Biology and Systematic of Marine Invertebrates: (academic course)	Y. Benayahu	Interuniversity Institute for Marine Sciences	Invertebrates
Bird-Watching	T. Shariv	Avshalom Institute	Birds 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 TAU natural history collections 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	A. Gasith	Tel Aviv University	Entomology and Invertebrates
Taxonomy Identification	E. Groner	Ben-Gurion University of the Negev	Entomology
Taxonomy Identification	E. van dan Brink	Israel Antiquity Authority	Molluscs
Taxonomy Identification	A. Gasith	Tel Aviv University	Molluscs
Taxonomy Identification	E. Galili	Israel Antiquity Authority	Molluscs
Taxonomy Identification	S. Vaisman	Plant Protection and Inspection Services	Molluscs
Taxonomy Identification	E. Sheffer	IOLR - Haifa	Molluscs
Taxonomy Identification	Campus Teva	Tel Aviv University	Molluscs

Purpose	Name	Institute	Taxonomic group
Taxonomy Identification	D. Milstein	Israel Nature and Parks Authority	Molluscs
Taxonomy Identification	North Distric	Israel Nature and Parks Authority	Molluscs
Taxonomy Identification	North Distric	Israel Nature and Parks Authority	Fishes
Taxonomy Identification		Pipeline company	Mammals
Taxonomy Identification		Procter & Gamble Israel	Mammals
Taxonomy Identification		Israeli Air Force	Birds
Taxonomy Identification		Israel Airport Authority	Birds
Taxidermist services	Nature Campus	Tel Aviv University	Mammals, Birds and Taxidermist
Taxidermist services		Israel Nature and Parks Authority	Birds and Taxidermist
Taxidermist services		Safari, The Zoological Center Tel Aviv - Ramat Gan	Mammals and Taxidermist
DNA Shipment	A. Boldo	Israel Nature and Parks Authority	Mammals
DNA Shipment	M. Bellmaker	Harvard University	Mammals
DNA Shipment	M. Meiri	Tel Aviv Universiy	Mammals
DNA Shipment	A. Dolev	MIGAL Institute	Mammals
DNA Shipment	J. F. Trape	Institut de Recherche pour le Développement, France	Reptilia
DNA Shipment	P. Kapli	Natural History Museum of Crete	Reptilia
DNA Shipment	C. Berthouly-Salazar	Stellenbosch University, South Africa	Reptilia
DNA Shipment	C.S. McFadden	Harvey Mudd College, USA	Invertebrates: Soft Corals

Purpose	Name	Institute	Taxonomic group
DNA Shipment	J.D. Reimer	University of the Ryukyus, Japan	Invertebrates: Soft Corals
DNA Shipment	L. van Ofwegen	National Museum of Natural History , Leiden The Netherlands	Invertebrates: Soft Corals
DNA Shipment	Y. Tikochinski	Ruppin Academic Center	Fishes
DNA Shipment	E. Frankowski	University of Rostock, Germany	Fishes
DNA Shipment	I. Artzi	Israel Nature and Parks Authority	Fishes
DNA Shipment	R. Natan	Hebrew University	Birds
Electronic Data	C.A. Chen	Research Center for Biodiversity, Academia Sinica, Taiwan	Invertebrates: Soft Corals
Electronic Data	B. Yuval	Faculty of Agriculture, Food and Environment	Invertebrates: Holothuridae
Electronic Data	A. Dotan	Beit Berl College	Invertebrates: Ascidians and Molluscs
Electronic Data	D. Milstein	Israel Nature and Parks Authority	Molluscs and Fish
Electronic Data	N. Leader	Israel Nature and Parks Authority	Mammals and Birds
Electronic Data	M. Meiri	Tel Aviv University	Mammals
Electronic Data	D. Koubínová	Charles University, Czech Republic	Mammals
Electronic Data	M. Bellmaker	Harvard University	Mammals
Electronic Data	M. Dekel	MIGAL Institute	Mammals
Electronic Data	A. Dolev	MIGAL Institute	Mammals
Electronic Data	F. Ahmadzadeh	Universitat Bonn, Germany	Reptilia
Electronic Data	P. Kapli	Natural History Museum of Crete	Reptilia

