

The 3rd Israeli Conference for Conservation Science Species, Ecosystems, and People



Steinhardt Museum of Natural History, Tel-Aviv University 18-20th October 2022

Program & abstract booklet







זאגודה הישראלית

ולוגיה ומדעי הסביבה

The Israel Society of Ecology and Environmental Scier







Detailed program

Day 1 – 18.10.22					
8:30-9:30	Registration				
	Workshops:				
8:30-9:30	WS1: Erdi 1		WS2: Erdi 2		
	Sharing biodiversity data: past, present and		An introduction to species distribution		
	future Tomer Gueta		mo	models Eduardo Arlé	
9:30-9:45	Tamar Dayan, Uri Roll Openin	ng greeting Au	ditorium		
0.45 10.45	Plenary:				
9:45-10:45	Mark Burgman Making a science of expert judgement for conservation				
10:45-11:15	Poster session + coffee				
	Invited talks:				
	Auditorium: Miriam Beli	maker	Erdi 1:	Rabbi Yonatan Neril	
11:15-12:00	Through the looking glass: A v	view from the	Faith and Sc	ience Earth Alliance: Bridging	
	past on nature conservation		the gap between religion and environmental		
				science	
	Contributed talks				
12:00-13:00	CT1: Auditorium	CT2: Erdi 1		CT3: Erdi 2	
	Endangered species	Pollution and enrichment		Agroecosystems	
12.00 12.15	army bunkers along the Jordan River	nutritional compounds in seaweeds via		system-zoonotic risk interface using	
12.00-12.15	into bat roosts – summary	abiotic stressors in integrated		scenario analysis	
	Keren Klass Black howler monkey	Nir Band * Nitrogen enrichment is a		Michal Handel * Designing effective	
12.15-12.30	dispersal, demography, and population	global driver of species loss in grassland		ecological corridors in agroecosystems: Arable fields impede and field margins	
12.15-12.50		ecosystems		facilitate the movement of some bird	
	Tal Polak Hard lessons: Findings from a	Gal Varad L Assassment of plastic		species	
12.30-12.45	three-year pilot of hard-releases in the	pollution in the tropical coral reefs of		Israel's national pest control project –	
12.30-12.43	Israel Arabian oryx (<i>Oryx leucoryx</i>) reintroduction program	Eilat, a highly tourist northern tip of the R	ouristic city in the rainfall and land-use predict breeding success	rainfall and land-use predictors of breeding success	
	Ron Efrat * Captive-breeding has long-	-			
12:45-13:00	lasting effects on migratory proficiencies of reintroduced Egyptian vultures				
12:45-14:00	Lunch				
	<u>Symposia:</u>				
14.00-15.20	SE1: Auditorium			SE2: Erdi 1	
14:00-15:30	Systematic conservation planning for Israeli E		Engaging the public in nature conservation		
	wildlife Chairs Uri Roll & Enav Vidan Ch		air Yaela Golumbic		
	Contributed talks				
15:30-16:30	CT4: Auditorium	CT5: Erdi 1		CT6: Erdi 2	
10.00 10.00	Climate change	Urban ecology		Citizen science and	
				protected areas	



<u>Day 1 – 18.10.22</u>			
15:30-15:45	Gidon Winters Predicting the combined effects of warming and nutrient increase on the tropical seagrass Halophila stipulacea	Yuval Itescu Life in urban cemeteries – what shapes it?	Asaf Ben-David The effect of urban and rural land use on small mammals community – results from citizen science research
15:45-16:00	Ronen Liberman * Can "going deeper" be a viable refuge for corals?	Lior Ventura * Assessing the contribution of cities to regional biodiversity – insights from a large-scale systematic bird survey across urban, rural, and natural areas	Omer Darel * Insights on the ecology, life history and conservation of an endangered amphibian species achieved through a multi-year citizen science project
16:00-16:15	Shahar Chaikin * Poleward shifts of leading-edge marine fish populations may drive an abundance collapse	Jessica Schäckermann Migratory birds, a farmer's best friend: How bio-pest control approaches can protect birds and crops simultaneously	Maya Mayrose It is TiME for education!
16:15-16:30	Tom Morav * Mesophotic refuge? Genetic connectivity among sponges' populations in Israeli Mediterranean coast	Reut Vardi COVID-19 effects on large mammals in urban centres in North America	Nitzan Dan-Rakedzon * The experience of nature in Protected Areas
16:30-17:30	Beer, snacks, posters and best poster prizes		
17:30 -	Field trip: bats in the city		





<u>Day 2 – 19.10.22</u>					
8:30-9:30	Registration				
	Contributed talks				
9.30-11.00	CT7: Auditorium	CT8: Erdi 1		CT9: Erdi 2	
9.30-11.00	Landscape and	Conservation policy and		Aquatic and marine	
	macroecology	planning		habitats	
9:30-9:45	Asaf Tsoar Applied use of remote sensing for biological conservation	Lihi Barkan A novel eco-friendly code of conduct for artificial light at night		Tamar Guy-Haim Shedding light on the Ophel biome: New biodiversity discoveries in Israel's subterranean aquatic habitats	
9:45-10:00	Gilad Ben Zvi Bioindicator-focused invertebrate monitoring raises concerns over climate change impact on the Negev Mountains ecosystem	Simon C. Nemtzov When biological conservation and biotechnology clash: An update on what the Post-2020 Global Biodiversity Framework means for Israeli researchers and for the biotech industryMatan Yuval * 3D imaging reveals coral reef resilience; lessons from a shallow coral reef		Matan Yuval * 3D imaging reveals coral reef resilience; lessons from a shallow coral reef	
10:00-10:15	Francesca Falco * The potential of area-based measures for landscape- scale farmland biodiversity conservation	Ronit Justo-Hanani Risk regulation of alien invasive species in Europe and the United States Ori H subst Israe prote		Ori Hepner * Characterizing soft substrate fish communities along the Israeli coastline to facilitate marine protected area planning	
10:15-10:30	Eduardo Arle CNA – the Cumulative Niche Approach: A correlative framework to examine the fundamental niche of species considering the native and alien ranges	Guy Rubinstein Maximizing the environmental benefits of fish ponds, for the benefit of all stakeholders		Tal Gavriel * Striking recovery of the reef fish community after an extreme storm event in the Gulf of Aqaba	
10:30-10:45	Adi Elmaliah * Mapping and assessing cultural ecosystem services and their spatial correlation with biodiversity Israel's Arava Valley	Inbar Schwartz Belkin * A review of geospatial technologies for improving marine spatial planning: challenges and opportunities		Noam Leader Artificial light at night on nesting beaches of the green sea turtle, <i>Chelonia mydas</i> , in the eastern Mediterranean and future implications on sea turtle conservation	
10:45-11:00	Amir Lewin Current and future land- uses, conservation status and overlap of global arid landscapes	Gabriel Caetano From reactive to proactive conservation – a new extinction risk index focused on the future		Orr Comay Marine ecosystems are more sensitive to climate change than terrestrial ones	
11:00-11:15	Coffee				
	Symposia:				
	Invited talk: Erdi 1		Symp	nposium SE3: Auditorium	
11:15-12:45	Yaron Ziv Current principles	of ecological Information		and conservation decisions in	
	restoration with examples from	nples from the Oron- the strat		gic planning of Israel Chair Nir	
	Tzin restoration ecology project		Angert		
12:45-14:00	<u>Lunch</u>				
	Workshops:				
14:00-15:00	WS3: Erdi 1			WS4: Erdi 2	
14.00-13.00	How to publish in conservation biology		Tips and tricks for using iNaturalist Tomer		
	journals Mark Burgman		Gueta		
	Contributed talks				
15:00-17:00	CT10: Auditorium	CT11: Erdi 1		CT12: Erdi 2	
	Endangered species	Impact of threats on		Invasion / evolution / fitness	
		populations and behaviors			
15:00-15:15	Maya Weinberg * Seasonal challenges of Rousettus bats in temperate zones	Noam Ben Moshe * light pollution in Isra ecological and spati main findings of the Nature Report	An overview of ael from an al perspective – Israel's State of	Amir Arnon * Diet composition and quality of sympatric mountain gazelles (<i>Gazella gazella</i>) and cattle: A NIRS and metabarcoding-aided study	



<u>Day 2 – 19.10.22</u>			
Ma ext 15:15-15:30	argareta Walczak Conservation of tremely rare endangered plants in ael	Inbal Schekler * How many passerines migrate through Israel and where do they stop to rest? Evidence for dramatic decrease in the amount of passerine migration	Nili Anglister * Mycoplasma in griffon vultures in Israel: Population restocking with imported individuals might be enhancing pathogen prevalence
15:30-15:45	mrod Marom Water voles in Israel: nover, extinction, and potential ntroduction	Yael Lehnardt* Mapping potential impacts of traffic noise on bird density in non-urban Israeli environments reveals alarming consequences	Mor Binder * The transgenerational effects of stress on reproduction strategy in the mixed mating plant Lamium amplexicaule
15:45-16:00 pot spe suc	erav Lebel Vine * Quantifying the tential niches of endangered plant ecies for improving reintroduction ccess	Sasha Pekarsky Open surface mining blast impact on movement patterns of an endangered vulture	Alejandro Alaman * Anthropogenic habitat modification influences the fitness and life history traits of a cooperative breeder
Gid 16:00-16:15	deon Vaadia * Acceleration-based note classification of griffon vulture haviour as a conservation tool	Einat Zahabian * Wildlife behavioral responses to anthropogenic disturbances around natural water sources in the desert	Manuel Jesus Garcia Serrano * Study of the fitness differences between alien and native populations of <i>Cicerbita</i> <i>alpina</i> (L.) Wallr. in the United Kingdom
Pel of 1 16:15-16:30	leg Lanir * Genetic characterization the Oryx leucoryx population in Israel	Yiftach Golov * Tracking the invisible: Extrapolated dispersal model of the "disruptive pheromone" using a fluorescence-marked-pheromone nanoparticle	Sharon Moscovitz * Invasive, eruptive, and non-pest snail population dynamics on a source to fishpond gradient in Emek HaMa'ayanot
16:30-16:45 16:30-16:45 Ma ma Isra	ohir Gidron * Constructing a bochastic population model and entifying key ecological corridors of acQueen's bustard (<i>Chlamydotis</i> acqueenii) in the northern Negev, ael	Amir Perelberg Cattle grazing effects on Basidiomycotina and Ascomycotina fungi in a Mediterranean woodland ecosystem in the Upper Galilee, northern Israel	Krista Oswald Do small human settlements represent potential ecological traps for Arabian babblers?
Ally 16:45-17:00	y Harari Human effects on mating nals in a moth	Dror Denneboom * Effects of traffic volume and road attributes on roadkill probability	Itaii Applebaum * The effect of the invasive plant <i>Acacia saligna</i> on soil fungal community in a Mediterranean sand dune ecosystem
17:00-18:00 <u>Be</u>	Beer, snacks and best lecture prizes		
18:00- <u>Fie</u>	<u>eld trip</u> : botanical garden		





Day	3 – 20.10.22 - Marine reserves and protected areas (Auditorium)
8:30-	Registration
9:00-9:15	Ruthy Yahel, Jonathan Belmaker Opening greeting
	Plenary:
9:15-10:00	Sylvaine Giakoumi Mediterranean MPAs: Strengths, challenges, opportunities, and
	expectations (remote lecture)
Gitai Yahel Invading bivalves replaced the native Levantine populations, but th	
10:00-10:20	has a negligible effect on the local benthic community
10:20-10:40	Sarah Ohayon Spatial patterns of fish biomass across MPAs borders
10:40-10:50	Discussion [Hebrew]
10:50-11:00	Coffee
11:00-11:20	Sigal Shefer Our journey from mesophotic sponge grounds to marine protected area
	Yizhag Makovsky Cost effective baseline and monitoring for rocky marine protected areas
11:20-11:40	(MPAs) at the edge of the Israeli Mediterranean shelf
11.40 11.50	Gil Rilov Mapping Mediterranean ecological hotspots with public knowledge – results,
11:40-11:50	challenges and insights
11:50-12:00	Dror Zurel Discussion [Hebrew]
12:00-12:30	Coffee
12.20-12.00	Ruthy Yahel, Ori Frid, Rei Diga, Mai Lazarus The bioblitz survey: effects of marine protected
12.50-15.00	areas
	Anat Tsemel Results from surveys of the rocky reef and apex predator presence in Hof
13:00-13:10	HaSharon, and suggested nursery grounds for the blackchin guitarfish along the Hof HaSharon
	and Evtach coastal reserve
13:10-13:30	Omri Bronstein, Yahushua Shkedy An integrated monitoring program for Israel's
	Mediterranean marine reserves
13:30-13:40	Ruthy Yahel Discussion [Hebrew]
13:40-14:30	Lunch
14:30-14:50	Ayah Lazar Protected Areas Connectivity in the Israeli Mediterranean Waters -a
	biophysical modeling approach
14:50-15:10	igal Berenshtein Proposed Marine Protected Areas (MPAs) support regional and local
15.10 15.20	
15.10-15.20	Vahushua Shkadu I Open discussion: implementing scientific findings and the payt stops
15:20-15:40	[Hebrew]
	Inauguration of the marine biodiversity center
16:00-16:15	Tamar Davan, Roi Holzman I. Opening greeting and overview of the center
10.00 10.15	Plenary:
16:15-17:00	Sean Connolly I Commonness and rarity in marine systems: the curse of dimensionality and
	the challenge of understanding high-diversity systems
17:00-17:30	Noa Shenkar What's in my jar? Underwater discoveries
	Panel: Using museum collections to guide marine management [Hebrew]
17:30-18:00	Participants: Tamar Davan, Noga Kronfeld-Schor, Yahushua Shkedy, Micha Ilan, Rotem Trivizki
18:00-	Cocktail reception



Poster presentations

Presenter	Title
Darar Bega*	Environmental changes and the evolution of senescence
Yonatan Bendett*	Microbiome-related aspects of locust density-dependent phase transition
Gabriel Caetano	Evaluating global progress in awareness of biodiversity and conservation action worldwide
Shlomo Cain*	Anthropogenic effects on mortality of free-ranging barn owls
Gad Degani*	The black and yellow spot pattern of salamander (<i>Salamandra infraimmaculata</i>) in various habitats at the southern border of its distribution
Francesca Falco*	Recent evidence of scale matches and mismatches between ecological systems and management actions
Eli Finarov*	Catch me if you can: Mitigation of common myna abundance in protected areas
Carmi Korine	Urban bats and their ecological services
Noam Leader	Reptile Scales: A rapid screening method of exotic reptiles for invasion risk assessment
Aliza Leit*	Testing Methods for the Restoration of Vermetid Reefs
Liran Sagi*	What impact may climate change have on nest site selection in a desert lizard?
Jessica Schackermann	The impact of Social Structure on Open-Land Development Preferences in the Southern Arava
Jessica Schackermann	What is 'eco' about 'ecotourism'? Defining a coherent definition of ecotourism for the hyper-arid deserts
Nitzan Segev	Evaluation of Bat Activity and Diversity in Three Habitats of Wadi Shita
Ole Johannes R. Soerensen*	Eastern Mediterranean habitat classification using sonar images: A novel technique for the study of habitat-species interactions

* Participating in the best contributed talk / poster presentation competition





Plenary lecture:

Making a science of expert judgement for conservation

Mark Burgman^{1*}

^{1.} Centre for Environmental Policy, Imperial College London

* mburgman@conbio.org

Conservation scientists measure impacts in terms of species extinctions and ecosystem collapse, and practitioners typically seek solutions that pre-empt irreversible change. Present challenges such as global losses of biodiversity and social-ecological systems require efficient and timely action. Decisions need to be made quickly, yet the data and understanding necessary to assess problems and provide unequivocal solutions are typically unavailable, incomplete, dated, or biased. These issues are amplified by a suite of surprisingly common procedures and actions that – without malicious intent – misuse or misrepresent data and analyses, generating spurious results and misleading advice. Here, I review the quality and reliability of expert opinion used to fill information gaps and assess the quality of scientific evidence, present some recent empirical results on the limits of ecological judgement, and discuss the prospects for improving expert scientific judgement.



Plenary lecture:

Mediterranean MPAs: strengths, challenges, opportunities, and expectations

Sylvaine Giakoumi^{1*}

¹ Department of Integrative Marine Ecology, Sicily Marine Centre, Lungomare Cristoforo Colombo

* <u>sylvaine.giakoumi1@gmail.com</u>

Marine protected areas (MPAs) play a fundamental role in marine biodiversity conservation. A metaanalysis of studies on 24 Mediterranean MPAs revealed significant positive effects of protection for previously fished species. Total fish biomass and density were on average 2.25 and 1.37 times greater, respectively, in the fully protected areas of the MPAs compared to unprotected locations. Only 0.23% of the Mediterranean Sea is no-take or highly protected. Some of the factors that might have contributed to this low percentage include: inadequate funding, the lack of stakeholder engagement, the low enforcement and compliance, and the lack of political will. The EU Biodiversity Strategy for 2030 gives the opportunity to increase biodiversity conservation in the Mediterranean Sea by setting the conservation target that 30% of European seas should be protected. Worldwide, the target 30x30, i.e., protecting 30% of the ocean by 2030, is being adopted. MPAs are vulnerable to pressures occurring beyond their borders, such as land-based pressures, and complementary management actions are needed. MPAs are unlikely to protect marine ecosystems from heat waves. Fifteen years after the 2003 heat way, corals in the Scandola Reserve have not recovered yet. In such cases, active restoration actions might be needed.



Plenary lecture:

Commonness and rarity in marine systems: the curse of dimensionality and the challenge of

understanding high-diversity systems

Sean Connolly 1*

^{1.} The Smithsonian Tropical Research Institute, Panama

* <u>ConnollyS@si.edu</u>

A major challenge for conservation and global change biology is projecting the effects of species interactions on community dynamics. This challenge is particularly salient in highly species-rich systems, where species-by-species quantification of all potentially relevant species interactions is logistically and statistically infeasible, due to a phenomenon known as the "curse of dimensionality". In this talk, I will use coral reefs as a model system to explore the promise of several alternative approaches to overcome this problem. I will begin with neutral ecological approaches that make highly restrictive symmetry assumptions, and largely fail to capture important features of community dynamics. I will then explore somewhat more flexible approaches that use statistical distributions to allow demographic traits to vary among species, but do not aim to attribute particular trait values to particular species. Such approaches can robustly characterize aggregate community properties, such as distributions of commonness and rarity and the relative importance of stochastic demographic fluctuations in community dynamics, but cannot be used for species-level inference. I will conclude by presenting work that uses contemporary, reduced-parameter statistical innovations to estimate species interactions and patterns of covariation in species' responses to environmental fluctuations. This work provides remarkably statistically robust, species-level characterization of demographic characteristics and interactive effects on other species, making possible the rigorous incorporation of community dynamics in the projection of biodiversity futures, in response to both adverse anthropogenic impacts as well as to interventions designed to protect or enhance biodiversity and ecosystem functioning.



Workshop:

Sharing Biodiversity Data: Past, Present and Future

Tomer Gueta^{1*}

^{1.} Steinhardt Museum of Natural History, Tel Aviv University

* tomergu@tauex.tau.ac.il

Over the past twenty years, an extensive global effort has been made to gather raw biodiversity data and make them accessible. As a result, many open data platforms have emerged, which are aggregated by the Global Biodiversity Information Facility (GBIF). The most commonly used data standard in the GBIF community is Darwin Core, which provides a simple and effective framework to support the growth of species occurrence data. It may, however, result in a loss of data richness due to oversimplification, which hinders data interoperability and reusability. Therefore, biodiversity data standards should be able to accommodate a broader range of data types, which would allow for richer and more complex data types to be shared globally. In this workshop, we will provide a brief overview of Darwin Core and discuss the differences between the data structures of major biodiversity platforms such as eBird and iNaturalist. We will also present the ongoing work of GBIF and the community of data publishers and data users to produce and review various use cases. Through these use cases, a unified data model is being developed - one that supports a wide range of needs and enhances data sharing capabilities.



