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CCME 2016 Conference

Compassionate Conservation Middle East @ Hatzeva Dead Sea Arava Research Station



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Compassionate Conservation Middle East Conference 2016

Schedule and Abstracts

Compassionate Conservation Middle East

Schedule

Thursday 8th Dec 2016

18:45 Dinner at the Visitor Center

19:45 Welcome

20:00 Keynote Speech by David Salz

The value of reintroductions as a conservation tool: ungulates in Israel

Friday 9th Dec

07:30 Breakfast

08:40 Shirli Bar David

Non-invasive population monitoring of Asiatic Wild Ass: generating spatial, behavior and genetic information

09:00 Shevy Waner

Road-kills of Asian wild-asses in Israel – possible causes and thoughts to reduce

09:20 Liv Baker

The ethics of wildlife reintroductions for conservation

09:40 Overview of conservation projects in Jordan

10:00 Coffee break

10:20 Plenary by Daniel Ramp

Compassionate Conservation: Reshaping conservation in the Anthropocene

11:00 Amir Balaban

Compassionate conservation management for the mountain gazelle - yes, but do we have time?

11:20 Amit Dolev

Management of overabundant jackal populations in Northern Israel: is sanitation an effective tool?

11:40 Alon Reichman

Wolf population dynamics and management in the north of Israel

12:00 Lunch

13:00 Dror Ben-Ami

Compassionate Conservation in Israel

13:20 Lisa Kubotera and Shira Yashphe

Compassionate Conservation Middle East

- Living with wildlife: integrating animal welfare into conservation policy
- 13:40 Uri Shanas
Why conflicts with wild boars are on the rise?
- 14:00 Oded Keynan
Using compassionate conservation methods in a long term study of birds and what can we learn from it
- 14:20 Coffee break
- 14:40 Anton Kalilieh
Avifauna of the occupied Palestinian territories
- 15:00 Boaz Shacham
Let go of that snake! Dilemmas and possible answers when trying to conserve nature by educating the public.
- 15:20 Leon Blaustein
Compassionate approaches for the conservation and protection of Fire Salamanders
- 15:40 Arian Wallach
Global distribution and conservation status of Israel's migrant species
- 16:00 Coffee break
- 16:20 Eli Groner
The Long Term Socio-Ecological Research (LTSER) site of the Arava
- 16:40 Nitzan Segev
The effect of oil spills on the ecology of Evrona
- 17:00 Gavin Bonsen
'Landscapes of fear' and their cascading effects through the ecosystem
- 17:15 Banan Al Sheikh
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- 17:30 Discussion
- 18:15 End

Abstracts

(In alphabetical order – by presenter)

Wolf population dynamics and management in the north of Israel

Alon Reichman

Israel Nature and Park Authority

In the 1980's, observations of wolves in the Golan were very rare, but since 1993 there has been an increase in the number of observations. Parallel to this increase there has also been an increase in livestock predation by wolves. The increase in livestock predation led to many poisoning events that cause serious damage to vulture and hyenas population in the Golan. There is also a concern that the increase in the number of wolves will impact on the ecological system in the Golan. In the lecture I will discuss the reasons for the increased Wolf population, the efficiency of protection methods, and I will estimate the effect of wolves on the gazelle's population.

Compassionate Conservation Middle East

Compassionate conservation management for the mountain gazelle - yes, but do we have time?

Amir Balaban,
Society for Protection of Nature, Urban Conservation

Once distributed throughout the Middle East, the mountain gazelle (*Gazella gazella*) persists mostly in Israel. The population is in decline and is listed on the IUCN red list. The mountain gazelle is distributed throughout the country and faces varying gradients of disturbance depending on the geographical location. In recent years there have been particularly alarming population declines due to a number of anthropogenic disturbances such as hunting, predation, and loss of habitat.

Israel is a relatively small and densely populated country where urban, agricultural and non-developed lands overlap. Pristine lands are virtually non-existent and the peri-urban landscape encompasses much of the country, particularly in its center. The disturbances observed within the peri-urban (including urban) environment include habitat loss, predation by feral dogs, hunting and road-kill. Stringent management efforts are needed to ensure the persistence of the mountain gazelle.