Purpose	Name	Institute	Taxonomic group
Electronic Data	A. Boldo	Israel Nature and Parks Authority	Reptilia
Electronic Data	G. Stephen	Whittier College, California	Reptilia
Electronic Data	O. Shimoni		Reptilia
Electronic Data	E. Shani	Bar Ilan University	Reptilia and Birds
Electronic Data	L. Gidron	Plant Protection and Inspection Services	Entomology
Shipment of Specimens	Y.L. Werner	Hebrew University	Reptilia
Shipment of Specimens	G. Stephen	Whittier College, California	Reptilia
Shipment of Specimens	P. Kapli	Natural History Museum of Crete	Reptilia
Shipment of Specimens	M. Rozenfeld	Alon High school, Ramat HaSharon	Birds
Shipment of Specimens	G. Csorba	Hungarian Natural History Museum, Hungary	Mammals
Shipment of Specimens		Safari, The Zoological Center Tel Aviv - Ramat Gan	Mammals, Birds and Taxidermist
Shipment of Specimens	W.D. Anderson	Grice Marine Biology Laboratory, USA	Fishes
Shipment of Specimens	B. Russell	Museum & Art Gallery of the Northern Territory, Australia	Fishes
Shipment of Specimens	A. Baranes	Inter-University Institute, Eilat	Fishes
Shipment of Specimens	C.A. Chen	Research Center for Biodiversity, Academia Sinica, Taiwan	Invertebrates: Soft Corals
Shipment of Specimens	J. van Egmond	National Museum of Natural History, The Netherlands	Invertebrates: Soft Corals

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	R. Toonen	University of Hawaii at Manoa, The Hawai'i Institute of Marine Biology Coconut Island, USA	Invertebrates: Soft Corals
Shipment of Specimens	C.S. McFadden	Harvey Mudd College, USA	Invertebrates: Soft Corals
Shipment of Specimens	J.D. Reimer	University of the Ryukyus, Japan	Invertebrates: Soft Corals
Shipment of Specimens	L. van Ofwegen	National Museum of Natural History , Leiden The Netherlands	Invertebrates: Soft Corals
Shipment of Specimens	F. Benzoni	University of Milan-Bicocca, Italy	Invertebrates: Soft Corals
Shipment of Specimens	T. Goulet	The University of Mississippi, USA	Invertebrates: Soft Corals
Shipment of Specimens	X. Turon	Center for Advanced Studies of Blanes, Spain	Invertebrates: Ascidians
Shipment of Specimens	M. Kuhlmann	The Natural History Museum, London UK	Entomology
Shipment of Specimens	T. Üstüner	University, Konya, Turkey	Entomology
Shipment of Specimens	J. LaSalle	CSIRO Ecosystem Sciences, Canberra Australia	Entomology
Shipment of Specimens	G. Wagner	Hamburg Germany	Entomology
Shipment of Specimens	B. Pauly	Zoological Institute RAS, St. Petersburg, Russia	Entomology
Shipment of Specimens	S. Sinev	Zoological Institution RAN, St. Petersburg, Russia	Entomology
Shipment of Specimens	J. Pelletier	Monnaie, France	Entomology
Shipment of Specimens	P. Moulet	Museum Requien, Avignon France	Entomology

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	A. Sabatinelli	Gembloux BELGIQUE	Entomology
Shipment of Specimens	G.A. Evans	USDA, Beltsville, MD, USA	Entomology
Shipment of Specimens	J. Papp	Natural History Museum, Budapest, Hungary	Entomology
Shipment of Specimens	Y.M. Marusik	Museum, University of Turku, Finland	Entomology
Shipment of Specimens	P.J. Schwarz	University of California, Irvine, CA, USA	Entomology
Shipment of Specimens	T. Assmann	University of Lueneburg, Germany	Entomology
Shipment of Specimens	N. Dorchin	Museum Koenig, Bonn, Germany	Entomology
Shipment of Specimens	Z. Efremova	Ulyanovsk State Pedagogical University, Russia	Entomology
Shipment of Specimens	J. Beccaloni	Natural History Museum, London, UK	Entomology
Shipment of Specimens	A. Dorchin	Institute of Evolution, Haifa University, Israel	Entomology
Shipment of Specimens	A.Z. Lehrer	Israel	Entomology
Shipment of Specimens	C. Taylor	The Natural History Museum, London, UK	Entomology
Shipment of Specimens	A. Kotenko	The I. I. Schmalhausen Institute of Zoology, Kiev, Ukraine	Entomology
Shipment of Specimens	S. Patiny	Gembloux Belgique	Entomology
Shipment of Specimens	D. Michez	Montferrier-sur-Lez France	Entomology
Shipment of Specimens	S. Risch	Leverkusen, Germany	Entomology
Shipment of Specimens	H. Bohn	Zoologische Staatssammlung Muenchen, Germany	Entomology