Workshop:

An introduction to species distribution models

Eduardo Arlé^{12*}

^{1.} School of Zoology, Tel Aviv University

² German Centre for Integrative Biodiversity Research (iDiv), Halle-Jena-Leipzig

* eduardo.arle@idiv.de

Species distribution models are a powerful tool in ecology and biogeography. Recent efforts have rapidly increased the availability of data on species occurrences and on environmental conditions. These freely available data, combined through classical and innovative statistical approaches, offer multiple research opportunities. SDMs' applications include identifying priority areas for conservation, finding new populations of rare species, forecasting distributions under global change scenarios, reconstructing species historical ranges, predicting and preventing biological invasions, amongst others. This workshop will offer a theoretical introduction to the ecological concepts and methods underlying SDMs. The participants are invited to perform practical examples in R, exploring some of the possibilities offered by this tool.



Workshop:

How to publish in conservation biology journals?

Mark Burgman^{1*}

^{1.} Centre for Environmental Policy, Imperial College London

* mburgman@conbio.org

Advice and a Q & A session by the Editor-in-Chief of the journal Conservation Biology



Workshop:

Tips and Tricks for Using iNaturalist

Tomer Gueta^{1*}

^{1.} Steinhardt Museum of Natural History, Tel Aviv University

* tomergu@tauex.tau.ac.il

iNaturalist crowdsources biodiversity observations collected by citizen scientists. Since 2008, more than 380,000 species have been collected by over 2.2 million people on iNaturalist, with 265,000 people helping others identify them. Research, conservation and policy have all benefited from iNaturalist data. This workshop will provide background and hands-on experience for scientists to engage with iNaturalist and attain scientific value from this platform. The workshop will begin with an introduction to the main features of the web platform and mobile apps, supported by hands-on practice sessions. This will be followed by reviewing key concepts, such as the community identification scheme, types of projects, sensitive species data handling, and an overview of the computer vision feature. Lastly, we will discuss real-world applications of iNaturalist. Neither prior knowledge of iNaturalist nor experience with the platform are required for this workshop. We request that you sign up to iNaturalist and download the mobile app in advance.



Symposium:

Systematic conservation planning for Israeli wildlife

Organizers: Enav Vidan^{1*}, Dotan Rotem², Yoram Yom-Tov³, Uri Roll¹

- ¹ Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev
- ^{2.} Israel Nature and Parks Authority
- ^{3.} School of Zoology, Tel-Aviv University
- * enavidan@gmail.com

This symposium and its consequent round-table discussion is dedicated to planning and implementing systematic conservation planning (SCP) in the terrestrial and marine environments of Israel. The symposium includes four lectures that present overviews and new comprehensive efforts to conduct systematic conservation planning for Israel's nature.

Lectures in the symposium:

Yoram Yom-Tov (Tel-Aviv University) – The need for a systematic approach for protecting Israel's wildlife in light of extreme changes to it in the past, and its dire future prospects

Enav Vidan (Ben-Gurion University) – Building a Systematic Conservation Plan for Israel's land vertebrates, challenges and promises

Ateret Shabtay (Society for the Protection of Israel) - Conservation planning of the Israeli exclusive economic zone: Meeting global conservation targets where development is rapidly growing

Yoav Sagi (Israel's Open Landscapes Institute) – Moving the goalposts: how to incorporate conservation narratives in policy and planning

Round-table discussion:

Tamar Raviv - Head of the open landscapes and biodiversity unit in the Israeli Ministry of Environmental Protection

Alon Rothschild- Head of the biodiversity unit, the Society for the Protection of Nature in Israel

Asaf Tsoar – Head of the environmental department of the Israeli Nature and Parks Authority



Symposium:

Social dimensions in nature conservation

Organizers: Yaela Golumbic^{1*}

^{1.} The Steinhardt Museum of Natural History, Tel Aviv University

* yaelago@tauex.tau.ac.il

Protecting natural resources and wildlife is a crucial element for ensuring our future existence and livelihood on the planet. At the same time, it is a task too large and too complex to accomplish without greater involvement and engagement of society. Public participation in environmental causes can be as small as reducing personal use of consumables, through participating in citizen science research and as large as planning and executing civil action for contesting development plans. The importance of involving the public in nature, demands an ongoing effective conversation between the public and environmental stakeholders, discussing environmental action, conservation and preservation and raising awareness of diverse audiences to nature protection matters.

This session will discuss the many social dimensions related to nature conservation and the importance of mobilizing and engaging with the public in order to achieve these goals. The session will feature speakers from a range of social science disciplines, each approaching nature conservation from a unique socio-scientific perspective. Topics to be discussed include science communication, public involvement in science, citizen science, interfaces between academia and society, creating dialogue between scientists and the public, social activism, public involvement in nature conservation and environmental education. Following short presentations, we will conduct a panel addressing the complex social environment related to nature conservation in Israel and practical steps the nature conservation community can take to encourage public discourse and harness the public power for addressing existing environmental challenges.

Speakers

Dr. Yael Barel-Ben David, Citizen Lab, Technion-Madatech. Science Communication and Public Engagement with science

Prof. Ayelet Shavit, Tel Hai College. Interfaces between Academia, Science and Society and the importance of creating discourse

Dr. Itay Greenspan, The Hebrew University. Social activism and the importance of public involvement for the implementation of nature conservation

Prof. Orit Asraf Ben Zvi, Ben Gurion University. Environmental education

Nadav Gofer, GreenStep. Nature monitoring as a means of education for nature conservation



Symposium:

מידע אקולוגי במשפיע על התבנון האסטרטגי בישראל Information and conservation decisions in the strategic planning of Israel

Organizer: Nir Angert^{1*}

^{1.} Israel Nature and Parks Authority

* <u>nir@npa.org.il</u>

בעולם התכנון קיים מדרג תכנוני – תכניות ברמה הארצית ובהן תכנית ארצית משולבת (תמ"א 35) תכנית ארצית שמאגדת חלק מהתכניות ארציות (תמ"א 1) וכן תכניות מתאר ארציות מתאריות או מפורטות לנושאים ספציפיים ברמה המחוזית קימות תכניות מתאר מחוזיות ובחלק מהשטח תכניות מחוזיות חלקיות לאזורים ספציפיים. רוב תכניות המתאר המחוזיות תוכננו לשנת יעד שהגיעה או שאנו בסמיכות אליה. ברמה שמתחת קיימות - תכניות כוללניות ותכניות מפורטות. ככלל תחום הדיור מוגדר בתמ"א 35 לפי המרקמים השונים ולוחות לפי סיווגי ישובים, הביטוי ברמה המרחבית מפורטות. ככלל תחום הדיור מוגדר בתמ"א 35 לפי המרקמים השונים ולוחות לפי סיווגי ישובים, הביטוי ברמה המרחבית הוא בתכניות המחוזיות. כל התכניות האלו לוו ע"י צוותי תכנון רב תחומיים וניתן בהם ביטוי למידע האקולוגי שהיה באותה תקופה. קיים כיום מידע אקולוגי רב במאגרי מידע שונים וכן נעשים סקרים רבים, למעשה רוב התכנית המפורטות החדשות מלוות במסמך סביבתי שבוחן את הערכים בשטח ואמור לכוון את התכנון. זה המצב הקיים, ככל הנראה אין בו די

המועצה הלאומית לבלבלה הבינה עבודת מטה על צרבי הדיור העתידיים שתורגמה להחלטת ממשלה, מנהל התכנון נענה לאתגר והמועצה הארצית החליטה על עריבת תכנית אסטרטגית לשנת היעד 2040. התכנית אמורה הייתה לכלול מענה לצרבי הדיור וכן פרקים נוספים נלווים- תשתיות, חקלאות ושטחים פתוחים(אקולוגיה ותרבות). במסגרת זו נעשתה עבודה רבה בצוותי עבודה פרטניים, העבודה הוצגה בועדת המשנה של המועצה הארצית אך נתקלה בביקורת שאין בה כדי לענות על צרכי הפיתוח העתידיים, בימים אלו בוחנים את המשך העבודה. במקביל, ואולי כהעתקת המודל המוצלח של ישראל 2020 שהייתה הבסיס להכנת ואישור תמ"א 35, מקודמת יוזמת ישראל 100 עבודה אקדמית של מומחים משבעה מוסדות אקדמיים בשיתוף גורמים רבים, את הפעילות מרכזים ומתאמים חברי המטה של ישראל100 מומחים משבעה מוסדות אקדמיים בשיתוף גורמים רבים, את הפעילות מרכזים ומתאמים חברי המטה של ישראל100 במסגרת המרכז לחקר העיר והאזור בטכניון .עבודה נוספת נעשית על ידי תנועת אור, החזון שגיבשו- "ישראל 2048 עתיד משותף "להפיכת הנגב והגליל למרכזי חיים עצמאיים ומשגשגים, אשר יהוו אבן שואבת לכלל חלקי האוכלוסייה ויהיו מנוע לשגשוג ולצמיחה לאומית". התנועה פועלת לישומו באמצעות מהלבי מדיניות, אסטרטגיה, התיישבות, קידום מודעות והסברה, משיכת השקעות ויישום של מאות יוזמות ופרויקטים מחוללי שינוי במגוון תחומי חיים.

המושב יעסוק בין השאר בשאלה-האם ניתן לתכנן מענה לצרכי הפיתוח העתידיים של ישראל ועדין לשמור על טבע מתפקד? מה המתכון האפשרי לכך?

כל מרצה ישאל שאלה זהה - האם לדעתך ניתן לתכנן מענה לצרכי הפיתוח לישראל בשנת 2048 ועדין לשמור על טבע מתפקד? מה המתכון האפשרי לכך?

- התייחסות לשמירת טבע בתכנון קיים/תכנון אסטרטגי, ממעוף הציפור-ניר אנגרט, רט"ג
- אם יש בפני מקבלי ההחלטות מידע אקולוגי טוב, זמין ומכוון אסטרטגית- ד"ר אסף צוער, רט"ג 🔹
 - פרק המים והנחלים בתכנית האסטרטגית- מר אסף זנזורי, חלה"ט
 - צרכי המדינה בתחומי הדיור והתשתיות בראיה אסטרטגית- מר שחר סולר, מנהל התכנון
 - ישראל 100- אדריבלית נוף מתניה ז״ק ,הטבניון ישראל100 •



Panel:

שימוש באוספים ככלי לתכנון סביבתי מבוסס נתונים Using museum collections to guide marine management

Organizer: Roi Holzman^{1,2,*}

^{1.} School of Zoology and the Steinhardt Museum of Natural History, Tel Aviv University

^{2.} Inter-University Institute of Marine Science, Eilat (IUI)

* holzman@tauex.tau.ac.il

אוספים ביולוגיים מהווים את בסיס הידע על ההיסטוריה הארוכה והקרובה של מינים וחברות, ויש להם תפקיד מרכזי במחקר פלאנטולוגי, אבולוציוני, ותרבותי. לאוספים ביולוגיים תפקיד מרכזי בתעוד והבנה של השפעת האדם על סביבתו הביולוגית וההשפעה של ארועים היסטוריים על מערכות אקולוגיות. לאור ההשפעה חסרת התקדים של האדם על סביבתו בעידן ה"אַנְתְרוֹפּוֹקֶן" (Anthropocene), עולה הצורך הבוער לנהל את הסביבה הטבעית באופן מושכל ומבוסס נתונים. מטרת הפאנל היא לדון בהתאמת האוספים הקיימים לסייע לתכנון מושכל, ובהתאמות הנדרשות למאמצי האיסוף הנוכחיים כדי לשרת טוב יותר את אתגרי התכנון של מדינת ישראל.

<u>משתתפים:</u>

פרופסור תמר דיין, יו״ר מוזיאון הטבע ע״ש שטיינהרדט, ובית הספר לזואולוגיה באוניברסיטת ת״א פרופסור נגה קרונפלד-שור, המדענית הראשית של המשרד להגנת הסביבה ד״ר יהושע שקדי, המדען הראשי של רשות שמורות הטבע פרופסור מיכה אילן, מוזיאון הטבע ע״ש שטיינהרדט, ובית הספר לזואולוגיה באוניברסיטת ת״א רותם טריביצקי, מנהלת פיתוח וחדשנות ימית, חברת אתרים



Invited talk:

Current principles of ecological restoration with examples from the Oron-Tzin large-scale

restoration ecology project

Yaron Ziv^{1*}, Talia Gabay², Tom Zylberberg³, Nathan Levi², Osnat Gillor², Arnon Karnieli², Tarin Paz-Kagan⁴,

Zehava Siegal³, Yael Zilka², Tomer Karni², Guy Rotem²

- ^{1.} Department of Life Sciences and School of Sustainability and Climate Change, Ben-Gurion University of the Negev
- ^{2.} Ben-Gurion University of the Negev
- ^{3.} Israel Nature and Parks Authority
- ^{4.} Agricultural Research Organization, Volcani Center
- * yziv@bgu.ac.il

Large demolished areas, such as mining sites, require a strategic, active ecological restoration. Advanced sizable restoration projects recommend, among others, the need for: (1) Understanding the characteristics of the restored natural ecosystem; (2) Designing an Entity-Relationship Process-Based Model to identify the major constraints and bottlenecks; (3) Applying an ecosystem oriented approach to study different functional groups; (4) Employing aggressive practices that change the habitat structure to overcome low-productivity, post-disturbance local stability; (5) Taking into account long-term transition phases that do not necessarily reflect the desired ecosystem; (6) Considering climate change of the ecosystem since the time it has been disturbed. In line with these principles, we study the restoration of Oron-Tzin phosphate mines. We designed a PRPB Model and identified the system's constraints to study specific elements, such as bacterial communities and soil biocrusts, plants and arthropods. Paired natural-restored comparisons showed that some restored sites are better restored, probably due to their soil properties and terrain. However, time from restoration is not indicative of restoration success as different sites have very different geologic and geographic features. Based on our findings, a new large-scale restoration planning is now promoted to advance the establishment of native plants and animals.



Invited talk:

Through the looking glass: a view from the past on nature conservation

Miriam Belmaker^{1*}

^{1.} The University of Tulsa

* miriam-belmaker@utulsa.edu

Decisions about conservation areas, extent, and focus combine economic policy and ecological and conservation science, among others. Usually, paleontology and paleoecology are missing from the conversation. In this paper, I will discuss the four key issues that stem from current paleoecological studies, and which bear direct relevance to current conservation science and decision-making. Since environments, communities, and species are everchanging, not only at evolutionary time frames but ecological ones, what are the communities or species we aim to conserve – the current environment ca. 2022, which differs significantly from that 100, 1000, and 10,000 years ago? If we focus on community structure, do we wish to include non-analog communities, such as giraffes, baboons, buffalo, and deer, in the same region, that do not co-inhabit the same environment today? Do we wish to provide species with the diet and environment they eat today or acknowledge that the same species 1000 years ago may have had a different diet? When do we determine stasis in the community if we know that during the Pleistocene, communities changed drastically over shorter periods? Several case studies from the Southern Levant will be described and discussed, highlighting each situation. Solutions will not be offered.



Invited talk:

Faith and Science Earth Alliance: Bridging the gap between religion and environmental science

Rabbi Yonatan Neril^{1*}

^{1.} Interfaith center for sustainable development

* <u>yneril@interfaithsustain.com</u>

The tremendous gap between many faith adherents and environmental science represents a significant challenge to achieving a sustainable humanity. Billions place their faith in the world's many religions and spiritual paths. Billions respect the scientific view of the material universe. Many hold both the spiritual and scientific views with equal respect. Science provides valuable insights into cause and effect and can help us address our climate and habitat challenges. Religion has been a channel for moral and ethical instruction across the ages and can help us to address the roots of the ecological crisis. We need scientific research to define problems and direct solutions, but science alone will not solve the ecological crisis. According to a Pew study, over 80% of the world's population identifies with a religion, but most do not teach or preach on environmental issues. Unless religion gets on board, we won't solve the underlying issues of greed, short-term thinking, and pleasure seeking in the physical. Faith and science need to work together, and this session will explore some ways that can happen. In the words of E.O. Wilson, famed scientist and educator, in his book The Creation: An Appeal to Save Life on Earth, "Religion and science are the two most powerful forces in the world today... If there is any

moral precept shared by people of all beliefs, it is that we owe ourselves and future generations a beautiful, rich, and healthful environment." Leveraging their combined potential will catalyze solutions to issues of environmental concern.



Invited talk:

What's in my jar? Underwater discoveries

Noa Shenkar^{1,2,} *

^{1.} School of Zoology, Tel Aviv University

^{2.} The Steinhardt Museum of Natural History, Israel National Center for Biodiversity Studies, Tel Aviv University

* noa.shenkar@gmail.com

Taxonomy is the biological discipline that identifies, describes, classifies and names extant and extinct species and other taxa. Since the beginning of Linnaean nomenclature in 1758, taxonomists have been describing and naming thousands of species every year with numbers that rapidly increase for many groups of organisms due to the incorporation of new tools for discovery and the exploration of poorly known areas of the planet. The marine environment offers a fascinating ground for new species discoveries that contribute significantly to our understanding of fundamental questions in biology together with biotechnology development. However, it also presents great challenges for sampling and research. Particularly, for less "popular" groups of organisms from overlooked phyla. Yet, the study of such taxons is crucial for understanding the complexity of marine ecosystems. Development and exploitation of coastal areas along the Mediterranean and Red Sea coasts of Israel further demands a meticulous understanding of the local fauna in view of the arrival of non-indigenous species and climate change. Here at the Steinhardt Museum of National History we actively promote the collecting and gathering of knowledge regarding the marine fauna of the region in view of the rapid changes our oceans are facing, and provide the international scientific community a fertile ground from which to embark on additional studies on these unique organisms.



Abstracts for contributed talks and poster presentations





Anthropogenic habitat modification influences the fitness and life history traits of a

cooperative breeder

Alejandro Alaman^{1*}, Enrique Casas², Oded Keynan³, Manuel Arbelo⁴, Lee Koren⁵

^{1.} Goodman faculty of Life Science, Bar-Ilan University

^{2.} Earth and Atmosphere Observation Group, University of La Laguna, Tenerife, Spain

^{3.} Dead Sea & Arava Science Center

^{4.} Earth and Atmosphere Observation Group, University of La Laguna, Tenerife, Spain

^{5.} Goodman faculty of Life Science, Bar-Ilan University

* <u>alexalaman@hotmail.com</u>

Landscape modification through human activity is faster than species adaptative processes. The unpredictability of changes challenges the adaptation to new environments. Therefore, modification of natural habitats can lead to an ecological trap through maladaptive selection of lower-quality habitats over natural landscapes. Several studies have shown that cooperatively breeding species may be especially vulnerable to these processes leading to population declines. The aim of this study was to assess if selection of anthropogenically modified habitats influences the fitness and life history traits of a cooperative breeder. We used data collected during a period of six years from a monitored population of Arabian babbler (*Argya squamiceps*) in the Sheizaf Nature Reserve (Arava Valley, Israel) to explore whether habitat selection affects breeding success and survival as well as group size, dispersal age and dominance acquisition age. We found that groups living in modified habitats had more breeding attempts than those in natural habitats, but juvenile and adult survival in modified habitats were lower. Males living in modified habitats also dispersed and acquired dominance earlier than males from natural habitats. Our results suggest that modified habitats entail an ecological trap for Arabian babblers, which adjusts its life history traits as a response.