The conservation of mountain gazelles within the peri-urban environment can play a crucial role in its overall conservation. Moreover, conservation of this flagship species in peri-urban environment may contribute to biodiversity conservation efforts in Israel.

Management of overabundant jackal populations in Northern Israel: is sanitation an effective tool?

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Overabundance of predators resulting from anthropogenic resources, induces damage to agriculture, promotes epidemic eruptions as rabies and threatens ecosystem integrity. Increased canid predation of cattle, sheep and mountain gazelles, invoked various management practices, including culling, calving paddocks and guard dogs. All were ineffective in reducing canids.

Our study focused on the effect of sanitation in controlling jackal densities and the effect on herbivore populations. A wide-range sanitation management has been applied in the Golan Heights since 2010, covering over 10,000 ha of cattle rangelands containing ca. 2,000 cows and several villages. About 80% of cattle carcasses are removed from the rangeland year-round. A field study was initiated in 2005, five years before sanitation began, in order to monitor the changes. We fit radio and GPS collars to golden jackals for tracking their movement and survival, and in addition jackals were counted along fixed transects. A model for jackal population dynamics predicts linear reduction in population size that is proportionally to the amount of food removed. In contrast, culling jackals presents compensation by increased jackals recruitment that leads to non-proportional reduction.

While the previous culling management was indeed ineffective in decreasing jackal densities, the wide-range sanitation within 3 years led to increased jackal home ranges and reduced jackal survival by 40% in pristine rangelands, whereas jackals inhabiting areas near villages, where human waste is available, exhibited no change in survival, and their home ranges remained very small (less than 1 km²). In addition, in 75% farms, cattle predation either decreased or remained stable, and mountain gazelle counts increased in about 20%.

A decrease in available resources invoked acute spatial and survival responses in jackals. At such large scales, full success of the process requires that sanitation will be applied in the future to most anthropogenic waste sources across the landscape.

Key words: sanitation, jackal, anthropogenic food resources, carcass

Avifauna of the occupied Palestinian territories

Anton Kalilieh

Society for Protection of Nature Palestine

As of today, the avifauna of the occupied Palestinian territories (oPt) has not been studied, based on a scientific approach, at the national level by any organization or institute. The extant lack of comprehensive scientific information about the birds of Palestine is a consequence of many factors; including the shortage of specialized Palestinian ornithologists, birdwatchers and birders, the lack of dedicated institutes or organizations that focus on the avifauna of oPt, and the restrictions on the movement of Palestinian researchers posed by the Israeli authorities. Despite these limitations, and based on literature review and unsystematic field survey, the number of bird species that expected to be recorded within the oPt is about 370 species. These species represent 21 orders, 69 families, 21 subfamilies, and 173 genera. The largest numbers of species are from three orders: the Passeriformes with 146 species, the Charadriiformes, with 65 species, and the Accipitriformes, with 31 species. The families with the largest number of species are Sylviidae with 34 species, Turdidae with 32 species, and Accipitridae with 31 species. Some of the species were recorded almost two centuries ago and never recorded again in Palestine such as the Whooper Swan. The birds of the oPt can be divided into two main categories, the first of which includes resident breeders and summer-visitor breeders, whereas the second comprises non-breeding species that include winter visitors, passage migrants, and vagrants. Several species became extinct such as the Brwon fish Owl, others are declining in numbers and should be included at the national redlist, such as the Golden Eagle, Bonelli's Eagle, and Spectacled Warbler. Since birds are among the most mobile animals on earth and do not know borders, regional collaboration is a must in order to study and to conserve these species.