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	M. Terzo	Université de Mons, Belgique	Entomology
Shipment of Specimens	H. Dathe	Deutsches Entomologisches Institut, Germany	Entomology
Shipment of Specimens	C. Praz	Entomological Collection, Switzerland	Entomology
Shipment of Specimens	A. Müller	Entomological Collection, Switzerland	Entomology
Shipment of Specimens	E. Colonnelli	Rome, Italy	Entomology
Shipment of Specimens	P. Cerretti	Università degli Studi di Roma "La Sapienza", Italy	Entomology
Shipment of Specimens	S.A. Belokobylskij	ZIN RAS, St. Petersburg, Russia	Entomology
Shipment of Specimens	D.V. Logunov	The University of Manchester, Manchester UK	Entomology
Shipment of Specimens	K.B. Kunt	Ankara, Turkey	Entomology
Shipment of Specimens	R.S. Capellari	Departamento de Biologia, São Paulo Brazil	Entomology
Shipment of Specimens	K. Rognes	University of Stavanger Norway	Entomology
Shipment of Specimens	H. Winkelmann	Berlin Germany	Entomology
Shipment of Specimens	N. Yunakov	ZIN RAS, St.Petersburg Russia	Entomology
Shipment of Specimens	A. A. Legalov	Zoological Museum, Novosibirsk, Russia	Entomology
Shipment of Specimens	W.N.. Mathis	Smithsonian Institution, Washington, USA	Entomology
Shipment of Specimens	M Carles-Tolra	Barcelona Spain	Entomology
Shipment of Specimens	L. Gidron	PPIS, Ministry of Agriculture	Entomology

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	T. Dikow	Field Museum of Natural History, Chicago, USA	Entomology
Shipment of Specimens	M. Langer	Lichtenwalde Germany	Entomology
Shipment of Specimens	O. Merkl	Hungarian Natural History Museum, Budapest, Hungary	Entomology
Shipment of Specimens	R. Wahis	Faculté universitaire des Sciences agronomiques, Belgique	Entomology
Shipment of Specimens	M. Mei	Università degli Studi di Roma "La Sapienza", Italy	Entomology
Shipment of Specimens	I. Winkler	North Carolina State University Raleigh, USA	Entomology
Shipment of Specimens	V. Tolkanitz	Institute of Zoology, Kiev, Ukraine	Entomology
Shipment of Specimens	A. Herrmann	Stade, Germany	Entomology
Shipment of Specimens	H. Meybohm	Grosshansdorf, Germany	Entomology
Shipment of Specimens	A. Hetzel	Darmstadt, Germany	Entomology
Shipment of Specimens	J. Stary	Palacky University, Czech Republic	Entomology
Shipment of Specimens	A.H. Kirk-Spriggs	National Museum, South Africa	Entomology
Shipment of Specimens	H. Perrin	Muséum national d'Histoire naturelle, France	Entomology
Shipment of Specimens	E. Narchuk	Zoological Institution RAN, Sanct-Petersburg Russia	Entomology
Shipment of Specimens	S. Aibulatov	Zoological Institution RAN, Sanct-Petersburg Russia	Entomology

Purpose	Name	Institute	Taxonomic group
Shipment of Specimens	A. Przhiboro	Zoological Institution RAN, Sanct-Petersburg Russia	Entomology
Shipment of Specimens	A. Shatalkin	Moscow State University Russia	Entomology
Shipment of Specimens	T. Deuve	Muséum national d'Histoire naturelle, France	Entomology
Shipment of Specimens	D. Gotzek	University of Illinois at Urbana-Champaign, USA	Entomology
Shipment of Specimens	R. Gebarra	IRTA, Barcelona Spain	Entomology
Shipment of Specimens	R. Danielsson	Museum of Zoology, Lund University, Sweden	Entomology
Shipment of Specimens	L. Ross	University of Oxford, U.K	Entomology
Shipment of Specimens	S. Miller	Smithsonian Institution, USA	Entomology
Shipment of Specimens	B. Fisher	California Academy of Sciences, USA	Entomology
Shipment of Specimens	C. Eardly	Plant Protection Research Institute, South Africa	Entomology
Shipment of Specimens	B. Guéorguiev	National Museum of Natural History, Sofia Bulgaria	Entomology