Mycoplasma in griffon vultures in Israel: population restocking with imported individuals

might be enhancing pathogen prevalence

Nili Anglister^{1*}, On Avraham², Roni King³, Ohad Hatzofe³, Ygal Miller³, Nili Avni-Magen⁴, Asaf Berkowitz⁵,

Avishai Lublin⁵, Inna Mikula⁵, Inna Lysnyansky⁵, Orr Spiegel¹

^{1.} School of Zoology, Tel Aviv University

^{2.} Koret School of Veterinary Medicine, Hebrew University of Jerusalem

^{3.} Israeli Nature and Parks Authority

^{4.} The Tisch Family Zoological Gardens in Jerusalem (The Biblical Zoo)

^{5.} Division of Avian Diseases, Kimron Veterinary Institute

* nili.anglister@mail.huji.ac.il

Mycoplasmas are known as commensal and pathogenic bacteria of various raptor species causing clinical or subclinical infections. However, little is known about the prevalence of mycoplasma in captive and wild raptors and its implications for their health. In Israel, the griffon vulture (*Gyps fulvus*; hereafter griffons) is considered critically endangered, and its intensive management program includes population monitoring and restocking (captive-born in Israel or imported rehabilitated wild Spanish griffons). Here we survey the prevalence of Mycoplasma species in both the wild and captive populations. During 2019-2020, we collected 411 tracheal swab samples from 252 unique individuals. We used PCR analysis to identify Mycoplasma species and found that the prevalence rose from 2019 to 2020 (43.4% vs. 69.4%); a few potential new species that were not previously recorded locally have been detected. Further, the prevalence was significantly higher in young griffons and in imported individuals. GPS-tracking of 60 free-ranging individuals showed that mycoplasma-positive griffons have shorter daily movements, likely indicating clinical symptoms. While this is still correlative support (and health-status or comorbidities may be confounding factors), our findings may highlight a possible negative side-effect of the restocking program. Hence, we suggest that similar conservation programs should consider possible pathogen introductions.



The effect of the invasive plant Acacia saligna on soil fungal community in a Mediterranean

sand dune ecosystem

Itaii Applebaum^{1*}, Tirza Doniger¹, May Levi¹, Chen Sherman¹, Yosef Steinberger¹

^{1.} Bar-Ilan University

* Itaiiapplebaum@gmail.com

Invasive plants have become a global concern, and a large body of research investigating the causes for plant invasion and its impact has been published. Soil ecologists have suggested several hypotheses that help explain plant invasion. In our research, we analyzed the impact of the invasive plant *Acacia saligna* on the soil fungal community under its canopy, compared to the soil fungal community under the local plant Retama raetam and in a bare soil control. We tested whether this change supports current hypotheses regarding soil microbiology and plant invasion. We found that *A. saligna* changes the soil fungal community composition under its canopy both taxonomically and functionally. Our results do not support the accumulation of local pathogens hypothesis, but they do support the enemy release hypothesis, and co-introduction of a fungal symbiont. We found a relatively large abundance of *Ruhlandiella sp.* in the *A. saligna* soil sample, and due to the Australian origin of both the fungal genus and the plant species, it is likely that *Ruhlandiella sp.* was co-introduced with *A. saligna*.



CNA – the Cumulative Niche Approach: a correlative framework to examine the fundamental

niche of species considering the native and alien ranges

Eduardo Arlé^{1*}, Tiffany Knight², Jonathan Belmaker¹

^{1.} School of Zoology, Tel Aviv University

^{2.} German Centre for Integrative Biodiversity Research (iDiv), Halle-Jena-Leipzig

* eduardo.arle@idiv.de

Alien species threaten natural ecosystems and cause major ecological and economic damage. Understanding the climate niche of alien species is crucial to predict and prevent future introductions. Ecological Niche Models (ENMs) are often used to predict species distributions. However, this approach tends to be inaccurate when applied to biological invasions because alien species' realised niches can differ between the colonised and native range. Here, we present a novel solution, the cumulative niche approach (CNA), that will recast our ability to predict and prevent future biological invasions. This framework relies on species distribution data and on environmental variable layers to quantify species' realised niches in the alien range and to compare this to their native range. We demonstrate the CNA with 26 species of naturalised amphibians, birds, and mammals as study cases. For each species, we assessed whether the relationship between climate niche extent and occupancy data have reached an asymptote, indicating we have a good understanding of the climate niche that can be used for future risk assessments. Our results point that it is possible to verify whether we can infer each species' fundamental niche through our approach, providing a guideline and powerful tool in invasion biology research and management.



Diet composition and quality of sympatric mountain gazelles (Gazella gazella) and cattle: a

NIRS and metabarcoding-aided study

Amir Arnon^{1,2*}, Yan Landau³, Dan Malkinson⁴, Tova Deutch-Traubman³, Maya Lalzar⁴, Ido Izhaki⁵

^{1.} Department of Evolutionary and Environmental Biology, University of Haifa

^{2.} Ramat Hanadiv Nature Park, Zikhron Yaakov, Israel

^{3.} Department of Natural Resources, Agricultural Research Organization - Volcani Institute

^{4.} Bioinformatics Service Unit, University of Haifa

^{5.} Department of Evolutionary and Environmental Biology, University of Haifa

* amir@ramathanadiv.org.il

The endangered mountain gazelle (*Gazella gazella*) inhabits many nature reserves and forests throughout Israel's Mediterranean region, almost half of which are under cattle ranching. While both ungulates are considered "mainly grazers", little is known about how their diets change between ecosystems and seasons, and how these changes are manifested in dietary overlaps and nutritional quality, a knowledge that may promote rangeland management that better supports gazelle conservation. We collected fecal samples of gazelles and cattle along one year, at two sites: Ramat Hanadiv, and Yehudiya Nature Reserve. We used DNA Metabarcoding, and Near Infra-Red Spectroscopy as complementary tools to study changes in both the composition and quality of the diets of the two ungulates. The diets of gazelles and cattle were generally diverse, and woody plants were dominant components in all cases. Nutritional quality was more stable in cattle than in gazelles, and in Ramat Hanadiv than in Yehudiya, likely due to a higher abundance of shrubs. Dietary overlap between gazelles and cattle was low, especially in Ramat Hanadiv. Overlap was highest in Yehudiya, in autumn. Our results indicate that under low to moderate stocking rates, the effect of cattle on the diet of gazelles is probably low.



Enrichment of nutritional compounds in seaweeds via abiotic stressors in integrated

aquaculture

Doron Ashkenazi^{1*}, Avigdor Abelson¹, Alvaro Israel², Guy Paz², Yael Segal², Shoshana Ben-Valid³, Merav

Nadav Tsubery³, Eitan Salomon⁴

^{1.} School of Zoology, Tel Aviv University

^{2.} Israel Oceanographic and Limnological Research Institute (IOLR)

^{3.} Department of Chemistry, Faculty of Exact Sciences at Bar-Ilan University

^{4.} National Center for Mariculture in Eilat

* doronashkenazi1@gmail.com

Seaweeds may contain significant amounts of essential proteins, carbohydrates, and minerals, offering an alternative, sustainable, healthy food source from the sea. However, there are yet challenges impending their full exploitation. Our study presents an innovative, two-step aquaculture approach integrating seaweeds and finfish, dedicated to enrich seaweeds with nutritional compounds. The approach involves diverting fish effluents rich in nutrients into a series of seaweed cultivation tanks. Then, the seaweeds were exposed to short-term abiotic stressors (namely, high irradiance, nutrient starvation, and high salinity) to stimulate synthesis of desired ingredients in their tissues. Our methodology enabled high growth rates of up to 25% seaweed biomass increase per day, with significant enhancements in the amount of protein, starch, and minerals within days. Moreover, the seaweeds presented elevated bioremediation capabilities assimilating the ammonia nitrogen, NO₃ and PO₄ with high uptake rates, and with 50–75% removal efficiencies.



Nitrogen enrichment is a global driver of species loss in grassland ecosystems

Nir Band^{1*}, Ronen Kadmon¹, Micha Mandel², Niv DeMalach³

¹ Department of Ecology, Evolution & Behavior, Hebrew University of Jerusalem

^{2.} Department of Statistics, Hebrew University of Jerusalem

^{3.} Institute of Plant Sciences and Genetics in Agriculture, Hebrew University of Jerusalem

* nir.band@mail.huji.ac.il

Grassland ecosystems are among the richest communities in the world. Nutrient enrichment is known as a primary driver of species loss in such ecosystems, but the underlying mechanisms of this phenomenon are still unclear. This gap of knowledge limits our ability to conserve the diversity of such ecosystems. Currently there are two main explanations for species decline following nutrient enrichment: an increase in biomass which leads to intensified competition (the 'Biomass-driven Competition Hypothesis'), and a decrease in the number of limiting resources, which reduces the potential for species coexistence (the 'Niche Dimension Hypothesis'). An alternative hypothesis attributes the decline in richness to nitrogen-specific effects (the 'Nitrogen Detriment Hypothesis'). We have conducted the first simultaneous test of the three hypotheses by integrating data from 630 resource addition experiments located in 99 sites worldwide. Our global-scale meta-analysis provides strong support for the Nitrogen Detriment Hypothesis, weaker support for the Biomass-driven Competition Hypothesis, and negligible support for the Niche Dimension Hypothesis. Thus, we conclude that nitrogen-specific mechanisms are more important than biomass or niche dimensionality as drivers of species loss under high levels of soil resources. This conclusion is highly relevant for future attempts to reduce biodiversity loss caused by global eutrophication.



A novel eco-friendly code of conduct for artificial light at night

Lihi Barkan^{1*}, Alon Rothschild¹, Daniela Vatine², Inna Nisenboim³, Ana Traktenbrut³, Noam leader⁴

- ^{1.} Society for the Protection of Nature in Israel
- ^{2.} AVIV AMCG
- ^{3.} Ministry of Environment, Israel
- ⁴ Israel Nature and Parks Authority
- * lihib@spni.org.il

Artificial Light at Night (ALAN) is a widespread and expanding form of pollution. Its impacts span the biological hierarchy from organism physiology to changes in the composition of ecological communities. ALAN has been reshaping nature for more than a century. Israel is a densely populated country and its open spaces are fragmented with infrastructures like roads, water facilities and military bases. ALAN expands the negative impact of these infrastructures and increases ecological fragmentation. The Eco-friendly code of conduct for ALAN contains 10 principal guidelines for the planning of outdoor lighting, from the basic alternative of maintaining natural light regime, through planning to light only where, when and on the minimum intensity needed, to detailed guidelines for spectrum, distances, intensity and the type of light fixture recommended. The code of conduct breaks down the guidelines relevant for each user, land use, planning phase (in the statutory process), and need (security, safety, operational etc.). The code is based on numerous case studies in Israel, and on a thorough literature review. A comprehensive stakeholder engagement process was conducted. The code is a joint initiative of the SPNI, MOEP and INPA, and serves now the official guideline for the environment representatives in planning committees.



Environmental changes and the evolution of senescence

Darar Bega^{1*}, Yael Gurevich², Ohad Lewin-Epstein³, Lilach Hadany¹

^{1.} School of Plant Sciences and Food Security, Tel Aviv University

^{2.} University of Maryland, Center for Bioinformatics and Computational Biology

^{3.} Weizmann Institute of Science, Department of Plant and Environmental Sciences

* dararbega@gmail.com

Species ability to respond to environmental changes is important for their conservation. Here, the evolutionary conditions that induce such plastic response in senescence rate is explored. In environmental conditions that lead to population growth, early reproduction is preferred over late reproduction. The intuition is that during growth, progeny born earlier can reproduce earlier, and will represent a larger fraction of the population at the end of the growth period. In a declining population the reverse logic applies, and later reproduction is advantageous. I will present a new model that predicts the effect of directional and periodical environmental changes on senescence evolution. The model is used to compare strategies for dealing with environmental change: synchronized life-history, bet-hedging, and senescence plasticity. The model suggests that plastic response to environmental changes is more likely to evolve under periodical changes that occur in the timescale of species lifespan. The model can help in conservation efforts by predicting demographic changes expected from environmental change.



Microbiome-related aspects of locust density-dependent phase transition

Yonatan Bendett^{1*}, Omer Lavy², Ohad Lewin-Epstein³, Uri Gophna⁴, Eran Gefen⁵, Lilach Hadany⁶, Amir

Ayali⁷

^{1.} School of Plant Sciences and Food Security, Tel-Aviv University

^{2.} Department of Life Science, Ben-Gurion University of the Negev

^{3.} Department of Plant & Environmental Sciences, Weizmann Institute of Science

^{4.} Shmunis School of Biomedicine and Cancer Research, Tel-Aviv University

^{5.} Department of Biology, University of Haifa at Oranim

^{6.} School of Plant Sciences and Food Security, Tel-Aviv University

^{7.} School of Zoology, Tel-Aviv University

* ybendett@gmail.com

Locust plagues are a notorious, ancient phenomenon. These swarming pests tend to aggregate and perform long migrations, decimating cultivated fields along their path. When population density is low, however, the locusts will express a cryptic, solitary, non-aggregating phenotype that is not considered a pest. Although the transition from the solitary to the gregarious phase has been well studied, associated shifts in the locust's microbiome have yet to be addressed. Here, using 16S rRNA amplicon sequencing, we compared the bacterial composition of solitary desert locusts before and after a phase transition. Our findings revealed that the microbiome is altered during the phase transition, and that a major aspect of this change is the acquisition of Weissella (Firmicutes). Our findings led us to hypothesize that the locust microbiome plays a role in inducing aggregation behaviour, contributing to the formation and maintenance of a swarm. Employing a mathematical model, we demonstrate the potential evolutionary advantage of inducing aggregation under different conditions; specifically, when the aggregation-inducing microbe exhibits a relatively high horizontal transmission rate. This is the first report of a previously unknown aspect of locust phase transition, demonstrating that the phase shift includes a shift in the gut and integument bacterial composition.



The effect of urban and rural land use on small mammals' community - results from citizen

science research

Asaf Ben-David^{1*}, Tamar Dayan^{1,2}, Ayelet Shavit³

^{1.} School of Zoology, Tel Aviv University

^{2.} Steinhardt Museum of Natural History, Tel Aviv University

^{3.} Tel-Hai College

* asafbd@gmail.com

Small mammals are good ecological indicators for habitat complexity due to their specific ecological niches and limited range. Therefore, learning their distribution patterns can help assess anthropogenic effects with high accuracy. In recent years there has been public discourse on feeding feral cats (*Felis sylvestris catus*) in residential areas and its impact on biodiversity. One of the central claims in favor of the feeding practice is the ability of feral cats to mitigate rodent populations.

With a custom-made citizen science program, we built a database of more than 1500 sites in urban and rural lands to understand the effect of different land uses on small mammal distribution. We used trackplates, a non-invasive and cost-effective method based on simple materials such as charcoal and sticky paper to collect presence/absence data. We found that in the urban landscape, there is an established community comprising feral cats, rats (*Rattus sp.*), east European hedgehogs (*Erinaceus concolor*), and in light soils, long-eared hedgehogs (*Hemiechinus auratus*). With almost no observations of small rodents, e.g. mice (*Mus sp.*), even in natural patches and urban edges. as opposed to natural and cultivated lands that show a high presence of small rodents.



An overview of light pollution in Israel from an ecological and spatial perspective - main findings of the Israel's State of Nature Report

Noam Ben Moshe^{1*}

^{1.} Hamaarag, The Steinhardt Museum of Natural History, Tel Aviv University

* Noam.benmoshe@hamaarag.org.il

Light pollution poses a serious threat to ecosystems and the organisms that inhabit them, however, it is only in recent years that naturalists have begun to address the issue and comprehend the extent of the threat and its consequences. The talk briefly reviews the effects of light pollution on nature and focuses on the key findings that were recently published in the State of Israel's Nature Report issued by the Ma'arag. As part of the study, satellite data was used to map the intensities of artificial light at night in Israel over the past eight years and a novel method was developed for converting them into degrees of light pollution according to their potential impact on ecological systems. According to the findings, Israel is one of the most heavily lit countries in the world, and in the areas to the north of Beer Sheva, the situation is particularly bleak, even in protected areas. Despite this, there are still dark areas that need to be recognized in order to protect them while reducing light pollution in illuminated areas that are particularly vulnerable to this threat.



Bioindicator-focused invertebrate monitoring raises concerns over climate change impact on

the Negev Mountains ecosystem

Gilad Ben Zvi^{1*}, Rael Horwitz², Adi Ramot, Ahikam Gera¹, Ittai Renan^{1,2}

^{1.} The entomology lab for applied ecology, The Steinhardt Museum of Natural History, Tel Aviv University

^{2.} Hamaarag, The Steinhardt Museum of Natural History, Tel Aviv University

* giladbenzvi@hotmail.com

Increased temperatures and decreased precipitation may severely impact ecosystems surrounded by more arid zones, such as the Negev Mountains ecosystem. Monitoring whether this process has already begun calls for bioindicators sensitive to increasing aridity, abundant, easy to monitor and preferably ecosystem engineers, thus affecting many organisms by their decreasing abundance. We monitored three relevant bioindicators, the crustacean *Hemilepistus reaumurii* and the snail species *Xerocrassa seetzeni* and *Sphincterochila zonata zonata*. For *H. reaumurii* we conducted biannual monitoring in 2014-22, counting burrows along transects spanning a geographic/climatic gradient. For the snails we repeated a monitoring scheme conducted in 1969-71 by Y. Yom-Tov. We monitored numbers of individuals of both species in plots undisturbed by human development across north- and south-facing aspects. Our endpoint data and Yom-Tov's start-point dataset substituted for long term monitoring. *H. reaumurii* abundance decreased gradually in most sites until disappearing in 2022 from all Negev Mountains sites, as opposed to Northern Negev sites. *X. seetzeni* abundance drastically decreased, while *S. zonata zonata*, the more xerophilic species, increased dramatically in numbers, both trends being more pronounced in south-facing aspects. These results ascertain that the Negev Mountain ecosystem experiences dramatic changes.


The transgenerational effects of stress on reproduction strategy in the mixed mating plant

Lamium amplexicaule

Mor Binder^{1*}, Nir Ohad¹, Lilach Hadany¹

1. School of Plant Sciences and Food Security, Tel Aviv University

* morbinderr@gmail.com

The responses of plants to environmental stress are critical in changing environments. The hypothesis of Fitness Associated Sex (FAS) predicts that – everything else being equal – less fit individuals would reproduce sexually at higher rates compared with fitter ones. To test this, we used the dimorphic cleistogamous plant *Lamium amplexicaule*, capable of producing both self-pollinating closed flowers (CL), alongside open flowers (CH) that allow cross pollination, partially in response to environmental cues. We investigated the effects of abiotic stress – salt solution irrigation – on the flowering patterns of stressed plants and their offspring. We monitored several flowering and vegetative parameters, including the number and distribution of flowers, CH fraction, and plant size. We found that stressed plants show increased tendency for self-pollination and a deficit in floral and vegetative development. However, when parentally primed, stressed plants show a milder response. Un-stressed offspring of stressed parents show reversed responses and exhibit an increased tendency to outcross, and improved floral and vegetative development. In summary, we found that stress has an effect on reproduction strategy in the plants that experienced the stress and in subsequent offspring through F2 generation. We present evidence regarding the extension of FAS\FAD theories to transgenerational effects.