Global distribution and conservation status of Israel's migrant species

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Biotic globalisation is a hallmark of the Anthropocene. The rise of 'migrant species' ('invasive species') has been greeted with alarm, in part because some populations have contributed to declines of local species, but also because they have come to represent anthropogenic change. Invasion Biology has grown out of this paradigm, and calls for suppressing and eradicating migrant species. This call is increasingly heeded in Israel. We therefore thought it timely to conduct a review of Israel's migrant species (IMS), from a counter perspective – Novel Ecosystems – that considers the values of biotic globalisation. IMS are taxonomically and geographically diverse. They include 201 plants and animals that have immigrated into Israel from across the globe; and 123 Israeli species that have emigrated to every bioregion. The conservation values of IMS are understudied, but potentially significant: 3 immigrant species are globally threatened in their native ranges (10% of species with IUCN listings), and 71 emigrant species (58%) are locally threatened or extinct in Israel. However, the conservation status of 73% of IMS is unknown, and even the native range of 10 immigrant species (5%) is unknown. The ecological influences of IMS is varied and context-specific. Immigrant species are not considered drivers of extinctions in Israel, but some emigrants have been so implicated. In these cases, growing evidence points to other human-driven factors that drive their ecologies, including persecution of large predators and habitat loss. Following the principles of Compassionate Conservation, a new perspective of IMS could emerge that embraces their conservation values, prioritises ethical policies, and even grants them "Israeli citizenship".

Compassionate Conservation Middle East

Let go of that snake! Dilemmas and possible answers when trying to conserve nature by educating the public.

Boaz Shacham

National Natural History Collections, The Hebrew University of Jerusalem

The public debate regarding animal rights and animal welfare is well known and publicized. Humans, from the lofty heights of their anthropocentric perspective, allow themselves to decide upon the fate of millions of lives in the name of science, medicine, food and industry. Less publicized is the debate regarding the fate of animals affected directly by nature conservation efforts – within actions intended to save habitats and their wild inhabitants from local or general extinction. More often than not, the threat of that extinction is a direct or indirect consequence of human actions, with other humans attempting to remedy the situation.

Decisions to negate freedom or even the lives of living creatures are never to be taken lightly. Nevertheless, sometimes extreme actions causing the suffering of a few must be tolerated in order to save countless others, perhaps entire populations or even ecosystems. Each case must be weighed on its own merit, using compassion and logical reasoning, to reach the best possible outcome.

Even given the best intentions, intense conflicts arise between animal rights and nature conservation efforts, and conservationists are forced to take the liberty or lives of animals:

- Temporary incarceration for educational purposes;
- Collection of specimens for systematic and taxonomic studies;
- Captive animals in breeding nuclei for reintroduction programs;
- Study of natural history aspects in captive animals;
- Culling or eradication of invasive and explosive species.

In my talk I will focus on the first item – temporary incarceration of wild animals for educational purposes. I shall exemplify real life dilemmas: when are such actions justified? And suggest some potential guidelines for dealing with these situations.

Compassionate Conservation: Reshaping conservation in the Anthropocene

Daniel Ramp

Centre for Compassionate Conservation, University of Technology Sydney, Ultimo, NSW, 2007, Australia

In the newly recognised age of anthropogenic influence, now labelled the Anthropocene, questions of how we should engage with nature and how we ought to rectify our global impacts are increasingly important. There is considerable urgency needed in addressing these questions as wildlife are experiencing both unprecedented extinction rates and decline in numbers. Conflicts between people and nature are increasing in frequency as space becomes limited, while frameworks for encouraging mutualistic coexistence are lacking. Symptomatic of this, attempts to design and implement projects to address conservation concerns have been subject to considerable backlash worldwide because of a perceived failure to be ethically robust and transparent. Many forms of ethical approaches for conservation exist and discussion of their merit is not new, however, as the Anthropocene advances at hitherto unprecedented rates of change, conservation must also advance to remain applicable to societal and ecological knowledge. Problematically, the various forms conservation has taken since its inception are not always in support of one another. This has given rise to three major tensions around aims, methods, and values in conservation. One axis of tension is whether conservation aims are best driven by intrinsic or utilitarian values; a second tension is between concern for individuals and ecological collectives; and a third is between the views that we should aspire towards restoring an historic benchmark or else allow biotic communities to change with the times. In this talk I highlight how these tensions are paralysing conservation programmes around the world. In doing so I outline the case for compassionate conservation as a scientifically-robust, practical, and inclusive model for future-proofing conservation in the Anthropocene.