Collections budget

הוצאות שכר

סך העלות	מספר משרות	
4,477,436	17.70	סה"כ אוצרים
1,901,556	3.50	אוצרים (1)
985,074	2	אוצרים - עמיתי מחקר
0	7	אוצרים בגמלאות
930,556	4	מדענים עולים
660,250	1.2	אוצרים נלווים (2)
0		אחר
3,791,779	15.68	סגל טכני (4)
8,269,214	33.38	סה"כ הוצאות שכר

מלגות

272,334	מלגות פוסט דוק
272,334	סה"כ מלגות

הוצאות שאינן שכר

105,000	הוצאות אחסון
74,000	הוצאות שימור
30,000	הוצאות תיעוד וקטלוג
45,000	הוצאות לשיפור מצב האוספים (3)
254,000	סה"כ הוצאות שאינן שכר

8,795,549	סה"כ הוצאות לפני הוצאות מנהל ומשק
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1,759,110	הוצאות מנהל ומשק (20%)
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10,554,659	סה"כ הוצאות
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מקורות מימון

1,881,000	השתתפות ות"ת:
175,000	השתתפות ות"ת - קמ"ע
1,706,000	השתתפות ות"ת
7,321,999	השתתפות מוסד:
2,529,776	השתתפות המוסד בהוצאות שכר האוצרים
2,506,779	השתתפות המוסד בהוצאות שכר הסגל הטכני
526,334	השתתפות המוסד בהוצאות שאינן שכר
1,759,110	השתתפות המוסד - הוצאות כלליות
1,354,660	הכנסות מגופים ציבוריים:
1,285,000	מענקי מחקר
66,660	משרד הקליטה
10,554,659	סה"כ הכנסות
0	עודף (גרעון)

- (1) שכר האוצרים מהווה 50% ממשרתם של אנשי הסגל הבכיר הפעילים במוסד ושהנם בעלי אחריות ישירה על אוספים ספציפיים.
- (2) שכר האוצרים הנילווים מהווה 20% ממשרתם של הפעילים במוסד .
- (3) הוצאות לשיפור מצב האוספים כוללות השלמת אוספים וטיפול במערך האיחסון.
- (4) לא כולל הוצאות והכנסות בגין קמפוס טבע
- לא נלקחה בחישוב הוצאה בסך כ-M6\$ הנדרשת למחשוב אוסף אנטומולוגי והעלאת קואורדינטות על נתוני אוספים.

תקציב מתוכנן של מרכז הידע התשתיתי לתקופה 1.12.2010-
30.11.2011

דו"ח כספי מפורט ישלח על ידי האוניברסיטה אחרי ה 30.11.2011.

128,000	הוצאות משכורת
20,000	רכישת ציוד מדעי
30,000	רכישת חומרים
39,400	תשלומים שונים
32,600	הוצאות מינהל ומשק-תקורה
250,000	סה"כ

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 national collections of natural history and all collections-based activities are recognized as a project of national significance. Therefore we felt that we would do well to have a Scientific and Public Council to represent 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

Yehudith Birk

Gedalya Gal

Dan David

Yael Dayan

Ariel Weiss

Samuel Hayek

Yossi Vardi (observer)

Ilan Chet

Yaakov Turkel

Ami Federman

Aaron Ciechanover

Shoni Rivnai

Shimshon Shoshani

Michael Steinhardt

Brian Sherman

Meir Shalev

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: Yehudith Birk (Chairperson), Tamar Dayan, Yossi Loya, Yael Lubin, Reuven Merhav, Rafi Mechoulam, Oded Navon, Ehud Spanier, Yossi Segal.

Steering Committee of the collections as a knowledge Center of the Ministry of Science: Yehudith Birk (Chairperson), Shai Avriel, Tamar Dayan, Bella Galil, Menahem Goren, Husam Massalha.

Sponsors' Steering Committee: Yeshayahu Bar-Or (Chair), David Mingelgrin, Miriam Freund, Yael Siman-Tov, Ofer Lugassi , 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): Michael Ottolenghi, Yossi Loya, Yael Lubin, Bella Galil, Alan Matthews. Observer: Ran Levy. Tamar Dayan and Menahem Goren direct the initiative.