From reactive to proactive conservation - a new extinction risk index focused on the future

Gabriel Caetano^{1*}, Shai Meiri^{2,3}, Uri Roll¹

^{1.} Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

^{2.} School of Zoology, Tel Aviv University

^{3.} Steinhardt Museum of Natural History, Tel Aviv University

* gabrielhoc@gmail.com

Recent global changes direly threaten nature and are expected to intensify during the 21st century and prioritizing conservation effort is paramount. Current prioritization schemes seldom incorporate projected effects of climate, and land-use changes. To overcome this, we constructed an extinction risk index that accounts for climatic, and land use changes, as well as human footprint, species range area, body mass and brood size. We used this index to evaluate all reptile species, uncover spatial and phylogenetic patterns and evaluate the influence of future climatic scenarios. We show that reptiles are more sensitive to climatic changes and to current human footprint, than other threats. We found that reducing carbon emissions can lower extinction risk for turtles and some snakes, but not for the most other species. Risks remain high in drylands even under low emission scenarios. Extinctions risk becomes more prevalent across taxa and regions in the end of the century, particularly under high emission scenarios. Our index correlated with the International Union for the Conservation of Nature's Red List of Threatened Species, but Non-Evaluated, Near Threatened and Data Deficient species scored close to Vulnerable species. Our results show that incorporating future threatening processes is essential for conservation thinking prioritization.



Evaluating global progress in awareness of biodiversity and conservation action worldwide

Gabriel Caetano^{1*}, Reut Vardi², Ivan Jarić³, Ricardo Correia⁴, Uri Roll¹, Diogo Veríssimo⁵

- ^{1.} Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev
- ^{2.} School of Zoology, Tel Aviv University
- ^{3.} Czech University of Life Sciences
- ^{4.} University of Helsinki
- ^{5.} Oxford University
- * gabrielhoc@gmail.com

The Convention for Biological Diversity first target for the last decade was to increase awareness of biodiversity and conservation. Public awareness of biodiversity and conservation is important for fostering pro-conservation behavior and advocacy. We used data on Google searches to evaluate the success in achieving this target, and investigated the socioeconomic factors driving differences between countries. We found partial success for the target globally. Global interest for biodiversity increased, driven mostly by charismatic fauna, while interest for conservation decreased, driven mostly by a decline in searches for national parks after the 2019 pandemic. Economic inequality had a negative effect in interest for biodiversity and conservation, while purchasing power had an indirect positive effect through education and research. Interest for biodiversity and conservation may be increased in the next decade with outreach campaigns focusing on charismatic species, institutional support for national parks, environmental education, conservation research and reduction of economic inequality.



Anthropogenic effects on mortality of free-ranging barn owls

Shlomo Cain^{1*}, Tovale Solomon¹, Yossi Leshem¹, Orr Spiegel¹

^{1.} School of Zoology, Tel Aviv University

* shlomocain@mail.tau.ac.il

Identifying the causes of wildlife mortality is central for understanding concurrent anthropogenic threats, ultimately improving management practice. Among other factors affecting fitness and mortality, individuality in behavior and movement is recently gaining attention as an important factor with consequences for conservation. To link between individual movement patterns, behavioral-type and survival we have tracked 136 Barn owls (*Tyto alba*) over long periods (115.2 \pm 112.1 nights; $\overline{X}\pm$ SD; max 664), monitored their survival, and explored death causes. Individuals differed consistency in their movement, having repeatable nightly max-displacements and predictabilities (namely, intra-individual variability in this movement index). Juveniles were consistently less predictable than adults, but flew similar distances and did not suffer from higher mortality. Many (N=34) barn-owls died during tracking, and anthropogenic factors were responsible for ~50% of all identified mortalities, with road-kill being the primary cause. While individuals' behavioral-type (mean max-displacement), sex or age did not affect their survival, more predictable owls suffered from enhanced mortality. Taken together, these results demonstrate that individual predictability may act as an overlooked axis of behavioral-type, with potential implications for individual fitness and ecological processes at the population level. They also show that anthropogenic pressure may have non-random impact on wildlife survival, selecting against specific behavioral-types.



Poleward shifts of leading-edge marine fish populations may drive an abundance collapse

Shahar Chaikin^{1*}, Jonathan Belmaker¹, Jean-Philippe Lessard², Federico Riva³

- ^{1.} School of Zoology, Tel-Aviv University
- ^{2.} Department of Biology, Concordia University
- ^{3.} Department of Biology, Carleton University
- * shahar710@gmail.com

Climate change is a major driver of species redistributions and abundance change. While a large portion of marine species display poleward shifts, and many decline in abundance, it is uncertain whether and how the two are related. For instance, it is unresolved whether poleward shifting species are subjected to increased abundances, and in which cases shifts are a potential means of escaping adverse warming conditions. To elucidate the relationship between redistributions and abundance change we combined two databases: (1) 'BioTime' - a global collection of species abundance time series, and (2) 'BioShifts' - a collection of species range shift estimates. The new dataset included 146 marine fish species spanning 2,572 populations and enabled us to observe population-level abundance changes and relate this to climate-driven redistributions across the global ocean. We found that abundance trends are negatively associated with shifts, meaning that poleward migrating species decreased in abundance. Nevertheless, this pattern was mainly driven by leading-edge populations increased in abundance. These findings suggest that for leading-edge populations, poleward shifts did not compensate for the potential adverse warming, stressing that cold leading-edge populations may become increasingly threatened by climate change.



Marine ecosystems are more sensitive to climate change than terrestrial ones

Orr Comay^{1,2*}

- ^{1.} Hamaarag, The Steinhardt Museum of Natural History, Tel Aviv University
- ^{2.} Entomological Laboratory for Applied Ecology, Steinhardt Museum of Natural Histrory, Tel Aviv University
- * orrcomay@tauex.tau.ac.il

Here we present a literature review of recent studies describing the demonstrated and projected ecological and conservation impacts of current anthropogenic climate change, including both theoretical and empirical studies. Ecological theory estimates that climate change effects will be more severe in marine or aquatic, ectothermic, sessile or otherwise dispersal-restricted species with a small climatic niche. Water has a high specific heat, meaning that it changes temperature slower than air, leading to narrow temperature tolerance in marine and aquatic organisms. The easternmost section of the Mediterranean, the Levant Sea, is its warmest and most saline. Given that its fauna originates from the northern Atlantic Ocean, the Levant Sea presents the most difficult conditions to the native biota. Thus, recent findings of mass local extinctions of native molluscs in the Levant Sea are in line with the theoretical expectations. These impacts are considerably worse than those in terrestrial, endothermic species, including documented morphological changes in birds and expected distribution shifts in mammals. Likewise, experimental studies on herbaceous plants found little impact of drought (although a meta-analysis revealed that actual droughts are more severe than experimental ones of the same magnitude), while marine heatwaves caused mass mortality of fish in the Red Sea.



The experience of nature in Protected Areas

Nitzan Dan-Rakedzon^{1*}, Assaf Shwartz¹, Nurit Lissovsky¹

^{1.} Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology

* <u>nitzan.r@campus.technion.ac.il</u>

Urbanization threatens biodiversity and separates people from the experience of nature. This represents a major concern, given the growing evidence on the positive relations between experience of nature and people's health, well-being, affinity for nature, and conservation support. Protected areas (PAs), which host rich biodiversity, have a great potential to provide high quality nature experiences. However, to date research on nature experience in PAs is scarce. We explored how nature experience while being in nature. We analyzed planning documents and interviewed landscape architects and managers of 12 highly visited nature reserves in Israel. We also interviewed 88 lay people about their nature experiences. Our results indicate that the experience of nature was not a main theme when designing and managing PAs. Instead, the discourse focused on means to restrict the visitors' activity. Interviews revealed that for lay people experience of nature includes touching and smelling nature, observing wildlife, feel a sense of belonging and break the daily routine, which is sometimes limited in PAs. These results highlight that the attempts to protect nature in PAs may ironically contribute to the growing alienation of people from nature.



Insights on the ecology, life history and conservation of an endangered amphibian species

achieved through a multi-year citizen science project

Omer Darel^{1*}, Olga Rybak², Asaf Ben Levy², Gabi Kolodny², Tamar Kis-Papo³, Nirit Lavie Alon², Rotem

Vidan², Oren Kolodny¹

^{1.} Hebrew University of Jerusalem

^{2.} The Society for Protection of Nature in Israel

^{3.} The Israeli Ministry of Education

* omer.darel@mail.huji.ac.il

The Haifa Salamander Monitoring Project was started by an initial group of volunteers with research and conservation backgrounds, who designed survey protocols and routes meant to evaluate the state of the local *Salamandra infraimmaculata* population. The project's initiators recruited and trained a larger team of volunteers to track the salamanders, which the team then leaders handled. The salamanders were measured and photographed, and recaptures were identified using the salamanders' unique dorsal spot patterns. In collaboration with the volunteers leading this project, we used the subsequent recaptures of over 100 identified individual salamanders during multiple years to study their movement patterns and growth rate and performed a multi-year capture-recapture analysis. We found that almost all of these salamanders' growth occurs before the age of eight and that most adult salamanders are recaptured within a radius of 50 meters over multiple years. Our capture-recapture analysis suggests that these populations suffer from low recruitment and that the salamanders' survivability is lowest in salamanders under the age of five. We conclude that aquatic breeding sites should be prioritized in conservation efforts, while protecting fully grown adults should also be considered a crucial part of the conservation strategy, due to the slow recovery expected if these adults were lost.



The black and yellow spot pattern of the salamander, *Salamandra infraimmaculata*, in various habitats at the southern border of its distribution

Gad Degani^{1*} Gad Ish Am, Amit Biran Ish Am, Amir Marshansky, Sivan Margalit¹, Eitan Nissim, Hava

Goldstein², Niva Ahkked

^{1.} Tel-Hai Academic College

^{2.} Israel Nature and Parks Authority

* gad@migal.org.il

The present study describes the different color-pattern phenotypes of spots on the black back of Salamandra infraimmaculata in three habitats at the southern border of its distribution in Israel. At Tel Dan, we photographed 454 salamanders in moist habitats where water flows year round; 100 of these were sampled to measure the percentage of yellow and black color and the number of spots/blotches. At Kibbutz Sasa, 201 salamanders in a semi-arid habitat were photographed, of which 62 were sampled for measurements. In the semi-arid habitat of Kibbutz Yehiam, 200 salamanders were photographed, and 60 sampled for measurements. At all sites, about a third of the salamanders were photographed more than once. For all populations, yellow spots on the salamander back were found in one row, two rows or scattered. For two indices (proportion of yellow/black and number of spots on the head), the Dan population (river, where water is available year round) differed from the two other populations of salamanders (living under semi-arid mountain conditions). The number of yellow spots on the head of the salamanders in the three populations varied from 1 to 7. In all populations, 4 spots was most common. In the Dan population, there were significantly more salamanders with 1 to 3 spots on their head than in the Sasa or Yehiam populations, and the pattern of head spots for the Dan population differed significantly from the other two populations. No difference was found in the number of head spots for Sasa vs. Yehiam salamanders. The main question examined is whether there is an effect of the habitat in isolated populations on the pattern of the spots in. The answer is positive and is supported by previous studies.



Effects of traffic volume and road attributes on roadkill probability

Dror Denneboom^{1*}, Avi Bar-Massada², Assaf Shwartz¹

^{1.} Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology

- ^{2.} University of Haifa, Faculty of Natural Sciences
- * drordene@gmail.com

Roadkill due to wildlife-vehicle collisions leads to excessive wildlife mortality which plays a major role in the global biodiversity crisis. The probability of roadkill is affected by species traits, road and landscape features, temporal factors, and traffic characteristics. Traffic volume is considered one of the major factors that affect roadkill probability. It was theorized that the effect should be unimodal, based on wildlife disturbance avoidance behavior. However, empirical evidence of this theory is lacking. We studied the effects of traffic volume on roadkill probability for twenty species in Israel using nation-wide roadkill and traffic data. We also studied how road attributes affect roadkill, while accounting for various confounding variables. The unimodal effect of traffic volume on roadkill was empirically supported only for the striped hyena. A U-shaped effect was identified for five other species, while a negative linear effect was found for three species. Low traffic roads were identified as a major risk of wildlife mortality. We also found various effects of road attributes on roadkill probability. For example, road lighting decreased roadkill of six species. We conclude that the complex effects of traffic volume on roadkill probability in road avoidance behavior.



Proof of the impact of shipping underwater radiated noise on coastal dolphins

Roee Diamant^{1*}, Aviad Scheinin¹

^{1.} University of Haifa

* roee.d@univ.haifa.ac.il

With the large increase in human marine activity, our seas have become populated with boats and ships projecting underwater radiated noise (URN) of extremely high power that often affect areas of up to 20 square km and more. As a result, standards were set to limit the transmitted acoustic power per exposure time, and regulations impose limitations on seismic surveys, such as applying a "soft start" to allow animals to move away from the source and suspending activity upon the visual or acoustical identification of endangered species. However, a quantitative study that examines the extent to which intensity shipping URN impacts the ecosystem – and especially coastal dolphins – has yet to be conducted. In this work, we prove that dolphins systematically respond to shipping URN. Our methodology involves obtaining a statistically large enough database of both dolphin's whistles and evidence of nearby vessels and classifying dolphin's whistles into 'boat-nearby' or 'no-boat' types. We show a statistically significant success in such classification and conclude that the dolphin's whistle holds information about the presence of vessels. We thus argue that dolphins are impacted by the occurrence of nearby vessels, and that the URN should thus be monitored like a pollution factor.



Captive-breeding has long-lasting effects on migratory proficiencies of reintroduced Egyptian

vultures

Ron Efrat^{1*}, Thomas Mueller^{2,3}, Nir Sapir⁴, Oded Berger-Tal¹

¹ Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

^{2.} Senckenberg Biodiversity and Climate Research Centre (SBiK-F), Frankfurt am Main

^{3.} Department of Biological Sciences, Johann Wolfgang Goethe-University Frankfurt

^{4.} Nir Sapir, Department of Evolutionary and Environmental Biology and Institute of Evolution, University of Haifa

* ronef@post.bgu.ac.il

During an animal's early stages of life, it learns to exploit its environment efficiently and perform important tasks such as foraging and breeding. Thus, differences among animals' early life experience and task-specific (e.g., breeding) experience can affect their ability to overcome challenges they might face during their lives and eventually determine their fitness. For migratory animals, migration poses a major challenge, being the period with the lowest survival for many species. Using data collected by satellite transmitters, we studied the migratory proficiencies of two sympatric populations of Egyptian vultures during multiple migratory journeys. The two groups differed greatly in their early life experience, one group being captive-bred and the other wild-hatched. Furthermore, captive-bred vultures were released to the wild after the annual period for the outset of their first migration has already passed, and thus migrated for the first time at an older age than wild-hatched vultures. We found that both early life and task-specific experiences affected the vultures showing improvement between consecutive migrations. These results present important, and so far overlooked, consequences of captive-breeding and reintroduction and thus have important conservation implications.



Mapping and assessing cultural ecosystem services and their spatial correlation with

biodiversity Israel's Arava Valley

Adi Elmaliah^{1*}, Daniel Orenstein¹

^{1.} Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology

* adi.e@campus.technion.ac.il

After nearly two decades of ecosystem service research and assessment, the spatial correlation between cultural ecosystem services and biodiversity remains a subject of uncertainty and debate. Such knowledge has significant implications for spatial planning and conservation efforts. This study examines the spatial correlation between cultural ecosystem services (CES) and biodiversity in a hyper-arid ecosystem, the southern Arava valley, Israel. The research uses public participation mapping method (PPGIS) to create spatial distribution maps of CES. The online survey included a mapping activity where participants marked areas of significant cultural importance, followed by questions regarding the marked point. The data was analyzed first using ArcGIS Pro to [1] identify CES hotspots, [2] examine spatial correlations between CES with biodiversity data, and [3] define patterns of cultural use by comparing CES data to landscape features and infrastructures. Finally, a qualitative analysis of survey responses was conducted to identify the main themes characterizing CES, and to investigate if biodiversity plays a role in participants' descriptions of the CES indicated. This research thus highlights the power of qualitative and quantitative mapping by identifying spatial hotspots of CES provision and of biodiversity and illuminating the trade-offs and complementarities that are critical for landscape management and planning.



The potential of area-based measures for landscape-scale farmland biodiversity conservation

Francesca Falco^{1*}

^{1.} School of Zoology, Tel Aviv University

* falco@mail.tau.ac.il

This work evaluates the effectiveness of farmland biodiversity conservation policies in relation to their spatial scale of application. While area-based measures, such as protected areas, are a classic tool for wildlife conservation, farmland biodiversity conservation measures are typically designed as economic incentives to single farm holdings. However, ecological research suggests that many farmland species, in particular those involved in the provision of crucial ecosystem services, depend on landscapes of 200-500 ha, a much larger extent than the average farm holding. Therefore, we hypothesize that area-based measures tailored to whole landscapes are more effective than farm-scale measures. In order to empirically test the hypothesis, we selected farmed areas in the European Union "treated" with an area-based landscape-scale measure – the Natura 2000 network of protected sites. We then ran a fixed-effects model to estimate how heterogeneous agricultural land cover, an indicator of high-quality habitat for farmland biodiversity, changed over time inside and outside the selected sites, before and after their formal protection. The results show a very negative trend of high quality farmland over the years in control sites. In contrast, the designation as a Natura 2000 site appears to effectively contrast such decline and, in some cases, even reverse the trend.



Recent evidence of scale matches and mismatches between ecological systems and

management actions

Francesca Falco^{1*}, Shlomo Preiss-Bloom¹

^{1.} School of Zoology, Tel Aviv University

* falco@mail.tau.ac.il

Our recently published article reviews 122 case studies from the empirical literature of the last 5 years that deal with (mis)matches between ecological processes and resource management actions, focusing in particular on conservation measures. For each case, we assessed the performance of the measure and evaluated the nature of the scale (mis)matches in time, space and functional properties across five different conservation strategies and five distinct types of ecological systems. In line with the scale fit conceptual framework, we found that mismatches are always recorded in relation to poorer performance of conservation actions and, vice versa, matches are mostly related to successful measures. In addition, we found that spatial scale (mis)matches are documented and published far more frequently than temporal and functional case studies. Also, mismatches outnumber matches in the reviewed literature, except for certain realms of conservation practice such as farmland and fishery management, for which we propose possible explanations. The results highlight the need to document more examples of successful scale matches, especially in areas where they are lacking, in order to provide valuable experience and inspiration for the planning of future conservation efforts.



Catch me if you can: Mitigation of common myna abundance in protected areas

Eli Finarov^{1*}, Shai Meiri¹, Uri Roll², Assaf Shwartz³

^{1.} School of Zoology, Tel Aviv University

^{2.} Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

^{3.} Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology

* elifi84@gmail.com

The common myna (*Acridotheres tristis*) is a highly successful invader, with various evidences showing its' adverse impacts on native species. Since the myna invaded Israel in 1997, it is growing in numbers and in distribution, with a recent penetration into natural and protected areas.

My research was set to: (1) identify where mynas are active in protected areas (Ramat Hanadiv as a case study); (2) test experimentally the effect of trapping on myna abundance in protected areas and (3) understand how trapping influences mynas' vigilance. During two breeding seasons (2021-2022), I recorded myna presence and flight initiation distances (FIDs) in three protected areas in Israel, before and after trapping experiments. Trapping efforts achieved high specificity (95.3%) and resulted in 368 captured mynas in all three sites. I found that mynas were more active in the buffer zone than in other habitats, indicating the creation of buffer zones encourages the penetration of invasive species into natural habitats. Distinct increase in FIDs after trapping was found in all sites, indicating trapping caused heightened vigilance that may ultimately have fitness implications. I also found that intensive trapping can dramatically reduce myna abundance in protected areas and that this effect can last for months.