The value of reintroductions as a conservation tool: ungulates in Israel

David Saltz

Swiss Institute for Desert Energy and Environmental Research, Ben-Gurion University of the Negev, Israel

Relative to other conservation-oriented endeavors reintroductions are both hi-risk and hi-cost. Reintroductions can be justified on the basis of both the intrinsic value and the pragmatist philosophical approaches in conservation; however the latter requires “hard evidence”. I review the conservation benefits obtained from the ungulate reintroduction program in Israel. These benefits can be divided into three types:

(1) Reintroductions can be viewed as part of ecosystem restoration. We have demonstrated that several of the reintroduced species fulfill key functions in the ecosystem that in their absence would lead to a significant decline in biodiversity. These functions could not be compensated for by other extant species, including ungulates.

(2) Reintroduced species are often both umbrella and flagship. Thus, their successful establishment and needs for future range expansion can be used to secure land for conservation. Successfully reintroduced populations also offer an excellent opportunity to study habitat selection and range expansion. We used these attributes to project the reintroduced populations’ range expansion and prioritize areas for conservation. We then used this evidence to prevent land development and secure areas for conservation.

(3) The contribution that reintroduction programs can make to the sciences of general and applied ecology has been previously outlined. In Israel studies of reintroduced populations demonstrated the validity of population growth-projection models, the impact of age structure and sex ratio in small populations on their dynamics, the susceptibility of social organisms to conspecific disruption, potential impact of global change, and the impact of the founder effect on genetics.

Compassionate Conservation in Israel

Dror Ben-Ami

Tel Aviv University

Israel is a small country where urban development, agricultural lands, and nature reserves are within close proximity, causing increased human wildlife conflict. In addition, non-native wildlife species are increasing their range within Israel and excluding endemic species, and some endemic species are exploiting altered environments to the detriment of others. Whilst traditional conservation management methods tend to be harmful, in Israel there is a strong movement towards animal protection that includes both animal welfare and animal rights. Israel's population has one of the highest proportions of vegetarians and vegans in the world. Thus, compassionate conservation can be an appropriate conservation management tool for bridging conservation management and animal protection concerns. There are already a number of conservation projects in Israel that imbue compassionate conservation principles on an intuitive basis, but not through a formal process. Examples include conservation management research that is practiced with predators, primarily in terms of limiting food supply. The results in favour of this non-invasive approach are mixed. Non-lethal management of water-ways herbivores is also being explored. Human wildlife conflicts are being addressed in the protection of livestock with limited success. Owls are utilised in pest management of agricultural fields; and fish farms are being protected from cormorants using a mixture of non-lethal deterrents and alternative feeding stations with some success. Taken together, the already existing conservation projects and evolving social values, show that there is ample potential in Israel to develop compassionate conservation.

Compassionate Conservation Middle East

The Long Term Socio-Ecological Research (LTSER) site of the arava

Elli Groner

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One of the best ways to study the changes in ecosystems is to follow changes over a long time. The International Long Term Ecological Research (LTER) network has been doing this for decades. In Israel there are 10 LTER sites. Amongst them the Arava LTER site is one of the newest. It aims to monitor ecological changes over decades and to relate them to climate change and human impact. In Samar sand dunes, this has been done for over a decade. The acacia trees has also been monitored for over a decade. These initiatives are put together into a program of long term monitoring in the Arava. The Arava LTER is also collaborating with Jordan and Palestine LTER sites. We also include the socio element in the site and turn it into an Long Term Socio-Ecology Research platform (LTSER) as is done in some of the European sites.