Museum staff

Tamar Dayan	Department of Zoology	Director
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Curators (TAU faculty members)

Shai Meiri	Department of Zoology	Higher Vertebrates
Yoram Yom-Tov (emeritus)	Department of Zoology	Higher Vertebrates
Yehuda Benayahu	Department of Zoology	Invertebrates
Frida Ben-Ami	Department of Zoology	Mollusca
Amnon Freidberg	Department of Zoology	Entomology
Menachem Goren	Department of Zoology	Fishes
Lev Fishelson (emeritus)	Department of Zoology	Fishes
Dorothee Huchon	Department of Zoology	Molecular Systematics
Baruch Arensburg (emeritus)	Department of Anatomy & Anthropology	Physical Anthropology
Yoel Rak	Department of Anatomy & Anthropology	Physical Anthropology
Israel Hershkovitz	Department of Anatomy & Anthropology	Physical Anthropology
Nissan Binyamini (retired)	Department of Molecular Biology and Ecology of Plants Sciences	Fungi
Margalith Galun (emeritus)	Department of Molecular Biology and Ecology of Plants Sciences	Lichens
Jacob Garty (emeritus)	Department of Molecular Biology and Ecology of Plants Sciences	Lichens
Ya'akov Lipkin (retired)	Department of Molecular Biology and Ecology of Plants Sciences	Algae

Curators (TAU faculty members; new immigrants in various absorption schemes)

Silvia Blumenfeld	Department of Molecular Biology and Ecology of Plants Sciences	Fungi
Vladimir Chikatunov	Department of Zoology	Coleoptera
Vasiliy Kravchenko	Department of Zoology	Lepidoptera
Sergei Zonstein	Department of Zoology	Arachnidae
Andy Lehrer (retired)	Department of Zoology	Diptera
Yuri Katz	Department of Zoology	Paleontology
Olga Orlov-Labkovsky	Department of Zoology	Micropaleontology

Associate curators (faculty members)

Yossi Loya	Department of Zoology	Stony Corals
Micha Ilan	Department of Zoology	Sponges
Bella S. Galil	Israel Oceanographic & Limnological Research - Haifa	Crustaceans
Frida Ben-Ami	Department of Zoology	Mollusca
Dan Gerling (emeritus)	Department of Zoology	Hymenoptera
Abraham Hefetz	Department of Zoology	Entomology
Danny Simon	Department of Zoology	Formicidae
Ilan Yarom	Hazeva Research & Development	Diptera
Yael Mandelik	Faculty of Agriculture, Food and Environment	Apoidea
Eli Geffen	Department of Zoology	Molecular Systematics
Elazar Kochva (emeritus)	Department of Zoology	Herpetology
Roi Holzman	Department of Zoology	Herpetology

VATAT supported expert collections managers

Armin Ionescu-Hirsch, PhD	Department of Zoology	Hymenoptera
Daniella E. Bar-Yosef Mayer, PhD	Department of Zoology	Paleontology
David G. Furth, PhD	Department of Zoology	Entomology
Moshe Guershon, PhD	Department of Zoology	Apoidea
Wolf Kuslitzky, PhD	Department of Zoology	Hymenoptera
Stanislav Volynchik, PhD	Department of Zoology	Reptiles
Tamar Feldstein-Farksh, PhD	Department of Zoology	Porifera, Molecular Systematics
Sigal Shefer (Ramati), PhD	Department of Zoology	Porifera, Bryozoa

VATAT supported Post-docs

Claudia Drees
Merav Vonshak
Hadas Steinitz
Annat Haber
Corinna S. Bazelet

Technical assistants (assistant curators, collection managers, technicians, taxidermist)

Revital Ben-David-Zaslow, PhD	Department of Zoology
Avigail Ben-Dov	Department of Zoology
Tova Feller	Department of Zoology
Leonid Friedman	Department of Zoology
Igor Gavrilov	Department of Zoology
Armin Ionescu-Hirsch, PhD	Department of Zoology
Arieh (Reuven) Landsman	Department of Zoology
Erez Maza	Department of Zoology
Henk Mienis	Department of Zoology

Tatyana Novoselsky	Department of Zoology
Oz Rittner	Department of Zoology
Tzilla Shariv	Department of Zoology
Alex Shlagman	Department of Zoology
Tirza Stern	Department of Zoology
Stanislav Volynchik, PhD	Department of Zoology

‘Nature Campus’

Yael Gavrieli, PhD	Director
Anat Feldman	Content Development
Bat Sheva Rothman	Content Development
Tovia Eshcoly	Public Programs Coordinator

Part time employees

Gil Wizen	Department of Zoology
Nir Shtern	Department of Zoology
Daniel Berkowic	Department of Zoology
Elizabeth Morgolis	Department of Zoology
Tali Kuperman	Department of Anatomy & Anthropology
Yolia Avramov	Department of Anatomy & Anthropology
Vivian Sloan	Department of Anatomy & Anthropology

The Israel Taxonomy Initiative coordinator

Daniella Bar-Yosef Mayer, PhD	Department of Zoology
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