Study of the fitness differences between alien and native populations of Cicerbita alpina (L.)

Wallr. in the United Kingdom

Manuel Jesus Garcia Serrano^{1*}, Aline Finger²

^{1.} Ben-Gurion University of the Negev

^{2.} Royal Botanic Garden of Edinburgh

* manuelje@post.bgu.ac.il

The severe decline of biodiversity observed at global scale has led to performing numerous conservation translocations around the world. The IUCN emphasises on fostering genetic diversity as one of the cornerstones to carry them out successfully. As part of my MSc dissertation, I studied fitness differences between alien and native populations of *Cicerbita alpina* in the UK. The presence of *C. alpina* in the UK is highly threatened, with only four small, isolated populations. This project seeks to ascertain the use of new genotypes in future translocations, and thus increasing the impoverished genetic variability of the British populations. In order to determine it, a total number of 77 specimens of *C. alpina* were provided by the RBGE. Among these plants, several different genotypes were represented: Norwegian individuals, Norwegian-Scottish hybrids, Scottish intra-population crosses, and Scottish inter-population crosses. A series of morphological and physiological traits were measured under benign conditions: chlorophyll fluorescence, diameter, height, leaf area, leaf length, leaf width, and performance index. The results demonstrated that high diverse genotypes presented slightly higher values for the studied variables. It is concluded that Norwegian-Scottish and Scottish-Scottish specimens might be employed in experimental translocations to re-establish a gene flow among the isolated, native populations.



Striking recovery of the reef fish community after an extreme storm event in the Gulf of

Aqaba

Tal Gavriel^{1*}, Assaf Zvuloni², Jonathan Belmaker^{1,3}

^{1.} School of Zoology, Tel Aviv University

^{2.} Israel Nature and Parks Authority

^{3.} Steinhardt Museum of Natural History, Tel Aviv University

* talgav@gmail.com

Storms are among the most common disturbances within coral reef ecosystems. However, their effects on reef fish diversity can be either negative or positive. In the Gulf of Aqaba, storms are extremely rare, yet in March 2020 strong storm surge hit the coast of Eilat, causing severe damage to the coral reef and shore infrastructure. Using data collected from 78 reef knolls surveyed repeatedly since 2015, we explore the storm's effects on the structure and spatial heterogeneity of the fish community across multiple scales. We found a post-storm decrease in fish density and an increase in community evenness. Yet, storm impacts differed considerably between close sites with variating conservation efforts and visitor pressure. The fish community showed striking recovery and regained baseline richness, abundance, and diversity values within a year. The resilience of the unaccustomed reef fish community to storm disturbance suggests that conservation efforts should focus on managing and mitigating local human stressors such as shoreline modification, intensive diving pressure, and the prevention of oil spills. Additionally, those findings stress the importance of a long-term monitoring program that can assess the response of reef fish communities shortly after disturbances events.



Constructing a stochastic population model and identifying key ecological corridors of MacQueen's Bustard (*Chlamydotis macqueenii*) in the northern Negev, Israel

Ophir Gidron^{1*}, Ofer Ovadia¹, Eyal Shochat¹

^{1.} Ben-Gurion University

* ophirgi@post.bgu.ac.il

Anthropogenic land alterations result in habitat loss. In the northern Negev of Israel, habitat loss and illegal hunting have driven the population of MacQueen's Bustard (*Chlamydotis macqueenii*), one of Israel's flagship species, to the verge of extinction. An analysis based on a simple stochastic population model indicated that this regionally distinct population is expected to go extinct within 48 years under the current conditions. We identified key environmental factors associated with the species distribution in the Negev desert of Israel using GPS data from nineteen males equipped with GSM-GPS devices. MacQueen's Bustards migrate between two areas in the Negev by walking. We constructed habitat niche models using MAXENT and identified potential migration corridors. These corridors only partially overlap with protected areas. Therefore, we call for designating these entire corridors as nature reserves and preventing their destruction.



Tracking the invisible: extrapolated dispersal model of the "disruptive pheromone" using a

fluorescence-marked-pheromone nanoparticle

Yiftach Golov^{1,2*}, Alexander Liberzon¹, Elisheva Sasson³, Natalie Mizrahi³, Shlomo Margel³, Eyal Halon²,

Ally Harari²

^{1.} Tel Aviv University

^{2.} Agricultural Research Organization, Volcani Center

^{3.} Bar-Ilan University

* ygolov@gmail.com

Mating disruption is a sustainable bio-control method commonly used by farmers to prevent odormediated mate finding by saturating the air with synthetic odor. Yet, the accumulated evidence of failures of this method have led farmers to revert to the non-sustainable pesticides-based control. It was suggested that successful mating of the pest occurs within patches of very low synthetic concentrations, due to uneven dispersal of the synthetic molecules. Yet, it is impossible to test this theory because of the lack of instantaneous dispersal model of the sex pheromone of moths. The goal of this work was to develop a method that enables to generate a contemporary dispersal model of moths' sex pheromone. For that, we developed a marking method of moth's sex pheromone using nanoparticles and fluorescence marker. The dispersal of the marked pheromone was tracked in a wind tunnel assay, and obtained data was used to generate an extrapolated plume dispersal model. Then, as a case study, we simulate our "theoretical plume" in a chosen polygon of an apple orchard in the north of Israel. Our results provide clear evidence for the feasibility of using our marked-pheromone method to shed light on the exact pheromone disposal.



Shedding light on the Ophel biome: new biodiversity discoveries in Israel's subterranean

aquatic habitats.

Tamar Guy-Haim^{1*}, Amos Frumkin², Oren Kolodny³

¹ National Institute of Oceanography, Israel Oceanographic and Limnological Research

^{2.} Institute of Earth Sciences, Hebrew University of Jerusalem

^{3.} Department of Ecology, Evolution and Behavior, Hebrew University of Jerusalem

* tamar.guy-haim@ocean.org.il

Distribution patterns of aquatic subterranean (stygobitic) species are characterized by limited geographical ranges and high levels of endemism, exposing them to high extinction risk. We use integrative taxonomy, combining morphological and molecular methods, to identify new and cryptic species and learn about their ecology and biogeography. In En-Sa'adiya, a tectonic spring at the Carmel, we recently discovered two new stygobites, the blind prawn *Typhlocaris n.sp.* and the amphipod *Niphargus n.sp.*, reported here for the first time. Molecular analyses indicate that the prawn is closely related to its congener from the Ayyalon cave, *T. ayyaloni*, and the amphipod – to *N. nadarini* from Magharite Cave in Lebanon. In Levana cave, part of the Ayyalon-Nesher-Ramla (ANR) complex, genetics-based reconsideration of the previously-reported copepod *Metacyclops subdolus* indicates it is a different, new species, implying endemism of all ANR fauna. In the underground spring En-Nur near Tabgha, we discovered a stygobitic harpacticoid copepod *Nitokra sp.*; Comparison to Jordan Rift Valley *Nitokra spp.* is ongoing. The persistence of subterranean ecosystems relies on their biodiversity. The disappearance of species from these sensitive systems can irreversibly lead to their decline. Considering local and regional development plans, our new discoveries are critical for the conservation of Israel's subterranean habitats.



Designing effective ecological corridors in agroecosystems: arable fields impede and field

margins facilitate the movement of some bird species

Michal Handel^{1*}, Orr Spiegel¹, Assaf Shwartz¹

1. Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology

2. School of Zoology, Tel Aviv University

* michalhandel@gmail.com

Ecological corridors are a key solution for enhancing landscape connectivity and mitigating biodiversity loss due to fragmentation. Yet, empirical evidence on the factors facilitating viable wildlife movements within areas designated as corridors is scarce. Here, we aim to explore how different landscape attributes influence species movement along a proposed national corridor within an intensive agriculture area. Using a cutting-edge tracking system (ATLAS), we monitored at high-resolution (8 seconds fix interval) the regional movements of 15 bird species (with a total of 167 individuals, 8,500 days, and over 57 million localizations). This massive dataset revealed that species differ substantially in their movement behavior and corridor usage. For instance, both white-spectacled bulbul (*Pycnonotus xanthopygos*) and Syrian woodpecker (*Dendrocopos syriacus*) strongly avoided arable fields within the suggested corridor, while traveling exclusively along uncultivated (wild-growth) field margins. In contrast, other species like the european greenfinch (*Chloris chloris*) and common kestrel (*Falco tinnunculus*) readily crossed arable fields, resulting in higher connectivity through the landscape. Our findings emphasize the importance of various landscape features for facilitating species-specific movements within the agroecosystem and the benefit of high-resolution movement tracking for improving the design and management of effective ecological corridors.



Characterizing soft substrate fish communities along the Israeli coastline to facilitate marine

protected area planning

Ori Hepner^{1*}, Jonathan Belmaker¹, Shahar Malamud¹, Sheenan Harpaz²

¹ School of Zoology, Tel Aviv University

^{2.} Institute of Animal Sciences ARO, Volcani Center

* hepnerori@gmail.com

The Levantine basin, including the Israeli coastline, is characterized by mostly soft bottom habitat. While most studies on fish communities in this region have focused on hard bottom environments, there is only little information on the soft bottom and this habitat is underrepresented in marine protected areas. The overall aim of this study is to characterize spatial and temporal patterns in the fish communities over soft bottoms environments to improve the conservation of this habitat and facilitate the establishment of new marine protected areas. For this we used baited remote underwater stereovideo (BRUV's), visual surveys by divers using a tow-board, and Hydro-Acoustic survey with SIMARD-EK-80 echosounder. The surveys were conducted across 7 sites along the Israeli coasts. Results revealed a general increase in diversity and abundance from South to North. This pattern was similar for both indigenous and non-indigenous species. Importantly, our surveys uncovered hitherto unknown meadows of the seagrass *Cymodocea nodosa*. Seagrass meadows are unique and important habitat that supply high complexity, serves as a nursery for many species and help stabilize the substrate. Understanding the soft bottom environment is crucial for making informed decisions about protection of this important marine habitat.



Life in urban cemeteries - what shapes it?

Yuval Itescu^{1,2*}, Joel Luft², Tanja Straka³, Jonathan M. Jeschke^{1,2}

¹ Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB)

^{2.} Institute of Biology, Freie Universität Berlin

^{3.} Department of Ecology, Technische Universität Berlin

* yuvitescu@gmail.com

There is growing recognition in recent years that anthropologic diversity is likely related to biodiversity, especially in urban areas, but very little research has been conducted on this topic to date. Cemeteries are an important part of the green infrastructure in urban areas and form a unique multidimensional environment that integrates ecological, historical and cultural components. Here, we studied the relationship between these components and the way they shape biodiversity in cemeteries. We mapped the woody vegetation of 45 cemeteries in Berlin, quantified multiple indices of biodiversity, and tested how they are related to characteristics such as cemetery area, age, activity status, urbanization level, religious affiliation, cemetery design, managing authority, and cold-war legacies. We found that species richness and diversity (estimated using Shannon H', Evenness, and Simpson index) were mostly associated with cemetery area (positive correlations) and religious affiliation (Jewish cemeteries were species-poorer and less diverse than those of other religions). The proportion of native species was highest in Orthodox-Christian cemeteries and was also higher in closed (vs. active) cemeteries. These results demonstrate that human cultural diversity has a role in shaping urban biodiversity, and its influence should be considered in conservation plans and management.



Risk regulation of alien invasive species in Europe and the United States

Ronit Justo-Hanani^{1,2*}, Tamar Dayan^{2,3}

^{1.} Department of Public Policy, Tel Aviv University

^{2.} Steinhardt Museum of Natural History, Tel Aviv University

^{3.} School of Zoology, Tel Aviv University

* ronitjus@mail.tau.ac.il

The precautionary nature of risk regulation in the European Union (EU) and the United States (US) is an ongoing debate. Theoretical contentions over 'who is more precautionary' confirm that the degree of relative precaution may lead to different levels of protection, but also suggest that precaution needs to be evaluated against different parts of the regulatory process. This paper addresses a new case of transatlantic split which has occurred with the adoption of the EU regulation on alien invasive species. This regulation aims to drive important changes at the trade–environment nexus and reflects Europe's integrated policy approach to environmental, health, and safety risks. We have carried out a comparative analysis by examining parts of the regulatory process. We argue that differences in legal and policy frameworks, risk assessment, and risk management structures have left the EU and the US wide apart as to their risk governance ambitions. The EU exhibits more pre-cautionary approach with regard to these parts, as compared to the US. Our finding suggests that policy divergence, as reflected in this case, is true for both stringency and regulatory process, expanding literature discussions on precaution in these systems. Yet, with the EU's regulation being relatively new, there are still implementation issues up for debate.



Barn Owls (Tyto alba) in Israel's national pest control project – rainfall and land-use

predictors of breeding success

Tomer Karni^{1*}, Yaron Ziv¹, Guy Rotem¹, Yoav Motro²

^{1.} Ben-Gurion University of the Negev

^{2.} Ministry of Agriculture and Rural Development

* tomerkar@post.bgu.ac.il

Using a four-year survey of Barn Owl nest boxes from different geographic regions in Israel (Golan Heights, Sharon Plain and Northern Negev), we analyzed the relationship between rainfall and land-use predictors and Barn Owl breeding success. The breeding success was assessed by using two factors: nest box occupancy and clutch size. At the whole-Israel scale occupancy models performed poorly compared with the geographic region models. Accordingly, the models of the geographic regions were unique in their set of predictors, even showing opposite trends. These results show that rainfall and land-use factors correlate differently with Barn Owl breeding at distinct geographic locations, possibly due to the different constraints the Barn Owls confront. The results also suggest that the proximity of rainfall to the breeding season is more important than the overall amount of rain during the rainy season. The clutch size at the whole-Israel scale was positively affected by autumn rainfall and negatively affected by spring rainfall. A higher percentage of agricultural buildings, agricultural fields and natural shrub & grass patches are related to bigger clutch size. These findings illustrate the complexity of Barn Owls' ecology and may contribute to our understanding and utilization of their service as pest control agents.



Black howler monkey dispersal, demography, and population genetics in a fragmented

landscape

Keren Klass^{1*}, Julie A. Teichroeb², Amanda Melin³, Gwen Duytschaever³, Eva C. Wikberg⁴, Alejandro Estrada⁵, Sarie Van Belle⁴, Gili Greenbaum¹

- ^{1.} Hebrew University of Jerusalem
- ^{2.} University of Toronto Scarborough
- ^{3.} University of Calgary
- ^{4.} University of Texas at San Antonio
- ^{5.} The National Autonomous University of Mexico
- * keren.klass@mail.huji.ac.il

Forest loss and fragmentation are an urgent threat to primates, with important consequences for dispersal. Increased dispersal costs in fragmented landscapes can affect male and females differently, altering sex-specific dispersal behavior and subsequently shaping population-level patterns. We surveyed endangered black howler monkeys (*Alouatta pigra*) in 34 forest fragments in Chiapas, Mexico (N=407 individuals). We aimed to evaluate the effect of fragmentation on dispersal, via genetic and demographic population structure analyses. We sequenced DNA from 51 individually identified fecal samples with ddRAD sequencing to generate a dataset of 12,759 SNPs. Our genomic analyses revealed fine-scale population structure, with genetic clusters corresponding to single forest fragments or to small groups of geographically-proximate fragments. We analyzed kinship patterns and found higher relatedness among male-male pairs within the same fragment than was seen in female-female or female-male pairs. Demographic analyses showed that the population in fragments had significantly fewer adult males than an adjacent continuous, protected population, suggesting a specific way in which habitat fragmentation may be restricting gene flow: increased male mortality during dispersal across the matrix. Our results suggest that forest fragmentation is having sex-specific effects on black howler dispersal decisions and outcomes, altering the demographic and genetic structure of this population.



Urban bats and their ecological services

Carmi Korine^{1*}, Danilo Russo², Leonardo Ancillotto², Joanna Coleman³

^{1.} Ben-Gurion University of the Negev

^{2.} Wildlife Research Unit, Dipartimento di Agraria, Università degli Studi di Napoli Federico II

^{3.} Department of Biology, Queens College, City University of New York

* ckorine@bgu.ac.il

Urban bats may provide important ecosystem services (ES) in cities and adjacent areas. However, ES for urban bats have been relatively neglected. Based on studies on various continents that used molecular identification of prey remains in bat droppings, we show substantial consumption by bats of urban pests, including "nuisance" insects, such as drain flies and mosquitos, and species that bite or induce allergic reactions, as well as insects that damage stored products. Ecosystem services rendered by phytophagous bats (pollination and seed dispersal) in urban areas are poorly known, but potentially important. The few studies available fail to prove that phytophagous bats in urban areas mediate plant recruitment, yet there is some anecdotal evidence that they do. Urban bats also provide cultural ES, e.g., bat-related tourism, which in some cases generate a considerable revenue. Awareness of ES provided by urban bats should help convince the public that bats are essential components of urban biodiversity.



Genetic characterization of the Oryx leucoryx population in Israel

Peleg Lanir^{1*}, Yaron Tikochinski¹, Tal Polak²

- ^{1.} Michmoret Faculty of Marine Sciences Ruppin Academic Center
- ^{2.} Israel Nature and Parks Authority
- * peleglan@gmail.com

Today there is evidence of a mass-extinction occurring. Large-mammals are essential to maintain ecosystem stability however extremely vulnerable to extinction. The White Oryx (*Oryx Leucoryx*) is an endemic species of the Arabian-Peninsula. In 1972 it was considered extinct in the wilderness and the last Oryx in Israel was observed in the 1930's. Following a rehabilitation plan, the White Oryx was reintroduced to nature and the wild population was classified as endangered. Currently, because of these efforts, it is considered vulnerable. To continue and secure population growth and maintain its genetic variability, a genetically based captive breeding plan is of need. In this study we lay the foundations for a long-term improved breeding program and an in-situ monitoring of the White Oryx population in Israel. Using the RAD-sequencing technology on 35 DNA samples extracted from individual's blood, prior to their release, we have managed to find 750 informative SNPs. We have also established a reliable protocol for extraction of Oryx DNA from feces. Applying these molecular biology tools, we have started to monitor the wild population and intend to add the genetic variability factor to the current reintroduction plan at the individual level.



Artificial light at night on nesting beaches of the green sea turtle, *Chelonia mydas*, in the eastern Mediterranean and future implications on sea turtle conservation

Noam Leader^{1*}, Yaniv Levy¹

^{1.} Science Division, Israel Nature and Parks Authority

* leader@npa.org.il

Mediterranean Sea turtle nesting beaches experience severe anthropogenic coastal development compared to other world regions. This results in a subsequent increase in artificial illumination falling on coastlines. Artificial light at night (ALAN) frequently disrupts both nesting female turtles and the seafinding ability of emerging hatchlings. When sea-finding behavior is disrupted, the prospect for hatchling survival significantly diminishes. Hence, ALAN may pose a serious threat to the future survival of the endangered Mediterranean Chelonia mydas (CM) population. Using nighttime satellite-imagery, we documented ALAN levels at important nesting beaches for CM populations in the Eastern Mediterranean, calculating the proportion of nesting areas exposed to detectable levels of ALAN, and are thus prone to negative effects on reproductive success. We then modelled a quantitative estimate of the potential future effects of ALAN on nesting success and hatching survival. Overall, yearly recruitment of the Mediterranean population may be reduced by 30%, leading to a potential annual loss of more than 60,000 turtles. However, due to the species long generation length, any outcome of reduced recruitment may only manifest itself in the future and may not be immediately observed. The effects of ALAN may therefore have important implications for Sea Turtle conservation assessment and management.