'Landscapes of fear' and their cascading effects through the ecosystem

Gavin Bonsen¹, Daniel Ramp¹, Oded Keynan², Dror Ben-Ami^{1,3}, Arian D. Wallach¹

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The important ecological roles of large (apex) predators are becoming increasingly exemplified around the world, particularly in North America and Australia. Sitting at the 'top of the food chain', apex predators induce top-down effects on ecosystems by controlling prey and mesopredator populations, which creates knock-on effects to other trophic levels. Trophic cascades studies are revealing strikingly similar patterns in different systems. For example, in Australia dingoes suppress foxes, just as wolves control coyotes. These 'trophic cascades' don't solely occur as a result of direct mortality from predation, but also from the perceived risk – or fear – of predation. By measuring fear responses of prey animals, including spatial and temporal use of habitat relative to predation risk, we are able to produce geographical maps depicting 'landscapes of fear' for different species. Israel provides a unique opportunity to test these interactions in a unique context by extending trophic cascades to humans. Areas of human conflict, such as minefields and militarised areas, potentially provide sanctuaries for wolves because they exclude humans (that often kill wolves). By the same token, areas that are dangerous to wolves may be safer for mesopredators such as jackals. I aim to investigate how these landscapes of fear cascade to shape ecosystems in Israel.

Compassionate Approaches for the Conservation and Protection of Fire Salamanders

Leon Blaustein¹, Ori Segev¹, Shirli Bar-David^{1,2} and Alan Templeton¹

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²Mitrani Center for Desert Ecology, Blaustein Institutes for Desert Research, Ben Gurion University, Sede Boqer Campus

The fire salamander, *Salamandra infraimmaculata*, is considered an endangered species in Israel and near-threatened worldwide. For the past two decades, our laboratory has sought ethical sampling methods to protect individuals and populations of *Salamandra* as well as other amphibian species. To “mark” individuals for estimating dispersal and population size, we use non-invasive individual-specific markings - i.e., photographs - of larvae and adults. We demonstrated that exotic *Gambusia affinis* is not necessarily a better solution for mosquito control than *Salamandra* larvae but that mosquitofish also has extreme negative effects on *Salamandra* larvae. We identified breeding-site characteristics that support larger salamander populations. For population genetics studies, we take minimal sized tail tips from adults for microsatellite data. For gene expression studies, conventionally, the entire individual has been sacrificed. We demonstrated that by taking only a small tail tip section, we could adequately follow gene expression. We additionally demonstrated that tail tip removal does not affect survival, time to or size at metamorphosis. We documented high road kill rates at specific breeding sites. We sterilize boots and sampling gear to prevent potential disease spread. We use the obtained results for implementing or recommending conservation of individuals and populations – e.g., identifying movement corridors for reaching breeding sites and dispersal; adequate breeding site construction, identifying roadkill hotspots for recommending under-road tunnels; utilizing population genetic structure for recommending management units; information on demography and genetic diversity to identify hot spots for conservation; removal of *Gambusia* for amphibian protection and using *Salamandra* larvae for natural mosquito control.

Living with wildlife: integrating animal welfare into conservation policy

Lisa Kubotera and Shira Yashphe
Columbia University

Compassionate Conservation is an emerging field which advocates the consideration of individual animal welfare within the context of conservation, so as to promote species survival even while minimizing individual suffering. The struggle to meet human needs, to conserve biodiversity and to protect ecosystems, as well as the individual needs of its members, necessitates a multidisciplinary, multifaceted approach, incorporating aspects such as conservation biology, ecology and animal welfare, as well as environmental policy and economics. Policy makers have the tools to translate theory to practice, however awareness and careful consideration of all stakeholders involved is key to any successful policy. The positive effects of thoughtful and robust policy design would be demonstrated through the introduction of coyote management program case studies in California and Canada. Examination of these case studies would emphasize how policies incorporating Compassionate Conservation concepts could promote the moral treatment of animals, whilst also proving to be economically and socially beneficial.

Conservation, translocations and why individuals matter

Liv Baker, PhD

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Self-interest has often motivated people to relocate free-ranging animals. Translocations of threatened species now account for the majority of relocation events. Translocation, in fact, is in the recovery plans for most at-risk species. Translocation success rates, however, are as low as 15-20%; with mortality as high as 50-95%. If not death, translocated animals can suffer from injuries, disease, cognitive impairment, and reproduction depression. Even as we become aware that the typical translocation is a threat to an animal's welfare and life, it has taken longer to acknowledge that the process conflicts with the conservation goals of the practice.

In the face of habitat destruction and rapid loss of species, how can conservation interventions better prevent suffering and protect species? Translocation biology offers an important opportunity to establish a working interface between conservation and animal welfare. Because translocation encompasses direct care and management of individuals along with concerns for population and species health, it highlights that attention to individuals is integral for improved welfare and species recovery.

The stressors of translocation events differentially affect individuals because of varying personality and coping ability. In a study with endangered kangaroo rats we identified a range of personality types. Personality was predictive of stress response and survival post-release. Kangaroo rats that exhibited longer-term survival exhibited greater adaptive behaviors, whereas individuals who died early were highly reactive and routinized. Knowing how to manage personalities will help us anticipate and reduce the negative impact on individuals and determine how successfully a translocated population may be established.

The effect of oil spills on the ecology of Evrona

Nitzan Segev^{1,2}, Elli Groner¹

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In December 2014, 5 million liter of crude oil spilled in to the Evrona nature reserve.

The oil was removed with the soil that absorbed it out side of the nature reserve, but not inside it. A similar oil spill occurred in 1975 in an adjacent area.

The Nature Protection Authority of Israel is examining various ways of managing the left behind contaminated oil and in the meanwhile we examined the effect of the oil on the ecosystem.

The findings from the 75 survey indicates that the biodiversity of plants is similar in both control and contaminated areas. However, in the contaminated area, germination of acacia trees is lower, and the tree size parameters are smaller.

A long term monitoring has started, examining many environmental parameters, conducted by many expert scientists. The different parameters are soil, vegetation, invertebrates, reptiles, bats, rodents and birds. This monitoring is comparing the recovery of the areas with the new oil spill to unaffected areas, and to the 1975 oil spill area.

In the short term monitoring, a severe damage for the acacia trees was found only in a small percentage of the population, and the greenness of the trees wasn't influence by the oil spill, while the antlions' funnels were strongly affected by it. Contaminated trees were filmed and analyze the footage showing gazelles that feed on contaminated pods, and different activities conducted on the contaminated ground by insects, reptiles, rodents, birds and canines.

Hopefully, the results of these surveys, will provide a better understanding about the Evrona nature reserve ecology, and provide tools for the decision makers in the Nature Protection Authority, as for the conservation of this area in the future.

Compassionate Conservation Middle East

Using compassionate conservation methods in a long term study of birds and what can we learn from it

Oded Keynan

Dead Sea & Arava Science Centre

The Arabian babblers research project was established by professor Amotz Zahavi in 1971. The entire population of the Babblers (*Latin name*) in the research area is marked, and the birds are habituated to human observers. The researchers are familiar with most of the individual birds, who live in some 20 groups in the research area. The population of Babblers on Hazeva was used as the basis for development of central scientific theories in sociobiology and behavioral ecology. This long-term research uses only compassionate methods for research. Ringing is a “once in a lifetime” event for each individual and apart from it there is no capturing of birds. The researchers follow the birds with minimum interference, avoiding any stressful manipulations. Together with the compassionate research methods, the long-term study allows us to study the interactions between human development in the region (agriculture, tourism and infrastructure) and the population of babblers. By studying these interactions, and especially the way that agriculture (mainly greenhouses and horticulture) affects the survival of individuals and groups, we are trying to develop compassionate ways to prevent birds from entering the greenhouses and dying in them. These methods may be used to prevent other species of birds from entering the greenhouses, resulting in higher survival of birds while reducing damage to the crops for the farmers.

Road-kills of Asian wild-asses in Israel – possible causes and thoughts to reduce

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Roads have wide ecological effects on the landscapes that they penetrate, e.g., landscape changes and fragmentation, chemical pollution, noise affecting wildlife and road kills. The Asiatic wild ass (*Equus hemionus*) is a medium-size equid weighing approximately 200 kg. They are polygynous, males are territorial. Those not holding a territory wander around in bachelor herds. Females wander around between the males territories. Water has an important impact on the wild-ass location, especially in breeding seasons when nursing females need to drink daily.