Reptile Scales: a rapid screening method of exotic reptiles for invasion risk assessment

Noam Leader^{1*}, Shai Meiri^{2,3}

^{1.} Israel Nature & Parks Authority

- ^{2.} School of Zoology, Tel Aviv University
- ^{3.} Steinhardt Museum of Natural History, Tel Aviv University
- * leader@npa.org.il

Global trade in live reptiles has facilitated the introduction and establishment of exotic species in many countries. Introduced reptiles may have adverse ecological impacts and some large and venomous species may be dangerous to humans. Increased popularity of exotic reptile pets in Israel has led to a currently booming local trade. Intentional or accidental release by pet owners caused the recent reptile introductions in Israel. The Israel Nature & Parks Authority wildlife trade policy addresses invasion risk, and requires conducting risk assessments for species sought for import to Israel, yet knowledge gaps on basic life history traits of many species hinders assessment of their potential impacts. We devised a scoring system for invasion risk by reptiles based on several attributes: climate matching, native distribution range size, known invasive species in the genus, and representation of the genus in Israel. Following validation using a subset of known invasive reptiles, the resulting scores, on a 1-5 scale, were used to pre-screen all known ~11,700 reptile species. In practice, all import requests by the public are initially screened using this scale and then traits such as CITES compliance, danger to humans, and animal welfare are considered, and publicly published as "White/Black" lists.



Quantifying the potential niches of endangered plant species for improving reintroduction

success

Merav Lebel Vine^{1*}, Yuval Sapir¹, Jonathan Belmaker²

^{1.} School of Plant Sciences and Food Security, Tel Aviv University

^{2.} School of Zoology, Tel Aviv University

* meravlebel@gmail.com

One of the most severe threats to global biodiversity is land-use changes. Reintroduction is a major conservation tool, but its success relies on accurate estimation of the species niche. While niche modeling has been used to predict the distribution of plants, it has been rarely used as a tool for predicting reintroduction success. We aim to examine the possible use of niche modeling for improving endangered species reintroduction success. As Israel is one of the world's most populated countries, very few natural areas remained challenging the finding of appropriate sites for reintroduction. Moreover, habitat suitability is rapidly changing with global climate change. We used species distribution models (SDM) to estimate the potential niche for reintroduction of endangered species based on known sites of occurrence. Reintroduction field experiments are currently performed for five endangered endemic plants - *Rumex aeroplaniformis, Verbascum berytheum, Salvia eigii, Alkanna galilaea*, and *Vicia esdraeloninsis* - representing two endangered habitats in Israel: Loamy soils and coastal sandy soils. For those species, we also predicted future potential distribution using future climate projections. For all species, the model predicts a decline in the potential distribution in general and in particular suitability of the current population sites.



Mapping potential impacts of traffic noise on bird density in non-urban Israeli environments

reveals alarming consequences

Yael Lehnardt^{1*}, Gopal Murali¹, Uri Roll¹, Oded Berger-Tal¹

¹ Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

* lehnardt@post.bgu.ac.il

Roads have many environmental impacts, but the consequences of road traffic noise are underappreciated, despite studies showing that traffic noise has substantial negative impacts on wildlife. We quantified the impact ranges of traffic noise on breeding bird density. We used literature data on traffic noise impacts on breeding bird density and road traffic volume data to map potential impacts of traffic noise in non-urban environments in Israel. We found that almost half (46.7%) of the non-urban environments are within the impact range of road traffic noise on breeding bird density. Specifically, 82% of the densely vegetated areas and 40% of the open habitats might be affected by noise. These hazardous impacts of traffic noise are also prevalent in protected areas and may consequently alter habitat use by species and functionally occlude ecological corridors. Put together, we found that for many bird species, Israeli non-urban areas – even within protected areas - are not a safe refuge from the deleterious effects of roads. Our review on the negative effects of noise pollution on animal behavior can be used to target specific actions in key areas to reduce the impact of traffic noise and can also be expanded to aid conservation planning.



Testing methods for the restoration of vermetid reefs

Aliza Leit^{1*}, Jonathan Belmaker¹

^{1.} School of Zoology, Tel Aviv University

* aleit21@coa.edu

Intertidal habitat degradation is expansive throughout the globe, with stark rises in man-made coastal alteration and increased biological invasions. Pronounced coastal habitat modifications have occurred in the Eastern Mediterranean Sea coupled with a continuing biological invasion from Red Sea Species. A habitat of particular concern in this region is vermetid reefs, a unique biogenic structure produced by marine gastropods containing diverse algal communities, and various invertebrate and fish niches. The pressures faced by vermetid reefs include trampling, climate change, invasive species, urban expansion, and nutrient/pollution input. We conducted baseline surveys in a particular reef in southern Tel Aviv to assess species diversity and abundance. Following the baseline surveys we examined several methods to quantify anthropogenic pressures and restore the reef. These include: (1) reducing trampling, (2) limiting grazing by invasive rabbitfish, (3) restoring grouper habitat, and (4) providing artificial reef rims to increase complexity. Preliminary results suggest trampling exclusion on the reef's edge did not facilitate significant shifts in algal species composition or abundance. However, we found an increase in algal species diversity and abundance in grazing exclusionary treatments present in the center of the reef. These results indicate divergent impacts of trampling and grazing in different areas of the vermetid reef. We intend to continue this research to strengthen our conclusions and inform management practices for these unique biogenic structures.



Transforming of abandoned army bunkers along the Jordan River into bat roosts - summary

of first 15 years

Eran Levin^{1*}, Amos Sabach², Shmulik Yadveb³, Aviam Atar¹

^{1.} School of Zoology, Tel-Aviv University

^{2.} Israel Nature and Parks Authority

^{3.} Zoological Center, Tel Aviv-Ramat Gan

* levineran1@gmail.com

Israel bat fauna is relatively rich, with about 33 species. To date, 29 species are under threat, primarily due to roost interference, habitat loss, and poisoning. In 2007 we found that at least 12 bat species started to inhabit the abounded army bunkers along the political border with Jordan, between the Dead Sea and the Sea of Galilee (96 km). Since then, we have modified 25 of these bunkers into bat houses, technically by modifying the ceiling surface for the bats to cling, and statutorily with the Israeli army and Nature and Parks Authority. The most common bat species in these bunkers is the lesser mouse-tailed bat (*Rhinopoma cystops*); this is a medium size (12g) insectivore bat inhabiting arid and hot habitats of the "old world"; their population in the bunkers grew from 2000 in 2014 to 7000 in 2021. We banded a few hundred of these bats with metal rings and found high philopatry for the bunkers. For other bats species, these artificial structures are the largest maternity colonies known in Israel today. We suggest that this successful conservation project and this unique system can leverage the proclamation of the area of the Jordan River as a biosphere reserve.



Current and future land-uses, conservation status and overlap of global arid landscapes

Amir Lewin^{1*}, Gopal Murali¹, Shimon Rachmilevitch², Uri Roll¹

- ^{1.} Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev
- ^{2.} French Associates Institute for Agriculture and Biotechnology of Drylands, Ben-Gurion University of the Negev

* amirlewin@gmail.com

Drylands encompass a large and vital part of Earth's land surface. A major challenge facing land-use planning in such regions is the application of several disparate classifications comprising broad and nonoverlapping regions. We examined several dryland designations to evaluate their degree of global congruence, protected area coverage, and current and future land-use pressures. We focus on several of the foremost landcover designations among major international organizations – each utilizing dissimilar methodologies categorizing "drylands". We identify core regions of drylands identified as such across all designations, in addition to regions falling under only one or few designations – thereby highlighting their potential complementarity, while also identifying unique desert regions omitted by other designations. Our findings reveal significant variation among designations, and unique desert regions encompassing approximately 12.1 million km². We also find that relative to other biomes, deserts are among the least protected by assigned conservation areas aimed at protecting biodiversity. These attributes were further highlighted in major dryland regions separately, revealing regions of very low protection and high human agricultural and future urban pressures (e.g., Asia), representing high conservation priority. Identifying desert classifications and their spatial distributions will be integral to determining potential threats, requisite conservation interventions and land-use planning in desert regions globally.


Can "going deeper" be a viable refuge for corals?

Ronen Liberman^{1*}, Tom Shlesinger^{1,2}, Yossi Loya^{1,3}, Yehuda Benayahu¹

^{1.} School of Zoology, Tel Aviv University

^{2.} Institute for Global Ecology, Florida Institute of Technology

^{3.} The Interuniversity Institute for Marine Sciences, Eilat

* ronenliberman@gmail.com

Wide-scale declines of coral reef ecosystems are currently leading to increased efforts to identify natural refuge zones. Such a refuge has been suggested to be that of mesophotic coral ecosystems (MCEs), but whether depth can provide coral populations with a viable and reproductive refuge remains unclear. Although coral reproduction has been widely studied, there is still a gap in knowledge regarding their reproductive phenology along a depth gradient. Filling in this gap may also improve our understanding of the environmental cues that regulate coral reproduction. Here, we examined the relationship between environmental factors and reproductive phenology of the octocoral *Rhytisma fulvum* along its entire depth range. The findings revealed a significant decrease in the number of reproducing colonies deeper than 30 m. They further indicated that an increase in seawater temperature over 1–2-day intervals during the breeding season correlated with the onset of reproductive activity, leading to different reproductive periodicities along depths. These results suggest that differential temperature regimes across depth may create intraspecific temporal reproductive segregation between populations along a depth gradient. Together, this study raises the question of whether MCEs may provide a long-term and viable refuge for corals in face of global environmental changes.



Water voles in Israel: Turnover, extinction, and potential reintroduction

Nimrod Marom^{1*}, Adva Peretz^{2,3}, Shai Meiri^{1,4}

^{1.} University of Haifa

- ^{2.} School of Zoology, Tel Aviv University
- ^{3.} Israel Nature and Parks Authority
- ^{4.} Steinhardt Museum of Natural History, Tel Aviv University
- * nmarom@marsci.haifa.ac.il

Water voles (*Arvicola amphibius*) inhabited the Hula Valley until the mid-20th century. This population has either disappeared following the drainage of the valley, or dwindled away in the following decades. The water vole is the last mammal to have gone locally extinct in Israel. Therefore, it could be a prime candidate for restoration, as part of the efforts to revive the Hula valley wetlands. We aimed to (1) confirm the extinction of the Hula voles, using field-sign and trap surveys; (2) clarify the association between the historic population of the Hula voles, extant Eurasian populations, and archaeological populations from the region, using geometric morphometrics; and (3), to estimate current habitat suitability of the region to water voles using a species distribution model. Our results confirm the extirpation of the Hula water voles; it was similar, however, to extant Eurasian morphotypes. Maxent modelling predicts low habitat suitability of the region to water voles because of locally high summer temperatures, but the presence records may be biased towards high latitude European localities.



It is TiME for education!

Maya Mayrose^{1*}, Uri Shanas²

^{1.} Peres Campus, Holon

^{2.} Department of Biology and Environment, University of Haifa-Oranim

* maya.mayrose3@gmail.com

Most students/pupils today do not actively try to make a change when it comes to humans' negative influence on nature. Surprisingly, exposing students to the TiME ("This is My Earth") project in various (>20) education institutes across Israel and abroad recently led to a fundamental change in their behavior, in a way that they became passionate, and dedicated substantial amounts of time and resources in promoting ideas and principles of nature conservation in their communities. The TiME project, which leads global democratic activity to conserve biodiversity, turned out to be an exciting way of triggering motivation of discouraged post-COVID-19 students, probably due to its positive and optimistic strategy of dealing with conservation issues. In contrast to other nature conservation educational programs, TiME led to recruiting of over 85% of students to activism. The talk will focus on sharing this unique way of teaching conservation science at schools and in the academy and will offer practical strategies for adopting it in any educational institution. TiME is becoming a fundamental conservation practice that allows students to rebuild their hope and belief in themselves as change-agents in saving our planet.



Engaging world citizens of all ages in conservation with the TiME education platform

Maya Mayrose^{1*}, Mali Bar-Amalia², Nurit Hochberg³, Hen Pardovitz⁴, Neta Perry⁵, Keren Shmilovich⁶, Uri

Shanas⁷

- ^{1.} Peres Campus, Holon
- ^{2.} Leo Baeck School, Haifa
- ^{3.} Grinberg School, Tivon,
- ^{4.} Yigal Alon School, Yokneam
- ^{5.} Shazr School, Bat Yam
- ^{6.} Rogozin School, Kiryat Ata
- ^{7.} Department of Biology and Environment, University of Haifa-Oranim
- * maya.mayrose3@gmail.com

Land transformation and degradation is the major driver of current species extinction, lately recognized as the sixth mass extinction. To address this threat innovative programs that combine both immediate remedies of land protection and deep educational programs are soughed. This is My Earth (TiME), allows every citizen of the world to join an international organization and take an active role, through a democratic process, in protecting critical biodiversity hotspots. Using the TiME platform and curriculum, teachers involve classes in discussions about environmental decision-making, prioritizing conservation efforts and practical ways to protect nature. Through TiME, conservation education is transformed into a compelling, real-life experience and a catalyst for individual activism, reaching a high student involvement rate of 85%. Since its establishment TiME recruited thousands of members that together raised funds to purchase eight biodiversity lands across central and south America and in Africa, engaging hundreds of students from preschool to university level in a compelling, real-life experience educational program.



Mesophotic refuge? Genetic connectivity among sponges' populations in Israeli

Mediterranean coast

Tom Morav^{1*}, Liron Goren^{1,2}, Tal Idan³, Yaron Tikochinski⁴, Sigal Shefer^{1,2}, Micha Ilan¹

^{1.} School of Zoology, Tel Aviv University

^{2.} Steinhardt Museum of Natural History, Tel Aviv University

^{3.} Department of Biomolecular Sciences, the Weizmann Institute of Science

^{4.} Faculty of Marine Sciences, Ruppin Academic Center

* tommorav@mail.tau.ac.il

Establishing Marine-Protected-Areas (MPAs) and their networks, based on populations spatial connectivity will enable maintaining the genetic diversity required for their existence. Thus, MPA communities will better cope with natural and anthropogenic-induced ecological changes, including climate change. In the last decade, mesophotic sponge grounds (MSG) were discovered in the East Mediterranean-Sea with unparalleled local richness and diversity. The MSG's stable conditions facilitate their role as a refuge for shallow water species, and a potential source for larvae to colonize shallow habitats. As such, some MSG have been promoted as MPAs. By using novel sequencing (ddRAD) we examined the genetic connectivity of *Axinella polypoides* in three depths (100,40,25m) between and within four rocky sites. In each location and depth, 15 specimens were collected by either a Remotely-Operated-Vehicle or diving. We found low genetic differentiation (Fst<0.03) among *A. polypoides* populations between sites, with more similarity among populations from same depths. Moreover, populations genetic distance correlated with physical distance from each other (Rho=0.35,p=0.04). Low differentiation between these populations indicates gene flow and high connectivity between those areas. Our results emphasize the importance of the MSG along Israel's shore, as a possible refuge for *A. polypoides*, and the need for further research about other species.



Invasive, eruptive, and non-pest snail population dynamics on a source to fishpond gradient

in Emek HaMa'ayanot

Sharon Moscovitz^{1*}, Hanoch Glassner², Moise Wokam¹, Eliahu D. Aflalo^{1,3}, Ofer Ovadia¹, Amir Sagi^{1,4}

^{1.} Department of Life Sciences, Ben-Gurion University of the Negev

^{2.} Eden Research Station, Beir Shean, Israel

^{3.} Department of Life Sciences, Achva Academic College

^{4.} National Institute for Biotechnology in the Negev (NIBN), Ben-Gurion University of the Negev

* moscovis@post.bgu.ac.il

Freshwater snails transmit fish diseases caused by parasitic trematodes, which cause slower growth and higher mortality in fish and water circulation damage in fish farms. Fish farmers use integrated approaches of pesticides and biocontrol agents. Emek HaMa'ayanot (EH) region, Israel, harbors a complex water system transporting spring water to fish farms. They range from natural spring flow to manufactured trenches and pumps. Snails in EH include local species (*Melanopsidae; Theodexus*) known in springs; invasive species (*Thiara scabra; Tarebia granifera; Pseudosuccinea columella*), and overabundant local species (*Melanoides tuberculata*), the last four found in massive abundances in fishponds and farms. We studied the snail species composition in five representative water-transport tracks in EH between sources and fishponds, aiming to find potentially influential spots for biocontrol. We found that the presence of a commercial fishpond determines the species composition. With no fishpond in the track, the species were local and in low abundance. In contrary, with a fishpond the site location significantly influenced the species not only in fishponds but also in midpoints out of the fish farm and even in springs. Conservation-wise, we suggest using temporal biocontrol in the midpoints.



When biological conservation and biotechnology clash: an update on what the Post-2020 Global Biodiversity Framework means for Israeli researchers and for the biotech industry

Simon C. Nemtzov^{1*}

^{1.} Israel Nature and Parks Authority

* simon@npa.org.il

By the end of the UN Decade on Biodiversity (2011-2020), none of the 20 "Aichi Biodiversity Targets" set by the Convention on Biological Diversity (CBD) were achieved by the nations of the world. Since then, the Parties to CBD have been negotiating in an attempt to draft new biodiversity targets for 2030, as part of an overall Global Biodiversity Framework (GBF) towards the UN goal for 2050 of "Living in Harmony with Nature". The new GBF will hopefully be adopted at the UN Biodiversity Conference in December 2022. The current major stumbling block for adoption, is disagreement over sharing of benefits from digital sequence information (DSI) from genetic resources. The current CBD instrument for Access and Benefit-Sharing (ABS) of genetic resources is the Nagoya Protocol, but it does not address DSI. The world's developing countries are insisting on a new mechanism to provide them with significant monetary benefits from DSI. The decision on ABS from DSI in the GBF could have staggering impacts on international research, as well as the profits of Israeli biotechnology and pharmaceutical companies. The nations of the world need to urgently agree on a creative formula for ABS from DSI, to ensure adoption of the GBF.



Do small human settlements represent potential ecological traps for Arabian babblers?

Krista Oswald^{1*}, Oded Berger-Tal¹, Uri Roll¹

^{1.} Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

* knoswald@gmail.com

Human settlements can provide resources in an otherwise stark environment, but this may come with negative trade-offs such as increased competition with non-native species and predation from nonnative predators. Between February and July 2022, we monitored 33 breeding attempts from 13 groups of Arabian babblers (*Turdoides squamiceps*) around Sde Tsin in the Negev desert, Israel. Nests were recorded as being in areas of either high (orchards, settlements) or low (greater plateau) human disturbance. Despite greater success for babblers nesting further from direct human impacts (64.3% greater plateau v. 31.6% orchards, settlements), this difference was not significant (p=0.098) with most variance due to individual group. There was also more recorded predation in areas of high disturbance (n=13) compared to low (n=5). Both habitats experience predation from native red foxes (*Vulpes vulpes*; n=6) as well as the non-native golden jackals (*Canis aureus*; n=5) whose expansion into the area is due to anthropogenic presence. However, areas of high disturbance also experienced predation from domesticated cats (*Felis catus*; n=4). Thus, if an effort was made to control invasive predators, the increased resource availability in areas with higher human presence could potential help buffer against negative effects of climate change.