Though once abundant in western Asia, the wild-asses are now considered to be an endangered species by the IUCN. There has been great effort to re-establish the population of wild-asses which were reintroduced to the Negev between 1982–1993 from Turkmenistan and Iran, after becoming extinct in Israel.

During 2009–2013 there have been 26 known cases of wild-ass road kills in the northern region (ca. 8–10% of the population), 61% of these were on Road 40, particularly along the 'Meishar'. Though not statistically significant (probably because of a small sample size), three main hotspots of kills were identified along this road, which are correlated to water sources such as artificial taps along the road for releasing air as well as water from underground pipes. Closures around these resources as well as additional water supplement further away from the roads, and road signs at these hotspots might be ideas worth investigating in order to reduce kills.

Non-invasive population monitoring of Asiatic Wild Ass: generating spatial, behavior and genetic information

Shirli Bar-David, Oded Nezer, Sharon Renan, Tomer Gueta, Edith Speyer, Achiad Davidson, Naama Shahaar, Gili Greenbaum, Tamar Ben-Nun, Alon Ziv, Ariel Altman, Yohay Carmel, Amos Bouskila and Alan R. Templeton

Small threatened populations are of a special concern in conservation biology. Information about their distribution, behavioral patterns and genetic diversity is crucial in order to generate management and conservation protocols. Due to their rarity, elusiveness and sensitivity it is difficult to obtain such information on small populations using conventional invasive research methods. The Asiatic wild ass (*Equus hemionus*), an endangered elusive species, was reintroduced to the Negev Desert between 1982-1993. During recent years our laboratory has used non-invasive techniques to collect information on the reintroduced population. Based on systematic field surveys of feces-mounds we developed a species distribution model which enabled the identification of preferred habitats and activity centers. We identified potential pathways, important for maintaining connectivity within the population, by surveying dung density along them as an index of pathway use. We established non-invasive genetic protocols to extract DNA from feces, and based on their genotypes we inferred the population's genetic structure and diversity. A genetic structure has evolved since reintroduction onset, probably a result of founder effects, impact of landscape features on gene-flow and the species behavioral patterns. By using non-invasive genetic data we gained insights into territorial behavior of dominant males, the role of kinship in females' social structure, and the genetic mating system of the population. We revealed a strongly polygynous mating system which might affect the population's genetic diversity, effective population size, and persistence. The non-invasive approaches developed in this study can support conservation decision making processes and can be further applied to other systems.

Why conflicts with wild boars are on the rise?

Presenting: Uri Shanas

Achiad Davidson¹, Dan Malkinson², Uri Shanas^{1,3}

¹Evolutionary and Environmental Biology, University of Haifa.

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Throughout Europe and Asia as well as in Israel, populations of wild boars (*Sus scrofa*) demonstrate a steady increase in recent decades, mostly in the vicinity of human settlements and agricultural fields. The results are increased conflicts between wild boars and humans including higher risks for the boars and increased epidemics to livestock and humans, damages to gardens and agricultural crops, and even loss of human lives. Culling wild boars is the most widespread and popular management tool throughout the world to deal with this increased conflict. It is estimated that in Europe more than 2 million wild boars are killed every year. Yet, studies show that populations of wild boars that experience high hunting pressure have shorter generation times leading to higher reproduction rates. The mechanism of this phenomenon has not been examined to date, thus favoring the culling practice to go undisturbed. In this study we hypothesize two routes, not necessarily mutually exclusive: activating the stress-reproductive axis, and the boar effect. These hypotheses are based on domesticated pigs' biology knowledge where farm pigs respond to short-term stressors with a stimulating effect on reproduction, and the boar effect, where the odor of males can advance pubertal estrus in domesticated gilts. Understanding the biological mechanisms that couple hunting with increased reproduction will help to develop new practices that negate hunting. We will discuss these possible routes and present preliminary results from our field study.