Open surface mining blast impact on movement patterns of an endangered vulture

Sasha Pekarsky^{1*}, Ofer Steinitz¹, Noam Leader¹, Asaf Tsoar¹, Gideon Vaadia², Nili Anglister², Orr Spiegel²,

Ohad Hatzofe¹

^{1.} Science Division, Israel Nature and Parks Authority

^{2.} School of Zoology, Tel Aviv University

* sasha.pekarsky@gmail.com

Open-pit mining is increasingly expanding over the world but remains poorly regulated, causing not only habitat fragmentation, degradation, and contamination but also massive noise pollution through drilling, crushing, transportation and blasting. While studies found mining impacts on bird diversity and population sizes, the impacts of acute noise pollution by mine blasting on movement and behavior remains unknown. In the current study we investigated the impact of blasting events on movement ecology of griffon vultures by coupling movement data of 83 vultures equipped with GPS-transmitters with precise records of blasting events in the ICL's Hatrurim open-pit mine between 2018 and 2022. This mine is located less than 3 km from a former important nesting site of griffon vultures. We found that 52% of individuals were directly exposed to the blast while flying within less than 20 km from the mine. Despite being on the main flight route connecting the Judean desert and the Negev, vultures tended to keep a distance from the mine, though whether this is an effect of the mining activity is unknown since we lack movement data before mining started. Better understanding of movement responses of highly endangered vultures can help their conservation efforts in industrially modified landscapes.



Cattle grazing effects on Basidiomycotina and Ascomycotina fungi in a Mediterranean

woodland ecosystem in the Upper Galilee, northern Israel

Amir Perelberg^{1*}, Bruria Gal², Yair Ur, Talia Oron³

¹ Open Landscape Institute, The Steinhardt Museum of Natural History, Tel Aviv University

^{2.} The Steinhardt Museum of Natural History, Tel Aviv University

^{3.} Israel Nature and Parks Authority

* aperelbe@tauex.tau.ac.il

A common vegetation management practice in Israel's nature reserves is cattle grazing. In recent years, concerns were raised that this practice decreases biodiversity in general, and fungi community – in particular: the compaction of the soil by the cattle and the changes grazing causes to the habitat structure might cause a considerable change in mushroom community composition. The purpose of this study was to examine these effects on Basidiomycotina and Ascomycotina fungi communities in the Israeli Upper Galilee. Mt. Meron reserve was sampled in the winters of 2014/15-2015/16, and Bar'am forest reserve was sampled between 2011/12-2014/15. Results showed clear differences between grazed (experiment) and non-grazed (control) study plots: in Mt. Meron, species richness, abundance and Shannon diversity index were higher in the control plots, with ca. half of the species found only in the control. In Bar'am forest, species richness, Shannon and Simpson indices were higher in the control plots, but community composition was more similar than in Mt. Meron. These findings demonstrate the strong impact of cattle grazing on fungi community structure, and urges for a controlled and monitored grazing practice, which will maintain sustainable reserve management, with minimal impact on biodiversity in general and fungi community in particular.



Resolving the phylogeny, geographical distribution and population differentiation of frogs

belonging to the genus Hyla in Israel

Bina Perl^{1,2*}, Gal Mesika Surizon³, Uri Roll⁴, Eli Geffen⁵, Sarig Gafny³

^{1.} Department of Terrestrial Zoology, Senckenberg Research Institute

^{2.} Natural History Museum Frankfurt

^{3.} Faculty of Marine Sciences, Ruppin Academic Center

^{4.} Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

^{5.} School of Zoology, Tel Aviv University

* <u>bina.perl@gmail.com</u>

Treefrogs of the genus *Hyla* provide one example of a morphologically and ecologically cryptic group. For Israel, up to three distinct species have been proposed and this number has been subject to taxonomical debates ever since. We analyzed 16S rRNA and COI gene fragments of 660 individuals sampled at 47 pools in nine regions across Israel to resolve the taxonomic status of *Hyla* frogs in this country. We generated phylogenetic trees for each gene fragment under both a Bayesian and a Maximum Likelihood framework, and constructed time-calibrated trees to provide an evolutionary context of sequence variation. We further applied SAMOVA as well as Monmonier's maximumdifference algorithm to study the genetic structure among populations and to identify zones of genetic barriers between locations. Our results revealed two distinct haplogroups for each gene fragment that were separated from another by over 60 mutational steps each. The time of divergence between the two haplogroups was dated at 10-20 mya (16S) and at 3-18 mya (COI), respectively. SAMOVA analyses partitioned the populations in three groups, which was confirmed by the barrier analyses. We conclude that there are two *Hyla* species in Israel and one population that might qualify as a separate evolutionary significant unit.



Hard lessons: findings from a three-year pilot of hard-releases in the Israel Arabian oryx (*Oryx leucoryx*) reintroduction program

Tal Polak^{1*}, Noam Leader¹, Asaf Tsoar¹, Amir Shafir¹, Golan Rider¹, Eran Hayms¹, Oren Prital¹, Mark Catz¹,

Yosi Sade¹

^{1.} Israel Nature and Parks Authority

* talp@npa.org.il

The majority of the Israeli Arabian oryx reintroduction program occurred from 1997-2007 using a softrelease tactic, transferring animals from the breeding core to a habituation enclosure in the release area for several weeks prior to release. In 2017, the Israel Nature and Parks Authority (INPA) began a pilot to investigate the hard-release method for Arabian oryx reintroductions; animals are transferred from the breeding core directly to the release site and immediately set free. The pilot had two objectives: 1) to evaluate the survival rate of hard-released individuals and 2) to unify the released individuals to wild herds. Young, sexually mature oryx were selected for each hard-release, sometimes together, to ease their acceptance to the natural herds. Since 2017, 27 females and 21 males were released in 16 events, in locations known for high oryx presence. Survival rate of collared individuals was ~50%. A combination of direct observations, drones and camera traps allowed us to monitor the oryx assimilation into the wild herds. Overall the program suggested hard-release can be used as an effective reintroduction method and provide invaluable information which the INPA intend to develop into a population monitor program.



Understanding the ecotoxicological and environmental impact of Apollonia's yellow stain at

Apollonia beach, Herzeliya

Yamit Romano^{1*}, Yehuda Benayahu¹, Jonathan Belmaker¹, Dror Avisar²

^{1.} School of Zoology, Tel Aviv University

^{2.} Department of Geophysics, Tel Aviv University

* yamitromano@gmail.com

In the late 1990's a yellow stain appeared in the waters of Apollonia beach, Herzliya. The Ministry of Environmental Protection and the National Laboratory for Water Quality Monitoring has found that the stain originate from pollutants were derived from a nearby military facility, and consists mainly of nitro-aromatic compounds. It has also been suggested that these pollutants infiltrate into the coastal aquifer and consequently lead to the stain. However, no studies have been done on its effect on the marine life. The main goals of our study are to examine (1) the chemical composition of the stain, (2) the toxicity of the compounds and (3) the ecological effects of the stain. We identified new compounds that have not been found in previous studies in the site, including toxic compounds containing Benzene Phenolic and Fluorides residues. We tested the toxicity of NIPA 5 (5-nitrobenzene-1,3-dicarboxylic acid), RC1 (1-chloro-2-nitro-4-(trifluoromethyl) benzene) and RC2 (2-chloro-5-(trifluoromethyl) aniline) on *Artemia salina* and revealed LD50 values significantly higher than their concentration in the seawater. When we examined the fish and benthic invertebrate communities at the stain and a nearby control sites and did not find significant differences. The results suggest that some chemical compounds of concern are present in the yellow stain, but thus far we could not detect impact on the marine environment.



Maximizing the environmental benefits of the fish ponds, for the benefit of all stakeholders

Guy Rubinstein^{1*}

^{1.} Ministry of Agriculture

* guyr@moag.gov.il

Increasing awareness of environmental protection, creating new conflicts in the aquaculture industry in Israel. The Ministry of aquaculture together with the Ministry of Environmental Protection, in collaboration with farmers, and environmental organizations, are in the midst of a broad environmental reform to regulate the interface of releasing the water from fishponds to the environment. Our goal is to produce an economic growth interface, with minimum environmental harm, while maximizing the unique environmental benefits using ecological ponds in the aquaculture farm area, which will improve the water quality for the farmers, and will provide system services to a wide variety of animals and to the environment in the area. In this presentation, I will present the rationale of environmental reform in Israel, how we implement it in practice, and what we do to maximize synergy with the environment for the benefit of farmers and environmental organizations.



What impact may climate change have on nest site selection in a desert lizard?

Liran Sagi^{1*}, Amos Bouskila¹

^{1.} Department of Life Sciences, Ben-Gurion University of the Negev

* <u>liransag@post.bgu.ac.il</u>

Reproduction is the most important stage in an animal's life and is greatly affected by environmental conditions. Many studies discuss effects of incubation conditions on reptile eggs and hatchlings, but it is not known where most reptiles lay eggs or how they choose nesting sites. The desert chameleon (*Chamaeleo chamaeleon musae*) is an exception – we found that its nests are at one meter under the surface with burrows 1.5 m long leading to them. Females abandon several nesting attempts before laying eggs. If conditions while excavating nests will not indicate conditions during incubation, nests may become ecological traps. We constructed a dynamic state variable model to understand decision-making in females and to predict impacts of climate change on the decisions. The model suggests that chameleons with high energetic state take more risks: they often reject burrows and search for better nesting sites. In contrast, chameleons in medium energetic state dig in the first possible nest they find. The decisions are mostly influenced by costs of walking and digging, and by the probability of finding a good nest. Under climate change, erroneous decisions will have a greater negative impact on individuals with a high energetic state because they take higher risks.



Migratory birds, a farmer's best friend: how bio-pest control approaches can protect birds

and crops simultaneously

Jessica Schäckermann^{1*}, Noah Morris¹, Noam Weiss²

^{1.} Southern Arava R&D

^{2.} International Birding and Research Center Eilat

* jschaec@gmail.com

Agriculture is of high economic importance in the Southern Arava, which is also located along one of the world's busiest migratory routes of birds. Insects are a serious concern for farmers in the region; on the other hand, they provide protein resources for migratory birds. This creates the possibility for a win-win situation; birds can use agricultural sites to fuel up on protein while farmers receive bio-pest control services. We investigated which species of birds are potential service givers for different crops and if habitat structures and pest abundance have an impact on bird abundance. We collected bird data using point counts to investigate which bird species can be found within agricultural sites. We also studied if tape luring could be used to attract birds to specific sites. Our results showed that habitat structures are less important than the crop itself and that agricultural sites are highly attractive to migratory birds. Specific bird species are attracted to a high abundance of specific pests, and tape luring can attract birds to crops according to the phenology of migration. Our findings highlight the importance of agricultural sites for migratory birds and the need to include conservation biological control approaches in agricultural protocols.



What is 'eco' about 'ecotourism'? Defining a coherent definition of ecotourism for the hyper-

arid deserts

Jessica Schäckermann^{1*}, Arielle Earn¹, Avigail Morris¹, Elli Groner², Daniel Orenstein³

^{1.} The Arava Institute for Environmental Studies

^{2.} Dead Sea and Arava Science Center

^{3.} Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology

* jschaec@gmail.com

There are two paradigmatic understandings of the desert in Southern Israel; the Israel Nature and Parks Authority, considers the desert an asset (protect it), while the tourism industry considers it a product (use it). Tourism operators in the Arava Valley attempt to bridge these conflicting paradigms through 'ecotourism'. Yet approaches to ecotourism differ substantially, making it difficult to define a common set of shared goals, values, and even definitions. To develop a common definition and shared best practices for ecotourism relevant to hyper-arid ecosystems, we conducted open-ended surveys around nine tourist sites, investigating the definition of ecotourism. We did a qualitative, directed content analysis using the frameworks of six 'ecotourism-core-tenets' (ECT) (nature-based, environmental education, ethics, distribution of benefits, conservation, and sustainability). We found that there is no shared understanding of ecotourism among the operators in the region. Different site managers defined ecotourism in different ways and just one site practices ecotourism including all 6 ECT. Many cultural ecosystem services (CES) are connected to different tourism activities; hence ecotourism cannot be considered a CES, as often defined in the literature, but exploits a range of different services. This realization can help to develop a more pluralistic definition of ecotourism.



The impact of social structure on open-land development preferences in the Southern Arava

Jessica Schäckermann^{1*}, Chloe Gordon-Chow¹, Avigail Morris¹, Elli Groner², Daniel Orenstein³

^{1.} The Arava Institute for Environmental Studies

^{2.} Dead Sea and Arava Science Center

^{3.} Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology

* jschaec@gmail.com

Despite the harsh climate, the Arava Valley is currently home to over 5,000 people living within 12 communities. While residents of the Arava Valley share the same environmental conditions, the social context of each of the 12 communities is unique. We examined the relationship between social structure and preferences regarding open-land development. We ask if preferences regarding development are correlated to the social structure of each community. The objective was to understand if and how social structure influences respondents' prioritization of ecosystem and environmental services in the context of open-land development. Six communities were selected for comparison based on their differences in social structure. A mixed methods approach, including semi-structured interviews and mixed fixed response/open-ended survey questions, was used to collect both qualitative and quantitative data from residents. We found that development preferences were similar across all six communities. Environmental conservation and renewable energy were consistently ranked highly important across all communities. Rather than finding differences according to social context, our findings demonstrate the shared environmental values and development preferences of residents of the Southern Arava. Other factors than the social structure seem to influence the development preferences of residents by planners.



How many passerines migrate through Israel and where do they stop to rest? Evidence for

dramatic decrease in the amount of passerine migration

Inbal Schekler^{1*}, Jeffrey J. Buler², Jaclyn A. Smolinsky², Yuval Werber¹, Felix Liechti³, David Troupin¹, Nir

Sapir¹

- ^{1.} University of Haifa
- ^{2.} University of Delaware
- ^{3.} Felix Liechti, Swiss Ornithological institute

* goldinbal@gmail.com

During bird migration, the availability and quality of stopover sites are crucial for the survival of the migrants. Yet, our knowledge of bird stopover distributions in our region is very limited. Using weather radars, we quantified large-scale bird departure patterns. We found that bird distributions differed between the seasons and highlighted the important areas for conservation. We also point the factors that affect this distribution like artificial light at night that strongly attracted migrants. Changes in the quality of stopover sites can cause changes in the amount of migrating birds. Thirty years ago, two radars were deployed in the desert of Israel. These radars provide the only comprehensive information we have until today regarding the properties of bird migration in this region, which is part of a large migration flyway. In the last two years, we deployed two radars in the same localities for comparing the number of birds that migrate in this region nowadays and 30 years ago. Our findings are very concerning, estimating a decrease of about 70% in the number of migrants over the last 30 years. Our results substantially advance the understanding of bird migration ecology and facilitate informed conservation efforts in a highly populated region.



A review of geospatial technologies for improving marine spatial planning: challenges and

opportunities

Inbar Schwartz Belkin^{1*}

^{1.} Technion - Israel Institute of Technology

* inbar.sch@campus.technion.ac.il

Common marine spatial planning challenges include lack of data on the marine environment, high mobility of both animals and humans, and plan implementation challenges including lack of enforcement and compliance with regulations along with monitoring deficiencies. These can be potentially addressed using geospatial technologies (GTs) such as remote sensing, GPS and GIS. This research presents geospatial tools that are available for the process of developing, implementing, and monitoring marine spatial plans. Tools include satellites and water-based platforms carrying various sensors and receivers for environmental ocean data, vessel tracking and animal telemetry via multispectral, acoustic, radar, and other means. Planners and ocean managers might not always be aware of technological solutions available for the development and implementation of marine spatial plans. Here, urgent planning needs, summarized from various publications, are linked to GTs solutions published in relevant literature between the years 2015–2020. The GTs were used for data collection, dynamic human activities' management, environmental monitoring and enforcement, all as required by marine spatial plans. This paper concludes with insights into GT solutions that can enhance the process of evidence-based management and spatial planning in marine environments.



Evaluation of bat activity and diversity in three habitats of Wadi Shita

Nitzan Segev^{1*}, Nofar Basil²

- ^{1.} Dead Sea and Arava Science Center
- ^{2.} Arava Institute for Environmental Studies
- * <u>Nitzan@adssc.org</u>

Bats are an integral part of the desert ecosystem. Various factors affect the level of activity, foraging, and habitat preference. We used an echolocation detector in order to monitor the biodiversity and activity levels of bats in different habitats in LTER station "Wadi Shita". The objective was to understand habitat preferences regarding the dry channel order and the presence of the main road 90. We found nine different bat species, including rare species. The highest activity levels and species richness and almost all of the foraging activity were measured in the main channels, characterized by the highest acacia tree density. Our results emphasize the role of acacia trees' environment as food suppliers for bats. In addition, the road appears to have a negative impact on bat activity. There was a decrease in the number of bat recordings as the plot was closer to the road. This initial survey proves the Wadi Shita is a good platform for further research and conservation of desert areas with diverse bat species.



Conservation planning of the Israeli exclusive economic zone: meeting global conservation

targets where development is rapidly growing

Ateret Shabtay^{1*}, Amir Dani², Ben-Lamine Emna³, Bialik Or⁴, Gal Gideon⁵, Gertman Isaac⁵, Giakoumi

Sylvaine⁶, Goren Liron⁷, Guy-Haim Tamar⁵, Tal Idan⁸, Karniel Tzeela², Makovsky Yizhaq⁴, Neuman Adi⁴,

Ofir Eyal⁵, Rothschild Alon¹, Rubin-Blum Maxim⁵, Slavenko Alex⁹, Stern Nir⁵, Zurel Dror¹⁰

- ^{1.} Society for the Protection of Nature in Israel
- ^{2.} Dani Amir Environmental Planning LTD
- ^{3.} UCA UMR ECOSEAS, Université Côte d'Azur, France
- ^{4.} Strauss Department of Marine Geosciences, Leon H. Charney School of Marine Sciences, University of Haifa
- ^{5.} Israel Oceanographic and Limnological Research, Haifa
- ^{6.} Zoological Station "Anton Dohrn" Department of Integrative Marine Ecology, Sicily Marine Centre
- ^{7.} Steinhardt Museum of Natural History and School of Zoology, Tel Aviv University
- ^{8.} School of Zoology, Tel Aviv University and Department of Biomolecular Science, The Weizmann Institute of Science
- ^{9.} Fenner School of Environment & Society, College of Science, The Australian National University
- ^{10.} Israel Ministry of Environmental Protection
- * aterets@spni.org.il

The need to balance conservation and development is acknowledged globally and initiatives to protect 30% of marine territories are multiplying. In the Israeli exclusive economic zone in the Mediterranean Sea, development is rapidly growing while conservation policy has not been established yet. The SPNI, initiated and designed a marine conservation planning process following the best-known planning approaches and practices. The goal is to design an MPA masterplan, that covers representative and unique habitats in 30% of the EEZ. The process included habitat classification performed using data analyses and modelling of faunal distribution. Then, decision-support tools were used for spatial conservation prioritization, and for examining spatiotemporal ecosystem dynamics. Finally, wide consultation with experts and stakeholders navigates the entire process to establish transparent, evidence-based recommendations, and publicly supported masterplan. Despite previous conceptions regarding low habitats' diversity in the EEZ, we demonstrate that variability do exist, and suggest alternative basis for planning and management in the area. The results bind the promotion of spatial protection in the EEZ, and reconsidering future development there. The masterplan can also be used to direct research efforts to underexplored areas of the deep sea. These can add data for plan's updates and adjustment to changing realities.



Exploring the food system-zoonotic risk interface using scenario analysis

Alon Shepon^{1*}, Tong Wu, Claire Kremen, Tamar Dayan, Ivette Perfecto, Jessica Fanzo, Gidon Eshel, Christopher D. Golden

^{1.} Department of Environmental Studies, Tel Aviv University

* alonshepon@tauex.tau.ac.il

The unprecedented economic and health impacts of COVID-19 pandemic have shown the global necessity of mitigating the underlying drivers of zoonotic outbreaks, which occur at the human-wildlife/domesticated animal interface in spillover events. Spillover events are associated with higher habitat fragmentation, biodiversity loss through land use change, high livestock densities, increased agricultural inputs, and wildlife hunting and farming - all facets of food systems. As such, the structure and characteristics of food systems can be considered key determinants of modern pandemic risks. This means that emerging infectious diseases should be more explicitly addressed in food systems discourse in order to mitigate the likelihood and impacts of zoonotic outbreaks. Here, we adopt a risk analysis and qualitative scenario framework to highlight the myriad connections between food systems, zoonotic diseases, and sustainability. We identify two overarching dimensions - the extent of land use for food production and the agricultural practices employed - that shape four archetypal food systems, each with a distinct risk profile with respect to zoonotic spillovers and differing dimensions of sustainability. Our analysis sheds light on a hitherto but increasingly important dimension of food system transformation, calls for which increasingly abound. We detail the implications of our findings for advancing sustainable development while reducing zoonotic spillovers, highlighting future research directions.



Eastern Mediterranean habitat classification using sonar images – a novel technique for the

study of habitat-species interactions

Ole Johannes R. Soerensen^{1*}, Itai van Rijn¹, Dan Tchernov¹, Yizhaq Makovsky²

^{1.} Morris Kahn Marine Research Station, Department of Marine Biology, Leon H. Charney School of Marine Sciences, University of Haifa

^{2.} Strauss Department of Marine Geosciences & Hatter Dep. of Marine Technologies, CSMS, University of Haifa

* ole.johs.sorensen@gmail.com

Habitat-species interactions shape fish communities, and therefore are a critical component for efficient resource management, conservation efforts and coastal planning. At a local scale, structural traits such as reef complexity, can create preferable niches for individual fish. In parallel, wider-scale traits such as habitat connectivity, corridors or fragmentation, are likely to affect species` populations and the overall fish community. Therefore, characterizing species-habitat interaction requires a multi-scale approach. In this work we'll be addressing both local and wide-scale habitat traits by developing novel techniques for habitat classification using high-resolution Synthetic Aperture Sonar (SAS) and bathymetry layers. Three major applications are developed: (1) The SAS images provide divers with a map such that divers can precisely identify their location at the reef in-situ. (2) The bathymetry layer allows us to identify the full gradient of various complexity indices – at multiple scales, and (3) the classification scheme allow us to calculate ecological functions at multiple scales. We will use Eastern Mediterranean fish communities as a study case from which we will develop a general framework for future studies of habitat-species modeling in other marine environments.



What influences shifts in urban nature site visitation during COVID-19? A case study in Tel

Aviv-Yafo, Israel

Michelle Talal^{1*}, Michal Gruntman¹

^{1.} Department of Environmental Studies, Tel Aviv University

* michelle.talal@gmail.com

Urban nature sites are crucial places for the promotion of human health and well-being during the COVID-19 pandemic, but there are few interdisciplinary studies that simultaneously investigate the impact of a range of social and environmental factors on potential shifts in urban nature site visitation. We sought to do this by analyzing both geospatial data of the amenities and environmental features of urban nature sites with a web-based survey of urban nature site visitation in Tel Aviv-Yafo, Israel. We found that 53% of surveyed participants decreased visitation during the pandemic, while 26% increased visitation, 21% had no change, and only 1.7% were first-time visitors of urban nature sites. We developed a multiple linear regression model for shifts in visitation frequency during the pandemic, and found that a relative increase was positively associated with higher ratings of the physical and mental health contribution of the urban nature sites, higher nature maintenance and accessibility ratings, and visiting with a spouse, but negatively associated with variables such as car transportation and visit length. Our results suggest that the perceived health benefits and accessibility of urban nature sites could be key in motivating visitation during the pandemic more than specific environmental features or amenities.



Applied use of remote sensing for biological conservation

Asaf Tsoar^{1*}, Edna Guk¹

^{1.} Israel Nature and Parks Authority

* tsoar@npa.org.il

Remote sensing is widely used in ecology and biological conservation. In recent years, data has become accessible cheaper and better. In this talk I will briefly present different projects done by the INPA and how I see the future of remote sensing as a basic monitoring tool within protected areas. I will also talk about the limitations of current work with academic researchers and how we can overcome those difficulties. In the talk I will give an example of a remote sensing project to map illegal Pot farms (Cannabis farms) in the Negev desert some within nature reserves. These Pot farms cause significant damage to protected areas. By remote sensing we were able to correctly identify these pot farms with an 80% accuracy. We used the temporal change in the NDVI over time. Where we expect that in the desert climate, only cultivated areas are expected to have a positive change over time in the NDVI. This data can be used by the rangers to better manage nature reserves and prevent the illegal use of pot farms. I will also examine the limitations of this method and how we plan to improve it in the future.



Acceleration-based remote classification of griffon vulture behaviour as a conservation tool

Gideon Vaadia^{1*}, Tal Agassi², Shimon Shahar², Orr Spiegel¹

^{1.} School of Zoology, Tel Aviv University

^{2.} Center of AI and Data Science, Tel Aviv University

* <u>Randomdude18@gmail.com</u>

Recent anthropogenic changes drive vulture populations worldwide, including the Israeli griffon vulture (*Gyps fulvus*) to a rapid decline. one of the major threats for vultures is poisoning, making identifying foraging areas critical for their conservation. Yet observing in-situ feeding events remains challenging. Here we address this challenge by developing a reliable tool for remote identification of behaviours from bio-telemetry data. We tagged 104 griffons using GPS/GSM transmitters with tri-axial accelerometers. Then, we trained a Random-forest algorithm with data from 34 individuals (14 captive & 20 wild) to classify accelerometer measurements into six behavioural classes (Eating, Soaring, Flapping, Lying-down, Standing and Ground behaviours). We validated the algorithm both by data-splitting into training/test sets and against real-life GPS data. Comparing the feeding behaviour of wild griffons (n=20) from three age classes (juvenile, subadult and adult) we found that juveniles feed more frequently and spend more time feeding than the other age groups. This suggests that juveniles may be at higher risk of poisoning and should be prioritized for tracking. Further, this classification may improve the real-time alert system used to flag suspicious landing sites for local rangers, thus demonstrating the potential of accelerometer-based behavioural identification as a conservation and research tool.



COVID-19 effects on large mammals in urban centres in North America

Reut Vardi^{1*}, Oded Berger-Tal², Uri Roll²

¹ School of Zoology, Tel Aviv University

² Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

* reutvardi@gmail.com

Restricted human activity during the COVID-19 pandemic raised global attention to the presence of wildlife in cities. Here, we analyzed iNaturalist observations of prominent wildlife species around North-American urban centers, before and during the COVID-19 pandemic outbreak. We suggest that the popular notion of 'wildlife reclaiming cities' may have been exaggerated. We found that while pumas ventured deeper into urban habitats during the COVID-19 pandemic, bears, bobcats, coyotes, and moose did not. Species differential behavioral responses may highlight their evolutionary history cohabiting human habitats. Nevertheless, our results highlight the importance of urban nature for people during the pandemic, as well as the great potential of citizen science data. Our insights could help manage urban wildlife, better plan greenspaces, and promote positive nature engagements.



Assessing the contribution of cities to regional biodiversity – insights from a large-scale

systematic bird survey across urban, rural, and natural areas

Lior Ventura^{1*}, Diederik Strubbe², Assaf Shwartz¹

^{1.} Faculty of Architecture and Town Planning, Technion - Israel Institute of Technology

^{2.} Department of Biology, Ghent University

* <u>lior.ventura@gmail.com</u>

Urbanization is a major driver of biodiversity decline globally, although studies indicate that cities can retain considerable biodiversity. Yet, we still lack understanding of the relationship between urban biodiversity and the regional species pool, information crucial for planning cities that optimize contribution to nature conservation. We carried out an extensive bird point-count survey across a 300 km2 region that includes a major metropolitan area, Tel-Aviv District, and adjacent agricultural and natural land. 2,166 points were surveyed, randomly located across the region, during spring season of 2021. Overall, the species pool of urban and non-urban areas was surprisingly similar, with an 80% overlap. Local species diversity was similar in points located in open, agricultural, built-up, and urban park areas. Local richness was highest in urban parks, but this is largely attributed to high richness of synanthropic species. Turnover among points was lowest among urban points and was positively correlated with cover of low vegetation. Our results suggest cities are not necessarily species leads to increased homogenization. Non-synanthropic species may benefit from incorporating certain habitat features, such as low vegetation, in urban green space design.



Assessment of plastic pollution in the tropical coral reefs of Eilat, a highly touristic city in the

northern tip of the Red Sea

Gal Vered^{1,2*}, Noa Shenkar^{1,3}

- ^{1.} School of Zoology, Tel Aviv University
- ^{2.} The Interuniversity Institute for Marine Sciences (IUI)
- ^{3.} The Steinhardt Museum of Natural History, Israel National Center for Biodiversity Studies, Tel Aviv University
- * galvered1@mail.tau.ac.il

Coral reefs provide a wide variety of biodiversity and ecosystem goods and services that benefit society, from food security and coastal protection to novel drug sources. However, climate change, ocean acidification, and ongoing anthropogenic stressors put these unique ecosystems at existential risk. The present study examined benthic large plastic debris, plastic particles smaller than 5mm, and plastic-associated chemicals in corals, bottom seawater, and sediment from the Gulf of Aqaba/Eilat, the Red Sea. The occurrence of benthic plastic debris down to 100 meters deep was quantified by underwater surveys during 2020-2021, and analysis of transect images from 2016-2018. The Nature Reserve showed significantly less debris compared to areas out of the reserve featuring high touristic facilities. Assessment of plasticizers in sediment and bottom seawater revealed limited levels in most sites with higher concentrations in the Eilat Marina. Moreover, dibutyl phthalate, one of the analyzed plasticizers, was found at significantly higher concentrations in the branching coral *Stylophora pistillata* compared to its surrounding water and sediment, and to the massive coral *Favites abdita*. Results of the current study provide a detailed baseline necessary for establishing effective preservation policies and strategies for plastic pollution management in the region.



Building a Systematic Conservation Plan for Israel's land vertebrates, challenges and promises

Enav Vidan¹, Yoram Yom-Tov², Uri Roll¹

¹ Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

² School of Zoology, Tel-Aviv University

* enavidan@gmail.com

Systematic conservation planning is an important development in prioritizing conservation actions using sound data and methods. In Israel such approaches have been lacking to aid conservation planning in the terrestrial realm. In this work we aimed to construct a systematic conservation plan based on land vertebrates' distributions together with various Israeli land-use data. To this end we first collected distributional data from various sources for all Israeli land vertebrate species. We constructed species distribution data models for all species and compared various methods for representing species' distributions. We then constructed systematic conservation plans using different methods of representing species distribution per land-vertebrate class. Plans were constructed using the 'Prioritizr' package in R. We found that several regions in Israel – including the Israeli coastal plain, Galilee, Golan Heights, and the central Arava, have been highlighted as important regions for conservation, that are not currently well covered by the Israeli network of protected areas. We think that such approaches, as we employ here, could prove useful for Israeli conservation planning.



Conservation of extremely rare endangered plants in Israel

Margareta Walczak^{1*}, Merav Lebel Vine¹

^{1.} Israel Nature and Parks Authority

* margareta@npa.org.il

More than 50 threatened plant species in Israel are represented today by single populations. The Israel Nature and Parks Authority, together with collaborating institutions, takes measures to prevent extinction of these species by applying different strategies, according to individual features of the species and their habitat: historical and current range, population size and dynamics, statutory protection, threat level, endemism, life form, reproduction mechanisms and climatic conditions. In addition to monitoring, management, promoting conservation programs for "Hot Spots" lacking statutory protection, seeds are stored in the National Gene Bank and cultivated in botanic gardens and refuge gardens. Over the last ten years, nine critically endangered species with small and declining populations, have been reinforced, reintroduced or introduced to suitable habitats in protected areas within their range. The new populations were monitored and managed. The most successful reintroductions have been the annual *Anthemis brachycarpa* in Bitan Aharon Nature Reserve (thousands of individuals after 3 years) and the perennial *Hormuzakia negevensis* in Mamshit National Park (47% survival after 8 years from the first planting, and 41% after 1 year from the second planting). On the other hand, introduction of *Aster tripolium* in seven different sites failed. Identification of suitable microsites, appropriate propagation methods and management contributes to success.



Seasonal challenges of Rousettus bats in temperate zones

Maya Weinberg¹, Omer Mazar¹, Adi Rachum¹, Xing Chen¹, Nora Lifshitz², Gábor Á. Czirják³, Yossi Yovel^{1*}

- ^{1.} School of Zoology, Tel Aviv University
- ^{2.} Amutat Atalef, NGO
- ³Leibniz Institute for Zoo and Wildlife Research, Berlin
- * mayababa@gmail.com

To examine the challenges faced by free-ranging *Rousettus aegyptiacus* living at the northern edge of their distribution, we performed a retrospective analysis of 2196 clinical cases reported by a bat rescue NGO over 36 months, from all over Israel. All cases of injured bats were evaluated and categorized according to date, place, sex, age, and etiology of the morbidity. The analysis of the data showed an increase in all types of morbidity during the wintertime, with more than twice the number of cases in comparison with the summertime, over three consecutive years. Moreover, we found that the number of abandoned pups peaks during spring till autumn when adult morbidity is minimal. We characterized two prominent types of previously undescribed morbidity in *R. aegyptiacus*, one in the form of bacterial illness, and the other associated with feet deformation in addition to major anthropogenic-related threats related to synanthropic predators. We further used GPS tracking to monitor the movement and foraging of dozens of bats and examine the causes of elevated winter morbidity. We hypothesize that *R. aegyptiacus*, a fruit bat of tropical origin, is facing major seasonal difficulties near the northern edge of its distribution, probably limiting its further spread northward.



Predicting the combined effects of warming and nutrient increase on the tropical seagrass

Halophila stipulacea

Gidon Winters^{1,2*}, Pedro Beca-Carretero^{1,3,4}, Tom´as Azc´arate-García^{1,5,8}, Mirta Teichberg^{6,7}, Priyanka

Patra¹, Farhan Feroze¹, Maria J. Gonz'alez³, Isabel Medina³,

^{1.} The Dead Sea-Arava Science Center

^{2.} Ben-Gurion University of the Negev

^{3.} Department of Oceanography, Institute of Marine Research (IIM-CSIC)

^{4.} Department of Theoretical Ecology and Modelling, Leibniz Centre for Tropical Marine Research,

^{5.} Institute of Marine Sciences (ICM-CSIC)

^{6.} Leibniz Centre for Tropical Marine Research (ZMT)

^{7.} The Ecosystems Center, Marine Biological Laboratory

^{8.} Department of Evolutionary Biology, University of Barcelona

* wintersg@adssc.org

Famous for its coral reefs, the Gulf of Aqaba also supports extensive seagrass meadows, dominated by *Halophila stipulacea*. Nutrient loading and warming are considered the biggest threats to seagrass meadows, and their combination can potentially amplify their negative effects. We exposed two seagrass populations with different eutrophication "history" to control (27°C) and simulated warming (31°C), with and without nutrients (20 µg DIN). While exposure to only thermal stress favoured growth, eutrophication only reduced Fv/Fm and growth but favoured algae proliferation. Combined effects negatively enhanced seagrass performance with the highest mortality rates observed after four weeks of combined exposure. Negative effects of combined stressors were stronger in populations with low eutrophication "history". Lipidomic analyses showed stress decreased ratios of fatty acids 16:3n-3/16:2n-6 and 18:3n-3/18:2n-6 with bigger declines in these ratios following exposure to the interaction of both stressors. The GoA's waters are warming faster than the average of the world's coastal warming trends. While it might be difficult to directly control the effects of global warming, sources of eutrophication are usually on local scales. For seagrasses to survive climate change, managers must put efforts into limiting other stressors such as eutrophication which would reduce the resilience of meadows to other stressors.



Israel's nature past and future and the need for a systematic conservation approach

Yoram Yom-Tov^{1*}

¹ School of Zoology, Tel-Aviv University

* yomtov@tauex.tau.ac.il

Israel has undergone major changes in the past 150 years. These changes included a dramatic increase in its human population and standard of living. Consequently, Israel's landscape has also been transformed with greater urbanization, intensification of agriculture, afforestation, increase in road density, pollution, poaching, and importantly loss and fragmentation of natural habitats. In turn, these changes had negative effects on Israel's wildlife during this period. Many local species' populations have been adversely affected due to habitat loss and fragmentation, unsustainable hunting and poaching, competition and predation by invasive and commensal species, and mortality in road accidents. Israel human population is projected to double by the middle of the 21st century greatly intensifying human's pressures on wildlife and natural systems. Hence, there is a dire need for a systematic approach to protect Israel's unique nature to safeguard its persistence for generations to come.



3D imaging reveals coral reef resilience; lessons from a shallow coral reef

Matan Yuval^{1*}, Naama Pearl¹, Opher Bar-Nathan¹, Dan Tchernov¹, Yossi Loya², Avi Bar-Massada³, Tali

Treibitz¹

^{1.} University of Haifa, Israel

^{2.} School of Zoology, Tel Aviv University

^{3.} University of Haifa

* mtnyvl@gmail.com

The fringing reefs of Eilat have experienced an extreme weather event in the year 2019- the most powerful storm in the region in over five decades. However, the amount of damage is hard to quantify because this system is intricate, complex, and open. Recently, photogrammetry has emerged as a superior method for coral reef surveys and 3-Dimensional (3D) mapping. Here, we employ photogrammetry and automated multivariate geometrical analysis to study the impact of the storm on coral reef dynamics. Our dataset contains 21 3D models at seven sites: before, immediately after, and 2 years after the storm, depicting the demise and recovery of the reef's structural complexity. We developed novel algorithms for fractal dimension calculation- measuring structural complexity at several spatial scales. This enables us to answer questions such as: what are the scales that were most affected by the storm and on what scale is recovery occurring? Altogether, we present a novel workflow and a one-of-a-kind study on coral reef resilience, i.e., the capacity of an ecosystem to recover from an acute disturbance.


The 3rd Israeli Conference for Conservation Science - The Steinhardt Museum of Natural History, October 2022

Wildlife behavioral responses to anthropogenic disturbances around natural water sources in

the desert

Einat Zahabian^{1*}, David Saltz¹, Oded Berger-Tal¹

¹ Mitrani Department of Desert Ecology, Ben-Gurion University of the Negev

* einatza@post.bgu.ac.il

In desert ecosystems, water is a critically limiting factor for both wildlife and humans, which can result in human-wildlife conflict. We examined the effects of human disturbance around water sources in the Negev desert on medium-large mammals and birds. We placed motion-activated camera traps at ten natural water sources with either high or low levels of human visitation. We found that high human disturbance reduced mammal and bird abundance at the water sources. Furthermore, next to the highly disturbed water sources, there was little overlap between the activity times of humans and other mammals, with mammals arriving before or after humans' activity hours. Interestingly, the mammal's activity at a distance of ~500 m from the water source showed a similar pattern, even though there were no humans at these sites. This suggests that the impact of high disturbance next to desert water sources on mammals' behavior extends far beyond the water source itself.



The 3rd Israeli Conference for Conservation Science - The Steinhardt Museum of Natural History, October 2022













